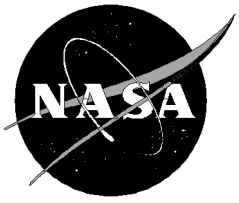
Scientific and Technical Aerospace Reports

Volume 39
June 15, 2001



National Aeronautics and Space Administration
Langley Research Center

Scientific and Technical Information Program Office

The NASA STI Program Office . . . in Profile

Since its founding, NASA has been dedicated to the advancement of aeronautics and space science. The NASA Scientific and Technical Information (STI) Program Office plays a key part in helping NASA maintain this important role.

The NASA STI Program Office is operated by Langley Research Center, the lead center for NASA's scientific and technical information. The NASA STI Program Office provides access to the NASA STI Database, the largest collection of aeronautical and space science STI in the world. The Program Office is also NASA's institutional mechanism for disseminating the results of its research and development activities. These results are published by NASA in the NASA STI Report Series, which includes the following report types:

- TECHNICAL PUBLICATION. Reports of completed research or a major significant phase of research that present the results of NASA programs and include extensive data or theoretical analysis. Includes compilations of significant scientific and technical data and information deemed to be of continuing reference value. NASA's counterpart of peer-reviewed formal professional papers but has less stringent limitations on manuscript length and extent of graphic presentations.

- TECHNICAL MEMORANDUM. Scientific and technical findings that are preliminary or of specialized interest, e.g., quick release reports, working papers, and bibliographies that contain minimal annotation. Does not contain extensive analysis.

- CONTRACTOR REPORT. Scientific and technical findings by NASA-sponsored contractors and grantees.

- CONFERENCE PUBLICATION. Collected papers from scientific and technical conferences, symposia, seminars, or other meetings sponsored or cosponsored by NASA.

- SPECIAL PUBLICATION. Scientific, technical, or historical information from NASA programs, projects, and missions, often concerned with subjects having substantial public interest.

- TECHNICAL TRANSLATION. English-language translations of foreign scientific and technical material pertinent to NASA's mission.

Specialized services that complement the STI Program Office's diverse offerings include creating custom thesauri, building customized databases, organizing and publishing research results . . . even providing videos.

For more information about the NASA STI Program Office, see the following:

- Access the NASA STI Program Home Page at ***http://www.sti.nasa.gov***

- E-mail your question via the Internet to help@sti.nasa.gov

- Fax your question to the NASA STI Help Desk at (301) 621-0134

- Telephone the NASA STI Help Desk at (301) 621-0390

- Write to:
  NASA STI Help Desk
  NASA Center for AeroSpace Information
  7121 Standard Drive
  Hanover, MD 21076-1320

Introduction

Scientific and Technical Aerospace Reports (STAR) is an electronic abstract journal, listing citations with abstracts for aerospace-related reports obtained from worldwide sources. It is electronically published biweekly and announces documents that have recently been entered into the NASA Scientific and Technical Information (STI) Database. The documents are of the following types:

- NASA, NASA contractor, and NASA grantee reports;
- Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms;
- Translations in report form;
- NASA-owned patents and patent applications
- Other U.S. Government agency and foreign patents and patent applications
- Domestic and foreign dissertations and theses.

Also included are two indexes, Subject Term and Personal Author. The Subject Term Index is generated from the *NASA Thesaurus* terms associated and listed with each document.

STAR subject coverage includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of Earth resources, energy development, conservation, oceanography, environmental protection, urban transportation, and other topics of high national priority are also covered.

Abstracts in *STAR* are categorized by 10 major subject divisions that are divided further into 76 specific subject categories. The subject divisions and categories are listed in the Table of Contents together with a note for each that defines its scope and provides any cross-references.

SCAN Goes Electronic!

If you have electronic mail or if you can access the Internet, you can view biweekly issues of *SCAN* from your desktop absolutely free!

Electronic SCAN takes advantage of computer technology to inform you of the latest worldwide, aerospace-related, scientific and technical information that has been published.

No more waiting while the paper copy is printed and mailed to you. You can view *Electronic SCAN* the same day it is released—up to 191 topics to browse at your leisure. When you locate a publication of interest, you can print the announcement. You can also go back to the *Electronic SCAN* home page and follow the ordering instructions to quickly receive the full document.

Start your access to *Electronic SCAN* today. Over 1,000 announcements of new reports, books, conference proceedings, journal articles...and more—available to your computer every two weeks.

For Internet access to *E-SCAN*, use any of the following addresses:

http://www.sti.nasa.gov
ftp.sti.nasa.gov
gopher.sti.nasa.gov

To receive a free subscription, send e-mail for complete information about the service first. Enter **scan@sti.nasa.gov** on the address line. Leave the subject and message areas blank and send. You will receive a reply in minutes.

Then simply determine the SCAN topics you wish to receive and send a second e-mail to **listserv@sti.nasa.gov**. Leave the subject line blank and enter a subscribe command, denoting which topic you want and your name in the message area, formatted as follows:

Subscribe SCAN–02–01 Jane Doe

For additional information, e-mail a message to **help@sti.nasa.gov**.

Phone: (301) 621-0390

Fax: (301) 621-0134

Write: NASA STI Help Desk
NASA Center for AeroSpace Information
7121 Standard Drive
Hanover, MD 21076-1320

Looking just for *Aerospace Medicine and Biology* reports?

Although hard copy distribution has been discontinued, you can still receive these vital announcements through your *E-SCAN* subscription. Just **Subscribe SCAN-AEROMED Jane Doe** in the message area of your e-mail to **listserv@sti.nasa.gov**.

Table of Contents

Subject Divisions

Document citations are grouped first by the following divisions. Select a division title to view the category-level Table of Contents.

A. Aeronautics
B. Astronautics
C. Chemistry and Materials
D. Engineering
E. Geosciences
F. Life Sciences
G. Mathematical and Computer Sciences
H. Physics
I. Social and Information Sciences
J. Space Sciences
K. General

Indexes

Two indexes are available. You may use the find command under the tools menu while viewing the PDF file for direct match searching on any text string. You may also select either of the two indexes provided for searching on *NASA Thesaurus* subject terms and personal author names.

Subject Term Index
Personal Author Index

Document Availability

Select **Availability Info** for important information about NASA Scientific and Technical Information (STI) Program Office products and services, including registration with the NASA Center for AeroSpace Information (CASI) for access to the NASA CASI TRS (Technical Report Server), and availability and pricing information for cited documents.

Subject Categories of the Division A. Aeronautics

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

02 Aerodynamics 1

Includes aerodynamics of flight vehicles, test bodies, airframe components and combinations, wings, and control surfaces. Also includes aerodynamics of rotors, stators, fans and other elements of turbomachinery. For related information, see also *34 Fluid Mechanics and Heat Transfer.*

03 Air Transportation and Safety 6

Includes passenger and cargo air transport operations; aircraft ground operations; flight safety and hazards; and aircraft accidents. Systems and hardware specific to ground operations of aircraft and to airport construction are covered in *09 Research and Support Facilities (Air)*. Air traffic control is covered in *04 Aircraft Communications and Navigation*. For related information see also *16 Space Transportation and Safety*; and *85 Technology Utilization and Surface Transportation*.

04 Aircraft Communications and Navigation 12

Includes all modes of communication with and between aircraft; air navigation systems (satellite and ground based); and air traffic control. For related information see also *06 Avionics and Aircraft Instrumentation*; *17 Space Communications; Spacecraft Communications, Command and Tracking,* and *32 Communications and Radar.*

05 Aircraft Design, Testing and Performance 14

Includes all stages of design of aircraft and aircraft structures and systems. Also includes aircraft testing, performance, and evaluation, and aircraft and flight simulation technology. For related information, see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*. For land transportation vehicles, see *85 Technology Utilization and Surface Transportation*.

06 Avionics and Aircraft Instrumentation 24

Includes all avionics systems, cockpit and cabin display devices, and flight instruments intended for use in aircraft. For relatead information see also *04 Aircraft Communications and Navigation; 08 Aircraft Stability and Control; 19 Spacecraft Instrumentation and Astrionics; and 35 Instrumentation and Photography.*

07 Aircraft Propulsion and Power 25

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and onboard auxiliary power plants for aircraft. For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

08 Aircraft Stability and Control 28

Includes flight dynamics, aircraft handling qualities; piloting; flight controls; and autopilots. For related information, see also *05 Aircraft Design, Testing and Performance* and *06 Avionics and Aircraft Instrumentation*.

09 Research and Support Facilities (Air) 30

Includes airports, runways, hangers, and aircraft repair and overhaul facilities, wind tunnels, water tunnels, and shock tubes; flight simulators; and aircraft engine test stands. Also includes airport ground equipment and systems. For airport ground operation see *03 Air Transportation and Safety.* For astronautical facilities see *14 Ground Support Systems and Facilities (Space).*

Subject Categories of the Division B. Astronautics

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

12 Astronautics (General) 35

Includes general research topics related to space flight and manned and unmanned space vehicles, platforms or objects launched into, or assembled in, outer space; and related components and equipment. Also includes manufacturing and maintenance of such vehicles or platforms. For specific topics in astronautics see *categories 13 through 20.* For extraterrestrial exploration, see *91 Lunar and Planetary Science and Exploration*.

13 Astrodynamics 36

Includes powered and free-flight trajectories; and orbital and launching dynamics.

15 Launch Vehicles and Launch Operations 36

Includes all classes of launch vehicles, launch/space vehicle systems, and boosters; and launch operations. For related information see also *18 Spacecraft Design, Testing, and Performance; and 20 Spacecraft Propulsion and Power.*

16 Space Transportation and Safety 38

Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques. For related information, see also *03 Air Transportation and Safety* and *15 Launch Vehicles and Launch Vehicles,* and *18 Spacecraft Design, Testing and Performance*. For space suits, see *54 Man/System Technology and Life Support*.

17 Space Communications, Spacecraft Communications, Command and Tracking 43

Includes space systems telemetry; space communications networks; astronavigation and guidance; and spacecraft radio blackout. For related information, see also *04 Aircraft Communications and Navigation* and *32 Communications and Radar.*

18 Spacecraft Design, Testing and Performance 44

Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and spacecraft control and stability characteristics. For life support systems, see *54 Man/System Technology and Life Support*. For related information, see also *05 Aircraft Design, Testing and Performance, 39 Structural Mechanics, and 16 Space Transportation and Safety.*

20 Spacecraft Propulsion and Power 45

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources. For related information, see also *07 Aircraft Propulsion and Power; 28 Propellants and Fuels; 15 Launch Vehicles and Launch Operations;* and *44 Energy Production and Conversion*.

Subject Categories of the Division C. Chemistry and Materials

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

23 Chemistry and Materials (General) 49

Includes general research topics related to the composition, properties, structure, and use of chemical compounds and materials as they relate to aircraft, launch vehicles, and spacecraft. For specific topics in chemistry and materials see *categories 24 through 29*. For astrochemistry see category *90 Astrophysics*.

24 Composite Materials 51

Includes physical, chemical, and mechanical properties of laminates and other composite materials.

25 Inorganic, Organic, and Physical Chemistry 58

Includes the analysis, synthesis, and use inorganic and organic compounds; combustion theory; electrochemistry; and photochemistry. For related information see also *34 Fluid Dynamics and Thermodynamics, For astrochemistry see category 90 Astrophysics*.

26 Metals and Metallic Materials 63

Includes physical, chemical, and mechanical properties of metals and metallic materials; and metallurgy.

27 Nonmetallic Materials 67

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials. For composite materials see *24 Composite Materials.*

28 Propellants and Fuels 71

Includes rocket propellants, igniters and oxidizers; their storage and handling procedures; and aircraft fuels. For nuclear fuels see *73 Nuclear Physics*. For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power*, and *44 Energy Production and Conversion*.

29 Space Processing 73

Includes space-based development of materials, compounds, and processes for research or commercial application. Also includes the development of materials and compounds in simulated reduced–gravity environments. For legal aspects of space commercialization see *84 Law, Political Science and Space Policy.*

Subject Categories of the Division D. Engineering

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

31 Engineering (General) 73

Includes general research topics to engineering and applied physics, and particular areas of vacuum technology, industrial engineering, cryogenics, and fire prevention. For specific topics in engineering see *categories 32 through 39*.

32 Communications and Radar 76

Includes radar; radio, wire, and optical communications; land and global communications; communications theory. For related information see also *04 Aircraft Communications and Navigation;* and *17 Space Communications, Spacecraft Communications, Command and Tracking;* for search and rescue see *03 Air Transportation and Safety,* and *16 Space Transportation and Safety.*

33 Electronics and Electrical Engineering 83

Includes development, performance, and maintainability of electrical/electronic devices and components; related test equipment. and microelectronics and integrated circuitry. For related information see also *60 Computer Operations and Hardware;* and *76 Solid-State Physics*. For communications equipment and devices see *32 Communications and Radar.*

34 Fluid Mechanics and Thermodynamics 88

Includes fluid dynamics and kinematics and all forms of heat transfer; boundary layer flow; hydrodynamics; hydraulics; fluidics; mass transfer and ablation cooling. For related information see also *02 Aerodynamics.*

35 Instrumentation and Photography 102

Includes remote sensors; measuring instruments and gauges; detectors; cameras and photographic supplies; and holography. For aerial photography see *43 Earth Resources and Remote Sensing*. For related information see also *06 Avionics and Aircraft Instrumentation;* and *19 Spacecraft Instrumentation*.

36 Lasers and Masers 108

Includes lasing theory, laser pumping techniques, maser amplifiers, laser materials, and the assessment of laser and maser outputs. For cases where the application of the laser or maser is emphasized see also the specific category where the application is treated. For related information see also *76 Solid-State Physics*.

37 Mechanical Engineering 109

Includes mechanical devices and equipment; machine elements and processes. For cases where the application of a device or the host vehicle is emphasized see also the specific category where the application or vehicle is treated. For robotics see *63 Cybernetics, Artificial Intelligence, and Robotics*; and *54 Man/System Technology and Life Support*.

38 Quality Assurance and Reliability 113

Includes approaches to, and methods for reliability analysis and control, inspection, maintainability, and standardization.

39 Structural Mechanics 115

Includes structural element design, analysis and testing; dynamic responses of structures; weight analysis; fatigue and other structural properties; and mechanical and thermal stresses in structure. For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

Subject Categories of the Division E. Geosciences

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

42 Geosciences (General) 120

Includes general research topics related to the Earth sciences, and the specific areas of petrology, minerology, and general geology. For other specific topics in geosciences see *categories 42 through 48*.

43 Earth Resources and Remote Sensing 124

Includes remote sensing of earth features, phenomena and resources by aircraft, balloon, rocket, and spacecraft; analysis or remote sensing data and imagery; development of remote sensing products; photogrammetry; and aerial photographs. For instrumentation see *35 Instrumentation and Photography.*

44 Energy Production and Conversion 129

Includes specific energy conversion systems, e.g., fuel cells; and solar, geothermal, windpower, and waterwave conversion systems; energy storage; and traditional power generators. For technologies related to nuclear energy production see *73 Nuclear Physics*. For related information see also *07 Aircraft Propulsion and Power; 20 Spacecraft Propulsion and Power,* and *28 Propellants and Fuels*.

45 Environment Pollution 129

Includes atmospheric, water, soil, noise, and thermal pollution.

46 Geophysics 144

Includes earth structure and dynamics, aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism. For related information see *47 Meteorology and Climatology;* and *93 Space Radiation*.

47 Meteorology and Climatology 150

Includes weather observation forecasting and modification.

48 Oceanography **156**

Includes the physical, chemical and biological aspects of oceans and seas; ocean dynamics, and marine resources. For related information see also *43 Earth Resources and Remote Sensing*.

Subject Categories of the Division F. Life Sciences

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

51 Life Sciences (General) **158**

Includes general research topics related to plant and animal biology (non–human); ecology; microbiology; and also the origin, development, structure, and maintenance, of animals and plants in space and related environmental conditions. For specific topics in life sciences see *categories 52 through 55*.

52 Aerospace Medicine **180**

Includes the biological and physiological effects of atmospheric and space flight (weightlessness, space radiation, acceleration, and altitude stress) on the human being; and the prevention of adverse effects on those environments. For psychological and behavioral effects of aerospace environments see *53 Behavioral Sciences*. For the effects of space on animals and plants see *51 Life Sciences*.

53 Behavioral Sciences **189**

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 Man/System Technology and Life Support **192**

Includes human factors engineering; bionics, man–machine, life support, space suits and protective clothing. For related information see also *16 Space Transportation* and *52 Aerospace Medicine*..

Subject Categories of the Division G. Mathematical and Computer Sciences

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

59 Mathematical and Computer Sciences (General) **196**

Includes general topics and overviews related to mathematics and computer science. For specific topics in these areas see *categories 60 through 67*.

60 Computer Operations and Hardware **196**

Includes hardware for computer graphics, firmware and data processing. For components see *33 Electronics and Electrical Engineering*. For computer vision see *63 Cybernetics, Artificial Intelligence and Robotics*.

61 Computer Programming and Software 200

Includes software engineering, computer programs, routines, algorithms, and specific applications, e.g., CAD/CAM. For computer software applied to specific applications, see also the associated category.

62 Computer Systems 209

Includes computer networks and distributed processing systems. For information systems see *82 Documentation and Information Science*. For computer systems applied to specific applications, see the associated category.

63 Cybernetics, Artificial Intelligence and Robotics 213

Includes feedback and control theory, information theory, machine learning, and expert systems. For related information see also *54 Man/System Technology and Life Support.*

64 Numerical Analysis 215

Includes iteration, differential and difference equations, and numerical approximation.

65 Statistics and Probability 217

Includes data sampling and smoothing; Monte Carlo method; time series and analysis; and stochastic processes.

66 Systems Analysis and Operations Research 219

Includes mathematical modeling of systems; network analysis; mathematical programming; decision theory; and game theory.

67 Theoretical Mathematics 223

Includes algebra, functional analysis, geometry, topology set theory, group theory and and number theory.

Subject Categories of the Division H. Physics

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

70 Physics (General) 223

Includes general research topics related to mechanics, kinetics, magnetism, and electrodynamics. For specific areas of physics see *categories 71 through 77*. For related instrumentation see *35 Instrumentation and Photography;* for geophysics, astrophysics or solar physics see *46 Geophysics, 90 Astrophysics,* or *92 Solar Physics*.

71 Acoustics 224

Includes sound generation, transmission, and attenuation. For noise pollution see *45 Environment Pollution.* For aircraft noise see also *02 Aerodynamics* and *07 Aircraft Propulsion Propulsion and Power.*

72 Atomic and Molecular Physics 231

Includes atomic and molecular structure, electron properties, and atomic and molecular spectra. For elementary particle physics see *73 Nuclear Physics*.

73 Nuclear Physics 234

Includes nuclear particles; and reactor theory. For space radiation see *93 Space Radiation*. For atomic and molecular physics see *72 Atomic and Molecular Physics*. For elementary particle physics see *77 Physics of Elementary Particles and Fields*. For nuclear astrophysics see *90 Astrophysics*.

74 Optics 235

Includes light phenomena and the theory of optical devices. For lasers see *36 Lasers and Masers*.

75 Plasma Physics 236

Includes magnetohydrodynamics and plasma fusion. For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

76 Solid-State Physics 238

Includes condensed matter physics, crystallography, and superconductivity. For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

Subject Categories of the Division I. Social and Information Sciences

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

80 Social and Information Sciences (General) 244

Includes general research topics related to sociology; educational programs and curricula.

81 Administration and Management 245

Includes management planning and research.

82 Documentation and Information Science 248

Includes information management; information storage and retrieval technology; technical writing; graphic arts; and micrography. For computer documentation see *61 Computer Programming and Software*.

84 Law, Political Science and Space Policy 258

Includes aviation law; space law and policy; international law; international cooperation; and patent policy.

85 Technology Utilization and Surface Transportation 259

Includes aerospace technology transfer; urban technology; surface and mass transportation. For related information see also *03 Air Transportation and Safety, 16 Space Transportation and Safety, and 44*

Energy Production and Conversion. For specific technology transfer applications see also the category where the subject is treated.

Subject Categories of the Division J. Space Sciences

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

89 Astronomy **260**

Includes observations of celestial bodies, astronomical instruments and techniques; radio, gamma-ray, x–ray, ultraviolet, and infrared astronomy; and astrometry.

90 Astrophysics **262**

Includes cosmology; celestial mechanics; space plasmas; and interstellar and interplanetary gases and dust.

91 Lunar and Planetary Science and Exploration **268**

Includes planetology; selenology; meteorites; comets; and manned and unmanned planetary and lunar flights. For spacecraft design or space stations see *18 Spacecraft Design, Testing and Performance*.

92 Solar Physics **531**

Includes solar activity, solar flares, solar radiation and sunspots. For related information see *93 Space Radiation.*

93 Space Radiation **533**

Includes cosmic radiation; and inner and outer Earth radiation belts. For biological effects of radiation on plants and animals see *52 Aerospace Medicine*. For theory see *73 Nuclear Physics*.

Subject Categories of the Division K. General

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

99 General **535**

Includes aeronautical, astronautical, and space science related histories, biographies, and pertinent reports too broad for categorization; histories or broad overviews of NASA programs such as Apollo, Gemini, and Mercury spacecraft, Earth Resources Technology Satellite (ERTS), and Skylab; NASA appropriations hearings.

Document Availability Information

The mission of the NASA Scientific and Technical (STI) Program Office is to quickly, efficiently, and cost-effectively provide the NASA community with desktop access to STI produced by NASA and the world's aerospace industry and academia. In addition, we will provide the aerospace industry, academia, and the taxpayer access to the intellectual scientific and technical output and achievements of NASA.

Eligibility and Registration for NASA STI Products and Services

The NASA STI Program offers a wide variety of products and services to achieve its mission. Your affiliation with NASA determines the level and type of services provided by the NASA STI Program. To assure that appropriate level of services are provided, NASA STI users are requested to register at the NASA Center for AeroSpace Information (CASI). Please contact NASA CASI in one of the following ways:

E-mail:	help@sti.nasa.gov
Fax:	301-621-0134
Phone:	301-621-0390
Mail:	ATTN: Registration Services NASA Center for AeroSpace Information 7121 Standard Drive Hanover, MD 21076-1320

Limited Reproducibility

In the database citations, a note of limited reproducibility appears if there are factors affecting the reproducibility of more than 20 percent of the document. These factors include faint or broken type, color photographs, black and white photographs, foldouts, dot matrix print, or some other factor that limits the reproducibility of the document. This notation also appears on the microfiche header.

NASA Patents and Patent Applications

Patents owned by NASA are announced in the STI Database. Printed copies of patents (which are not microfiched) are available for purchase from the U.S. Patent and Trademark Office.

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the U.S. Patent and Trademark Office.

Patents and patent applications owned by NASA are available for licensing. Requests for licensing terms and further information should be addressed to:

National Aeronautics and Space Administration
Associate General Counsel for Intellectual Property
Code GP
Washington, DC 20546-0001

Sources for Documents

One or more sources from which a document announced in the STI Database is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below, with an Addresses of Organizations list near the back of this section. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source.

Avail: NASA CASI. Sold by the NASA Center for AeroSpace Information. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the citation. Current values are given in the NASA CASI Price Code Table near the end of this section.

Note on Ordering Documents: When ordering publications from NASA CASI, use the document ID number or other report number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in Energy Research Abstracts. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center—Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: ESDU. Pricing information on specific data, computer programs, and details on ESDU International topic categories can be obtained from ESDU International.

Avail: Fachinformationszentrum Karlsruhe. Gesellschaft für wissenschaftlich-technische Information mbH 76344 Eggenstein-Leopoldshafen, Germany.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, CA. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration (JBD-4), Public Documents Room (Room 1H23), Washington, DC 20546-0001, or public document rooms located at NASA installations, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: NTIS. Sold by the National Technical Information Service. Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) are available. For information concerning this service, consult the NTIS Subscription Section, Springfield, VA 22161.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from Dissertation Abstracts and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: US Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of $1.50 each, postage free.

Avail: (US Sales Only). These foreign documents are available to users within the United States from the National Technical Information Service (NTIS). They are available to users outside the United States through the International Nuclear Information Service (INlS) representative in their country, or by applying directly to the issuing organization.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed on the Addresses of Organizations page. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Addresses of Organizations

British Library Lending Division
Boston Spa, Wetherby, Yorkshire
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, DC 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, TN 37830

European Space Agency–
Information Retrieval Service ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

ESDU International
27 Corsham Street
London
N1 6UA
England

Fachinformationszentrum Karlsruhe
Gesellschaft für wissenschaftlich–technische
Information mbH
76344 Eggenstein–Leopoldshafen, Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Center for AeroSpace Information
7121 Standard Drive
Hanover, MD 21076-1320

(NASA STI Lead Center)
National Aeronautics and Space Administration
Scientific and Technical Information Program Office
Langley Research Center – MS157
Hampton, VA 23681

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, CA 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, MI 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey Library National Center
MS 950
12201 Sunrise Valley Drive
Reston, VA 22092

U.S. Geological Survey Library
2255 North Gemini Drive
Flagstaff, AZ 86001

U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025

U.S. Geological Survey Library
Box 25046
Denver Federal Center, MS914
Denver, CO 80225

NASA CASI Price Tables — Effective January 1, 2001
Prices are subject to change without notice

Hardcopy & Microfiche Prices			
Code	*NASA*	*U.S.**	*International**
A01	$9.50	$9.50	$19.00
A02	$13.50	$14.50	$29.00
A03	$24.50	$27.50	$55.00
A04	$27.00	$30.50	$61.00
A05	$28.50	$32.50	$65.00
A06	$31.00	$35.50	$71.00
A07	$34.50	$39.50	$79.00
A08	$37.50	$43.00	$86.00
A09	$42.50	$49.00	$98.00
A10	$45.50	$53.00	$106.00
A11	$48.50	$56.50	$113.00
A12	$52.50	$61.00	$122.00
A13	$55.50	$65.00	$130.00
A14	$57.50	$67.00	$134.00
A15	$59.50	$69.50	$139.00
A16	$61.50	$72.00	$144.00
A17	$63.50	$74.50	$149.00
A18	$67.00	$78.50	$157.00
A19	$69.00	$81.00	$162.00
A20	$71.00	$83.50	$167.00
A21	$73.00	$86.00	$172.00
A22	$78.50	$92.50	$185.00
A23	$80.50	$95.00	$190.00
A24	$82.50	$97.00	$194.00
A25	$84.50	$99.50	$199.00
A99	Contact NASA CASI		

Exception Prices			
Code	*NASA*	*U.S.**	*International**
E01	$102.50	$121.00	$242.00
E02	$111.00	$131.50	$263.00
E03	$120.50	$143.00	$286.00
E04	$130.00	$154.00	$308.00
E05	$139.50	$165.50	$331.00
E06	$148.00	$176.00	$352.00
E07	$157.50	$187.00	$374.00
E08	$167.00	$198.50	$397.00
E09	$175.50	$209.00	$418.00
E10	$185.00	$220.00	$440.00
E11	$194.50	$231.50	$463.00
E12	$202.50	$241.00	$482.00
E13	$212.00	$252.50	$505.00
E14	$221.50	$264.00	$528.00
E15	$231.00	$275.50	$551.00
E16	$239.50	$285.50	$571.00
E17	$249.00	$297.00	$594.00
E18	$258.50	$308.50	$617.00
E19	$267.00	$318.50	$637.00
E20	$276.50	$330.00	$660.00
E21	$286.00	$341.50	$683.00
E22	$294.50	$351.50	$703.00
E23	$304.00	$363.00	$726.00
E24	$313.50	$374.50	$749.00
E99	Free	Free	Free

NASA Prices:
For NASA libraries, NASA Employees & NASA contractors registered at NASA CASI.

U.S. Prices:
For users within the U.S.

International Prices:
For users outside the U.S. and International Embassies within the U.S.

Processing
Standard N/A
(most orders are processed within three (3) business days, then shipped)

Rush
$10.00 per item
(orders are processed within one (1) business day, then shipped)

Shipping & Handling Fees: per item
Standard (USPS Priority)
$2.00 U.S.
(delivered within 2-3 business days)

$7.00 International
(delivered within 4-7 business days)

USPS Express (U.S. only)
$13.00
(1-day delivery service to most destinations)

Fax (Up to 30 pages,
$16.50 U.S.
$24.00 International

Federal Express
User's Account Only _____

Federal Depository Library Program

In order to provide the general public with greater access to U.S. Government publications, Congress established the Federal Depository Library Program under the Government Printing Office (GPO), with 53 regional depositories responsible for permanent retention of material, inter-library loan, and reference services. At least one copy of nearly every NASA and NASA-sponsored publication, either in printed or microfiche format, is received and retained by the 53 regional depositories. A list of the Federal Regional Depository Libraries, arranged alphabetically by state, appears at the very end of this section. These libraries are not sales outlets. A local library can contact a regional depository to help locate specific reports, or direct contact may be made by an individual.

Public Collection of NASA Documents

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England for public access. The British Library Lending Division also has available many of the non-NASA publications cited in the STI Database. European requesters may purchase facsimile copy or microfiche of NASA and NASA-sponsored documents FIZ–Fachinformation Karlsruhe–Bibliographic Service, D-76344 Eggenstein-Leopoldshafen, Germany and TIB–Technische Informationsbibliothek, P.O. Box 60 80, D-30080 Hannover, Germany.

Submitting Documents

All users of this abstract service are urged to forward reports to be considered for announcement in the STI Database. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those you will transmit to NASA, DOD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to:

ATTN: Acquisitions Specialist
NASA Center for AeroSpace Information
7121 Standard Drive
Hanover, MD 21076-1320.

Reprints of journal articles, book chapters, and conference papers are also welcome.

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on a public sale at the NASA Center for AeroSpace Information. Copyrighted publications will be announced but not distributed or sold.

Federal Regional Depository Libraries

ALABAMA

AUBURN UNIV. AT MONTGOMERY LIBRARY
Documents Dept.
7300 University Dr.
Montgomery, AL 36117–3596
(205) 244–3650 Fax: (205) 244–0678

UNIV. OF ALABAMA
Amelia Gayle Gorgas Library
Govt. Documents
P.O. Box 870266
Tuscaloosa, AL 35487–0266
(205) 348–6046 Fax: (205) 348–0760

ARIZONA

DEPT. OF LIBRARY, ARCHIVES, AND PUBLIC RECORDS
Research Division
Third Floor, State Capitol
1700 West Washington
Phoenix, AZ 85007
(602) 542–3701 Fax: (602) 542–4400

ARKANSAS

ARKANSAS STATE LIBRARY
State Library Service Section
Documents Service Section
One Capitol Mall
Little Rock, AR 72201–1014
(501) 682–2053 Fax: (501) 682–1529

CALIFORNIA

CALIFORNIA STATE LIBRARY
Govt. Publications Section
P.O. Box 942837 – 914 Capitol Mall
Sacramento, CA 94337–0091
(916) 654–0069 Fax: (916) 654–0241

COLORADO

UNIV. OF COLORADO – BOULDER
Libraries – Govt. Publications
Campus Box 184
Boulder, CO 80309–0184
(303) 492–8834 Fax: (303) 492–1881

DENVER PUBLIC LIBRARY
Govt. Publications Dept. BSG
1357 Broadway
Denver, CO 80203–2165
(303) 640–8846 Fax: (303) 640–8817

CONNECTICUT

CONNECTICUT STATE LIBRARY
231 Capitol Avenue
Hartford, CT 06106
(203) 566–4971 Fax: (203) 566–3322

FLORIDA

UNIV. OF FLORIDA LIBRARIES
Documents Dept.
240 Library West
Gainesville, FL 32611–2048
(904) 392–0366 Fax: (904) 392–7251

GEORGIA

UNIV. OF GEORGIA LIBRARIES
Govt. Documents Dept.
Jackson Street
Athens, GA 30602–1645
(706) 542–8949 Fax: (706) 542–4144

HAWAII

UNIV. OF HAWAII
Hamilton Library
Govt. Documents Collection
2550 The Mall
Honolulu, HI 96822
(808) 948–8230 Fax: (808) 956–5968

IDAHO

UNIV. OF IDAHO LIBRARY
Documents Section
Rayburn Street
Moscow, ID 83844–2353
(208) 885–6344 Fax: (208) 885–6817

ILLINOIS

ILLINOIS STATE LIBRARY
Federal Documents Dept.
300 South Second Street
Springfield, IL 62701–1796
(217) 782–7596 Fax: (217) 782–6437

INDIANA

INDIANA STATE LIBRARY
Serials/Documents Section
140 North Senate Avenue
Indianapolis, IN 46204–2296
(317) 232–3679 Fax: (317) 232–3728

IOWA

UNIV. OF IOWA LIBRARIES
Govt. Publications
Washington & Madison Streets
Iowa City, IA 52242–1166
(319) 335–5926 Fax: (319) 335–5900

KANSAS

UNIV. OF KANSAS
Govt. Documents & Maps Library
6001 Malott Hall
Lawrence, KS 66045–2800
(913) 864–4660 Fax: (913) 864–3855

KENTUCKY

UNIV. OF KENTUCKY
King Library South
Govt. Publications/Maps Dept.
Patterson Drive
Lexington, KY 40506–0039
(606) 257–3139 Fax: (606) 257–3139

LOUISIANA

LOUISIANA STATE UNIV.
Middleton Library
Govt. Documents Dept.
Baton Rouge, LA 70803–3312
(504) 388–2570 Fax: (504) 388–6992

LOUISIANA TECHNICAL UNIV.
Prescott Memorial Library
Govt. Documents Dept.
Ruston, LA 71272–0046
(318) 257–4962 Fax: (318) 257–2447

MAINE

UNIV. OF MAINE
Raymond H. Fogler Library
Govt. Documents Dept.
Orono, ME 04469–5729
(207) 581–1673 Fax: (207) 581–1653

MARYLAND

UNIV. OF MARYLAND – COLLEGE PARK
McKeldin Library
Govt. Documents/Maps Unit
College Park, MD 20742
(301) 405–9165 Fax: (301) 314–9416

MASSACHUSETTS

BOSTON PUBLIC LIBRARY
Govt. Documents
666 Boylston Street
Boston, MA 02117–0286
(617) 536–5400, ext. 226
Fax: (617) 536–7758

MICHIGAN

DETROIT PUBLIC LIBRARY
5201 Woodward Avenue
Detroit, MI 48202–4093
(313) 833–1025 Fax: (313) 833–0156

LIBRARY OF MICHIGAN
Govt. Documents Unit
P.O. Box 30007
717 West Allegan Street
Lansing, MI 48909
(517) 373–1300 Fax: (517) 373–3381

MINNESOTA

UNIV. OF MINNESOTA
Govt. Publications
409 Wilson Library
309 19th Avenue South
Minneapolis, MN 55455
(612) 624–5073 Fax: (612) 626–9353

MISSISSIPPI

UNIV. OF MISSISSIPPI
J.D. Williams Library
106 Old Gym Bldg.
University, MS 38677
(601) 232–5857 Fax: (601) 232–7465

MISSOURI

UNIV. OF MISSOURI – COLUMBIA
106B Ellis Library
Govt. Documents Sect.
Columbia, MO 65201–5149
(314) 882–6733 Fax: (314) 882–8044

MONTANA

UNIV. OF MONTANA
Mansfield Library
Documents Division
Missoula, MT 59812–1195
(406) 243–6700 Fax: (406) 243–2060

NEBRASKA

UNIV. OF NEBRASKA – LINCOLN
D.L. Love Memorial Library
Lincoln, NE 68588–0410
(402) 472–2562 Fax: (402) 472–5131

NEVADA

THE UNIV. OF NEVADA LIBRARIES
Business and Govt. Information Center
Reno, NV 89557–0044
(702) 784–6579 Fax: (702) 784–1751

NEW JERSEY

NEWARK PUBLIC LIBRARY
Science Div. – Public Access
P.O. Box 630
Five Washington Street
Newark, NJ 07101–7812
(201) 733–7782 Fax: (201) 733–5648

NEW MEXICO

UNIV. OF NEW MEXICO
General Library
Govt. Information Dept.
Albuquerque, NM 87131–1466
(505) 277–5441 Fax: (505) 277–6019

NEW MEXICO STATE LIBRARY
325 Don Gaspar Avenue
Santa Fe, NM 87503
(505) 827–3824 Fax: (505) 827–3888

NEW YORK

NEW YORK STATE LIBRARY
Cultural Education Center
Documents/Gift & Exchange Section
Empire State Plaza
Albany, NY 12230–0001
(518) 474–5355 Fax: (518) 474–5786

NORTH CAROLINA

UNIV. OF NORTH CAROLINA – CHAPEL HILL
Walter Royal Davis Library
CB 3912, Reference Dept.
Chapel Hill, NC 27514–8890
(919) 962–1151 Fax: (919) 962–4451

NORTH DAKOTA

NORTH DAKOTA STATE UNIV. LIB.
Documents
P.O. Box 5599
Fargo, ND 58105–5599
(701) 237–8886 Fax: (701) 237–7138

UNIV. OF NORTH DAKOTA
Chester Fritz Library
University Station
P.O. Box 9000 – Centennial and University Avenue
Grand Forks, ND 58202–9000
(701) 777–4632 Fax: (701) 777–3319

OHIO

STATE LIBRARY OF OHIO
Documents Dept.
65 South Front Street
Columbus, OH 43215–4163
(614) 644–7051 Fax: (614) 752–9178

OKLAHOMA

OKLAHOMA DEPT. OF LIBRARIES
U.S. Govt. Information Division
200 Northeast 18th Street
Oklahoma City, OK 73105–3298
(405) 521–2502, ext. 253
Fax: (405) 525–7804

OKLAHOMA STATE UNIV.
Edmon Low Library
Stillwater, OK 74078–0375
(405) 744–6546 Fax: (405) 744–5183

OREGON

PORTLAND STATE UNIV.
Branford P. Millar Library
934 Southwest Harrison
Portland, OR 97207–1151
(503) 725–4123 Fax: (503) 725–4524

PENNSYLVANIA

STATE LIBRARY OF PENN.
Govt. Publications Section
116 Walnut & Commonwealth Ave.
Harrisburg, PA 17105–1601
(717) 787–3752 Fax: (717) 783–2070

SOUTH CAROLINA

CLEMSON UNIV.
Robert Muldrow Cooper Library
Public Documents Unit
P.O. Box 343001
Clemson, SC 29634–3001
(803) 656–5174 Fax: (803) 656–3025

UNIV. OF SOUTH CAROLINA
Thomas Cooper Library
Green and Sumter Streets
Columbia, SC 29208
(803) 777–4841 Fax: (803) 777–9503

TENNESSEE

UNIV. OF MEMPHIS LIBRARIES
Govt. Publications Dept.
Memphis, TN 38152–0001
(901) 678–2206 Fax: (901) 678–2511

TEXAS

TEXAS STATE LIBRARY
United States Documents
P.O. Box 12927 – 1201 Brazos
Austin, TX 78701–0001
(512) 463–5455 Fax: (512) 463–5436

TEXAS TECH. UNIV. LIBRARIES
Documents Dept.
Lubbock, TX 79409–0002
(806) 742–2282 Fax: (806) 742–1920

UTAH

UTAH STATE UNIV.
Merrill Library Documents Dept.
Logan, UT 84322–3000
(801) 797–2678 Fax: (801) 797–2677

VIRGINIA

UNIV. OF VIRGINIA
Alderman Library
Govt. Documents
University Ave. & McCormick Rd.
Charlottesville, VA 22903–2498
(804) 824–3133 Fax: (804) 924–4337

WASHINGTON

WASHINGTON STATE LIBRARY
Govt. Publications
P.O. Box 42478
16th and Water Streets
Olympia, WA 98504–2478
(206) 753–4027 Fax: (206) 586–7575

WEST VIRGINIA

WEST VIRGINIA UNIV. LIBRARY
Govt. Documents Section
P.O. Box 6069 – 1549 University Ave.
Morgantown, WV 26506–6069
(304) 293–3051 Fax: (304) 293–6638

WISCONSIN

ST. HIST. SOC. OF WISCONSIN LIBRARY
Govt. Publication Section
816 State Street
Madison, WI 53706
(608) 264–6525 Fax: (608) 264–6520

MILWAUKEE PUBLIC LIBRARY
Documents Division
814 West Wisconsin Avenue
Milwaukee, WI 53233
(414) 286–3073 Fax: (414) 286–8074

Typical Report Citation and Abstract

❶ **19970001126** NASA Langley Research Center, Hampton, VA USA
❷ **Water Tunnel Flow Visualization Study Through Poststall of 12 Novel Planform Shapes**
❸ Gatlin, Gregory M., NASA Langley Research Center, USA Neuhart, Dan H., Lockheed Engineering and Sciences Co., USA;
❹ Mar. 1996; 130p; In English
❺ Contract(s)/Grant(s): RTOP 505-68-70-04
❻ Report No(s): NASA-TM-4663; NAS 1.15:4663; L-17418; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche
❼ To determine the flow field characteristics of 12 planform geometries, a flow visualization investigation was conducted in the Langley 16- by 24-Inch Water Tunnel. Concepts studied included flat plate representations of diamond wings, twin bodies, double wings, cutout wing configurations, and serrated forebodies. The off-surface flow patterns were identified by injecting colored dyes from the model surface into the free-stream flow. These dyes generally were injected so that the localized vortical flow patterns were visualized. Photographs were obtained for angles of attack ranging from 10’ to 50’, and all investigations were conducted at a test section speed of 0.25 ft per sec. Results from the investigation indicate that the formation of strong vortices on highly swept forebodies can improve poststall lift characteristics; however, the asymmetric bursting of these vortices could produce substantial control problems. A wing cutout was found to significantly alter the position of the forebody vortex on the wing by shifting the vortex inboard. Serrated forebodies were found to effectively generate multiple vortices over the configuration. Vortices from 65’ swept forebody serrations tended to roll together, while vortices from 40’ swept serrations were more effective in generating additional lift caused by their more independent nature.
❽ Author
❾ *Water Tunnel Tests; Flow Visualization; Flow Distribution; Free Flow; Planforms; Wing Profiles; Aerodynamic Configurations*

Key

1. Document ID Number; Corporate Source
2. Title
3. Author(s) and Affiliation(s)
4. Publication Date
5. Contract/Grant Number(s)
6. Report Number(s); Availability and Price Codes
7. Abstract
8. Abstract Author
9. Subject Terms

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS

A Biweekly Publication of the National Aeronautics and Space Administration

VOLUME 39, JUNE 15, 2001

02
AERODYNAMICS

Includes aerodynamics of flight vehicles, test bodies, airframe components and combinations, wings, and control surfaces. Also includes aerodynamics of rotors, stators, fans and other elements of turbomachinery. For related information, see also 34 Fluid Mechanics and Heat Transfer.

20010044080 Bath Univ., Bath, UK

Interaction of Vortex Breakdown with a Flexible Fin and its Control, Phase 2 ***Final Report***

Gursul, Ismet, Bath Univ., UK; Feb. 13, 2001; 25p; In English

Contract(s)/Grant(s): F61775-00-WE025

Report No.(s): AD-A387547; EOARD-SPC-00-4025; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

This report results from a contract tasking University of Bath as follows: The contractor will investigate the fin buffeting caused by vortex breakdown and its control. In this phase, a flexible fin will be designed and fabricated. It consists of a thin brass spar surrounded by several balsa wood segments to provide aerodynamic shaping. Fin vibration levels will be sensed by root strain gages and tip accelerometers. Unsteady surface pressure measurements on the delta wing and underneath the vortex will be carried out in order to detect and quantify the oscillations of vortex breakdown location due to fin vibrations. Also, flow velocity measurements and visualization experiments will be carried out in U. of Bath water tunnel.

DTIC

Vibration; Aeroelasticity; Buffeting; Fins; Aerodynamic Characteristics; Fabrication; Pressure Measurement; Velocity Measurement

20010044098 Embry-Riddle Aeronautical Univ., Daytona Beach, FL USA

A Methodology to Predict the Empennage In-Flight Loads of a General Aviation Aircraft Using Backpropagation Neural Networks ***Final Report***

Kim, D.; Marciniak, M.; Feb. 2001; 52p; In English

Contract(s)/Grant(s): FAA-93-G-026

Report No.(s): PB2001-104558; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Backpropagation neural networks were used to predict strains resulting from maneuver loads in the empennage structure of a Cessna 172P. The purpose of this research was to develop a methodology for the prediction of strains in the tail section of a general aviation aircraft that would not require installation of strain gages and to determine the minimum set of sensors necessary for a prediction suitable for small aircraft. This report provides a methodology for determining in-flight tail loads using neural networks. The method does not require the installation of strain gages on each airplane. It is an inexpensive and effective technique for collecting empennage load spectra for small transport airplanes already in service where installation of strain gages are impractical. Linear accelerometer, angular accelerometer, rate gyro, and strain gage signals were collected in flight using DAQBook portable data acquisition system for dutch-roll, roll, sideslip left, sideslip right, stabilized g turn left, stabilized g turn right, and push-pull maneuvers at airspeeds of 65 KIAS, 80 KIAS, and 95 KIAS. The sensor signals were filtered and used to train the neural networks. Modular neural networks were used to predict the strains. The horizontal tail neural network was trained with c.g. Nz and x-, y-, and z-axis angular accelerometer signals and predicted 93% of all strains to within 50 he of measured values. The vertical tail neural network predicted 100% of all strains to within 50 he of measured values.

NTIS

Aerodynamic Loads; General Aviation Aircraft; Cessna Aircraft; Horizontal Tail Surfaces

20010045673 NASA Langley Research Center, Hampton, VA USA

Aerodynamic Performance of an Active Flow Control Configuration Using Unstructured-Grid RANS

Joslin, Ronald D., Pennsylvania State Univ., USA; Viken, Sally A., NASA Langley Research Center, USA; [2001]; 22p; In English; 39th AIAA Aerospace Sciences Meeting and Exhibit, 8-11 Jan. 2001, Reno, NV, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA; Original contains color illustrations

Report No.(s): AIAA Paper 2001-0248; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

This research is focused on assessing the value of the Reynolds-Averaged Navier-Stokes (RANS) methodology for active flow control applications. An experimental flow control database exists for a TAU0015 airfoil, which is a modification of a NACA0015 airfoil. The airfoil has discontinuities at the leading edge due to the implementation of a fluidic actuator and aft of mid chord oil the upper surface. This paper documents two- and three-dimensional computational results for the baseline wing configuration (no control) with the experimental results. The two-dimensional results suggest that the mid-chord discontinuity does not effect the aerodynamics of the wing and can be ignored for more efficient computations. The leading-edge discontinuity significantly affects the lift and drag; hence the integrity of the leading-edge notch discontinuity must be maintained in the computations to achieve a good match with the experimental data. The three-dimensional integrated performance results are in good agreement with the experiments in spite of some convergence and grid resolution issues.

Author

Active Control; Flow Distribution; Discontinuity; Navier-Stokes Equation; Reynolds Averaging; Aerodynamic Configurations; Configuration Management

20010045830 Lockheed Martin Engineering and Sciences Co., Hampton, VA USA

Inviscid Flow Computations of Several Aeroshell Configurations for a '07 Mars Lander

Prabhu, Ramadas K., Lockheed Martin Engineering and Sciences Co., USA; April 2001; 28p; In English

Contract(s)/Grant(s): NAS1-96014; RTOP 242-80-01-01

Report No.(s): NASA/CR-2001-210851; NAS 1.26:210851; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report documents the results of an inviscid computational study conducted on several candidate aeroshell configurations for a proposed '07 Mars lander. Eleven different configurations were considered, and the aerodynamic characteristics of each of these were computed for a Mach number of 23.7 at 10, 15, and 20 degree angles of attack. The unstructured grid software FELISA with the equilibrium Mars gas option was used for these computations. The pitching moment characteristics and the lift-to-drag ratios at trim angle of attack of each of these configurations were examined to make a selection. The criterion for selection was that the configuration should be longitudinally stable, and should trim at an angle of attack where the L/D is -0.25. Based on the present study, two configurations were selected for further study

Author

Aerodynamic Characteristics; Aeroshells; Inviscid Flow

20010046485 Army Aviation and Missile Command, Aeroflightdynamics Directorate, Moffett Field, CA USA

Devices that Alter the Tip Vortex of a Rotor

McAlister, Kenneth W., Army Aviation and Missile Command, USA; Tung, Chee, Army Aviation and Missile Command, USA; Heineck, James T., NASA Ames Research Center, USA; February 2001; 210p; In English; Original contains color illustrations

Contract(s)/Grant(s): RTOP 712-10-12

Report No.(s): NASA/TM-2001-209625; NAS 1.15:209625; A-00V0036; No Copyright; Avail: CASI; A10, Hardcopy; A03, Microfiche

Small devices were attached near the tip of a hovering rotor blade 'in order to alter the structure and trajectory of the trailing vortex. Stereo particle image velocimetry (PIV) images were used to quantify the wake behind the rotor blade during the first revolution. A procedure for analyzing the 3D-velocity field is presented that includes a method for accounting for vortex wander. The results show that a vortex generator can alter the trajectory of the trailing vortex and that a major change in the size and intensity of the trailing vortex can be achieved by introducing a high level of turbulence into the core of the vortex.

Author

Rotors; Wakes; Vortices; Particle Image Velocimetry

20010046863 NASA Langley Research Center, Hampton, VA USA

Flow-Visualization Techniques Used at High Speed by Configuration Aerodynamics Wind-Tunnel-Test Team

Lamar, John E., Editor, NASA Langley Research Center, USA; April 2001; 34p; In English

Contract(s)/Grant(s): RTOP 522-31-31-03

Report No.(s): NASA/TM-2001-210848; L-17973; NAS 1.15:210848; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This paper summarizes a variety of optically based flow-visualization techniques used for high-speed research by the Configuration Aerodynamics Wind-Tunnel Test Team of the High-Speed Research Program during its tenure. The work of other national experts is included for completeness. Details of each technique with applications and status in various national wind tunnels are given.
Author
Flow Visualization; High Speed; Wind Tunnel Tests; Aerodynamic Configurations

20010046989 NASA Ames Research Center, Moffett Field, CA USA
Wind Tunnel Visualization of the Flow Over a Full-Scale F/A-18 Aircraft
Lanser, Wendy R., NASA Ames Research Center, USA; Botha, Gavin J., NASA Ames Research Center, USA; James, Kevin D., Sterling Federal Systems, Inc., USA; Crowder, James P., X-Aero Systems, Inc., USA; [1994]; 1p; In English; SAE Aerospace Atlantic Conference, 18-22 Apr. 1994, Dayton, OH, USA; Sponsored by Society of Automotive Engineers, Inc., USA
Contract(s)/Grant(s): RTOP 505-59-30; No Copyright; Avail: Issuing Activity; Abstract Only

The proposed paper presents flow visualization performed during experiments conducted on a full-scale F/A-18 aircraft in the 80- by 120-Foot Wind-Tunnel at NASA Ames Research Center. This investigation used both surface and off-surface flow visualization techniques to examine the flow field on the forebody, canopy, leading edge extensions (LEXs), and wings. The various techniques used to visualize the flow field were fluorescent tufts, flow cones treated with reflective material, smoke in combination with a laser light sheet, and a video imaging system. The flow visualization experiments were conducted over an angle of attack range from 20deg to 45deg and over a sideslip range from -10deg to 10deg. The results show regions of attached and separated flow on the forebody, canopy, and wings. Additionally, the vortical flow is clearly visible over the leading-edge extensions, canopy, and wings.
Author
Wind Tunnels; Imaging Techniques; Flow Visualization; Leading Edges; Separated Flow

20010047229 Rolls-Royce Allison, Indianapolis, IN USA
Application of TURBO-AE to Flutter Prediction: Aeroelastic Code Development ***Final Report***
Hoyniak, Daniel, Rolls-Royce Allison, USA; Simons, Todd A., Rolls-Royce Allison, USA; May 2001; 108p; In English
Contract(s)/Grant(s): NAS3-27725; RTOP 708-28-13
Report No.(s): NASA/CR-2001-210761; EDR-19540; NAS 1.26:210761; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The TURBO-AE program has been evaluated by comparing the obtained results to cascade rig data and to prediction made from various in-house programs. A high-speed fan cascade, a turbine cascade, a turbine cascade and a fan geometry that shower flutter in torsion mode were analyzed. The steady predictions for the high-speed fan cascade showed the TURBO-AE predictions to match in-house codes. However, the predictions did not match the measured blade surface data. Other researchers also reported similar disagreement with these data set. Unsteady runs for the fan configuration were not successful using TURBO-AE .
Derived from text
Flutter Analysis; Computer Programs; Turbomachine Blades; Aeroelasticity

20010047254 Minnesota Univ., Dept. of Aerospace Engineering and Mechanics, Minneapolis, MN USA
Effect of Internal Energy Excitation on Supersonic Blunt-Body Aerodynamics ***Final Report***
Candler, Graham V.; Mar. 20, 2001; 24p; In English; Original contains color plates
Contract(s)/Grant(s): F49629-01-0177
Report No.(s): AD-A388179; AFRL-SR-BL-TR-01-0236; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A computational study of the experiments performed by Lowry et al. at the Arnold Engineering and Development Center (AEDC) has been performed. In these experiments, a RF discharge is used to weakly ionize a volume of air; then a projectile is fired through this plasma. Relative to the conditions without the discharge, the shock standoff distance is observed to increase substantially, and the bow shock becomes flatter. The RF discharge and the resulting thermo-chemical state of the air within the discharge region have been modeled. Based on these conditions, the projectile flow field was simulated to determine if the relaxation of the stored internal energy causes the shock movement. The results obtained indicate that the stored internal energy does not relax fast enough and therefore this effect is not responsible for the observed effects. Two additional mechanisms are considered, and it is found that unsteady flight through thermal non-uniformities is the likely explanation.
DTIC
Aerodynamics; Blunt Bodies; Excitation; Internal Energy; Projectiles; Shock Waves; Supersonics; Air Flow; Plasma Dynamics; Ionized Gases

20010047398 NASA Glenn Research Center, Cleveland, OH USA

Effect of Delta Tabs on Free Jets From Complex Nozzles

Zaman, K. B. M. Q., NASA Glenn Research Center, USA; March 2001; 68p; In English

Contract(s)/Grant(s): RTOP 708-90-43

Report No.(s): NASA/TM-2001-210674; NAS 1.15:210674; E-12601; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Effects of 'delta-tabs' on the mixing and noise characteristics of two model-scale nozzles have been investigated experimentally. The two models are (1) an eight-lobed nozzle simulating the primary flow of a mixer-ejector configuration considered for the HSCT program, (2) an axisymmetric nozzle with a centerbody simulating the 'ACE' configuration also considered for the HSCT program. Details of the flow-field for model (1) are explored, while primarily the noise-field is explored for model (2). Effects of different tab configurations are documented.

Author

Ejectors; Flow Distribution; Free Jets; Nozzle Flow; Simulation; Tabs (Control Surfaces)

20010047400 NASA Langley Research Center, Hampton, VA USA

Flight, Wind-Tunnel, and Computational Fluid Dynamics Comparison for Cranked Arrow Wing (F-16XL-1) at Subsonic and Transonic Speeds

Lamar, John E., NASA Langley Research Center, USA; Obara, Clifford J., NASA Langley Research Center, USA; Fisher, Bruce D., NASA Langley Research Center, USA; Fisher, David F., NASA Dryden Flight Research Center, USA; February 2001; 168p; In English; Original contains color illustrations

Contract(s)/Grant(s): RTOP 522-31-31-03

Report No.(s): NASA/TP-2001-210629; NAS 1.60:210629; L-18018; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

Geometrical, flight, computational fluid dynamics (CFD), and wind-tunnel studies for the F-16XL-1 airplane are summarized over a wide range of test conditions. Details are as follows: (1) For geometry, the upper surface of the airplane and the numerical surface description compare reasonably well. (2) For flight, CFD, and wind-tunnel surface pressures, the comparisons are generally good at low angles of attack at both subsonic and transonic speeds, however, local differences are present. In addition, the shock location at transonic speeds from wind-tunnel pressure contours is near the aileron hinge line and generally is in correlative agreement with flight results. (3) For boundary layers, flight profiles were predicted reasonably well for attached flow and underneath the primary vortex but not for the secondary vortex. Flight data indicate the presence of an interaction of the secondary vortex system and the boundary layer and the boundary-layer measurements show the secondary vortex located more outboard than predicted. (4) Predicted and measured skin friction distributions showed qualitative agreement for a two vortex system. (5) Web-based data-extraction and computational-graphical tools have proven useful in expediting the preceding comparisons. (6) Data fusion has produced insightful results for a variety of visualization-based data sets.

Author

Aerodynamic Characteristics; Computational Fluid Dynamics; Subsonic Speed; Transonic Speed; Wind Tunnel Tests; Wing Profiles; Geometry; Flight Tests; Data Integration

20010047552 Riverbend Design Services, Palm Beach Gardens, FL USA

Turbine Aerodynamics Design Tool Development

Huber, Frank W., Riverbend Design Services, USA; [2001]; 31p; In English; Marshal Space Flight Center Fluids Workshop, 4-5 Apr. 2001, Huntsville, AL, USA; Original contains color illustrations

Contract(s)/Grant(s): NASA Order H-32853-D; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This paper presents the Marshal Space Flight Center Fluids Workshop on Turbine Aerodynamic design tool development. The topics include: (1) Meanline Design/Off-design Analysis; and (2) Airfoil Contour Generation and Analysis. This paper is in viewgraph form.

CASI

Turbine Engines; Aerodynamic Configurations; Computational Fluid Dynamics; Design Analysis

20010047593 NASA Langley Research Center, Hampton, VA USA

Cranked Arrow Wing (F-16XL-1) Flight Flow Physics with CFD Predictions at Subsonic and Transonic Speeds

Lamar, John E., NASA Langley Research Center, USA; [2001]; 20p; In English; RTO AVT Symposium on Advanced Flow Management, 7-10 May 2001, Loen, Norway, Part A: Vortex Flow and High Angle of Attack; Sponsored by Research and Technology Organization, France; Original contains color illustrations

Report No.(s): Paper-44; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The computational fluid dynamics (CFD) modeling used has produced reasonably good global upper-surface pressure coefficient comparisons with measured flight data at both transonic and subsonic speeds at the angles of attack presented. Boundary layer comparisons showed the profiles to be reasonably well predicted inboard and under the primary vortex system. However, the secondary vortex profile was not well predicted either at the anticipated separation point or under the secondary vortex. Moreover, the flight data showed there to be a vortex/boundary-layer interaction that occurred in the vicinity of the secondary vortex. The spanwise distribution of local skin friction measured data was reasonably well predicted, especially away from the wing leading-edge. Lastly, predicted and measured flight-pressures, as well as flight-image data, for the F-16XL-1 airplane are now available via the World Wide Web.
Author
Computational Fluid Dynamics; Vortices; Boundary Layers; Computerized Simulation

20010047619 Research and Technology Organization, Applied Vehicle Technology (AVT) Panel Meeting, Neuilly-sur-Seine, France
Vortical Flow Prediction Using an Adaptive Unstructured Grid Method
Pirzadeh, Shahyar Z., NASA Langley Research Center, USA; [2001]; 38p; In English; Symposium on Advanced Flow Management. Part A: Vortex Flow and High Angle of Attack, 7-11 May 2001, Norway; Original contains color illustrations
Report No.(s): Paper-13; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A computational fluid dynamics (CFD) method has been employed to compute vortical flows around slender wing/body configurations. The emphasis of the paper is on the effectiveness of an adaptive grid procedure in ”capturing” concentrated vortices generated at sharp edges or flow separation lines of lifting surfaces flying at high angles of attack. The method is based on a tetrahedral unstructured grid technology developed at the NASA Langley Research Center. Two steady-state, subsonic, inviscid and Navier-Stokes flow test cases are presented to demonstrate the applicability of the method for solving practical vortical flow problems. The first test case concerns vortex flow over a simple 65’ delta wing with different values of leading-edge bluntness, and the second case is that of a more complex fighter configuration. The superiority of the adapted solutions in capturing the vortex flow structure over the conventional unadapted results is demonstrated by comparisons with the windtunnel experimental data. The study shows that numerical prediction of vortical flows is highly sensitive to the local grid resolution and that the implementation of grid adaptation is essential when applying CFD methods to such complicated flow problems.
Author
Computational Fluid Dynamics; Mathematical Models; Vortices

20010047838 Catholic Univ. of America, School of Engineering and Architecture, Washington, DC USA
The Practical Calculation of the Aerodynamic Characteristics of Slender Finned Vehicles
Barrowman, James S., Catholic Univ. of America, USA; March 1967; 92p; In English
Report No.(s): NASA/TM-2001-209983; NAS 1.15:209983; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The basic objective of this thesis is to provide a practical method of computing the aerodynamic characteristics of slender finned vehicles such as sounding rockets, high speed bombs, and guided missiles. The aerodynamic characteristics considered are the normal force coefficient derivative, c(sub N(sub alpha)); center of pressure, bar-X; roll forcing moment coefficient derivative, c(sub l(sub delta)); roll damping moment coefficient derivative, c(sub l(sub p)); pitch damping moment coefficient derivative, c(sub mq); and the drag coefficient, c (sub D). Equations are determined for both subsonic and supersonic flow. No attempts is made to analyze the transonic region. The general configuration to which the relations are applicable is a slender axisymmetric body having three or four fins.
Derived from text
Aerodynamic Characteristics; Slender Bodies; Finned Bodies; Aerodynamic Configurations; Aircraft Design; Sounding Rockets; Bombs (Ordnance); Missiles

20010048653 NASA Ames Research Center, Moffett Field, CA USA
A Unified Development of Basis Reduction Methods for Rotor Blade Analysis
Ruzicka, Gene C., NASA Ames Research Center, USA; Hodges, Dewey H., Georgia Inst. of Tech., USA; [2001]; 1p; In English, 9-13 Sep. 2001, Pittsburgh, PA, USA; Sponsored by AMSE, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The axial foreshortening effect plays a key role in rotor blade dynamics, but approximating it accurately in reduced basis models has long posed a difficult problem for analysts. Recently, though, several methods have been shown to be effective in obtaining accurate,reduced basis models for rotor blades. These methods are the axial elongation method,the mixed finite element method, and the nonlinear normal mode method. The main objective of this paper is to demonstrate the close relationships among these methods, which are seemingly disparate at first glance. First, the difficulties inherent in obtaining reduced basis models of

rotor blades are illustrated by examining the modal reduction accuracy of several blade analysis formulations. It is shown that classical, displacement-based finite elements are ill-suited for rotor blade analysis because they can't accurately represent the axial strain in modal space, and that this problem may be solved by employing the axial force as a variable in the analysis. It is shown that the mixed finite element method is a convenient means for accomplishing this, and the derivation of a mixed finite element for rotor blade analysis is outlined. A shortcoming of the mixed finite element method is that is that it increases the number of variables in the analysis. It is demonstrated that this problem may be rectified by solving for the axial displacements in terms of the axial forces and the bending displacements. Effectively, this procedure constitutes a generalization of the widely used axial elongation method to blades of arbitrary topology. The procedure is developed first for a single element, and then extended to an arbitrary assemblage of elements of arbitrary type. Finally, it is shown that the generalized axial elongation method is essentially an approximate solution for an invariant manifold that can be used as the basis for a nonlinear normal mode.
Author
Rotor Dynamics; Rotary Wings; Axial Strain; Manifolds (Mathematics); Displacement

20010048902 NASA Ames Research Center, Moffett Field, CA USA
Wing-Body Aeroelasticity Using Finite-Difference Fluid/Finite-Element Structural Equations on Parallel Computers
Byun, Chansup, NASA Ames Research Center, USA; Guruswamy, Guru P., NASA Ames Research Center, USA; [1994]; 1p; In English
Contract(s)/Grant(s): RTOP 509-10-00; No Copyright; Avail: Issuing Activity; Abstract Only

In recent years significant advances have been made for parallel computers in both hardware and software. Now parallel computers have become viable tools in computational mechanics. Many application codes developed on conventional computers have been modified to benefit from parallel computers. Significant speedups in some areas have been achieved by parallel computations. For single-discipline use of both fluid dynamics and structural dynamics, computations have been made on wing-body configurations using parallel computers. However, only a limited amount of work has been completed in combining these two disciplines for multidisciplinary applications. The prime reason is the increased level of complication associated with a multidisciplinary approach. In this work, procedures to compute aeroelasticity on parallel computers using direct coupling of fluid and structural equations will be investigated for wing-body configurations. The parallel computer selected for computations is an Intel iPSC/860 computer which is a distributed-memory, multiple-instruction, multiple data (MIMD) computer with 128 processors. In this study, the computational efficiency issues of parallel integration of both fluid and structural equations will be investigated in detail. The fluid and structural domains will be modeled using finite-difference and finite-element approaches, respectively. Results from the parallel computer will be compared with those from the conventional computers using a single processor. This study will provide an efficient computational tool for the aeroelastic analysis of wing-body structures on MIMD type parallel computers.
Author
Aeroelasticity; Body-Wing Configurations; Computer Systems Programs; Dynamic Structural Analysis

03
AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; aircraft ground operations; flight safety and hazards; and aircraft accidents. Systems and hardware specific to ground operations of aircraft and to airport construction are covered in 09 Research and Support Facilities (Air). Air traffic control is covered in 04 Aircraft Communications and Navigation. For related information see also 16 Space Transportation and Safety; and 85 Technology Utilization and Surface Transportation.

20010044337 Federal Aviation Administration, Airport and Aircraft Safety Research and Development Div., Atlantic City, NJ USA
Thermal Decomposition Mechanism of 2,2-Bis-(4-Hydroxy phenyl)-1,1-Dichloroethylene-Based Polymers ***Final Report***
Ramirez, M. L.; Feb. 2001; 82p; In English
Report No.(s): PB2001-104382; DOT/FAA/AR-00/42; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The work has been conducted as part of the Federal Aviation Administration's (FAA) effort to develop fire-resistant materials for commercial aircraft cabins. Polymers based on 2.2-bis-(40hydroxyphenyl) -1,1-dichloroethylene (bisphenol C, BPC) have thermal and physical properties of bisphenol-A polymers but have an order of magnitude lower heat release in flaming combustion. This is due to a thermal degradation mechanism that yields only char and noncombustible gases in a fire. Two thermoplastics and one thermoset BPC-based polymer were studied to establish the decomposition mechanism of these materials. Thermal gravimetric analysis, differential scanning calorimetry, infrared spectroscopy, chromatography, and mass spectrometry

were used separately and in combination to characterize the thermal degradation mechanism. Results showed that the major volatiles are hydrogen chloride (HCI) and the degradation products of the linking group. The rearrangement through stilbenes and acetylenes is responsible for the high char yield when burned.
NTIS
Thermal Decomposition; Thermal Analysis; Polymers; Flammability; Aircraft Compartments

20010044338 Kurowski (Max) Aviation Group, Inc., Tulsa, OK USA
History, Processing, and Usage of Recycled Glycol for Aircraft Deicing and Anti-Icing ***Final Report***
Kurowski, M.; Feb. 2001; 52p; In English
Report No.(s): PB2001-104381; DOT/FAA/AR-99/55; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Numerous advancements in aircraft deicing/anti-icing fluids, application methodologies, training and deicing/anti-icing equipment have emerged in recent years; however, the undesirable effects of deicing fluid runoff on the environment remain a challenge. Although most proper disposal operations include precise metering on the resultant deicing operation runoff into sewer systems in amounts deemed not ecologically detrimental, this practice is not considered a suitable solution by all. Costs associated with glycol runoff may provide additional incentive for recycling. Capturing spent glycols for recycling into aircraft usable, certified deicing/anti-icing products or marketable glycols for nonaviation use is anticipated to ease the stress of local environs and water treatment plants. Practices and procedures addressing the recycling and reuse of these glycols are the underlying focus of this investigation. The primary objective of this study was to globally investigate and document spent glycol recycling methods and practices, including Asian, former Soviet bloc countries, and other areas of the world not within the purview of current SAE/ISO fluid standards.
NTIS
Ice Prevention; Glycols; Aircraft Icing; Deicers; Deicing; Antifreezes

20010044342 NASA Glenn Research Center, Cleveland, OH USA
First NASA Aviation Safety Program Weather Accident Prevention Project Annual Review
Colantonio, Ron, NASA Glenn Research Center, USA; May 2000; In English; First NASA Aviation Safety Program Weather Accident Prevention Project Annual Review, 23-25 May 2000, Hampton, VA, USA; Original contains color illustrations; Compatible with all leading CD-R writers and readers
Contract(s)/Grant(s): RTOP 577-40-30
Report No.(s): NASA/CP-2000-210207; E-12326; NAS 1.55:210207; NONP-NASA-CD-2001059508; No Copyright; Avail: CASI; C01, CD-ROM

The goal of this Annual Review was to present NASA plans and accomplishments that will impact the national aviation safety goal. NASA's WxAP Project focuses on developing the following products: (1) Aviation Weather Information (AWIN) technologies (displays, sensors, pilot decision tools, communication links, etc.); (2) Electronic Pilot Reporting (E-PIREPS) technologies; (3) Enhanced weather products with associated hazard metrics; (4) Forward looking turbulence sensor technologies (radar, lidar, etc.); (5) Turbulence mitigation control system designs; Attendees included personnel from various NASA Centers, FAA, National Weather Service, DoD, airlines, aircraft and pilot associations, industry, aircraft manufacturers and academia. Attendees participated in discussion sessions aimed at collecting aviation user community feedback on NASA plans and R&D activities. This CD is a compilation of most of the presentations presented at this Review.
Author
Aircraft Safety; Accident Prevention; Weather; Flight Safety; Communication Networks

20010047494 Boeing Commercial Airplane Group, Seattle, WA USA
Onboard Inert Gas Generation System/Onboard Oxygen Gas Generation System (OBIGGS/OBOGS) Study, Part 1, Aircraft System Requirements ***Final Report***
Reynolds, Thomas L., Boeing Commercial Airplane Group, USA; Bailey, Delbert B., Boeing Commercial Airplane Group, USA; Lewinski, Daniel F., Boeing Commercial Airplane Group, USA; Roseburg, Conrad M., Boeing Commercial Airplane Group, USA; May 2001; 180p; In English
Contract(s)/Grant(s): NAS1-20341; RTOP 728-50-20
Report No.(s): NASA/CR-2001-210903/PT1; E-12780/PT1; NAS 1.26:210903/PT1; D950-10529-Pt-1; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

The purpose of this technology assessment is to define a multiphase research study program investigating Onboard Inert Gas Generation Systems (OBIGGS) and Onboard Oxygen Generation Systems (OBOGS) that would identify current airplane systems design and certification requirements (Subtask 1); explore state-of-the-art technology (Subtask 2); develop systems specifications

(Subtask 3); and develop an initial system design (Subtask 4). If feasible, consideration may be given to the development of a prototype laboratory test system that could potentially be used in commercial transport aircraft (Subtask 5). These systems should be capable of providing inert nitrogen gas for improved fire cargo compartment fire suppression and fuel tank inerting and emergency oxygen for crew and passenger use. Subtask I of this research study, presented herein, defines current production aircraft certification requirements and design objectives necessary to meet mandatory FAA certification requirements and Boeing design and performance specifications. These requirements will be utilized for baseline comparisons for subsequent OBIGGS/OBOGS application evaluations and assessments.
Author
Systems Engineering; Rare Gases; Oxygen Production; Technology Assessment

20010047557 Federal Aviation Administration, Washington, DC USA
FAA Aerospace Forecasts Fiscal Years 2001-2012
Mar. 2001; 283p; In English
Report No.(s): AD-A388085; No Copyright; Avail: CASI; A13, Hardcopy; A03, Microfiche

In the publication FAA Aerospace Forecasts Fiscal Years 2001 - 2012 a number of risks were highlighted that had the potential to impact the accuracy of the short-term forecasts. Among these risks was slower growth in the U.S. economy. Subsequent to the completion of the forecasts presented in the publication, the Office of Management and Budget (0MB) issued a revised 11-year forecast for the U.S. economy, which projected significantly lower economic growth in 2001. However, the long-term U.S. economic forecasts for 2012 remain basically unchanged. The forecasts presented in these supplemental tables are based on the revised 0MB forecasts and reflect FAA's latest outlook for aviation activity and U.S. commercial air carrier traffic. Most of the impact occurred in 2001.
DTIC
Economics; Forecasting; Accuracy; Aerospace Systems

20010047596 Human Resources Research Organization, Alexandria, VA USA
Documentation of Validity for the AT-SAT Computerized Test Battery, Volume 2 ***Final Report***
Ramos, R. A.; Hall, M. C.; Manning, C. A.; Mar. 2001; 192p; In English; Original contains color illustrations
Report No.(s): PB2001-104873; DOT/FAA/AM-01/6; No Copyright; Avail: CASI; A02, Microfiche; A09, Hardcopy

This document is a comprehensive report on a large-scale research project to develop and validate a computerized selection battery to hire Air Traffic Control Specialists (ATCSs) for the Federal Aviation Administration (FAA). The purpose of this report is to document the validity of the Air Traffic Selection and Training (AT-SAT) battery according to legal and professional guidelines. An overview of the project is provided, followed by a history of the various job analyses efforts. Development of predictors and criterion measures are given in detail. The document concludes with the presentation of the validation of predictors and analyses of archival data.
NTIS
Air Traffic Controllers (Personnel); Personnel Selection; Employment

20010047597 Human Resources Research Organization, Alexandria, VA USA
Documentation of Validity for the AT-SAT Computerized Test Battery, Volume 1 ***Final Report***
Ramos, R. A.; Heil, M. C.; Manning, C. A.; Mar. 2001; 180p; In English; Original contains color illustrations
Report No.(s): PB2001-104872; DOT/FAA/AM-01/5; No Copyright; Avail: CASI; A02, Microfiche; A09, Hardcopy

This document is a comprehensive report on a large-scale research project to develop and validate a computerized selection battery to hire Air Traffic Control Specialists (ATCSs) for the Federal Aviation Administration (FAA). The purpose of this report is to document the validity of the Air Traffic Selection and Training (AT-SAT) battery according to legal and professional guidelines. An overview of the project is provided, followed by a history of the various job analyses efforts. Development of predictors and criterion measures are given in detail. The document concludes with the presentation of the validation of predictors and analyses of archival data.
NTIS
Air Traffic Controllers (Personnel); Education

20010047610 Civil Aeromedical Inst., Oklahoma City, OK USA
Access-to-Egress: A Meta-Analysis of the Factors That Control Emergency Evacuation through the Transport Airplane Type-III Overwing Exit ***Final Report***
McLean, G. A.; Jan. 2001; 36p; In English
Report No.(s): PB2001-104655; DOT/FAA/AM-01/2; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

This analytical review of the studies conducted to address access to the Type-III exit has confirmed that human factors effects related to passengers present the biggest challenge to the execution of successful evacuations. Deficiencies that may exist regarding configural and informational egress factors are expressed through their interactions with these human factors effects, which have often made determination of specific deficiencies more difficult. Solutions to overcoming deficiencies must address both the specific deficiency and its interactiveness.

NTIS
Human Factors Engineering; Egress; Aircraft Safety; Evacuating (Transportation)

20010047689 Federal Aviation Administration, William J. Hughes Technical Center, Atlantic City, NJ USA
Report of the 12A Working Group on Critical Ice Shapes for the Certification of Aircraft ***Final Report***
September 2000; 213p; In English
Report No.(s): AD-A384818; DOT/FAA/AR-00/37; No Copyright; Avail: CASI; A03, Microfiche; A10, Hardcopy

Task 12A of the Federal Aviation Administration (FAA) Aircraft In-Flight Icing Plan states that the ”FAA, along with industry and research organizations, shall form a working group to explore categories of ice accretions that represent potential safety problems on aircraft” with the goal of developing guidance material on the determination of critical ice accretion shapes and roughness in aircraft certification. Accordingly, the 12A Working Group, on critical ice shapes used in icing certification, was formed under the joint leadership of the FAA and the National Aeronautics and Space Administration (NASA) in November 1997. This report describes the activities and findings of the 12A Working Group and its recommended actions for progress to meet the goals stated in the FAA Aircraft In-Flight Icing Plan.

DTIC
Deposition; Aircraft Icing; Ice; Shapes; Surface Roughness

20010048032 Federal Aviation Administration, Technical Center, Atlantic City, NJ USA
Longitudinal Acceleration Test of Overhead Luggage Bins and Auxiliary Fuel Tank in a Transport Airplane Airframe Section, Part 2 ***Final Report***
McGuire, Robert, Federal Aviation Administration, USA; Oct. 2000; 139p; In English; Original contains color plates
Contract(s)/Grant(s): DOT/FAA/AR-99/4
Report No.(s): AD-A388305; DOT/FAA/AR-99/4-2; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

This report contains the description and test results of overhead stowage bin calibrations and longitudinal impact testing of a 10-foot transport airframe section conducted at the Transportation Research Center Inc. (TRC). The purpose of the tests was to measure the structural responses and interaction between the fuselage, overhead stowage bins, and auxiliary fuel tank under simulated, potentially survivable, crash conditions. A 10-foot section from a Boeing 737, Model 200 was used as the test section. The overhead stowage bin connection supports were instrumented with strain gages and calibrated. Two types of overhead storage bins were installed in the transport airframe and pulled in a longitudinal direction at various known loads to monitor and record the strain gage outputs. The transport airframe was longitudinally impact tested using TRC’s 24-inch shock tester. Peak accelerations and corresponding velocity changes of 6.1 g (23.2 ft/sec), 8.2 g (32.2 ft/sec), and 14.2 g (41.7 ft/sec) were recorded. The transport airframe section was configured with a 120-inch overhead stowage bin (Bin A) attached to the left/pilot side, a 60-inch overhead stowage bin (Bin B) attached to the right/copilot side, and a 500-gallon auxiliary fuel tank attached underneath the airframe’s passenger floor section. The test articles were equipped with accelerometers, strain gages, and potentiometers totaling approximately 90 channels of data per simulated crash test.

DTIC
Acceleration (Physics); Fuel Tanks; Impact Tests; Aircraft Compartments

20010048036 Naval Air Warfare Center, Aircraft Div., Patuxent River, MD USA
Probability of Aircraft Tactical Hazards IV (PATH IV) Next Generation of Navy Model for Safe Escape
Lehman, Christopher J.; Jan. 2001; 16p; In English; Prepared in collaboration with DCS Corp.
Report No.(s): AD-A388298; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

PATH IV is the latest product in the evolution of the Navy’s PATH (Probability of Aircraft Tactical Hazards) series of safe escape models. PATH IV introduces a fully 3-dimensional model to describe the interaction between the aircraft and the warhead

fragment cloud and uses fourth-order Runge-Kutta numerical integration to compute the trajectories of these fragments. Using a fully 3-dimensional model contributes to an increased accuracy in the description of the fragment cloud via 3-dimensional fragment cells. The model also simulates the physical situation in a more natural, intuitive manner than a 2-dimensional model can provide. to minimize execution time on older, slower computers, the previous versions of the Navy's safe escape models principally used ballistic functions to compute the fragment trajectory data and thus approximated the actual position data for fragments. As weapon release altitudes have increased with increasing aircraft capability, the accuracy of these ballistic functions has degraded and has become unacceptable for high-altitude releases. Since current computers allow more flexibility in execution time, the use of numerical integration is now possible and removes this accuracy problem and at the same time allows the Navy to add capabilities that were not possible with the older ballistic functions. The three previous versions of the Navy safe escape models were all coded in the FORTRAN programming language that minimized the range of problems for which these models could be used. The object-oriented design of PATH IV has allowed a more generalized design and increased its range of use. by providing the more general concepts of an object at risk and a detonating object, PATH IV allows for a broader range of possible scenarios and the inclusion of collateral damage and force protection computations. Safe escape studies involving more than one aircraft are also supported in PATH IV. The object-oriented design also greatly facilitates the extension of the model for future uses, particularly the inclusion of functionality for probability of damage or kill studies.
DTIC
Mathematical Models; Aircraft Hazards; Probability Theory; Computer Programming; Navy

20010048090 Royal Aeronautical Society, London, UK
Safety is No Accident: Proceedings
[2001]; 110p; In English; Safety is No Accident, 2 May 2001, London, UK; See also 20010048091 through 20010048097; ISBN 1-85768-142-8; Copyright; Avail: Issuing Activity

This document contains the papers presented at the Royal Aeronautical Society's conference 'Safety is No Accident.' The titles are as follows: (1) Operator Global Accident Prevention Flight Safety Strategy; (2) Human Factors: The Big Picture; (3) Maintenance Error Reduction; (4) Common Themes in Transport Safety Initiative--Aerospace, Railways, Shipping, and Automobile; (5) Planning for Safer Operations through Safety Management Systems; (6) Safety Management Systems in Engineering and Maintenance; (7) Flight Operations Safety Management Systems; and (8) A Non-Traditional Look at Safety.
CASI
Accident Prevention; Flight Safety; Safety Management; Management Systems; Conferences

20010048091 Joint Aviation Authorities, UK
Operator Global Accident Prevention Flight Safety Strategy
Rebender, G., Joint Aviation Authorities, UK; Safety is No Accident: Proceedings; [2001], pp. 1.1 - 1.21; In English; See also 20010048090; Copyright; Avail: Issuing Activity

The Joint Aviation Authorities' (JAA's) aim at continuous improvements of its effective safety system is leading to further reductions of the annual number of accidents and the annual number of fatalities irrespective of the growth of the air traffic.
Author
Accident Prevention; Air Traffic; Flight Safety

20010048092 Civil Aviation Authority, UK
Human Factors: The Big Picture
Courteney, Hazel, Civil Aviation Authority, UK; Safety is No Accident: Proceedings; [2001], pp. 2.1 - 2.11; In English; See also 20010048090; Copyright; Avail: Issuing Activity

It is no longer news to say that crew error is the most common causal factor in aviation accidents. In fact, human errors would probably account for all but a handful of accidents if the definition were extended to errors in air traffic management, aerodrome support, aircraft maintenance, production, design, organizational management, and so on. Human error is our single biggest safety risk. Yet, despite this awareness, and the current high profile of 'human factors' in the industry, the issues remain cloudy, much debated and unresolved. This paper will discuss what 'human factors' actually means, where some of the issues really come from, and what is being done in one particularly important area - type certification of aircraft design.
Author
Aircraft Accidents; Human Performance; Errors; Flight Safety

20010048093 Cranfield Univ., UK

Maintenance Error Reduction

Thompson, Mike, Cranfield Univ., UK; Safety is No Accident: Proceedings; [2001], pp. 3.1 - 3.12; In English; See also 20010048090; Copyright; Avail: Issuing Activity

When embarking on a discussion relating to any subject it is useful, I believe, at the outset to headline the issues that have given rise to the need for that discussion. In the particular case of maintenance error reduction I would therefore like to mention one or two points to put this issue into context. Large transport aircraft accident rates have fallen over the last 30 years, to rate currently fewer than five accidents per million departures. However, if, as predicted, air traffic doubles over the next 10 to 15 years, this low accident rate could yield double the number of accidents. A UK study of more than 200 maintenance occurrences identified that incorrect installation contributed to 60% of the cases, and Boeing statistics identified maintenance error as the primary cause of 6% of aircraft losses and a contributory cause in approximately 17%. In an attempt to identify the dollar cost of human error it might be appropriate to consider for a moment that airlines purchase Hull All Risks and Liability Insurance based on the agreed value of aircraft and a specified limit of liability. However, there is no such thing as 'All Risks' for example two exclusions are War and Aircraft Hull Deductibles. In the latter case a wide body hull deductible can be US$ 1 million, and to insure against it is very expensive indeed, so airlines don't buy it and what is more it does not cover consequential losses (Loss of use, delay, etc.). The latest estimate of the global cost to the industry for uninsured losses is US$ 3 billion annually (Willis Insurance Brokers). and maintenance error is a major contributor to this enormous cost. to suggest that maintenance error in aircraft can be eliminated entirely would be naive, however, it is possible to reduce its likelihood by the introduction of initiatives aimed at establishing awareness in the workplace of the conditions that provoke error. Furthermore, the adoption of appropriate maintenance error management systems will provide management with the feedback necessary to position the workforce for future growth and improved performance. The concerns surrounding the issue of maintenance error eventually manifested themselves following investigations into a number of incidents and accidents that revealed that the Human Element had played a major part in their causes. There are numerous accident reports now in the public domain that have identified human error as the contributory cause, but for the purposes of this paper I would like to, very briefly, mention just six to demonstrate how maintenance related activities can be so error provoking.

Author

Aircraft Accidents; Aircraft Maintenance; Commercial Aircraft; Errors; Human Performance

20010048094 BMT Reliability Consultants Ltd., Fareham, UK

Common Themes in Transport Safety Initiative: Aerospace, Railways, Shipping and Automobile

Starling, Michael, BMT Reliability Consultants Ltd., UK; Safety is No Accident: Proceedings; [2001], pp. 4.1 - 4.5; In English; See also 20010048090; Copyright; Avail: Issuing Activity

What I intend to do in this talk is to draw together some of the common themes that are emerging in transport safety and in particular in the aerospace, railway shipping, and automobile sectors. It is based on BMT's experience in transport safety.

Author

Automobiles; Rail Transportation; Safety; Accident Prevention

20010048095 Shell Aircraft Ltd., UK

Planning for Safer Operations Through Safety Management Systems

Edwards, Cliff, Shell Aircraft Ltd., UK; Safety is No Accident: Proceedings; [2001], pp. 5.1 - 5.25; In English; See also 20010048090; Copyright; Avail: Issuing Activity

Safety Management Systems, as a means of improving safety performance, will only work if it has full commitment from top management and the support of the staff. Careful consideration must be given to the implementation and continuing operation of such systems to ensure it will add value to the organizations systems. Without adequate planning Safety Management will not be effective,

Derived from text

Management Systems; Safety Management

20010048096 Civil Aviation Authority, Flight Operations Inspectorate (Aeroplanes), Gatwick, UK

Flight Operations Safety Management Systems

Johnson, Brian E., Civil Aviation Authority, UK; Safety is No Accident: Proceedings; [2001], pp. 7.1 - 7.3; In English; See also 20010048090; Copyright; Avail: Issuing Activity

The Safety Management System (SMS) sets out a Company's safety policy and how it will manage safety as an integral part of its overall business. CAA's Safety Regulation Group (SRG) recommends that companies establishing an SMS need to take a

pragmatic approach, building where possible on existing policies, procedures and practices, particularly Quality Management. This paper describes the benefits of an SMS and the contents of a new publication 'Safety Management Systems for Commercial Air Transport Operations - A Guide to Implementation' which will shortly be issued as Civil Aviation Publication 712.
Author
Management Systems; Flight Safety; Policies; Safety Management

20010048097 Federal Aviation Administration, Small Airplane Directorate, USA
A Non-Traditional Look at Safety
Gallagher, Michael, Federal Aviation Administration, USA; Colomy, John, Federal Aviation Administration, USA; Safety is No Accident: Proceedings; [2001], pp. 8.1 - 8.9; In English; See also 20010048090; Copyright; Avail: Issuing Activity

During the last century, general aviation (GA), including rotorcraft, has grown from humble beginnings into a mature safe transportation system. The high levels of safety achieved in GA were made possible through the combined efforts of all members of the GA community, including manufacturers, owners, operators, maintainers, academia, and regulators. The 1990's saw a lifeless GA industry begin another growth cycle. As we move into the 21st century it is important that the Federal Aviation Administration (FAA) Small Airplane Directorate (SAD) participate with manufacturers and the GA community to raise the level of safety. This importance goes beyond preventing accidents, which is the SAD's primary goal. Our role in the health of GA is to work with manufacturers and GA organizations to determine the most effective (value verses cost) ways to reduce accidents in both the existing fleet and new airplanes. Safety is an important component to the overall value of an airplane and has become an important selling point for new airplane designs. It is vital that the SAD, working with industry and organizations, improve the small airplane safety record if the GA market is to grow beyond the enthusiast market. Our role includes studying and understanding the causes of accidents. The GA community has collected a large volume of safety data based on service history. Review of these data (through programs like the FAA Administrator's Safer Skies Initiative) has highlighted several key areas where we can improve safety. Complimentary to the data review processes, the SAD has taken a critical look at how we do business and interface with owners and operators. Our self-evaluation has led us to new approaches in our approval process. This paper outlines changes taking place in the FAA and the efforts that we are making to reduce the number of accidents in the current fleet and improve our effectiveness in working with industry, operators, and owners to field a new generation of equipment and aircraft.
Author
Accident Investigation; Flight Safety; Accident Prevention

20010048916 Army Safety Center, Fort Rucker, AL USA
Countermeasure, Volume 22
January 2001; 16p; In English
Report No.(s): AD-A387213; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Without accident investigation, many questions would go unanswered, prevention measures could not be developed, and soldiers would be left to make the same mistakes that often took the lives of fellow soldiers.
Derived from text
Accident Investigation; Countermeasures; Prevention

04
AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes all modes of communication with and between aircraft; air navigation systems (satellite and ground based); and air traffic control. For related information see also 06 Avionics and Aircraft Instrumentation; 17 Space Communications; Spacecraft Communications, Command and Tracking, and 32 Communications and Radar.

20010045822 NASA Goddard Space Flight Center, Greenbelt, MD USA
A Low Cost GPS System for Real-Time Tracking of Sounding Rockets
Markgraf, M., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Montenbruck, O., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Hassenpflug, F., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Turner, P., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Bull, B., NASA Goddard Space Flight Center, USA; [2001]; 1p; In English; 15th Symposium on European Rocket and Balloon Programmes and Related Research, 28 May - 1 Jun. 2001, Biarritz, France; Sponsored by European Space Agency, France; No Copyright; Avail: Issuing Activity; Abstract Only

In an effort to minimize the need for costly, complex, tracking radars, the German Space Operations Center has set up a research project for GPS based tracking of sounding rockets. As part of this project, a GPS receiver based on commercial

technology for terrestrial applications has been modified to allow its use under the highly dynamical conditions of a sounding rocket flight. In addition, new antenna concepts are studied as an alternative to proven but costly wrap-around antennas.
Author
Low Cost; Global Positioning System; Receivers

20010046486 NASA Ames Research Center, Moffett Field, CA USA
A Cognitive Engineering Analysis of the Vertical Navigation (VNAV) Function
Sherry, Lance, RAND/Honeywell International, Inc., USA; Feary, Michael, NASA Ames Research Center, USA; Polson, Peter, Colorado Univ., USA; Mumaw, Randall, Boeing Computer Services Co., USA; Palmer, Everett, NASA Ames Research Center, USA; April 2001; 27p; In English
Contract(s)/Grant(s): RTOP 711-41-12
Report No.(s): NASA/TM-2001-210915; NAS 1.15:210915; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A cognitive engineering analysis of the Flight Management System (FMS) Vertical Navigation (VNAV) function has identified overloading of the VNAV button and overloading of the Flight Mode Annunciator (FMA) used by the VNAV function. These two types of overloading, resulting in modal input devices and ambiguous feedback, are well known sources of operator confusion, and explain, in part, the operational issues experienced by airline pilots using VNAV in descent and approach. A proposal to modify the existing VNAV design to eliminate the overloading is discussed. The proposed design improves pilot's situational awareness of the VNAV function, and potentially reduces the cost of software development and improves safety.
Author
Flight Management Systems; Cognitive Psychology; Vertical Flight

20010047393 NASA Glenn Research Center, Cleveland, OH USA
Satellite Communications for Aeronautics Applications: Technology Development and Demonstration
Kerczewski, Robert J., NASA Glenn Research Center, USA; Hoder, Douglas J., NASA Glenn Research Center, USA; Zakrajsek, Robert J., NASA Glenn Research Center, USA; March 2001; 12p; In English; 2001 Aerospace Conference, 10-17 Mar. 2001, Big Sky, MT, USA; Sponsored by Institute of Electrical and Electronics Engineers, USA
Contract(s)/Grant(s): RTOP 727-01-00
Report No.(s): NASA/TM-2001-210766; E-12695; NAS 1.15:210766; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The National Aeronautics and Space Administration (NASA) is performing research and development to improve the safety and increase the capacity of the National Airspace System (NAS). Improved communications, especially to and from the aircraft flight deck, has been identified as an essential enabling technology for future improvements to the air traffic management system and aviation safety. NASA's Glenn Research Center is engaged in research and development of satellite communications technologies for aeronautical applications. A mobile aero terminal has been developed for use with Ku band commercial communications satellites. This experimental terminal will be used in mobile ground and air-based tests and demonstrations during 2000-2004. This paper will describe the basic operational parameters of the Ku Band aero terminal, the communications architecture it is intended to demonstrate, and the key technology issues being addressed in the tests and demonstrations. The design of the Ku Band aero terminal and associated ground testbed, planned tests and demonstrations, and results to date will be presented.
Author
Satellite Communication; Flight Safety; Superhigh Frequencies; Radio Communication; Aircraft Safety; NASA Programs; National Airspace System

20010048175 NASA Goddard Space Flight Center, Greenbelt, MD USA
A Post-Flight Comparison Between GPS Signal Generator and On-Orbit Testing Results from the STS-101 and STS-106 SOAR Shuttle Flight Experiment
Simpson, James, NASA Goddard Space Flight Center, USA; Gomez, Susan, NASA Johnson Space Center, USA; [2001]; 1p; In English; GPS Conference, 11-14 Sep. 2001, Salt Lake City, UT, USA; Sponsored by Institute of Navigation, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The use of a GPS Signal Generator (GPSSG) prior to launch for verification of a GPS subsystem and GN&C system on a spacecraft is becoming a very common practice. The level of confidence in the verification created by running a receiver with a GPSSG can greatly impact both schedule and cost of spacecraft development. This paper addresses the comparison of the Space Shuttle STS-101 and STS-106 Space Integrated GPS/INS (SIGI) Orbital Attitude Readiness (SOAR) flight experiments on-orbit performance with the performance from the same receiver on a Global Simulation Systems (GSS) GPSSG. The SOAR flight

experiment was designed to demonstrate on-orbit performance of the International Space Station Force-19 GPS receiver. This paper discusses the process involved in getting the post-flight Best Estimate of Trajectory and Best Estimate of Attitude into the GPSSG such that the Force-19 receiver will experience the same trajectory and environmental conditions as observed during the SOAR flight experiment. Results of the comparison conclude with recommendations of how better to construct and interpret results from receiver tests using a GSS GPSSG.
Author
Space Transportation System; Space Transportation System Flights; Spacecraft Design; Postflight Analysis; Global Positioning System; Signal Generators; Space Shuttles

20010048880 NASA Ames Research Center, Moffett Field, CA USA
The Final Approach Spacing Tool
Davis, Thomas J., NASA Ames Research Center, USA; Bergh, Christopher, Massachusetts Inst. of Tech., USA; Krzeczowski, Ken J., Sterling Federal Systems, Inc., USA; [1994]; 1p; In English; IFAC Conference, Sep. 1994, Palo Alto, CA, USA; Sponsored by International Federation of Automatic Control, Unknown
Contract(s)/Grant(s): RTOP 505-64-13; No Copyright; Avail: Issuing Activity; Abstract Only

A system for assisting terminal area air traffic controllers in the management and control of arrival traffic, referred to as the Final Approach Spacing Tool (FAST), is being developed at NASA Ames Research Center. In a cooperative program, NASA and FAA have efforts underway to install and evaluate the system at the Dallas/Fort Worth Terminal Radar Approach Control facility. This paper will review the software architecture, the algorithms components, and the human-machine interface. The system is based on continuous updates of a detailed trajectory analyses of all arrival aircraft. FAST interprets the results of these trajectory analyses to build an efficient and procedurally acceptable plan for the arrival traffic that consists of a sequence, schedule, and runway assignment. The system utilizes a heuristically-based conflict resolution algorithm to build a solution trajectory that satisfies the plan, It extracts a series of speed and heading advisories from the solution trajectory to assist the controller in efficiently managing and controlling the arrival traffic down to the runway. The advisories are displayed in a graphical format to the controller. In addition to the radar tracking data, the system also relies on a series of data bases. These data bases contain aircraft performance models, airline preferred operational procedures, airspace structure, air traffic procedural models, and a three dimensional wind model. Field evaluation of FAST is expected to begin in 1994.
Author
Air Traffic; Air Traffic Controllers (Personnel); Airline Operations; Computer Programs; Ground Based Control; Man Machine Systems

05
AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes all stages of design of aircraft and aircraft structures and systems. Also includes aircraft testing, performance, and evaluation, and aircraft and flight simulation technology. For related information, see also 18 Spacecraft Design, Testing and Performance and 39 Structural Mechanics. For land transportation vehicles, see 85 Technology Utilization and Surface Transportation.

20010045643 Naval Postgraduate School, Monterey, CA USA
An Analysis of the Manpower Costs Associated with the Helicopter Air Wing Commander Concept
Brennan, Peter J.; Mar. 1998; 120p; In English
Report No.(s): AD-A343363; No Copyright; Avail: Defense Technical Information Center (DTIC)

This thesis presents an analysis and comparison of manpower costs of three options for the USA Navy Helicopter force structure through the year 2020. The first option, the basic plan, leaves the force structure as it is today. The second option assumes the mission to support the Military Sealift Command (MSC) is outsourced and combines the Helicopter Combat Support (HC) and Helicopter Antisubmarine Warfare (HS) communities into a community referred to as HSC. The third option realigns the force along missions performed by the SH-60Bs and CH-60 under a Helicopter Air Wing Commander (HAWC). All three options support the requirements set forth in the Helo Master Plan (HMP) and are based on the acquisition of the CH-60 helicopter along with the upgrade of all SH-6OBs and SH-60Fs to SH-60Rs. The analysis involved developing manning levels, by pay grade, for the three options and determining the differences in those manning levels. Manpower costs were allocated to the total personnel requirements, and differences in costs among the options were calculated. The manpower cost associated with the basic plan set forth in the HMP is projected to be $575 million per year. Because the HSC option does not support the MSC mission, it has the lowest annual projected manpower cost of $531 million. When a factor accounting for the MSC requirement is added to compare

the three manning structures on a consistent basis, the annual HSC option cost is $579 million. The HAWC concept manpower cost is $568 million per year.
DTIC
Costs; Helicopters; Manpower

20010045674 FDC/NYMA, Inc., Hampton, VA USA
Data Mining of NASA Boeing 737 Flight Data: Frequency Analysis of In-Flight Recorded Data
Butterfield, Ansel J., FDC/NYMA, Inc., USA; March 2001; 28p; In English
Contract(s)/Grant(s): NAS1-96013; RTOP 706-61-11-01
Report No.(s): NASA/CR-2001-210641; NAS 1.26:210641; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Data recorded during flights of the NASA Trailblazer Boeing 737 have been analyzed to ascertain the presence of aircraft structural responses from various excitations such as the engine, aerodynamic effects, wind gusts, and control system operations. The NASA Trailblazer Boeing 737 was chosen as a focus of the study because of a large quantity of its flight data records. The goal of this study was to determine if any aircraft structural characteristics could be identified from flight data collected for measuring non-structural phenomena. A number of such data were examined for spatial and frequency correlation as a means of discovering hidden knowledge of the dynamic behavior of the aircraft. Data recorded from on-board dynamic sensors over a range of flight conditions showed consistently appearing frequencies. Those frequencies were attributed to aircraft structural vibrations. Author
Boeing 737 Aircraft; Structural Vibration; Aerodynamics; Dynamic Characteristics; Aircraft Structures

20010046969 General Accounting Office, Washington, DC USA
Tactical Aircraft: Modernization Plans Will Not Reduce Average Age of Aircraft: Report to the Secretary of Defense
Feb. 2001; 77p; In English
Report No.(s): AD-A386698; GAO-01-163; No Copyright; Avail: CASI; A01, Microfiche; A05, Hardcopy

The Department of Defense (DOD) faces a major challenge as it continues to implement its current tactical aircraft modernization plans. The Navy and the Air Force will not be able to procure enough new tactical aircraft to reduce the average age of tactical aircraft, and over the next 11 years, the average age will continue to increase, we especially in the Air Force. The upcoming Quadrennial Defense Review provides an opportunity to assess whether the issue of aging requires concerted attention. Therefore, we recommend that if DOD considers reducing the average age of tactical aircraft as a critical goal for their modernization plans, the 2001 Quadrennial Defense Review should consider alternatives to the current tactical aircraft modernization plans to achieve this goal.
DTIC
Defense Program; Military Aircraft

20010046981 NASA Ames Research Center, Moffett Field, CA USA
SHARP-B2: Flight Test Objectives, Project Implementation and Initial Results
Salute, Joan, NASA Ames Research Center, USA; Bull, Jeff, NASA Ames Research Center, USA; Rasky, Dan, NASA Ames Research Center, USA; Keese, David, Sandia National Labs., USA; [2001]; 26p; In English; 2nd Annual Conference on Composites, Materials and Structures, 22-25 Jan. 2001, Cocoa Beach, FL, USA; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

On September 28, 2000 the SHARP-B2 flight experiment was launched from Vandenberg Air Force Base, California. SHARP-B2 is the 2nd Ballistic flight test in the SHARP (Slender Hypervelocity Aerothermodynamic Research Probes) program which develops and tests new thermal protection materials and sharp body concepts. The flight tested Ultra-High Temperature Ceramics (UHTCs), which may radically change the design and performance of future aerospace vehicles. The new designs may overturn an age-old tenet of aerodynamics: that blunt-body aerospace vehicles, but not those with sharp leading edges, can survive the searing temperatures created as the vehicles tear through the atmosphere. Sharp leading edges offer numerous advantages over the blunt-body design currently in use. They could allow a space shuttle or crew return vehicle to maneuver in space more like an airplane and potentially allow astronauts to return to Earth from anywhere on orbit. They may allow improved astronaut safety by decreasing the risk of aborting into the ocean. They may reduce the electromagnetic interference that causes the communications blackouts that plague reentering blunt-body space vehicles. Reducing the amount of drag could lead to a reduction in propulsion requirements. Planetary probes could make use of sharp-body technology for aerobraking and to maximize their maneuvering capability. SHARP-B2 was a joint effort among NASA Ames, Sandia National Laboratories, the U.S. Air Force and the U.S. Army. It was funded by the Pathfinder Program at NASA's Marshall Space Flight Center. The SHARP-B2 payload was carried aboard a U.S. Air Force Minuteman III missile carrying a modified Mk 12A reentry vehicle (RV),

which blasted off from Vandenberg Air Force Base near Lompoc, CA, at 3:01 a.m. PDT on Sept. 28. The RV was equipped with four 5. 1 inch-long strakes, or sharp leading edges. Each strake contained three UHTCs: ZrB2/SiC/C; ZrB2/SiC; and HfB2/SiC. Once it reached an altitude of about 400 nautical miles, the RV was released, returning through Earth's atmosphere at speeds exceeding Mach 22. One pair of strakes was designed to retract just before reaching temperatures high enough to cause the material to begin ablating. The other pair was designed to retract shortly after ablation began, at an expected temperature of nearly 5,100 degrees Fahrenheit. Sensors in the strakes measured how closely performance matched pre-flight calculations, and data was successfully collected throughout the 23-minute flight. A parachute was deployed (but not fully inflated) and the RV splashed down in a lagoon at the Kwajalein missile range in the Pacific Ocean. Within 3 hours radar track analysis showed ocean entry to be precisely at the latitude/longitude coordinates estimated during pre-flight simulation. An hour later a ship was deployed by the Army to recover the reentry vehicle, which was recovered in 165 feet of water, just 500 feet from its planned splash-down point. This is the first RV recovery in over a decade.
Derived from text
Aerothermodynamics; Blunt Bodies; Ceramics; Flight Simulation; Flight Tests; Thermal Protection

20010047075 Boeing Co., Seattle, WA USA
ASTAC Airframe Systems Subcommittee Perspective
Anderson, M. O., Boeing Co., USA; Turbulence Modeling Workshop; March 2001, pp. 48-73; In English; See also 20010047073; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

This paper presents The Airframe Systems Subcommittee's perspective in support of NASA's Aerospace Technology Advisory Committee (ASTAC) and NASA Advisory Council (NAC). The topics include: 1) NASA's Advisory Council Structure; 2) Strategic R&D Issues for Subcommittee; 3) Airframe Systems Subcommittee Assessments; and 4) Expectations.
Derived from text
Airframes; Turbulence Models; Aerospace Systems

20010047260 Naval Air Warfare Center, Aircraft Div., Patuxent River, MD USA
S-3B Small-Scale Applique Coupon Flight Test Evaluation Results, *of test results*
Werking, William E.; Kuhlman, Jeffery A.; Jan. 09, 2001; 32p; In English
Report No.(s): AD-A388188; NAWCADPAX/RTR-2000/97; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

An evaluation of FP500 and FP1500 paint replacement film (applique) small-scale coupons with 52-4 adhesive installed on the S-3B aircraft was conducted during 225 hr of laboratory tests and 2 flights totaling 2.0 flight-hours to determine system suitability for large-scale coupon evaluation. Complete adhesion of the film to the surface of the aircraft during basic maneuvers is an enhancing characteristic that will promote reliable performance of FP500 and FP1500 applique material reducing corrosion and maintenance down time aircraft. Tattering of prepeeled (failed) sections of the applique was an enhancing characteristic that will prevent any in-flight failures from becoming catastrophic failures. The capability of the adhesive to adhere to the film and not the aircraft surface during applique removal is an enhancing characteristic that will facilitate the rapid removal of the applique. There are no deficiencies.
DTIC
Flight Tests; S-3 Aircraft; Protective Coatings

20010047277 Naval Air Warfare Center, Aircraft Div., Patuxent River, MD USA
Development and Testing of the F/A-18 Replacement MIL-STD-1760 Umbilical
Jahn, Susan; Miller, Greg; Jan. 2001; 38p; In English
Report No.(s): AD-A388254; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The purpose of this presentation is to improve the fit, and service life of the umbilical design.
DTIC
F-18 Aircraft; Cables (Ropes); Tetherlines; Umbilical Connectors; Service Life

20010047278 Naval Air Warfare Center, Aircraft Div., Patuxent River, MD USA
Development and Testing of the F/A-18 Replacement MIL-STD-1760 Umbilical
Jahn, Susan; Miller, Greg; Jan. 1998; 12p; In English
Report No.(s): AD-A388256; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The U.S. Navy F/A-18 aircraft currently uses a generic weapon umbilical cable with the new MIL-STD-1760 interface weapons. The existing cable has been shown to be problematic during weapon separation/integration testing and general fleet use. Modification of the existing cable was not feasible so redesign was required for replacement. The goals of the replacement cable

design were to fix the specific problem areas of the existing cable as well as improving overall performance and service life. The service life goals for the umbilical were to be suitable for reuse for at least 25-30 releases. NAWCAD (4.11.2) developed a testing approach for qualification of the umbilical and to credibly assess service performance potential without specific airborne release tests. The qualification effort 5 discussed from an overall perspective as well as details of the lightning testing of the connector, static, and ejection testing, and captive flight testing of the cable. A short summary of post. certification efforts involving the umbilical is also given along with conclusions concerning the test effort.
DTIC
F-18 Aircraft; Cables (Ropes); Umbilical Connectors; Tetherlines; Service Life

20010047562 Naval Air Warfare Center, Aircraft Div., Patuxent River, MD USA
Atlantic Test Range. Dynamic RCS Measurement Capability
Jun. 28, 2000; 34p; In English
Report No.(s): AD-A388094; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This slide presentation reports on the capabilities of the Dynamic Avionics Measurement Branch at the Naval Air Warfare Center Aviation Division. Developmental tests and evaluation (DT&E) are conducted on Navy aircraft and their avionics systems. These systems include radars (fighter/attack, sea surveillance, and AEW), Navigation (IFF, GPS, and INS), communications (voice and data link), reconnaissance systems, antenna systems, forward looking infrared systems and ASW systems. Also included are electronic support measures (ESM) systems, electronic intelligence (ELINT) systems, radar warning receivers, missile warning systems, communications receivers, and antenna patterns. Additionally, NAWC-AD has the mission to conduct performance testing of ECM and ECCM avionics systems including aircraft signature measurements (RCS), radar and communication Jammer-to-Signal (J/S) ratio measurements, Chaff and decoy measurements.
DTIC
Avionics; Antenna Design; Communication Equipment; Performance Tests; Radar Tracking; Reconnaissance; Warning Systems; IFF Systems (Identification); FLIR Detectors

20010047570 Defence and Civil Inst. of Environmental Medicine, Downsview, Ontario Canada
Damage Mechanisms and Non-Destructive Testing in the Case of Water Ingress in CF-18 Flight Control Surfaces
Giguere, J. S.; Aug. 2000; 36p; In English
Report No.(s): AD-A388125; DCIEM-TM-2000-098; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Most service failures of adhesive bonded aircraft structures have been attributed to environmental degradation of bonded joints exposed to moist conditions. High humidity normally leads to plasticisation of the adhesive and an associated reduction of mechanical properties recoverable upon drying. Conversely, direct water ingress causes permanent adhesive bond degradation. Very little is known of the degradation mechanisms experienced with direct water ingress; however, this knowledge is required to establish the inspection requirements and for fielding nondestructive testing (NDT) techniques. This technical memorandum details the possible damage mechanisms and the results obtained with various nondestructive testing techniques tested during the course of the project.
DTIC
Nondestructive Tests; Damage Assessment; Bonded Joints; Adhesive Bonding; Control Surfaces; Flight Control; Joints (Junctions)

20010047680 Army Aviation and Missile Command, Research, Development, and Engineering Center, Redstone Arsenal, AL USA
Application of Low-Cost Turbo-Jet Powered Interceptors for Cruise Missile Defense
Jimmerson, Gary T., Army Aviation and Missile Command, USA; Dali, Hans J., Northrop Grumman Corp., USA; [2000]; 10p; In English
Report No.(s): AD-A386395; No Copyright; Avail: CASI; A01, Microfiche; A02, Hardcopy

This paper will detail the concept for such an affordable cruise missile defense system. It will include the Concept of Operations (CONOPS), a definition of the integrated system and detail the innovative use of current sensors and other technologies. Analytical and simulation results are utilized as the basis for the development of the concept and evaluation of its expected capabilities.
DTIC
Low Cost; Fighter Aircraft; Cruise Missiles; Missile Defense

20010048030 Naval Air Warfare Center, Aircraft Div., Patuxent River, MD USA

Electric Fuzing Instrumentation System Test Program on the F/A-18A Aircraft

Brown, Travis A.; Jan. 1997; 8p; In English; Original contains color plates

Report No.(s): AD-A388313; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

NAVAIRSYSCOM is currently conducting an Electric Fuzing Dud Investigation Systems Engineering Analysis of the F/A-18 Fighter Aircraft. to support that effort, NAWCAD Air Vehicle Stores Compatibility Division was tasked by PMA-201 to develop a quick install, deployable EFUZIS to collect electrical fuzing data during practice bombing missions. The system consists of COTS digital recorder and specially designed signal conditioner that will record real-time nontelemetered electric fuzing data during bomb drops. The purpose of the testing was to qualify the instrumentation system for use on testing and training squadron F/A-18C/D aircraft. Ground testing was done over a period of 4 days and consisted of 73 ground drops utilizing Mk-82 bomb bodies in the parent rack and canted vertical ejection rack (CVER) configurations. Electric fuzing data was collected during these drops and analyzed to ensure that proper signal timing, amplitude, polarity, and duration were being recorded. The results of the ground tests showed that the EFUZIS performed as designed. Flight testing followed to test the effects of the flight environment on the recorder system. Flight testing consisted of a single flight during which two Mk-82 bombs were released using the CVER configuration. In addition, dynamic test maneuvers were performed to evaluate the effects of load factors on the EFUZIS. Flight test results showed that the instrumentation system recorded all the required parameters and that the recorder was able to withstand the flight environment. Overall, the EFUZIS demonstrated excellent potential for gathering electrical fuzing data as proven by the extensive ground and flight testing performed by the test team.

DTIC

Systems Engineering; F-18 Aircraft; Flight Tests; Fuses (Ordnance)

20010048035 Naval Air Warfare Center, Aircraft Div., Patuxent River, MD USA

Omega Air 707/F/A-18A-D Aerial Refueling Ground and Flight Test Evaluation and MA-3-1 Coupling Ground Test Evaluation, *12 Jul. - 27 Sep. 2000*

Markowich, Brian; Picard, Mary; Whitley, Scott; Mar. 13, 2001; 137p; In English; Original contains color plates

Report No.(s): AD-A388301; NAWCADPAX/RTR-2000/206; No Copyright; Avail: CASI; A02, Microfiche; A07, Hardcopy

Omega Air, Incorporated, a private organization that provides shipping and transportation services, contracted Marconi Flight Systems, Incorporated, to retrofit a Boeing 707 aircraft with an internal centerline aerial refueling (AR) system. In support of this program, NAWCAD Patuxent River, Maryland, was funded under a private party Test and Evaluation Commercial Service Agreement to provide engineering, ground, and flight test support. The AR system used in the 707 is the same system (pump and reel) used, wing-mounted, on the KC-130F/R/T, modified to allow for a centerline installation. The hose and drogue are not the same as on the KC-130F/R/T but have the same form, fit, and function. The 707 airframe is similar to the KC-135 AR platform, which is used by the U.S. Air Force (USAF) for AR from a centerline boom and wing refueling pods. Additional piggyback ground tests of an upgrade kit for the MA-2 coupling was performed during the Omega ground tests. Product Support, Incorporated, a Maryland-based supplier of Navy and USAF refueling equipment, developed a new refueling coupling designed to reduce pressure surges in F/A-18 and other Navy/U.S. Marine Corps receiver aircraft. This coupling, designated MA-3-1, is a form, fit, function replacement of the existing KC-130 MA-2 coupling and has undergone full contractor qualification testing. The only test remaining prior to fleet release was a functional ground check with an instrumented receiver aircraft.

DTIC

Flight Tests; Ground Tests; Air to Air Refueling; Boeing 707 Aircraft; Aircraft Fuel Systems

20010048040 Air Univ., Maxwell AFB, AL USA

The Vital Link: The Tanker's Role in Winning America's Wars

Cohen, Daniel M.; Mar. 2001; 78p; In English

Report No.(s): AD-A388278; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This paper focuses on the unique and vital capabilities of the US Air Force's KC-135 tanker fleet. Specifically, historic and current tanker usage, tanker operational employment, and the capability of today's tanker fleet are analyzed, with emphasis on force structure and force management. Given that the KC-135 is the USAF's primary air refueling asset and that no planned replacements are due on the flightline for some time, how can the current KC-135 method of employment and force structure support future DOD and coalition operations? Since its inception in the mid-1950s, the KC-135 has undergone numerous configuration as well as mission changes. One constant throughout has been the reliance of the nation's airpower on this critical asset, whether It was sitting alert during the cold war, or providing mission essential fuel for F-117s en route to Baghdad during the Gulf War. The success of combat operations in Operation Allied Force was made possible due to the rapid, massive, and professional employment of the KC-135 in the theater of operations. This success, however, can be attributed more to the actions

of the tanker community than to any planned, deliberate inclusion of air refueling assets into the operations plan. In light of decreasing budgets, aging airframes, increased downtime for maintenance, and an explosion in the operations tempo, this paper proposes a four-pronged methodology addressing tanker vision, organization, training, and employment, as the correction needed to get the KC-135 weapon system back on centerline. This will allow the tanker to effectively aid the Air Force in successfully deterring conflict and if needed, quickly win the nation's future wars.
DTIC
Air to Air Refueling; Weapon Systems; Tanker Aircraft; Military Operations; C-135 Aircraft; Warfare

20010048044 Naval Air Warfare Center, Aircraft Div., Patuxent River, MD USA
VMCA Flight Test of the C-2A
Wagner, Michael; Webb, Chuck; Mar. 30, 2001; 28p; In English
Contract(s)/Grant(s): Proj-
Report No.(s): AD-A388269; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
A viewgraph presentation outlines flight tests for the C-2A aircraft, including details on the configuration approach speeds, scope (test conditions, flight hours, techniques used), engine response, and recovery time.
CASI
Turboprop Engines; Transport Aircraft; Flight Tests

20010048671 NASA Ames Research Center, Moffett Field, CA USA
An Experimental Comparison of Transmission Vibration Responses from OH-58 and AH-1 Helicopters
Huff, Edward M., NASA Ames Research Center, USA; Tumer, Irem Y., NASA Ames Research Center, USA; Mosher, Marianne, NASA Ames Research Center, USA; [2001]; 10p; In English; 57th Annual Forum, 9-11 May 2001, USA; Sponsored by American Helicopter Society, Inc., USA; Copyright; Avail: Issuing Activity
Statistical analyses of transmission vibration patterns from an AH-1 Cobra helicopter were previously reported. Fourteen steady-state maneuvers were analyzed using multi-factor analysis of covariance. Based on triaxial recordings, it was found that only two maneuvers displayed reliably stationary time-series: low and high power forward climb. Principal Components Analysis of the triaxial RMS data was shown to aggregate a large portion of variance associated with engine torque on the fist component. In the present study the experimental procedures were repeated on an OH-58c Kiowa helicopter. Statistical results are compared with those from the earlier study, and also with data from the Glenn Research Center OH-58c transmission test facility. Analyses are also included of the comparative frequency responses of these three transmission systems, and general conclusions are drawn with regard to HUMS design requirements. Finally, future research directions are summarized for in-flight HUMS research using NASA/Army aircraft and transmission test facilities.
Author
Vibration; Transmission; OH-58 Helicopter; Aircraft Maneuvers; Experiment Design

20010048685 NASA Ames Research Center, Moffett Field, CA USA
Computational Investigation of an F-18 Aircraft in the High-Alpha Regime
Murman, Scott M., MCAT Inst., USA; Rizk, Yehia M., NASA Ames Research Center, USA; [1994]; 1p; In English; 4th NASA High Alpha Conference/Workshop, 12-14 Jul. 1994, Edwards, CA, USA; Sponsored by NASA Dryden Flight Research Center, USA
Contract(s)/Grant(s): RTOP 505-68-00; No Copyright; Avail: Issuing Activity; Abstract Only
One of the goals of NASA's High Alpha Technology Program is to provide flight-validated design methods for the high-angle-of-attack regime. This is an integrated effort utilizing computational simulations, wind tunnel experiments, and flight tests using the F-18 High Alpha Research Vehicle (HARV). The dominant physics of the aircraft flows in the high alpha regime changes as the angle of attack is increased. At moderate angle of attack the flow is characterized by boundary layer separation and the formation of tight vortices. As the angle of attack is increased, these vortices break down producing unsteady wakes. With further increase in angle of attack, the, vortex breakdown moves progressively upstream until the entire flowfield becomes dominated by the unsteady wake. Previous computational work has demonstrated the ability to simulate flows about the F-18 HARV in the medium-to-high angle of attack range, where the flowfield is characterized by the vortex formation and subsequent breakdown. This paper extends the previous computations to include conditions of 45 degree angle of attack where the flowfield becomes dominated by the unsteady wake shed from the Leading Edge Extension (LEX), and regions of laminar and transitional flow appear on the fuselage forebody. A more complete surface geometry is utilized, which includes the features of the engine nacelle, inlet diffuser, and the boundary layer diverter duct. A volume grid sensitivity study was also performed to extend the accuracy of the results, most notably in the prediction of the LEX vortex breakdown position. This paper includes comparisons

of computational results with both in-flight surface pressure measurements, and flow visualizations of the surface and off-surface particle trajectories.
Author
F-18 Aircraft; Computerized Simulation; Wind Tunnel Tests; Flight Tests; Angle of Attack

20010048688 NASA Ames Research Center, Moffett Field, CA USA
Maneuver Performance Enhancement for an Advanced Fighter/Attack Aircraft
Samuels, Jeff, NASA Ames Research Center, USA; Langan, Kevin J., Wright Lab., USA; [1994]; 1p; In English; AIAA Aerospace Atlantic, 19-21 Apr. 1994, Dayton, OH, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA Contract(s)/Grant(s): RTOP 505-59-30; No Copyright; Avail: Issuing Activity; Abstract Only

A small scale wind tunnel test of a realistic fighter configuration has been completed in NASA Ames' 7'x10' wind tunnel. This test was part of the Fighter Lift and Control (FLAC) program, a joint NASA - USAF research program, involving small and large-scale wind-tunnel tests and computational analysis of unique lift augmentation and control devices. The goal of this program is to enhance the maneuver and control capability of next-generation Air Force multi-role fighter aircraft with low-observables geometries. The principal objective of this test was to determine the effectiveness of passive boundary layer control devices at increasing L/D at sustained maneuver lift coefficients. Vortex generators (VGs) were used to energize the boundary layer to prevent or delay separation. Corotating vanes, counter-rotating vanes, and Wheeler Wishbone VGs were used in the vicinity of the leading and trailing edge flap hinge lines. Principle test parameters were leading and trailing edge flap deflections, and location, size, spacing, and orientation for each VG type. Gurney flaps were also tested. Data gathered include balance force and moment data, surface pressures, and flow visualization for characterizing flow behavior and locating separation lines. Results were quite different for the two best flap configurations tested. All VG types tested showed improvement (up to 5%) in maneuver L/D with flaps at LE=20 degrees, TE=0 degrees. The same VGs degraded performance, in all but a few cases, with flaps at LE=15 degrees, TE=10 degrees.
Author
Fighter Aircraft; Maneuverability; Wind Tunnel Tests; Augmentation

20010048835 Defence Science and Technology Organisation, Airframes and Engines Div., Melbourne, Australia
Specifications for an Unified Strain and Flight Parameter Based Aircraft Fatigue Usage Monitoring System
Molent, L., Defence Science and Technology Organisation, Australia; Inan, S., Defence Science and Technology Organisation, Australia; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 53-67; In English; See also 20010048829; Copyright; Avail: Issuing Activity

In the current environment of decreasing budgets, the need for an accurate and reliable fatigue usage monitoring system is of increasing importance to ensure the safe and economical utilization of fixed winged aircraft, which are expected to last longer than ever. Strain based in-flight data recorders are perceived to provide an increase in accuracy over the conventional fatigue meter, and have thus been implemented by many military fleet operators worldwide. Although this may be the case, these new generation recorders and the systems required for fatigue damage interpretation are complex, and many problems can arise with their use. Military airworthiness regulations mandate the use of fleet fatigue monitoring systems, however these regulations are open to interpretation and thus the implementation of monitoring systems is variable. The open literature contains many examples of the implementation of monitoring hardware, yet there is a dearth of details regarding the philosophy chosen for their utilization. This paper proposes requirements, for implementation of a reliable fatigue monitoring system in modern agile military aircraft. These requirements aim to reduce undue conservatism in the estimation of fatigue accumulation by ensuring that the system is scientifically robust and as accurate as possible. It is hoped that these requirements will form the basis of a future specification for individual aircraft monitoring systems.
Author
Fatigue (Materials); Flight Fatigue; Data Recorders

20010048836 Naval Air Warfare Center, Aircraft Div., Patuxent River, MD USA
USN Development Strategy, Fault Testing Results, and Future Plans for Diagnostics, Prognostics and Health Management of Helicopter Drive Train Systems
Hardman, William, Naval Air Warfare Center, USA; Hess, Andrew, Naval Air Warfare Center, USA; Ahne, Rebecca, Naval Air Warfare Center, USA; Blunt, David, Defence Science and Technology Organisation, Australia; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 69-78; In English; See also 20010048829; Copyright; Avail: Issuing Activity

A US Navy strategy was generated and is still evolving to develop and demonstrate diagnostics and prognostics for helicopter drivetrains. The SH-60 program was initiated as a proof-of-concept effort to develop, demonstrate, and integrate available and

advanced mechanical diagnostic technologies for propulsion and power drive system monitoring. Included in these technologies were various rule based and model based analysis techniques which were applied to demonstrate and validate various levels of diagnostic and prognostic capabilities. Sonic of these will be discussed. Since spalling of the SB 2205 roller bearing integral inner race is the most common dynamic component cause for gearbox removal in the SH-60, it was tested as part of the original HIDS effort. Using this as a case example, diagnostic methods are used to identify the fault, and means of applying prognostics are discussed. Other more recent examples of 'seeded faults' will also be discussed as case studies demonstrating various degrees of diagnostic and prognostic capabilities. These include the evaluation of an epicyclic planet gear separation algorithm developed by the Defence Science and Technology Organization (DSTO), Australia. Multivariate analysis reasoners, and information fusion requirements and approaches will also be discussed. Most recently a strategy is evolving to more fully develop and demonstrate the predictive aspects of prognostics. Finally a full description, recent accomplishments, status, and future plans for the NAWCAD Helicopter Transmission Test Facility (HTTF) will be presented.
Author
Diagnosis; Helicopter Propeller Drive; Systems Analysis

20010048837 Kaman Aerospace Corp., Preliminary Design, USA
Vibration and Usage Monitoring System for The Kaman SH-2G(A) Helicopter
Vrionides, Polis, Kaman Aerospace Corp., USA; Curtin, Amy, Kaman Aerospace Corp., USA; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 79-84; In English; See also 20010048829; Copyright; Avail: Issuing Activity

The SH-2G(A) Super Seasprite helicopter has been developed for the Royal Australian Navy by Kaman Aerospace Corporation of Bloomfield, Connecticut, USA. When delivered in 2001, the SH-2G(A) Super Seasprite will be the most advanced intermediate naval helicopter available featuring a fully Integrated Tactical Avionics System (ITAS) including a glass cockpit, as well as a fully Integrated Weapons Systems (IWS) including Radar, FLIR, ESM, and air-to-surface missiles. The Royal Australian Navy will operate SH-2G(A) helicopters from ANZAC class frigates and from bases ashore along the Australian coast. The helicopter's primary, missions of surface surveillance, anti-surface warfare and anti-submarine warfare requires not only, modularity of installed systems, but reliability that can sustain the anticipated tempo of operations. The level of integration introduced in the SH-2G(A) and the resident capability of the ITAS allows for the usage monitoring and recording of aircraft systems and components. A dedicated vibration monitoring system, for the powerplant, transmission, main and tail rotor systems and airframe is fitted in the aircraft, that can interface directly with the Chadwick-Helmuth 8500 system in service with the Royal Australian Navy. Additionally, the aircraft is equipped with a cockpit voice recorder and flight data recorder (CVR/FDR) to complete the suite of usage monitoring equipment. Downloading of the ITAS recorded data is accomplished via a Data Loader/Recorder, and playback and archiving of the information takes place at the Mission De-Brief Facility/Ground Station. Overall system design and capability will be presented and future development of the system discussed.
Author
Helicopters; Vibration; Systems Engineering; Monitors

20010048838 WTI Aeronautics, USA
An Affordable Modular HUMS Certification Program in an EMS Helicopter
Wainwright, Rodney C., WTI Aeronautics, USA; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 85-86; In English; See also 20010048829; Copyright; Abstract Only; Available from CASI only as part of the entire parent document

Health and Usage Monitoring Systems (HUMS), designated M-HUMS, was developed specifically for the light and medium twin aircraft. M-HUMS is lower in cost, endorsed by the airframe and engine manufacturer, and enables each operator to select only the modules necessary to fit the mission. Additional information is contained in the original extended abstract.
Author
Systems Health Monitoring; Hardware; Vibration; Modules

20010048839 Smiths Industries Aerospace, UK
Smiths Industries Generic Health and Usage Monitoring System (GenHUMS): A Modular Approach to Aircraft Data Management
Trammel, Charles, Smiths Industries Aerospace, UK; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 87; In English; See also 20010048829; Copyright; Abstract Only; Available from CASI only as part of the entire parent document

Smiths Industries Aerospace (SI) offers a multi-aircraft capable Integrated Data Acquisition and Recorder System (IDARS) with built-in Health and Usage Monitoring Systems (HUMS) growth capability. A number of civil and military operators have

selected the SI GenHUMS, including Bell Helicopter for the Bell-Agusta 609 civil tiltrotor and the UK Ministry of Defence (MoD) for the Chinook aircraft with additional options for Puma, Sea King and Lynx aircraft. Additional information is contained in the original extended abstract.
Author
Data Management; Systems Health Monitoring; Data Acquisition; Architecture (Computers)

20010048840 Defence Science and Technology Organisation, Australia
Smart Structures Technologies For Structural Health Monitoring
Galea, S. C., Defence Science and Technology Organisation, Australia; Rajic, N., Defence Science and Technology Organisation, Australia; Powlesland, I. G., Defence Science and Technology Organisation, Australia; Moss, S., Defence Science and Technology Organisation, Australia; Konak, M., Defence Science and Technology Organisation, Australia; VanderVelden, S., Defence Science and Technology Organisation, Australia; Baker, A. A., Defence Science and Technology Organisation, Australia; McKenzie, I., Monash Univ., Australia; Koh, Y. L., Monash Univ., Australia; Chiu, W. K., Monash Univ., Australia; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 88; In English; See also 20010048829; Copyright; Abstract Only; Available from CASI only as part of the entire parent document

Due to economic pressures, including the very high cost of replacement aircraft, the military in most countries (including the US) are forced to extend the life of their aircraft. Similar problems arise for some civil operators. It can be expected, therefore, that the problems of corrosion and fatigue cracking, associated with aging aircraft, will become increasingly severe in the future. In the Australia a significant number of ADF aircraft are being operated well past their design life. For example the F-111C fleet will be in service till the year 2015 which is about 20 years more than the original design life of the aircraft. As fleets get older a greater share of the operator's resources need to be used on through-life-support of the airframe. One way of reducing costs and increasing aircraft availability is through the use of smart materials technology. Smart materials are materials with the ability to respond to changes in the operating environment or to other stimuli in an intelligent way. This ability may be achieved from sensors and actuators embedded in or attached to the structure or, more simply, from an inherent response mechanism in the material. In the context of ageing airframes, smart materials/structures technology has excellent potential to provide improvements in through-life support, including health and usage monitoring (HUMS), with the eventual aim of allowing condition based maintenance procedures to be adopted, rather then relying on current expensive time-based maintenance procedures. This paper discusses the development and evaluation in DSTO of smart structure technologies to be applied to structural health monitoring of aircraft structures. Systems are being developed by DSTO with the specific aim of retro-fitting to existing airframe structures (e.g., smart repairs and reinforcements with the ability to self-monitor patch system integrity), need to be autonomous, distributed, robust and reliable. The paper describes some of the health monitoring techniques being developed and evaluated, including: (1) smart repairs and reinforcements (i.e., ability to self monitor patch system integrity), (2) use of piezotransducers for health monitoring, (3) optical fiber systems for loads and health monitoring, and (4) MEMS-based devices. The paper also discusses approaches taken in achieving system autonomy by the development of self-powering and wireless access techniques.
Author
Service Life; Smart Materials; Smart Structures; Structural Engineering

20010048842 Dassault Aviation, France
Structural In-Service Monitoring of Advanced Combat Aircraft: Operational Benefits
Perrin, Phillippe, Dassault Aviation, France; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 90; In English; See also 20010048829; Copyright; Abstract Only; Available from CASI only as part of the entire parent document

Innovative, original, and accurate methods have been developed in Dassault Aviation in order to monitor the health and usage of advanced combat aircraft. These methods were developed and validated in the 90's and have been applied to the dimensioning and the qualification of RAFALE. The resulting Integrated Health and Usage Monitoring System performs fleet-wide monitoring of significant structural loading events and fatigue life consumption, minimizing in-service structural maintenance actions. The PROFILE advanced IHUMS is described. The description outlines the process from Finite Elements Modelization during the design phase down to the definition of simple but accurate In-Service Monitoring means and procedures. The overall approach to IHUMS-based structural maintenance is addressed, yielding key outputs in terms of aircraft maintenance plan and means, end user autonomy and Life Cycle Cost reduction.
Author
Systems Health Monitoring; Fatigue Life; Finite Element Method

20010048843 Honeywell Technology Center, Minneapolis, MN USA

Advanced Knowledge Management for Helicopter HUMS

Menon, Sunil, Honeywell Technology Center, USA; Hamza, Rida, Honeywell Technology Center, USA; McRoberts, Sam, Chadwick-Helmuth Co., Inc., USA; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 91; In English; See also 20010048829; Copyright; Abstract Only; Available from CASI only as part of the entire parent document

Conventional helicopter Health and Usage Monitoring Systems (HUMS) systems rely on analysis algorithms to interpret the data collected from helicopter systems (engine, transmission, etc.) and detect faults. Fault detection and diagnosis methods can be vastly improved by incorporating knowledge gained from other helicopter subsystems and earlier experiments. In this work, we propose a fusion technique that transforms incomplete, or imprecise, data provided by current sensors into more useful information by fusing it with stored data. The algorithm takes different inputs, from archived data, and combines them synergistically for the purpose of obtaining more comprehensive interpretation of current data. Data mining techniques are applied to archived data to retrieve only relevant information to current system. The choice of knowledge management architecture is a fundamental issue in developing a data fusion system and in deciding at what level to combine or fuse data in the processing flow of more than one data source. We devise an architecture that addresses this issue and we draw specific examples from fault detection and diagnosis of the helicopter transmission system. The advantage of this proposed architecture is that it permits us to apply earlier gained knowledge into some form of meaningful inference. Fault prognosis algorithms are also incorporated in this architecture and can be the basis for a more advanced helicopter fleet management system.

Author

Algorithms; Systems Health Monitoring; Diagnosis; Fault Detection

20010048844 Defence Science and Technology Organisation, Airframes and Engines Div., Melbourne, Australia

A Review of Permanently Installed Helicopter Gearbox Vibration Monitoring Systems in the Australian Defence Force

Becker, Andrew, Defence Science and Technology Organisation, Australia; Blunt, David, Defence Science and Technology Organisation, Australia; Forrester, David, Defence Science and Technology Organisation, Australia; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 92; In English; See also 20010048829; Copyright; Abstract Only; Available from CASI only as part of the entire parent document

The prevention of catastrophic failure of helicopter gearboxes is the primary objective of gearbox vibration monitoring. In the past gearbox vibration monitoring involved the temporary installation of sensors and cabling followed by dedicated flights to record the data. This amounted to an added workload for squadron personnel simply to acquire the vibration data. The Royal Australian Navy (RAN) recently commenced permanently installing (hardwiring) the Sea King and Seahawk helicopters with vibration sensors and cabling to enable rotor track and balance, airframe vibration survey, engine vibration survey, and gearbox vibration analysis. The gearbox vibration analysis component of this system has been developed by the Defence Science and Technology Organisation (DSTO). The other vibration analysis is conducted using commercially available equipment This paper discusses the DSTO developed gearbox vibration analysis element of the RAN hard-wired system. The system will be described in detail and the intended operating procedures outlined. The current status of the hard-wiring program in the RAN will be discussed together with proposed systems for other Australian Defence Force (ADF) helicopters.

Author

Dynamic Structural Analysis; Failure; Prevention; Transmissions (Machine Elements); Vibration

20010048845 RSL Electronics Ltd., Migdal Haemek, Israel

The Other Values of HUMS

Silverman, Hanan, RSL Electronics Ltd., Israel; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 93; In English; See also 20010048829; Copyright; Abstract Only; Available from CASI only as part of the entire parent document

The benefits of Health and Usage Monitoring Systems (HUMS) have become well known to the maintenance and aircraft operations divisions of many fixed wing and rotary wing operators. HUMS provides aircraft and engine maintenance staff with important data regarding the health and performance of the airframe and powerplant. In addition, RSL's Total HUMS (THUMS) offers the capability to analyze the data using state-of-the-art artificial intelligence tools and expert systems to provide prognostic and diagnostic information on the airframe's health, maintenance requirements, and continued airworthiness. This paper suggests that THUMS may also serve as an important data source for flight operational safety programs such as Flight Operations Quality Assurance (FOQA), and other flight data analysis programs. The paper first addresses the data and operational requirements of FOQA, and then briefly reviews the potential benefits that may be gained by an operator's adoption of such programs. The

remainder of the paper examines the applicability of THUMS data for FOQA and similar programs, and discusses the way in which THUMS data may be best utilized to improve the operator's safety and operational efficiencies.
Author
Artificial Intelligence; Systems Health Monitoring; Flight Safety; Computer Programs; Systems Analysis

20010048851 Defence Science and Technology Organisation, Australia
Vibration-Based Helicopter Gearbox Health Monitoring: An Overview of the Research Program in DSTO
Wong, A. K., Defence Science and Technology Organisation, Australia; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 99; In English; See also 20010048829; Copyright; Abstract Only; Available from CASI only as part of the entire parent document

The Defense Science and Technology Organization (DSTO) has a long and respected association with vibration-based condition monitoring technologies, and this paper presents an overview of the DSTO's program of work in this area. The paper briefly charts through over two decades of tract research and development, arriving at the current work program covering advanced algorithm development, experimental validation, field deployment, and commercialisation. The presentation concludes with glimpses of the future work that DSTO will embark on.
Author
Research and Development; Systems Health Monitoring

06
AVIONICS AND AIRCRAFT INSTRUMENTATION

Includes all stages of design of aircraft and aircraft structures and systems. Also includes aircraft testing, performance, and evaluation, and aircraft and flight simulation technology. For related information, see also 18 Spacecraft Design, Testing and Performance and 39 Structural Mechanics. For land transportation vehicles, see 85 Technology Utilization and Surface Transportation.

20010047997 Qualtech Systems, Inc., Wethersfield, CT USA
Condition Monitoring for Helicopter Data, Appendix A *Final Report*
Wen, Fang, Connecticut Univ., USA; Willett, Peter, Connecticut Univ., USA; Deb, Somnath, Qualtech Systems, Inc., USA; [2000]; 7p; In English; IEEE SMC International Conference, 8-11 Oct. 2000, Nashville, TN, USA; Sponsored by Institute of Electrical and Electronics Engineers, USA
Contract(s)/Grant(s): NAS2-99048; DAAG55-98-C-0057; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

In this paper the classical "Westland" set of empirical accelerometer helicopter data is analyzed with the aim of condition monitoring for diagnostic purposes. The goal is to determine features for failure events from these data, via a proprietary signal processing toolbox, and to weigh these according to a variety of classification algorithms. As regards signal processing, it appears that the autoregressive (AR) coefficients from a simple linear model encapsulate a great deal of information in a relatively few measurements; it has also been found that augmentation of these by harmonic and other parameters can improve classification significantly. As regards classification, several techniques have been explored, among these restricted Coulomb energy (RCE) networks, learning vector quantization (LVQ), Gaussian mixture classifiers and decision trees. A problem with these approaches, and in common with many classification paradigms, is that augmentation of the feature dimension can degrade classification ability. Thus, we also introduce the Bayesian data reduction algorithm (BDRA), which imposes a Dirichlet prior on training data and is thus able to quantify probability of error in an exact manner, such that features may be discarded or coarsened appropriately.
Author
Helicopters; Accelerometers; Signal Processing; Failure; Systems Health Monitoring

20010048007 NASA Ames Research Center, Moffett Field, CA USA
A Model-based Health Monitoring and Diagnostic System for the UH-60 Helicopter, Appendix D *Final Report*
Patterson-Hine, Ann, NASA Ames Research Center, USA; Hindson, William, NASA Ames Research Center, USA; Sanderfer, Dwight, NASA Ames Research Center, USA; Deb, Somnath, Qualtech Systems, Inc., USA; Domagala, Chuck, Qualtech Systems, Inc., USA; [2001]; 19p; In English; AHS International 57th Annual Forum and Technology Display, 9-11 May 2001, Washington, DC, USA; Sponsored by American Helicopter Society, Inc., USA
Contract(s)/Grant(s): NAS2-99048; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Model-based reasoning techniques hold much promise in providing comprehensive monitoring and diagnostics capabilities for complex systems. We are exploring the use of one of these techniques, which utilizes multi-signal modeling and the

TEAMS-RT real-time diagnostic engine, on the UH-60 Rotorcraft Aircrew Systems Concepts Airborne Laboratory (RASCAL) flight research aircraft. We focus on the engine and transmission systems, and acquire sensor data across the 1553 bus as well as by direct analog-to-digital conversion from sensors to the QHuMS (Qualtech health and usage monitoring system) computer. The QHuMS computer uses commercially available components and is rack-mounted in the RASCAL facility. A multi-signal model of the transmission and engine subsystems enables studies of system testability and analysis of the degree of fault isolation available with various instrumentation suites. The model and examples of these analyses will be described and the data architectures enumerated. Flight tests of this system will validate the data architecture and provide real-time flight profiles to be further analyzed in the laboratory.
Author
Systems Health Monitoring; UH-60A Helicopter; Complex Systems; Helicopter Design

07
AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and onboard auxiliary power plants for aircraft. For related information see also 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels, and 44 Energy Production and Conversion.

20010047251 Southwest Research Inst., San Antonio, TX USA
Turbine Rotor Material Design ***Final Report***
Leverant, G. R., Southwest Research Inst., USA; Enright, M. P., Southwest Research Inst., USA; Fischer, C., Scientific Forming Technologies Corp., USA; McClung, R. C., Southwest Research Inst., USA; Chell, G. G., Southwest Research Inst., USA; Dec. 2000; 356p; In English; Original contains color plates
Contract(s)/Grant(s): 92-G-041
Report No.(s): AD-A388174; TR-18-7445; DOT/FAA/AR-00/64; No Copyright; Avail: CASI; A16, Hardcopy; A03, Microfiche

Premium grade titanium alloys are used for fan and compressor rotors and disks in aircraft turbine engines. Occasional upsets during processing can result in the formation of metallurgical anomalies referred to as hard alpha (HA). Although rare, low-cycle fatigue cracks initiated by HA have led to uncontained engine failures that resulted in fatal accidents such as the incident at Sioux City, Iowa, in 1989. In a report issued by the Federal Aviation Administration (FAA) after the accident at Sioux City, it was recommended that a damage tolerance approach be implemented to explicitly address HA anomalies, with the objective of enhancing conventional rotor life management methodology. The probabilistic, damage tolerance code developed in this program for low-cycle fatigue of titanium rotors/disks is intended to supplement, not replace, the current safe-life design. The code is called Design Assessment of Reliability With INspection (DARWIN) and was developed in collaboration with Allied Signal Engines, General Electric Aircraft Engines, Pratt & Whitney, and Rolls-Royce Allison. DARWIN integrates finite element stress analysis, fracture mechanics analysis, nondestructive inspection simulation, and probabilistic analysis to assess the risk of rotor fracture. Supplementary tasks performed in this program in support of code implementation included the generation of fatigue crack growth data for Ti-64, Ti-6242, and Ti-17beta in high vacuum; determination of the crack initiation behavior of artificial and natural HA defects embedded in plates of Ti-64; and development of a forging microcode to predict the movement, shape and orientation of HA anomalies during processing from ingot to billet, and from billet to a disk forging.
DTIC
Titanium Alloys; Aircraft Design; Aircraft Engines; Aircraft Safety; Compressor Rotors; Gas Turbine Engines

20010047274 Virginia Polytechnic Inst. and State Univ., Dept. of Mechanical Engineering, Blacksburg, VA USA
Film Cooling Visualization and Heat Transfer on Transonic Turbine Blades ***Final Report, Jun. 1997-Sep. 2000***
Diller, Thomas E.; Mar. 2001; 66p; In English
Contract(s)/Grant(s): F49620-97-1-0331; AF Proj. 3484
Report No.(s): AD-A388243; AFRL-SR-BL-TR-01-0223; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This study is an investigation of the film cooling effectiveness and heat transfer coefficient of a two-dimensional turbine rotor blade in a linear transonic cascade. Experiments were performed in Virginia Tech's Cascade Wind Tunnel with an exit Mach number of 1.2 and an exit Reynolds number of 5 x 10 (exp 6) to simulate real engine flow conditions. The freestream and coolant flows were maintained at a total temperature ratio of 2 + 0.4 and a total pressure ration of 1.04. The freestream turbulence was approximately 1%. There are six rows of staggered, discrete cooling holes on and near the leading edge of the blade in a showerhead configuration. Cooled air was used as the coolant. Experiments were performed with and without film cooling on the surface of the blade. The heat transfer coefficient was found to increase with the addition of film cooling an average of 14%

overall and to a maximum of 26% at the first gauge location. The average film cooling effectiveness that suggest either a transition from a laminar to a turbulent film regime or the regime or the existence of three-dimensionality in the flow-field over the gauges. DTIC

Film Cooling; Flow Visualization; Heat Transfer; Supersonic Turbines; Turbine Blades; Rotor Blades (Turbomachinery)

20010047489 NASA Langley Research Center, Hampton, VA USA

Measurements and Predictions for a Distributed Exhaust Nozzle

Kinzie, Kevin W., NASA Langley Research Center, USA; Brown, Martha C., NASA Langley Research Center, USA; Schein, David B., Northrop Grumman Corp., USA; Solomon, W. David, Jr., Northrop Grumman Corp., USA; [2001; 16p; In English; 7th AIAA/CEAS Aeroacoustic Conference, 28-30 May 2001, Maastricht, Netherlands; Sponsored by American Inst. of Aeronautics and Astronautics, USA; Original contains color illustrations

Report No.(s): AIAA Paper 2001-2236; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The acoustic and aerodynamic performance characteristics of a distributed exhaust nozzle (DEN) design concept were evaluated experimentally and analytically with the purpose of developing a design methodology for developing future DEN technology. Aerodynamic and acoustic measurements were made to evaluate the DEN performance and the CFD design tool. While the CFD approach did provide an excellent prediction of the flowfield and aerodynamic performance characteristics of the DEN and 2D reference nozzle, the measured acoustic suppression potential of this particular DEN was low. The measurements and predictions indicated that the mini-exhaust jets comprising the distributed exhaust coalesced back into a single stream jet very shortly after leaving the nozzles. Even so, the database provided here will be useful for future distributed exhaust designs with greater noise reduction and aerodynamic performance potential.

Author

Acoustic Measurement; Acoustic Properties; Aerodynamic Characteristics; Exhaust Nozzles; Nozzle Design

20010047675 NASA Langley Research Center, Hampton, VA USA

Hyper-X Flight Engine Ground Testing for X-43 Flight Risk Reduction

Huebner, Lawrence D., NASA Langley Research Center, USA; Rock, Kenneth E., NASA Langley Research Center, USA; Ruf, Edward G., NASA Langley Research Center, USA; Witte, David W., NASA Langley Research Center, USA; Andrews, Earl H., Jr., Swales Aerospace, USA; [2001]; 16p; In English; 10th International Space Planes and Hypersonic Systems and Technologies Conference, 24-27 Apr. 2001, Kyoto, Japan; Sponsored by American Inst. of Aeronautics and Astronautics, USA

Report No.(s): AIAA Paper 2001-1809; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

Airframe-integrated scramjet engine testing has been completed at Mach 7 flight conditions in the NASA Langley 8-Foot High Temperature Tunnel as part of the NASA Hyper-X program. This test provided engine performance and operability data, as well as design and database verification, for the Mach 7 flight tests of the Hyper-X research vehicle (X-43), which will provide the first-ever airframe-integrated scramjet data in flight. The Hyper-X Flight Engine, a duplicate Mach 7 X-43 scramjet engine, was mounted on an airframe structure that duplicated the entire three-dimensional propulsion flowpath from the vehicle leading edge to the vehicle trailing edge. This model was also tested to verify and validate the complete flight-like engine system. This paper describes the subsystems that were subjected to flight-like conditions and presents supporting data. The results from this test help to reduce risk for the Mach 7 flights of the X-43.

Author

Engine Airframe Integration; Hypersonic Speed; Supersonic Combustion Ramjet Engines; X-43 Vehicle; Wind Tunnel Tests; Aerodynamic Configurations; Aerodynamic Characteristics

20010047830 NASA Glenn Research Center, Cleveland, OH USA

Gust Response Analysis of a Turbine Cascade

Gorla, R. S. R., Cleveland State Univ., USA; Reddy, T. S. R., Toledo Univ., USA; Reddy, D. R., NASA Glenn Research Center, USA; Kurkov, A. P., NASA Glenn Research Center, USA; January 2001; 22p; In English; 46th International Gas Turbine and Aeroengine Technical Congress, Exposition, and Users Symposium, 4-6 Jun. 2001, New Orleans, LA, USA; Sponsored by American Society of Mechanical Engineers, USA

Contract(s)/Grant(s): RTOP 323-71-00

Report No.(s): NASA/TM-2001-210562; NAS 1.15:210562; E-12520; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A study was made of the gust response of an annular turbine cascade using a two-dimensional Navier Stokes code. The time-marching CFD code, NPARC, was used to calculate the unsteady forces due to the fluid flow. The computational results were compared with a previously published experimental data for the annular cascade reported in the literature. Reduced frequency,

Mach number and angle of incidence were varied independently and the gust velocity was sinusoidal. For the high inlet velocity case, the cascade was nearly choked.
Author
Gusts; Dynamic Response; Turbines; Turbomachine Blades; Cascade Flow; Annular Flow; Unsteady Aerodynamics

20010048659 NASA Ames Research Center, Moffett Field, CA USA
MHD Energy Bypass Scramjet Engine ***Progress Report***
Mehta, Unmeel B., NASA Ames Research Center, USA; Bogdanoff, David W., Eloret Corp., USA; Park, Chul, Eloret Corp., USA; [2001]; 1p; In English; NASA/JPL/MSFC/UAH 12th Annual Advanced Space Propulsion Workshop, 3-5 Apr. 2001, USA; Sponsored by NASA, USA
Contract(s)/Grant(s): RTOP 713-74-00; No Copyright; Avail: Issuing Activity; Abstract Only

Revolutionary rather than evolutionary changes in propulsion systems are most likely to decrease cost of space transportation and to provide a global range capability. Hypersonic air-breathing propulsion is a revolutionary propulsion system. The performance of scramjet engines can be improved by the AJAX energy management concept. A magneto-hydro-dynamics (MHD) generator controls the flow and extracts flow energy in the engine inlet and a MHD accelerator downstream of the combustor accelerates the nozzle flow. A progress report toward developing the MHD technology is presented herein. Recent theoretical efforts are reviewed and ongoing experimental efforts are discussed. The latter efforts also include an ongoing collaboration between NASA, the US Air Force Research Laboratory, US industry, and Russian scientific organizations. Two of the critical technologies, the ionization of the air and the MHD accelerator, are briefly discussed. Examples of limiting the combustor entrance Mach number to a low supersonic value with a MHD energy bypass scheme are presented, demonstrating an improvement in scramjet performance. The results for a simplified design of an aerospace plane show that the specific impulse of the MHD-bypass system is better than the non-MHD system and typical rocket over a narrow region of flight speeds and design parameters. Equilibrium ionization and non-equilibrium ionization are discussed. The thermodynamic condition of air at the entrance of the engine inlet determines the method of ionization. The required external power for non-equilibrium ionization is computed. There have been many experiments in which electrical power generation has successfully been achieved by magneto-hydrodynamic (MHD) means. However, relatively few experiments have been made to date for the reverse case of achieving gas acceleration by the MHD means. An experiment in a shock tunnel is described in which MHD acceleration is investigated experimentally. MHD has several potential aerospace applications. The first is to improve the performance of hypersonic air-breathing engines for space launch and cruise vehicles. The second is to improve the performance of a high enthalpy wind tunnel. The third is to control a hypersonic vehicle. With such applications in mind, theoretical and experiments are being conducted at the NASA Ames Research Center to develop the MHD technology.
Author
Magnetohydrodynamic Generators; Turbofan Engines; Propulsion System Configurations; Propulsion System Performance; Supersonic Combustion Ramjet Engines; Magnetohydrodynamics; Design Analysis; Aerospace Engineering

20010048846 Royal Australian Air Force, Systems Certification and Integrity/Propulsion and Mechanical Systems, Australia
Certification of Engine Usage Monitoring Systems
Matchett, Robert A., Royal Australian Air Force, Australia; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 94; In English; See also 20010048829; Copyright; Abstract Only; Available from CASI only as part of the entire parent document

ADF is responsible for certification of state aircraft (including engine and systems). Engine Usage Monitoring Systems (EUMS) provides opportunity to increase safety, reduce LCC, and increase operational availability. Certification of EUMS is critical to ensuring continued airworthiness of engines. ADF is developing guidance for certification of EUMS.
Author
Aircraft Reliability; Certification; Safety

20010048849 Defence Science and Technology Organisation, Airframes and Engines Div., Melbourne, Australia
Model-Based Decision Support Tools For T700 Engine Health Monitoring
Frith, Peter, Defence Science and Technology Organisation, Australia; Karvounis, George, Defence Science and Technology Organisation, Australia; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 96; In English; See also 20010048829; Copyright; Abstract Only; Available from CASI only as part of the entire parent document

This paper describes the progress made by the Defense Science and Technology Organization (DSTO) in developing a model-based approach to the diagnosis and prognosis of engine gas path health in Australian Defense Force (ADF) helicopters powered by General Electric T700 engines. In particular, two new model-based tools are presented, one for estimating power

assurance and one for detecting abnormal engine operation. These tools have been developed to take advantage of the engine parameters recorded by modern Health and Usage Monitoring System (HUMS). Such systems are under consideration for fitting to ADF helicopters as part of midlife upgrade projects. The first tool, the T700 model-based power assurance estimator, is proposed for use with the current Health Indicator Test (HIT) check and it links the HIT check value to the power available for a given flight condition and scenario of component degradation. The second tool, a combined model-based detector and fuzzy-logic decision maker, is proposed initially for use in a HUMS ground station to reduce the amount of data manually processed or interrogated. The DSTO developed MATLAB-Simulink true twin T700 engine model with its demonstrated accurate tracking of transient flight data provides the means of detecting major shifts in in-flight engine condition over a given flight. A fuzzy logic formulation then provides the means to automate this detection process and provide an end of flight estimate for future prognostic trending.
Author
Research and Development; Turbine Engines; Models

08
AIRCRAFT STABILITY AND CONTROL

Includes flight dynamics, aircraft handling qualities; piloting; flight controls; and autopilots. For related information, see also 05 Aircraft Design, Testing and Performance and 06 Avionics and Aircraft Instrumentation.

20010046947 NASA Ames Research Center, Moffett Field, CA USA
Toward Real Time Neural Net Flight Controllers
Jorgensen, C. C., NASA Ames Research Center, USA; Mah, R. W., NASA Ames Research Center, USA; Ross, J., NASA Ames Research Center, USA; [1994]; 4p; In English; IEEE World Congress on Computational Intelligence, 28 Jun. - 2 Jul. 1994, Orlando, FL, USA; Sponsored by Institute of Electrical and Electronics Engineers, USA
Contract(s)/Grant(s): RTOP 505-64-52; No Copyright; Avail: Issuing Activity; Abstract Only

NASA Ames Research Center has an ongoing program in neural network control technology targeted toward real time flight demonstrations using a modified F-15 which permits direct inner loop control of actuators, rapid switching between alternative control designs, and substitutable processors. An important part of this program is the ACTIVE flight project which is examining the feasibility of using neural networks in the design, control, and system identification of new aircraft prototypes. This paper discusses two research applications initiated with this objective in mind: utilization of neural networks for wind tunnel aircraft model identification and rapid learning algorithms for on line reconfiguration and control. The first application involves the identification of aerodynamic flight characteristics from analysis of wind tunnel test data. This identification is important in the early stages of aircraft design because complete specification of control architecture's may not be possible even though concept models at varying scales are available for aerodynamic wind tunnel testing. Testing of this type is often a long and expensive process involving measurement of aircraft lift, drag, and moment of inertia at varying angles of attack and control surface configurations. This information in turn can be used in the design of the flight control systems by applying the derived lookup tables to generate piece wise linearized controllers. Thus, reduced costs in tunnel test times and the rapid transfer of wind tunnel insights into prototype controllers becomes an important factor in more efficient generation and testing of new flight systems. NASA Ames Research Center is successfully applying modular neural networks as one way of anticipating small scale aircraft model performances prior to testing, thus reducing the number of in tunnel test hours and potentially, the number of intermediate scaled models required for estimation of surface flow effects.
Author
Neural Nets; Network Control; Real Time Operation; Aerodynamic Characteristics; Control Systems Design; Scale Models; Wind Tunnel Models; Wind Tunnel Tests; Algorithms

20010046997 Institute for Human Factors TNO, Soesterberg, Netherlands
Ergonomic Assessment of MUAV Payload Controls *Final Report*
vanBreda, L., Institute for Human Factors TNO, Netherlands; vanErp, J. B. F., Institute for Human Factors TNO, Netherlands; vanVeen, H. A. H. C., Institute for Human Factors TNO, Netherlands; Mar. 28, 2001; 20p; In English
Contract(s)/Grant(s): 013.29313; TNO Proj. 788.1
Report No.(s): TD-2001-0129; TNO-TM-01-A025; Copyright; Avail: Issuing Activity

To investigate how a payload in a maritime unmanned aerial vehicle (MUAV) can be operated. In previous exploratory studies a joystick was used as primary payload control device. For possible introduction of MUAV operations in the Combat Management Systems on-board RNLN frigates, other human-computer interaction devices must be considered. The underlying study focuses

on the application of a rolling ball device. In a simulator experiment operator performance was determined in a target detection and tracking task for three control conditions: a standard joystick in velocity control mode, a rolling ball in position control mode, and a rolling ball in velocity control mode. The results show that control performance with a rolling ball in position control mode is equal to control performance with a standard joystick. Control performance decreases by a factor of two when a rolling ball is used in velocity control mode, the so-called virtual joystick. MUAV payload control using a rolling ball device must be based on position control.
Derived from text
Human Factors Engineering; Human-Computer Interface; Pilotless Aircraft; Remotely Piloted Vehicles; Payload Control

20010047076 Lockheed Martin Aeronautics Co., Fort Worth, TX USA
Turbulence Modeling Needs and Capabilities for Military Aircraft
Smith, Brian R., Lockheed Martin Aeronautics Co., USA; Turbulence Modeling Workshop; March 2001, pp. 74-106; In English; See also 20010047073; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

This paper presents the application of turbulence modeling to Military Aircraft. The topics include: 1) Lockheed Martin Aeronautics product line; 2) Turbulence modeling application challenges; 3) Current modeling approaches (RANS); 4) Turbulent flows with large scale unsteadiness (LES); 5) Experimental accuracy and extrapolation for full scale; and 6) Directions for future research. This paper is in viewgraph form.
CASI
Military Aircraft; Turbulence Models; Computational Fluid Dynamics

20010048002 Research and Technology Organization, Concepts and Integration (SCI) Panel, Neuilly-sur-Seine, France
Flight Control Design: Best Practices
December 2000; 214p; In English
Report No.(s): AD-A387777; RTO-TR-029; AC/323(SCI)TP/23; ISBN 92-837-1047-9; No Copyright; Avail: CASI; A03, Microfiche; A10, Hardcopy

Accidents due to adverse aircraft-pilot coupling phenomena in the latest technology aircraft occurred in the US and in Europe, while other programs had less well-publicized flight control development problems. These events showed that a robust and affordable solution to the development process of digital flight control systems was not universally available. This Technical Report begins with a review of some examples of flight control problems. They span the history of flight from the time when the practices of flying was preceding theoretical developments up to the recent events. There is a chapter detailing lessons learned from various programs with positive results. The review of problems and lessons learned leads into a chapter detailing a series of recommended design best practices. The best practices are laid out as a logical process with recommendations for avoiding the pitfalls that have lead to problems in the past. The second part of the report continues with some theoretical aspects, such as flying qualities criteria and 'carefree handling', the latest results from analytical and research activities into PIOs, and modelling and system identification to support the design process. The report concludes with suggestions for required future research.
Author
Flight Control; Aircraft Safety; Computerized Simulation; Procedures

20010048033 California Univ., Dept. of Mechanical and Aerospace Engineering, Los Angeles, CA USA
Aeroelastic Problems Associated With External Stories and Innovative Scaling Laws for Such Problems ***Final Report, 1 Jul. 1995-30 Jun. 2000***
Friedmann, Peretz P., California Univ., USA; Jun. 30, 2000; 3p; In English
Contract(s)/Grant(s): F49620-95-1-0453
Report No.(s): AD-A388304; AFRL-SR-BL-TR-01-0231; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

This AASERT grant was initially funded 7/1/95 and a Ph.D. student (Anne Le) was hired and started her studies towards a Ph. D. degree working on the problem of active control of flutter induced by stores on the wing of a typical fighter aircraft and its aeroelastic scaling. The main thrust of her research has been the development of an aeroelastic computer code capable of simulating the subsonic flutter of a fighter type wing, including stores, as well as partial span control surfaces that can be actively controlled and used for flutter suppression.
DTIC
Aeroelasticity; Scaling Laws; Computer Programs; Active Control; Subsonic Flutter

20010048037 Duke Univ., Dept. of Mechanical Engineering and Materials Science, Durham, NC USA
Nonlinear Dynamics and Control of Wings and Panels ***Final Report***
Dowell, Earl H.; Clark, Robert L., Jr.; Virgin, Lawrence N.; Nov. 2000; 7p; In English
Contract(s)/Grant(s): F496F20-97-1-0414; AF Proj. 3484
Report No.(s): AD-A388297; AFRL-SR-BL-TR-01-0290; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Experimental and theoretical studies of the nonlinear dynamics and control of aeroelastic systems including airfoils and wings have been conducted. Nonlinear geometric stiffness and freeplay have been considered specifically and good theoretical/experimental correlation obtained. Active control systems have been designed, built and tested to increase flutter speed and reduce limit cycle oscillations (LCO).

DTIC

Aeroelasticity; Wings; Panels; Active Control; Nonlinearity

09
RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, runways, hangars, and aircraft repair and overhaul facilities; wind tunnels, water tunnels, and shock tubes; flight simulators; and aircraft engine test stands. Also includes airport ground equipment and systems. For airport ground operations see 03 Air Transportation and Safety. For astronautical facilities see 14 Ground Support Systems and Facilities (Space).

20010044245 NASA Ames Research Center, Moffett Field, CA USA
Vertical Axis Rotational Motion Cues in Hovering Flight Simulation
Schroeder, Jeffrey A., NASA Ames Research Center, USA; Johnson, Walter W., NASA Ames Research Center, USA; [1994]; 3p; In English; Flight Simulation Technologies Conference, 1-3 Aug. 1994, Scottsdale, AZ, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA
Contract(s)/Grant(s): RTOP 307-50-42; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

A previous study that examined how yaw motion affected a pilot's ability to perform realistic hovering flight tasks indicated that any amount of pure yaw motion had little-to-no effect on pilot performance or opinion. In that experiment, pilots were located at the vehicle's center of rotation; thus lateral or longitudinal accelerations were absent. The purpose of the new study described here was to investigate further these unanticipated results for additional flight tasks, but with the introduction of linear accelerations associated with yaw rotations when the pilot is not at the center of rotation. The question of whether a yaw motion degree-of-freedom is necessary or not is important to government regulators who specify what simulator motions are necessary according to prescribed levels of simulator sophistication. Currently, specifies two levels of motion sophistication for flight simulators: full 6-degree-of-freedom and 3-degree-of-freedom. For the less sophisticated simulator, the assumed three degrees of freedom are pitch, roll, and heave. If other degrees of freedom are selected, which are different f rom these three, they must be qualified on a case-by-case basis. Picking the assumed three axes is reasonable and based upon experience, but little empirical data are available to support the selection of critical axes. Thus, the research described here is aimed at answering this question. The yaw and lateral degrees of freedom were selected to be examined first, and maneuvers were defined to uncouple these motions from changes in the gravity vector with respect to the pilot. This approach simplifies the problem to be examined. For this experiment, the NASA Ames Vertical Motion Simulator was used in a comprehensive investigation. The math model was an AH-64 Apache in hover, which was identified from flight test data and had previously been validated by several AH-64 pilots. The pilot's head was located 4.5 ft in front of the vehicle center of gravity, which is representative of the AH-64 pilot location. Six test pilots flew three tasks that were specifically designed to represent a broad class of situations in which both lateral and yaw motion cues may be useful. For the first task, the pilot controlled only the yaw axis and was required to rapidly acquire a North heading from 15 deg yaw offsets to either the East or West. This task allowed for full, or 1:1, motion to be used in all axes (yaw, lateral, and longitudinal). The second task was a 10 sec., 180 deg. pedal turn over a runway, but with the pilot only controlling the yaw degree-of-freedom. The position of the vehicle's center-of-mass remained fixed. This maneuver was taken from a current U.S. Army rotary wing design standard5 and is representative of a maneuver performed for acceptance of military helicopters; however, it does not allow for full 1:1 motion, since the simulator cab cannot rotate 180 deg. The third task required the pilot to perform a rapid 9 ft climb at a constant heading. This task was challenging, because rapid collective lever movement in the unaugmented AH64 results in a substantial yawing moment (due to engine torque) that must be countered by the pilot. This task also had full motion in all axes, but, in this case, the pilot had two axes to control simultaneously, rather than one as in the previous tasks. Four motion configurations were examined for each task: full motion (except for the 180 deg turn, for which the motion system was configured to provide as much motion as possible), full linear with no yaw motion, full yaw with no linear motion, and no motion. Each configuration was flown four times in a randomized test matrix, and the pilots were not informed of the

configuration given. Vehicle state data were recorded for objective performance comparisons, and pilots provided subjective comments and ratings. As part of the pilots' evaluation, they were asked to rate the compensation required, the overall fidelity of the motion as compared to real flight, and whether motion was detected or not in each of the six degrees of freedom. In addition, the pilots provided a numerical level-of confidence rating, between 1 and 7, corresponding to how sure they were whether or not motion was present in each degree-of-freedom. The latter rating allow classical signal detection analysis to be performed.
Author
AH-64 Helicopter; Aircraft Design; Climbing Flight; Degrees of Freedom; Detection; Flight Simulation; Flight Tests; Pilot Performance; Vertical Motion Simulators

20010044348 NASA Ames Research Center, Moffett Field, CA USA
Realistic Radio Communications in Pilot Simulator Training ***Final Report***
Burki-Cohen, Judith; Kendra, Andrew J.; Kanki, Barbara G.; Lee, Alfred T.; Dec. 2000; 70p; In English; Prepared in collaboration with Federal Aviation Administration, Cambridge, MA and Beta Research, Inc., Scotts Valley, CA.
Report No.(s): AD-A388067; DOT-VNTSC-FAA-00-13; DOT/FAA/AR-00/62; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Simulators used for total training and evaluation of airline pilots must satisfy stringent criteria in order to assure their adequacy for training and checking maneuvers. Air traffic control and company radio communications simulation, however, may still be left to role-play by the already taxed instructor/evaluators in spite of their central importance in every aspect of the flight environment. The underlying premise of this research is that providing a realistic radio communications environment would increase safety by enhancing pilot training and evaluation. This report summarizes the first-year efforts of assessing the requirement and feasibility of simulating radio communications automatically. A review of the training and crew resource/task management literature showed both practical and theoretical support for the need for realistic radio communications simulation. A survey of 29 instructor/evaluators from 14 airlines revealed that radio communications are mainly role-played by the instructor/evaluators. This increases instructor/evaluators' own workload while unrealistically lowering pilot communications load compared to actual operations, with a concomitant loss in training/evaluation effectiveness. A technology review searching for an automated means of providing radio communications to and from aircraft with minimal human effort showed that while promising, the technology is still immature. Further research and the need for establishing a proof-of-concept are also discussed.
DTIC
Radio Communication; Training Simulators; Pilot Training; Resources Management; Training Evaluation; Air Traffic Control

20010047235 NASA Glenn Research Center, Cleveland, OH USA
Lessons Learned From The Construction of Upgrades to the NASA Glenn Icing Research Tunnel and Re-Activation Testing
Sheldon, David W., NASA Glenn Research Center, USA; Andracchio, Charles R., NASA Glenn Research Center, USA; Krivanek, Thomas M., NASA Glenn Research Center, USA; Spera, David A., DYNACS Engineering Co., Inc., USA; Austinson, Todd A., DYNACS Engineering Co., Inc., USA; March 2001; 30p; In English; 39th Aerospace Sciences Meeting and Exhibit, 8-11 Jan. 2001, Reno, NV, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA
Contract(s)/Grant(s): RTOP 708-90-1A
Report No.(s): NASA/TM-2001-210688; NAS 1.15:210688; E-12615; AIAA Paper 2001-0231; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Major upgrades were made in 1999 to the 6- by 9-Foot (1.8- by 2.7-m) Icing Research Tunnel (IRT) at the NASA Glenn Research Center. These included replacement of the electronic controls for the variable-speed drive motor, replacement of the heat exchanger, complete replacement and enlargement of the leg of the tunnel containing the new heat-exchanger, the addition of flow-expanding and flow-contracting turning vanes upstream and downstream of the heat exchanger, respectively, and the addition of fan outlet guide vanes (OGV's). This paper presents an overview of the construction and reactivation testing phases of the project. Important lessons learned during the technical and contract management work are documented.
Author
Construction; Electronic Control; Ice Formation; Wind Tunnels; Research Facilities

20010047275 Arnold Engineering Development Center, Arnold AFS, TN USA
Integrated Optical Diagnostics for 16-ft Transonic Wind Tunnel ***Final Report, Oct. 1997-Sep. 2000***
Lowry, Heard S.; Smith, Mike S.; Bertrand, William T.; Heltsley, Fred; Sinclair, Daryl W.; Feb. 2001; 76p; In English; Original contains color plates
Report No.(s): AD-A388246; AEDC-TR-00-3; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The Integrated Optical Diagnostics project integrated three optical diagnostics systems for use in the Aerodynamic 16-foot transonic wind tunnel testing area. Integration of the systems was provided through an optical diagnostics controller via fiber-optic reflective memory interface hardware. This hardware will be used as the common developmental structure for all future optical diagnostic techniques that will be used in the 16T environment. Control commands and data transfers from the 16T control/data system were accomplished through ethernet connection. This integration will provide aerospace system developers and testers the tools needed to reduce the total time required to conduct a wind tunnel test program.
DTIC
Transonic Wind Tunnels; Wind Tunnel Tests; Optical Properties; Diagnosis

20010047484 NASA Ames Research Center, Moffett Field, CA USA
Revalidation of the NASA Ames 11-by 11-Foot Transonic Wind Tunnel with a Commercial Airplane Model
Kmak, Frank J., NASA Ames Research Center, USA; Hudgins, M., Boeing Co., USA; Hergert, D., Boeing Co., USA; [2001]; 28p; In English; 39th AIAA Aerospace Sciences Meeting and Exhibit, 8-11 Jan. 2001, Reno, NV, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA
Report No.(s): AIAA Paper 2001-0454; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The 11-By 11-Foot Transonic leg of the Unitary Plan Wind Tunnel (UPWT) was modernized to improve tunnel performance, capability, productivity, and reliability. Wind tunnel tests to demonstrate the readiness of the tunnel for a return to production operations included an Integrated Systems Test (IST), calibration tests, and airplane validation tests. One of the two validation tests was a 0.037-scale Boeing 777 model that was previously tested in the 11-By 11-Foot tunnel in 1991. The objective of the validation tests was to compare pre-modernization and post-modernization results from the same airplane model in order to substantiate the operational readiness of the facility. Evaluation of within-test, test-to-test, and tunnel-to-tunnel data repeatability were made to study the effects of the tunnel modifications. Tunnel productivity was also evaluated to determine the readiness of the facility for production operations. The operation of the facility, including model installation, tunnel operations, and the performance of tunnel systems, was observed and facility deficiency findings generated. The data repeatability studies and tunnel-to-tunnel comparisons demonstrated outstanding data repeatability and a high overall level of data quality. Despite some operational and facility problems, the validation test was successful in demonstrating the readiness of the facility to perform production airplane wind tunnel%, tests.
Author
Transonic Wind Tunnels; Aircraft Models; Calibrating; Maintainability; Wind Tunnel Tests

20010047578 Naval Air Warfare Center, Aircraft Div., Patuxent River, MD USA
Air Combat Environment Test & Evaluation Facility
Macone, Dan; Jun. 28, 2000; 19p; In English
Report No.(s): AD-A388145; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

ACETEF's primary mission is to reduce technical risk and cost for navy aircraft and aircraft systems through the use of simulation and stimulation during installed systems testing. The facility provides a multitude of resources and capabilities which are used for Research, Development, Test and Evaluation and Training in support of the systems development process and systems deployment.
DTIC
Combat; Air Defense; Systems Engineering

20010047587 Federal Aviation Administration, Technical Center, Atlantic City, NJ USA
Airport Movement Area Safety System (AMASS) Intersecting Runways Parameter Study Test Plan
Dellmyer, Dan; Jan. 2001; 11p; In English
Report No.(s): AD-A388171; DOT/FAA/CT-TN01/04; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The purpose of this Airport Movement Area Safety System (AMASS) Intersecting Runways Parameter Study Test Plan is to describe the approach and concept that will be used to determine a recommended set of alert parameters for intersecting runways alerts. The plan describes the data collection and analysis that will be used to determine which intersecting runway parameter set will maximize the AMASS safety benefit while minimizing the number of nuisance alerts generated.
DTIC
Airports; Safety; Runways; Air Traffic Control

20010047841 DYNACS Engineering Co., Inc., Brook Park, OH USA

Use of a Scale Model in the Design of Modifications to the NASA Glenn Icing Research Tunnel ***Final Report***

Canacci, Victor A., DYNACS Engineering Co., Inc., USA; Gonsalez, Jose C., DYNACS Engineering Co., Inc., USA; Spera, David A., DYNACS Engineering Co., Inc., USA; March 2001; 46p; In English; 39th Aerospace Sciences Meeting, 8-11 Jan. 2001, Reno, NV, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA

Contract(s)/Grant(s): NAS3-98008; RTOP 708-90-1A

Report No.(s): NASA/CR-2001-210687; E-12614; NAS 1.26:210687; AIAA Paper 2001-0230; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Major modifications were made in 1999 to the 6- by 9-Foot (1.8- by 2.7-m) Icing Research tunnel (IRT) at the NASA Glenn Research Center, including replacement of its heat exchanger and associated ducts and turning vanes, and the addition of fan outlet guide vanes (OGV's). A one-tenth scale model of the IRT (designated as the SMIRT) was constructed with and without these modifications and tested to increase confidence in obtaining expected improvements in flow quality around the tunnel loop. The SMIRT is itself an aerodynamic test facility whose flow patterns without modifications have been shown to be accurate, scaled representations of those measured in the IRT prior to the 1999 upgrade program. In addition, tests in the SMIRT equipped with simulated OGV's indicated that these devices in the IRT might reduce flow distortions immediately downstream of the fan by two thirds. Flow quality parameters measured in the SMIRT were projected to the full-size modified IRT, and quantitative estimates of improvements in flow quality were given prior to construction. In this paper, the results of extensive flow quality studies conducted in the SMIRT are documented. Samples of these are then compared with equivalent measurements made in the full-scale IRT, both before and after its configuration was upgraded. Airspeed, turbulence intensity, and flow angularity distributions are presented for cross sections downstream of the drive fan, both upstream and downstream of the replacement flat heat exchanger, in the stilling chamber, in the test section, and in the wakes of the new comer turning vanes with their unique expanding and contracting designs. Lessons learned from these scale-model studies are discussed.

Author

Subsonic Wind Tunnels; Wind Tunnel Tests; Flow Distribution; Aerodynamic Characteristics; Ice Formation

20010048406 NASA Glenn Research Center, Cleveland, OH USA

Overview of the Icing and Flow Quality Improvements Program for the NASA Glenn Icing Research Tunnel

Irvine, Thomas B., NASA Glenn Research Center, USA; Kevdzija, Susan L., NASA Glenn Research Center, USA; Sheldon, David W., NASA Glenn Research Center, USA; Spera, David A., DYNACS Engineering Co., Inc., USA; February 2001; 38p; In English; 39th Aerospace Sciences Meeting and Exhibit, 8-11 Jan. 2001, Reno, NV, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA

Contract(s)/Grant(s): RTOP 708-90-1A

Report No.(s): NASA/TM-2001-210686; NAS 1.15:210686; E-12613; AIAA Paper 2001-0229; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Major upgrades were made in 1999 to the 6- by 9-Foot (1.8- by 2.7-m) Icing Research Tunnel (IRT) at the NASA Glenn Research Center. These included replacement of the electronic controls for the variable-speed drive motor, replacement of the heat exchanger, complete replacement and enlargement of the leg of the tunnel containing the new heat-exchanger, the addition of flow-expanding and flow-contracting turning vanes upstream and downstream of the heat exchanger, respectively, and the addition of fan outlet guide vanes (OGV's). This paper describes the rationale behind this latest program of IRT upgrades and the program's requirements and goals. An overview is given of the scope of work undertaken by the design and construction contractors, the scale-model IRT (SMIRT) design verification program, the comprehensive reactivation test program initiated upon completion of construction, and the overall management approach followed.

Author

Wind Tunnels; Subsonic Flow; Construction; Replacing; Ice Formation; Electronic Control

20010048652 NASA Ames Research Center, Moffett Field, CA USA

Runway Texture and Grid Pattern Effects on Rate-of-Descent Perception

Schroeder, J. A., NASA Ames Research Center, USA; Dearing, M. G., NASA Ames Research Center, USA; Sweet, B. T., NASA Ames Research Center, USA; Kaiser, M. K., NASA Ames Research Center, USA; [2001]; 1p; In English; 2001 AIAA Modeling and Simulation Conference, Unknown; Sponsored by American Inst. of Aeronautics and Astronautics, USA; No Copyright; Avail: Issuing Activity; Abstract Only

To date, perceptual errors occur in determining descent rate from a computer-generated image in flight simulation. Pilots tend to touch down twice as hard in simulation than in flight, and more training time is needed in simulation before reaching steady-state performance. Barnes suggested that recognition of range may be the culprit, and he cited that problems such as collimated objects,

binocular vision, and poor resolution lead to poor estimation of the velocity vector. Brown's study essentially ruled out that the lack of binocular vision is the problem. Dorfel added specificity to the problem by showing that pilots underestimated range in simulated scenes by 50% when 800 ft from the runway threshold. Palmer and Petitt showed that pilots are able to distinguish between a 1.7 ft/sec and 2.9 ft/sec sink rate when passively observing sink rates in a night scene. Platform motion also plays a role, as previous research has shown that the addition of substantial platform motion improves pilot estimates of vertical velocity and results in simulated touchdown rates more closely resembling flight. This experiment examined how some specific variations in the visual scene properties affect a pilot's perception of sink rate. It extended another experiment that focused on the visual and motion cues necessary for helicopter autorotations. In that experiment, pilots performed steep approaches to a runway. The visual content of the runway and its surroundings varied in two ways: texture and rectangular grid spacing. Four textures, included a no-texture case, were evaluated. Three grid spacings, including a no-grid case, were evaluated. The results showed that pilot better controlled their vertical descent rates when good texture cues were present. No significant differences were found for the grid manipulation. Using those visual scenes a simple psychophysics, experiment was performed. The purpose was to determine if the variations in the visual scenes allowed pilots to better perceive vertical velocity. to determine that answer, pilots passively viewed a particular visual scene in which the vehicle was descending at two different rates. Pilots had to select which of the two rates they thought was the fastest rate. The difference between the two rates changed using a staircase method, depending on whether or not the pilot was correct, until a minimum threshold between the two descent rates was reached. This process was repeated for all of the visual scenes to decide whether or not the visual scenes did allow pilots to perceive vertical velocity better among them. All of the data have yet to be analyzed; however, neither the effects of grid nor texture revealed any statistically significant trends. On further examination of the staircase method employed, a possibility exists that the lack of an evident trend may be due to the exit criterion used during the study. As such, the experiment will be repeated with an improved exit criterion in February. Results of this study will be presented in the submitted paper.
Author
Runways; Perceptual Errors; Textures; Touchdown; Steady State

20010048881 NASA Dryden Flight Research Center, Edwards, CA USA
Description of the NASA Dryden Flow Visualization Facility
DelFrate, John H., NASA Dryden Flight Research Center, USA; [1994]; 1p; In English
Contract(s)/Grant(s): RTOP 505-59-53; No Copyright; Avail: Issuing Activity; Abstract Only

A water tunnel facility at the NASA Dryden Flight Research Facility is described. This water tunnel facility, the Flow Visualization Facility, is used primarily for visualizing and analyzing vortical flows on aircraft models and other shapes at high incidence angles. The tunnel is used extensively as a low cost diagnostic tool to help understand complex flows over aircraft and other full scale vehicles. The facility consists primarily of a closed circuit water tunnel with a 16 in by 24 in vertical test section. The velocity of the flow through the test section can be varied from 0 to 10 in/sec, however 3 in/sec has been found to be optimum for flow visualization. This corresponds to a unit Reynolds number of 23,000 per foot and a turbulence level over the majority of the test section below .05%. Flow visualization techniques described include the dye tracer, laser light sheet and the shadowgraph techniques. Limited correlation to full-scale flight data is shown.
Author
Data Correlation; Flow Velocity; Flow Visualization; Research Facilities; Test Chambers; Water Tunnel Tests

20010048896 NASA Ames Research Center, Moffett Field, CA USA
Development of a Metabolic Cage for Simulation of Weightlessness in a Laboratory Environment
Mulenburg, Gerald M., NASA Ames Research Center, USA; Evans, JuliAnn, NASA Ames Research Center, USA; Gundo, Daniel P., NASA Ames Research Center, USA; Skundberg, Thomas L., Bionetics Corp., USA; Harper, Jennifer, Bionetics Corp., USA; [1994]; 1p; In English; 18th Space Simulation Conference: Space Mission Success through Testing, 31 Oct. - 3 Nov. 1994, Baltimore, MD, USA
Contract(s)/Grant(s): RTOP 199-08-12; No Copyright; Avail: Issuing Activity; Abstract Only

Astronauts experience many physiological changes during spaceflight and exposure to microgravity. There is a headwardshift of fluids, muscles atrophy, and changes occur in the body's bone structure and hormone levels. This paper describes a unique metabolic cage that was developed to evaluate ground simulation of these effects. Hindlimb or tail suspension in rats has been studied as a model to create the effects of microgravity in order to study how to counteract them. This suspension model, developed by Holton, accurately simulates the effects of weightlessness during spaceflight by unloading the hindlimbs and producing a head-ward shift of fluids. However, obtaining quantitative data on the nutritional state, the gastrointestinal and renal function of these animals has not been possible, until now. Using Holton's tail suspension model, the new metabolic suspension cage effectively separates urine and feces samples for analysis allowing investigators to examine the effects of microgravity in many

complex body systems. A description of the cage system, its design, and results of its use is provided along with pictures and details for replication of the cages.
Author
Weightlessness; Metabolism; Simulation; Physiology

20010048897 NASA Ames Research Center, Moffett Field, CA USA
Development of a Rotating Human Research Facility
Mulenburg, Gerald M., NASA Ames Research Center, USA; Caldwell, William F., NASA Ames Research Center, USA; Tucker, John, NASA Ames Research Center, USA; [1994]; 1p; In English; 18th Space Simulation Conference: Space Mission Success through Testing, 31 Oct. - 3 Nov. 1994, Baltimore, MD, USA
Contract(s)/Grant(s): RTOP 199-08-12; No Copyright; Avail: Issuing Activity; Abstract Only

A unique facility has been developed at the NASA Ames Research Center to provide scientists with unusual research opportunities at greater than Earth's gravity. In addition to its use for basic research, this facility will help provide answers to many of the questions posed by proponents of rotating human space vehicles. This paper describes the design and planned use of this facility, the Spaceflight Environmental Simulator. Using an existing 52-foot diameter cylindrical rotating platform design centrifuge, the revised facility design includes the provision of two human habitats for long duration studies of the effects of hypergravity. Up to four humans (per habitat) will be able to live at up to 2 G for as long as one month without stopping the centrifuge. Each habitat, constructed of lightweight honeycomb sandwich panels, is nominally 9 ft high x 11 ft wide x 25 1/2 ft long. A radial positioning system provides for positioning each habitat at a distance of 15 to 21 feet from the centrifuge's axis of rotation to the midpoint of the habitat's interior floor. As centrifugal acceleration changes with rotation rate, a habitat floor-mounted accelerometer signal provides automatic servo controlled adjustment of each habitat's angle of inclination to provide an environment for the habitat's crew and cargo in which the resultant gravity vector is normal to the habitat floor at all times. Design of the habitats and modifications to the centrifuge are complete, and are currently under construction. Design philosophy and operational rationale are presented along with complete descriptions of the facility and its systems.
Author
High Gravity Environments; Research Facilities; Rotation

12
ASTRONAUTICS (GENERAL)

Includes general research topics related to space flight and manned and unmanned space vehicles, platforms or objects launched into, or assembled in, outer space; and related components and equipment. Also includes manufacturing and maintenance of such vehicles or platforms. For specific topics in astronautics see categories 13 through 20. For extraterrestrial exploration, see 91 Lunar and Planetary Science and Exploration.

20010045816 NASA Marshall Space Flight Center, Huntsville, AL USA
2nd Generation RLV: Program Goals and Acquisition Strategy
Graham, J. Bart, NASA Marshall Space Flight Center, USA; [2001]; 8p; In English; Space Technology and Applications International Forum, 11-14 Feb. 2001, Albuquerque, NM, USA; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The risk to loss of life for Space Shuttle crewmembers is approximately one in 245 missions. U.S. launch service providers captured nearly 100%, of the commercial launch market revenues in the mid 1980s. Today, the U.S. captures less than 50% of that market. A launch system architecture is needed that will dramatically increase the safety of space flight while significantly reducing the cost. NASA's Space Launch Initiative, which is implemented by the 2nd Generation RLV Program Office at Marshall Space Flight Center, seeks to develop technology and reusable launch vehicle concepts which satisfy the commercial launch market needs and the unique needs of NASA. Presented in this paper are the five primary elements of NASA's Integrated Space Transportation Plan along with the highest level goals and the acquisition strategy of the 2nd Generation RLV Program. Approval of the Space Launch Initiative FY01 budget of $290M is seen as a major commitment by the Agency and the Nation to realize the commercial potential that space offers and to move forward in the exploration of space.
Author
Space Transportation; Reusable Launch Vehicles; Market Research

13
ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbital and launching dynamics.

20010045811 Centre National d'Etudes Spatiales, Toulouse, France
Principles of Generic Attitude Simulation ***Principes de Simulation Generique d'Attitude***
Maisonobe, Luc, Centre National d'Etudes Spatiales, France; Feb. 2001; 82p; In French
Report No.(s): CNES-142; CCTMO-3; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

Marmottes are a set of mathematical models and associated solvers aimed towards generic satellite attitude motion simulation. Genericity means that the specificities of both the attitude control modes and the sensors show up at input data level rather than in algorithms or computer programs.
Author
Attitude Control; Mathematical Models; Motion Simulation

15
LAUNCH VEHICLES AND LAUNCH OPERATIONS

Includes all classes of launch vehicles, launch/space vehicle systems, and boosters; and launch operations. For related information see also 18 Spacecraft Design, Testing, and Performance; and 20 Spacecraft Propulsion and Power.

20010046955 NASA Marshall Space Flight Center, Huntsville, AL USA
2nd Generation Reusable Launch Vehicle Potential Commercial Development Scenarios
Creech, Stephen D., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; IAA 31st Symposium of Economics and Commercialization of Space Activities, Unknown; Sponsored by International Academy of Astronautics, Unknown; No Copyright; Avail: Issuing Activity; Abstract Only

The presentation will discuss potential commercial development scenarios for a Second Generation Reusable Launch Vehicle. The analysis of potential scenarios will include commercial rates of return, government return on investment, and market considerations. The presentation will include policy considerations in addition to analysis of Second Generation Reusable Launch Vehicle economics. The data discussed is being developed as a part of NASA's Second Generation Reusable Launch Vehicle Program, for consideration as potential scenarios for enabling a next generation system. Material will include potential scenarios not previously considered by NASA or presented at other conferences. Candidate paper has not been presented at a previous meeting, and conference attendance of the author has been approved by NASA.
Author
Reusable Launch Vehicles; Economics; Commercialization; Conferences

20010048017 Defence Science and Technology Organisation, Weapons Systems Div., Salisbury, Australia
A Two-Stage Light Gas Gun for the Study of High Speed Impact in Propellants
Doolan, Con; Jan. 2001; 30p; In English; Original contains color plates
Report No.(s): AD-A388455; DSTO-TR-1092; DODA-AR-011-669; Copyright; Avail: Defense Technical Information Center (DTIC)

This report describes a proposed two-stage light gas gun for the investigation of high speed impact in solid rocket propellants. Such a facility would provide valuable, quantitative information on the IM response of propellants for the ADF. A description of the operating principles and anticipated design is followed by a performance prediction using a numerical model. A quasi-one-dimensional computational fluid dynamics code was utilized to simulate the interaction of the gas dynamics with piston and projectile motion. Various projectile masses and initial gas fill pressures were investigated. It was concluded that the device described in this report was capable of accelerating masses of the order of 5-15g at hypervelocity speeds using a helium driver gas and that performance would be enhanced by evacuating the launch tube prior to projectile release. Marginal performance increases could be obtained by replacing the driver gas with hydrogen.
DTIC
Computational Fluid Dynamics; Gas Dynamics; Light Gas Guns

20010048664 NASA Ames Research Center, Moffett Field, CA USA

Zero Boil Off Cryogen Storage for Future Launchers

Valentian, D., Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, France; Plachta, D., NASA Glenn Research Center, USA; Kittel, P., NASA Ames Research Center, USA; Hastings, L. J., NASA Marshall Space Flight Center, USA; Salerno, Louis J., NASA Ames Research Center, USA; [2001]; 2p; In English; Third European Conference on Launcher Technology, Strasbourg, France; No Copyright; Avail: Issuing Activity; Abstract Only

Zero boil off (ZBO) cryogen storage using both cryocoolers and passive insulation technologies will enable long-term exploration missions by allowing designers to optimize tankage without the need for excess cryogen storage to account for boil off. Studies of ZBO (zero boil off) have been on-going in the USA for several years. More recently, a review of the needs of advanced space propulsion took place in Europe. This showed the interest of the European community in cryogenic propulsion for planetary missions as well as the use of liquid hydrogen for large power electric propulsion (manned Mars missions). Although natural boiling could be acceptable for single leg missions, passive insulation techniques yield roughly a I% per month cryogen loss and this would not be cost effective for robotic planetary missions involving storage times greater than one year. to make economic sense, long-term exploration missions require lower tank capacity and longer storage times. Recent advances in cryocooler technology, resulting in vast improvements in both cooler efficiency and reliability, make ZBO is a clear choice for planetary exploration missions. Other, more near term applications of ZBO include boil-off reduction or elimination applied to first and upper stages of future earth-to-orbit (ETO) launchers. This would extend launch windows and reduce infrastructure costs. Successors to vehicles like Ariane 5 could greatly benefit by implementing ZBO. Zero Boil Off will only be successful in ETO launcher applications if it makes economic sense to implement. The energy cost is only a fraction of the total cost of buying liquid cryogen, the rest being transportation and other overhead. Because of this, higher boiling point cryogens will benefit more from on-board liquefaction, thus reducing the infrastructure costs. Since hydrogen requires a liquefier with at least a 17% efficiency just to break even from a cost standpoint, one approach for implementing ZBO in upper stages would be to actively cool the shield in the hydrogen tank to reduce the parasitic losses. This would allow the use of less expensive, presently available coolers (80 K vs. 20 K) and potentially simplify the system by requiring only a single compressor on the pad amd a single disconnect line. The compressor could be a hefty commercial unit, with only the cold head requiring expensive flight development and qualification. While this is actually a reduced boil off configuration rather than a zero-boil off case, if the cryogen loss could be cut significantly, the increase in hold time and reduced need for draining and refilling the propellant tanks could meet the vehicle operations needs in the majority of instances.Bearing in mind the potential benefits of ZBO, NASA AMES and SNECMA Moteurs decided to exchange their technical views on the subject. This paper will present a preliminary analysis for a multi-mission module using a fairly low thrust cryogenic engine and ZBO during cruise. Initial mass is 5.5. tons (in ETO). The cryogenic engine will be used near each periapsis in order to minimize the AV requirement. The payload obtained by this propulsion system is compared to a classical storable bipropellant propulsion system for several cases (e. g. Mars lander, Jupiter orbiter, Saturn orbiter). For the Jupiter and Saturn cases, the power source could be an RTG or a large parabolic mirror illuminating a solar panel. It is shown -that - due to its much larger specific impulse - the cryogenic ZBO solution provides much higher payloads, especially for exploration missions involving landing on planets, asteroids, comets, or other celestial bodies.

Author

Boiling; Celestial Bodies; Coolers; Cryogenic Cooling; Cryogenic Equipment; Cryogenic Fluids; Thermoelectric Generators; Tanks (Containers)

20010048747 NASA Marshall Space Flight Center, Huntsville, AL USA

An Approach to Establishing System Benefits for Technologies In NASA's Spaceliner Investment Area

Hueter, Uwe, NASA Marshall Space Flight Center, USA; Pannell, Bill, NASA Marshall Space Flight Center, USA; [2001]; 2p; In English; 52nd International Aeronautical Congress, 1-5 Oct. 2001, Toulouse, France; Sponsored by International Aeronautical Congress, France; No Copyright; Avail: Issuing Activity; Abstract Only

NASA's has established long term goals for access-to-space. The third generation launch systems are to be fully reusable and operational around 2025. The goals for the third generation launch system are to significantly reduce cost and improve safety over current systems. The Advanced Space Transportation Program Office (ASTP) at the NASA's Marshall Space Flight Center in Huntsville, AL has the agency lead to develop space transportation technologies. Within ASTP, under the Spaceliner Investment Area, third generation technologies are being pursued. The Spaceliner Investment Area's primary objective is to mature vehicle technologies to enable substantial increases in the design and operating margins of third generation RLVs (current Space Shuttle is considered the first generation RLV) by incorporating advanced propulsion systems, materials, structures, thermal protection systems, power, and avionics technologies. Advancements in design tools and better characterization of the operational environment will result in reduced design and operational variabilities leading to improvements in margins. Improvements in operational efficiencies will be obtained through the introduction of integrated vehicle health management, operations and range

technologies. Investments in these technologies will enable the reduction in the high operational costs associated with today's vehicles by allowing components to operate well below their design points resulting in improved component operating life, reliability, and safety which in turn reduces both maintenance and refurbishment costs. The introduction of advanced technologies may enable horizontal takeoff by significantly reducing the takeoff weight and allowing use of existing infrastructure. This would be a major step toward the goal of airline-like operation. These factors in conjunction with increased flight rates, resulting from reductions in transportation costs, will result in significant improvements of future vehicles. The real-world problem is that resources are limited and technologies need to be prioritized to assure the resources are spent on technologies that provide the highest system level benefits. Toward that end, a systems approach is being taken to determine the benefits of technologies for the Spaceliner Investment Area. Technologies identified to be enabling will be funded. However, the other technologies will be funded based on their system's benefits. Since the final launch system concept will not be decided for many years, several vehicle concepts are being evaluated to determine technology benefits. Not only performance, but also cost and operability are being assessed. This will become an annual process to assess these technologies against their goals and the benefits to various launch systems concepts. The paper describes the system process, tools and concepts used to determine the technology benefits. Preliminary results will be presented along with the current technology investments that are being made by ASTP's Spaceliner Investment Area.
Author
Cost Reduction; Operating Costs; Space Transportation System; Reusable Launch Vehicles; Reusable Spacecraft; Cost Effectiveness; Cost Analysis

20010048867 Army Research Lab., Aberdeen Proving Ground, MD USA
Accuracy and Railguns ***Final Report, Jan. - Jun. 2000***
Zielinski, Alexander E., Army Research Lab., USA; February 2001; 18p; In English
Contract(s)/Grant(s): DA Proj. 1L1-622618-AH-80
Report No.(s): AD-A387176; ARL-TR-2392; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Assessment of accuracy is dominated by a detailed experimental investigation of the launch and flight performance of a launcher and round. This assessment is commonly called a jump test. to evaluate the path of the round as it accelerates down the launcher, exits the barrel, and flies downrange to the target, single-shot firings are conducted. In the most recent test, integrated launch packages (ILPs) were launched at an exit velocity of 1,350 m/s. The test provides for the only set of accuracy data available in the world on E gun-launched projectiles. The impact data show larger variability in the vertical direction than in the horizontal direction. Results from the jump test indicate that effects of the deviation of the launcher centerline (i.e., straightness) contribute significantly to the target impact dispersion. Substantial linear and angular rates at the muzzle are evident in the vertical direction. The contribution attributable to sabot discard is minimal in either plane.
Author
Accuracy; Flight Characteristics; Railgun Accelerators; Sabot Projectiles; Launchers

16
SPACE TRANSPORTATION AND SAFETY

Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques. For related information, see also 03 Air Transportation and Safety and 15 Launch Vehicles and Launch Vehicles, and 18 Spacecraft Design, Testing and Performance. For space suits, see 54 Man/System Technology and Life Support.

20010047226 Science Applications International Corp., Huntsville, AL USA
Systems Safety, Reliability, and Risk Assessment. Task 4: Safety and Launch Vehicle Review Support ***Final Report***
Mar. 20, 2001; 11p; In English; Original contains color illustrations
Contract(s)/Grant(s): NASA Order H-31980-D; GS-23F-8006H; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report summarizes support provided by Science Applications International Corporation (SAIC) to the NASA/Marshall Space Flight Center (MSFC). Work under this contract was performed in support of the Advanced Space Transportation Program and the Second Generation RLV Program Office.
Author
Safety; Space Transportation; Reliability

20010047481 NASA Johnson Space Center, Houston, TX USA
STS-106 Mission Highlights Resource Tape, Part 1 of 2
May 15, 2001; In English; Videotape: 1 hr. 26 min. 50 sec. playing time, in color, with sound
Report No.(s): NONP-NASA-VT-2001072041; JSC-1844; No Copyright; Avail: CASI; B04, Videotape-Beta; V04, Videotape-VHS

An overview of the STS-106 mission is given through footage of the activities of the first flight days of the mission, starting with flight day one and ending with flight day eight. The crewmembers of Atlantis, Commander Terrence Wilcutt, Pilot Scott Altman, and Mission Specialists Daniel Burbank, Edward Lu, Richard Mastracchio, Yuri Malenchenko, and Boris Morukov, are seen during various prelaunch activities, such as during the ceremonial breakfast, suit up, and boarding Atlantis. The launch is seen, as are the rendezvous and docking of the Orbiter to the International Space Station (ISS) and the spacewalks performed on flight day three by Lu and Malenchenko. Activities for flight days 9-12 can be seen on 'STS-106 Mission Highlights Resource Tape, Part 2 of 2' (internal ID 2001072040).
CASI
Extravehicular Activity; International Space Station; Orbital Rendezvous; Spacecraft Docking; Atlantis (Orbiter); Crew Procedures (Inflight); Crew Procedures (Preflight)

20010047555 NASA Johnson Space Center, Houston, TX USA
STS-100 Flight Day 12 Highlights
May 04, 2001; In English; Videotape: 25 min. 32 sec. playing time, in color, with sound
Report No.(s): NONP-NASA-VT-2001064667; BRF-1428L; No Copyright; Avail: CASI; B02, Videotape-Beta; V02, Videotape-VHS

On this twelfth day of the STS-100 mission, the crewmembers of Atlantis, Commander Kent Rominger, Pilot Jeffrey Ashby, and Mission Specialists Chris Hadfield, Scott Parazynski, John Phillips, Umberto Guidoni, and Yuri Valentinovich Lonchakov, are seen in an on-orbit press conference as they answer questions from the press. Also shown is the approach and dock of the Russian Soyuz spacecraft to the International Space Station (ISS). The Expedition 2 crew, Commander Yuriy Usachev and Flight Engineers James Voss and Susan Helms, and the Soyuz crew greet each other and welcome space tourist Dennis Tito to the ISS.
CASI
Soyuz Spacecraft; International Space Station; Crew Procedures (Inflight); Spacecrews

20010047588 NASA Johnson Space Center, Houston, TX USA
STS-104 Crew Interview: Mike Gernhardt
May 13, 2001; In English; Videotape: 55 min. playing time, in color, with sound
Report No.(s): NONP-NASA-VT-2001071162; JSC-1871C; No Copyright; Avail: CASI; B03, Videotape-Beta; V03, Videotape-VHS

STS-104 Mission Specialist Mike Gernhardt is seen being interviewed. He answers questions about his inspiration to become an astronaut and his career path. He gives details on the mission's goals and significance, its payload (the Joint Airlock and the external gas tanks), and the usefulness of the newly installed Canadian Robotic Arm (installed by STS-100 crew). Gernhardt describes his role in the rendezvous, docking, undocking, and flyaround of the Atlantis Orbiter and the International Space Station (ISS) and discusses the mission's planned spacewalks.
CASI
Air Locks; External Tanks; Extravehicular Activity; Spacecraft Docking; Crew Procedures (Inflight); Prelaunch Summaries

20010047589 NASA Johnson Space Center, Houston, TX USA
STS-104 Crew Interview: Jim Reilly
May 13, 2001; In English; Videotape: 53 min. playing time, in color, with sound
Report No.(s): NONP-NASA-VT-2001071161; JSC-1871E; No Copyright; Avail: CASI; B03, Videotape-Beta; V03, Videotape-VHS

STS-104 Mission Specialist Jim Reilly is seen being interviewed. He answers questions about his inspiration to become an astronaut and his career path. He gives details on the mission's goals and significance, its payload (the Joint Airlock and the external gas tanks), and the usefulness of the newly installed Canadian Robotic Arm (installed by STS-100 crew). Reilly describes his role in the rendezvous, docking, undocking, and flyaround of the Atlantis Orbiter and the International Space Station (ISS) and discusses the mission's planned spacewalks.
CASI
Air Locks; External Tanks; Extravehicular Activity; Spacecraft Docking; Crew Procedures (Inflight); Prelaunch Summaries

20010047590 NASA Johnson Space Center, Houston, TX USA
STS-104 Crew Interview: Charlie Hobaugh
May 13, 2001; In English; Videotape: 44 min. 30 sec. playing time, in color, with sound
Report No.(s): NONP-NASA-VT-2001071160; JSC-1871B; No Copyright; Avail: CASI; B03, Videotape-Beta; V03, Videotape-VHS

STS-104 Pilot Charlie Hobaugh is seen being interviewed. He answers questions about his inspiration to become an astronaut and his career path. He gives details on the mission's goals and significance, its payload (the Joint Airlock and the external gas tanks), and the usefulness of the newly installed Canadian Robotic Arm (installed by STS-100 crew). Hobaugh describes his role in the rendezvous, docking, undocking, and flyaround of the Atlantis Orbiter and the International Space Station (ISS) and discusses the mission's planned spacewalks.
CASI
Air Locks; Extravehicular Activity; Spacecraft Docking; Prelaunch Summaries; Crew Procedures (Inflight)

20010047594 NASA Johnson Space Center, Houston, TX USA
STS-104 Crew Interview: Janet Kavandi
May 13, 2001; In English; Videotape: 30 min. playing time, in color, with sound
Report No.(s): NONP-NASA-VT-2001070357; JSC-1871D; No Copyright; Avail: CASI; B02, Videotape-Beta; V02, Videotape-VHS

STS-104 Mission Specialist Janet Kavandi is seen being interviewed. She answers questions about her inspiration to become an astronaut and her career path. She gives details on the mission's goals and significance, its payload (the Joint Airlock and the external gas tanks), and the usefulness of the newly installed Canadian Robotic Arm (installed by STS-100 crew). Kavandi describes her role in the rendezvous, docking, undocking, and flyaround of the Atlantis Orbiter and the International Space Station (ISS) and discusses the mission's planned spacewalks.
CASI
Air Locks; External Tanks; Extravehicular Activity; Spacecraft Docking; Crew Procedures (Inflight); Prelaunch Summaries

20010047595 NASA Johnson Space Center, Houston, TX USA
STS-104 Crew Interview: Steve Lindsey
May 13, 2001; In English; Videotape: 40 min. 2 sec. playing time, in color, with sound
Report No.(s): NONP-NASA-VT-2001070356; JSC-1871A; No Copyright; Avail: CASI; B03, Videotape-Beta; V03, Videotape-VHS

STS-104 Commander Steve Lindsey is seen being interviewed. He answers questions about his inspiration to become an astronaut and his career path. He gives details on the mission's goals and significance, its payload (the Joint Airlock and the external gas tanks), and the usefulness of the newly installed Canadian Robotic Arm (installed by STS-100 crew). Lindsey describes his role in the rendezvous, docking, undocking, and flyaround of the Atlantis Orbiter and the International Space Station (ISS) and discusses the mission's planned spacewalks.
CASI
Air Locks; External Tanks; Extravehicular Activity; Spacecraft Docking; Crew Procedures (Inflight); Prelaunch Summaries

20010047633 NASA Johnson Space Center, Houston, TX USA
STS-100 Crew Activity Report: Flight Day 7 Highlights
Apr. 25, 2001; In English; Videotape: 22 min. 27 sec. playing time, in color, with sound
Report No.(s): NONP-NASA-VT-2001061752; BRF-1428G; No Copyright; Avail: CASI; B02, Videotape-Beta; V02, Videotape-VHS

On this seventh day of the STS-100 mission, the crewmembers of Endeavour, Commander Kent Rominger, Pilot Jeffrey Ashby, and Mission Specialists Chris Hadfield, Scott Parazynski, John Phillips, Umberto Guidoni, and Yuri Valentinovich Lonchakov, are seen as they unload equipment from the Rafaello Logistics Module. Guidoni and Rominger answer questions from the Italian and European Space Agencies in an on-orbit press conference. The computer glitch that delayed tests on the Canadian Robotic Arm and another boost to the International Space Station (ISS) is described.
CASI
International Space Station; Crew Procedures (Inflight); Space Station Modules; Loading Operations

20010047634 NASA Johnson Space Center, Houston, TX USA
STS-100 Flight Day 10 Highlights
Apr. 30, 2001; In English; Videotape: 23 min. playing time, in color, with sound
Report No.(s): NONP-NASA-VT-2001061751; BRF-1428J; No Copyright; Avail: CASI; B02, Videotape-Beta; V02, Videotape-VHS

On this tenth day of the STS-100 mission, the computer problems that delayed tests on the Canadian robotic arm are discussed between the Atlantis and Mission Ground Control. The Canadian robotic arm is seen after it lifts Spacelab from the pallet on Atlantis and moves to meet the Space Shuttle's robotic arm as it 'hands over' Spacelab to the smaller robotic arm. The Canadian robotic arm with Spacelab are seen against a backdrop of Earth as the Space Shuttle and International Space Station pass to the northeast of Australia.
CASI
International Space Station; Robot Arms; Crew Procedures (Inflight); Computer Systems Performance

20010047635 NASA Johnson Space Center, Houston, TX USA
STS-100 Flight Day 9 Highlights
Apr. 30, 2001; In English; Videotape: 27 mins. 58 sec. playing time, in color, with sound
Report No.(s): NONP-NASA-VT-2001061750; BRF-1428I; No Copyright; Avail: CASI; B02, Videotape-Beta; V02, Videotape-VHS

On this ninth day of the STS-100 mission, Commander Kent Rominger and Mission Specialist Chris Hadfield answer questions about the mission in an on-orbit press conference. The Expedition 2 crew, Commander Yuriy Usachev and Flight Engineers James Voss and Susan Helms, answer questions about their mission and the Canadian Robotic Arm in another on-orbit press conference. The Rafaello Logistics Module is removed from the Unity Module on the International Space Station and transfers it to the payload bay of Atlantis.
CASI
International Space Station; Crew Procedures (Inflight); Astronaut Performance; Space Station Modules

20010047636 NASA Johnson Space Center, Houston, TX USA
STS-100 Flight Day 11 Highlights
Apr. 30, 2001; In English; Videotape: 23 min. 40 sec. playing time, in color, with sound
Report No.(s): NONP-NASA-VT-2001061749; BRF-1428K; No Copyright; Avail: CASI; B02, Videotape-Beta; V02, Videotape-VHS

On this eleventh day of the STS-100 mission, the Atlantis Orbiter undocks from the International Space Station (ISS). The ISS is seen against a backdrop of Earth and space as Atlantis performs its flyaround of the station.
CASI
Atlantis (Orbiter); International Space Station; Spacecraft Docking

20010047641 NASA Johnson Space Center, Houston, TX USA
STS-100 Flight Day 8 Highlights
Apr. 26, 2001; In English; Videotape: 13 min. 40 sec. playing time, in color, with sound
Report No.(s): NONP-NASA-VT-2001059990; BRF-1428H; No Copyright; Avail: CASI; B01, Videotape-Beta; V01, Videotape-VHS

On this eighth day of the STS-100 mission, the crewmembers of Endeavour, Commander Kent Rominger, Pilot Jeffrey Ashby, and Mission Specialists Chris Hadfield, Scott Parazynski, John Phillips, Umberto Guidoni, and Yuri Valentinovich Lonchakov, are seen reloading the Rafaello Logistics Module. External views of the International Space Station (ISS) are shown against a backdrop of Earth as Mission Ground Control and the Atlantis crew discuss the efforts to fix the glitch in the ISS' computer system.
CASI
International Space Station; Computer Systems Performance; Astronaut Performance; Crew Procedures (Inflight)

20010047642 NASA Johnson Space Center, Houston, TX USA
STS-100 Crew Activity Report: Flight Day 4 Highlights
Apr. 24, 2001; In English; Videotape: 29 min. playing time, in color, with sound
Report No.(s): NONP-NASA-VT-2001059520; BRF-1428D; No Copyright; Avail: CASI; B02, Videotape-Beta; V02, Videotape-VHS

On this fourth day of the STS-100 mission, Mission Specialists Chris Hadfield and Scott Parazynski are seen performing their spacewalks, where they work on the electrical connections between the Destiny Laboratory and the Canadian Robotic Arm, remove the ultrahigh frequency antenna from the pallet and install it onto Destiny, and raise the Robotic Arm to prepare it for deployment. The fully deployed Robotic Arm is seen against a backdrop of Earth.
CASI
Extravehicular Activity; Robot Arms; Crew Procedures (Inflight); International Space Station

20010047643 NASA Johnson Space Center, Houston, TX USA
Space Shuttle: The Orbiter
Jan. 01, 2001; In English; Videotape: 18 min. playing time, in color, with sound
Report No.(s): NONP-NASA-VT-2001059519; No Copyright; Avail: CASI; B02, Videotape-Beta; V02, Videotape-VHS
This video gives an overview of the components, systems, interior layout, and procedures associated with the Space Shuttle Orbiter. A rollout, launch, and landing of the Orbiter are shown.
CASI
Spacecraft Launching; Spacecraft Landing; Specifications; Space Shuttle Orbiters

20010047992 NASA Ames Research Center, Moffett Field, CA USA
Ways to Increase Launch Velocities of 2-Stage Gas Guns
Bogdanoff, David W., Eloret Corp., USA; Cambier, Jean-Luc, NASA Ames Research Center, USA; [1994]; 2p; In English; 1994 Hypervelocity Impact Symposium, 16-19 Oct. 1994, Santa Fe, NM, USA
Contract(s)/Grant(s): RTOP 505-70-91; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche
The amount of space debris is rapidly increasing and the debris is distributed over a wide variety of orbits. Satellites, manned space vehicles and space stations will have to pay increasing attention to the dangers of impacts with space debris. Various armoring techniques (i.e., double or triple layer armor) will have to tested extensively to determine the most effective armor per unit weight. Intersecting near-earth orbits can lead to impact velocities up to 15 km/sec. Conventional two-stage light gas guns can launch intact, controlled-shape projectiles with a density of 1.2 gm/cc and length- to-diameter ratios of 0.5-1.0 at velocities up to 8-9 km/sec. Higher velocities (10-11 km/sec) can be obtained' for very light projectiles. The higher launch velocities tend to be very severe on the high pressure coupling and barrel of the gun and lead to short component lifetimes. Clearly, the ability to raise the launch velocity of a gun (for reasonably massive projectile shapes) from 8-9 km/sec to 11-13 km/sec (or higher), without reduction of component lifetimes, would have significant benefits. This would allow much better simulation of the higher velocity debris impacts as well as better simulation of high speed re-entry into planetary atmospheres. Several techniques for increasing the launcher muzzle velocity above 8-9 km/sec have been studied using CFD simulations and appear to offer the potential for significant gains. The first technique is to use multiple compressions, instead of a single compression, in the pump tube of the light gas gun. In a sense, this is a kind of pre-heating of the gas in the pump tube; other types of pre-heating have yielded disappointing results in the past. The dynamics of the multiple compression pump tube is very different, however, from the earlier techniques, where the pump tube was typically heated ohmically before the gun 2 cycle was started. In this paper, we present CFD calculations that show that significant increases in muzzle velocity can be obtained with multiple compressions in the pump tube. With a conventional two-stage gun, an important limitation to obtaining higher velocities is friction and heat transfer to the barrel, which typically has a length- to- diameter ratio of 200-400. These viscous losses greatly reduce the effectiveness of the regions of the barrel far removed from the second stage breech. We have studied computationally the effect of adding an additional breech (or breeches) along the barrel to reduce these viscous losses. Velocity increases from 6.5 to 7.2 km/sec have been obtained using the main breech and one additional breech. In these results, both breeches were operated with hydrogen, heated electrothermally. We have also studied a gun geometry where the main breech is operated in the conventional manner, using piston compression. The additional breech is operated either with electrothermal heating or heating by using a high explosive charge in a novel geometry. The latter option provides very effective compression, heating and acceleration of the hydrogen working gas and is fully reusable. Calculations are presented which show that very substantial increases in muzzle velocity can be obtained this way, without overstressing the projectile or the 'gun. The third technique studied is to add a section of ram accelerator tube after the barrel to further accelerate the projectile. The ram accelerator used here is not the conventional premixed gas ram accelerator, but a new technique using high explosive as the energy source and pure hydrogen as the working gas in a geometry which can be made fully reusable. Preliminary results with this new rain accelerator geometry were presented and showed that stable ram accelerator drive can be established. Herein, detailed calculations axe presented which show that substantial velocity increases can be obtained using this ram accelerator technique in tandem with a conventional light gas gun.
Author
Ram Accelerators; Computational Fluid Dynamics; Debris; Gas Heating; Impact Velocity; Light Gas Guns

20010047995 NASA Johnson Space Center, Houston, TX USA
STS-106 Mission Highlights Resource Tape, Part 2 of 2
May 15, 2001; In English; Videotape: 38 min. 57 sec. playing time, in color, with sound
Report No.(s): NONP-NASA-VT-2001072040; JSC-1844; No Copyright; Avail: CASI; B03, Videotape-Beta; V03, Videotape-VHS

A continuation of 'STS-106 Mission Highlights Resource Tape, Part 1 of 2' (internal ID 2001072041), footage shows the activities of flight days 9-12, including the undocking of Atlantis from the International Space Station (ISS) and the landing of the Space Shuttle.
CASI
International Space Station; Atlantis (Orbiter); Spacecraft Docking; Spacecraft Landing; Crew Procedures (Inflight)

17
SPACE COMMUNICATIONS, SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes space systems telemetry; space communications networks; astronavigation and guidance; and spacecraft radio blackout. For related information, see also 04 Aircraft Communications and Navigation and 32 Communications and Radar.

20010047232 Science Applications International Corp., Schaumburg, IL USA
Integrated Operations Architecture Technology Assessment Study ***Final Report***
March 2001; 86p; In English
Contract(s)/Grant(s): NAS3-26565; RTOP 322-10-OH
Report No.(s): NASA/CR-2001-210563/PT1; NAS 1.26:210563/PT1; E-12522-1-PT1; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

As part of NASA's Integrated Operations Architecture (IOA) Baseline, NASA will consolidate all communications operations. including ground-based, near-earth, and deep-space communications, into a single integrated network. This network will make maximum use of commercial equipment, services and standards. It will be an Internet Protocol (IP) based network. This study supports technology development planning for the IOA. The technical problems that may arise when LEO mission spacecraft interoperate with commercial satellite services were investigated. Commercial technology and services that could support the IOA were surveyed, and gaps in the capability of existing technology and techniques were identified. Recommendations were made on which gaps should be closed by means of NASA research and development funding. Several findings emerged from the interoperability assessment: in the NASA mission set, there is a preponderance of small. inexpensive, low data rate science missions; proposed commercial satellite communications services could potentially provide TDRSS-like data relay functions; and. IP and related protocols, such as TCP, require augmentation to operate in the mobile networking environment required by the space-to-ground portion of the IOA. Five case studies were performed in the technology assessment. Each case represented a realistic implementation of the near-earth portion of the IOA. The cases included the use of frequencies at L-band, Ka-band and the optical spectrum. The cases also represented both space relay architectures and direct-to-ground architectures. Some of the main recommendations resulting from the case studies are: select an architecture for the LEO/MEO communications network; pursue the development of a Ka-band space-qualified transmitter (and possibly a receiver), and a low-cost Ka-band ground terminal for a direct-to-ground network, pursue the development of an Inmarsat (L-band) space-qualified transceiver to implement a global, low data rate network for LEO/MEO, mission spacecraft; and, pursue developmental research for a miniaturized, high data rate optical transceiver.
Author
Satellite Communication; Communication Satellites; Communication Networks; Technology Assessment; Technological Forecasting

20010047408 NASA Glenn Research Center, Cleveland, OH USA
ATM QoS Experiments Using TCP Applications: Performance of TCP/IP Over ATM in a Variety of Errored Links
Frantz, Brian D., GTE Technology Organization, USA; Ivancic, William D., NASA Glenn Research Center, USA; January 2001; 16p; In English
Contract(s)/Grant(s): RTOP 322-20-2A
Report No.(s): NASA/TM-2001-209644; E-11990; NAS 1.15:209644; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Asynchronous Transfer Mode (ATM) Quality of Service (QoS) experiments using the Transmission Control Protocol/Internet Protocol (TCP/IP) were performed for various link delays. The link delay was set to emulate a Wide Area

Network (WAN) and a Satellite Link. The purpose of these experiments was to evaluate the ATM QoS requirements for applications that utilize advance TCP/IP protocols implemented with large windows and Selective ACKnowledgements (SACK). The effects of cell error, cell loss, and random bit errors on throughput were reported. The detailed test plan and test results are presented herein.
Author
Asynchronous Transfer Mode; Quality Control; Protocol (Computers); Wide Area Networks

18
SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and spacecraft control and stability characteristics. For life support systems, see 54 Man/System Technology and Life Support. For related information, see also 05 Aircraft Design, Testing and Performance, 39 Structural Mechanics, and 16 Space Transportation and Safety.

20010046858 NASA Marshall Space Flight Center, Huntsville, AL USA
Mars Transportation Environment Definition Document
Alexander, M., Editor, NASA Marshall Space Flight Center, USA; March 2001; 116p; In English
Report No.(s): NASA/TM-2001-210935; M-1011; NAS 1.15:210935; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

This document provides a compilation of environments knowledge about the planet Mars. Information is divided into three catagories: (1) interplanetary space environments (environments required by the technical community to travel to and from Mars); (2) atmospheric environments (environments needed to aerocapture, aerobrake, or use aeroassist for precision trajectories down to the surface); and (3) surface environments (environments needed to have robots or explorers survive and work on the surface).
Author
Mars (Planet); Aerospace Environments; Mars Atmosphere

20010046953 NASA Marshall Space Flight Center, Huntsville, AL USA
Initial Results From The Jovian Electrodynamic Tether Systems (JETS) Study
Gallagher, D. L., NASA Marshall Space Flight Center, USA; Garbe, G. P., NASA Marshall Space Flight Center, USA; Moore, J., SRS Technologies, USA; Talley, C., SRS Technologies, USA; [2001]; 1p; In English; Forum on Innovative Approaches to Outer Planetary Exploration, 21-22 Feb. 2001, Houston, TX, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The Jovian system with its rapid planetary rotation and strong magnetic field presents exciting opportunities for the use of electrodynamic (EM) tethers in system applications on a Jovian spacecraft. Previous analysis for a radial, 10-km length tether demonstrated the possibility of propulsive forces as large as 50 N and power generation levels as high as 10^6 W for low perijov passing trajectories. For orbital positions beyond approximately 15 Jovian radii, JETS can be used simultaneously for power and increases in the orbital altitude. Previous study demonstrated the physical feasibility of EM tether use at Jupiter, but did not address the issues of limited gravity gradient force for tether extension and power regulation needed before JETS can be implemented as a practical spacecraft system. This presentation will discuss these issues and current progress in an ongoing systems feasibility study.
Author
Electrodynamics; Tethering; Jupiter (Planet)

20010046964 NASA Marshall Space Flight Center, Huntsville, AL USA
Life Cycle Tests on a Hollow Cathode Based Plasma Contactor
Vaughn, Jason A., NASA Marshall Space Flight Center, USA; Schneider, Todd A., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; NASA/JPL/MSFC/UAH 12th Annual Advanced Space Propulsion Workshop, 3-5 Apr. 2001, Huntsville, AL, USA; Sponsored by NASA, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The propulsive Small Expendable Deployer System (ProSEDS) mission is designed to provide an on-orbit demonstration of the electrodynamic propulsion capabilities of tethers in space. The ProSEDS experiment will be a secondary payload on a Delta II unmanned expendable booster with a mission duration of 12 days. A 5-km conductive tether is attached to the Delta II second stage and collects current from the low Earth orbit (LEO) plasma, and a Hollow Cathode Plasma Contactor (HCPC) emits the collected electrons from the Delta II, completing the electrical circuit to the ambient plasma. The HCPC for the ProSEDS mission have made it necessary to turn off the HCPC once a minute throughout the entire mission. Because of the unusual operating

requirements by the ProSEDS mission, an engineering development unit of the HCPC was built to demonstrate the HCPC design would start reliably for the life of the ProSEDS mission. During the life test the engineering unit cycled for over 10,000 on/off cycles without missing a single start, and during that same test the HCPC unit demonstrated the capability to emit 0 to 5 A electron emission current. The performance of the HCPC unit during this life test will be discussed.
Author
Contactors; Hollow Cathodes; Plasmas (Physics); Space Missions; Life (Durability)

20010047510 NASA Goddard Space Flight Center, Greenbelt, MD USA
A Coupled Nonlinear Spacecraft Attitude Controller/Observer With an Unknown Constant Gyro Bias
Deutschmann, Julie, NASA Goddard Space Flight Center, USA; Sanner, Robert M., Maryland Univ., USA; [2001]; 12p; In English; 40th IEEE Conference on Decision and Control, 4-7 Dec. 2001, USA; Sponsored by Institute of Electrical and Electronics Engineers, USA
Report No.(s): CDC01-REG1379; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A nonlinear control scheme for attitude control of a spacecraft is combined with a nonlinear gyro bias observer for the case of constant gyro bias. The closed loop system is proven to be globally stable, with zero tracking error, thus proving a separation principle for the given system. The nonlinear observer incorporates persistency of excitation, resulting in exponential convergence of the gyro bias error.
Author
Spacecraft Control; Attitude Control; Controllers; Attitude (Inclination); Response Bias; Gyroscopes; Design Analysis

20010048402 NASA Goddard Space Flight Center, Greenbelt, MD USA
A High Temperature Thermal Blanket for Temperatures Up to 2100 C
Choi. Michael K., NASA Goddard Space Flight Center, USA; [2001]; 4p; In English; Proceedings of IECEC'01: 36th Intersociety Energy Conversion Engineering Conference, 29 Jul - 2 Aug. 2001, Savannah, GA, USA
Report No.(s): IECEC2001-TM-17; Copyright; Avail: Issuing Activity

A high temperature multi-layer insulation (MLI) thermal blanket is proposed for the National Aeronautics and Space Administration (NASA) Solar Probe near-sun flyby mission. The maximum temperature limit of the thermal blanket is 2100 C. The thickness of the thermal blanket is only 0.1 to 0.2 mm, which is 100 to 200 times thinner than the carbon-carbon foam insulation currently used. Thus it reduces the volume required to accommodate the thermal insulation and allows more volume for accommodating the spacecraft and instrument flight hardware. It also reduces the heat radiation from the spacecraft and instrument high temperature (up to 2100 C) surfaces to components that require much colder temperatures. It solves many high temperature thermal radiation problems for the Solar Probe mission.
Author
High Temperature; Multilayer Insulation; Thermal Insulation

20
SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources. For related information, see also 07 Aircraft Propulsion and Power; 28 Propellants and Fuels; 15 Launch Vehicles and Launch Operations; and 44 Energy Production and Conversion.

20010045826 bd Systems, Inc., Control Dynamics Div., Huntsville, AL USA
Solid Rocket Booster Integrated Electronic Assemblies Support ***Final Report, 14 Feb. - 20 Apr. 2001***
Blanche, James, bd Systems, Inc., USA; Apr. 20, 2001; 85p; In English
Contract(s)/Grant(s): NASA Order H-32836-D; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The paper discusses the following: assess the impact of aging and usage on SRB Forward and Aft Integrated Electronic Assemblies (IEA's); d3etermine the relative position of the IEA's on their expected reliability curves; provide recommendations, with supporting rationale, for any upgrades necessary to maintain reliability and logistic supportability through the year 2020; if upgrades are recommended the team will define a roadmap for the design and implementation of the upgrade; assess the other reusable boxes on the SRB to determine if the screening tests between flights are adequate; and assess the other reusable boxes on the SRB to determine if they are wearing out.
Derived from text
Booster Rocket Engines; Solid Propellant Rocket Engines; Aging (Materials)

20010047007 NASA Marshall Space Flight Center, Huntsville, AL USA

Shape Optimization of Supersonic Turbines Using Response Surface and Neural Network Methods

Papila, Nilay, Florida Univ., USA; Shyy, Wei, Florida Univ., USA; Griffin, Lisa W., NASA Marshall Space Flight Center, USA; Dorney, Daniel J., NASA Marshall Space Flight Center, USA; [2001]; 16p; In English; 39th AIAA Aerospace Sciences Meeting and Exhibit, 8-11 Jan. 2001, Reno, NV, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA

Report No.(s): AIAA Paper 2001-1065; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

Turbine performance directly affects engine specific impulse, thrust-to-weight ratio, and cost in a rocket propulsion system. A global optimization framework combining the radial basis neural network (RBNN) and the polynomial-based response surface method (RSM) is constructed for shape optimization of a supersonic turbine. Based on the optimized preliminary design, shape optimization is performed for the first vane and blade of a 2-stage supersonic turbine, involving O(10) design variables. The design of experiment approach is adopted to reduce the data size needed by the optimization task. It is demonstrated that a major merit of the global optimization approach is that it enables one to adaptively revise the design space to perform multiple optimization cycles. This benefit is realized when an optimal design approaches the boundary of a pre-defined design space. Furthermore, by inspecting the influence of each design variable, one can also gain insight into the existence of multiple design choices and select the optimum design based on other factors such as stress and materials considerations.

Author

Shape Optimization; Supersonic Turbines; Design Analysis; Design Optimization; Specific Impulse; Experiment Design

20010047227 NASA Glenn Research Center, Cleveland, OH USA

Assessment of the Free-Piston Stirling Convertor as a Long Life Power Convertor for Space

Schreiber, Jeffrey G., NASA Glenn Research Center, USA; January 2001; 14p; In English; 35th Intersociety Energy Conversion Engineering Conference Energy and Power in Transition, 24-28 Jul. 2000, Las Vegas, NV, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA

Contract(s)/Grant(s): RTOP 839-20-00

Report No.(s): NASA/TM-2001-210604; E-12564; NAS 1.15:210604; AIAA Paper 2000-3021; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

There is currently a renewed interest in the use of free-piston Stirling power convertors for space power applications. More specifically, the Stirling convertor is being developed to be part of the Stirling Radioisotope Power System to supply electric power to spacecraft for NASA deep space science missions. The current development effort involves the Department of Energy, Germantown, MD, the NASA Glenn Research Center, Cleveland, OH, and the Stirling Technology Company, Kennewick, WA. The Stirling convertor will absorb heat supplied from the decay of plutonium dioxide contained in the General Purpose Heat Source modules and convert it into electricity to power the spacecraft. For many years the ”potentials” of the free-piston Stirling convertor have been publicized by it’s developers. Among these ”potentials” were long life and high reliability. This paper will present an overview of the critical areas that enable long life of the free-piston Stirling power convertor, and present some of the techniques that have been used when long life has been achieved.

Author

Piston Engines; Stirling Cycle; Power Converters; NASA Space Programs; Stirling Engines

20010047231 Kaiser Marquardt, Van Nuys, CA USA

Mars Flyer Rocket Propulsion Risk Assessment Kaiser Marquardt Testing *Final Report*

Marquardt, Kaiser, Kaiser Marquardt, USA; April 2001; 36p; In English

Contract(s)/Grant(s): NAS3-99198; RTOP 755-B4-01

Report No.(s): NASA/CR-2001-210710; NAS 1.26:210710; E-12643; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report describes the investigation of a 10-N, bipropellant thruster, operating at -40 C, with monomethylhydrazine (MMH) and 25% nitric oxide in nitrogen tetroxide (MON-25). The thruster testing was conducted as part of a risk reduction activity for the Mars Flyer, a proposed mission to fly a miniature airplane in the Martian atmosphere. Testing was conducted using an existing thruster, designed for MMH and MON-3 propellants. The nitric oxide content of MON-3 was increased to 25%, to lower its freezing point to -55 C. The thruster was conditioned, along with the propellants, to temperature prior to hot firing. Thruster operating parameters included oxidizer-to-fuel mixture ratios of 1.6 to 2.7 and inlet pressure ranging from 689 to 2070 kPa. The test matrix consisted of many 10-second firings and several 60-, 300-, 600-, and 1200-second firings, as well as pulse testing. The thruster successfully accumulated nearly 10,000 seconds of operation without failure, at temperatures ranging from

-40 C to 22 C. At nominal inlet pressures, the ignition delay was comparable to MMH/MON-3 operation. The optimal performance for the 8.9-N thruster was determined to be at a mixture ratio of 1.93 with an average specific impulse of 298 sec.
Author
Liquid Rocket Propellants; Performance Tests; Oxidizers; Nitrogen Tetroxide; Mars Atmosphere; Rocket Engines; Failure

20010047294 Atlantic Research Corp., Niagara Falls, NY USA
Mars Flyer Rocket Propulsion Risk Assessment: ARC Testing ***Final Report***
April 2001; 54p; In English
Contract(s)/Grant(s): NAS3-99197; RTOP 755-B4-01
Report No.(s): NASA/CR-2001-210709; NAS 1.26:210709; E-12642; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This report describes the investigation of a 10-N, bipropellant thruster, operating at -40 C, with monomethy1hydrazine (MMH) and 25% nitric oxide in nitrogen tetroxide (MON-25). The thruster testing was conducted as part of a risk reduction activity for the Mars Flyer, a proposed mission to fly a miniature airplane in the Martian atmosphere. Testing was conducted using an existing thruster, designed for MMH and MON-3 propellants. MON-25 oxidizer was successfully manufactured from MON-3 by the addition of nitric oxide. The thruster was operated successfully over a range of propellant temperatures (-40 to 21 C and feed pressures (6.9 to 20.7 kPa). The thruster hardware was always equal or lower than the propellant temperature. Most tests were 30- and 60-second durations, with 600- and 1200-second duration and pulse testing also conducted. When operating at -40 C, the mixture ratio of the thruster shifted from the nominal value of 1.65 to about 1.85, probably caused by an increase in MMH viscosity, with a corresponding reduction in MMH flowrate. Specific impulse at - 40 C (at nominal feed pressures) was 267 sec, while performance was 277 sec at 21 C. This difference in performance was due, in part, to the mixture ratio shift.
Author
Liquid Rocket Propellants; Performance Tests; Oxidizers; Nitrogen Tetroxide; Mars Atmosphere; Rocket Engines

20010047591 Johns Hopkins Univ., Chemical Propulsion Information Agency, Columbia, MD USA
Overview of Pulse Detonation Propulsion Technology, ***1942 - 1999***
Coleman, M. L., Johns Hopkins Univ., USA; April 2001; 68p; In English
Contract(s)/Grant(s): SPO700-97-D-4004
Report No.(s): CPTR-70; No Copyright; Avail: CPIA, 10630 Little Patuxent Pkwy., Suite 202, Columbia, MD 21044-3200 HC

Propulsion systems based on the pulsed detonation cycle offer the potential to provide increased performance while simultaneously reducing engine weight, cost, and complexity, relative to conventional propulsion systems currently in service. The increased performance potential is due to the high thermodynamic efficiency of detonation combustion. The near constant volume heat addition process of the detonation cycle, along with the lack of a compression cycle lend to the high efficiency and specific impulse, simplicity, and low-cost of pulse detonation propulsion systems. Pulse detonation Engines (PDEs) have the potential for operation at speeds ranging from static to high-supersonic (Mis less than 5), with competitive efficiencies enabling supersonic operation beyond conventional gas turbine engine technology. Currently, no single engine cycle exists that has such a broad range of operability. Pulse Detonation Rocket Engines (PDREs) have the potential to drastically reduce the cost of upper stage and orbit-transfer propulsion systems, and are also attractive for lunar and planetary exploration, and landers and excursion vehicles that require throttling for soft landing.
Author
Propulsion System Configurations; Pulse Detonation Engines; Detonation; Air Breathing Engines

20010047592 Johns Hopkins Univ., Chemical Propulsion Information Agency, Columbia, MD USA
Subscale Fast Cookoff Testing and Modeling for the Hazard Assessment of Large Rocket Motors, ***1965 - 2001***
Cocchiaro, J. E., Johns Hopkins Univ., USA; March 2001; 60p; In English
Contract(s)/Grant(s): SPO700-97-D-4004
Report No.(s): CPTR-72; No Copyright; Avail: CPIA, 10630 Little Patuxent Pkwy., Suite 202, Columbia, MD 21044-3200 HC

A significant issue facing the solid propulsion acquisition and safety communities is to determine if hazard classification requirements can be structured for large solid rocket motor programs to maximize safety while optimizing the tradeoff between safety and logistical considerations and system acquisition costs. Integral to this assessment is an evaluation of the potential application of subscale analog testing and modeling to characterize the full-scale motor response in a variety of scenarios such as in an engulfing fuel fire (fast cookoff) or wood bonfire environment. This information is necessary for final hazard classification and insensitive munitions (IM) assessment purposes for new systems. This report summarizes fast cookoff testing diagnostic techniques, subscale analog hazard response tests, established computer modeling analysis techniques, and other empirical

information that might be useful for scaling the results of a subscale analog fast cookoff/bonfire test to a full-size solid rocket motor (SRM) for hazard classification and/or IM assessment. Since subjective observations and judgment cannot be completely eliminated from a subscale test protocol, an integral aspect of the scaling issue makes use of empirical (experimental) motor hazard response information that has been gained from full-scale fast cookoff/bonfire tests and related, well characterized accidents exhibiting similar failure modes. Thus, the final part of the report summarizes findings of fast cookoff parametric test programs and other miscellaneous full-scale test results with solid rocket motors containing high-energy propellants.
Author
Environmental Tests; Fires; Hazards; Firing (Igniting); Full Scale Tests; Solid Propellant Rocket Engines

20010047775 NASA Glenn Research Center, Cleveland, OH USA
Thermal Characterization of a NASA 30-cm Ion Thruster Operated up to 5 kW
SarverVerhey, Timothy R., NASA Glenn Research Center, USA; Domonkos, Matthew T., NASA Glenn Research Center, USA; Patterson, Michael J., NASA Glenn Research Center, USA; March 2001; 15p; In English; 36th Joint Propulsion Conference and Exhibit, 16-19 Jul. 2000, Huntsville, AL, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA
Contract(s)/Grant(s): RTOP 755-B4-04
Report No.(s): NASA/TM-2001-210696; NAS 1.15:210696; E-12627; AIAA Paper 2000-3816; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A preliminary thermal characterization of a newly-fabricated NSTAR-derived test-bed thruster has recently been performed. The temperature behavior of the rare-earth magnets are reported because of their critical impact on thruster operation. The results obtained to date showed that the magnet temperatures did not exceed the stabilization Emit during thruster operation up to 4.6 kW. Magnet temperature data were also obtained for two earlier NSTAR Engineering Model Thrusters and are discussed in this report. Comparison between these thrusters suggests that the test-bed engine in its present condition is able to operate safely at higher power because of the lower discharge losses over the entire operating power range of this engine. However, because of the 'burn-in' behavior of the NSTAR thruster, magnet temperatures are expected to increase as discharge losses increase with accumulated thruster operation. Consequently, a new engineering solution may be required to achieve 5-kW operation with acceptable margin.
Author
Ion Propulsion; Rare Earth Elements; Electromagnets; Ion Engines; Thermodynamic Properties

20010047837 NASA Glenn Research Center, Cleveland, OH USA
Advanced Hall Electric Propulsion for Future In-Space Transportation
Oleson, Steven R., NASA Glenn Research Center, USA; Sankovic, John M., NASA Glenn Research Center, USA; April 2001; 16p; In English; Third International Spacecraft Propulsion Conference, 10-13 Oct. 2000, Cannes, France; Sponsored by Centre National d'Etudes Spatiales, France
Contract(s)/Grant(s): RTOP 755-B4-08
Report No.(s): NASA/TM-2001-210676; E-12603; NAS 1.15:210676; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Hall thruster is an electric propulsion device used for multiple in-space applications including orbit raising, on-orbit maneuvers, and de-orbit functions. These in-space propulsion functions are currently performed by toxic hydrazine monopropellant or hydrazine derivative/nitrogen tetroxide bi-propellant thrusters. The Hall thruster operates nominally in the 1500 sec specific impulse regime. It provides greater thrust to power than conventional gridded ion engines, thus reducing trip times and operational life when compared to that technology in Earth orbit applications. The technology in the far term, by adding a second acceleration stage, has shown promise of providing over 4000s Isp, the regime of the gridded ion engine and necessary for deep space applications. The Hall thruster system consists of three parts, the thruster, the power processor, and the propellant system. The technology is operational and commercially available at the 1.5 kW power level and 5 kW application is underway. NASA is looking toward 10 kW and eventually 50 kW-class engines for ambitious space transportation applications. The former allows launch vehicle step-down for GEO missions and demanding planetary missions such as Europa Lander, while the latter allows quick all-electric propulsion LEO to GEO transfers and non-nuclear transportation human Mars missions.
Author
Hall Thrusters; Electric Propulsion; Low Earth Orbits

20010048758 NASA Marshall Space Flight Center, Huntsville, AL USA

Thermal Analysis of a Carbon Fiber Rope Barrier for Use in the Reusable Solid Rocket Motor Nozzle Joint-2

Clayton, J. Louie, NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; 21st; JANNAF Interagency Propulsion Committee Meeting, 27-29 Mar. 2001, Cocoa Beach, FL, USA; Sponsored by Department of the Army, USA; No Copyright; Avail: Issuing Activity; Abstract Only

This study provides for development and verification of analysis methods used to assess performance of a carbon fiber rope (CFR) thermal barrier system that is currently being qualified for use in Reusable Solid Rocket Motor (RSRM) nozzle joint-2. Modeled geometry for flow calculations considers the joint to be vented with the porous CFR barriers placed in the ”open’ assembly gap. Model development is based on a 1-D volume filling approach where flow resistances (assembly gap and CFRs) are defined by serially connected internal flow and the porous media ”Darcy” relationships. Combustion gas flow rates are computed using the volume filling code by assuming a lumped distribution total joint fill volume on a per linear circumferential inch basis. Gas compressibility, friction and heat transfer are included in the modeling. Gas-to-wall heat transfer is simulated by concurrent solution of the compressible flow equations and a large thermal 2-D finite element (FE) conduction grid. The derived numerical technique loosely couples the FE conduction matrix with the compressible gas flow equations, Free constants that appear in the governing equations are calibrated by parametric model comparison to hot fire subscale test results. The calibrated model is then used to make full-scale motor predictions using RSRM aft dome environments. Model results indicate that CFR thermal barrier systems will provide a thermally benign and controlled pressurization environment for the RSRM nozzle joint-2 primary seal activation.

Author

Thermal Analysis; Carbon Fibers; Solid Propellant Rocket Engines; Nozzles; Heat Transfer

23
CHEMISTRY AND MATERIALS (GENERAL)

Includes general research topics related to the composition, properties, structure, and use of chemical compounds and materials as they relate to aircraft, launch vehicles, and spacecraft. For specific topics in chemistry and materials see categories 24 through 29. For astrochemistry see category 90 Astrophysics.

20010044088 Army Research Lab., Adelphi, MD USA

Aerosol Fluorescence Spectrum Analyzer for Rapid Measurement of Single Micrometer-Sized Airborne Biological Particles *Final Report, 1 Jan. - 1 Jun. 1997*

Pinnick, Ronald G.; Hill, Steven C.; Nachman, Paul; Niles, Stanley; Videen, Gordon; May 1998; 24p; In English

Contract(s)/Grant(s): B53A; Proj-PE61102A

Report No.(s): AD-A344708; ARL-TR-1665; No Copyright; Avail: Defense Technical Information Center (DTIC)

We report the operation of an aerosol analyzer capable of measuring the fluorescence spectra of single micrometer-sized bioaerosol particles as they flow through the instrument. Particles entrained in an air stream initially traverse a cw (488-nm) ”trigger” laser beam, where their elastic scattering and total fluorescence are measured with photomultipliers. When the elastic scattering and/or fluorescence signals exceed preset levels, a 266-nm UV ”probe” laser is triggered to fire and illuminate preselected particles downstream from the trigger laser. The UV-laser-excited spectra of particles are measured with the instrument’s image-intensified charge-coupled device (CCD) detector, which is gated to be on when the probe laser fires. We demonstrate the instrument’s ability to capture the fluorescence spectra of single micrometer-sized airborne biological particles, including some simulants for biowarfare agents. Such spectra should be useful in differentiating between biological and nonbiological aerosols and in partially characterizing airborne biological particles.

DTIC

Laser Induced Fluorescence; Laser Beams; Aerosols; Spectrum Analysis; Ultraviolet Lasers

20010044093 European Materials Research Society, Strasbourg, France

International Conference on Advanced Materials ICAM ’97; European Materials Research Society Spring Meeting E-MRS ’97

Jun. 1997; 301p; In English, 16-22 Jun. 1997, Strasbourg, France

Report No.(s): AD-A327958; No Copyright; Avail: Defense Technical Information Center (DTIC)

Partial Contents: Fullerenes and Carbon Based Materials; Epitaxial Thin Film Growth and Nanostructures Joint with EPS-Solid State Division; Recent Developments in Electron Microscopy and X-Ray Diffraction of Thin Film Structures; Computational Modeling of Issues in Materials Science; Materials Aspects for Electric Vehicles including Batteries and Fuel

Cells; Second International Symposium on Advanced Materials; Biomaterials: Perspectives for Research & Industry at the Century Change; Biodegradable Polymers & Macromolecules; Interrelation of Science, Economics & Policy in Materials Research & Processing; Light-Weight Materials for Transportation; Coatings and Surface Modifications for Surface Protection and Tribological Applications; III-V Nitrides Semiconductors and Ceramics from Material Growth to Device Applications; Materials, Physics and Devices for Molecular Electronics and Photonics.
DTIC
Composite Materials; Ceramics; Molecular Electronics; Nanostructures (Devices)

20010044350 State Univ. of New York, Research Foundation, Albany, NY USA
Multiphoton and Multicolor Confocal Microscopy of Microstructure, Fracture Delamination and Thermal Degradation in Multilayer Organic Coatings and Paints ***Final Report, 1 Jul. 1997 - 30 Jun. 2000***
Prasad, Paras N.; Jun. 2000; 15p; In English
Contract(s)/Grant(s): F49620-97-10125
Report No.(s): AD-A387428; AFRL-SR-BL-TR-01-0129; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
Two photon confocal microscopy is an emerging technique in the field of laser scanning microscopy which has an inherent capability for optical sectioning in 3D. We have used this two photon confocal scanning microscopy as a nondestructive tool to study onset of corrosion of metallic substrates beneath the paint layer in-situ without removing or peeling off the paint layer. The result shows that the onset of corrosion can be studied by a combination of reflection and two-photon fluorescence modes of detection in confocal microscopy. We have used the newly developed localized spectrometer (multi-photon or confocal) to study the microenvironmental changes inside the polymeric paint coatings. We have also explored a new technique called ”Optical Coherence Tomography” (OCT) for imaging through the paint coatings. In the process, we have developed a Confocal enhanced OCT (CEOCT) for imaging through highly scattering media. CEOCT was found to have a better S/N ratio while imaging through highly scattering coatings compared to two photoniconfocal or normal OCT.
DTIC
Microscopy; Paints; Nondestructive Tests; Organic Materials; Coatings

20010045653 Washington Univ., Saint Louis, MO USA
New Approaches to the Labeling of Estrogen Useful for PET ***Annual Report, 1 Jun. 1996 - 31 May 1997***
Welch, Michael J.; Johnson, Stephanie D.; Jul. 1997; 26p; In English
Contract(s)/Grant(s): DAMD17-94-J-4029
Report No.(s): AD-A344073; No Copyright; Avail: Defense Technical Information Center (DTIC)
Positron Emission Tomography (PET) allows estrogen receptor-positive breast cancer to be diagnostically imaged using radiolabeled estrogens with the benefit of early detection, monitoring, and staging of breast cancer. In order to better target breast cancer, improved estrogen receptor imaging agents are sought. Three new estrogen receptor ligands were synthesized with a methoxy substituted at the 16 position. These compounds were obtained by utilizing the chemistry of methyl hypofluorite (MeOF). Conditions for reacting methyl hypofluorite and steroids were optimized overcoming solubility and solvent problems resulting in decreased formation of side products. Two of the three estradiol analogs were tested for their affinity to bind the estrogen receptor. The results predict these agents to be poor visualizers of breast tumors. The third estrogen, 16alpha-methoxyestradiol-17beta, is currently being tested and based on its structure is predicted to be the superior imaging agent of the three. Synthesis of this third compound required several modifications leaving it the last to be tested. If the binding affinity of this compound is found to be favorable, carbon-11 radiolabeling studies will be initiated to further evaluate the biological effectiveness.
DTIC
Estrogens; Mammary Glands; Imaging Techniques; Receptors (Physiology); Biological Effects

20010048028 Aerospace Corp., Lab. Operations, El Segundo, CA USA
Replacement of Methylene Chloride in NVR and Paint Removal Applications
Luey, K. T.; Coleman, D. J.; Ternet, G. K.; Dec. 30, 2000; 30p; In English
Contract(s)/Grant(s): F04701-00-C-0009
Report No.(s): AD-A388362; TR-2001(1306)-1; SMC-TR-01-09; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
Molecular film contamination is detected and monitored using a gravimetric laboratory process described in ASTM standard methods. These processes currently specify the use of methylene chloride as a rinsing and wiping solvent. Methylene chloride, however, is an organic solvent targeted for reduction by the Environmental Protection Agency. In this report, we describe a request for a change in the solvent specified by the ASTM standard procedure. We review the criteria for the suggested replacement, ethyl

acetate, for use in nonvolatile residue (NVR) testing. The solubility criteria assembled for the replacement of methylene chloride are then used to evaluate the replacement of methlyene chloride-based paint removers. It is found through an examination of the literature that paint removal is a complex procedure that cannot be described solely by solubility parameters. The general state of paint removal technologies that do not use methylene chloride is reviewed. The EPA survey of maximum achievable control technologies (MACTs) for paint removal suggests that flashlamp exposure followed by either wet or dry media blasting is the best alternative for paint stripping tasks.
DTIC
Environment Protection; Paint Removal; Methylene; Chlorides; Contamination

24
COMPOSITE MATERIALS

Includes physical, chemical, and mechanical properties of laminates and other composite materials.

20010043984 NASA Langley Research Center, Hampton, VA USA
Vibroacoustic Model Validation for a Curved Honeycomb Composite Panel
Buehrle, Ralph D., NASA Langley Research Center, USA; Robinson, Jay H., NASA Langley Research Center, USA; Grosveld, Ferdinand W., Lockheed Martin Engineering and Sciences Co., USA; [2001]; 9p; In English
Report No.(s): AIAA Paper 2001-1587; Copyright Waived; Avail: CASI; A02, Hardcopy; A01, Microfiche

Finite element and boundary element models are developed to investigate the vibroacoustic response of a curved honeycomb composite sidewall panel. Results from vibroacoustic tests conducted in the NASA Langley Structural Acoustic Loads and Transmission facility are used to validate the numerical predictions. The sidewall panel is constructed from a flexible honeycomb core sandwiched between carbon fiber reinforced composite laminate face sheets. This type of construction is being used in the development of an all-composite aircraft fuselage. In contrast to conventional rib-stiffened aircraft fuselage structures, the composite panel has nominally uniform thickness resulting in a uniform distribution of mass and stiffness. Due to differences in the mass and stiffness distribution, the noise transmission mechanisms for the composite panel are expected to be substantially different from those of a conventional rib-stiffened structure. The development of accurate vibroacoustic models will aide in the understanding of the dominant noise transmission mechanisms and enable optimization studies to be performed that will determine the most beneficial noise control treatments. Finite element and boundary element models of the sidewall panel are described. Vibroacoustic response predictions are presented for forced vibration input and the results are compared with experimental data.
Author
Acoustics; Honeycomb Structures; Finite Element Method; Vibrational Stress; Curved Panels; Boundary Element Method

20010043985 NASA Langley Research Center, Hampton, VA USA
Composite Structures and Materials Research at NASA Langley Research Center
Starnes, James H., Jr., NASA Langley Research Center, USA; Dexter, H. Benson, NASA Langley Research Center, USA; Johnston, Norman J., NASA Langley Research Center, USA; Ambur, Damodar R., NASA Langley Research Center, USA; Cano, Roberto J., NASA Langley Research Center, USA; [2001]; 14p; In English; Low Cost Composite Structures, 7-8 May 2001, Loen, Norway; Sponsored by North Atlantic Treaty Organization, Norway
Report No.(s): Paper-MP-69-P-17-Starnes; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A summary of recent composite structures and materials research at NASA Langley Research Center is presented. Fabrication research to develop low-cost automated robotic fabrication procedures for thermosetting and thermoplastic composite materials, and low-cost liquid molding processes for preformed textile materials is described. Robotic fabrication procedures discussed include ply-by-ply, cure-on-the-fly heated placement head and out-of-autoclave electron-beam cure methods for tow and tape thermosetting and thermoplastic materials. Liquid molding fabrication processes described include Resin Film Infusion (RFI) Resin Transfer Molding (RTM) and Vacuum-Assisted Resin Transfer Molding (VARTM). Results for a full-scale composite wing box are summarized to identify the performance of materials and structures fabricated with these low-cost fabrication methods.
Author
Composite Structures; Fabrication; Composite Materials; Automatic Control

20010044083 Purdue Univ., West Lafayette, IN USA

An Investigation on High Temperature Behavior of Laminate and Nanostructured Composite Materials ***Final Report, Oct. 1997 - Dec. 1999***

Espinosa, Horacio D., Purdue Univ., USA; September 2000; 30p; In English

Contract(s)/Grant(s): F49620-98-1-0039

Report No.(s): AD-A387593; AFRL-SR-BL-TR-01-0154; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Planar impact experiments are performed on preheated Ti-6A1-4V specimens at temperatures the range 25-550

DTIC

Composite Materials; Laminates; Strain Rate; High Temperature

20010044106 West Virginia Univ., Dept. of Mechanical and Aerospace Engineering, Morgantown, WV USA

FRP Beam-Column Design Equations ***Final Report***

Barbero, E. J.; Apr. 28, 2000; 86p; In English

Contract(s)/Grant(s): RP-131

Report No.(s): PB2001-104345; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

A simple procedure was developed for the design of beam-columns. The design accounts for axial load eccentricity and lateral loads. Several examples are presented to illustrate the simplified design procedure. The procedure is also explained in the commentary. It as found that the section properties used in the design of beams and columns are sufficient for the design of beam-columns. No additional section properties are required. Therefore, the cost and time involved in testing structural shapes is minimized.

NTIS

Structural Design; Beams (Supports); Columns (Supports); Carbon Fiber Reinforced Plastics

20010045808 Kyushu Univ., Fukuoka, Japan

Rate Dependence of Mode-II Interlaminar Fracture Toughness in Carbon/Epoxy Laminates

Kato, Hideyuki, Kyushu Univ., Japan; Kunoo, Kazuo, Kyushu Univ., Japan; Uda, Nobuhide, Kyushu Univ., Japan; Ono, Kousei, Kyushu Univ., Japan; Nagayasu, Tadashi, Kyushu Univ., Japan; Technology Reports of Kyushu University; March 2001; ISSN 0023-2718; Volume 74, No. 2, pp. 107-114; In Japanese; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The ENF (End Notch Flexure) test method is the most popular method among the ones measuring mode-II fracture toughness. However this method has fatal deficiency that the fracture toughness and crack speed cannot be measured during crack propagation because of the unstable fracture. In order to cope with these difficulties, we used a combination of the ELS (End Loaded Split) test method and the electrical potential method in this study. According to these methods, we measured the energy release rate G(sub IIR) in various crack speeds precisely. The measured G(sub IIR)s were compared favorably with the ones measured by the beam theory. The results of 10 Specimens Showed that G(sub IIR) was approximately constant over the range of the crack speed from 2.0 x 10(exp -5) m/s to 3.0 m/s. We also compared the energy release rate G(sub IIc) at crack initiation by ENF and ELS and found no big differences between them.

Author

Fracture Strength; Crack Propagation; Crack Initiation; Fracturing; Notch Tests

20010045827 NASA Langley Research Center, Hampton, VA USA

Fatigue Life Methodology for Bonded Composite Skin/Stringer Configurations

Krueger, Ronald, Institute for Computer Applications in Science and Engineering, USA; Paris, Isabelle L., NASA Langley Research Center, USA; OBrien, T. Kevin, Army Research Lab., USA; Minguet, Pierre J., Boeing Co., USA; April 2001; 46p; In English

Contract(s)/Grant(s): RTOP 712-10-21-01

Report No.(s): NASA/TM-2001-210842; L-18067; NAS 1.15:210842; ARL-TR-2432; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A methodology is presented for determining the fatigue life of composite structures based on fatigue characterization data and geometric nonlinear finite element (FE) analyses. to demonstrate the approach, predicted results were compared to fatigue tests performed on specimens which represented a tapered composite flange bonded onto a composite skin. In a first step, tension tests were performed to evaluate the debonding mechanisms between the flange and the skin. In a second step, a 2D FE model was developed to analyze the tests. To predict matrix cracking onset, the relationship between the tension load and the maximum principal stresses transverse to the fiber direction was determined through FE analysis. Transverse tension fatigue life data were used to -enerate an onset fatigue life P-N curve for matrix cracking. The resulting prediction was in good agreement with data

from the fatigue tests. In a third step, a fracture mechanics approach based on FE analysis was used to determine the relationship between the tension load and the critical energy release rate. Mixed mode energy release rate fatigue life data were used to create a fatigue life onset G-N curve for delamination. The resulting prediction was in good agreement with data from the fatigue tests. Further, the prediction curve for cumulative life to failure was generated from the previous onset fatigue life curves. The results showed that the methodology offers a significant potential to Predict cumulative fatigue life of composite structures.
Author
Fatigue Life; Composite Structures; Debonding (Materials); Flanges; Fatigue Tests; Finite Element Method

20010047250 Northrop Grumman Corp., Military Aircraft Systems Div., El Segundo, CA USA
Assessment of Probabilistic Certification Methodology for Composite Structures ***Final Report***
Kan, Han-Pin; Jan. 2001; 58p; In English
Contract(s)/Grant(s): DTFA03-98-F-IA024; 437-25-24
Report No.(s): AD-A388173; DOT/FAA/AR-00/74; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

A sensitivity study has been conducted to assess the currently available probabilistic structural analysis methods. The influence of the distribution parameters on the probability of failure was investigated analytically. The significant parameters that have an impact on development of probabilistic certification procedures were identified. The technical gaps which need to be filled for probabilistic certification of composite structures were discussed.
DTIC
Composite Structures; Composite Materials; Airframes; Probability Theory; Structural Analysis; Sensitivity

20010047271 Army Research Lab., Human Research and Engineering Directorate, Aberdeen Proving Ground, MD USA
Vinyl-Ester (VE) Cure Characterization Via Direct Current Sensors ***Final Report, May 1997-May 2000***
Fink, Bruce K.; Dorairaj, Mahendra B.; Gillespie, John W., Jr.; Mar. 2001; 184p; In English; Prepared in collaboration with the University of Delaware, Center for Composite Materials, Newark, DE.
Report No.(s): AD-A388230; ARL-TR-2441; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

High-performance thermosetting composites typically consist of a high-modulus fibrous material embedded in a thermosetting polymer matrix. The behavior of the resulting composite depends on the properties of the reinforcement, the interphase, and the matrix. Vinyl-ester (VE) resins are relatively low-cost matrix resins used in liquid molding of large structures such as contiguous vehicle hulls. In liquid-molding processes, quality-control sensors can ensure resin impregnation of the preform and cure of the resin after infiltration. For these purposes, SMARTweave (SW), based on direct current (DC) sensing, is used as an in-situ flow-front detection and cure-monitoring system. SW measures change in the ionic conductivity with cure, which can then be related to the material properties like viscosity and degree of cure. This enables in-situ measurement of degree of cure and viscosity development during cure from SW measurements. This report builds on previous modeling work that assumed a direct dependence of DC resistance on the resin viscosity, limiting the use of such models beyond gelation. This report presents a continuum model based on free volume theory to describe ionic conductivity through gelation to vitrification.
DTIC
Curing; Epoxy Resins; Resin Matrix Composites; Matrix Materials; Direct Current; Ion Currents; Viscosity

20010047389 NASA Glenn Research Center, Cleveland, OH USA
Structural Analysis of Composite Flywheels: An Integrated NDE and FEM Approach
Abdul-Aziz, Ali, NASA Glenn Research Center, USA; Baaklini, George, NASA Glenn Research Center, USA; Trudell, Jeffrey, NASA Glenn Research Center, USA; January 2001; 22p; In English; 6th Annual International Symposium on NDE for Health Monitoring and Diagnostics, 4-8 Mar. 2001, Newport Beach, CA, USA; Sponsored by International Society for Optical Engineering, Unknown; Original contains color illustrations
Contract(s)/Grant(s): RTOP 494-21-11
Report No.(s): NASA/TM-2001-210461; E-12457; NAS 1.15:210461; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A structural assessment by integrating finite-element methods (FEM) and a nondestructive evaluation (NDE) of two flywheel rotor assemblies is presented. Composite rotor A is pancake-like with a solid hub design, and composite rotor B is cylindrical with a hollow hub design. Detailed analyses under combined centrifugal and interference-fit loading are performed. Two- and three-dimensional stress analyses and two-dimensional fracture mechanics analyses are conducted. A comparison of the structural analysis results obtained with those extracted via NDE findings is reported. Contact effects due to press-fit conditions are evaluated. Stress results generated from the finite-element analyses were corroborated with the analytical solution. Cracks due to rotational loading up to 48,000 rpm for rotor A and 34,000 rpm for rotor B were successfully imaged with NDE and predicted

with FEM and fracture mechanics analyses. A procedure that extends current structural analysis to a life prediction tool is also defined.
Author
Flywheels; Structural Analysis; Nondestructive Tests; Finite Element Method; Fracture Mechanics; Centrifugal Force; Stress Distribution; Stress Analysis

20010047394 NASA Glenn Research Center, Cleveland, OH USA
One-Step Tape Casting of Composites via Slurry on Fiber
deGroh, Henry C., III, NASA Glenn Research Center, USA; February 2001; 34p; In English
Contract(s)/Grant(s): RTOP 708-31-13
Report No.(s): NASA/TM-2001-210684; NAS 1.15:210684; E-12611; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A process by which metal matrix composites can be made was presented. The process involves putting a powder slurry on fibers to make a precursor green tape. These green tapes are cut, stacked and hot pressed to form the fully dense composite. A computer program was presented which enables complete quantification and control of the process. Once some easily obtained properties of the slurry and its behavior are determined (such as the shrinkage from the wet to green state, and the density of the green tape) modification of the fiber spacing and blade height give the maker precise control of fiber volume fraction, and fiber architecture in the composite. The process was shown to be accurate and flexible through the production of a wide variety of volume fraction fiber composites made from a wide variety of fibers and powders. The most time consuming step of the tape casting process (other than hot pressing) was winding the fiber on the drum. The tape casting techniques developed resulted in high quality metal matrix composites, with ultimate tensile strength in the range of 215 ksi (1477 MPa), a strain at failure of 1.15 percent, and in fatigue at room temperature 0 to 120 ksi, n = 0.3 Hz, a 4-ply Ti-24Al-11Nb/SCS-6, 32 vol% fiber tape cast composite lasted 202,205 cycles with a maximum strain on the 100th cycle of 0.43 percent.
Author
Metal Matrix Composites; Casting; Slurries; Fibers

20010047395 NASA Glenn Research Center, Cleveland, OH USA
Deformation and Life Analysis of Composite Flywheel Disk and Multi-Disk Systems
Arnold, S. M., NASA Glenn Research Center, USA; Saleeb, A. F., Akron Univ., USA; AlZoubi, N. R., Akron Univ., USA; January 2001; 56p; In English
Contract(s)/Grant(s): NCC3-788; RTOP 755-A4-09
Report No.(s): NASA/TM-2001-210578; NAS 1.15:210578; E-12547; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

In this study an attempt is made to put into perspective the problem of a rotating disk, be it a single disk or a number of concentric disks forming a unit. An analytical model capable of performing an elastic stress analysis for single/multiple, annular/solid, anisotropic/isotropic disk systems, subjected to both pressure surface tractions, body forces (in the form of temperature-changes and rotation fields) and interfacial misfits is derived and discussed. Results of an extensive parametric study are presented to clearly define the key design variables and their associated influence. In general the important parameters were identified as misfit, mean radius, thickness, material property and/or load gradation, and speed; all of which must be simultaneously optimized to achieve the ”best” and most reliable design. Also, the important issue of defining proper performance/merit indices (based on the specific stored energy), in the presence of multiaxiality and material anisotropy is addressed. These merit indices are then utilized to discuss the difference between flywheels made from PMC and TMC materials with either an annular or solid geometry. Finally two major aspects of failure analysis, that is the static and cyclic limit (burst) speeds are addressed. In the case of static limit loads, upper, lower, and out-of-plane bounds for disks with constant thickness are presented for both the case of internal pressure loading (as one would see in a hydroburst test) and pure rotation (as in the case of a free spinning disk). The results (interaction diagrams) are displayed graphically in designer friendly format. For the case of fatigue, a representative fatigue/life master curve is illustrated in which the normalized limit speed versus number of applied cycles is given for a cladded TMC disk application.
Author
Design Analysis; Failure Analysis; Mathematical Models; Rotating Disks; Stress Analysis; Flywheels; Elastic Deformation

20010047396 NASA Glenn Research Center, Cleveland, OH USA

Thermal Conductivity and Thermal Gradient Cyclic Behavior of Refractory Silicate Coatings on SiC/SiC Ceramic Matrix Composites

Zhu, Dongming, Ohio Aerospace Inst., USA; Lee, Kang N., Cleveland State Univ., USA; Miller, Robert A., NASA Glenn Research Center, USA; April 2001; 16p; In English; 25Th Annual International Conference on Advanced Ceramics and Structures, 21-26 Jan. 2001, Cocoa Beach, FL, USA; Sponsored by American Ceramic Society, USA

Contract(s)/Grant(s): RTOP 714-04-30

Report No.(s): NASA/TM-2001-210824; E-12742; NAS 1.15:210824; C7-027-01; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Plasma-sprayed mullite and BSAS coatings have been developed to protect SiC/SiC ceramic matrix composites from high temperature environmental attack. In this study, thermal conductivity and thermal barrier functions of these coating systems are evaluated using a laser high-heat-flux test rig. The effects of water vapor on coating thermal conductivity and durability are studied by using alternating furnace and laser thermal gradient cyclic tests. The influence of laser high thermal-gradient cycling on coating failure modes is also investigated.

Author

Thermal Conductivity; Temperature Gradients; Refractory Coatings; Ceramic Matrix Composites; Silicon Carbides

20010047399 NASA Glenn Research Center, Cleveland, OH USA

Implementation of Fiber Substructuring Into Strain Rate Dependent Micromechanics Analysis of Polymer Matrix Composites

Goldberg, Robert K., NASA Glenn Research Center, USA; April 2001; 30p; In English

Contract(s)/Grant(s): RTOP 708-24-13

Report No.(s): NASA/TM-2001-210822; NAS 1.15:210822; E-12740; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A research program is in progress to develop strain rate dependent deformation and failure models for the analysis of polymer matrix composites subject to impact loads. Previously, strain rate dependent inelastic constitutive equations developed to model the polymer matrix were incorporated into a mechanics of materials based micromechanics method. In the current work, the micromechanics method is revised such that the composite unit cell is divided into a number of slices. Micromechanics equations are then developed for each slice, with laminate theory applied to determine the elastic properties, effective stresses and effective inelastic strains for the unit cell. Verification studies are conducted using two representative polymer matrix composites with a nonlinear, strain rate dependent deformation response. The computed results compare well to experimentally obtained values.

Author

Deformation; Elastic Properties; Failure Analysis; Polymer Matrix Composites; Numerical Analysis

20010047637 Old Dominion Univ., Coll. of Engineering and Technology, Norfolk, VA USA

Fabrication of Thermoplastic Composite Laminates Having Film Interleaves by Automated Fiber Placement ***Final Report, Period ending 31 Dec. 2001***

Hulcher, A. B., Old Dominion Univ., USA; Tiwari, S. N., Old Dominion Univ., USA; Marchello, J. M., Old Dominion Univ., USA; April 2001; 146p; In English

Contract(s)/Grant(s): NCC1-227; ODURF Proj. 150101; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Experiments were carried out at the NASA Langley Research Center automated Fiber placement facility to determine an optimal process for the fabrication of composite materials having polymer film interleaves. A series of experiments was conducted to determine an optimal process for the composite prior to investigation of a process to fabricate laminates with polymer films. The results of the composite tests indicated that a well-consolidated, void-free laminate could be attained. Preliminary interleaf processing trials were then conducted to establish some broad guidelines for film processing. The primary finding of these initial studies was that a two-stage process was necessary in order to process these materials adequately. A screening experiment was then performed to determine the relative influence of the process variables on the quality of the film interface as determined by the wedge peel test method. Parameters that were found to be of minor influence on specimen quality were subsequently held at fixed values enabling a more rapid determination of an optimal process. Optimization studies were then performed by varying the remaining parameters at three film melt processing rates. The resulting peel data were fitted with quadratic response surfaces. Additional specimens were fabricated at levels of high peel strength as predicted by the regression models in an attempt to gage

the accuracy of the predicted response and to assess the repeatability of the process. The overall results indicate that quality laminates having film interleaves can be successfully and repeatably fabricated by automated fiber placement.
Author
Thermoplasticity; Laminates; Composite Materials; Fabrication

20010047674 NASA Langley Research Center, Hampton, VA USA
Experimental Validation of a Thermoelastic Model for SMA Hybrid Composites
Turner, Travis L., NASA Langley Research Center, USA; [2001]; Volume 4326, No. 4326-24; 12p; In English; SPIE 8th Annual International Symposium on Smart Structures and Materials; Modeling, Signal Processing, and Control in Smart Structures, 4-8 Mar. 2001, Newport Beach, CA, USA; Sponsored by International Society for Optical Engineering, USA
Report No.(s): SPIE-4326-24; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This study presents results from experimental validation of a recently developed model for predicting the thermomechanical behavior of shape memory alloy hybrid composite (SMAHC) structures, composite structures with an embedded SMA constituent. The model captures the material nonlinearity of the material system with temperature and is capable of modeling constrained, restrained, or free recovery behavior from experimental measurement of fundamental engineering properties. A brief description of the model and analysis procedures is given, followed by an overview of a parallel effort to fabricate and characterize the material system of SMAHC specimens. Static and dynamic experimental configurations for the SMAHC specimens are described and experimental results for thermal post-buckling and random response are presented. Excellent agreement is achieved between the measured and predicted results, fully validating the theoretical model for constrained recovery behavior of SMAHC structures.
Author
Hybrid Composites; Mathematical Models; Shape Memory Alloys; Thermodynamics; Thermoelasticity; Actuators; Nonlinearity

20010047683 Defence Science and Technology Organisation, Airframes and Engines Div., Melbourne, Australia
Development of Film-Infused Tougher Boron/Epoxy Ply
Chalkley, Peter, Defence Science and Technology Organisation, Australia; Stoyanovski, Ivan, Defence Science and Technology Organisation, Australia; Muscat, Richard, Defence Science and Technology Organisation, Australia; Rider, Andrew, Defence Science and Technology Organisation, Australia; October 2000; 34p; In English
Report No.(s): AD-A385581; DODA-AR-011-599; DSTO-TN-0308; Copyright; Avail: Defense Technical Information Center (DTIC)

A previous study has examined the fatigue properties of bonded joints representative of the boron-epoxy doublers bonded to the wing-pivot fittings of Royal Australian Air Force (RAAF) F-111C aircraft. These repairs indicated some fatigue damage and crack propagation occurred at the boron fiber to adhesive interface of the doubler. This paper reports studies that have investigated methods to improve the fracture toughness of the boron/epoxy laminate. Two types of specimen were prepared. In the first case the standard boron epoxy laminate was modified by co-curing FM73 film infused layers at the midplane was prepared. The two modified laminates showed substantial increases in the fracture toughness, however, the co-cured FM73 laminate did not exhibit stable fracture. Failure analysis indicated that the three laminate specimens tested exhibited a complex fracture. Fracture either propagated at the boron-epoxy interface or within the resin or FM73 layers. Further improvement in fracture toughness of the laminate may be achieved by improving the boron to FM73 adhesion. The methods reported for improving laminate fracture toughness may potentially be employed for aircraft repairs in which very high stresses are known to be present.
DTIC
Bonded Joints; Boron-Epoxy Composites; Epoxy Resins; Laminates

20010047831 NASA Glenn Research Center, Cleveland, OH USA
Impact Testing of Composites for Aircraft Engine Fan Cases
Roberts, Gary D., NASA Glenn Research Center, USA; Revilock, Duane M., NASA Glenn Research Center, USA; Binienda, Wieslaw K., Akron Univ., USA; Nie, Walter Z., Akron Univ., USA; Mackenzie, S. Ben, Saint-Bogain Performance Plastics, USA; Todd, Kevin B., Saint-Bogain Performance Plastics, USA; April 2001; 16p; In English; 42nd Structures, Structural Dynamics, and Materials Conference and Exhibit, 16-19 Apr. 2001, Seattle, WA, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA
Contract(s)/Grant(s): RTOP 708-24-13
Report No.(s): NASA/TM-2001-210887; NAS 1.15:210887; E-12763; AIAA Paper 2001-1633; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Before composite materials can be considered for use in the fan case of a commercial jet engine, the performance of a composite structure under blade-out loads needs to be demonstrated. The objective of this program is to develop an efficient test and analysis method for evaluating potential composite case concepts. Ballistic impact tests were performed on laminated glass/epoxy composites in order to identify potential failure modes and to provide data for analysis. Flat 7x7 in. panels were impacted with cylindrical titanium projectiles, and 15 in. diameter half-rings were impacted with wedge-shaped titanium projectiles. Composite failure involved local fiber fracture as well as tearing and delamination on a larger scale. A 36 in. diameter full-ring subcomponent was proposed for larger scale testing. Explicit, transient, finite element analyses were used to evaluate impact dynamics and subsequent global deformation for the proposed full-ring subcomponent test. Analyses on half-ring and quarter ring configurations indicated that less expensive smaller scale tests could be used to screen potential composite concepts when evaluation of local impact damage is the primary concern.
Author
Impact Tests; Epoxy Matrix Composites; Finite Element Method

20010048745 NASA Marshall Space Flight Center, Huntsville, AL USA
Detection and Characterization of Imperfections in Composite Pressure Vessels
Walker, James L., NASA Marshall Space Flight Center, USA; Russell, Samuel S., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; Composite Materials: Testing, Design, and Acceptance Criteria: ASTM STP 1416, 26-27 Mar. 2001, Phoenix, AZ, USA; Sponsored by American Society for Testing and Materials, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The thermographic evaluation of composite structures for delaminations, disbonds, inclusions, porosity and microcracking has proven to be a valuable asset in the field of nondestructive testing. Coupling large area coverage, variable sensitivity and minimal surface contact with a photographic type image representation of structural anomalies; thermography has become a primary inspection method for composite structures. Thermography works well for locating both surface and subsurface defects in most composite systems ranging in thickness of up to 0.25 inch (0.64 cm) or more. The thermographic method for inspection of composite structures typically involves applying an external source of heat to the structure and then recording the changes in the surface heat profile manifested by embedded defects or by material property variations. If these temperature variations are large enough and an infrared camera with sufficient sensitivity is used, then the material or structural abnormality can be detected and referred back to its source. Interpreting the information given in a thermogram, can be a difficult task under ideal circumstances and extremely challenging in a real world setting. Variables including depth, thermal conductivity, orientation and size of the abnormality can all have a great influence on how its heat pattern will be seen by the imager. The work discussed in this paper illustrates how the microstructure of several commonly found defects in composite structures relate to their thermographic image counterpart. Two test cases are studied herein, including a large graphite/epoxy RP-1 fuel tank and a graphite composite cryogenic fuel feedline. The structures used in this study were designed to serve as manufacturing proof of concept specimens and to undergo hydroburst testing to verify manufacturing practices and structural design. Prior to hydrostatic testing the structures underwent 100% thermographic evaluation to ensure that no manufacturing or handling damage was present. Due to a large inclusion found in the feedline, it was pulled from service and dissected without performing the hydroproof The thermographic indications found in the RP-1 tank were below critical limits so it underwent a complete hydroproof loading series and finally a hydroburst. Following the hydroburst samples were cut from the tank in regions where thermography had located damage before the test. These regions were thermographically and then were cross-sectioned and photomicrographed.
Author
Composite Structures; Defects; Microstructure; Nondestructive Tests; Thermography

20010048757 NASA Marshall Space Flight Center, Huntsville, AL USA
High-Pressure Synthesis of Metal-Ceramic Nano-Composites
Gierlotka, S., Polish Academy of Sciences, Poland; Palosz, B., Polish Academy of Sciences, Poland; Ekimov, E., Academy of Sciences (USSR), USSR; Grzanka, E., Polish Academy of Sciences, Poland; Stelmakh, S., Polish Academy of Sciences, Poland; Lojkowski, W., Polish Academy of Sciences, Poland; Bismayer, U., Hamburg Univ., Germany; Palosz, W., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; Nanospace 2001, 14 Mar. 2001, Galveston, TX, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The major problems in fabrication of nano-crystal line materials form nano-powders are: (1), coarsening of the initial nano-size grains, (2), insufficient densification (high concentration of pores), and, (3), conversion of diamond into graphite (for diamond-based ceramics). We have developed a novel technique of the synthesis of nano-composite materials applying very high (up to about 10 GPa) pressures. In this technique, one component is pre-compacted and placed next to another having a lower melting point temperature. The whole sample is pressed and the temperature raised above the melting point of the second

component, what results in the melt getting pressed into the (nano-size) pores of the compact. Upon subsequent crystallization the melt forms the second nanophase. The process is fast, on the order of seconds, and the temperatures are relatively low what prevents, or at least significantly reduces coarsening of the starting nanophase grains. Also, conversion of diamond into graphite can be prevented. The technique allows for control of the final product properties through a proper selection of (1) the initial compact density and grain size, (2) chemical composition of the source, and (3) the temperature and pressure of the process. The application of the technique to the synthesis of SiC and diamond with Si, Ge, and different metals. Results of the in-situ investigation of the synthesis process by synchrotron X-ray diffraction technique will be presented.
Author
Fabrication; Product Development; Synthesis (Chemistry); High Pressure; Metals; Ceramics; Nanocomposites; Chemical Composition

25
INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY

Includes the analysis, synthesis, and use inorganic and organic compounds; combustion theory; electrochemistry; and photochemistry. For related information see also 34 Fluid Dynamics and Thermodynamics, For astrochemistry see category 90 Astrophysics.

20010045636 Eltron Research, Inc., Boulder, CO USA
High-Temperature Heterogeneous Redox Catalysis for NO(x) Abatement ***Final Report, 25 Apr. - 25 Oct. 1997***
White, J.; Heidrick, J.; Roark, S.; Mitchel, J.; Sammells, A. F.; Jan. 23, 1998; 48p; In English
Contract(s)/Grant(s): F41624-97-C-0010; AF Proj. 3005
Report No.(s): AD-A344818; AL/EQ-TR-1997-0044; No Copyright; Avail: Defense Technical Information Center (DTIC)

This Phase I SBIR program was directed towards the synthesis, characterization, and determination of preferred catalyst compositions for the high-temperature direct (reagentless) decomposition of nitrogen oxides in exhaust streams. Phase I results showed clearly that significant persistent (nontransient) activity (35% removal) for direct deNO(x) (at is greater than 500 C) could be attained in helium at space velocities of 1,000,000 per h (3.6ms residence time) over a brownmillerite catalyst supported on a powdered ceramic (yttria-stabilized zirconia) representative of thermal barrier coatings, in the presence of 16% O2, absent of any reagent. This catalyst, when unsupported, showed persistent activity (27% removal at 500,000 per h for at least 6 hours and at least 140 hours at 50,000 per h). Significant activity was measured at up to 1,000 deg C. These catalysts also possessed exceptional activity for the combustion of propane and propylene as well as measurable activity for oxidation of CO. Preliminary results showed tolerance to feedstream CO2 (10%) and SO2 (10ppm). Results point clearly to probable attainment of Air Force's Phase II targets of 50% removal in millisecond residence time regimes and retention of 50% of initial activity after 500 hours.
DTIC
Nitrogen Oxides; Catalysis; Oxidation-Reduction Reactions; Catalysts; Environment Effects; Plumes; Thermal Control Coatings; Yttria-Stabilized Zirconia

20010045712 Prins Maurits Lab. TNO, Rijswijk, Netherlands
Electrospray Mass Spectrometry and Tandem Mass Spectrometry of Some Alkyl Methylphosphonates and Ethylphosphonates
vanBaar, B. L. M., Prins Maurits Lab. TNO, Netherlands; Hulst, A. G., Prins Maurits Lab. TNO, Netherlands; Wils, E. R. J., Prins Maurits Lab. TNO, Netherlands; February 2001; 22p; In English
Contract(s)/Grant(s): A93/KL/424; TNO Pruj. 014.11868
Report No.(s): TD-2000-0073; TNO-PML-2000-A71; Copyright; Avail: Issuing Activity

Under a Memorandum of Understanding between the Minister of National Defence of Canada and the Minister of Defence of the Kingdom of the Netherlands, the two countries are working together on a collaborative assessment in the area of detection and identification of chemical warfare agents. As part of this project the TNO Prins Maurits Laboratory (TNO-PML) has produced electrospray mass spectra (ESI-MS and ESI-MS/MS) of 22 alkyl methylphosphonates (alkyl ranging from C3 to C6) and nine alkyl ethylphosphonates (alkyl: C4 and C5). These compounds are primary hydrolysis products of the corresponding nerve agents alkyl methylphosphonofluoridates and alkyl ethylphosphonofluoridates. The study has provided valuable insight in the use of the recorded data for the identification of hydrolysis products of nerve agents by ESI-MS and ESI-MS/MS. The data were collected in two separate databases (one for the ESI-MS and one for the ESI-MS/MS spectra).
Author
Alkyl Compounds; Mass Spectroscopy; Chemical Warfare

20010046963 NASA Marshall Space Flight Center, Huntsville, AL USA

An Overview of In-Stu Treatability Studies at Marshall Space Flight Center, Huntsville, Alabama

McElroy, Bill, CH2M/Hill, Inc., USA; Keith, Amy, NASA Marshall Space Flight Center, USA; Glasgow, J. K., CH2M/Hill, Inc., USA; Dasappa, Srini, CH2M/Hill, Inc., USA; [2001]; 3p; In English; Oxidation and Reduction Technologies for In-Situ Treatment of Soil and Groundwater, 26-29 Jun. 2001, Niagra Falls, Canada; No Copyright; Avail: Issuing Activity; Abstract Only

Marshall Space Flight Center (MSFC) is located in Huntsville, Alabama (north-central Alabama), on approximately 1,840 acres near the center of the U.S. Army's Redstone Arsenal (RSA). MSFC is the National Aeronautics and Space Administration's (NASA's) principal propulsion development center. Its scientists, engineers, and support personnel play a major role in the National Space Transportation System by managing space shuttle mission activities, including the microgravity laboratory. In addition, MSFC will be a significant contributor to several of NASA's future programs, including the Reusable Launch Vehicle (X-33), International Space Station, and Advanced X-ray Astrophysics Facility, as well as research on a variety of space science applications. MSFC has been used to develop, test and manufacture space vehicles and components since 1960, when civilian rocketry and missile activities were transferred from RSA to MSFC. In 1994, MSFC was placed on the National Priority List for the management of hazardous waste sites, under the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). One requirement of the CERCLA program is to evaluate the nature and extent of environmental contamination resulting from identified CERCLA sites, assess the public health and environmental risks associated with the identified contamination, and identify potential remedial actions. A CERCLA remedial investigation (RI) for the groundwater system has identified at least five major plumes of chlorinated volatile organic compounds (CVOCs) in the groundwater beneath the facility. These plumes are believed to be the result of former management practices at 14 main facility locations (termed "source areas") where CVOCs were released to the subsurface. Trichloroethene (TCE) is the predominant CVOC and is common to all the plumes. Perchloroethene (PCE) also exists in two of the plumes. In addition to TCE and PCE, carbon tetrachloride and 1,1,2,2-tetrachloroethane are contained in one of the plumes. The CVOCs are believed to exist as dense non-aqueous phase liquids (DNAPLs) beneath many of the source areas.

Author

NASA Programs; Environment Pollution

20010047281 Florida Univ., Dept. of Chemistry and Physics, Gainesville, FL USA

Fundamentals and Applications of Atmospheric Pressure Chemical Ionization Quadrupole Ion Trap Mass Spectrometry for the Analysis of Explosives

Reich, Richard F., Jr.; Jan. 2001; 214p; In English

Report No.(s): AD-A388263; CI01-67; No Copyright; Avail: CASI; A10, Hardcopy; A03, Microfiche

The goal of this research was to develop a liquid chromatography (LC)/atmospheric pressure chemical ionization (APCI)-mass spectrometry (MS) and tandem mass spectrometry (MS/MS) method for the analysis of explosives. APCI and electrospray ionization (ESI) are soft ionization techniques which produce characteristic ions of explosives at atmospheric pressure. Most explosives are susceptible to impurities in the solvent and form adduct ions instead of molecular-type ions. Additives allow specific adduct ions to be preferentially formed, which increases the sensitivity for explosives and improves spectral consistency. However, these adduct ions are formed by weak van der Waals forces that can be easily dissociated by the energy imparted during vaporization.

DTIC

Atmospheric Pressure; Mass Spectroscopy; Molecular Ions; Explosives; Liquid Chromatography; Chemical Analysis

20010047291 International Business Machines Corp., Almaden Research Center, San Jose, CA USA

[Molecular Dynamics Modeling of Metal Electrode Surfaces and Electric Double Layers] ***Final Report***

Philpott, Michael; Jan. 10, 2001; 293p; In English

Contract(s)/Grant(s): N00014-92-C-0173

Report No.(s): AD-A387912; No Copyright; Avail: Defense Technical Information Center (DTIC)

The primary objective of the proposal was the design and execution of computer experiments designed to provide the first detailed picture of the dynamics of adsorption of ions and small neutrals on metal electrode surfaces as well as any concomitant changes in the electric double layer. Using molecular dynamic (MD) and Monte Carlo (MC) statistical techniques video movies of these simulations became an integral part of the effort, since visual aids sharpen our perceptions and allow us to visualize the dynamics of these processes better than charts and graphs.

DTIC

Molecular Dynamics; Monte Carlo Method; Ions; Adsorption; Computerized Simulation; Statistical Analysis; Metal Surfaces

20010047561 Army Research Lab., Human Research and Engineering Directorate, Aberdeen Proving Ground, MD USA
A Chemically Specific Burning Rate Predictor Model for Energetic Materials ***Final Report, Jan. 1997-Jan. 2000***
Miller, Martin S.; Anderson, William R.; Feb. 2001; 66p; In English
Report No.(s): AD-A388090; ARL-TR-2390; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The application of complex networks of elementary chemical reactions to the gas phase of burning energetic materials has increased markedly over the last decade. The exquisite complexity of these gas-phase reaction networks, coupled with available high-rigor treatments of transport, is not matched by an equivalent level of sophistication in descriptions of the condensed-phase and interfacial phenomena. Owing to the vastly more complicated, many-body nature of the condensed phase, this condition is not likely to be relieved soon. In response to these difficulties, a new semi-empirical approach to burning-rate calculation has been developed and applied to frozen ozone, cyclotrimethylenetrinitramine (RDX), and nitroglycerine. The new approach hypothesizes a single overall reaction linking the unreacted material to the net products of condensed-phase decomposition and characterizes their rate of formation according to an empirically derived pyrolysis law. These condensed-phase products become the reactants for the gas phase, which are treated in full elementary-reaction detail. Using this new semi-empirical model, a methodology for computing the relative effects of several additives on the burning rate of nitroglycerine is developed and demonstrated. Hopefully this approach will enable more rapid progress in modeling multi-ingredient propellants than did previous approaches attempting to model the condensed-phase processes in detail.
DTIC
Burning Rate; Mathematical Models; Combustion; Propellants

20010047626 Colorado School of Mines, Dept. of Metallurgical and Materials Engineering, Golden, CO USA
Hydrogen-assisted Processing of Materials
Eliaz, N., Negev Univ., Israel; Eliezer, D., Negev Univ., Israel; Olson, D. L., Colorado School of Mines, USA; Materials Science and Engineering A; 2000; ISSN 0921-5093; Volume 289, pp. 41-53; In English
Report No.(s): AD-A387048; ARO-37378.19-MS; Copyright; Avail: Defense Technical Information Center (DTIC)

Under certain conditions, hydrogen can degrade the mechanical properties and fracture behavior of most structural alloys; however, it also has some positive effects in metals. Several current and potential applications of hydrogen for enhancing the production and processing of materials are reviewed. These include thermohydrogen processing (THP) and forming of refractory alloys, processing of rare earth-transition metal magnets by hydrogen decrepitation (HD) and hydrogenation-decomposition-desorption-recombination (HDDR), hydrogen-induced amorphization (HIA) and microstructural refinement, extraction of elements from ores and alloys, and the use of hydrogen as a reducing gas for welding and brazing. Hydrogen is found to enhance the formability, microstructure and properties of a large variety of materials, including steels, Ti-based alloys and metal matrix composites (MMCs), refractory metals and alloys, rare earth-transition metal alloys, metalloid-containing metallic glasses, etc.
DTIC
Hydrogen; Thermodynamics; Phase Transformations; Phase Change Materials; Amorphous Materials; Brazing; Welding

20010047657 Alabama Univ., Laser and Photonics Research Center, Birmingham, AL USA
Oxidative Enhancement of the Values of Solutions of Chi(exp 3) Values of Solutions cis-Mo(CO)4L2 (L = PPh3, AsPh3, PPh2Np) Complexes as Measured by DFWM
Sun, W., Alabama Univ., USA; Byeon, C. C., Alabama Univ., USA; McKerns, M. M., Alabama Univ., USA; Lawson, C. M., Alabama Univ., USA; Dunn, J. M., Alabama Univ., USA; Hariharasarma, M., Alabama Univ., USA; Gray, G. M., Alabama Univ., USA; Optical Materials; 1998; ISSN 0925-3467; Volume 11, pp. 87-93; In English
Contract(s)/Grant(s): DAAH04-96-1-0400
Report No.(s): AD-A386195; Copyright; Avail: Defense Technical Information Center (DTIC)

Detailed degenerate four wave mixing (DFWM) studies of four molybdenum complexes, cis-Mo(CO)4(PPh3)2, cis-Mo(CO)4(AsPh3)2, cis-Mo(CO)4(PPh2Np)2, and cis-Mo(CO)4(P(OPh)3)2, are reported in this paper. Upon exposure to air/oxygen, the chi(sup 3) values of solutions of the first three complexes increase dramatically with time, however, when excess free ligand is added to any of the solutions, no additional increase in the chi(sup 3) is observed. Hence, it is possible to obtain solutions with high chi(sup 3) values by first oxidizing the solution and then adding excess ligand to stabilize the solution. Further, the increase in the chi(sup 3) values of the solutions parallels the increase in the linear absorption, but it is unclear whether the increased linear absorption plays any role in the increase in the chi(sup 3) values of the solutions. This study also shows how

degenerate four wave mixing can be used as a very sensitive technique to detect the chemical change in a solution when the third order optical nonlinearities of the reactant and product are very different.
Author
Four-Wave Mixing; Molybdenum; Oxidation

20010048034 Civil Aeromedical Inst., Civil Aeromedical Inst., Oklahoma City, OK USA
A Fatality Caused by Hydrogen Sulfide Produced from an Accidential Transfer of Sodium Hydrogen Sulfide into a Tank Containing Dilute Sulfuric Acid *Final Report*
Chaturvedi, Arvind K., Civil Aeromedical Inst., USA; Smith, Dudley R., Civil Aeromedical Inst., USA; Canfield, Dennis V., Civil Aeromedical Inst., USA; Nov. 2000; 7p; In English
Contract(s)/Grant(s): AM-B-99-TOX-202; AM-B-00-TOX-202
Report No.(s): AD-A388303; DOT/FAA/AM-00/34; No Copyright; Avail: CASI; A01, Microfiche; A02, Hardcopy

The National Transportation Safety Board has an agreement with the Federal Aviation Administration (FAA) that the FAA's Civil Aeromedical Institute (CAMI) provide toxicological services for selected surface transportation accidents. Under this agreement, postmortem biosamples from a hazardous chemical accident fatality were submitted to CAMI for toxicological evaluation. The victim succumbed from breathing the hydrogen sulfide (H2S) gas produced by an accidental transfer of sodium hydrogen sulfide (NaHS) from a tanker truck to a tank containing 4% sulfuric acid (H2SO4) and iron(II) sulfate (FeSO4). After inhaling the gas, the 55-year old male Caucasian truck driver was dead at the scene. Autopsy examination of the decedent's body revealed pulmonary edema and passive congestion in lungs, spleen, kidneys, and adrenal glands. The submitted samples were analyzed for carbon monoxide, cyanide, alcohols, and drugs. Since a potential exposure to H2S was involved, blood was analyzed for sulfide (S(2-)) The analysis entailed isolating S(2-) from blood as H2S using 0.5 M H3PO4, trapping the gas in 0.1 M NaOH, and determining the electromotive force using a sulfide ion specific electrode. Carbon monoxide, cyanide, or ethanol was not detected in blood, but acetaminophen at a therapeutic concentration of 14.3 microg/mL of blood was found, and metoprolol was detected in the blood, liver, and kidney samples. Analysis further revealed the presence of S(2-). in blood at the level of 1.68 microg/mL. This S(2-). concentration is approximately 2 times higher than that reported in the blood of 2 separate fatalities associated with accidental exposures to H2S. The blood S(2-). value in the present case was about 34 times higher than the blood S(2-) concentration (is less than 0.05 microg/mL) in normal subjects.
DTIC
Hydrogen Sulfide; Safety Management; Sodium; Sulfuric Acid; Hazardous Materials; Toxicology; Toxic Hazards

20010048417 NASA Goddard Space Flight Center, Greenbelt, MD USA
On the Relationship of Multiple Solutions in Tropospheric Photochemistry to Observable Phenomena
Stewart, Richard W., NASA Goddard Space Flight Center, USA; [2000]; 1p; In English; Fall AGU Meeting, 15-19 Dec. 2000, San Francisco, CA, USA; Sponsored by American Geophysical Union, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Multiple steady-state solutions are a fairly robust feature of simplified models of tropospheric photochemistry and have been reported for a range of different modeling assumptions. Multiple solutions occur through a bifurcation as changes in a control parameter induce a transition from low to high NO(x) conditions. The usual control parameters are the sources of NO and of CO, CH4 or non-methane hydrocarbons. Typically, with increasing NO source, bifurcations occur at NO(x). concentrations that are higher than would be expected of even heavily polluted conditions. However, there are other ways of inducing a low NO(x) - high NO(x) transition. In this paper the primary control parameter is solar zenith angle. This is varied throughout the year by computing noontime steady states on successive days. Background NO(x), varied by assuming different NO(x) sources values, is used as a secondary control parameter. It is found that bifurcations can occur from high to low NO(x) conditions, for reasonable background NO(x) levels, as the model progresses through spring and then from low to high NO,, during the progression through fall. A time dependent version of this model has been run for the same parameter values as in the steady state runs. This shows rapid spring and fall transitions between high and low NO(x) states. H2O2, for example, rises from sub-ppb levels to about 2 ppb over a five day period in spring and declines quickly, but less precipitously, in fall. This study supports the suggestions that the rapid change in peroxide concentrations between summer and winter conditions may be understood as a manifestation of different underlying steady-state behavior.
Author
Photochemical Reactions; Troposphere; Pollution; Models

20010048668 NASA Ames Research Center, Moffett Field, CA USA

Methanol Uptake by Low Temperature Aqueous Sulfuric Acid Solutions

Iraci, L. T.; Essin, A. M.; Golden, D. M.; [2000]; 1p; In English; American Geophysical Union Fall Meeting, 16 Dec. 2000, USA; Sponsored by American Geophysical Union, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The global methanol budget is currently unbalanced, with source terms significantly larger than the sinks terms. to evaluate possible losses of gaseous methanol to sulfate aerosols, the solubility and reactivity of methanol in aqueous sulfuric acid solutions representative of upper tropospheric and lower stratospheric aerosols is under investigation. Methanol will partition into sulfate aerosols according to its Henry's law solubility. Using standard uptake techniques in a Knudsen cell reactor, we have measured the effective Henry's law coefficient, H*, for cold (196 - 220 K) solutions ranging between 45 and 70 wt % H2SO4. We have found that methanol solubility ranges from approx. 10(exp 5) - 10(exp 7) M/atm for UT/LS conditions. Solubility increases with decreasing temperature and with increasing sulfuric acid content. Although methanol is slightly more soluble than are acetone and formaldehyde, current data indicate that uptake by clean aqueous sulfuric acid particles will not be a significant sink for methanol in the UT/LS. These solubility measurements include uptake due to physical solvation and any rapid equilibria which are established in solution. Reaction between primary alcohols and sulfuric acid does occur, leading to the production of alkyl sulfates. Literature values for the rate of this reaction suggest that formation of CH3OSO3H is not significant over our experimental time scale for solutions below 80 wt % H2SO4. to confirm this directly, results obtained using a complementary equilibrium measurement technique will also be presented.

Author

Methyl Alcohol; Low Temperature; Sulfuric Acid; Alkyl Compounds; Computation; Troposphere; Stratosphere

20010048866 Idaho Univ., Moscow, ID USA

Catalytically Assisted Combustion of Aquanol in Demonstration Vehicles ***Final Report, Jul. 1998 - Aug. 00***

Beyerlein, Steven, Idaho Univ., USA; Steciak, Judi, Idaho Univ., USA; McIlroy, David, Idaho Univ., USA; Blackketter, Donald, Idaho Univ., USA; Clarke, Eric, Idaho Univ., USA; Gordon, Dan, Idaho Univ., USA; Morton, Andrew, Idaho Univ., USA; Jan. 2001; 32p; In English

Contract(s)/Grant(s): DTRS98-G-0027

Report No.(s): PB2001-104032; NIATT-N01-08; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Aqueous fuels have the potential for lower emissions and higher engine efficiency than can be experienced with gasoline or diesel fuels. Past attempts to burn aqueous fuels in over-the-road vehicles have been unsuccessful due to difficulties in initiating combustion. For this project, the authors adapted and used SmartPlug(TM), catalytic igniter technology developed by Automotive Resources Inc. (Sandpoint, Idaho)-in a transit van supplied by Valley Transit of Lewiston, Idaho. The adaptation entailed retrofitting the cylinders with total seal piston rings, installing corrosion-proof components in the fuel system, and reprogramming the fuel computer. The authors completed several hundred miles of vehicle testing to demonstrate the robustness of the conversion. Future emission studies are planned to quantify the emission reduction associated with the use of aqueous fuels. The information gained on this project will enable future conversions achieving higher efficiencies and lower emissions than currently possible on existing platforms.

NTIS

Fuels; Ignition; Combustion; Environment Effects; Igniters; Catalytic Activity; Fuel Systems

20010048911 Idaho Univ., Moscow, ID USA

Homogeneous Charge Combustion of Aqueous Ethanol ***Final Report***

Beyerlein, Steve, Idaho Univ., USA; McIllroy, David, Idaho Univ., USA; Blackketter, Donald, Idaho Univ., USA; Steciak, Judi, Idaho Univ., USA; Clarke, Eric, Idaho Univ., USA; Morton, Andron, Idaho Univ., USA; Feb. 2001; 36p; In English

Contract(s)/Grant(s): DTRS98-G-0027

Report No.(s): PB2001-104033; NIATT-N01-09; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Combusting ethanol-water fuels with a Catalytic Plasma Torch (CPT) promises to reduce pollutant emissions from low-compression engines in urban areas. This project involves obtaining a van with an SI engine from Valley Transit and working with Aqualytic Technologies Inc. to convert the vehicle to burn aquanol as well as gasoline. Upon completion, the vehicle will be used on a daily basis as part of the Valley Transit van fleet in Lewiston, Idaho. Emission and performance data will be collected periodically to verify durability of the catalytic ignition system. The goal of this project is to demonstrate the feasibility of retrofitting a spark ignition engine for catalytic operation and to monitor the long-term operator in a public transit application.

NTIS

Ethyl Alcohol; Combustion; Contaminants; Ignition Systems; Alternatives; Fuels

26
METALS AND METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals and metallic materials; and metallurgy.

20010043988 Virginia Univ., School of Engineering and Applied Science, Charlottesville, VA USA
An Electrochemical Framework to Explain Intergranular Stress Corrosion Cracking in an Al-5.4%Cu-0.5%Mg-0.5%Ag Alloy ***Final Report***
Little, D. A., Virginia Univ., USA; Connolly, B. J., Virginia Univ., USA; Scully, J. R., Virginia Univ., USA; [2001]; 18p; In English
Contract(s)/Grant(s): NAG1-2282
Report No.(s): UVA-5-28768; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A modified version of the Cu-depletion electrochemical framework was used to explain the metallurgical factor creating intergranular stress corrosion cracking susceptibility in an aged Al-Cu-Mg-Ag alloy, C416. This framework was also used to explain the increased resistance to intergranular stress corrosion cracking in the overaged temper. Susceptibility in the under aged and T8 condition is consistent with the grain boundary Cu-depletion mechanism. Improvements in resistance of the T8+ thermal exposure of 5000 h at 225 F (T8+) compared to the T8 condition can be explained by depletion of Cu from solid solution.
Author
Electrochemistry; Intergranular Corrosion; Stress Corrosion Cracking; Corrosion Resistance

20010044246 NASA Langley Research Center, Hampton, VA USA
Fabrication and Characterization of SMA Hybrid Composites
Turner, Travis L., NASA Langley Research Center, USA; Lach, Cynthia L., NASA Langley Research Center, USA; Cano, Robert J., NASA Langley Research Center, USA; [2001]; 12p; In English; 8th Annual International Symposium on Smart Structures and Materials: Active Materials: Behavior and Mechanics, 4-8 Mar. 2001, Newport Beach, CA, USA; Sponsored by International Society for Optical Engineering, USA; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Results from an effort to fabrication shape memory alloy hybrid composite (SMAHC) test specimens and characterize the material system are presented in this study. The SMAHC specimens are conventional composite structures with an embedded SMA constituent. The fabrication and characterization work was undertaken to better understand the mechanics of the material system, address fabrication issues cited in the literature, and provide specimens for experimental validation of a recently developed thermomechanical model for SMAHC structures. Processes and hardware developed for fabrication of the SMAHC specimens are described. Fabrication of a SMA14C laminate with quasi-isotropic lamination and ribbon-type Nitinol actuators embedded in the 0' layers is presented. Beam specimens are machined from the laminate and are the focus of recent work, but the processes and hardware are readily extensible to more practical structures. Results of thermomechanical property testing on the composite matrix and Nitinol ribbon are presented. Test results from the Nitinol include stress-strain behavior, modulus versus temperature. and constrained recovery stress versus temperature and thermal cycle. Complex thermomechanical behaviors of the Nitinol and composite matrix are demonstrated, which have significant implications for modeling of SMAHC structures.
Author
Characterization; Fabrication; Hybrid Composites; Isotropy; Nitinol Alloys; Shape Memory Alloys

20010045707 Institute of Industrial Technology TNO, Materials Technology Div., Eindhoven, Netherlands
Correlations of Accelerated Corrosion Tests with Outdoor Exposure ***Final Report Correlaties van Versnelde Corrosietesten met Buitenexpositie***
Hoeflaak, M., Institute of Industrial Technology TNO, Netherlands; Nov. 28, 2000; 23p; In Dutch
Contract(s)/Grant(s): A96/KL/116; TNO Proj. 007.50105/01.01
Report No.(s): TD-2001-0121; TNO-Bu4.00/039459-1/MH; Copyright; Avail: Issuing Activity

Due to the legislation with respect to environmental and health aspects, the Dutch Army has to use new protective coatings systems with low contents of volatile organic components. The artificial corrosion tests in the current specifications may give unreliable results with these new paint systems. For this reason different artificial corrosion tests were evaluated with respect to their correlations with outdoor exposure. For the evaluation protective paint systems on steel and on aluminium are used. For steel substrates the best correlations are obtained with the Prohesion test and with a cyclic corrosion test developed by TNO. For the aluminium substrate the best correlations are obtained with the cyclic TNO test and the Lockheed test.
Author
Accelerated Life Tests; Corrosion Tests; Exposure; Protective Coatings; Correlation

20010046860 Tuskegee Inst., Dept. of Electrical Engineering, AL USA

Identification of Surface and Near Surface Defects and Damage Evaluation by Laser Speckle Techniques

Gowda, Chandrakanth H., Tuskegee Inst., USA; Mar. 20, 2001; 17p; In English

Contract(s)/Grant(s): NAG1-1865; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

As a part of the grant activity, a laboratory was established within the Department of Electrical Engineering for the study for measurements of surface defects and damage evaluation. This facility has been utilized for implementing several algorithms for accurate measurements of defects. Experiments were conducted using simulated images and multiple images were fused to achieve accurate measurements. During the nine months of the grants when the principal investigator was transferred in my name, experiments were conducted using simulated synthetic aperture radar (SAR) images. This proved useful when several algorithms were used on images of smooth objects with minor deformalities. Given the time constraint, the derived algorithms could not be applied to actual images of smooth objects with minor abnormalities.

Derived from text

Damage Assessment; Surface Defects; Speckle Patterns; Laser Outputs

20010047407 NASA Glenn Research Center, Cleveland, OH USA

Microprobe Evaluations of Grain Boundary Segregation in KM4 and IN100

Gabb, T. P., NASA Glenn Research Center, USA; Smith, J. W., Cleveland State Univ., USA; January 2001; 24p; In English; Original contains color illustrations

Contract(s)/Grant(s): RTOP 714-04-10

Report No.(s): NASA/TM-2001-210666; E-12574; NAS 1.15:210666; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Turbine disk alloys subjected to fatigue cycles with dwells at high temperatures and stresses can fail by cracking along grain boundaries. This could be due to concentrated creep deformation or environmental attack at grain boundaries. It would be important to identify any chemical segregation along grain boundaries to aid understanding of this intergranular failure mode. The objective of this study was to evaluate the degree of chemical segregation present at the grain boundaries of two disk alloys, KM4 and IN 100. An electron microprobe employing wavelength dispersive x-ray chemical analyses was used to characterize the chemistry along multiple grain boundaries in metallographically prepared samples of each alloy. Some degrees of boron, chromium, and cobalt enrichment of grain boundaries were observed in each alloy.

Derived from text

Grain Boundaries; High Temperature; Failure Modes; Metal Fatigue; Creep Properties; Deformation; Cracking (Fracturing)

20010047628 Colorado School of Mines, Center for Welding, Joining and Coating Research, Golden, CO USA

Hydrogen Trapping in High Steel Weld Metal

Maroef, I. S., Colorado School of Mines, USA; Park, Y. D., Colorado School of Mines, USA; Lensing, C., Colorado School of Mines, USA; Landau, A., Colorado School of Mines, USA; Olson, D. L., Colorado School of Mines, USA; Proceedings of Second International Conference on Joining of Advanced and Specialty Materials; [1999]; 9p; In English; Second International Conference on Joining of Advanced and Specialty Materials, 1-4 Nov. 1999, Cincinnati, OH, USA, Session 7: Welding and Weld Characterization; Sponsored by American Society for Metals, USA

Contract(s)/Grant(s): DAAG55-98-1-0085

Report No.(s): AD-A387052; ARO-37378.9-MS; Copyright; Avail: Defense Technical Information Center (DTIC)

The prediction of safe welding conditions for high strength steel has evolved from a more practical criteria, such as P(sub cm) method, to the use of finite element analysis, such as that calculation proposed by Karppi et al. and Boellinghaus et al. Such an evolution was inevitable because there is a lot of non-uniformity in the hydrogen cracking determining parameters (temperature, hardness, stress, and hydrogen concentration) involved during the weld cooling cycle. Particularly for high strength steel welding, high restraint stress is usually developed at high enough temperature rangers when hydrogen transport is still fast, either by lattice diffusion or by dislocation assisted transport. This situation results in local accumulation of hydrogen in regions of stress concentration in the weldment, as determined by the singularity of the restraint stress profile in the weldment. With the occurrence of such non-uniformities, a bulk parameter oriented criterion like the P(sub cm) method may become insufficient for critical welding geometries.

DTIC

Hydrogen; Trapping; High Strength Steels; Steel Structures

20010047629 Colorado School of Mines, Center for Welding, Joining and Coating Research, Golden, CO USA

Fundamental Aspects of Hydrogen Trapping in Steel Weld Metal

Maroef, I. S., Colorado School of Mines, USA; Olson, D. L., Colorado School of Mines, USA; Proceedings of Second International Conference on Joining of Advanced and Specialty Materials; [1999]; 10p; In English; Second International Conference on Joining of Advanced and Specialty Materials, 1-4 Nov. 1999, Cincinnati, OH, USA, Session 8: Joining of Stainless Steels and Fe-Based Alloys; Sponsored by American Society for Metals, USA

Contract(s)/Grant(s): DAAG55-98-1-0085

Report No.(s): AD-A387053; ARO-37378.3-MS; Copyright; Avail: Defense Technical Information Center (DTIC)

Prevention of hydrogen cracking in high strength steel welding may require heat treatments, which are no longer practical and cost efficient. The more conventional post or pre heat treatment procedures that have been prescribed to many classes of steel may have lost their purpose when it comes to high strength steel welding. The primary cause of this failure is local accumulation of hydrogen at regions of stress concentration, during the course of conventional heat treatment.

DTIC

Hydrogen; Trapping; Cracking (Fracturing); Prevention

20010047632 Nebraska Univ., Dept. of Physics, Lincoln, NE USA

Simulation of Structural Transformation in Aragonite CaCO3.

Liu, Jian-Jun, Nebraska Univ., USA; Ossowski, M. M., Nebraska Univ., USA; Hardy, J. R., Nebraska Univ., USA; Duan, Chun-Gang, Nebraska Univ., USA; Fundamental Physics of Ferroelectrics 2000; 2000, pp. 338-343; In English

Contract(s)/Grant(s): DAAG55-97-1-0106; DAAG55-98-1-0273; NSF EPS-97-20643

Report No.(s): AD-A387091; ARO-358.10-PH; ISBN 1-56396-959-9; Copyright; Avail: Defense Technical Information Center (DTIC)

The structural transformation in aragonite CaCO3 is simulated by molecular dynamics. The simulations are based on the potentials calculated from the Gordon-Kim modified electron gas formalism. We found two phase transitions in aragonite at high temperature.

DTIC

Simulation; Phase Transformations; Crystallization; Molecular Dynamics; Crystal Structure

20010047666 Naval Research Lab., Oceanography Div., Stennis Space Center, MS USA

Localized Corrosion and Bacterial Attraction Determined by Surface Analytical Techniques

Little, Brenda, Naval Research Lab., USA; Pope, Robert, Naval Research Lab., USA; Ray, Richard, Naval Research Lab., USA; Journal of Corrosion; Dec. 28, 2000; 12p; In English; Corrosion 2000, 26-31 Mar. 2000, Orlando, FL, USA

Report No.(s): AD-A386249; NRL/PP/7303-99/0047; NACE Paper-395; Copyright; Avail: Defense Technical Information Center (DTIC)

Used in combination, surface analytical techniques can be used to resolve spatial relationships between bacteria and localized corrosion, determine specific corrosion mechanisms and to differentiate between abiotic and biotic processes. Confocal laser scanning microscopy and scanning vibrating electrode microscopy were used to demonstrate marine bacteria and anodic sites co-located. Environmental scanning electron microscopy coupled with energy dispersive x-ray spectroscopy was used to demonstrate de-alloying of nickel from copper:nickel alloys. X-ray absorption spectroscopy and transmission electron microscopy equipped with electron energy loss spectrometry were used to determine the speciation of copper associated with corrosion products.

DTIC

Bacteria; Corrosion; Spatial Distribution

20010047834 NASA Glenn Research Center, Cleveland, OH USA

High Temperature Fatigue Crack Growth Behavior of Alloy 10

Gayda, John, NASA Glenn Research Center, USA; April 2001; 20p; In English

Contract(s)/Grant(s): RTOP 708-24-13

Report No.(s): NASA/TM-2001-210814; E-12729; NAS 1.15:210814; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Methods to improve the high temperature, dwell crack growth resistance of Alloy 10, a high strength, nickel-base disk alloy, were studied. Two approaches, heat treat variations and composition modifications, were investigated. Under the heat treat approach, solution temperature, cooling rates, and stabilization, were studied. It was found that higher solution temperatures, which promote coarser grain sizes, coupled with a 1550 F stabilization treatment were found to significantly reduce dwell crack

growth rates at 1300 F Changes in the niobium and tantalum content were found to have a much smaller impact on crack growth behavior. Lowering the niobium:tantalum ratio did improve crack growth resistance and this effect was most pronounced for coarse grain microstructures. Based on these findings, a coarse grain microstructure for Alloy 10 appears to be the best option for improving dwell crack growth resistance, especially in the rim of a disk where temperatures can reach or exceed 1300 T. Further, the use of advanced processing technologies, which can produce a coarse grain rim and fine grain bore, would be the preferred option for Alloy 10 to obtain the optimal balance between tensile, creep, and crack growth requirements for small gas turbine engines.
Author
Crack Propagation; Engine Design; Fracture Strength; Heat of Solution; High Strength Alloys; Niobium; Tantalum; Thermal Fatigue

20010048014 Battelle Columbus Labs., OH USA
Preliminary Material Properties Handbook, Volume 2, SI Units ***Final Report, 1 Nov. 1998 - 1 Jul. 2000***
Jackson, Jana; Rice, Richard; Jul. 01, 2000; 293p; In English
Contract(s)/Grant(s): F33615-97-C-5647; AF Proj. 4349
Report No.(s): AD-A388463; AFRL-ML-WP-TR-2001-4027; No Copyright; Avail: CASI; A03, Microfiche; A13, Hardcopy
The Emerging Materials program provides the aerospace industry with typical properties of emerging materials and other materials of interest that have not met all the criteria for inclusion in the MIL-HDBK-5. Materials included in this report are standardized with regard to composition and processing methods and are described by industry, government, or company specifications.
DTIC
Handbooks; Aerospace Industry

20010048740 Virginia Univ., Dept. of Materials Science and Engineering, Charlottesville, VA USA
Processing and Properties of Al-Li-Cu-X Alloys
Starke, Edgar A., Jr., Virginia Univ., USA; [2000]; 42p; In English
Contract(s)/Grant(s): F49620-97-I-0234
Report No.(s): AD-A387422; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy
The objectives of this research were to identify the mechanisms for the large difference in ductility between the near peak aged AF/C-489 and AF/C 458 and then develop an aging schedule to optimize the microstructure for high strength and ductility. Duplex aging treatments produced significant increased in ductility for AF/C-489, approaching that of AF/C-458. Although strain localization occurred in both alloys it was more severe in AF/C-489 due to the higher volume fraction of shearable delta prime and a much larger grain size. Our results show that a significant increase in ductility of the higher lithium AF/C-489 can be obtained by double aging and reducing the grain size. The report describes the details of the study and the optimum processing to obtain this goal.
DTIC
Optimization; Thermomechanical Treatment; Heat Treatment

20010048750 Universities Space Research Association, Huntsville, AL USA
Lamellar Spacing Selection in Al-Si Eutectic System: a Theoretical Investigation
Catalina, Adrian V., Universities Space Research Association, USA; Sen, Subhayu, Universities Space Research Association, USA; Curreri, Peter A., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; Science of Casting and Solidifcation Conference, 28 May 2001, Brasov, Romania
Contract(s)/Grant(s): NCC8-66; No Copyright; Avail: Issuing Activity; Abstract Only
It is well known that irregular eutectics such as Al-Si and Fe-C exhibit larger lamellar spacings and undercoolings compared to the predictions made by the Jackson and Hunt (JH) theory. In this paper, we reexamine the JH theory and relax some of the assumptions used in that treatment. The modified theoretical model has enhanced capabilities to predict the lamellar spacing in both regular and irregular eutectics. For the Al-Si system in particular we identified two different spacing selection mechanisms:a) for a particular growth rate, a nearly isothermal interface can be achieved at a unique minimum spacing lambda(sub I); b) the average spacing in the microstructure (lambda(sub av) greater than lambda(sub I)) is essentially dictated by the undercooling of the faceted phase. Based on the modified theoretical model a semi-empirical expression has been developed to account for the influence of the temperature gradient. Application of a Mullin and Sekerka type stability analysis for eutectics will also be

presented and the results compared to the modified JH model. It will be shown that the both theoretical approaches are in good agreement with each other and also with the published experimental measurements.
Author
Eutectics; Aluminum Silicates; Mathematical Models; Numerical Analysis; Microstructure

20010048877 Battelle Memorial Inst., Columbus, OH USA
Preliminary Material Properties Handbook. Volume 1: English Units ***Final Report, 1 Nov. 1998-1 Jul. 2000***
Jackson, Jana; Rice, Richard; Jul. 2000; 293p; In English
Contract(s)/Grant(s): F33615-97-C-5647; AF Proj. 4349
Report No.(s): AD-A388466; AFRL-ML-WP-TR-2001-4027; No Copyright; Avail: CASI; A13, Hardcopy; A03, Microfiche
The Emerging Materials program provides the aerospace industry with typical properties of emerging materials and other materials of interest that have not met all the criteria for inclusion in the MIL-HDBK-5. Materials included in this report are standardized with regard to composition and processing methods and are described by industry, government, or company specifications.
DTIC
Handbooks; Aerospace Industry; Standardization; Aircraft Construction Materials

27
NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials. For composite materials see 24 Composite Materials.

20010044082 Texas Univ., Austin, TX USA
Micromechanical Measurements of Foams, Adhesives and Composites ***Final Report, 4 Jan. 1999 - 30 Sep. 2000***
Kyriakides, Stelios, Texas Univ., USA; Liechti, Kenneth M., Texas Univ., USA; Feb. 20, 2001; 4p; In English
Contract(s)/Grant(s): F49620-99-1-0228
Report No.(s): AD-A387558; AFRL-SR-BL-TR-01-0150; No Copyright; Avail: CASI; A01, Microfiche; A01, Hardcopy
This was an AFOSR DURIP 99 Instrumentation Grant. The grant was used to purchase two major pieces of equipment and to design and fabricate two others. The equipment are being used to perform micromechanical testing and image processing in fiber polymeric foams and honeycomb adhesives and composites. The first piece of equipment purchased is an M-5 Atomic Force Microscope from ThermoMicrosopes. The facility is being used for general surface scanning and for custom material testing. An Optronics digital camera and a digital video disk recorder were purchased for general monitoring of material testing. A 15 ft drop weight testing facility along with related accessories was designed, fabricated and tested during the period of the grant. The facility is being used to establish the dynamic energy absorption capacity of honeycombs and other light weight materials. A Mixed-Mode Delaminati Tester was designed and fabricated for examining interfacial and near interfacial crack growth in composites. The facilities have become part of the laboratory of the Center for Mechanics of Solids Structures & Materials of the University of Texas.
DTIC
Composite Materials; Adhesives; Micromechanics; Crack Propagation; Foams

20010044110 Florida Dept. of Transportation, Gainesville, FL USA
Environmentally Friendly Passivating Coatings for Steel Rebars ***Final Report***
Neely, J.; Sagues, A.; Powers, R.; Feb. 2001; 14p; In English
Report No.(s): PB2001-104274; NCHRP-56; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
This report summarizes the findings of the first year of an ongoing investigation conducted by the Florida Department of Transportation (FDOT). In conjunction with the University of South Florida (USF) and Neely Industries. The general objective for this work is to determine the effectiveness of Inorganic Polymer Coated (IPC) reinforcing bar (rebar) in the presence of sodium chloride (NaCl). Also of interest is the potential of this coating to passivate any damage the rebar may have suffered, such as that encountered in normal handling procedures.
NTIS
Steels; Plastic Coatings; Reinforcing Materials

20010046482 NASA Langley Research Center, Hampton, VA USA

Space Environmentally Stable Polyimides and Copolyimides Derived from Bis(3-aminophenyl)-3,5-di(Trifluoromethyl) Phenylphosphine Oxide

Connell, John W., NASA Langley Research Center, USA; Watson, Kent A., National Academy of Sciences - National Research Council, USA; High Performance Polymers; 2000; ISSN 0954-0083; Volume 13, pp. 23-34; In English; Copyright; Avail: Issuing Activity

Polyimides with a unique combination of properties including low colour in thin films, atomic oxygen (AO) resistance, ultra-violet (UV) radiation resistance, solubility in organic solvents in the imide form, high glass transition (T(sub g)) temperatures, and high thermal stability have been prepared and characterized. Polyimides were prepared by reacting a novel aromatic diamine bis(3-aminophenyl)-3,5-di(trifluoromethyl)phenylphosphine oxide, with various aromatic dianhydrides in a polar aprotic solvent. Copolymers were prepared by the addition of a second diamine. The solubility of the polymers in the imide form as well as the colour density of thin films was dependent upon the chemical structure of the dianhydride and the additional diamine. Thin films (25-50 micrometers thick) prepared by solution casting of amide acid or imide solutions exhibited very low colour and high optical transparency as determined by UV/visible spectroscopy. The polymers exhibited T(sub g) values greater than 200 C depending upon the structure of the dianhydride and temperatures of 5% weight loss approx. 500 C in air as determined by dynamic thermogravimetric analysis (TGA). Thin films coated with silver/inconel were exposed to a high fluence of AO and 1000 equivalent solar hours of UV radiation. The effects of these exposures on optical properties were minor. These space environmentally durable polymers are potentially useful in a variety of applications on spacecraft such as thin film membranes on antennae, second surface mirrors, thermal/optical coatings and multi-layer thermal insulation (MLI) blanket materials. The chemistry, physical and mechanical properties of the polymers as well as their responses to AO and UV exposure will be discussed. Author

Anhydrides; Antireflection Coatings; Chemical Composition; Copolymers; Mechanical Properties

20010046995 Institute of Industrial Technology TNO, Eindhoven, Netherlands

Feasibility Study on the Effect of Using Biodegradable Lubricants for Military Applications, Phase 2, Tribological Evaluation of Hydraulic Fluids - IRG Transition digram Data ***Final Report***

vanderHeide, E., Institute of Industrial Technology TNO, Netherlands; Jan. 09, 2001; 27p; In English

Contract(s)/Grant(s): A99/KL/122; TNO Proj. 007.40165

Report No.(s): TD-2001-0124; TNO-Div401.1013; Copyright; Avail: Issuing Activity

It is expected that biodegradable hydraulic fluids/lubricants will be demanded and used in military equipment within the near future. This change from well known products based on mineral oils to biodegradable or 'green' alternatives requires know how on the reliability in the military practice. Therefore a preliminary benchmark on a representative set of commercially available products with respect to the performance at severe tribological contact-conditions is done at a laboratory scale using the IRG transition diagram technique. Measurements show that the selected alternative fluids perform adequate at 750 C, when compared to the reference fluid H-540. Especially the important 1-11 transition takes place at the same or at higher loads. The results show that at a simplified laboratory scale, using standard test specimens and short term experiments at 75O C, it is possible to use a biodegradable alternative for H-540 without increasing the wear rate of the components. In order to advise a field test for example with the water-drilling equipment it is recommended to further explore the possibilities of biodegradable alternatives. More specifically with respect to temperature, the effect of log term testing and with respect to the effect of material selection on durability.

Derived from text

Biodegradability; Lubricants; Military Technology; Feasibility

20010047234 NASA Glenn Research Center, Cleveland, OH USA

The Role of Bearing and Scan Mechanism Life Testing in Flight Qualification of the MODIS Instrument

VanDyk, Steven G., Raytheon Systems Co., USA; Dietz, Brian J., Moog, Inc., USA; Street, Kenneth W., NASA Glenn Research Center, USA; Jones, William R., Jr., NASA Glenn Research Center, USA; Jansen, Mark J., AYT Corp., USA; Dube, Michael J., Nye Lubricants, Inc., USA; Sharma, Rajeev K., NASA Goddard Space Flight Center, USA; Predmore, Roamer E., NASA Goddard Space Flight Center, USA; April 2001; 22p; In English; 35th Aerospace Mechanisms Symposium, 9-11 May 2001, Mountain View, CA, USA; Sponsored by Lockheed Martin Missiles and Space, USA

Contract(s)/Grant(s): RTOP 274-00-00

Report No.(s): NASA/TM-2001-210896; NAS 1.15:210896; E-12771; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This paper describes the results of accelerated and operational life tests on bearings for the Moderate Resolution Imaging Spectroradiometer (MODIS). It also describes the post test analysis of the disassembled bearings. Analysis was performed using micro-Raman, micro-FTIR, X-ray Photoelectron Spectroscopy (XPS), Scanning Electron Microscopy (SEM), and Size Exclusion Chromatography (SEC). In general, the three sets of bearings in each of three test stations were in very good condition after accumulating 68, 144, and 209 million cycles, respectively. Some of the bearings exhibited lubricant degradation, indicated by viscous lubricant deposits on the cage and raceways.
Author
Accelerated Life Tests; Degradation; Flight Tests; Imaging Techniques; Qualifications; Life (Durability)

20010047267 Michigan Univ., Ann Arbor, MI USA
A Rational Approach to the Design and Synthesis of Tough Glassy Polymers ***Final Report, 15 Dec. 1997-31 Dec. 2000***
Yee, Albert F.; Mar. 20, 2001; 74p; In English
Contract(s)/Grant(s): F49620-98-1-0158; AF Proj. 2303
Report No.(s): AD-A388214; AFRL-SR-BL-TR-01-0227; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche
In this work we have designed and synthesized high Tg yet ductile polymers using a building block approach. In this approach functional molecular groups that provide high Tg alternate with molecular linkages that provide mobility. Specifically molecular mobility is provided by in-chain cyclohexylene units. The existence of mobility is verified by dynamic mechanical studies, and supported by positronium annihilation studies. We discovered an unusual behavior in the three series of polymers studied wherein the higher mobility is found to be accompanied by higher Tg yet lower modulus. This observation is explained in terms of the increase in the persistence length of the polymer with increasing cyclohexylene ester content. The greater persistence length improves packing, resulting in higher Tg, while the mobility reduces interchain interaction, thus reducing modulus. This work suggests that the building block approach may allow scientists to synthesize polymers with various physical functions yet with ductility.
DTIC
Glass; Glass Transition Temperature; High Polymers

20010047608 Corps of Engineers, Washington, DC USA
Chemical Grouting (Engineering and Design). CECW-EG Engineer Manual 1110-1-3500
Jan. 31, 1995; 38p; In English
Report No.(s): PB2001-104694; EM-1110-1-3500; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy
This manual provides information and guidance for the investigation and selection of materials, equipment, and methods to be used in chemical grouting in connection with construction projects. Elements discussed include types of chemical grout materials, grouting equipment and methods, planning of chemical grouting operations, and specifications. Emphasis is placed on the unique characteristics of chemical grouts that benefit hydraulic structures. Uses of conventional portland-cement-based grouts and microfine-cement grouts are not included here, but are discussed in Engineer Manual (EM) 1110-2-3506, Grouting Technology.
NTIS
Chemical Engineering; Construction; Grout

20010047631 Surface Optics Corp., San Diego, CA USA
Amplification of Enhanced Backscattering from a Dye-Doped Polymer Bounded by a Rough Surface
Gu, Zu-Han, Surface Optics Corp., USA; Peng, G. D., New South Wales Univ., Australia; Optics Letters; Mar. 15, 2000; ISSN 0146-9592; Volume 25, No. 6, pp. 375-377; In English
Contract(s)/Grant(s): DAAD19-99-1-0321; DAAG55-98-C-0034
Report No.(s): AD-A387073; ARO-37728.6-PH; Copyright; Avail: Defense Technical Information Center (DTIC)
We report the experimental study of the enhanced backscattering from a random rough surface through a laser dye-doped polymer. The sample is a slice of pyrromethene-doped polymer coupled with a two-dimensional rough gold layer with a large slope. When the sample is illuminated with an s-polarized He-Ne laser and pumped by a CW argon-ion laser, amplified backscattering is observed. The enhanced backscattering peak increases sharply and its width narrows for a sample with low dielectric constant absolute value of epsilon(sub 2).
DTIC
Amplification; Backscattering; Dyes; Dopes; Polymers

20010048031 Federal Aviation Administration, William J. Hughes Technical Center, Atlantic City, NJ USA
Thermal Decomposition Mechanism of 2,2-Bis-(4-Hydroxy-phenyl)-1, 1-Dichloroethylene-Based Polymers ***Final Report***
Ramirez, Michael L., Federal Aviation Administration, USA; Feb. 2001; 70p; In English
Report No.(s): AD-A388306; DOT/FAA/AR-00/42; No Copyright; Avail: CASI; A01, Microfiche; A04, Hardcopy

This work has been conducted as part of the Federal Aviation Administration's (FAA) efforts to develop fire-resistant materials for commercial aircraft cabins. Polymers based on 2,2-bis-(-hydroxyphenyl)-1,1-dichloroethylene (bisphenol C, BPC) have thermal and physical properties of bisphenol-A polymers but have an order of magnitude lower heat release in flaming combustion. This is due to thermal degradation mechanism that yields only char and noncombustible gases in a fire. Two thermoplastics and one thermoset BPC-based polymer were studied to establish the decomposition mechanism of these materials. Thermal gravimetric analysis, differential scanning calorimetry, infrared spectroscopy, chromatography, and mass spectrometry were used separately and in combination to characterize the thermal degradation mechanism. Results showed that the major volatiles are hydrogen chloride (HCL) and the degradation products of the linking group. The rearrangement through stilbenes and acetylenes is responsible for the high char yield when burned.
DTIC
Thermal Decomposition; Polymers; Flame Retardants

20010048042 Dayton Univ. Research Inst., Research Inst., OH USA
Evaluation of PMB Particulate Testing ***Final Report, 17 Mar. - 20 Nov. 2000***
Barrington, David W.; Nov. 2000; 26p; In English
Contract(s)/Grant(s): F49620-00-D-0039
Report No.(s): AD-A388271; UDRI-2187-P1-02-F; AFRL-ML-WP-TR-2001-4045; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Researchers at the University of Dayton Research Institute (UDRI), acting on behalf of the Air Force Coating Technology Integration Office (CTIO), were asked to investigate several technical issues which had been reported regarding the specification for plastic media for the depainting of aircraft, MIL-P-85891A. The technical issues included the method for specific gravity determination, a reported incompatibility of the reagents called for in testing for heavy and light particulates, and some Type V (acrylic plastic) media meeting the composition requirements but failing to meet the 95 percent methylene chloride solubility requirement.
DTIC
Particulates; Protective Coatings

20010048176 NASA Marshall Space Flight Center, Huntsville, AL USA
Structure Orientation in Phthalocyanine Film Growth by Vapor Deposition in Electrical Fields
Banks, C. E., NASA Marshall Space Flight Center, USA; Zhu, S., NASA Marshall Space Flight Center, USA; Frazier, D. O., NASA Marshall Space Flight Center, USA; Penn, B. G., NASA Marshall Space Flight Center, USA; Abdeldayem, H. A., NASA Marshall Space Flight Center, USA; Sharma, A., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; Sponsored by International Society for Optical Engineering, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Films of phthalocyanines were grown by vapor deposition in an electric field on to quartz substrates coated with a very thin layer of gold or indium tin oxide and compared to films grown in the absence of an electric field. A comparison of morphology, nonlinear optical properties, and crystal structure was also made. The films were characterized using scanning electron microscopy, x-ray diffraction, and FTIR. Films grown in the absence of an electric field had a fiber like morphology and those grown in electric fields having a maximum strength of 4000 V/cm had a dense-columnar structure. The crystal structure of films grown in an electric field was different than those grown in the absence of a field.
Author
Crystal Structure; Electric Fields; Morphology; Optical Properties; Phthalocyanin; Vapor Deposition; Quartz; Thin Films

20010048683 National Academy of Sciences - National Research Council, Moffett Field, CA USA
A Network Model for the Effective Thermal Conductivity of Rigid Fibrous Refractory Insulations
Marschall, Jochen, National Academy of Sciences - National Research Council, USA; [1995]; 2p; In English; 4th ASME/JSME Thermal Engineering Joint Conference, 19-24 Mar. 1995, Lahaina, HI, USA; Sponsored by Japan Society of Mechanical Engineers, Japan
Contract(s)/Grant(s): RTOP 232-01-04; No Copyright; Avail: Issuing Activity; Abstract Only

A procedure is described for computing the effective thermal conductivity of a rigid fibrous refractory insulation. The insulation is modeled as a 3-dimensional Cartesian network of thermal conductance. The values and volume distributions of the

conductance are assigned to reflect the physical properties of the insulation, its constituent fibers, and any permeating gas. The effective thermal conductivity is computed by considering the simultaneous energy transport by solid conduction, gas conduction and radiation through a cubic volume of model insulation; thus the coupling between heat transfer modes is retained (within the simplifications inherent to the model), rather than suppressed by treating these heat transfer modes as independent. The model takes into account insulation composition, density and fiber anisotropy, as well as the geometric and material properties of the constituent fibers. A relatively good agreement, between calculated and experimentally derived thermal conductivity values, is obtained for a variety of rigid fibrous insulations.
Author
Insulation; Thermal Conductivity; Three Dimensional Models; Refractories

20010048874 Georgia Inst. of Tech., School of Materials Science and Engineering, Atlanta, GA USA
Synthesis of Intermetallics and Ceramics With Ultra-Fine Microstructures ***Final Report, 1 Jun. 1997 - 30 Nov. 2000***
Thadhani, Naresh N.; Feb. 21, 2001; 87p; In English
Contract(s)/Grant(s): DAAG55-97-1-0163
Report No.(s): AD-A388444; ARO-35591.2-MS; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The objective of our work has been to combine the beneficial effects of shock-compression of powders and solid-state structural and chemical changes for synthesis and fabrication of intermetallic alloys and ceramics with ultra-fine-grain microstructures. In particular, our research has focussed on studying the mechanisms and kinetics of shock-induced chemical reactions using simultaneous time-resolved stress and velocity measurements combined with shock recovery experiments. The possible shock-induced formation of otherwise difficult-to-synthesize carbon-nitride compounds has also been investigated. In addition, the reaction behavior of shock-compressed and subsequently activated powder mixtures has been investigated to determine its potential for synthesis of intermetallic alloys with highly refined microstructures. Finally, shock-compression has also been employed for fabrication of bulk compacts of nanocrystalline intermetallic alloys.
DTIC
Microstructure; Synthesis (Chemistry); Ceramics; Intermetallics

28
PROPELLANTS AND FUELS

Includes rocket propellants, igniters and oxidizers; their storage and handling procedures; and aircraft fuels. For nuclear fuels see 73 Nuclear Physics. For related information see also 07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, and 44 Energy Production and Conversion.

20010045665 Prins Maurits Lab. TNO, Rijswijk, Netherlands
Semi-Empirical Prediction Methods to Determine Explosion Effects, Part 1, Inventory ***Final Report***
Rhijnsburger, M. P. M., Prins Maurits Lab. TNO, Netherlands; February 2001; 35p; In English; Original contains color illustrations
Contract(s)/Grant(s): A96/D/449; TNO Proj. 014.11904
Report No.(s): TD-2000-0072; TNO-PML-2000-A70; Copyright; Avail: Issuing Activity

Semi-empirical prediction programs to calculate the effects of an explosion are available. A short description of these programs is given and an inventory of the application areas of these programs have been made by studying the manuals and some reports concerning the programs. The application areas are presented in matrices. Also a number of other semi-empirical programs, which are not available at TNO-Prins Maurits Laboratory, are described briefly.
Author
Predictions; Explosions; Shock Waves; Human Beings; Structural Members

20010047257 Army Research Lab., Human Research and Engineering Directorate, Aberdeen Proving Ground, MD USA
On Propellant Surface Temperatures Derived from Calorimetry ***Final Report, Oct. 1998-Oct. 2000***
Vanderhoff, John A.; McQuaid, Michael; Mar. 2001; 48p; In English
Contract(s)/Grant(s): Proj-622618H80
Report No.(s): AD-A388182; ARL-TR-2434; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Propellant surface temperatures for double base (JA2) and nitramine (XM39) propellant samples burning at pressures from 0.8 to 4 MPa have been measured using two different calorimetric techniques. The methods differ in the way combustion is extinguished; one involves depressurization, and the other involves burning into an inert base. For the experiments based on

depressurization, a main source of uncertainty was in determining the area of the combusting surface. Moreover, this technique was prone to a large number of unproductive runs. Most of the data presented here was obtained from experiments in which combustion was extinguished by burning into a PolyEtherEtherKetone (PEEK) base. This robust material has thermophysical properties similar to the propellants studied. At higher pressures (and mass regression rates), radiative heating made nonnegligible contributions to total heat input to the inert base. Thus, a multivariate least squares model was developed to describe a time-dependent radiative and conductive heat input, and it was used to fit the experimental temperature histories. Propellant surface temperatures, radiative fluxes, and optical absorption coefficients are obtained from the fit to the data. For the regions of low mass regression rates (less than 0.7 g/sq cm-sec), the propellant surface temperatures were in agreement with published values. At larger mass regression rates, the propellant surface temperatures were larger than published values. This was believed to be a consequence of the way contributions from radiative heating were treated.
DTIC
Calorimeters; Nitramine Propellants; Mathematical Models; Combustion

20010047293 General Electric Co., Aircraft Engines, Cincinnati, OH USA
Design, Fabrication, and Testing of an Auxiliary Cooling System for Jet Engines ***Final Report***
Leamy, Kevin, General Electric Co., USA; Griffiths, Jim, General Electric Co., USA; Andersen, Paul, Honeywell Aerospace, USA; Joco, Fidel, Honeywell Aerospace, USA; Laski, Mark, Honeywell Aerospace, USA; January 2001; 190p; In English; Original contains color illustrations
Contract(s)/Grant(s): NAS3-27395; RTOP 529-40-14
Report No.(s): NASA/CR-2001-210353; NAS 1.26:210353; E-12402; R2000AE114; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

This report summarizes the technical effort of the Active Cooling for Enhanced Performance (ACEP) program sponsored by NASA. It covers the design, fabrication, and integrated systems testing of a jet engine auxiliary cooling system, or turbocooler, that significantly extends the use of conventional jet fuel as a heat sink. The turbocooler is designed to provide subcooled cooling air to the engine exhaust nozzle system or engine hot section. The turbocooler consists of three primary components: (1) a high-temperature air cycle machine driven by engine compressor discharge air, (2) a fuel/ air heat exchanger that transfers energy from the hot air to the fuel and uses a coating to mitigate fuel deposits, and (3) a high-temperature fuel injection system. The details of the turbocooler component designs and results of the integrated systems testing are documented. Industry Version-Data and information deemed subject to Limited Rights restrictions are omitted from this document.
Author
Design Analysis; Fabrication; Performance Tests; Jet Engines; Cooling Systems; Exhaust Nozzles

20010047615 Energy Information Administration, Office of Energy Markets and End Use, Washington, DC USA
International Energy Annual, 1999
Feb. 2001; 256p; In English
Report No.(s): PB2001-104658; DOE/EIA-0219(99); No Copyright; Avail: National Technical Information Service (NTIS)

The report presents an overview of key international energy trends for production, consumption, imports, and exports of primary energy commodities in over 220 countries, dependencies, and areas of special sovereignty. Also included are population and gross domestic product data, as well as prices for crude oil and petroleum products in selected countries. Renewable energy sources reported in the International Energy Annual 1999 include hydroelectric power and geothermal, solar, wind, and wood and waste electric power. Also included for the USA are geothermal, solar, and wood and waste energy not used for electricity generation. This report is published to keep the public and other interested parties fully informed of primary energy supplies on a global basis. The data presented have been largely derived from published sources. The data have been converted to units of measurement and thermal values (Appendices E and F) familiar to the American public.
NTIS
Energy Consumption; International Trade; Hydroelectricity

20010048913 Idaho Univ., Moscow, ID USA
Role of Clostridial Reducing Power in Nitroaryl Compound Degradation ***Final Report, 15 Aug. 1997 - 14 Aug. 2000***
Crawford, Ronald, Idaho Univ., USA; Jan. 18, 2001; 4p; In English
Contract(s)/Grant(s): F49620-97-1-0409
Report No.(s): AD-A387135; AFRL-SR-BL-TR-01-0104; No Copyright; Avail: CASI; A01, Microfiche; A01, Hardcopy

Biological remediation of pollutants in soils and groundwater is often desirable due to its relative low cost and effectiveness compared to other treatment technologies. Nitroaromatic compounds such as TNT are resistant to biological oxidation due to the

electrophilic nature of the nitro groups and their subsequent stabilization of the aromatic ring. In the past 25 years numerous studies have researched methods to bioremediate TNT-contaminated soils and waters. These methods include composting, aerobic slurry reactors, in situ stimulation, anaerobic reactors, and studies with pure strains of aerobic and anaerobic bacteria and fungi. Most of these studies have shown that in addition to the productive degradation of TNT, many reactions occur in which partially degraded metabolites of TNT condense and become more recalcitrant than the parent molecule. Recent research on pure strains of aerobic bacteria that use TNT as a nitrogen source has shown, unfortunately, that non-productive reactions (reduction) compete with productive (denitration) reactions during growth on TNT as a sole nitrogen source. We have characterized an aerobic bacterium, which was isolated from a TNT-contaminated site in Armenia. This isolate grows in minimal media with TNT as a sole nitrogen source. A greater understanding of the genes, which catalyze the initial steps of productive TNT metabolism may lead to the construction of hybrids that can degrade TNT in a more efficient manner.
Author
Aerobes; Bacteria; Degradation; Trinitrotoluene

29
SPACE PROCESSING

Includes space-based development of materials, compounds, and processes for research or commercial application. Also includes the development of materials and compounds in simulated reduced-gravity environments. For legal aspects of space commercialization see 84 Law, Political Science and Space Policy.

20010045530 NASA Ames Research Center, Moffett Field, CA USA
A Microgravity Helium Dilution Cooler
Roach, Pat R., NASA Ames Research Center, USA; [1994]; 1p; In English; 1994 Microgravity Low-Temperature Physics Workshop, 19-21 Jan., 1994, Washington, DC, USA
Contract(s)/Grant(s): RTOP 582-04-11; No Copyright; Avail: Issuing Activity; Abstract Only

We are developing a He-3-He-4 dilution cooler to operate in microgravity. It uses charcoal adsorption pumps and heaters for its operation; it has no moving parts. It currently operates cyclically to well below 0.1 K and we have designed a version to operate continuously. We expect that the continuous version will be able to provide the long-duration cooling that many experiments need at temperatures down to 0.040 K. More importantly, such a dilution cooler could provide the precooling that enables the use of adiabatic demagnetization techniques that can reach temperatures below 0.001 K. At temperatures below 0.002 K many fascinating microgravity experiments on superfluid He-3 become possible. Among the possibilities are: research into a superfluid He-3 gyroscope, study of the nucleation of the B-phase of superfluid He-3 when the sample is floating out of contact with walls, study of the anisotropy of the surface tension of the B-phase, and NMR experiments on tiny free-floating clusters of superfluid He-3 atoms that should model the shell structure of nuclei.
Author
Helium Isotopes; Dilution; Coolers; Superfluidity

31
ENGINEERING (GENERAL)

Includes general research topics to engineering and applied physics, and particular areas of vacuum technology, industrial engineering, cryogenics, and fire prevention. For specific topics in engineering see categories 32 through 39.

20010046478 Creare, Inc., Hanover, NH USA
A Low Temperature, Reverse Brayton Cryocooler ***Monthly Report, 1-30 Apr. 2001***
Swift, Walter L., Creare, Inc., USA; May 17, 2001; 9p; In English
Contract(s)/Grant(s): NAS5-97027; Proj. 8141
Report No.(s): Creare-52; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This status report covers the fifty-second month of a project to develop a low temperature, reverse-Brayton cryocooler using turbomachines. This program consists of a Basic Phase and four Option Phases. Each of the Phases is directed to a particular load/temperature combination. The technology and fundamental design features of the components used in these systems are related but differ somewhat in size, speed, and some details in physical geometry. Each of the Phases can be carried out independently of the others, except that all of the Phases rely on the technology developed and demonstrated during the Basic Phase. The Basic Phase includes the demonstration of a critical component and the production of a prototype model cryocooler.

The critical technology demonstration will be the test of a small turboalternator over a range of conditions at temperatures down to 6 K. These tests will provide design verification data useful for the further design of the other coolers. The prototype model cooler will be designed to provide at least 5 mW of cooling at 6 K. The heat rejection temperature for this requirement is 220 K or greater. The input power to the system at these conditions is to be less than 60 W.
Author
Brayton Cycle; Coolers; Cryogenic Cooling; Prototypes; Proving

20010046957 NASA Marshall Space Flight Center, Huntsville, AL USA
Innovative Method for Developing a Helium Pressurant Tank Suitable for the Upper Stage Flight Experiment
DeLay, Tom K., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; AIAA Conference, 28 Aug. 2001, Albuquerque, NM, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The AFRL USFE project is an experimental test bed for new propulsion technologies. It will utilize ambient temperature fuel and oxidizers (Kerosene and Hydrogen peroxide). The system is pressure fed, not pump fed, and will utilize a helium pressurant tank to drive the system. Mr. DeLay has developed a method for cost effectively producing a unique, large pressurant tank that is not commercially available. The pressure vessel is a layered composite structure with an electroformed metallic permeation barrier. The design/process is scalable and easily adaptable to different configurations with minimal cost in tooling development 1/3 scale tanks have already been fabricated and are scheduled for testing. The full-scale pressure vessel (50” diameter) design will be refined based on the performance of the sub-scale tank. The pressure vessels have been designed to operate at 6,000 psi. a PV/W of 1.92 million is anticipated.
Author
Helium; Upper Stage Rocket Engines; Pressure Vessel Design

20010046987 Computer Sciences Corp., Moffett Field, CA USA
3-D Unsteady Flow Visualization in Computational Fluid Dynamics
Lane, David A., Computer Sciences Corp., USA; [1994]; 2p; Repr. from Visualization of TIme-Dependent Flow Fields Proceedings of Visualization October 1993 (San Jose) p 32-38; In English; Dagstiuhl Seminar on Scientific Visualization, 22-27 May 1994, Saarbrucken, Germany
Contract(s)/Grant(s): RTOP 536-01-11; No Copyright; Avail: Issuing Activity; Abstract Only

Presently, there are very few visualization systems available for time-dependent flow fields. Although existing visualization systems for instantaneous flow fields may be used to view time-dependent flow fields at discrete points in time, the time variable is usually not considered in the visualization technique. A simple and effective approach for visualizing time-dependent flow fields using streaklines is presented. Some results from this approach are shown.
Derived from text
Computational Fluid Dynamics; Unsteady Flow; Flow Visualization; Flow Distribution; Time Dependence

20010047005 NASA Ames Research Center, Moffett Field, CA USA
Modeling Thermal Contact Resistance
Kittel, Peter, NASA Ames Research Center, USA; [1994]; 1p; In English; 8th; International Cryocooler Conference, 28-30 Jun. 1994, Colorado, USA
Contract(s)/Grant(s): RTOP 233-02-05-03; No Copyright; Avail: Issuing Activity; Abstract Only

One difficulty in using cryocoolers is making good thermal contact between the cooler and the instrument being cooled. The connection is often made through a bolted joint. The temperature drop associated with this joint has been the subject of many experimental and theoretical studies. The low temperature behavior of dry joints have shown some anomalous dependence on the surface condition of the mating parts. There is also some doubts on how well one can extrapolate from the test samples to predicting the performance of a real system. Both finite element and analytic models of a simple contact system have been developed. The model assumes (a) the contact is dry (contact limited to a small portion of the total available area and the spaces in-between the actual contact patches are perfect insulators), (b) contacts are clean (conductivity of the actual contact is the same as the bulk), (c) small temperature gradients (the bulk conductance may be assumed to be temperature independent), (d) the absolute temperature is low (thermal radiation effects are ignored), and (e) the dimensions of the nominal contact area are small compared to the thickness of the bulk material (the contact effects are localized near the contact). The models show that in the limit of actual contact area much less than the nominal area (a much less than A), that the excess temperature drop due to a single point of contact scales as a(exp -1/2). This disturbance only extends a distance approx. A(exp 1/2) into the bulk material. A group of identical

contacts will result in an excess temperature drop that scales as n(exp -1/2), where n is the number of contacts and n dot a is constant. This implies that flat rough surfaces will have a lower excess temperature drop than flat polished surfaces.
Author
Cryogenic Cooling; Bolted Joints; Thermal Resistance; Electric Contacts; Temperature Gradients; Semiconductors (Materials)

20010047391 NASA Glenn Research Center, Cleveland, OH USA
A Comprehensive C++ Controller for a Magnetically Supported Vertical Rotor, 1.0
Morrison, Carlos R., NASA Glenn Research Center, USA; April 2001; 132p; In English; Original contains color illustrations
Contract(s)/Grant(s): RTOP 708-28-13
Report No.(s): NASA/TM-2001-210701; E-12632; NAS 1.15:210701; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

This manual describes the new FATMaCC (Five-Axis, Three-Magnetic-Bearing Control Code). The FATMaCC (pronounced ”fat mak”) is a versatile control code that possesses many desirable features that were not available in previous in-house controllers. The ultimate goal in designing this code was to achieve full rotor levitation and control at a loop time of 50 microsec. Using a 1-GHz processor, the code will control a five-axis system in either a decentralized or a more elegant centralized (modal control) mode at a loop time of 56 microsec. In addition, it will levitate and control (with only minor modification to the input/output wiring) a two-axis and/or a four-axis system. Stable rotor levitation and control of any of the systems mentioned above are accomplished through appropriate key presses to modify parameters, such as stiffness, damping, and bias. A signal generation block provides 11 excitation signals. An excitation signal is then superimposed on the radial bearing x- and y-control signals, thus producing a resultant force vector. by modulating the signals on the bearing x- and y-axes with a cosine and a sine function, respectively, a radial excitation force vector is made to rotate 360 deg. about the bearing geometric center. The rotation of the force vector is achieved manually by using key press or automatically by engaging the ”one-per-revolution” feature. Rotor rigid body modes can be excited by using the excitation module. Depending on the polarities of the excitation signal in each radial bearing, the bounce or tilt mode will be excited.
Author
C++ (Programming Language); Controllers; Directional Control; Rotors

20010048403 NASA Glenn Research Center, Cleveland, OH USA
Research and Technology 2000, *FY 2000*
March 2001; 222p; In English
Report No.(s): NASA/TM-2001-210605; E-12565; NAS 1.15:210605; No Copyright; Avail: CASI; A10, Hardcopy; A03, Microfiche

This report selectively summarizes the NASA Glenn Research Center’s research and technology accomplishments for the fiscal year 2000. It comprises 138 short articles submitted by staff scientists and engineers. The report is organized into five major sections: Aeronautics, Research and Technology, Space, Engineering and Technical Services, and Commercial Technology, a table of contents and an author index have been developed to assist readers in finding articles of special interest. This report is not intended to be a comprehensive summary of all the research and technology work done over the past fiscal year. Most of the work is reported in Glenn-published technical reports, journal articles, and presentations prepared by Glenn staff and contractors. In addition, university grants have enabled faculty members and graduate students to engage in sponsored research that was reported at technical meetings or in journal articles. For each article in this report, a Glenn contact person has been identified, and where possible, reference documents are listed so that additional information can be easily obtained. The diversity of topics attests to the breadth of research and technology being pursued and to the skill mix of the staff that makes it possible. For more information about research at NASA Glenn, visit us on the World Wide Web (http://www.grc.nasa.gov). This document is available online (http://www.grc.nasa.gov/WWW/RT). For publicly available reports, visit the Glenn Technical Report Server (http://gltrs.gre.nasa.gov/GLTRS).
Author
Research and Development; Aeronautical Engineering; Technology Utilization

20010048848 Navy Office of Safety and Survivability, USA
Comprehensive HUMS (CHUMS)
Healing, Richard F., Navy Office of Safety and Survivability, USA; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 95; In English; See also 20010048829; Copyright; Abstract Only; Available from CASI only as part of the entire parent document

Military aviation demands a high standard of excellence. Excellence equals full mission performance, without injury or loss. Safety equals no injury, no loss. Therefore, excellence is full mission performance, plus safety. Health and Usage Monitoring Systems (HUMS) and FOQA have clearly saved immeasurable dollars and lives in the commercial world. Now is the time for the military to leverage the technologies which created the commercial success to implement a Comprehensive HUMS (CHUMS) and MFOQA system that will reduce mishaps, generate savings, and improve operational readiness and quality of life.
Author
Safety; Systems Health Monitoring

20010048850 Defence Science and Technology Organisation, Aeronautical and Maritime Research Lab., Melbourne, Australia
Using Econometric Modelling to Determine and Demonstrate HUMS Affordability
Forsyth, Graham F., Defence Science and Technology Organisation, Australia; Dutton, Scott A., Defence Science and Technology Organisation, Australia; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 97-98; In English; See also 20010048829; Copyright; Abstract Only; Available from CASI only as part of the entire parent document

Between 1992 and 1996, staff from the Australian Defense Science and Technology Organization (DSTO) provided technical support to an Australian Defense Working Party on helicopter health and usage monitoring. Although technical data on such systems was available, information on financial aspects proved harder to obtain and even harder to interpret when it was obtained. As a result, one of the documents produced for the working party described a set of equations to model the financial impact, expressed in terms of discounted cash flows, of all the perceived costs and benefits of such systems. This model was then implemented in software as a program known as HUMSSAVE. The current version of HUMSSAVE (Version 3, release 2) runs on any windows platform. Additional information is contained in the original extended abstract.
Author
Systems Health Monitoring; Computer Programs

20010048892 RECOM Technologies, Inc., Moffett Field, CA USA
Scope and Abstraction: Two Criteria for Localized Planning
Lansky, Amy L., RECOM Technologies, Inc., USA; Getoor, Lise C., RECOM Technologies, Inc., USA; [1994]; 1p; In English; AAAI'94 12th National Confernce on Artificial Intelligence, 31 Jul. - 4 Aug. 1994, Seattle, WA, USA
Contract(s)/Grant(s): RTOP 233-01-02; No Copyright; Avail: Issuing Activity; Abstract Only

Localization is a general-purpose representational technique for partitioning problem requirements into subproblems. Localized search utilizes a partitioning by breaking the overall search space into several smaller search spaces, one for each subproblem. Unlike most methods of partitioning, localization allows for subproblems that overlap -- i.e., multiple search spaces may be involved in constructing shared pieces of the overall plan. In this paper we focus on two criteria for forming localizations: abstraction and scope. Abstraction-based localizations are motivated by activation relationships between problem requirements. In contrast, scope-based localizations are motivated by the relevance of problem requirements to specific portions of the overall plan. This paper also describes a method for automatically generating scope and abstraction-based localizations. Empirical results are provided that contrast their use in an office-building construction planning domain.
Author
Artificial Intelligence; Problem Solving

32
COMMUNICATIONS AND RADAR

Includes radar; radio, wire, and optical communications; land and global communications; communications theory. For related information see also 04 Aircraft Communications and Navigation; and 17 Space Communications, Spacecraft Communications, Command and Tracking; for search and rescue see 03 Air Transportation and Safety, and 16 Space Transportation and Safety.

20010044349 Texas Univ., Dept. of Electrical and Computer Engineering, Austin, TX USA
AM-FM Analysis of Images and Video *Final Report, 1997-2000*
Bovik, Alan C.; Jan. 2000; 4p; In English
Contract(s)/Grant(s): F49620-97-1-0392
Report No.(s): AD-A387431; AFRL-SR-BL-TR-01-0143; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Our research has focused on the application of recently-developed AM-FM models to practical problems in image processing and analysis. We have been emphasizing three directions: (1) FM-Based Image Compresssion (2) Multicomponent AM-FM Signal Representations (3) AM-FM Image Synthesis Using Reaction-Diffusion Equations.
DTIC
Image Processing; Radio Signals

20010045667 Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Technische Menskunde, Soesterberg, Netherlands
Hearing Protection and Speech Intelligibility in the Royal Netherlands Airforces: a Review of Advices Given in Recent Years ***Final Report Gehoorbescherming en Spraakverstaanbaarheid bij de Koninklijke Luchtmacht: Een Overzicht van Eerder Gegeven Adviezen***
deGraaf, B., Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Netherlands; vanWijngaarden, S. J., Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Netherlands; Feb. 22, 2001; 13p; In Dutch; Original contains color illustrations
Contract(s)/Grant(s): 30311; TNO Proj. 786.4
Report No.(s): TD-2000-0357; TNO-TM-01-A014; Copyright; Avail: Issuing Activity
The advice which has been given to the Royal Netherlands Airforce in recent years, concerning the hearing protection and speech intelligibility, is summarized and put in order. It appears that there is not a single solution exists which is sound for all aircraft types. Several alternatives (wireless Communications Earplugs, Active Noise Reduction) are being discussed.
Author
Hearing; Protection; Speech; Voice Communication; Intelligibility

20010045711 Institute for Human Factors TNO, Soesterberg, Netherlands
Development of a Speech Communicability Test ***Final Report***
vanWijngaarden, S. J., Institute for Human Factors TNO, Netherlands; Smeele, P. M. T., Institute for Human Factors TNO, Netherlands; Pennings, J. M., Institute for Human Factors TNO, Netherlands; Feb. 09, 2001; 32p; In English; Original contains color illustrations
Contract(s)/Grant(s): 29314; TNO Proj. 786.4
Report No.(s): TD-2000-0352; TNO-TM-01-A010; Copyright; Avail: Issuing Activity
Methods to test the performance of communication systems in real time are known as speech communicability test methods. The term speech communicability is used to indicate both the objective performance of systems (efficiency of speech communication) and subjective experience (acceptability). Most known methods to test speech communicability are based on either subjective or objective measures, but not both; moreover, they generally do not offer possibilities to test for the influence of context (for example: communication of digits vs. free conversation). Upon assignment by the Royal Netherlands Navy, an improved speech communicability test method was developed by TNO Human Factors. Based on the existing literature on communicability testing, a list of requirements for the design of a now type of communicability test was made. A new type of communicability test was implemented with all of these requirements in mind, and a pilot experiment was carried out. The communicability test design proved effective in measuring both efficiency (objective) and acceptability (subjective) of real-time communication channels. The acceptability aspect was found to depend strongly on the level of background noise, but not on the transmission delay. For the efficiency aspect, the opposite result was found: there was a clear effect of delay, but (in the absence of delay) not of the level of background noise. At a roundtrip delay time of 1600 ms, an effect of background noise on efficiency was measurable. Compensation strategies (such as the Lombard effect and more careful articulation) may explain why the effect of noise on communication efficiency remains small. From the results of the pilot experiment, the chosen communicability test design (with a task based on the card game 'Black Jack") may be concluded to meet the list of requirements.
Author
Speech; Human Factors Engineering; Telecommunication

20010045829 State Univ. of New York, Stony Brook, NY USA
Study of Wave Dynamics in the MLT Region Using the UARS Measurements ***Final Report***
Yudin, Valery A., State Univ. of New York, USA; Geller, Marvin A., State Univ. of New York, USA; [2001]; 5p; In English
Contract(s)/Grant(s): NAG5-7134; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche
We have received funding for a three-year effort to develop techniques and models for analysis of UARS wind and temperature observations in the mesosphere and lower thermosphere (MLT) region. The developed methodology and models provide the means to analyze the thermal tides and their influence on the day and nighttime airglow diurnal variations in the MLT

region observed by the HRDI and WINDII instruments on board UARS. Major scientific results from this investigation are outlined in the following.
Author
Atmospheric Temperature; Diurnal Variations; Mesosphere; Thermosphere; Wind (Meteorology)

20010046070 NASA Ames Research Center, Moffett Field, CA USA
A Semianalytical Ion Current Model for Radio Frequency Driven Collisionless Sheaths
Bose, Deepak, Eloret Corp., USA; Govindan, T. R., NASA Ames Research Center, USA; Meyyappan, M., NASA Ames Research Center, USA; [2001]; 32p; In English
Contract(s)/Grant(s): NAS2-99092; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We propose a semianalytical ion dynamics model for a collisionless radio frequency biased sheath. The model uses bulk plasma conditions and electrode boundary condition to predict ion impact energy distribution and electrical properties of the sheath. The proposed model accounts for ion inertia and ion current modulation at bias frequencies that are of the same order of magnitude as the ion plasma frequency. A relaxation equation for ion current oscillations is derived which is coupled with a damped potential equation in order to model ion inertia effects. We find that inclusion of ion current modulation in the sheath model shows marked improvements in the predictions of sheath electrical properties and ion energy distribution function.
Author
Mathematical Models; Ion Currents; Radio Frequencies; Collisionless Plasmas; Plasma Sheaths

20010046994 Iowa Univ., Dept. of Physics and Astronomy, Iowa City, IA USA
A Minimal Radio and Plasma Wave Investigation For a Mercury Orbiter Mission ***Final Report, 1 Apr. 1997 - 31 Mar. 2000***
Kurth, W. S., Iowa Univ., USA; April 2001; 5p; In English
Contract(s)/Grant(s): NAG5-4581; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The primary thrust of the effort at The University of Iowa for the definition of an orbiter mission to Mercury is a minimum viable radio and plasma wave investigation. While it is simple to add sensors and capability to any payload, the challenge is to do reasonable science within limited resources; and viable missions to Mercury are especially limited in payload mass. For a wave investigation, this is a serious concern, as the sensor mass often makes up a significant fraction of the instrumentation mass.
Author
Mercury (Planet); Radio Waves; Space Missions; Plasma Waves

20010047055 Military Technical Academy, Bucharest , Romania
Using of Fault Tolerant Distributed Clusters in the Field of Command and Control Systems
Aurel, Serb, Military Technical Academy, Romania; Valeriu, Patriciu Victor, Military Technical Academy, Romania; New Information Processing Techniques for Military Systems; April 2001, pp. 12-1 - 12-10; In English; See also 20010047042; Copyright Waived; Avail: CASI; A02, Hardcopy

The open and distributed systems, that are the most important systems used in the field of command and control systems, must never fail. But only ideal system would be perfectly reliable and never fail. Fault tolerance is the best guarantee that high-confidence systems will not succumb to physical, design, or human-machine interaction faults. A fault tolerant system is one that can continue to operate reliably by producing acceptable outputs in spite of occasional occurrences of component failures, A fault tolerant cluster is a cluster with a set of independent nodes, connected over a network and always with external storage devices connected to the nodes on a common input/output bus. The cluster software is a layer that runs on top of local operating systems running on each computer. Clients are connected over the networks to a server application that is executing on the nodes. The nodes of a cluster are connected in a loosely coupled manner, each maintaining its own separate processors, memory, and operating system. Special communications protocols and system processes bind these nodes together and allow them to cooperate to provide outstanding levels of availability and flexibility for supporting mission critical applications. One of the most important problems in implementing fault tolerant system is the identification of single points of failure and elimination of these single points of failure by using replaceable units. When a component becomes unavailable, fault tolerant cluster software detects the loss and shifts that component's workload to another component in the cluster. The failure recovery is done automatically, without any human intervention. The need for interoperability between the M&S world and the Command and Control world has been formulated in several publications. The challenge even increases when NATO and PfP Nations demands to train using their own simulation systems as well as their own command and control systems. The key issue for the Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C41SR) community is the interoperability between live or real C41SR systems and modeling and simulation systems. Today, some of the architectural key words that are in common in the modem command and control systems and fault tolerant systems are the following: Open and distributed

systems; Networks; High level operating systems; Hierarchical architecture; Interoperability and reusability; High availability systems.
Author
Fault Tolerance; Failure Analysis; Computer Networks; Cluster Analysis; Data Mining

20010047059 SACLANT Undersea Research Centre, La Spezia, Italy
Wireless Tactical Networks in Support of Undersea Research
Berni, Alessandro, SACLANT Undersea Research Centre, Italy; Mozzone, Lorenzo, SACLANT Undersea Research Centre, Italy; New Information Processing Techniques for Military Systems; April 2001, pp. 16-1 - 16-9; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A02, Hardcopy

Emerging concepts for Anti-Submarine Warfare (ASW) and Rapid Environmental Assessment (REA) increasingly rely on communication technology, in order to implement distributed information networks and to exchange information between naval units and military commands ashore. The necessary communication links could be accomplished using a variety of solutions: our main focus is on radio frequency (RF) links, which offer easy deployment and flexible operations. Requirements (such as transmission data rate) change from one specific application to another. There are however a number of prerequisites that are shared by all applications and users: they include, but are not limited to, reliability, availability and security. The biggest challenge derives from the fact that those requirements are countered by either natural factors, such as thermal noise and multipath interference, or by hostile activity aimed at disrupting the integrity of the lines of communication. This document illustrates how spread-spectrum techniques can be adopted to substitute and enhance existing communications systems, to permit the deployment of distributed, scalable networks of ships and sensors, characterized by reliable performance (resistance to hostile jamming and environmental interference) and low probability of interception. An overview of real applications in ASW and REA is presented.
Author
Telecommunication; Multipath Transmission; Communication Networks; Radio Frequencies; Spread Spectrum Transmission

20010047060 Space and Naval Warfare Systems Command, Acoustics Branch, San Diego, CA USA
Telesonar Signaling and Seaweb Underwater Wireless Networks
Rice, J. A., Space and Naval Warfare Systems Command, USA; New Information Processing Techniques for Military Systems; April 2001, pp. 17-1 - 17-13; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A03, Hardcopy

Seawebs ’98, ’99, and 2000 are experiments incrementally advancing telesonar underwater acoustic signaling and ranging technology for undersea wireless networks. The constraints imposed by acoustic transmission through shallow-water channels have yielded channel-tolerant signaling methods, hybrid multi-user access strategies, novel network topologies, half-duplex handshake protocols, and iterative power-control techniques. Seawebs ’98 and ’99 respectively included 10 and 15 battery-powered, anchored telesonar nodes organized as noncentralized bi-directional networks. These tests demonstrated the feasibility of battery-powered, wide-area undersea networks linked via radio gateway buoy to the terrestrial internet. Testing involved delivery of remotely sensed data from the sea and remote control from manned command centers ashore and afloat. Seaweb 2000 introduces new telesonar modem hardware and a compact protocol for advanced network development. Sublinks ’98, ’99, and 2000 are parallel experiments that extend Seaweb networking to include a submerged submarine as a mobile gateway node.
Author
Underwater Acoustics; Control Systems Design; Acoustic Propagation; Sound Transmission; Remote Sensing

20010047061 Scientific and Technical Research Council of Turkey, Kocaeli, Turkey
The Turkish Narrow Band Voice Coding and Noise Pre-Processing NATO Candidate
Kondoz, Ahmet, Scientific and Technical Research Council of Turkey, Turkey; Palaz, Hasan, Scientific and Technical Research Council of Turkey, Turkey; New Information Processing Techniques for Military Systems; April 2001, pp. 18-1 - 18-5; In English; See also 20010047042; Copyright Waived; Avail: CASI; A01, Hardcopy

Robust and low power communication systems are essential for battle field environment in military communication which require bit rates below 4.8kb/s. In order to benefit from the new advances in speech coding technologies and hence upgrade its communication systems, the NATO has been planning to select a speech coding algorithm with its noise pre-processor. In this paper we describe a speech coder which is capable of operating at both 2.4 and 1.2kb/s, and produce good quality synthesized speech. This coder will form the basis of the Turkish candidate which is one of the three competing. The rate of the coder can be switched from 2.4kb/s to 1.2kb/s by increasing the frame length for parameter quantisation from 20ms to 60ms. Both rates use the same analysis and synthesis building blocks over 20ms. Reliable pitch estimation and very elaborate voiced/unvoiced mixture

determination algorithms render the coder robust to background noise. However in order to communicate in very severe noisy conditions a noise pre-processor has been integrated within the speech encoder.
Author
Telecommunication; Narrowband; Voice Data Processing; Coders

20010047062 SACLANT Undersea Research Centre, La Spezia, Italy
Data Communication and Data Fusion in Rapid Environmental Assessment: State of the Art
Trangeled, Alex, SACLANT Undersea Research Centre, Italy; Vink, Frederik H., SACLANT Undersea Research Centre, Italy; Berni, Alessandro, SACLANT Undersea Research Centre, Italy; New Information Processing Techniques for Military Systems; April 2001, pp. 19-1 - 19-8; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A02, Hardcopy

In the evolving world of international security, NATO faces new challenges. In early 1990's the Alliance studied the new security situation and revised its strategically concept. Future conflicts will occur in a wider area of interest with lower intensity and on a regional scale; the area of operation is in many aspects unknown. An active effort is necessary to be able to combat future threats. The mission of the SACLANT Undersea Research Centre (SACLANTCEN), based in La Spezia, Italy, is to conduct research in support of NATO's maritime operational requirements. Considerable efforts are being made to identify and counter the threats related to underwater warfare. SACLANTCEN performs operations research and analysis, research and development in the field of Anti Submarine Warfare (ASW), Mine Counter Measures (MCM) and Military Oceanography MILOC), Rapid Environmental Assessment (REA) is one of the five thrust areas of SACLANTCEN's Scientific Programme of Work (SPOW). The goal of the Centre's REA program is to research methods for providing warfighters and planners with tactical relevant information in a tactical relevant timeframe. This document concentrates on the technological aspects of data processing, fusion and transmission, illustrating the evolution of the techniques adopted and their innovative impact on MILOC activities.
Author
Data Transmission; Data Processing; Security; Operations Research; Multisensor Fusion

20010047272 Air Force Research Lab., Propulsion Directorate, Wright-Patterson AFB, OH USA
Analysis of Simulated Aircraft Lightning Strikes and Their Electromagnetic Effects ***Final Report, Jul. 1995-Jul. 1997***
Gruden, James M.; Walko, Lawrence C.; Schweickart, Daniel L.; Horwath, John C.; Webb, Gary L.; Feb. 2001; 28p; In English
Contract(s)/Grant(s): Proj-3145
Report No.(s): AD-A388234; AFRL-PR-WP-TR-2001-2024; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

To survive the intense electromagnetic fields associated with a lightning strike, proper design of aircraft electrical control systems requires knowledge of the transient current pulse associated with a lightning strike. This report summarizes in-house testing of low-level (less than 20 kA) current pulses on a 32-foot long aluminum cylinder simulating an aircraft fuselage. The test circuit consists of a capacitor bank, the aluminum cylinder and a coaxial return path of 16 wires that reconnects the end of the cylinder to the capacitor bank. Areas of investigation included magnetic field mapping along various areas of the cylinder, with and without access panels, as well as different panel materials. The effects on circuits internal to the cylinder are also evaluated. Using a magnetic field loop sensor, three-dimensional magnetic field plots are generated that depict how the magnetic field along the surface of the cylinder is distorted when it approaches an opening (access panel removed) along the surface of the cylinder. These plots identity the critical locations of the peak magnetic fields. Diffusion effects are also evaluated as the opening is relocated toward the end of the cylinder. Finally, induced currents on circuits internal to the cylinder are recorded and measured. DTIC
Simulators; Magnetic Fields; Lightning; Electricity; Electric Current

20010047273 Harvard Univ., Div. of Engineering and Applied Sciences, Cambridge, MA USA
Optimization and Applications of Discrete Event and Hybrid Dynamic Systems
Ho, Yu-Chi; Jan. 1998; 10p; In English
Contract(s)/Grant(s): F49620-95-1-0131
Report No.(s): AD-A388240; AFRL-SR-BL-TR-01-0238; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This is the final report of F49620-95-1-0131 which ended on 12/31/97. Our motivation for the work reported here is the need for effective design, analysis, and optimization techniques for large, complex, stochastic Discrete Event Dynamic Systems (D, EDS). DEDS are typified by communication networks, manufacturing, computer, C41, traffic and other systems governed by human-made rules and clearly important in all aspects of modern technology. The two major research thrusts of this effort are: New approaches to optimization specifically aimed at the problem of large search spaces that lack analytical structure. New ways

to simulate DEDS in concurrent or parallel fashion that will speed up our ability to design and analyze their performance and that are naturally matched to emerging parallel computing capabilities and software paradigms such as object-oriented programming.
DTIC
Optimization; Dynamical Systems; Software Engineering; Computer Programs; Object-Oriented Programming

20010047289 Bevilacqua Research Corp., Huntsville, AL USA
A Dialectic Approach to Moving Target Indicator (MTI) Correlation ***Final Report, 27 May 1999 - 26 Feb. 2001***
Skipper, David J., Bevilacqua Research Corp., USA; Feb. 26, 2001; 21p; In English
Contract(s)/Grant(s): F19628-98-C-0042
Report No.(s): AD-A387718; BRC-TR-00400-01-003; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

The problem examined by this research is tracking, with low update rates, on ground vehicles. Tracking solely by statistical prediction is inadequate for infrequently observed targets that exhibit non-deterministic behavior. The approach used here is to assume non-deterministic but rationale behavior will govern the targets. The method used to track is then to estimate the rationale behind the tracking by modeling that rationale using sophisticated knowledge modeling techniques. This report contains the additional results of the second year of research on moving target tracking of non-deterministic targets using low update rates for the observations. The first year's effort centered on building the structured needed for tracking. The original intent was that the basic structure was ready to receive the knowledge needed for tracking at the end of the first year and that knowledge would be installed during the second year. A lack of data sets made that impossible, so the second year, in the end, focused on technical improvements in the system.
Author
Prediction Analysis Techniques; Targets; Tracking (Position)

20010047584 Army Command and General Staff Coll., Fort Leavenworth, KS USA
Medium Brigade 2003: Can Space-Based Communications Ensure Information Dominance?
Viall, Kenneth E.; Jan. 01, 2000; 118p; In English
Report No.(s): AD-A388156; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

This thesis analyzes space-based communications support for medium brigade combat team forces over the next three years. The army's reaction to changes in the national security environment and increased technology as outlined in Joint Vision 2010 has been to pursue digitization of the force and develop a new, Medium Weight brigade--rapidly deployable, reliant on high-capacity information architecture, and capable of early entry and stability and support operations. The study examined the role of satellite communications in the objective command and control system that considered the nature of the higher headquarters, adjacent units, and internal brigade requirements. Using the proposed Initial Brigade Combat Team concept, the study reviewed task organization, signal support structure, bandwidth requirements, and the operational employment of satellite communications assets during Operation Restore Hope, Somalia; Operation Uphold Democracy, Haiti; and Operation Joint Endeavor, Bosnia-Hercegovina. The study concluded that space-based communications will remain pivotal to successful command and control and projected signal organizations and equipment of the medium brigade can provide effective support. However, the army must address shortfalls in national satellite infrastructure, reconcile task organization difficulties, and integrate digitization efforts to effectively manage available communications capacities.
DTIC
Satellite Communication; Armed Forces (USA); Military Operations

20010047773 Connecticut Univ., Storrs, CT USA
Signal Processing and Fault Detection with Application to CH-46 Helicopter Data
Wen, Fang, Connecticut Univ., USA; Willett, Peter, Connecticut Univ., USA; Deb, Somnath, Qualtech Systems, Inc., USA; [2000]; 13p; In English; IEEE Aerospace Conference, 15-18 Mar. 2000, Big Sky, MT, USA; Sponsored by Institute of Electrical and Electronics Engineers, USA
Contract(s)/Grant(s): DAAG55-98-C-0057; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Central to Qualtech Systems' mission is its testability and maintenance software (TEAMS) and derivatives. Many systems comprise components equipped with self-testing capability; but, if the system is complex (and involves feedback and if the self-testing itself may occasionally be faulty) tracing faults to a single or multiple causes is difficult. However, even for systems involving many thousands of components the PC-based TEAMS provides essentially real-time system-state diagnosis. Until recently TEAMS operation was passive: its diagnoses were based on whatever data sensors could provide. Now, however, a signal-processing (SP) "frontend" matched to inference needs is available. Many standard signal processing primitives, such as filtering, spectrum analysis and multi-resolution decomposition are available; the SP toolbox is also equipped with a (supervised)

classification capability based on a number of decision-making paradigms. This paper is about the SP toolbox. We show its capabilities, and demonstrate its performance on the CH-46 "Westland" data set.
Author
CH-46 Helicopter; Data Systems; Diagnosis; Fault Detection; Real Time Operation; Signal Processing

20010047827 Illinois Univ. at Urbana-Champaign, Electromagnetics Lab., Urbana, IL USA
Microstrip Antennas with Broadband Integrated Phase Shifting ***Final Report, 1 Mar. 2000 - 28 Feb. 2001***
Bernhard, Jennifer T., Illinois Univ. at Urbana-Champaign, USA; [2001]; 6p; In English
Contract(s)/Grant(s): NCC3-780; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The goal of this research was to investigate the feasibility of using a spiral microstrip antenna that incorporates a thin ferroelectric layer to achieve both radiation and phase shifting. This material is placed between the conductive spiral antenna structure and the grounded substrate. Application of a DC bias between the two arms of the spiral antenna will change the effective permittivity of the radiating structure and the degree of coupling between contiguous spiral arms, therefore changing the phase of the RF signal transmitted or received by the antenna. This could eliminate the need for a separate phase shifter apart from the antenna structure. The potential benefits of such an antenna element compared to traditional phased array elements include: continuous, broadband phase shifting at the antenna, lower overall system losses, lighter, more efficient, and more compact phased arrays, and simpler control algorithms. Professor Jennifer Bernhard, graduate student Gregory Huff, and undergraduate student Brian Huang participated in this effort from March 1, 2000 to February 28, 2001. No inventions resulted from the research undertaken in this cooperative agreement.
Author
Algorithms; Antenna Components; Broadband; Ferroelectricity; Microstrip Antennas; Phased Arrays; Feasibility

20010047835 NASA Glenn Research Center, Cleveland, OH USA
Air Traffic Control Improvement Using Prioritized CSMA
Robinson, Daryl C., NASA Glenn Research Center, USA; February 2001; 12p; In English; 2001 Aerospace Conference, 10-17 Mar. 2001, Big Sky, MT, USA; Sponsored by Institute of Electrical and Electronics Engineers, USA
Contract(s)/Grant(s): RTOP 727-01-00
Report No.(s): NASA/TM-2001-210603; E-12562; NAS 1.15:210603; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Version 7 simulations of the industry-standard network simulation software "OPNET" are presented of two applications of the Aeronautical Telecommunications Network (ATN), Controller Pilot Data Link Communications (CPDLC) and Automatic Dependent Surveillance-Broadcast mode (ADS-B), over VHF Data Link mode 2 (VDL-2). Communication is modeled for air traffic between just three cities. All aircraft are assumed to have the same equipage. The simulation involves Air Traffic Control (ATC) ground stations and 105 aircraft taking off, flying realistic free-flight trajectories, and landing in a 24-hr period. All communication is modeled as unreliable. Collision-less, prioritized carrier sense multiple access (CSMA) is successfully tested. The statistics presented include latency, queue length, and packet loss. This research may show that a communications system simpler than the currently accepted standard envisioned may not only suffice, but also surpass performance of the standard at a lower cost of deployment.
Author
Aeronautics; Air Traffic Control; Computer Systems Programs; Carrier Sense Multiple Access; Simulation

20010048039 Technical Cooperation Program, Redstone Arsenal, AL USA
The Technical Cooperation Program. Subcommittee on Non-Atomic Military Research and Development. Data Replication in Low Bandwidth Wireless Military Environments. Workshop Report from TTCP C3I TP-10 ***Final Report, 20-22 Apr. 1999***
Chamberlain, Sam; Gibb, Allan; May 2000; 21p; In English; Prepared in collaboration with the Defense Evaluation and Research Agency, UK.
Report No.(s): AD-A388295; TTCP,C3I,TP-10/2000; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

TTCP-31 Group Technical Panel 10 held a Workshop on "Data Replication in Low Bandwidth Wireless Military Environments" in the USA, at Fort Leavenworth, Kansas from 20-22 April 1999. The workshop addressed the problem of data replication among distributed databases using unreliable wireless communication links. With such links, the data in adjacent databases on the battlefield will not be fully consistent much of the time. One strong conclusion was that commercial database replication products are not yet up to the challenge on the tactical battlefield. There is a need for light-weight yet robust support for peer-to-peer replication designed to operate continuously over wireless broadcast communications media. Research in a

number of areas is required. Database concepts need to evolve so rules for managing data can be seamlessly integrated with the data themselves.
DTIC
Military Technology; Wireless Communication; Bandwidth; Research and Development

20010048041 Naval Air Warfare Center, Aircraft Div., Patuxent River, MD USA
Flight Evaluation of the Communications Earplug for Improved Situational Awareness in the F/A-18 E/F Super Hornet
Best, Scot; Jan. 2000; 16p; In English
Report No.(s): AD-A388272; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The F/A-18 E/F Super Hornet is the USA Navy's new long-range, multi-mission, all-weather strike fighter. As part of its multi-mission role, the Super Hornet will be used as an aerial refueling aircraft. The pilot of the aircraft to be refueled must fly in formation, driving the fuel probe of the aircraft into the fueling basket. The F/A-18 E/F operational evaluation (OPEVAL) reported excessive cockpit noise while flying in formation, receiving fuel from an F/A-18 E/F tanker (Figure 1). The noise levels have been described to be loud enough to allow aircrew to miss aural tones and/or radio/intercommunications system (ICS) transmissions during aerial refueling and close-in formations. Excessive noise has been found to compromise communications because of inadequate speech signal-to-noise ratio at the ear (Mozo & Murphy, 1997a).
DTIC
Air to Air Refueling; Flight Tests; Fighter Aircraft; Voice Communication; Ear Protectors

33
ELECTRONICS AND ELECTRICAL ENGINEERING

Includes development, performance, and maintainability of electrical/electronic devices and components; related test equipment. and microelectronics and integrated circuitry. For related information see also 60 Computer Operations and Hardware; and 76 Solid-State Physics. For communications equipment and devices see 32 Communications and Radar.

20010044094 Duke Univ., Durham, NC USA
Breast Tumorigenesis: Interaction of Two Signaling Pathways--TGF--Beta Versus Estrogen Receptor *Annual Report, 1 Sep. 1995 - 31 Aug. 1996*
Wang, Xiao-Fan; Yingling, Jonathan; Oct. 1996; 14p; In English
Contract(s)/Grant(s): DAMD17-94-J-4190
Report No.(s): AD-A320275; No Copyright; Avail: Defense Technical Information Center (DTIC)

The Smad protein family has been genetically implicated in transforming growth factor BETA (TGF-BETA) like signaling pathways in Drosophila and Caenorhabditis elegans. to investigate the role of these proteins in mammalian signaling pathways, we have isolated and studied two murine Smads, Smad1 and Smad5. Using antibodies against Smad1 and Smad5, we show that these two Smads and an immunogenically related protein, presumably also a Smad, are phosphorylated in a time and dose dependent manner in response to TGF-BETA. Bone morphogenetic protein 2, a TGF-BETA superfamily ligand, induces phosphorylation of only the related Smad protein. Thus, TGF-BETA superfamily members may use overlapping yet distinct Smads to mediate their intracellular signals. Furthermore, transient overexpression of either Smad1 or Smad5 causes growth arrest, implicating the Smads in growth regulation. This work provides strong biochemical and preliminary functional evidence that Smad1 and Smad5 represent prototypic members of a family of mammalian proteins that may serve as mediators of signaling pathways for TGF-BETA superfamily members.
DTIC
Mammary Glands; Tumors; Estrogens; Proteins; Beta Factor; Receptors (Physiology); Clinical Medicine

20010045831 Michigan Univ., Dept. of Electrical Engineering and Computer Science, Ann Arbor, MI USA
Long-Term Reliability of SiGe/Si HBTs From Accelerated Lifetime Testing, *4 Feb. 2000 - 3 Feb. 2001*
Bhattacharya, Pallab, Michigan Univ., USA; 2001; 19p; In English
Contract(s)/Grant(s): NAG3-2330; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Accelerated lifetime tests were performed on double-mesa structure Si(0.7)Ge(0.3)/Si npn heterojunction bipolar transistors, grown by molecular beam epitaxy, in the temperature range of 175 C-275 C. The transistors (with 5x20 sq micron emitter area) have DC current gains approx. 40-50 and f(sub T) and f(sub max) of up to 22 GHz and 25 GHz, respectively. It is found that a gradual degradation in these devices is caused by the recombination enhanced impurity diffusion (REID) of boron atoms from the p-type base region and the associated formation of parasitic energy barriers to electron transport from the emitter to collector

layers. This REED has been quantitatively modeled and explained, to the first order of approximation, and the agreement with the measured data is good. The mean time to failure (MTTF) of these devices at room temperature under 1.35 x 10(exp 4) A/sq cm current density operation is estimated from the extrapolation of the Arrhenius plots of device lifetime versus reciprocal temperature. The results of the reliability tests offer valuable feedback for SiGe heterostructure design in order to improve the long-term reliability of the devices and circuits made with them. Hot electron induced degradation of the base-emitter junction was also observed during the accelerated lifetime testing. In order to improve the HBT reliability endangered by the hot electrons, deuterium sintered techniques have been proposed. The preliminary results from this study show that a deuterium-sintered HBT is, indeed, more resistant to hot-electron induced base-emitter junction degradation.
Author
Accelerated Life Tests; Bipolar Transistors; Current Density; Energy Transfer; Reaction Kinetics; Reliability

20010046480 NASA Marshall Space Flight Center, Huntsville, AL USA
Feasibility Study of Thin Film Thermocouple Piles ***Final Report***
Sisk, R. C., NASA Marshall Space Flight Center, USA; April 2001; 17p; In English
Report No.(s): NASA/TM-2001-210963; NAS 1.15:210963; M-1013; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Historically, thermopile detectors, generators, and refrigerators based on bulk materials have been used to measure temperature, generate power for spacecraft, and cool sensors for scientific investigations. New potential uses of small, low-power, thin film thermopiles are in the area of microelectromechanical systems since power requirements decrease as electrical and mechanical machines shrink in size. In this research activity, thin film thermopile devices are fabricated utilizing radio frequency sputter coating and photoresist lift-off techniques. Electrical characterizations are performed on two designs in order to investigate the feasibility of generating small amounts of power, utilizing any available waste heat as the energy source.
Author
Thin Films; Thermocouples; Thermopiles; Fabrication; Manufacturing

20010047292 Mission Research Corp., Dayton, OH USA
Characteristics of an Ultra-Wide-Band Ultra-Wide-Angle Log-Periodic Antenna ***Final Report, Nov. 1999***
Cheskis, Leland M.; Litz, Marc S.; Tesny, Neal; Dilks, Lillian; Feb. 2001; 28p; In English; Original contains color plates
Report No.(s): AD-A388080; ARL-TR-2254; No Copyright; Avail: Defense Technical Information Center (DTIC)

A compact ultra-wide-band, ultra-wide-angle log-periodic antenna has been designed by the Mission Research Corporation under a small business innovative research phase II contract with the U.S. Army Research Laboratory (ARL). A proof-of-principle version of the antenna was delivered to ARL. The antenna was evaluated within two days and information returned to the vendor. The calibrations of the antennas included both frequency-domain and time-domain measurements in the High-Power Microwave Anechoic Chamber and the Electromagnetic Research Facility, respectively, and high-voltage-limit characterizations. The appropriate conversion of time-domain and frequency-domain data into gain curves was performed, and the results were discussed. These results are now being applied to the next version of the dual-polarization antenna pair.
DTIC
Log Periodic Antennas; Antenna Design

20010047397 NASA Glenn Research Center, Cleveland, OH USA
Fixed-Frequency and Frequency-Agile (Au, HTS) Microstrip Bandstop Filters for L-Band Applications
Saenz, Eileen M., Ohio Univ., USA; Subramanyam, Guru, Dayton Univ., USA; VanKeuls, Fred W., Ohio Aerospace Inst., USA; Chen, Chonglin, Houston Univ., USA; Miranda, Felix A., NASA Glenn Research Center, USA; April 2001; 10p; In English; Applied Superconductivity Conference, 17-22 Sep. 2000, Virginia Beach, VA, USA; Sponsored by Institute of Electrical and Electronics Engineers, USA
Contract(s)/Grant(s): RTOP 297-60-00
Report No.(s): NASA/TM-2001-210512; NAS 1.15:210512; E-12464; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

In this work, we report on the performance of a highly selective, compact 1.83 x 2.08 cm(exp 2) (approx. 0.72 x 0.82 in(exp 2) microstrip line bandstop filter of YBa2CU3O(7-delta) (YBCO) on LaAlO3 (LAO) substrate. The filter is designed for a center frequency of 1.623 GHz for a bandwidth at 3 dB from reference baseline of less than 5.15 MHz, and a bandstop rejection of 30 dB or better. The design and optimization of the filter was performed using Zeland's IE3D circuit simulator. The optimized design was used to fabricate gold (Au) and High-Temperature Superconductor (HTS) versions of the filter. We have also studied an electronically tunable version of the same filter. Tunability of the bandstop characteristics is achieved by the integration of a thin

film conductor (Au or HTS) and the nonlinear dielectric ferroelectric SRTiO3 in a conductor/ferroelectric/dielectric modified microstrip configuration. The performance of these filters and comparison with the simulated data will be presented.
Author
Microstrip Transmission Lines; Bandwidth; Bandstop Filters; Design Analysis; Ultrahigh Frequencies

20010047493 DYNACS Engineering Co., Inc., Brook Park, OH USA
Microelectromechanical Systems (MEMS) Actuators for Antenna Reconfigurability ***Final Report***
Simons, Rainee N., DYNACS Engineering Co., Inc., USA; Chun, Donghoon, Michigan Univ., USA; Katehi, Linda P. B., Michigan Univ., USA; March 2001; 10p; In English; 2001 International Microwave Symposium, 20-25 May 2001, Phoenix, AZ, USA; Sponsored by Institute of Electrical and Electronics Engineers, USA
Contract(s)/Grant(s): NAS3-98008; N0001498-1-0628; RTOP 755-08-0B
Report No.(s): NASA/CR-2001-210612; E-12560; NAS 1.26:210612; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A novel microelectromechanical systems (MEMS) actuator for patch antenna reconfiguration, is presented for the first time. A key feature is the capability of multi-band operation without greatly increasing the antenna element dimensions. Experimental results demonstrate that the center frequency can be reconfigured from few hundred MHz to few GHz away from the nominal operating frequency.
Author
Microelectromechanical Systems; Actuators; Antenna Components; Patch Antennas

20010047682 Defence Research Establishment Ottawa, Ottawa, Ontario Canada
Graphical Investigation of Quantisation Effects of Phase Shifters on on Array Patterns
Clenet, Michel, Defence Research Establishment Ottawa, Canada; Morin, Gilbert, Defence Research Establishment Ottawa, Canada; December 2000; 76p; In English
Report No.(s): AD-A385570; DREO-TR-2000-092; No Copyright; Avail: CASI; A01, Microfiche; A05, Hardcopy

This document presents graphical investigations of the array factor of phased arrays with digital phase shifters. A software program based on basic antenna array theory has been developed in Matlab to obtain the main array characteristics (array factor and directivity). The array factors of linear arrays of different sizes with different types of phase shifters have been studied as a function of the number of bits and the frequency. Unconventional two-dimensional color graphical representations are used to identify some characteristics of the array factor of arrays with digital phase shifters that can not be so clearly and quickly visualized with conventional graphical representations. Particularly, the effects of quantization on the array factor for arrays of different sizes and for phase shifters with different numbers of bits, over scanning and frequency ranges, are shown using this representation. Numerous data are also provided.
DTIC
Investigation; Phased Arrays; Antenna Arrays; Linear Arrays

20010047829 NASA Glenn Research Center, Cleveland, OH USA
Baseline Testing of The EV Global E-Bike
Eichenberg, Dennis J., NASA Glenn Research Center, USA; Kolacz, John S., NASA Glenn Research Center, USA; Tavernelli, Paul F., NASA Glenn Research Center, USA; January 2001; 60p; In English; Original contains color illustrations
Contract(s)/Grant(s): RTOP 251-30-07
Report No.(s): NASA/TM-2001-210569; NAS 1.15:210569; E-12534; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The NASA John H. Glenn Research Center initiated baseline testing of the EV Global E-Bike as a way to reduce pollution in urban areas, reduce fossil fuel consumption and reduce Operating costs for transportation systems. The work was done Linder the Hybrid Power Management (HPM) Program, which includes the Hybrid Electric Transit Bus (HETB). The E-Bike is a state of the art, ground up, hybrid electric bicycle. Unique features of the vehicle's power system include the use of an efficient, 400 W. electric hub motor and a 7-speed derailleur system that permits operation as fully electric, fully pedal, or a combination of the two. Other innovative features, such as regenerative braking through ultracapacitor energy storage are planned. Regenerative braking recovers much of the kinetic energy of the vehicle during deceleration. The E-Bike is an inexpensive approach to advance the state of the art in hybrid technology in a practical application. The project transfers space technology to terrestrial use via nontraditional partners, and provides power system data valuable for future space applications. A description of the E-bike, the results of performance testing, and future vehicle development plans is the subject of this report. The report concludes that the

E-Bike provides excellent performance, and that the implementation of ultracapacitors in the power system can provide significant performance improvements.
Author
Electric Equipment Tests; Engine Tests; Electric Motors; Performance Tests

20010048016 Delaware Univ., Dept. of Electrical and Computer Engineering, Newark, DE USA
SiGeC Optoelectronic Devices ***Final Report, 25 Sep. 1995 - 31 Jul. 1999***
Kolodzey, James; Jan. 24, 2001; 12p; In English
Contract(s)/Grant(s): DAAH04-95-1-0625
Report No.(s): AD-A388459; ARO-33074.1-EL; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

The spectral responses of a series of heterojunction diodes of p-type Ge(1-y)C(y) On n-type Si (100) substrates were measured by Fourier transform infrared spectroscopy. Alloy layers 0.5 micrometers thick were grown by molecular beam epitaxy at a substrate temperature of 400 C and were doped p-type with different B concentrations. With increasing C content, the diode dark current decreased, and the optical absorption band edge shifted toward higher energy by 70 meV for 0.12 atomic % of C. The increase in energy was attributed to the composition dependence of the bandgap rather than to strain relaxation, because the GeC layers were nearly relaxed with the same strain. The photoresponsivity was 0.07 Amps/Watt at a wavelength of 1.55 micrometers, and 0.2 Amps/Watt at a wavelength of 1.3 micrometers. These measurements show that GeC photodetectors have good properties and reasonable response at technologically important near-infrared wavelengths and can be fabricated by heteroepitaxy for compatibility with Si integrated circuits.
DTIC
Optoelectronic Devices; Germanium Compounds; Silicon Compounds; Carbon Compounds

20010048023 Maine Univ., Office of Research and Sponsored Programs, Orono, ME USA
Development of a Multi-GHz Sampling Capability at the University of Maine UHF Test Facility ***Final Report, 26 Sep. 1994 - 25 Sep. 1997***
Hummels, Donald M.; Irons, Fred; Feb. 19, 2001; 78p; In English
Contract(s)/Grant(s): DAAH04-94-G-0387
Report No.(s): AD-A388404; ARO-33635.5-RT-DPS; No Copyright; Avail: CASI; A01, Microfiche; A05, Hardcopy

The primary goal is to upgrade an existing 200 MHz high-speed ADC test facility to obtain 20 GHz test and measurement capability. The modification is required to keep abreast of developing technology in ADC design, and in particular to support an ongoing effort in the ARPA HBT/ADC program to develop multi-GHz analog-to-digital converters. Also, innovative test methodologies are being developed to characterize and diagnose distortion mechanisms for state-of-the-art converters with sample rates above 1 GHz. An important accomplishment is the development of diagnostic test procedures which may be used on fully packaged components. Normally it is not practical to probe internal points in high-speed circuits - due to loading and unloading transmission line effects - and so external diagnostic procedures are very desirable. Under this contract we have shown how phase plane error functions can be built and interpreted to estimate specific ADC architecture effects. Additionally, this work has shown that the same set of calibration data can be used to estimate different features through the appropriate choices of basis functions related to specific ADC architectures. Fast Orthogonal Search methods were developed to assist in the selection of the most sensitive error basis functions.
DTIC
Sampling; Test Facilities; Analog to Digital Converters; Ultrahigh Frequencies

20010048045 Army Research Lab., Sensors Directorate, Adelphi, MD USA
Development of an In-House Grating Spectrometer System for Validating Acousto-Optic Tunable Filter Spectrometer Results ***Final Report, Aug. 1997-Jan. 1999***
Bennett, Kelly W.; Gupta, Neelam; Dahmani, Rachid; Mar. 2001; 19p; In English
Contract(s)/Grant(s): Proj-AH94
Report No.(s): AD-A388264; ARL-MR-495; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We describe the design of a grating spectrometer system. We obtained emission spectroscopy results of a lamp source from a visible to near infrared (vis-NIR) acousto-optic tunable filter (AOTF) spectrometer and from an IN-house developed Grating (ING) spectrometer. We compare the measured lamp source emission-spectra results from the grating spectrometer with results

obtained with the AOTF spectrometer and results from the lamp manufacturer. The grating spectrometer compares well with the manufacturer's calibrated data and results obtained from the AOTF spectrometer.
DTIC
Spectrometers; Gratings; Tunable Filters; Acousto-Optics

20010048669 Sverdrup Technology, Inc., Moffett Field, CA USA
NASA Ames Research Center 60 MW Power Supply Modernization
Choy, Yuen Ching, NASA Ames Research Center, USA; Ilinets, Boris V., Sverdrup Technology, Inc., USA; Miller, Ted, E and C Engineering, USA; [2000]; 1p; In English
Contract(s)/Grant(s): NAS2-98074; No Copyright; Avail: Issuing Activity; Abstract Only

The NASA Ames Research Center 60 MW DC Power Supply was built in 1974 to provide controlled DC power for the Thermophysics Facility Arc Jet Laboratory. The Power Supply has gradually losing reliability due to outdated technology and component life limitation. NASA has decided to upgrade the existing rectifier modules with contemporary high-power electronics and control equipment. NASA plans to complete this project in 2001. This project includes a complete replacement of obsolete thyristor stacks in all six rectifier modules and rectifier bridge control system. High power water-cooled thyristors and freewheeling diodes will be used. The rating of each of the six modules will be 4000 A at 5500 V. The control firing angle signal will be sent from the Facility Control System to six modules via fiberoptic cable. The Power Supply control and monitoring system will include a Master PLC in the Facility building and a Slave PLC in each rectifier module. This system will also monitor each thyristor level in each stack and the auxiliary equipment.
Author
Thyristors; Control Equipment; Fiber Optics; Replacing; Research Facilities; Maintenance

20010048869 Pacific Science and Engineering Group, Inc., San Diego, CA USA
Tactical Routing Using Two-Dimensional and Three-Dimensional Views of Terrain, *Oct. 1998 - Jun. 2000*
St.John, M.; Smallman, H. S.; Bank, T. E.; Cowen, M. B.; Jan. 2001; 26p; In English; Original contains color plates
Contract(s)/Grant(s): N66001-99-D-0050
Report No.(s): AD-A387284; PSEGI-TR-1849; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Consoles for military and civilian occupations such as air warfare, command and control, air traffic control, piloting, and meteorological forecasting will be capable of displaying three-dimensional (3-D) perspective views. The question is when and how to use 3-D views effectively. This report discusses the results of two experiments where participants placed objects on a terrain map in 3-D or two-dimensions (2-D). In these experiments, we showed participants a terrain map that contained two fixed antennas (a source and terminal), several enemy unit locations, and a set of antennas to be placed on the map to establish line-of-sight communications. The task was to create a chain of antennas across the map to connect the source and terminal antennas. The antennas had to be within line of sight of each other while remaining concealed from the enemy units. We found the following: (1) antenna placement was performed better with a 2-D view than a 3 -D view, (2) antenna placement was peformed best when participants were provided with both a 2-D and 3-D view, and (3) initial planning of the antenna route was performed better with a 3-D view than a 2-D view.
DTIC
Terrain; Virtual Reality; Human-Computer Interface; Three Dimensional Models; Display Devices; Decision Making; Tactile Discrimination; Two Dimensional Models

20010048909 Drexel Univ., Dept. of Electrical and Computer Engineering, Philadelphia, PA USA
Ultra-High-Capacity Router Switching Fabrics Using Photonic Technologies *Final Report, Dec. 1998-Mar. 1999*
Personick, Stewart D., Drexel Univ., USA; Shi, Hongyuan, Drexel Univ., USA; Shankar, Dinesh, Drexel Univ., USA; Nov. 2000; 55p; In English
Contract(s)/Grant(s): F30602-99-1-0012; DARPA ORDER-H109; AF Proj. H109
Report No.(s): AD-A386598; AFRL-IF-RS-TR-2000-144; No Copyright; Avail: CASI; A01, Microfiche; A04, Hardcopy

In this report we present an architecture and a design study of the feasibility of implementing an ultra-high-capacity router switching fabric for Next Generation Internets utilizing mostly photonic components.
DTIC
Architecture (Computers); Data Transmission; Optical Switching; Photonics

34
FLUID MECHANICS AND THERMODYNAMICS

Includes fluid dynamics and kinematics and all forms of heat transfer; boundary layer flow; hydrodynamics; hydraulics; fluidics; mass transfer and ablation cooling. For related information see also 02 Aerodynamics.

20010044269 Florida State Univ., Dept. of Mathematics, Tallahassee, FL USA
Evaluation of Turbulence-Model Performance in Jet Flows
Woodruff, S. L., Florida State Univ., USA; Seiner, J. M., Mississippi Univ., USA; Hussaini, M. Y., Florida State Univ., USA; Erlebacher, G., Florida State Univ., USA; [2001]; 31p; In English; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The importance of reducing jet noise in both commercial and military aircraft applications has made jet acoustics a significant area of research. A technique for jet noise prediction commonly employed in practice is the MGB approach, based on the Lighthill acoustic analogy. This technique requires as aerodynamic input mean flow quantities and turbulence quantities like the kinetic energy and the dissipation. The purpose of the present paper is to assess existing capabilities for predicting these aerodynamic inputs. Two modern Navier-Stokes flow solvers, coupled with several modern turbulence models, are evaluated by comparison with experiment for their ability to predict mean flow properties in a supersonic jet plume. Potential weaknesses are identified for further investigation. Another comparison with similar intent is discussed by Barber et al. The ultimate goal of this research is to develop a reliable flow solver applicable to the low-noise, propulsion-efficient, nozzle exhaust systems being developed in NASA focused programs. These programs address a broad range of complex nozzle geometries operating in high temperature, compressible, flows. Seiner et al. previously discussed the jet configuration examined here. This convergent-divergent nozzle with an exit diameter of 3.6 inches was designed for an exhaust Mach number of 2.0 and a total temperature of 1680 F. The acoustic and aerodynamic data reported by Seiner et al. covered a range of jet total temperatures from 104 F to 2200 F at the fully-expanded nozzle pressure ratio. The aerodynamic data included centerline mean velocity and total temperature profiles. Computations were performed independently with two computational fluid dynamics (CFD) codes, ISAAC and PAB3D. Turbulence models employed include the k-epsilon model, the Gatski-Speziale algebraic-stress model and the Girimaji model, with and without the Sarkar compressibility correction. Centerline values of mean velocity and mean temperature are compared with experimental data.
Author
Jet Aircraft Noise; Navier-Stokes Equation; Flow Characteristics; Noise Prediction; K-Epsilon Turbulence Model; Noise Reduction

20010045670 Building and Construction Research TNO, Centre for Maritime Engineering, Delft, Netherlands
Interaction Modelling 2000
vanAanhold, J. E., Building and Construction Research TNO, Netherlands; Dec. 31, 2000; 52p; In English; Original contains color illustrations
Contract(s)/Grant(s): A98/KM/118; TNO Proj. 006.03463/01.01
Report No.(s): TD-2001-02; TNO-2000-CMC-R096; Copyright; Avail: Issuing Activity

This report describes the results of a number of activities that have been carried out as part of the research project 'Interaction Modelling 2000'. Chapter 2 describes the theoretical backgrounds of the BWAM whipping analysis model as currently implemented. Chapter 3 describes a short inventory and survey of simplified interaction models. The main conclusion is that simplified methods may be useful for the estimation of global motions, but less for estimating the local response. Chapter 4 describes the theoretical backgrounds of the so-called DAA, non-reflecting boundary. It has been attempted to implement this in 2DCAV, but this development could not be completed. In addition, Chapter 5 explains that, contrary to earlier findings, a simplified DAA method (DAA(sub s)) is possible for 2D structures. A prerequisite is presence of a free water surface. This creates openings for a much more simple and computationally efficient implementation in 2DCAV.
Author
Ship Hulls; Underwater Tests; Shock Tests; Shock Resistance; Shock Wave Propagation; Shock Waves

20010045814 Kyushu Univ., Fukuoka, Japan
Heat Transfer and Thermal Conduction Coefficient of Half-Solidification Layer
Shen, Zongbin, Kyushu Univ., Japan; Nishioka, Kouki, Kyushu Univ., Japan; Shimizu, Masakata, Kyushu Univ., Japan; Technology Reports of Kyushu University; March 2001; ISSN 0023-2718; Volume 74, No. 2, pp. 91-98; In Japanese; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

To make clear the heat transfer between liquid iron and a brick wall in blast furnace bottom, characteristics of heat transfer in half-solidification layer were experimentally studied using the water model of blast furnace hearth. From the experimental

results, a thermal conduction coefficient was derived. The conclusions are as follows: 1. With increase in liquid temperature, the width of columnar crystal of half-solidification layer became narrow, and the number of columnar crystal was increased. While, with increase in solution concentration, the length of columnar crystal was shorten, The thermal conduction coefficient of half-solidification layer was decreased in both cases. 2. Based on the experimental results, thermal conduction coefficient of half-solidification layer was derived as below: k(sub e) = f(sub s).k(sub s) + (1-f(sub s)).k(sub l)-0.09 x (C*)(sup -1/2).(T*)(sup -2.99) absolute value of k(sub s)-k(sub l) for (f(sub l)=1-f(sub s)).
Author
Conductive Heat Transfer; Solidification; Thermal Boundary Layer

20010045815 Kyushu Univ., Fukuoka, Japan
Influence of Solid's Shape on Thermal Convective Coefficient of Boundaries Between Solid Particle and Liquid Flow
Shen, Zongbin, Kyushu Univ., Japan; Nishioka, Kouki, Kyushu Univ., Japan; Shimizu, Masakata, Kyushu Univ., Japan; Technology Reports of Kyushu University; March 2001; ISSN 0023-2718; Volume 74, No. 2, pp. 83-90; In Japanese; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

In this paper, the influence of solid's shape on thermal convective coefficient of boundary layer between solid particle and liquid flow was studied by an experiment with a water model. As a result, it was clarified that the influence of solid's shape factor on thermal convective coefficient of boundaries between solid particle and liquid flow should not be disregarded. The Ranz-Marshall formula Should be made a few corrections with Leva's shape factor as follows: (1) In case of shape factor over 0. 7, Ranz-Marshall formula should be corrected using Leva's shape factor as below: Nu = h.dp/k(sub 1) = 2.0/phi(sub L) + 0.6 x Re(sup 1/2).Pr(sup 1/3)/square root of phi(sub L) for (0.7 is less than phi(sub L) is less than 1). (2) In case of shape factor under 0. 7, Ranz-Marshall formula was experimentally corrected as below: Nu = h.dp*/k(sub 1) = 0. 8/phi(sub L) + 0.24 x Re(sup 1/2).Pr(sup 1/3)/square root of phi(sub L) for (0.7 is less than phi(sub L)
Author
Thermal Boundary Layer; Convection; Heat Transfer

20010045817 NASA Marshall Space Flight Center, Huntsville, AL USA
MC-1 LOX Pump Rotating Cavitation: Issue and Investigation
VanHooser, Katherine, NASA Marshall Space Flight Center, USA; [2001]; 23p; In English; NASA/MSFC Fluids Workshop, 4-5 Apr. 2001, Huntsville, AL, USA; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Leading edge tip deformation was noted on the LOX inducer from the component test unit at disassembly. The damage was in a location similar to a previous Fastrac water flow inducer failure. A team was formed to investigate the anomaly.
Derived from text
Anomalies; Damage; Deformation; Failure

20010046952 NASA Marshall Space Flight Center, Huntsville, AL USA
Effective Gravitational Temperature in Sedimentation
Segre, Philip N., NASA Marshall Space Flight Center, USA; Liu, Fang, Pennsylvania Univ., USA; Umbanhower, Paul, Northwestern Univ., USA; Weitz, David A., Harvard Univ., USA; [2001]; 1p; In English; Nanoparticles Conference, 26 Feb. 2001, Orlando, FL, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Particle Image Velocimetry (PIV) is used to study the slow settling motions of spheres in suspensions ranging from dilute to highly concentrated, 0.05 less than phi less than 0.50. During sedimentation, velocity fluctuations are found to be organized into regions of characteristic size L approximately 11 a phi(exp-1/3) and buoyant mass DELTA m given by the rms density fluctuations in a region of size L(sup 3) assuming random statistics with excluded volume effects. A simple model accurately predicts the magnitudes of the velocity fluctuations DELTA V. Finally, we find a new universal relation for particle diffusion during sedimentation that can be written in a Stokes-Einstein type form as D approximately (DELTA mg L)/(6 pi eta L), where the effective temperature DELTA mg L is the gravitational potential energy of density fluctuations.
Author
Sediments; Gravitational Fields; Temperature

20010046971 Institute for Computer Applications in Science and Engineering, Hampton, VA USA

Theory of the Lattice Boltzmann Method: Lattice Boltzmann Models for Non-ideal Gases ***Final Report***

Luo, Li-Shi, Institute for Computer Applications in Science and Engineering, USA; April 2001; 31p; In English

Contract(s)/Grant(s): NAS1-97046; RTOP 505-90-52-01

Report No.(s): NASA/CR-2001-210858; NAS 1.26:210858; ICASE-2001-8; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In this paper a procedure for systematic a priori derivation of the lattice Boltzmann models for non-ideal gases from the Enskog equation (the modified Boltzmann equation for dense gases) is presented. This treatment provides a unified theory of lattice Boltzmann models for non-ideal gases. The lattice Boltzmann equation is systematically obtained by discretizing the Enskog equation in phase space and time. The lattice Boltzmann model derived in this paper is thermodynamically consistent up to the order of discretization error. Existing lattice Boltzmann models for non-ideal gases are analyzed and compared in detail. Evaluation of these models are made in light of the general procedure to construct the lattice Boltzmann model for non-ideal gases presented in this work.

Author

Boltzmann Transport Equation; Gas Density; Kinetic Equations

20010046977 Eloret Corp., Palo Alto, CA USA

Hypersonic Nozzle/Afterbody Experiment: Flow Visualization and Boundary Layer Experiments

Keener, Earl R., Eloret Corp., USA; Spaid, Frank W., McDonnell-Douglas Aerospace, USA; [1994]; 1p; In English

Contract(s)/Grant(s): NCC2-553; No Copyright; Avail: Issuing Activity; Abstract Only

This study was conducted to experimentally characterize the flow field created by the interaction of a single-expansion-ramp-nozzle (SERN) flow with a hypersonic external stream Data were obtained from a generic nozzle/afterbody model in the 3.5-Foot Hypersonic Wind Tunnel of the NASA Ames Research Center in a cooperative experimental program involving Ames and the McDonnell Douglas Aerospace. The model design and test planning were performed in close cooperation with members of the Ames computational fluid dynamics (CFD) team for the National Aero-Space Plane (NASP) program. This paper presents experimental results consisting of oil-flow and shadowgraph flow-visualization photographs, afterbody surface-pressure distributions, boundary-layer rake measurements, and Preston-tube skin-friction measurements.

Author

Hypersonic Nozzles; Afterbodies; Flow Visualization; Boundary Layers; Nozzle Flow; Hypersonic Flow

20010046978 Computer Sciences Corp., Moffett Field, CA USA

Development of a Magnetic Refrigerator Operating Between 2K and 10K

Lane, David A., Computer Sciences Corp., USA; [1994]; 1p; Repr. from Visualization of Time-Dependent Flow Fields Proceedings of Visualization (San Jose, CA), October 1993 p 32-38; In English; Dagstuhl Seminar on Scientific Visualization, 22-27 May 1994, Saarbrucken, Germany

Contract(s)/Grant(s): RTOP 536-01-11; No Copyright; Avail: Issuing Activity; Abstract Only

An adiabatic demagnetization refrigerator (ADR) is under development at NASA-Ames Research Center that will operate between 2 K and 10 K and will provide 50 mW of cool ng at 2 K. Gadolinium Gallium Garnet (GGG) is selected as the refrigerant for the ADR, to minimize temperature gradients in the GGG, thick slices of GGG are sandwiched together with strips of high-purity copper in between them. The copper strips are used to exchange heat between the GGG and the 2 K and the 10 K heat switches. The heat transfer across the Cu-GGG interfaces is improved by placing thin foils of' high-purity indium at the interfaces. The heat switches employed in the ADR have no moving parts. The 10 K heat switch is a helium gas-gap heat switch; while, the 2 K heat switch is a He ll-gap heat switch. A switch is on when its gap Is filled with helium and is off' when the gap is emptied. This is accomplished with an activated carbon pump (ACP). The ACP adsorbs helium when cooled and desorbs it when heated. A superconducting magnet capable of providing 9 T at 2 K is used for the ADR cycle. A prototype of this refrigerator has been built and is currently under test. A detailed design of the ADR and preliminary test results performed on the prototype ADR will be presented.

Author

Refrigerators; Magnetic Cooling; Gadolinium-Gallium Garnet; Demagnetization; Superconducting Magnets; Adiabatic Conditions

20010046979 NASA Ames Research Center, Moffett Field, CA USA

Effect of Under-Resolved Grids on High Order Methods

Yee, H. C., NASA Ames Research Center, USA; Sjoegreen, B., Royal Inst. of Tech., Sweden; [2001]; 2p; In English; 5th International Conference on Spectral and High Order Methods, 11-15 Jun. 2001, Uppsala, Sweden; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

There has been much discussion on verification and validation processes for establishing the credibility of CFD simulations. Since the early 1990s, many of the aeronautical and mechanical engineering related reference journals mandated that any accepted articles in numerical simulations (without known solutions to compared with) need to perform a minimum of one level of grid refinement and time step reduction. Due to the difficulty in analysis, the effect of under-resolved grids and the nonlinear behavior of available spatial discretizations, are scarcely discussed in the literature. Here, an under-resolved numerical simulation is one where the grid spacing being used is too coarse to resolve the smallest physically relevant scales of the chosen continuum governing equations that are of interest to the numerical modeler. With the advent of new developments in fourth-order or higher spatial schemes, it has become common to regard high order schemes as more accurate, reliable and require less grid points. The danger comes when one tries to perform computations with the coarsest grid possible while still hoping to maintain numerical results sufficiently accurate for complex flows, and especially, data-limited problems. On one hand, high order methods when applies to highly coupled multidimensional complex nonlinear problems might have different stability, convergence and reliability behavior than their well studied low order counterparts, especially for nonlinear schemes such as TVD, MUSCL with limiters, ENO, WENO and discrete Galerkin. On the other hand, high order methods involve more operation counts and systematic grid convergence study can be time consuming and prohibitively expansive. At the same time it is difficult to fully understand or categorize the different nonlinear behavior of finite discretizations, especially at the limits of under-resolution when different types of bifurcation phenomena might occur, depending on the combination of grid spacings, time steps, initial conditions and numerical treatments of boundary conditions.

Derived from text

Computational Grids; Computational Fluid Dynamics; Nonlinear Systems; Boundary Conditions; Aeronautical Engineering

20010046984 NASA Ames Research Center, Moffett Field, CA USA

Time-Accurate Incompressible Navier-Stokes Computations with Overlapped Moving Grids

Kiris, Cetin, MCAT Inst., USA; Kwak, Dochan, NASA Ames Research Center, USA; Rogers, Stuart, NASA Ames Research Center, USA; Lee, Yu-Tai, David Taylor Model Basin, USA; [1994]; 1p; In English; ASME Fluids Engineering Summer Meeting, 19-23 Jun. 1994, Lake Tahoe, CA, USA; Sponsored by American Society of Mechanical Engineers, USA

Contract(s)/Grant(s): RTOP 505-59-53; No Copyright; Avail: Issuing Activity; Abstract Only

MIT flapping foil experiment was used as a validation case to evaluate the current incompressible Navier-Stokes approach with overlapped grid schemes. Steady-state calculations were carried out for overlapped and patched grids. The grid dependency, turbulence model effects, and the effect of order of differencing were investigated. Numerical results were compared against experimental data. The resulting procedure were applied to unsteady flapping foil calculations. Two upstream NACA 0025 foils perform high-frequency synchronized motion and generate unsteady flow conditions to the downstream larger stationary foil. Comparison between unsteady experimental data and numerical results from two different moving boundary procedures will be presented.

Author

Foils; Computational Grids; Navier-Stokes Equation; Incompressible Flow; Mathematical Models

20010046985 NASA Ames Research Center, Moffett Field, CA USA

Thermal Conductance of Pressed Bimetal Contact Pairs at Liquid Nitrogen Temperatures

Kittle, Peter, NASA Ames Research Center, USA; Salerno, Louis J., NASA Ames Research Center, USA; Spivak, Alan L., Trans-Bay Electronics, USA; [1994]; 1p; In English; 15th International Cryogenic Engineering Conference and Industrial Exhibition, 7-10 Jun. 1994, Genova, Italy

Contract(s)/Grant(s): RTOP 233-02-05-03; No Copyright; Avail: Issuing Activity; Abstract Only

Large Dewars often use aluminum radiation shields and stainless steel vent lines. A simple, low cost method of making thermal contact between the shield and the line is to deform the shield around the line. A knowledge of the thermal conductance of such a joint is needed to thermally analyze the system. The thermal conductance of pressed metal contacts consisting of one aluminum and one stainless steel contact has been measured at 77 K, with applied forces from 8.9 N to 267 N. Both 5052 or 5083 aluminum were used as the upper contact. The lower contact was 304L stainless steel. The thermal conductance was found to be linear in temperature over the narrow temperature range of measurement. As the force was increased, the thermal conductance ranged from roughly 9 to 21 mW/K within a range of errors from 3% to 8%. Within the range of error no difference could be found

between the using either of the aluminum alloys as the upper contact. Extrapolating the data to zero applied force does not result in zero thermal conductance. Possible causes of this anomalous effect are discussed.
Author
Thermal Conductivity; Bimetals; Liquid Nitrogen; Heat Shielding; Aluminum Alloys

20010047000 NASA Ames Research Center, Moffett Field, CA USA
Aerothermodynamics of Pyrolizing Surfaces in Hypersonic Rarefied Flows
Haas, Brian L., Eloret Corp., USA; Milos, Frank S., NASA Ames Research Center, USA; [1994]; 1p; In English; 19th; International Symposium of Rarefied Gas Dynamics, 25-29 Jul. 1994, Oxford, UK
Contract(s)/Grant(s): RTOP 232-01-04; No Copyright; Avail: Issuing Activity; Abstract Only

Direct simulation Monte Carlo (DSMC) calculations of rarefied flows about entry bodies typically employ a fixed surface temperature or a radiative-equilibrium energy balance to compute that temperature. Such boundary conditions neglect any effects of heat capacitance and heat conduction in the spacecraft heat shield and, therefore, provide an upper bound for the surface temperature. Such calculations also neglect pyrolysis from the heat shield which can be significant for a high-energy incident flow at very low densities. Accurate prediction of both heating and aerodynamic forces requires including pyrolysis and surface heat transfer in the models for gas-surface interaction employed in DSMC methods. Although these physical models have long appeared in various continuum flow calculation codes, they have only recently appeared in DSMC codes which are required to simulate rarefied flows during entry at high altitudes. In the current implementation, routines from the widely distributed Charring Material Thermal Response and Ablation (CMA) program are coupled into a DSMC code to calculate the one-dimensional heat transfer into the carbon phenolic heat shield at each point on a vehicle surface. Temperature-dependent material properties, surface re-radiation, and in-depth pyrolysis were included in the calculation, but surface ablation was neglected. Sample calculations for entry of the Galileo probe into the atmosphere of Jupiter demonstrate that including pyrolysis in the model leads to significant differences in predicted aerodynamics. Granted, the drag coefficient does not depend strongly on the surface temperature which can itself be significantly below the radiative equilibrium value during entry. However, the surface mass flux due to pyrolysis of the material is significant once the probe drops to altitudes characterized by transition flow. This leads to a noticeable increase in drag and a decrease in heating compared to a body without pyrolysis.
Author
Aerodynamic Forces; Aerothermodynamics; Boundary Conditions; Conductive Heat Transfer; Pyrolysis; Rarefied Gas Dynamics; Monte Carlo Method

20010047002 NASA Ames Research Center, Moffett Field, CA USA
Turbulent Heat Transfer Characteristics in the Shear Layer of a Separated Flow
Jovic, S., Eloret Corp., USA; [1994]; 1p; In English; Turbulence Heat and Mass Transfer, 9-12 Aug. 1994, Lisabon, Portugal; Sponsored by International Centre for Heat and Mass Transfer, Turkey
Contract(s)/Grant(s): NCC2-465; No Copyright; Avail: Issuing Activity; Abstract Only

Experiments were performed to study the evolution of the heat transfer structure in a separated free shear layer region of an incompressible separated turbulent boundary layer flow behind a backward-facing step. While there is an abundance of velocity field measurements of separated flows, heat transfer measurements are rather scarce, thus limiting assessment of the heat transfer physics and its accurate modeling. The purpose of the paper is twofold: to improve an understanding of effects of flow separation on heat transfer characteristics, and to provide data for turbulence modeling and computation. The boundary layer upstream of the step was turbulent and fully developed. A constant temperature surface boundary condition was imposed upstream and downstream of the step for the heat transfer study. An internal mixing-layer like flow forms and grows from the step lip within the original boundary layer. The turbulent structure of the flow evolving downstream, however, does not switch immediately to that of a mixing layer over the entire shear layer thickness. Measurements of mean and fluctuating velocity and temperature fields indicate that the internal layer spreads gradually in the transverse direction while the outer part of the original boundary layer is effectively unperturbed. The results in this paper have not been previously reported.
Author
Turbulent Heat Transfer; Incompressible Boundary Layer; Boundary Layer Separation; Boundary Conditions; Backward Facing Steps; Shear Layers; Turbulent Flow

20010047003 NASA Ames Research Center, Moffett Field, CA USA
Incompressible Navier-Stokes Computations with Heat Transfer
Kiris, Cetin, MCAT Inst., USA; Kwak, Dochan, NASA Ames Research Center, USA; Rogers, Stuart, NASA Ames Research Center, USA; [1994]; 1p; In English; Fluids Engineering Summer Meeting, 19-23 Jun. 1994, Lake Tahoe, CA, USA; Sponsored

by American Society of Mechanical Engineers, USA
Contract(s)/Grant(s): RTOP 505-59-53; No Copyright; Avail: Issuing Activity; Abstract Only

The existing pseudocompressibility method for the system of incompressible Navier-Stokes equations is extended to heat transfer problems by including the energy equation. The solution method is based on the pseudo compressibility approach and uses an implicit-upwind differencing scheme together with the Gauss-Seidel line relaxation method. Current computations use one-equation Baldwin-Barth turbulence model which is derived from a simplified form of the standard k-epsilon model equations. Both forced and natural convection problems are examined. Numerical results from turbulent reattaching flow behind a backward-facing step will be compared against experimental measurements for the forced convection case. The validity of Boussinesq approximation to simplify the buoyancy force term will be investigated. The natural convective flow structure generated by heat transfer in a vertical rectangular cavity will be studied. The numerical results will be compared by experimental measurements by Morrison and Tran.

Author

Incompressible Flow; Heat Transfer; Navier-Stokes Equation; Turbulent Flow; Upwind Schemes (Mathematics); Convective Flow

20010047004 NASA Ames Research Center, Moffett Field, CA USA

Computational Fluid Dynamics at NASA Ames Research Center

Kutler, Paul, NASA Ames Research Center, USA; [1994]; 1p; In English; Computational fluid dynamics at NASA Ames Research Center, 19-20 Jun. 1994, Incline Village, NV, USA

Contract(s)/Grant(s): RTOP 505-59-00; No Copyright; Avail: Issuing Activity; Abstract Only

Computational fluid dynamics (CFD) is beginning to play a major role in the aircraft industry of the USA because of the realization that CFD can be a new and effective design tool and thus could provide a company with a competitive advantage. It is also playing a significant role in research institutions, both governmental and academic, as a tool for researching new fluid physics, as well as supplementing and complementing experimental testing. In this presentation, some of the progress made to date in CFD at NASA Ames will be reviewed. The presentation addresses the status of CFD in terms of methods, examples of CFD solutions, and computer technology. In addition, the role CFD will play in supporting the revolutionary goals set forth by the Aeronautical Policy Review Committee established by the Office of Science and Technology Policy is noted. The need for validated CFD tools is also briefly discussed.

Author

Computational Fluid Dynamics; Aircraft Industry; Computer Systems Design

20010047073 Institute for Computer Applications in Science and Engineering, Hampton, VA USA

Turbulence Modeling Workshop *Final Report*

Rubinstein, R., Editor, NASA Langley Research Center, USA; Rumsey, C. L., Editor, NASA Langley Research Center, USA; Salas, M. D., Editor, Institute for Computer Applications in Science and Engineering, USA; Thomas, J. L., Editor, NASA Langley Research Center, USA; March 2001; 196p; In English; Turbulence Modeling Workshop, 12-13 Jan. 2001, Reno, NV, USA; See also 20010047074 through 20010047079

Contract(s)/Grant(s): NAS1-97046; RTOP 505-90-52-01

Report No.(s): NASA/CR-2001-210841; NAS 1.26:210841; ICASE-IR-37; No Copyright; Avail: CASI; A09, Hardcopy; A03, Microfiche

Advances in turbulence modeling are needed in order to calculate high Reynolds number flows near the onset of separation and beyond. to this end, the participants in this workshop made the following recommendations. (1) A national/international database and standards for turbulence modeling assessment should be established. Existing experimental data sets should be reviewed and categorized. Advantage should be taken of other efforts already under-way, such as that of the European Research Community on Flow, Turbulence, and Combustion (ERCOFTAC) consortium. Carefully selected ”unit” experiments will be needed, as well as advances in instrumentation, to fill the gaps in existing datasets. A high priority should be given to document existing turbulence model capabilities in a standard form, including numerical implementation issues such as grid quality and resolution. (2) NASA should support long-term research on Algebraic Stress Models and Reynolds Stress Models. The emphasis should be placed on improving the length-scale equation, since it is the least understood and is a key component of two-equation and higher models. Second priority should be given to the development of improved near-wall models. Direct Numerical Simulations (DNS) and Large Eddy Simulations (LES) would provide valuable guidance in developing and validating new Reynolds-averaged Navier-Stokes (RANS) models. Although not the focus of this workshop, DNS, LES, and hybrid methods currently represent viable approaches for analysis on a limited basis. Therefore, although computer limitations require the use of

RANS methods for realistic configurations at high Reynolds number in the foreseeable future, a balanced effort in turbulence modeling development, validation, and implementation should include these approaches as well.
Author
Turbulence Models; High Reynolds Number; Aerodynamic Configurations

20010047074 NASA Langley Research Center, Hampton, VA USA
Turbulence Modeling Workshop: Purpose and Expectations
Kumar, Ajay, NASA Langley Research Center, USA; Turbulence Modeling Workshop; March 2001, pp. 38-47; In English; See also 20010047073; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche
This paper presents the purpose and expectations of turbulence modeling, in viewgraph form.
CASI
Turbulence Models; Aircraft Performance; Aircraft Design

20010047077 NASA Langley Research Center, Hampton, VA USA
Turbulence Modeling: A NASA Perspective
Gatski, T. B., NASA Langley Research Center, USA; Turbulence Modeling Workshop; March 2001, pp. 107-121; In English; See also 20010047073; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche
This paper presents turbulence modeling from NASA's perspective. The topics include: 1) Hierarchy of Solution Methods; 2) Turbulence Modeling Focus; 3) Linear Eddy Viscosity Models; and 4) Nonlinear Eddy Viscosity Algebraic Stress Models.
CASI
Turbulence Models; Computational Fluid Dynamics

20010047078 Stanford Univ., Thermosciences Div., Stanford, CA USA
Turbulence Modeling for High Reynolds Number Separated Flows
Bradshaw, Peter, Stanford Univ., USA; Turbulence Modeling Workshop; March 2001, pp. 122-140; In English; See also 20010047073; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche
This paper presents turbulence modeling through high reynolds number separated flow.
CASI
High Reynolds Number; Separated Flow; Turbulence Models

20010047079 Virginia Polytechnic Inst. and State Univ., Blacksburg, VA USA
Experimental Issues Related to Turbulent High Reynolds Number Separated Flows
Simpson, Roger, Virginia Polytechnic Inst. and State Univ., USA; Turbulence Modeling Workshop; March 2001, pp. 156-188; In English; See also 20010047073; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche
This paper presents the nature of separated flows, and some common three dimensional mean flows such as juncture flows, cross-flow separation, vortical separations, and swept wing separations. This paper is in viewgraph form.
CASI
High Reynolds Number; Separated Flow; Turbulent Flow

20010047264 Stanford Univ., Dept. of Mechanical Engineering, Stanford, CA USA
Development of a Structure-Based Turbulence Model ***Final Report, 1 Jan. 1998-30 Sep. 2000***
Reynolds, W. C.; Kassinos, S. C.; Sep. 2000; 40p; In English
Contract(s)/Grant(s): F49620-98-1-0138; AF Proj. 2307
Report No.(s): AD-A388207; AFRL-SR-BL-TR-01-0228; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
Work in the current period was aimed at the construction of extensions of the structure-based Particle Representation and one-point models to flows with slow or moderate mean deformations and wall proximity effects. The extended model can handle strong mean or frame rotation effects, a feature that will be important for the computation of aerodynamic and turbomachinery flows. The performance of Reynolds Stress Transport (RST) models in non-equilibrium flows is limited by the lack of information about two dynamically important effects: (1) the role of energy-containing turbulence structure (dimensionality) and (2) the breaking of reflectional symmetry due to strong mean or frame rotation. Both effects are fundamentally nonlocal in nature and this explains why it has been difficult to include them in one-point closures like RST models. Information about the energy-containing structure is necessary if turbulence models are to reflect differences in dynamic behavior associated with

structures of different dimensionality (nearly isotropic turbulence vs. turbulence with strongly organized two-dimensional structures).
DTIC
Turbulence Models; Two Dimensional Models; Nonequilibrium Flow; Dynamic Response

20010047276 California Univ., Dept. of Mechanical and Environmental Engineering, Santa Barbara, CA USA
Development of Micro-Resolution PIV and Analysis of Microthrusters for Small-Scale Aircraft and Spacecraft
Meinhart, Carl D.; Jan. 2000; 91p; In English
Contract(s)/Grant(s): F49620-97-1-0515
Report No.(s): AD-A388248; AFRL-SR-BL-TR-01-0225; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This research program consisted of two primary research objectives that were aimed at advancing the current understanding of microfluidic processes related to the development of small-scale aircraft and spacecraft. (1) Develop ultra-high resolution PIV instrumentation for measuring velocity vectors with spatial resolutions approaching one micron and temporal resolutions approaching five nanoseconds for use in measuring microfluidic devices. (2) Analyze and document the flow physics of several micronozzles with diameters ranging between 50 and 500 micrometers. The resulting information will be used to motivate, new, more efficient micronozzle designs and validate Navier-Stokes simulations of micronozzles. The instrumentation being developed in Objective 1 has had a broad impact on the microfluidics community. Specifically, the micro PIV technology can be extended ultimately to analyzing microfluidic devices for non-aerospace applications such as micromixing processes in BioMEMS devices or transient processes in inkjets heads. The results from Objective 2 will provide valuable information for designing many of the key elements required for small-scale aircraft and spacecraft. For example, micronozzles can be used for attitude control and thrust vectoring of small-scale aircraft.
DTIC
Miniaturization; Particle Image Velocimetry; Rocket Nozzles; Fluidics; Fluid Dynamics; Microrocket Engines; Microthrust

20010047410 AYT Corp., Brook Park, OH USA
Two-Equation Turbulence Models for Prediction of Heat Transfer on a Transonic Turbine Blade ***Final Report***
Garg, Vijay K., AYT Corp., USA; Ameri, Ali A., AYT Corp., USA; April 2001; 22p; In English; 2001 Turbo Expo, 4-7 Jun. 2001, New Orleans, LA, USA; Sponsored by American Society of Mechanical Engineers, USA
Contract(s)/Grant(s): NAS3-00180; RTOP 714-03-50
Report No.(s): NASA/CR-2000-210810; E-12717; NAS 1.26:210810; ASME Paper 2001-GT-0165; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Two versions of the two-equation k-omega model and a shear stress transport (SST) model are used in a three-dimensional, multi-block, Navier-Stokes code to compare the detailed heat transfer measurements on a transonic turbine blade. It is found that the SST model resolves the passage vortex better on the suction side of the blade, thus yielding a better comparison with the experimental data than either of the k-w models. However, the comparison is still deficient on the suction side of the blade. Use of the SST model does require the computation of distance from a wall, which for a multiblock grid, such as in the present case, can be complicated. However, a relatively easy fix for this problem was devised. Also addressed are issues such as (1) computation of the production term in the turbulence equations for aerodynamic applications, and (2) the relation between the computational and experimental values for the turbulence length scale, and its influence on the passage vortex on the suction side of the turbine blade.
Author
Mathematical Models; K-Omega Turbulence Model; Turbulent Flow; Computational Fluid Dynamics

20010047482 Eloret Corp., Moffett Field, CA USA
Vortex Filtering for Turbulence Models Applied to Crossflow Separation
Murman, Scott M., Eloret Corp., USA; [2001]; 15p; In English
Contract(s)/Grant(s): RTOP 725-09-10
Report No.(s): AIAA Paper 2001-0114; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The application of turbulence models to the flow about slender bodies at high angles of attack poses many difficulties. Regions of three-dimensional crossflow separation and strong vortices outside the boundary layer usually force the modification of standard models which have been developed for attached boundary layers and wake flows. This work examines the performance of three turbulence models for predicting crossflow separation; the Baldwin-Lomax model with corrections due to Degani-Schiff, the Spalart-Allmaras model, and Menter's shear-stress transport (SST) model. These models are applied to the crossflow separation from a smooth tangent-ogive cylinder at 20' angle of attack. The current work utilizes a scheme for generating

grid-independent solutions for these types of flows. From this it's found that the production of turbulent eddy-viscosity in the leeward vortices must be reduced for the one and two-equation models to provide accurate results. A vortex filter which is Galilean- invariant and computationally efficient is developed for this purpose. Computed results indicate that this filter can substantially improve the prediction of the surface pressure and crossflow separation locations for the one and two-equation turbulence models considered.
Author
Vortices; Electromagnetic Wave Filters; Turbulence Models; Cross Flow; Separation; Mathematical Models

20010047483 NASA Ames Research Center, Moffett Field, CA USA
Entropy Splitting and Numerical Dissipation
Yee, H. C., NASA Ames Research Center, USA; Vinokur, M., NASA Ames Research Center, USA; Djomehri, M. J., Sverdrup Technology, Inc., USA; August 1999; 83p; In English; 8th International Symposium on CFD, 5-10 Sep. 1999, Bremen, Germany
Contract(s)/Grant(s): RTOP 522-31-12
Report No.(s): NASA/TM-1999-208793; A-99V0035; NAS 1.15:208793; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

A rigorous stability estimate for arbitrary order of accuracy of spatial central difference schemes for initial-boundary value problems of nonlinear symmetrizable systems of hyperbolic conservation laws was established recently by Olsson and Oliger (1994) and Olsson (1995) and was applied to the two-dimensional compressible Euler equations for a perfect gas by Gerritsen and Olsson (1996) and Gerritsen (1996). The basic building block in developing the stability estimate is a generalized energy approach based on a special splitting of the flux derivative via a convex entropy function and certain homogeneous properties. Due to some of the unique properties of the compressible Euler equations for a perfect gas, the splitting resulted in the sum of a conservative portion and a non-conservative portion of the flux derivative. hereafter referred to as the "Entropy Splitting." There are several potential desirable attributes and side benefits of the entropy splitting for the compressible Euler equations that were not fully explored in Gerritsen and Olsson. The paper has several objectives. The first is to investigate the choice of the arbitrary parameter that determines the amount of splitting and its dependence on the type of physics of current interest to computational fluid dynamics. The second is to investigate in what manner the splitting affects the nonlinear stability of the central schemes for long time integrations of unsteady flows such as in nonlinear aeroacoustics and turbulence dynamics. If numerical dissipation indeed is needed to stabilize the central scheme, can the splitting help minimize the numerical dissipation compared to its un-split cousin? Extensive numerical study on the vortex preservation capability of the splitting in conjunction with central schemes for long time integrations will be presented. The third is to study the effect of the non-conservative proportion of splitting in obtaining the correct shock location for high speed complex shock-turbulence interactions. The fourth is to determine if this method can be extended to other physical equations of state and other evolutionary equation sets. If numerical dissipation is needed, the Yee, Sandham, and Djomehri (1999) numerical dissipation is employed. The Yee et al. schemes fit in the Olsson and Oliger framework.
Author
Entropy; Dissipation; Numerical Analysis; Computational Fluid Dynamics

20010047495 NASA Ames Research Center, Moffett Field, CA USA
Low Dissipative High Order Numerical Simulations of Supersonic Reactive Flows
Sjoegreen, B., Royal Inst. of Tech., Sweden; Yee, H. C., NASA Ames Research Center, USA; [2001]; 1p; In English; Computational Methods in Applied Sciences and Engineering CFD 2001 Conference, 4-7 Sep. 2001, Swansea, Wales, UK; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The objective of this paper is to evaluate the performance of a newly developed low dissipative sixth-order spatial and fourth-order temporal scheme for viscous reactive flows interacting with shock waves that contain fine scale flow structures. The accuracy and efficiency of the scheme, and to what degree the scheme can capture the correct physical wave speeds of stiff reactive flows will be included.
Author
Supersonic Flow; Viscous Flow; Computerized Simulation

20010047496 NASA Ames Research Center, Moffett Field, CA USA
Entropy Splitting for High Order Numerical Simulation of Vortex Sound at Low Mach Numbers
Mueller, B., Uppsala Univ., Sweden; Yee, H. C., NASA Ames Research Center, USA; [2001]; 3p; In English; 5th International Conference on Spectral and High Order Methods, 11-15 Jun. 2001, Uppsala, Sweden; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

A method of minimizing numerical errors, and improving nonlinear stability and accuracy associated with low Mach number computational aeroacoustics (CAA) is proposed. The method consists of two levels. From the governing equation level, we condition the Euler equations in two steps. The first step is to split the inviscid flux derivatives into a conservative and a non-conservative portion that satisfies a so called generalized energy estimate. This involves the symmetrization of the Euler equations via a transformation of variables that are functions of the physical entropy. Owing to the large disparity of acoustic and stagnation quantities in low Mach number aeroacoustics, the second step is to reformulate the split Euler equations in perturbation form with the new unknowns as the small changes of the conservative variables with respect to their large stagnation values. From the numerical scheme level, a stable sixth-order central interior scheme with a third-order boundary schemes that satisfies the discrete analogue of the integration-by-parts procedure used in the continuous energy estimate (summation-by-parts property) is employed.
Derived from text
Acoustic Simulation; Differential Equations; Aeroacoustics; Numerical Analysis

20010047553 NASA Marshall Space Flight Center, Huntsville, AL USA
Overview of MSFC's Applied Fluid Dynamics Analysis Group Activities
Garcia, Roberto, NASA Marshall Space Flight Center, USA; Wang, Tee-See, NASA Marshall Space Flight Center, USA; Griffin, Lisa, NASA Marshall Space Flight Center, USA; [2001]; 15p; In English; Fluids Workshop, 4-5 Apr. 2001, Huntsville, AL, USA; Original contains color illustrations; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This document is a presentation graphic which reviews the activities of the Applied Fluid Dynamics Analysis Group at Marshall Space Flight Center (i.e., Code TD64). The work of this group focused on supporting the space transportation programs. The work of the group is in Computational Fluid Dynamic tool development. This development is driven by hardware design needs. The major applications for the design and analysis tools are: turbines, pumps, propulsion-to-airframe integration, and combustion devices.
CASI
Computational Fluid Dynamics; NASA Programs; Product Development

20010047564 Mississippi State Univ., Engineering Research Center, Mississippi State, MS USA
Computational Simulation of Unsteady, Viscous, Hypersonic Flow about Flight Vehicles with Store Separation ***Final Report, 1 Oct. 1994 - 15 Jan. 1997***
Marcum, David L.; Feb. 28, 2001; 25p; In English; Original contains color plates
Contract(s)/Grant(s): F49620-95-1-0020
Report No.(s): AD-A388097; AFRL-SR-BL-TR-01-0189; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This project describes a research project to develop a computational capability to accurately and efficiently simulate unsteady, three-dimensional, hypersonic, viscous flow fields about realistic flight vehicle configurations with separating stores and/or components. Unstructured grid technology with an advanced implicit high-resolution flow field solution algorithm is utilized as the basis for this computational capability. The solution algorithm uses an implicit Newton-relaxation scheme with approximate LU factorization and Roe flux-difference splitting. A new unstructured grid generation procedure labeled Advancing-Front/Local-Reconnection (AFLR) was developed that significantly improves the state-of-the-art. This procedure uses an iterative point placement scheme. New points are generated using advancing-front type point placement and the connectivity is optimized with iterative local-reconnection. The combined efficiency, quality, and robustness for AFLR are a substantial improvement over existing techniques. Unsteady and steady flow fields about complex flight vehicles with separating components were simulated to demonstrate, test, and validate the overall computational procedure.
DTIC
Computational Fluid Dynamics; Flow Visualization; Flux Difference Splitting; Grid Generation (Mathematics); Unstructured Grids (Mathematics); Computerized Simulation; Unsteady Flow; Viscous Flow; External Store Separation; Hypersonic Aircraft; Launch Vehicles

20010047580 Stanford Univ., Dept. of Aeronautics and Astronautics, Stanford, CA USA
Numerical Study of Leading-Edge Heat Transfer Under Free-Stream Turbulence ***Final Report, 1 Jan. 1997-30 Sep. 2000***
Lele, Sanjiva K.; Xiong, Zhongmin; Sep. 30, 2000; 20p; In English
Contract(s)/Grant(s): F49620-97-1-0047; AF Proj. 2307
Report No.(s): AD-A388149; AFRL-SR-BL-TR-01-0203; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The effect of incoming organized disturbance and free-stream turbulence on leading-edge heat transfer is investigated numerically. An optimum length scale is found to give the maximum heat transfer enhancement for the organized disturbance case.

Beyond this optimum value, the enhancement decreases with the increase of length scale. For the free-steam turbulence case, large eddy simulation with dynamic SGS model is performed at Reynolds number Re(D) = 10(exp 4) based on upstream velocity u(infinity) and the leading edge diameter of curvature D. The free-stream turbulence is specified as homogeneous, isotropic turbulence with intensity U'(rm8)/U(infinity) = 0.08 and integral length scale L/D = 0.1. Three different regions characterize the interaction of turbulence impinging on the leading edge. For the conditions of the simulations a turbulent beat transfer enhancement of 11% is obtained, which is in fair agreement with the experimental data. The level of heat transfer enhancement is modest because of the Reynolds number is low. However, our results show that in the region very close to the leading edge, the energetic turbulence length scale decreases to the order of 2-3 times the local boundary layer thickness, so a high grid resolution is needed for accurate prediction of heat transfer using large eddy simulation. This is a challenge for future investigations where simulations at higher Reynolds numbers and transonic flow conditions are planned. Our results motivate a hybrid simulation strategy where the turbulence outside and away from a blade surface is captured using LES techniques while a finer DNS-like grid is embedded within the near-wall region to resolve the smaller eddies responsible for near-wall effects. Such a methodology is being developed in an extension of the work supported under this grant.
DTIC
Leading Edges; Aerodynamic Heat Transfer; Aerothermodynamics; Turbulent Heat Transfer; Augmentation

20010047581 Rensselaer Polytechnic Inst., Dept. of Mechanical Engineering Aeronautical Engineering and Mechanics, Troy, NY USA
Fellowships for the Advancement of Large-Eddy Simulation ***Final Report, 1 Jul. 1997-30 Jun. 2000***
Jansen, Kenneth; Tejada-Martinez, Andrew; Jan. 15, 2001; 24p; In English
Contract(s)/Grant(s): F49620-97-1-0478
Report No.(s): AD-A388152; A10804; AFRL-SR-BL-TR-01-0187; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In many complex flows, large-eddy simulation is difficult due to the simultaneous presence of a variety of flow features, often with quite different resolution requirements. For this reason, unstructured-grid large-eddy simulation techniques are being developed using the finite element method to solve the compressible Navier-Stokes equations with a dynamic model of the subgrid-scale stresses. As the purpose of this report was to support graduate student education, the bulk of this report is taken from the work of the student supported by this research (Andres Tejada-Martinez). That student has focused on the characterization of filters used within the dynamic subgrid-scale model for large eddy simulation. Though he is not quite finished, this report clearly shows that much was learned under the three years of support by the AFOSR.
DTIC
Large Eddy Simulation; Unstructured Grids (Mathematics); Mathematical Models

20010047670 NASA Ames Research Center, Moffett Field, CA USA
Rotational Relaxation Analysis of Nitrogen in Low-Density Freejet Expansions
Gochberg, Lawrence A., National Research Council; Haas, Brian L., NASA Ames Research Center, USA; [1994]; 2p; In English; 19th International Symposium on Purified Gas Dynamics, Oxford, Colorado Springs, CO, UK, USA
Contract(s)/Grant(s): RTOP 232-01-04; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The phenomena of rotational relaxation of nitrogen has been examined by numerous investigators over many years. One of the experiments which has been performed examines nonequilibrium flow in low-density free jet expansions. Data have been taken in such flows using a variety of techniques, including time-of-flight methods and electron beam fluorescence spectroscopy. The direct flow properties measured in these different investigations, such as density and translational, rotational and vibrational temperatures generally show reasonable agreement. However, this kind of correlation from experiment to experiment tends to be lost when these data are analyzed to obtain rotational relaxation time or collision number. The goal of such data analyses is to generate a succinct model for rotational relaxation in nitrogen which is essential for the computation of nonequilibrium rarefied flows. The objective of the present work is to process a large body of experimental data in a consistent manner to yield relaxation model parameters of the greatest utility for flow computations.
Author
Nonequilibrium Flow; Relaxation Method (Mathematics); Mathematical Models

20010047688 Iowa Univ., Iowa Inst. of Hydraulic Research, Iowa City, IA USA
A Flow Visualization Study of Vortex Interaction With the Wake of a Sphere
Sun, M., Iowa Univ., USA; Marshall, J. S., Iowa Univ., USA; Journal of Fluids Engineering; September 2000; Volume 122, pp. 560-568; In English

Contract(s)/Grant(s): DAAH04-96-1-0081
Report No.(s): AD-A385796; ARO-34934.15-EG; Copyright; Avail: Defense Technical Information Center (DTIC)

A study of the interaction between an initially columnar intake vortex (hereinafter referred to as the primary vortex) and vortex structures in the wake of a single sphere (hereinafter referred to as secondary vertices) is performed using a series of flow visualization experiments, in which a sphere is towed toward a stationary vortex with ambient axial flow and gradually decelerated to rest at a specified distance from the vortex core axis. Both the primary vortex core and the boundary layer of the sphere are visualized using laser-induced fluorescent dyes of two different colors, which are illuminated either with a laser sheet or a laser volume. The strength of the primary vortex is measured using particle-image velocimeter, which is also used to measure the strength of the secondary vortices in select cases. The form of the sphere wake in the presence of the primary vortex and the effect of the induced velocity from the secondary vortices on the primary vortex are studied for different values of the vortex core radius. Weak secondary vortices are observed to induce formation of small-amplitude waves of varying core area on the primary vortex, eventually forming a turbulent sheath surrounding the primary vortex. Stronger secondary vortices have an increasingly strong effect on the primary vortex, including large-amplitude variation in core area, outward ejection of fluid from the primary vortex core, and breakdown of the primary vortex.

DTIC

Flow Visualization; Particle Image Velocimetry; Vortices; Turbulent Flow; Turbulence; Wakes

20010047996 NASA Ames Research Center, Moffett Field, CA USA

Large Eddy Simulation of Homogeneous Rotating Turbulence

Squires, Kyle D., Vermont Univ., USA; Mansour, Nagi N., NASA Ames Research Center, USA; Cambon, Claude, Ecole Centrale de Lyon, France; Chasnov, Jeffrey R., Hong Kong Univ. of Science and Technology, Hong Kong; [1994]; 4p; In English; 74th AGARD Symposium on Application of Direct and Large Eddy Simulation to Transition and Turbulence, 18-21 Apr. 1994, Chania, Greece; Sponsored by Advisory Group for Aeronautical Research and Development, France

Contract(s)/Grant(s): RTOP 505-59-50; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Study of turbulent flows in rotating reference frames has proven to be one of the more challenging areas of turbulence research. The large number of theoretical, experimental, and computational studies performed over the years have demonstrated that the effect of solid-body rotation on turbulent flows is subtle and remains exceedingly difficult to predict. Because of the complexities associated with non-homogeneous turbulence, it is worthwhile to examine the effect of steady system rotation on the evolution of an initially isotropic turbulent flow. The assumption of statistical homogeneity considerably simplifies analysis and computation; calculation of homogeneous turbulence is further motivated since it possesses the essential physics found in more complex rotating flows. The principal objectives of the present study have therefore been to increase our fundamental understanding of turbulent flows in rotating reference frames through an examination of the asymptotic state of homogeneous rotating turbulence; particularly as to the existence of an asymptotic state which is self similar. Knowledge of an asymptotic similarity state permits prediction of the ultimate statistical evolution of the flow without requiring detailed knowledge of the complex, and not well understood, non-linear transfer processes. Aside from examination of possible similarity states in rotating turbulence, of further interest in this study has been an examination of the degree to which solid-body rotation induces a two-dimensional state in an initially isotropic flow.

Derived from text

Homogeneous Turbulence; Rotating Bodies; Turbulent Flow; Large Eddy Simulation

20010048404 NASA Glenn Research Center, Cleveland, OH USA

Effects of Gravity on Cocurrent Two-Phase Gas-Liquid Flows Through Packed Columns

Motil, Brian J., NASA Glenn Research Center, USA; Balakotaiah, Vemuri, Houston Univ., USA; Kamotani, Yasuhiro, Case Western Reserve Univ., USA; February 2001; 16p; In English; 39th Aerospace Sciences Meeting and Exhibit, 8-11 Jan. 2001, Reno, NV, USA; Sponsored by American Inst. for Research, USA

Contract(s)/Grant(s): RTOP 101-53-00

Report No.(s): NASA/TM-2001-210705; E-12636; NAS 1.15:210705; AIAA Paper 2001-0767; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This work presents the experimental results of research on the influence of gravity on flow pattern transitions, pressure drop and flow characteristics for cocurrent gas-liquid two-phase flow through packed columns. The flow pattern transition data indicates that the pulse flow regime exists over a wider range of gas and liquid flow rates under reduced gravity conditions compared to normal gravity cocurrent down-flow. This is illustrated by comparing the flow regime transitions found in reduced gravity with the transitions predicted by Talmor. Next, the effect of gravity on the total pressure drop in a packed column is shown to depend on the flow regime. The difference is roughly equivalent to the liquid static head for bubbly flow but begins to decrease

at the onset of pulse flow. As the spray flow regime is approached by increasing the gas to liquid ratio, the effect of gravity on pressure drop becomes negligible. Finally, gravity tends to suppress the amplitude of each pressure pulse. An example of this phenomenon is presented.
Author
Two Phase Flow; Liquid Flow; Liquid-Gas Mixtures; Gravitational Effects; Flow Characteristics; Transition Flow; Flow Distribution

20010048424 NASA Goddard Space Flight Center, Greenbelt, MD USA
A 7.5-Year Dataset of SSM/I-Derived Surface Turbulent Fluxes Over Global Oceans
Chou, Shu-Hsien, NASA Goddard Space Flight Center, USA; Shie, Chung-Lin, NASA Goddard Space Flight Center, USA; Atlas, Robert M., NASA Goddard Space Flight Center, USA; Ardizzone, Joe, NASA Goddard Space Flight Center, USA; Nelkin, Eric, NASA Goddard Space Flight Center, USA; [2001]; 1p; In English; WCRP/SCOR Workshop, 21-25 May 2001, Washington, DC, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The surface turbulent fluxes of momentum, latent heat, and sensible heat over global oceans are essential to weather, climate and ocean problems. Wind stress is the major forcing for driving the oceanic circulation, while Evaporation is a key component of hydrological cycle and surface heat budget. We have produced a 7.5-year (July 1987-December 1994) dataset of daily, individual monthly-mean and climatological (1988-94) monthly-mean surface turbulent fluxes over the global oceans from measurements of the Special Sensor Microwave/Imager (SSM/I) on board the US Defense Meteorological Satellite Program F8, F10, and F11 satellites. It has a spatial resolution of 2.0x2.5 latitude-longitude. Daily turbulent fluxes are derived from daily data of SSM/I surface winds and specific humidity, National Centers for Environmental Prediction (NCEP) sea surface temperatures, and European Centre for Medium-Range Weather Forecasts (ECMWF) air-sea temperature differences, using a stability-dependent bulk scheme. The retrieved instantaneous surface air humidity (with a 25-km resolution) IS found to be generally accurate as compared to the collocated radiosonde observations over global oceans. The surface wind speed and specific humidity (latent heat flux) derived from the F10 SSM/I are found to be -encrally smaller (larger) than those retrieved from the F11 SSM/I. The F11 SSM/I appears to have slightly better retrieval accuracy for surface wind speed and humidity as compared to the F10 SSM/I. This difference may be due to the orbital drift of the F10 satellite. The daily wind stresses and latent heat fluxes retrieved from F10 and F11 SSM/Is show useful accuracy as verified against the research quality in si -neasurerrients (IMET buoy, RV Moana Wave, and RV Wecoma) in the western Pacific warm pool during the TOGA COARE Intensive observing period (November 1992-February 1993). The 1988-94 seasonal-mean turbulent fluxes and input variables derived from FS and F11 SSM/Is show reasonable patterns related to seasonal variations of atmospheric general circulation. This dataset of SSM/I-derived turbulent fluxes is useful for climate studies, forcing of ocean models, and validation of coupled ocean-atmosphere global models and can be accessed through the NASA/GSFC Distributed Active Archive Center.
Author
Air Water Interactions; Atmospheric Models; Climatology; Heat Flux; Hydrological Cycle; Temperature Gradients; Weather Forecasting; Data Bases; Turbulent Flow

20010048655 Army Aviation and Missile Command, Army Aeroflightdynamics Directorate, Moffett Field, CA USA
CHSSI Software for Geometrically Complex Unsteady Aerodynamic Applications
Chan, William M., Army Aviation and Missile Command, USA; Meakin, Robert L., Army Aviation and Missile Command, USA; Potsdam, Mark A., Army Aviation and Missile Command, USA; [2001]; 1p; In English; 15th AIAA Computational Fluid Dynamics Conference, 11-14 Jun. 2001, Anaheim, CA, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA; No Copyright; Avail: Issuing Activity; Abstract Only

A comprehensive package of scalable overset grid CFD software is reviewed. The software facilitates accurate simulation of complete aircraft aerodynamics, including viscous effects, unsteadiness, and relative motion between component parts. The software significantly lowers the manpower and computer costs normally associated with such efforts. The software is discussed in terms of current capabilities and planned future enhancements.
Author
Computational Fluid Dynamics; Computerized Simulation; Computer Programs; Computational Grids; Aerodynamic Characteristics; Viscous Flow

20010048656 NASA Ames Research Center, Moffett Field, CA USA
Non-Linear Lessons from Axisymmetric Vortex Rings
Shariff, Karim, NASA Ames Research Center, USA; [2001]; 1p; In English; Nonlinear Science Seminar, 14-28 May 2001, IL, USA; No Copyright; Avail: Issuing Activity; Abstract Only

For presentation at Northwestern University, May 14-28, 2001, the talk will present two types of phenomena, both recognizable to students of nonlinearity, that are exhibited by axisymmetric vortex rings in numerical and laboratory experiments. (1) The first type of phenomenon is reminiscent of inelastic solitons.
Author
Vortex Rings; Vortices; Education

20010048672 NASA Ames Research Center, Moffett Field, CA USA
A Note on Conservation Laws for Keplerian Flows
Davis, Sanford, NASA Ames Research Center, USA; Dec. 06, 2000; 10p; In English
Contract(s)/Grant(s): RTOP 274-52-00-50; Copyright; Avail: Issuing Activity

The straightforward use of numerical conservation laws in curvilinear coordinates for flows with strong gravitational/centrifugal force coupling may induce significant errors. The numerical error when computing a simple Keplerian flow in polar coordinates is examined and traced to an incompatible finite-differencing sequence similar to that found in other applications. An alternate form of the conservation law in polar coordinates that exactly captures a Keplerian flow is presented and suggested for use in certain situations.
Author
Conservation Laws; Polar Coordinates; Spherical Coordinates; Flow Equations

20010048684 NASA Ames Research Center, Moffett Field, CA USA
The Roles of Large- and Small-Scale Structures in Turbulent Free Shear Layers
Moser, Robert D., NASA Ames Research Center, USA; [1994]; 2p; In English; 12th U.S. National Congress of Applied Mechanics, 26 Jun. - 1 Jul. 1994, Seattle, WA, USA
Contract(s)/Grant(s): RTOP 505-59-50; No Copyright; Avail: Issuing Activity; Abstract Only

The occurrence of large-scale coherent structures in turbulent free shear flows (especially the planar mixing layer) has been recognized for some time. Indeed, the observation of such structures in mixing layers did much to promote interest in the study of coherent structures in turbulence. It has been widely assumed that the large-scale structures in these flows are responsible for the entrainment of free-stream fluid and the overall growth of the layer, while the small-scale structures provide mixing and dissipation. A model of scalar mixing based on these ideas was proposed for these flows. However, recent experimental and computational evidence suggests that the dominance of the large-scale structures in turbulent mixing layers is not universal. In addition, there is a substantial variation among experiments in several statistical measures of self-similar mixing layers, for example growth rate and velocity variances. To investigate the importance of large-scale structures, several free shear flows (mixing layers and wakes) have been simulated via direct numerical simulation. The simulations are designed to mimic experimental mixing layers in which the splitter plate boundary layers are turbulent. Different levels of two-dimensional forcing are included resulting in large-scale structures of differing strength and importance. These simulations are used to investigate the role of large-scale coherent structures in free shear layers and the effect of these structures on relevant turbulence statistics and scalar mixing. It is found that the statistics and structures in several experiments involving turbulent mixing layers are in better agreement with simulations that do not exhibit dominant large-scale structures than those in which the common mixing layer structures do dominate. It is also found that the level of forcing can have a profound effect on the qualitative and quantitative features of these shear layer, even when they are nominally self-similar.
Author
Turbulent Flow; Shear Flow; Shear Layers; Planar Structures

20010048889 NASA Glenn Research Center, Cleveland, OH USA
Reduced Gravity Gas and Liquid Flows: Simple Data for Complex Problems
McQuillen, John, NASA Glenn Research Center, USA; Motil, Brian, NASA Glenn Research Center, USA; February 2001; 14p; In English; 39th Aerospace Sciences Meeting and Exhibit, 8-11 Jan. 2001, Reno, NV, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA
Contract(s)/Grant(s): RTOP 101-53-00
Report No.(s): NASA/TM-2001-210681; E-12608; NAS 1.15:210681; AIAA Paper 2001-0324; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

While there have been many studies for two-phase flow through straight cylindrical tubes, more recently, a new group of studies have emerged that examine two-phase flow through non-straight, non-cylindrical geometries, including expansions, contractions, tees, packed beds and cyclonic separation devices. Although these studies are still, relatively speaking, in their

infancy, they have provided valuable information regarding the importance of the flow momentum, and the existence of liquid dryout due to sharp comers in microgravity.
Author
Two Phase Flow; Microgravity; Gas Flow; Liquid Flow

35
INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gauges; detectors; cameras and photographic supplies; and holography. For aerial photography see 43 Earth Resources and Remote Sensing. For related information see also 06 Avionics and Aircraft Instrumentation; and 19 Spacecraft Instrumentation.

20010044248 Naval Postgraduate School, Dept. of Aeronautics and Astronautics, Monterey, CA USA
A Phase Locked High Speed Real-Time Interferometry System for Large Amplitude Unsteady Flows
Chandrasekhara, M. S., Naval Postgraduate School, USA; Squires, D. D., Sverdrup Technology, Inc., USA; Wilder, M. C., MCAT Inst., USA; Carr, L. W., NASA Ames Research Center, USA; [1994]; 2p; In English; Seventh International Symposium on Applications of Laser Techniques to Fluid Mechanics, 11-14 Jul. 1994, Lisbon, Portugal
Contract(s)/Grant(s): RTOP 505-59-53; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

A high speed phase locked interferometry system has been designed and developed for real-time measurements of the dynamic stall flow over a pitching airfoil. Point diffraction interferograms of incipient flow separation over a sinusoidally oscillating airfoil have been obtained at rates of up to 20 KHz and for free stream Mach numbers of 0.3 and 0.45. The images were recorded on ASA 125 and ASA 400 film using a drum camera. Special electronic timing and synchronizing circuits were developed to trigger the laser light source from the camera, and to initiate acquisition of the interferogram sequence from any desired phase angle of oscillation. The airfoil instantaneous angle of attack data provided by an optical encoder was recorded via a FIFO and in EPROM into a microcomputer. The interferograms have been analyzed using software developed in-house to get quantitative flow density and pressure distributions.
Author
Interferometry; High Speed; Design Analysis; Fabrication; Aerodynamic Stalling; Airfoils; Flow Distribution; Unsteady Flow; Phase Locked Systems

20010045634 Army Construction Engineering Research Lab., Champaign, IL USA
Evaluation and Demonstration of an Advanced Electromagnetic System for Nonintrusive Underground Surveys *Final Report*
Nielsen, Paul H.; Jan. 1998; 58p; In English
Report No.(s): AD-A344701; CERL-FEAP-TR-98/38; No Copyright; Avail: Defense Technical Information Center (DTIC)

This report documents field evaluations of the capabilities of GEM-1, an electromagnetic subsurface surveying instrument. GEM-1 was developed under the Small Business Innovative Research (SBIR) program as a tool for the expedient location of lost underground fuel storage tanks. GEM-1's characteristics allow its application to a variety of nonintrusive subsurface exploration applications. Evaluations conducted by USACERL included successful location and mapping of known and unknown underground storage tanks, pipes, a leach field, and a retired landfill. Searches for small buried pipes and small surface placed ordnance were relatively unsuccessful, however, because the geometry and sensitivity of GEM-1 were designed for significantly larger targets. Many more applications of electromagnetic subsurface exploration will likely become common with the availability of GEM-300, a commercially produced device based on the concepts and capabilities tested in this program.
DTIC
Underground Structures; Pipes (Tubes); Underground Storage; Storage Tanks; Surveys

20010045714 Prins Maurits Lab. TNO, Rijswijk, Netherlands
Mass Calculations from X-Ray Shadowgraphs Using Image Processing, Phase 2 *Final Report Massabepaling van Granaatscherven met Behulp van Beeldanalyse uit 'X-ray Shadowgraphs', Fase 2*
vanderWulp, C. J. M., Prins Maurits Lab. TNO, Netherlands; August 2000; 52p; In Dutch; Original contains color illustrations
Contract(s)/Grant(s): B96/KL/497; TNO Proj. 014.10661
Report No.(s): TD-2000-0005; TNO-PML-2000-A3; Copyright; Avail: Issuing Activity

In this report (Phase 2) two important aspects with respect to the calculation of the mass of shell fragments from X-ray shadowgraphs have been investigated. The first one is an extension to the experience from phase I and confirms the earlier

conclusion that a much better linear relationship is obtained between grey value and thickness of an object when the X-ray shadowgraph is scanned in a linear way i.s.o. a logarithmic one, especially when the settings of the minimum and maximum grey value range are chosen properly. A new background correction procedure is developed and applied to a heavy distorted image with excellent results. This procedure is applied during the investigation into the effect a change in threshold value has on the total and mean object grey value. It appeared that, due to convergence properties, the total grey value is the best parameter for the mass calculation. to obtain a more accurate determination of the mass of thin objects a dilation of thin objects is necessary. During this study the importance of another phenomenon, the grey value distribution within thick objects, became clear. This topic is dealt with in phase 3.
Author
Mass; Computation; X Rays; Shadowgraph Photography

20010045809 Kyushu Univ., Fukuoka, Japan
Development of a Filter for Real-Time Failure Diagnosis of Instruments
Yamagata, Kenichi, Kyushu Univ., Japan; Takeda, Kazuhiro, Kyushu Univ., Japan; Tsuge, Yoshifumi, Kyushu Univ., Japan; Matsuyama, Hisayoshi, Kyushu Univ., Japan; Technology Reports of Kyushu University; March 2001; ISSN 0023-2718; Volume 74, No. 2, pp. 75-82; In Japanese; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A filter is proposed to estimate both faulty biases in the measured values and the state variables not influenced by failure sensors. The estimated state variables can be applied to advanced control. The estimated faulty biases can be used for the maintenance of instruments. The performance of the proposed filter is demonstrated by use of simulations where the filter is applied to several types of failures in an ideal objective system.
Author
Kalman Filters; Real Time Operation; Failure Analysis

20010046959 NASA Marshall Space Flight Center, Huntsville, AL USA
X-33 XRS-2200 Linear Aerospike Engine Sea Level Plume Radiation
DAgostino, Mark, NASA Marshall Space Flight Center, USA; Lee, Young C., NASA Marshall Space Flight Center, USA; Wang, Ten-See, NASA Marshall Space Flight Center, USA; [2001]; 13p; In English; Fluids Workshop, 5 Apr. 2001, Huntsville, AL, USA; Original contains color illustrations; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This paper presents radiation data for the linear aerospike engine.
CASI
Aerospike Engines; Plumes

20010046965 NASA Marshall Space Flight Center, Huntsville, AL USA
Analysis of Spacelab-III Reconstructed Wavefronts by Non-Holographic Methods
Vikram, Chandra S., Alabama Univ., USA; Witherow, William K., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; SPIE Conference, 30 Jul. 2001, San Diego, CA, USA; Sponsored by International Society for Optical Engineering, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Holography has been used in several past space missions. One popular experimental mode deals with study of fluid refractive properties in the crystal growth cell. The perceived advantage of holography is that it stores and reconstructs wavefronts so that a complete information is available later on ground. That means the wavefront can be analyzed not only by traditional holographic interferometry but other means as well. We have successfully demonstrated two such means being described here. One is deflectometry using a Ronchi grating and the other confocal optical processing. These results, using holograms from Spacelab-III mission dealing with triglycine sulfate crystal growth clearly demonstrate that a single hardware (holography) can do the task of several fluid experimental systems. Finally, not experimentally demonstrated, the possibility of some other analysis modes like speckle techniques and video holography using the reconstructed wavefronts have been described. Since only traditional holographic interferometry has been used in the past leading to the argument that non-holographic interferometry hardware in space could do the job, the present study firmly establishes advantage of holography.
Author
Spacelab; Wave Fronts; Holography

20010046996 Prins Maurits Lab. TNO, Rijswijk, Netherlands

Optimalization of the End of Service Life Indicator (ESLI), based on the principle of expellation ***Final Report Optimalisatie van de Filterbusdoorbraakdetector, Gebaseerd op het Verdringingsprincipe***

vanVoorde, M. J., Prins Maurits Lab. TNO, Netherlands; February 2001; 68p; In Dutch; Original contains color illustrations

Contract(s)/Grant(s): A95/KL/431; TNO Proj. 014.11889

Report No.(s): TD-2000-0071; TNO-PML-2000-A69; Copyright; Avail: Issuing Activity

An End of Service Life Indicator (ESLI) for canisters has been developed which is easy to integrate into an activated carbon bed. It has no electronic parts and uses the human nose as a detector. The ESLI is suitable for substances that are capable to expel the odorous substance THT (Tetrahydrothiofene) or IAA (Isoamyl Acetate) from a loaded sorbent plug. Further it is proven that the ESLI operates properly under widely varying conditions, like: a concentration range of environmental pollution of 550 to 3000 mg/cubic m; a relative humidity between 0 to 90%; for breathing rates between 15 to 60 l/min; at temperatures lower than the desorption temperature of the aromatic substances, i.e. approximately 50 C for the used substances. Degradation and migration of the odorous substance from the plug into the surrounding carbon could be a problem. Therefor further investigation to stability of the adsorbed odor substance on the plug is necessary. On the basis of the present data it is not certain that the ESLI warns on time when a wearer uses his mask in an environment of extreme toxics, like Sarin. It has to be investigated whether the ESLI also works for toxic industrial gases, like Chlorine, Ammonia. Possibly the increase of temperature caused by chemisorption is capable to release the aromatic substance.

Author

Service Life; Cans

20010047664 Naval Research Lab., Oceanography Div., Stennis Space Center, MS USA

Meeting Navy Needs with the Generic Lidar Model

McBride, Walton E., III, Planning Systems, Inc., USA; Weidemann, Alan D., Naval Research Lab., USA; Shoemaker, J. Todd, Planning Systems, Inc., USA; Dec. 27, 2000; ISSN 0277-786X; 12p; In English; SPIE Conference on Airborne and In-Water Underwater Imaging, July 1999, Denver, CO, USA; Sponsored by International Society for Optical Engineering, USA

Contract(s)/Grant(s): N00014-99-C-0187

Report No.(s): AD-A386242; NRL/PP/7330-00/0063; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Under sponsorship from ONR, Planning Systems Incorporated (PSI) is developing the Generic Lidar Model (GLM) to compare different Lidar systems (pulsed/CW, airborne/in-water, monostatic/bistatic, wide/narrow beamwidth) using a consistent treatment of the environment. The model uses Modulation Transfer Functions to incorporate environmental influences on image detection and blurring. Environmental parameters include absorption, the depth-dependent effect of a scattering layer within the atmosphere and the water column, backscattering, bottom and target reflectivity, wind-driven air/sea interface changes. System parameters considered include source/receiver geometry, various spot and scan configurations, optical defocusing, and power. System electronics and image processing are being incorporated. GLM presently models a pulsed, range-gated system and a CW laser line scanner with the help of interactive GUIs which allow the user to instantly see and evaluate the effect of changes in important system and environment variables. Optical profiles obtained during the Oceanside ’95 exercise sponsored by NRL’s Littoral Optical Environment program were used to test GLM predictions. During this exercise, the optical signatures of passing internal waves were noted as having a dramatic effect on a laser-line scanner deployed. Profiles from the exercise were used to predict laser-line scanner performance before, during, and after the passage of the internal waves.

DTIC

Navy; Requirements; Optical Radar; Laser Applications; Optical Scanners; Image Processing; Point Spread Functions; Modulation Transfer Function

20010047836 NASA Glenn Research Center, Cleveland, OH USA

Rayleigh Scattering Diagnostic for Dynamic Measurement of Velocity and Temperature

Seasholtz, Richard G., NASA Glenn Research Center, USA; Panda, J., Modern Technologies Corp., USA; March 2001; 18p; In English; 37th Aerospace Sciences Meeting and Exhibit, 11-14 Jan. 1999, Reno, NV, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA

Contract(s)/Grant(s): RTOP 274-00-00

Report No.(s): NASA/TM-2001-210698; E-12627; NAS 1.15:210698; AIAA Paper 99-0641; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A new technique for measuring dynamic gas velocity and temperature is described. The technique is based on molecular Rayleigh scattering of laser light, so no seeding of the flow is necessary. The Rayleigh scattered light is filtered with a fixed cavity, planar mirror Fabry-Perot interferometer. A minimum number of photodetectors were used in order to allow the high data

acquisition rate needed for dynamic measurements. One photomultiplier tube (PMT) was used to measure the total Rayleigh scattering, which is proportional to the gas density. Two additional PMTs were used to detect light that passes through two apertures in a mask located in the interferometer fringe plane. An uncertainty analysis was used to select the optimum aperture parameters and to predict the measurement uncertainty due to photon shot-noise. Results of an experiment to measure the velocity of a subsonic free jet are presented.
Author
Rayleigh Scattering; Velocity Measurement; Gas Density; Light Scattering

20010048413 NASA Ames Research Center, Moffett Field, CA USA
The Visibility of Earth Transits
Castellano, Timothy P., NASA Ames Research Center, USA; Doyle, Laurance, Search for Extraterrestrial Intelligence Inst., USA; McIntosh, Dawn, Symtec Corp., USA; [2000]; 1p; In English; IAU Conference, Unknown; Sponsored by International Astronomical Union, Unknown
Contract(s)/Grant(s): RTOP 274-52-00-28; No Copyright; Avail: Issuing Activity; Abstract Only

The recent photometric detection of planetary transits of the solar-like star HD 209458 at a distance of 47 parsecs suggest that transits can reveal the presence of Jupiter-size planetary companions in the solar neighborhood. Recent space-based transit searches have achieved photometric precision within an order of magnitude of that required to detect the much smaller transit signal of an earth-size planet across a solar-size star. Laboratory experiments in the presence of realistic noise sources have shown that CCDs can achieve photometric precision adequate to detect the 9.6 E-5 dimming of the Sun due to a transit of the Earth. Space-based solar irradiance monitoring has shown that the intrinsic variability of the Sun would not preclude such a detection. Transits of the Sun by the Earth would be detectable by observers that reside within a narrow band of sky positions near the ecliptic plane, if the observers possess current Earth epoch levels of technology and astronomical expertise. A catalog of solar-like stars that satisfy the geometric condition for Earth transit visibility are presented.
Author
Photometry; A Stars; Light (Visible Radiation); Narrowband; Visibility

20010048420 NASA Goddard Space Flight Center, Greenbelt, MD USA
SMART Ground-based Radiation Measurements during PRIDE
Tsay, Si-Chee, NASA Goddard Space Flight Center, USA; Ji, Qiang, Science Systems and Applications, Inc., USA; Hansel, R., California Univ., USA; Pilewskie, P., NASA Ames Research Center, USA; [2000]; 1p; In English; AGU Fall Meeting, 15-19 Dec. 2000, San Francisco, CA, USA; Sponsored by American Geophysical Union, USA; No Copyright; Avail: Issuing Activity; Abstract Only

We deployed a suite of ground-based remote sensing instruments - SMART (Surface Measurements for Atmospheric Radiative Transfer), at the Roosevelt Road Naval Station in Puerto Rico during the Puerto Rico Dust Experiment (PRIDE). The instruments include several solar and infrared broadband radiometers, a sunphotometer, a shadow-band radiometer, a micro-pulse lidar, a total-sky imager, a microwave radiometer, and two solar spectrometers. These radiometers were set up on a mobile platform and a solar tracker. During 27 June - 23 July, about 25 days of data were acquired under partially cloudy sky conditions. The diurnal air temperature was fluctuating around 28.6 C to within a few degrees. Daytime average of solar irradiance reaching at the surface was ranged from about 400 W/sq m on a rainy day to about 640 W/sq m on a cloud-free day. The infrared irradiance at the surface during the measurement period was averaged about 408 W/sq m. The heights of boundary layer, dusts and clouds were captured by lidar images. Based on sunphotometer and shadow-band radiometer retrievals, the aerosol optical thickness varied from below 0.1 to over 0.6. Combining with radiative transfer modeling and other in-situ and remote sensing measurements, our ground-based measurements provide vital information on understanding the long-range transport of African dust into the Caribbean.
Author
Solar Spectrometers; Microwave Radiometers; Boundary Layers; Dust; Temperature Measurement

20010048421 NASA Goddard Space Flight Center, Greenbelt, MD USA
Scaling Issues Between Plot and Satellite Radiobrightness Observations of Arctic Tundra
Kim, Edward J., NASA Goddard Space Flight Center, USA; England, Anthony W., Michigan Univ., USA; Judge, Jasmeet, Indiana Univ., USA; [2000]; 1p; In English; Fall Meeting of the American Geophysical Union, 14-17 Dec. 2000, San Francisco, CA, USA; Sponsored by American Geophysical Union, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Data from generation of satellite microwave radiometer will allow the detection of seasonal to decadal changes in the arctic hydrology cycle as expressed in temporal and spatial patterns of moisture stored in soil and snow This nw capability will require

calibrated Land Surface Process/Radiobrightness (LSP/R) model for the principal terrains found in the circumpolar Arctic. These LSP/R models can than be used in weak constraint. Dimensional Data Assimilation (DDA)of the daily satellite observation to estimate temperature and moisture profiles within the permafrost in active layer.
Author
Annual Variations; Earth Surface; Hydrology; Moisture; Periodic Variations; Snow; Soil Moisture

20010048425 NASA Goddard Space Flight Center, Greenbelt, MD USA
MODIS Status
Salomonson, Vincent V., NASA Goddard Space Flight Center, USA; [2001]; 1p; In English; ASPRS Conference, 23-26 Apr. 2001, Saint Louis, MO, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The Moderate Resolution Imaging Spectroradiometer (MODIS) was sent into orbit on the Earth Observing System (EOS) Terra spacecraft in December 1999. The MODIS began taking observations on February 24, 2000. Instrument checkout and characterization progressed to the point in the Fall of 2000 along with the checkout of algorithms so that approximately 40 products for land, ocean and atmosphere studies on global and regional scales were and are now being produced systematically. These products are now designated ”beta”, products indicating that they are still being examined and validated, but in most cases are amenable to examination by the scientific and applications community to further assess their utility and provide feedback to the validation process and the MODIS Science Team. It is expected that many products will progress to ”provisionally useful” or fully ”validated” status by mid-year 2001. one goal is to produce a systematically processed data set by the end of 2001 from MODIS extends from November 2000 through October 2001. Overall the MODIS instrument and the associated data processing systems are performing well. The many examples of MODIS observations indicate that the prospect for highly useful and exciting studies of the Earth-atmosphere system using MODIS data looks very good.
Author
Imaging Spectrometers; Imaging Techniques; Spectroradiometers; Feedback; Earth Observing System (EOS)

20010048751 NASA Marshall Space Flight Center, Huntsville, AL USA
Design and Fabrication of a Fabry-Perot Electrooptic Modulator
Banks, C., Alabama A & M Univ., USA; Yelleswarapu, C., Alabama A & M Univ., USA; Sharma, A., Alabama A & M Univ., USA; Frazier, D., NASA Marshall Space Flight Center, USA; Penn, B., NASA Marshall Space Flight Center, USA; Abdeldayem, H., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; 13th Semi-Annual Project Review Meeting, 23 Feb. 2001, Atlanta, GA, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The research to design a Fabry-Perot electrooptic modulator with an intracavity electrooptically active organic material is based on the initial results of Wang et. al. using poled polymer thin films. The main feature of the proposed device is the observation that in traditional electrooptic modulators like a Pockels cell, it requires few kilovolts of driving voltage to cause a 3 dB modulation even in high figure-of-merit electrooptic materials like LiNbO3. The driving voltage for the modulator can be reduced to as low as 10 volts by introducing the electrooptic material inside the resonant cavity of a Fabry-Perot modulator. This is because the transmission of the Fabry-Perot cavity varies nonlinearly with the change of refractive index or phase of light due to applied electric field. We describe in this report the progress made so far in the design and fabrication of the proposed device.
Author
Design Analysis; Modulators; Electro-Optics; Organic Materials

20010048760 NASA Marshall Space Flight Center, Huntsville, AL USA
The ATIC Experiment : Performance of the Scintillator Hodoscope and the BGO Calorimeter
Isbert, J., Louisiana State Univ., USA; [2001]; 1p; In English; International Cosmic Ray Conference, 7-15 Aug. 2001, Hamburg, Germany; Financial sponsored in part by LA Board of Regents, NSBF and National Funding Agencies in the collaborating countries; No Copyright; Avail: Issuing Activity; Abstract Only

The Advanced Thin Ionization Calorimeter (ATIC) Balloon Experiment had its first flight from McMurdo, Antarctica, 28/12/00 to 13/01/01, recording over 360 hours of data. The design goal for ATIC was to measure the Cosmic Ray composition and energy spectra from approximately 50 GeV to near 100 TeV utilizing a Si-matrix detector, a scintillator hodoscope, carbon targets and a calorimeter consisting of a stack of BGO scintillator crystals. The design, operation, and in-flight performance of the scintillator hodoscope and the BGO calorimeter are described.
Author
Calorimeters; Hodoscopes; Balloon Flight; Scintillation Counters

20010048762 NASA Marshall Space Flight Center, Huntsville, AL USA

Application of Earth Occultation to the GLAST Burst Monitor

Harmon, B., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; GLAST Science Working Group Meeting, 3 Apr. 2001, Baltimore, MD, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Estimates were made for the proposed geometry of the Gamma Ray Large Area Space Telescope (GLAST) Burst Monitor for sensitivity and number of sources detectable using the BATSE-developed Earth Occultation Technique.

Author

Gamma Ray Bursts; Occultation; Earth (Planet); Gamma Ray Telescopes

20010048764 NASA Marshall Space Flight Center, Huntsville, AL USA

High Energy Electron and Gamma - Ray Detection with ATIC

Chang, J., Max-Planck-Inst. fuer Aeronomie, Germany; Schmidt, W. K. H., Max-Planck-Inst. fuer Aeronomie, Germany; [2001]; 1p; In English; International Cosmic Ray Conference, 7-15 Aug. 2001, Hamburg, Germany; No Copyright; Avail: Issuing Activity; Abstract Only

The Advanced Thin Ionization Calorimeter (ATIC) balloon borne ionization calorimeter is well suited to record and identify high energy cosmic ray electrons, and at very high energies gamma-ray photons as well. We have simulated the performance of the instrument, and compare the simulations with actual high energy electron exposures at the CERN accelerator. Simulations and measurements do not compare exactly, in detail, but overall the simulations have predicted actual measured behavior quite well. ATIC has had its first 16 day balloon flight at the turn of the year over Antarctica, and first results obtained using the analysis methods derived from simulations and calibrations will be reported.

Author

Calorimeters; High Energy Electrons; Ionization; Gamma Rays; Simulation; Calibrating; Balloon Flight

20010048765 NASA Marshall Space Flight Center, Huntsville, AL USA

ATIC Flight Data Processing

Ahn, H. S., Maryland Univ., USA; [2001]; 1p; In English; International Cosmic Ray Conference, 7-15 Aug. 2001, Hamburg, Germany; No Copyright; Avail: Issuing Activity; Abstract Only

The first flight of the Advanced Thin Ionization Calorimeter (ATIC) experiment from McMurdo, Antarctica lasted for 16 days, starting in December, 2000. The ATIC instrument consists of a fully active 320-crystal, 960-channel Bismuth Germanate (BGO) calorimeter, 202 scintillator strips in 3 hodoscopes interleaved with a graphite target, and a 4480-pixel silicon matrix charge detector. We have developed an Object Oriented data processing package based on ROOT. In this paper, we will describe the data processing scheme used in handling the accumulated 45 GB of flight data. We will also discuss trigger issues by comparing the measured energy-dependent trigger efficiency with its simulation and calibration issues by considering the time-dependence of housekeeping information, etc.

Author

Calorimeters; Ionization; Data Processing; Balloon Flight

20010048766 NASA Marshall Space Flight Center, Huntsville, AL USA

Preliminary Results from the First Flight of ATIC: The Silicon Matrix

Adams, J. H., Jr., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; International Cosmic Ray Conference, 7-15 Aug. 2001, Hamburg, Germany; No Copyright; Avail: Issuing Activity; Abstract Only

The Advanced Thin Ionization Calorimeter (ATIC) uses a silicon matrix detector to determine charge in conjunction with a scintillator hodoscope that measures charge and trajectory. Cosmic rays that interact in a carbon target have their energy determined from the shower that develops within a fully active calorimeter composed of a stack of scintillating BGO crystals. The silicon matrix consists of 4480 individual silicon pads, each capable of measuring the signal from cosmic rays with atomic numbers from 1 to 26. Preliminary results will be presented describing the performance of the silicon matrix during the 16-day maiden flight of ATIC around Antarctica.

Author

Calorimeters; Silicon; Ionization; Hodoscopes; Balloon Flight

20010048767 NASA Marshall Space Flight Center, Huntsville, AL USA

Preliminary Results from the First Flight of ATIC: Z>8 Spectra

Adams, J. H., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; International Cosmic Ray Conference, 7-15 Aug. 2001, Hamburg, Germany; No Copyright; Avail: Issuing Activity; Abstract Only

The Advanced Thin Ionization Calorimeter (ATIC) is designed to measure individual spectra from protons to Fe for energies from 10 GeV to near 100 Tev. Preliminary results will be presented 8 less than Z less than or equal to 26 spectra from the maiden flight of ATIC in Antarctica that acquired 360 hours of data.
Author
Ionization; Energy Spectra; Calorimeters

36
LASERS AND MASERS

Includes lasing theory, laser pumping techniques, maser amplifiers, laser materials, and the assessment of laser and maser outputs. For cases where the application of the laser or maser is emphasized see also the specific category where the application is treated. For related information see also 76 Solid-State Physics.

20010044081 Emory Univ., Atlanta, GA USA
Energy Transfer Kinetics and Dynamics of Relevance to Iodine Lasers ***Final Report, 1 Nov. 1997 - 31 Oct. 2000***
Heaven, Michael C., Emory Univ., USA; Jan. 31, 2001; 44p; In English
Contract(s)/Grant(s): F49620-98-1-0054; AF Proj. 2303
Report No.(s): AD-A387548; AFRL-SR-BL-TR-01-0109; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Rate constants were measured for elementary reactions that are of importance for iodine chemical lasers driven by O2(a(sup 1) delta) (COIL) or NCl(a(sup 1) delta). Energy transfer between I(2 P(1/2)) and O2(X) has been studied in detail. Rate constants for electronic energy transfer and nuclear spin relaxation were measured over the temperature range from 150-300 K. The mechanism for dissociation of 12 in COIL systems has been examined using kinetic models and experimental studies of I(sub 2)(A') collisional deactivation. A new model for the dissociation mechanism is presented. Quenching of NCl(a) has been characterized for the collision partners O2, Cl2, HCl, H2, 12, and CIN3. These measurements resolved serious discrepancies that had emerged from earlier investigations. Removal of NCl(a) by 12 was found to be a reactive process that liberates I atoms. The second order rate constant for self-annihilation of NCl(a) was measured using time-resolved fluorescence techniques. The value obtained, (7 +/- 2)) x l0(exp-13)cu cm/s is an order of magnitude slower than previous estimates. Detection of NCl(X) by means of the b-X absorption bands was demonstrated. Time-resolved absorption measurements were used to examine the kinetics of NCl(X) formation and decay.
DTIC
Energy Transfer; Iodine; Kinetics; Chemical Lasers; Reaction Kinetics; Hydrochloric Acid

20010046484 Civil Aeromedical Inst., Oklahoma City, OK USA
Laser Pointers: Their Potential Affects on Vision and Aviation Safety ***Final Report***
Nakagawara, Van B., Civil Aeromedical Inst., USA; Montgomery, R. W., Civil Aeromedical Inst., USA; April 2001; 10p; In English
Contract(s)/Grant(s): AM-B-00-TOX-203
Report No.(s): DOT/FAA/AM-01/7; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Laser pointers have been used for years to highlight key areas on charts and screens during visual presentations. When used in a responsible manner, laser pointers are not considered hazardous. While momentary ocular exposure to the light emitted by these devices can be startling to the observer and may result in temporary visual impairment, such exposures are too brief to cause any permanent ocular injury. However, as the availability of laser pointers has increased, so have reports of their misuse by some children and adults. In recent years, both the Food and Drug Administration and the American Academy of Ophthalmology have issued warnings concerning the possibility of eye injury from handheld laser pointers and recommended keeping these devices away from children. The purpose of this report was to investigate the illumination of aircraft by laser pointers in the National Airspace System. Laser pointers have caused ocular injury and may compromise aviation safety when used to illuminate aircraft in critical phases of flight. The physiological effects of exposure to laser light and the regulation and classification of commercial laser products are discussed. The proper selection and use of these devices can minimize the threat of temporary incapacitation and eye injury.
Author
Exposure; Eye (Anatomy); Flight Safety; Lasers

20010047832 NASA Goddard Space Flight Center, Greenbelt, MD USA

Full-Time, Eye-Safe Cloud and Aerosol Lidar Observation at Atmospheric Radiation Measurement Program Sites: Instruments and Data Analysis

Campbell, James R., Science Systems and Applications, Inc., USA; Hlavka, Dennis L., Science Systems and Applications, Inc., USA; Welton, Ellsworth J., Maryland Univ. Baltimore County, USA; Flynn, Connor J., Pacific Northwest National Lab., USA; Turner, David D., Pacific Northwest National Lab., USA; Spinhirne, James D., NASA Goddard Space Flight Center, USA; Scott, V. Stanley, III, NASA Goddard Space Flight Center, USA; Hwang, I. H., Science and Engineering Services, Inc., USA; [2001]; 47p; In English

Contract(s)/Grant(s): DE-AI01-92ER-61367; DE-AC06-76RLO-1830; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Atmospheric radiative forcing, surface radiation budget, and top of the atmosphere radiance interpretation involves a knowledge of the vertical height structure of overlying cloud and aerosol layers. During the last decade, the U.S. Department of Energy through I the Atmospheric Radiation Measurement (ARM) program has constructed four long- term atmospheric observing sites in strategic climate regimes (north central Oklahoma, In Barrow. Alaska, and Nauru and Manus Islands in the tropical western Pacific). Micro Pulse Lidar (MPL) systems provide continuous, autonomous observation of all significant atmospheric cloud and aerosol at each of the central ARM facilities. Systems are compact and transmitted pulses are eye-safe. Eye-safety is achieved by expanding relatively low-powered outgoing Pulse energy through a shared, coaxial transmit/receive telescope. ARM NIPL system specifications, and specific unit optical designs are discussed. Data normalization and calibration techniques are presented. A multiple cloud boundary detection algorithm is also described. These techniques in tandem represent an operational value added processing package used to produce normalized data products for Cloud and aerosol research and the historical ARM data archive.

Author

Eye (Anatomy); Safety; Aerosols; Clouds (Meteorology); Vertical Distribution

37
MECHANICAL ENGINEERING

Includes mechanical devices and equipment; machine elements and processes. For cases where the application of a device or the host vehicle is emphasized see also the specific category where the application or vehicle is treated. For robotics see 63 Cybernetics, Artificial Intelligence, and Robotics; and 54 Man/System Technology and Life Support.

20010044096 Michigan Univ., Transportation Research Inst., Ann Arbor, MI USA

Blowout Resistant Tire Study for Commercial Highway Vehicles ***Final Report, 9 Sep. 1999 - 31 May 00***

Bareket, Z.; Blower, D. F.; MacAdam, C.; Aug. 31, 2000; 60p; In English

Report No.(s): PB2001-104625; UMTRI-2000-28; No Copyright; Avail: National Technical Information Service (NTIS)

A report of findings for Task Order No. 4 entitled 'Blowout Resistant Tire Study for Commercial Vehicles,' under the Accident Data Analysis Support project (DTRS57-97-C-00051). The report is organized by the following principal sections: (1) Overview, (2) Crash Data Analysis of Truck Tire Blowouts, (3) Information Review of Truck Tire Blowouts, (4) Blowout Resistant Tire Developments and Related Industry Contacts, and (5) Summary Observations. Section 1 provides a short summary of the report and its organization. Section 2 contains analyses conducted by the UMTRI Center for National Truck Statistics that address findings regarding the crash record relating to heavy truck tire blowouts. Observations from the crash data analysis note the very small percentage of fatal crashes associated with tire failures overall and the even smaller involvement of tire blowouts in fatal crashes when the blowout occurs at a rearward location on the truck (non-steering axle cases). Crashes related to road debris (of which tire debris represents some unknown portion) are also addressed briefly in Section 2. A key observation from the crash data analysis is the significant linkage between fatalities involving truck tire blowouts and front tire (steering axle) involvement. A strong relationship between type of crash and left-versus right-side front axle blowouts is also noted.

NTIS

Accident Investigation; Tires; Blowouts; Automobiles

20010045654 Department of the Navy, Washington, DC USA

Integrated Cable Navigation and Control System

Racette, Russell A., III, Inventor, Department of the Navy, USA; Nov. 25, 1997; 7p; In English; Supersedes US-Patent-Appl-SN-525803

Patent Info.: Filed 8 Sep. 1995; US-Patent-Appl-SN-525,803; US-Patent-5,691,903

Report No.(s): AD-D018810; No Copyright; Avail: US Patent and Trademark Office

A system for accurate guidance of a vessel and precise deployment of undersea cable or pipe includes cable control sensors for monitoring cable length, payout rate and cable tension; navigation sensors for monitoring vessel position, heading, and speed; and environmental sensors for monitoring the water depth and current profile. A cable navigation control processor uses data collected by the cable control sensors, navigation sensors, and environmental sensors and compares this data with a predetermined cable payout plan to compute the ideal vessel heading and speed and the appropriate cable payout rate.
DTIC
Environmental Monitoring; Navigation; Navigation Instruments; Pipes (Tubes)

20010045662 Naval Surface Warfare Center, Carderock Div., Bethesda, MD USA
Feasibility of Using Composite Materials to Reduce the Weight of the CCN-15O Transfer Pump ***Final Report***
Telegadas, H. K.; Nov. 1996; 90p; In English
Report No.(s): AD-A327727; CGR/DC-32/96; USCG-D; No Copyright; Avail: Defense Technical Information Center (DTIC)
A Phase 1 study was initiated by the Coast Guard R&D Center to determine the feasibility of using composite materials to reduce the weight of the National Strike Force cargo transfer pumps. The Carderock Division of the Naval Surface Warfare Center (CDNSWC) was tasked to carry out Phase I. Initially all of the pumps in the Coast Guard's inventory were investigated. The study eventually focused on one particular pump at the Coast Guard's request, the CCN-150. A CCN-150 was obtained and disassembled by CDNSWC. Each of the major components was assessed as to the feasibility of fabricating it out of composite materials. A test plan for strain gaging and running the CNN-150 at a variety of operating conditions was proposed. Actual testing of the CCN-150 would provide an understanding of t he operational strain levels in the pump. Three options were presented for a composite CCN-150. The risk and potential weight savings for each option were presented. CDNSWC recommended that a composite CCN-150 be pursued in two separate stages. First, the suction bell and pump bowl would be replaced by a composite version. This pump would then be evaluated. If the performance of the CCN-150 was not degraded by these new composite components and significant weight savings were demonstrated, work on a composite motor housing would be initiated. A CCN-150 with a composite suction bell, pump bowl, and motor housing has the potential for reducing the weight of a state- of-the-art stainless steel CCN-150 by 36%.
DTIC
Composite Materials; Weight Reduction; Pumps; Fabrication

20010045671 Virginia Polytechnic Inst. and State Univ., Mechanical Engineering Dept., Blacksburg, VA USA
Efficient Hybrid Actuation Using Solid-State Actuators ***Final Report***
Leo, Donald J., Virginia Polytechnic Inst. and State Univ., USA; Cudney, Harley H., Virginia Polytechnic Inst. and State Univ., USA; [2001]; 34p; In English; Diskette: 1 3.5-inch DSHD diskette
Contract(s)/Grant(s): NAG1-2190; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
Piezohydraulic actuation is the use of fluid to rectify the motion of a piezoelectric actuator for the purpose of overcoming the small stroke limitations of the material. In this work we study a closed piezohydraulic circuit that utilizes active valves to rectify the motion of a hydraulic end affector. A linear, lumped parameter model of the system is developed and correlated with experiments. Results demonstrate that the model accurately predicts the filtering of the piezoelectric motion caused by hydraulic compliance. Accurate results are also obtained for predicting the unidirectional motion of the cylinder when the active valves are phased with respect to the piezoelectric actuator. A time delay associated with the mechanical response of the valves is incorporated into the model to reflect the finite time required to open or close the valves. This time delay is found to be the primary limiting factor in achieving higher speed and greater power from the piezohydraulic unit. Experiments on the piezohydraulic unit demonstrate that blocked forces on the order of 100 N and unloaded velocities of 180 micrometers/sec are achieved.
Author
Piezoelectric Actuators; Valves; Actuation; Hydraulic Equipment

20010046976 Florida Univ., Dept. of Aerospace Engineering, Mechanics and Engineering Science, Gainesville, FL USA
Accuracy Assessment of Response Surface Approximations for Supersonic Turbine Design ***Final Report***
Papila, Nilay, Florida Univ., USA; Papila, Melih, Florida Univ., USA; Shyy, Wei, Florida Univ., USA; Haftka, Raphael T., Florida Univ., USA; FitzCoy, Norman, Florida Univ., USA; [2001]; 11p; In English
Contract(s)/Grant(s): NAG8-1729; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
There is a growing trend to employ CFD tools to supply the necessary information for design optimization of fluid dynamics components/systems. Such results are prone to uncertainties due to reasons including discretization. errors, incomplete convergence of computational procedures, and errors associated with physical models such as turbulence closures. Based on this type of information, gradient-based optimization algorithms often suffer from the noisy calculations, which can seriously

compromise the outcome. Similar problems arise from the experimental measurements. Global optimization techniques, such as those based on the response surface (RS) concept are becoming popular in part because they can overcome some of these barriers. However, there are also fundamental issues related to such global optimization technique such as RS. For example, in high dimensional design spaces, typically only a small number of function evaluations are available due to computational and experimental costs. On the other hand, complex features of the design variables do not allow one to model the global characteristics of the design space with simple quadratic polynomials. Consequently a main challenge is to reduce the size of the region where we fit the RS, or make it more accurate in the regions where the optimum is likely to reside. Response Surface techniques using either polynomials or and Neural Network (NN) methods offer designers alternatives to conduct design optimization. The RS technique employs statistical and numerical techniques to establish the relationship between design variables and objective/constraint functions, typically using polynomials. In this study, we aim at addressing issues related to the following questions: (1) How to identify outliers associated with a given RS representation and improve the RS model via appropriate treatments? (2) How to focus on selected design data so that RS can give better performance in regions critical to design optimization? (3) How to combine NN and polynomial techniques for improving the accuracy of the RS model?
Author
Accuracy; Turbulence; Supersonic Turbines; Design Analysis; Computational Fluid Dynamics; Design Optimization

20010047623 Colorado School of Mines, Center for Welding, Joining and Coatings Research, Golden, CO USA
Hydrogen Management Strategies in Flux-Related Arc Welding
Liu, Stephen, Colorado School of Mines, USA; Maroef, Iman, Colorado School of Mines, USA; Olson, David L., Colorado School of Mines, USA; Matsushita, Muneo, Colorado School of Mines, USA; [2000]; 13p; In English; Asian Pacific International Congress, 29 Oct. - 2 Nov. 2000, Melborne, Australia
Contract(s)/Grant(s): DAAG55-98-1-0085
Report No.(s): AD-A387030; ARO-37378.10-MS; Copyright; Avail: Defense Technical Information Center (DTIC)

Low contents of diffusible hydrogen, as low as 2 ml/100g of weld metal, have been prescribed as the allowable limit for high strength steel welding. This ultra stringent requirement was needed to minimize hydrogen-related cracking. Simple pre-heating of a weld joint, even at the upper limit temperature, is typically insufficient for hydrogen removal. In fact, pre-heating alone may sometimes increase the cracking susceptibility by promoting hydrogen transport and accumulation in the HAZ. Sufficient hydrogen removal can only be achieved by applying a long post-weld heating, which can be costly to the fabrication process. Careful analysis of the welding system, i.e. the welding arc, the molten weld pool, and solidified weldment, clearly shows that hydrogen can be picked up from multiple sources, including welding consumables, plates and shielding gas. by controlling the amount of hydrogen coming from these sources, lower weld metal hydrogen can be obtained. Further decreases of hydrogen can be achieved by introducing ingredients such as fluorides that actively perturb the equilibrium hydrogen content in the arc plasma. Hydrogen is decreased from the arc by the addition of these ingredients. Once the hydrogen is incorporated in the weld metal, however, other strategies are required to minimize the hydrogen effect. Microstructural features such as inclusions and retained austenite can trap the mobile or diffusible hydrogen. This paper summarizes the interactions between hydrogen and fluorides in the arc and microstructural features in the high strength steel weld metal. Models that describe these two effects are presented and discussed.
DTIC
Hydrogen; Trapping; Thermal Analysis; Arc Welding; Heat Affected Zone

20010047828 NASA Glenn Research Center, Cleveland, OH USA
Icing Cloud Calibration of the NASA Glenn Icing Research Tunnel
Ide, Robert F., Army Research Lab., USA; Oldenburg, John R., NASA Glenn Research Center, USA; March 2001; 28p; In English; 39th Aerospace Sciences Meeting and Exhibit, 8-11 Jan. 2001, Reno, NV, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA; Original contains color illustrations
Contract(s)/Grant(s): DA Proj. 1L1-62211-A-47-A; RTOP 711-21-23
Report No.(s): NASA/TM-2001-210689; E-12616; NAS 1.15:210689; ARL-TR-2383; AIAA Paper 2001-0234; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The icing research tunnel at the NASA Glenn Research Center underwent a major rehabilitation in 1999, necessitating recalibration of the icing clouds. This report describes the methods used in the recalibration, including the procedure used to establish a uniform icing cloud and the use of a standard icing blade technique for measurement of liquid water content. The instruments and methods used to perform the droplet size calibration are also described. The liquid water content/droplet size

operating envelopes of the icing tunnel are shown for a range of airspeeds and compared to the FAA icing certification criteria. The capabilities of the IRT to produce large droplet icing clouds is also detailed.
Author
Aircraft Icing; Wind Tunnels; Calibrating

20010048020 Nevada Univ., Reno, NV USA
A Novel Magneto-Rheological Shock Absorber for Vibration Control ***Final Report, 15 Nov. 1997 - 14 Nov. 2000***
Gordaninejad, Fararmarz; Feb. 2001; 74p; In English
Contract(s)/Grant(s): DAAG55-97-1-0017
Report No.(s): AD-A388418; ARO-37747.1-EG-DPS; No Copyright; Avail: CASI; A01, Microfiche; A04, Hardcopy

This project focused on the fundamental understanding of behavior and development of novel magneto-rheological fluid (MRF) shock absorbers for mechanical systems. The aim of the study was on the feasibility of integrating controllable, semi-active, MRF shock absorbers in the suspension systems of the U.S. Army's High Mobility, Multi-purpose Wheeled Vehicle (HMMWV). New MRF damper designs were developed, fabricated and tested to meet and exceed the performance criteria set forth by the original equipment manufacture (OEM) test results. A nonlinear theoretical model was developed which can predict the performance of the MRF dampers. A unique capacity for bypass valving is included in the proposed design. A critical element of vehicle shock absorbers, bypass valving allows the shock absorber to accommodate high-force impulse loading (without failure) typical to off-highway environments. Moreover, a nonlinear fluid-mechanics based theoretical model was developed by employing Bingham plastic and Herschel-Bulkey non-Newtonian fluid models. Three dimensional electromagnetic finite element analysis was also performed for establishing a base for the MRF damper design. Extensive experiments were conducted to understand the nonlinear behavior of the new MRF dampers.
DTIC
Dimensional Analysis; Rheology; Shock Absorbers; Vibration Damping

20010048830 James Cook Univ. of North Queensland, School of Engineering, Townsville, Australia
The Development of an Expert System for Wear Debris Analysis
Peng, Z., James Cook Univ. of North Queensland, Australia; Goodwin, S., James Cook Univ. of North Queensland, Australia; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 5-12; In English; See also 20010048829; Copyright; Avail: Issuing Activity

Oil analysis technique has been viewed as an effective means to monitor the condition of a machine in some industries. However, wear particle analysis, the key component in oil analysis, has not been extensively applied in practice with its maximum economic benefit due to the requirements of extensive analyst's experience and time involvement of current techniques. It has been widely recognized that application of computer assisted analysis techniques and artificial intelligence technologies in wear debris analysis can significantly overcome the limitations. On the basis of the previous development of automated particle analysis and identification systems using numerical descriptors this project is a further work to develop an expert system. The aim of this project is to develop an artificial intelligence system to interpret comprehensive data obtained from the developed particle analysis system for machine condition monitoring. This paper presents the developing procedure, system functions, and advantages of the expert system.
Author
Artificial Intelligence; Expert Systems; Particles; Fault Detection

20010048831 Naval Research Lab., Washington, DC USA
Application of LaserNet Fines to Mechanical Wear and Hydraulic Monitoring
Reintjes, J., Naval Research Lab., USA; Tucker, J. E., Naval Research Lab., USA; Schultz, A. V., Naval Research Lab., USA; Tankersley, L. L., Naval Academy, USA; Lu, C., Towson State Univ., USA; Howard, P. L., Howard (P. L.) Enterprises, USA; Sebok, T., Lockheed Martin Corp., USA; Holloway, C., Lockheed Martin Corp., USA; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 13-21; In English; See also 20010048829; Copyright; Avail: Issuing Activity

We describe the application of LaserNet Fines to the detection of mechanical wear in diesel engines and hydraulic contamination in a variety of systems. The ability to relate LaserNet Fines results to specific types of faults and the use of LaserNet Fines results for root cause analysis and recommendation of remedial action is discussed.
Author
Debris; Fault Detection; Wear; Contamination; Computer Programs

20010048832 Avion, Inc., USA

Static Balancing Rotor Blades to Maintain Interchangeability and Facilitate Rapid Track and Balance

Beachum, Norman L., Avion, Inc., USA; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 23-32; In English; See also 20010048829; Copyright; Avail: Issuing Activity

The extract data displayed in this paper was collected over a two-year time frame. Most of the data were obtained in the presence of government and contractor personnel. Complete data sets that support the data reflected can be made available.
Author

Rotor Blades (Turbomachinery); Tolerances (Mechanics); Balancing

20010048833 Helitune Ltd., UK

Distributed Modular HUMS

Mowbray, Keith, Helitune Ltd., UK; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 33-36; In English; See also 20010048829; Copyright; Avail: Issuing Activity

There has been a great deal of time and effort spent on the development of Health and Usage Monitoring Systems (HUMS) technology, the quest to produce a systems that is generic enough to be all things to all users has proven a difficult goal. Thoughts have gradually turned to towards modular technology that can be reconfigured to meet varying requirements of the end user. Distributed modular thinking will take this process a stage further by utilizing existing technology as discrete modules. Each module can work independently or an integral part of a HUMS. The use of cost benefit and analysis tools can be effective in identifying the best value for money options dependent upon aircraft type and operation. Use of such tools can show that 70% of saving can be achieved by installing four or five modules at a cost of 25% of full HUMS system. This methodology will give the operator a choice to fit modules that will best suit their requirements, whilst the equipment manufacturer will be under pressure to deliver terms of price and support or risk being replaced. A day of pick and mix technology is coming to the market and should be welcomed by all, as benefits can be quantified and real to all concerned.
Author

Systems Health Monitoring; Cost Analysis; Cost Effectiveness

20010048834 New South Wales Univ., Sydney, Australia

Simulation of Vibration Signals From A Rolling Element Bearing Defect

Feng, N. S., New South Wales Univ., Australia; Hahn, E. J., New South Wales Univ., Australia; Randall, R. B., New South Wales Univ., Australia; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 37-52; In English; See also 20010048829; Copyright; Avail: Issuing Activity

This paper describes the capability of transient analysis software to simulate rolling element bearing defects in a simple rigid rotor, flexible housing configuration. Numerical examples using a deep groove ball bearing are used to illustrate via rotor displacement and pedestal acceleration amplitude spectra and wave forms the effect of an inner or an outer race defect under gravity and/or unbalance loading. It is shown that inner and outer race defects affect and vibration behaviour of the bearing differently, depending on the loading and running conditions, and on defect size and location.
Author

Defects; Rigid Rotors; Computerized Simulation; Spectra

38
QUALITY ASSURANCE AND RELIABILITY

Includes approaches to, and methods for reliability analysis and control, inspection, maintainability, and standardization.

20010045812 Kyushu Univ., Fukuoka, Japan

Study on Distribution Function of Quality Control Data Including Human Bias

Doi, Noriyoshi, Kyushu Univ., Japan; Matsufuji, Yasunori, Kyushu Univ., Japan; Koyama, Tomoyuki, Kyushu Univ., Japan; Technology Reports of Kyushu University; March 2001; ISSN 0023-2718; Volume 74, No. 2, pp. 123-130; In Japanese; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

It is generally assumed that the normal distribution is able to be applied to the most data statistics from quality control tests. However, some statistics tend to show the bias artificially or essentially. In the former case, it is necessary to evaluate quantitatively the influence of the artificial bias, namely the human bias, to prevent the inaccurate or inappropriate judgment. The purpose of this study is to specify the distribution function which can detect the human bias in the test results which cannot be overlooked at quality control. In this paper, we paid attention to the beta function, the peculiar distribution function, which was able to be

applied to various distributions of statistics, for example, uniform, normal distribution or even the exponential distribution includes the bias essentially. As a result, the conversion procedure from the nominal to the beta distribution was shown, and the effectiveness and the applicability of the presented method were clarified in the various distributions of quality control data on the ready mixed concrete.
Author
Distribution Functions; Statistical Distributions; Normal Density Functions; Quality Control; Statistical Tests

20010048021 Dayton Univ. Research Inst., Research Inst., OH USA
Retirement for Cause (RFC) Eddy Current Inspection System Calibration Improvement ***Final Report, Sep. 1995-Apr. 1999***
Stubbs, David A.; Martin, Richard W.; Schehl, Norm D.; Feb. 2000; 70p; In English
Contract(s)/Grant(s): F33615-95-C-5241
Report No.(s): AD-A388413; UDR-TR-2OOO-OOO57; AFRL-ML-WP-TR-2000-4035; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Examination of the reliability test data from the eddy current Retirement For Cause (RFC) systems installed at the San Antonio and Oklahoma City ALCs has revealed occasional systematic shifts in the probability of detection (POD) curves created from inspecting specimens containing fatigue cracks. Analysis showed that the shift was not related to the fatigue cracks. The most likely cause was thought to be the gain calibration process uses electro-discharge machined (EDM) notches as the artifact that causes the eddy current response, and it was thought that some of the shift in the POD curves was due to variability of the notches. EDM notches have been used in eddy current systems because of their similarity to fatigue cracks. However, the RFC eddy current systems were designed such that the calibration process did not require crack-like artifacts in order to successfully perform gain calibration. The research identified two candidate technologies fix the new calibration artifacts. A photolithography technique was investigated to produce both conductive lines and marked-off areas that caused reproducible eddy current responses. Precisely placed wire segments were also investigated as a technique to produce uniform and repeatable eddy current responses. Both types of calibration artifacts were fabricated and extensively tested for repeatability, uniformity, and ease of manufacture. Ultimately, the wire-type artifact was selected for more extensive testing due to the ease in which they were produced. Many wire-type artifacts were constructed having the same size, shape, and & fit conventional EDM notch calibration blocks used on the RFC systems.
DTIC
Calibrating; Eddy Currents; Retirement For Cause; Inspection

20010048426 NASA Ames Research Center, Moffett Field, CA USA
The Application of Time-Frequency Methods to HUMS
Pryor, Anna H., NASA Ames Research Center, USA; Mosher, Marianne, NASA Ames Research Center, USA; Lewicki, David G., Army Research Lab., USA; [2001]; 1p; In English; AHS 57th Annual Forum and Technology Display, 9-11 May 2001, Washington, DC, USA; Sponsored by American Helicopter Society, Inc., USA; Copyright; Avail: Issuing Activity

This paper reports the study of four time-frequency transforms applied to vibration signals and presents a new metric for comparing them for fault detection. The four methods to be described and compared are the Short Time Frequency Transform (STFT), the Choi-Williams Distribution (WV-CW), the Continuous Wavelet Transform (CWT) and the Discrete Wavelet Transform (DWT). Vibration data of bevel gear tooth fatigue cracks, under a variety of operating load levels, are analyzed using these methods. The new metric for automatic fault detection is developed and can be produced from any systematic numerical representation of the vibration signals. This new metric reveals indications of gear damage with all of the methods on this data set. Analysis with the CWT detects mechanical problems with the test rig not found with the other transforms. The WV-CW and CWT use considerably more resources than the STFT and the DWT. More testing of the new metric is needed to determine its value for automatic fault detection and to develop methods of setting the threshold for the metric.
Author
Systems Health Monitoring; Fault Detection; Vibration

20010048847 Howard (Paul L.) Enterprises, Inc., West Chester, PA USA
Diagnostic Sensor Fusion Test Program and Results
Howard, Paul L., Howard (Paul L.) Enterprises, Inc., USA; Reintjes, John, Naval Research Lab., USA; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 94; In English; See also 20010048829; No Copyright; Abstract Only; Available from CASI only as part of the entire parent document

The US Navy, Office of Naval Research and Naval Research Laboratory have established a cooperative research program with Swansea University aimed at correlating vibration signatures, acoustic emission data, and wear debris derived from wear

tests. The goal of the program is to improve the diagnostic accuracy of each technology by combining information. Testing is in progress on four ball, pin on disk, gear test machine and bearing testers and data is now becoming available indicating the complementary nature of these technologies. This paper details the program plan and results to date.
Author
Acoustic Emission; Correlation; Project Planning; Wear Tests

39
STRUCTURAL MECHANICS

Includes structural element design, analysis and testing; dynamic responses of structures; weight analysis; fatigue and other structural properties; and mechanical and thermal stresses in structure. For applications see 05 Aircraft Design, Testing and Performance and 18 Spacecraft Design, Testing and Performance.

20010044118 NASA Langley Research Center, Hampton, VA USA
Fuzzy Structures Analysis of Aircraft Panels in NASTRAN
Sparrow, Victor W., Pennsylvania State Univ., USA; Buehrle, Ralph D., NASA Langley Research Center, USA; [2001]; 10p; In English
Contract(s)/Grant(s): NCC1-382
Report No.(s): AIAA Paper 2001-1320; Copyright Waived; Avail: CASI; A02, Hardcopy; A01, Microfiche

This paper concerns an application of the fuzzy structures analysis (FSA) procedures of Soize to prototypical aerospace panels in MSC/NASTRAN, a large commercial finite element program. A brief introduction to the FSA procedures is first provided. The implementation of the FSA methods is then disclosed, and the method is validated by comparison to published results for the forced vibrations of a fuzzy beam. The results of the new implementation show excellent agreement to the benchmark results. The ongoing effort at NASA Langley and Penn State to apply these fuzzy structures analysis procedures to real aircraft panels is then described.
Author
Aircraft Structures; Finite Element Method; Nastran; Panels; Fuzzy Systems; Structural Analysis

20010044119 NASA Langley Research Center, Hampton, VA USA
Mixed-Mode Decohesion Elements for Analyses of Progressive Delamination
Davila, Carlos G., NASA Langley Research Center, USA; Camanho, Pedro P., Porto Univ., Portugal; deMoura, Marcelo F., Porto Univ., Portugal; [2001]; 1p; In English; 42nd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, 16-19 Apr. 2001, Seattle, WA, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA
Report No.(s): AIAA Paper 2001-1486; Copyright Waived; Avail: CASI; A01, Hardcopy; A01, Microfiche

A new 8-node decohesion element with mixed mode capability is proposed and demonstrated. The element is used at the interface between solid finite elements to model the initiation and propagation of delamination. A single displacement-based damage parameter is used in a strain softening law to track the damage state of the interface. The method can be used in conjunction with conventional material degradation procedures to account for inplane and intra-laminar damage modes. The accuracy of the predictions is evaluated in single mode delamination tests, in the mixed-mode bending test, and in a structural configuration consisting of the debonding of a stiffener flange from its skin.
Author
Delaminating; Finite Element Method; Debonding (Materials); Failure; Defects; Degradation; Fracturing

20010045669 Prins Maurits Lab. TNO, Rijswijk, Netherlands
Numerical Simulation of the Response of a Reinforced Concrete Slab Under Blast Loading ***Final Report***
vanDoormaal, J. C. A. M., Prins Maurits Lab. TNO, Netherlands; January 2001; 109p; In English; Original contains color illustrations
Contract(s)/Grant(s): A96/D/449; TNO Proj. 014.10401
Report No.(s): TD-2000-0068; TNO-PML-2000-A66; Copyright; Avail: Issuing Activity

A numerical simulation of a blast loaded reinforced concrete slab has been performed. The results of the simulation are compared with experimental results. The global behaviour of the slab can be simulated very well. The failure behavior, however, appears to be very sensitive to the concrete model that is being used. It is concluded that there is a need for appropriate constitutive

equations for the dynamic behaviour of concrete, which include rate effects. This model is necessary before numerical codes can be used as prediction tools.
Author
Computerized Simulation; Reinforcement (Structures); Composite Materials; Concretes; Slabs

20010045672 NASA Langley Research Center, Hampton, VA USA
Low Velocity Earth-Penetration Test and Analysis
Fasanella, Edwin L., Army Research Lab., USA; Jones, Yvonne, NASA Langley Research Center, USA; Knight, Norman F., Jr., Veridian Systems, USA; Kellas, Sotiris, Veridian Systems, USA; [2001]; 10p; In English
Contract(s)/Grant(s): GS-35F-4503G
Report No.(s): AIAA Paper 2001-1388; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Modeling and simulation of structural impacts into soil continue to challenge analysts to develop accurate material models and detailed analytical simulations to predict the soil penetration event. This paper discusses finite element modeling of a series of penetrometer drop tests into soft clay. Parametric studies are performed with penetrometers of varying diameters, masses, and impact speeds to a maximum of 45 m/s. Parameters influencing the simulation such as the contact penalty factor and the material model representing the soil are also studied. An empirical relationship between key parameters is developed and is shown to correlate experimental and analytical results quite well. The results provide preliminary design guidelines for Earth impact that may be useful for future space exploration sample return missions.
Author
Low Speed; Penetration; Soils; Drop Tests; Penetrometers; Diameters

20010045835 Prins Maurits Lab. TNO, Rijswijk, Netherlands
Simulation of Bunker Test in Dahn With FE-Code DIANA ***Final Report***
vanDoormaal, J. C. A. M., Prins Maurits Lab. TNO, Netherlands; January 2001; 93p; In English; Original contains color illustrations
Contract(s)/Grant(s): A96/D/449; TNO Proj. 014.10401
Report No.(s): TD-2000-0069; TNO-PML-2000-A67; Copyright; Avail: Issuing Activity

One of the bunker tests of Dahn has been simulated with the Finite Element (FE) code DIANA. Three approaches were used. The best results were obtained with a three dimensional model. The numerical results were compared with the test results. It was concluded that the cracking of the concrete structure was simulated as well as possible with the present knowledge. Numerical simulations are a good tool to increase the understanding about cracking of concrete.
Author
Mathematical Models; Computerized Simulation; Concrete Structures

20010046855 NASA Langley Research Center, Hampton, VA USA
Aeroelastic Stability of a Soft-Inplane Gimballed Tiltrotor Model in Hover
Nixon, Mark W., Army Research Lab., USA; Langston, Chester W., Army Research Lab., USA; Singleton, Jeffrey D., Army Research Lab., USA; Piatak, David J., NASA Langley Research Center, USA; Kvaternik, Raymond G., NASA Langley Research Center, USA; Corso, Lawrence M., Bell Helicopter Co., USA; Brown, Ross, Bell Helicopter Co., USA; [2001]; 14p; In English; 42nd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, 16-19 Aprl. 2001, Seattle, WA, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA
Report No.(s): AIAA Paper 2001-1533; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

Soft-inplane rotor systems can significantly reduce the inplane rotor loads generated during the maneuvers of large tiltrotors, thereby reducing the strength requirements and the associated structural weight of the hub. Soft-inplane rotor systems, however, are subject to instabilities associated with ground resonance, and for tiltrotors this instability has increased complexity as compared to a conventional helicopter. Researchers at Langley Research Center and Bell Helicopter-Textron, Inc. have completed an initial study of a soft-inplane gimballed tiltrotor model subject to ground resonance conditions in hover. Parametric variations of the rotor collective pitch and blade root damping., and their associated effects on the model stability were examined. Also considered in the study was the effectiveness of an active swashplate and a generalized predictive control (GPC) algorithm for stability augmentation of the ground resonance conditions. Results of this study show that the ground resonance behavior of a gimballed soft-inplane tiltrotor can be significantly different from that of a classical soft-inplane helicopter rotor. The GPC-based

active swashplate was successfully implemented, and served to significantly augment damping of the critical modes to an acceptable value.
Author
Aeroelasticity; Structural Analysis; Control Stability; Rotors; Helicopters; Stability Augmentation; Tilt Rotor Aircraft

20010046857 Army Research Lab., Vehicle Technology Directorate, Hampton, VA USA
Dynamic Finite Element Predictions for Mars Sample Return Cellular Impact Test #4
Fasanella, Edwin L., Army Research Lab., USA; Billings, Marcus D., George Washington Univ., USA; March 2001; 26p; In English
Report No.(s): VTD-NR-01-04; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The nonlinear finite element program MSC.Dytran was used to predict the impact pulse for (he drop test of an energy absorbing cellular structure. This pre-test simulation was performed to aid in the design of an energy absorbing concept for a highly reliable passive Earth Entry Vehicle (EEV) that will directly impact the Earth without a parachute. In addition, a goal of the simulation was to bound the acceleration pulse produced and delivered to the simulated space cargo container. EEV's are designed to return materials from asteroids, comets, or planets for laboratory analysis on Earth. The EEV concept uses an energy absorbing cellular structure designed to contain and limit the acceleration of space exploration samples during Earth impact. The spherical shaped cellular structure is composed of solid hexagonal and pentagonal foam-filled cells with hybrid graphite-epoxy/Kevlar cell walls. Space samples fit inside a smaller sphere at the enter of the EEV's cellular structure. The material models and failure criteria were varied to determine their effect on the resulting acceleration pulse. Pre-test analytical predictions using MSC.Dytran were compared with the test results obtained from impact test #4 using bungee accelerator located at the NASA Langley Research Center Impact Dynamics Research Facility. The material model used to represent the foam and the proper failure criteria for the cell walls were critical in predicting the impact loads of the cellular structure. It was determined that a FOAMI model for the foam and a 20% failure strain criteria for the cell walls gave an accurate prediction of the acceleration pulse for drop test #4.
Author
Finite Element Method; Prediction Analysis Techniques; Mars Sample Return Missions; Impact Tests; Acceleration (Physics); Atmospheric Entry

20010046859 Virginia Polytechnic Inst. and State Univ., Dept. of Aerospace and Ocean Engineering, Blacksburg, VA USA
Free Vibration of Uncertain Unsymmetrically Laminated Beams ***Final Report***
Kapania, Rakesh K., Virginia Polytechnic Inst. and State Univ., USA; Goyal, Vijay K., Virginia Polytechnic Inst. and State Univ., USA; [2001]; 12p; In English; 42nd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference and Exhibit, 16-19 Apr. 2001, Seattle, WA, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA
Contract(s)/Grant(s): NAG1-2286; NAG1-2277
Report No.(s): AIAA Paper 2001-1317; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

Monte Carlo Simulation and Stochastic FEA are used to predict randomness in the free vibration response of thin unsymmetrically laminated beams. For the present study, it is assumed that randomness in the response is only caused by uncertainties in the ply orientations. The ply orientations may become random or uncertain during the manufacturing process. A new 16-dof beam element, based on the first-order shear deformation beam theory, is used to study the stochastic nature of the natural frequencies. Using variational principles, the element stiffness matrix and mass matrix are obtained through analytical integration. Using a random sequence a large data set is generated, containing possible random ply-orientations. This data is assumed to be symmetric. The stochastic-based finite element model for free vibrations predicts the relation between the randomness in fundamental natural frequencies and the randomness in ply-orientation. The sensitivity derivatives are calculated numerically through an exact formulation. The squared fundamental natural frequencies are expressed in terms of deterministic and probabilistic quantities, allowing to determine how sensitive they are to variations in ply angles. The predicted mean-valued fundamental natural frequency squared and the variance of the present model are in good agreement with Monte Carlo Simulation. Results, also, show that variations between plus or minus 5 degrees in ply-angles can affect free vibration response of unsymmetrically and symmetrically laminated beams.
Author
Free Vibration; Mathematical Models; Laminates; Beams (Supports); Symmetry

20010046986 NASA Ames Research Center, Moffett Field, CA USA

The Relationship Between Constraint and Ductile Fracture Initiation as Defined by Micromechanical Analyses

Panontin, Tina L., NASA Ames Research Center, USA; Sheppard, Sheri D., Stanford Univ., USA; [1994]; 2p; In English; ASTM 26th National Symposium on Fracture Mechanics, 27-29 Jun. 1994, Idaho Falls, ID, USA; Sponsored by American Society for Testing and Materials, USA

Contract(s)/Grant(s): RTOP 323-11-03; No Copyright; Avail: Issuing Activity

The use of small laboratory specimens to predict the integrity of large, complex structures relies on the validity of single parameter fracture mechanics. Unfortunately, the constraint loss associated with large scale yielding, whether in a laboratory specimen because of its small size or in a structure because it contains shallow flaws loaded in tension, can cause the breakdown of classical fracture mechanics and the loss of transferability of critical, global fracture parameters. Although the issue of constraint loss can be eliminated by testing actual structural configurations, such an approach can be prohibitively costly. Hence, a methodology that can correct global fracture parameters for constraint effects is desirable. This research uses micromechanical analyses to define the relationship between global, ductile fracture initiation parameters and constraint in two specimen geometries (SECT and SECB with varying a/w ratios) and one structural geometry (circumferentially cracked pipe). Two local fracture criteria corresponding to ductile fracture micromechanisms are evaluated: a constraint-modified, critical strain criterion for void coalescence proposed by Hancock and Cowling and a critical void ratio criterion for void growth based on the Rice and Tracey model. Crack initiation is assumed to occur when the critical value in each case is reached over some critical length. The primary material of interest is A516-70, a high-hardening pressure vessel steel sensitive to constraint; however, a low-hardening structural steel that is less sensitive to constraint is also being studied. Critical values of local fracture parameters are obtained by numerical analysis and experimental testing of circumferentially notched tensile specimens of varying constraint (e.g., notch radius). These parameters are then used in conjunction with large strain, large deformation, two- and three-dimensional finite element analyses of the geometries listed above to predict crack initiation loads and to calculate the associated (critical) global fracture parameters. The loads are verified experimentally, and microscopy is used to measure pre-crack length, crack tip opening displacement (CTOD), and the amount of stable crack growth. Results for A516-70 steel indicate that the constraint-modified, critical strain criterion with a critical length approximately equal to the grain size (0.0025 inch) provides accurate predictions of crack initiation. The critical void growth criterion is shown to considerably underpredict crack initiation loads with the same critical length. The relationship between the critical value of the J-integral for ductile crack initiation and crack depth for SECT and SECB specimens has been determined using the constraint-modified, critical strain criterion, demonstrating that this micromechanical model can be used to correct in-plane constraint effects due to crack depth and bending vs. tension loading. Finally, the relationship developed for the SECT specimens is used to predict the behavior of circumferentially cracked pipe specimens.

Author

Fracture Mechanics; Ductility; Micromechanics; Crack Propagation; Bending

20010047268 California Univ., Dept. of Mechanical Engineering, Santa Barbara, CA USA

Dynamics and Control of Microcantilever-Based Systems ***Final Report, 1 Jan.-30 Nov. 2000***

Bamieh, Bassam; Dahleh, Mohammed; Mar. 05, 2001; 5p; In English

Contract(s)/Grant(s): F49620-00-1-0116

Report No.(s): AD-A388216; AFRL-SR-BL-TR-01-0212; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

We perform theoretical and experimental investigations of microcantilever-based systems. Specifically, we study repeated impact oscillators for the determination of nano-scale surface mechanical properties, investigate the presence of stochastic resonance in the Atomic Force Microscope, and investigate enhancing throughput in microcantilever-based systems using arrays of microcantilevers.

DTIC

Microscopes; Mechanical Properties; Surface Properties

20010047387 NASA Glenn Research Center, Cleveland, OH USA

Quantifying Residual Stresses by Means of Thermoelastic Stress Analysis

Gyekenyesi, Andrew L., Ohio Aerospace Inst., USA; Baaklini, George Y., NASA Glenn Research Center, USA; February 2001; 18p; In English; Nondestructive Evaluation of Aging Materials and Composites IV, 8-9 Mar. 2000, Newport Beach, CA, USA

Contract(s)/Grant(s): NAG3-755; RTOP 728-30-20

Report No.(s): NASA/TM-2001-210697; NAS 1.15:210697; E-12628; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This study focused on the application of the Thermoelastic Stress Analysis (TSA) technique as a tool for assessing the residual stress state of structures. TSA is based on the fact that materials experience small temperature changes when compressed or expanded. When a structure is cyclically loaded, a surface temperature profile results which correlates to the surface stresses. The cyclic surface temperature is measured with an infrared camera. Traditionally, the amplitude of a TSA signal was theoretically defined to be linearly dependent on the cyclic stress amplitude. Recent studies have established that the temperature response is also dependent on the cyclic mean stress (i.e., the static stress state of the structure). In a previous study by the authors, it was shown that mean stresses significantly influenced the TSA results for titanium- and nickel-based alloys. This study continued the effort of accurate direct measurements of the mean stress effect by implementing various experimental modifications. In addition, a more in-depth analysis was conducted which involved analyzing the second harmonic of the temperature response. by obtaining the amplitudes of the first and second harmonics, the stress amplitude and the mean stress at a given point on a structure subjected to a cyclic load can be simultaneously obtained. The experimental results showed good agreement with the theoretical predictions for both the first and second harmonics of the temperature response. As a result, confidence was achieved concerning the ability to simultaneously obtain values for the static stress state as well as the cyclic stress amplitude of structures subjected to cyclic loads using the TSA technique. With continued research, it is now feasible to establish a protocol that would enable the monitoring of residual stresses in structures utilizing TSA.
Author
Residual Stress; Thermoelasticity; Stress Analysis

20010047392 NASA Langley Research Center, Hampton, VA USA
Structural Testing of a Stitched/Resin Film Infused Graphite-Epoxy Wing Box
Jegley, Dawn C., NASA Langley Research Center, USA; Bush, Harold G., NASA Langley Research Center, USA; April 2001; 120p; In English
Contract(s)/Grant(s): RTOP 706-63-71-11
Report No.(s): NASA/TM-2001-210846; L-18071; NAS 1.15:210846; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The results of a series of tests conducted at the NASA Langley Research Center to evaluate the behavior of an all-composite full-scale wing box are presented. The wing box is representative of a section of a 220-passenger commercial transport aircraft wing box and was designed and constructed by The Boeing Company as part of the NASA Advanced Subsonics Technology (AST) program. The semi-span wing was fabricated from a graphite-epoxy material system with cover panels and spars held together using Kevlar stitches through the thickness. No mechanical fasteners were used to hold the stiffeners to the skin of the cover panels. Tests were conducted with and without low-speed impact damage, discrete source damage and repairs. Up-bending, down-bending and brake roll loading conditions were applied. The structure with non-visible impact damage carried 97% of Design Ultimate Load prior to failure through a lower cover panel access hole.
Author
Graphite-Epoxy Composites; Wings; Impact Damage; Bending; Failure

20010047401 NASA Glenn Research Center, Cleveland, OH USA
Structures and Acoustics Division *Annual Report, 1997-1999*
Acquaviva, Cynthia S., NASA Glenn Research Center, USA; March 2001; 97p; In English
Contract(s)/Grant(s): RTOP 910-30-11
Report No.(s): NASA/TM-2001-210366; NAS 1.15:210366; E-12415; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

The Structures and Acoustics Division of the NASA Glenn Research Center is an international leader in rotating structures, mechanical components, fatigue and fracture, and structural aeroacoustics. Included in this report are disciplines related to life prediction and reliability, nondestructive evaluation, and mechanical drive systems. Reported is a synopsis of the work and accomplishments completed by the Division during the 1997, 1998, and 1999 calendar years. A bibliography containing 93 citations is provided.
Author
Dynamic Structural Analysis; Aeroacoustics

20010048686 Computer Sciences Corp., Moffett Field, CA USA
Dynamic Load Balancing for Computational Plasticity on Parallel Computers
Pramono, Eddy, Computer Sciences Corp., USA; Simon, Horst, Computer Sciences Corp., USA; [1994]; 1p; In English; 3rd National Symposium on Large-Scale Structural Analysis for High-Performance Computers and Workstations, 8-11 Nov. 1994,

Norfolk, VA, USA; Sponsored by NASA Langley Research Center, USA
Contract(s)/Grant(s): RTOP 536-01-11; No Copyright; Avail: Issuing Activity; Abstract Only

The simulation of the computational plasticity on a complex structure remains a formidable computational task, especially when a highly nonlinear, complex material model was used. It appears that the computational requirements for a such problem can only be satisfied by massively parallel architectures. In order to effectively harness the tremendous computational power provided by such architectures, it is imperative to investigate and to study the algorithmic and implementation issues pertaining to dynamic load balancing for computational plasticity on a highly parallel, distributed-memory, multiple-instruction, multiple-data computers. This paper will measure the effectiveness of the algorithms developed in handling the dynamic load balancing.

Author

Dynamic Loads; Parallel Computers; Algorithms; Plastic Properties

20010048901 NASA Ames Research Center, Moffett Field, CA USA

Carbonaceous Survivability on Impact

Bunch, T. E., NASA Ames Research Center, USA; Becker, Luann, California Univ., San Diego, USA; [1994]; 1p; In English; 207th ACS National Meeting, 13-18 Mar. 1994, San Diego, CA, USA; Sponsored by American Chemical Society, USA
Contract(s)/Grant(s): RTOP 185-52-12; No Copyright; Avail: Issuing Activity; Abstract Only

In order to gain knowledge about the potential contributions of comets and cosmic dust to the origin of life on Earth, we need to explore the survivability of their potential organic compounds on impact and the formation of secondary products that may have arisen from the chaotic events sustained by the carriers as they fell to Earth. We have performed a series of hypervelocity impact experiments using carbon-bearing impactors (diamond, graphite, kerogens, PAH crystals, and Murchison and Nogoya meteorites) into Al plate targets at velocities - 6 km/s. Estimated peak shock pressures probably did not exceed 120 GPa and peak shock temperatures were probably less than 4000 K for times of nano- to microsecs. Nominal crater dia. are less than one mm. The most significant results of these experiments are the preservation of the higher mass PAHs (e. g., pyrene relative to napthalene) and the formation of additional alkylated PAHs. We have also examined the residues of polystyrene projectiles impacted by a microparticle accelerator into targets at velocities up to 15 km/s. This talk will discuss the results of these experiments and their implications with respect to the survival of carbonaceous deliverables to early Earth. The prospects of survivability of organic molecules on ”intact” capture of cosmic dust in space via soft: and hard cosmic dust collectors will also be discussed.

Author

Biological Evolution; Carbon; Comets; Hypervelocity Impact

42
GEOSCIENCES (GENERAL)

Includes general research topics related to the Earth sciences, and the specific areas of petrology, mineralogy, and general geology. For other specific topics in geosciences see categories 41 through 48.

20010044099 Rocky Mountain Research Station, Fort Collins, CO USA

Estimating the Number of Tree Species in Forest Populations Using Current Vegetation Survey and Forest Inventory and Analysis Approximation Plots and Grid Intensities ***Final Report***

Schreuder, H. T.; Lin, J. M. S.; Teply, J.; Oct. 2000; 14p; In English
Report No.(s): PB2001-104539; RMRS-RN-8-2000; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The USDA Forest Service is charged with inventorying all forest lands in the USA through its Forest Inventory and Analysis (FIA) units. Traditionally, interest has been primarily in timber-oriented variables and the focus has been on timberland. However, the information collected can also be used for other ecological variables of interest. One parameter that has been ignored is estimating the number of tree species in a population. The objective of this paper is to apply the estimator CM2f recommended by Schreuder and other (1999) to all National Forests in Region 6 of the Forest Service combined, in zones, and by National Forest using the Current Vegetation Survey (CVS) plot used by Region 6 and a plot more or less equivalent to the current FIA plot used for both the 2.7 km (1.7 mile) grid of the Region and the 5.5 km (3.4 mile) national grid used by FIA to determine what is gained by an increase in plot sample size and grid intensity.

NTIS

Forests; Estimating; Trees (Plants); Vegetation; Forest Management

20010044100 Forest Service, Communications Group, Portland, OR USA

Summary Estimates of Forest Resources on Unreserved Lands of the Ketchikan Inventory Unit, Tongass National Forest, Southeast Alaska, 1998

vanH ees, W. W. S.; Mar. 2001; 18p; In English

Report No.(s): PB2001-104537; PNW-RB-233; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Summary estimates are presented of forest resource area, timber volume, and growth and mortality of timber on unreserved national forest land in the Ketchikan inventory unit of the Tongass National Forest. Pacific Northwest Research Station, Forest Inventory and Analysis crews collected inventory data from 1995 to 1998. Productive forest land area (timberland) was estimated at 1,405 thousand acres, cubic-foot volume on timberland at 7,294 million cubic feet, and net annual growth and mortality at 14, 158 and 49,568 thousand cubic feet, respectively.

NTIS

Estimates; Forests; Estimating; Timber Inventory

20010044101 Forest Service, Pacific Southwest Research Station, Albany, CA USA

Estimating Snowpack Density from Albedo Measurement ***Final Report***

Smith, J. L.; Halverson, H. G.; Apr. 1979; 24p; In English

Report No.(s): PB2001-104535; PSW-RP-136; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Snow is a major source of water in the Western USA. Many snow covered sites are located in relatively inaccessible areas and in Federal wilderness areas. Access is limited to foot travel and remotely operated telemetered snow sensors are not permitted. In such areas it is impossible with the use of conventional methodology to obtain the data necessary for accurately predicting the quantity of available water. A non-contact remote sensing technique is needed to assess snow-water content in such inaccessible areas. Snow depth can be estimated from aerial snow markers. But measurements of snow density are needed as well for estimating water content of a snowpack.

NTIS

Density Measurement; Snow; Snow Cover; Albedo

20010044102 Pacific Southwest Forest and Range Experiment Station, Berkeley, CA USA

Rainfall and Streamflow from Small Tree-Convered and Fern-Covered and Burned Watershed in Hawaii ***Final Report***

Anderson, H. W.; Duffy, P. D.; Yamamoto, T.; 1999; 20p; In English

Report No.(s): PB2001-104528; FSRP-PSW-34; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In Hawaii a supply of water may depend on anything from rain on the roof at Kona to elaborate tunneling for water at Honolulu. Historically the people of Hawaii have looked mauka-to the mountain watersheds-for much of their water. What they now see are watershed slopes clothed with vegetation that protects the soil and helps deep percolation of water. But 80 year ago, these same slopes brought back vegetation to its present state.

NTIS

Rain; Watersheds; Water

20010044103 Pacific Southwest Forest and Range Experiment Station, Berkeley, CA USA

Transport of Intercepted Snow from Trees during Snow Storms ***Final Report***

Miller, D. H.; 1966; 46p; In English

Report No.(s): PB2001-104526; FSRP-PSW-33; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The west looks to winter snowfall for much of its water, and there is a good deal of evidence from Forest Service and other research that management of mountain land for wood, forage and recreational amenities can affect the accumulation of snow into a long-lasting pack. Studies of the physical processes that influence this accumulation, however, have lagged behind empirical studies. To help research workers interested in planning future basic studies, Dr. Miller has reviewed past research related to the basic processes by which intercepted snow is transported from tree branches during periods of snowfall-the second step in a complex chain of events that affect the accumulation and melting of snow. This paper is the second of several reporting results of his investigation.

NTIS

Snow; Trees (Plants)

20010044104 Pacific Southwest Forest and Range Experiment Station, Berkeley, CA USA
Emergency Revegetation to Rehabilitate Burned Watersheds in Southern California ***Final Report***
Corbett, E. S.; Green, L. R.; 1965; 28p; In English
Report No.(s): PB2001-104524; FSRP-PSW-22; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A wildfire denuded most of the San Dimas Experimental Forest in 1960. Before the fire the watersheds grew a dense cover of chaparral, consisting mostly of chamise with lesser amounts of ceanothus, white sage, black sage, manzanita, California buckwheat, and scrub oak. The fire was extremely hot. It consumed all of the lighter vegetation and most of the heavy brush stems. and it left the soil in a loose powder-dry condition-unshielded from the wind and from heavy rains that usually occur in winter.
NTIS
Vegetation; Emergencies; Watersheds; Erosion; Forest Fires

20010044336 Geological Survey, Water Resources Div., Troy, NY USA
Salt-Front Movement in the Hudson River Estuary, New York: Simulations by One-Dimensional Flow and Solute-Transport Models
deVries, M. P.; Weiss, L. A.; 2001; 80p; In English
Report No.(s): PB2001-104383; USGS/WRIR-99/4024; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The Hudson River is being considered for use as a supplemental source of water supply for New York City during droughts. One proposal entails withdrawal of Hudson River water from locations near Newburgh, Chelsea, or Kingston, but the extent to which this could cause the salt front to advanced upstream to points where it could adversely affect community water supplies is unknown. The U.S. Geological Survey (USGS) one-dimensional Branch-Network Dynamic Flow model (BRANCH) was used in conjunction with the USGS one-dimensional Branched Lagragian Solute-Transport Model (BLTM) to simulate the effect of five water-withdrawal scenarios on the salt-front location.
NTIS
Geological Surveys; Salts; Water Management

20010046749 NASA Goddard Space Flight Center, Greenbelt, MD USA
NASA/NOAA/AMS Earth Science Electronic Theater
Hasler, A. F., NASA Goddard Space Flight Center, USA; [2001]; 1p; In English, 9 Feb. 2001, Salt Lake City, UT, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The NASA/NOAA/AMS Earth Science Electronic Theater presents Earth science observations and visualizations in a historical perspective. Fly in from outer space to Florida and the KSC Visitor's Center. Go back to the early weather satellite images from the 1960s see them contrasted with the latest International global satellite weather movies including killer hurricanes & tornadic thunderstorms. See the latest spectacular images from NASA and NOAA remote sensing missions like GOES, NOAA, TRMM, SeaWiFS, LANDSAT7, & new Terra which will be visualized with state-of-the art tools.
Author
Earth Sciences; Video Data; Weather; Hurricanes; Tornadoes

20010047598 New Mexico State Univ., Las Cruces, NM USA
Institutional Adjustments for Coping with Prolonged and Severe Drought in the Rio Grande Basin
Ward, F. A.; Young, R.; Lacewell, R.; King, J. P.; Frasier, M.; Feb. 2001; 270p; In English; Original contains color illustrations
Report No.(s): PB2001-104871; TECHNICAL COMPLETION-317; No Copyright; Avail: CASI; A03, Microfiche; A12, Hardcopy

The Rio Grande originates in the southern Colorado Rocky Mountains, flows through New Mexico, and forms the border between the U.S. and Mexico on its way to the Gulf of Mexico. Serving over one-million acres of irrigated land and the municipal and industrial needs of cities like Albuquerque and El Paso, the Rio Grande represents a significant resource in the arid southwest. In 1938, Congress approved the Rio Grande Compact which divided the annual water flow among the three states of Colorado, New Mexico, and Texas. The U.S.-Mexico Treaty of 1906 divides the river flows between the U.S. and Mexico. The Compact acknowledges the Treaty in Articles IV and VI by stating that the Compact shall not diminish the allocation of water to Mexico and shall not degrade its quality. Since that time, significant growth in the Rio Grande Basin's demand for water due to increasing populations, growing economies, and emerging policies toward fish and wildlife habitat emphasizing endangered species, has stressed the region's already scarce water supply. Although the inevitable severe drought would cause significant economic damage to the regional economy, present institutional arrangements have not had to confront such an event since the 1950s. The

objective of this research is to test the hypothesis that new institutions for interstate coordination of surface water withdrawal and reservoir operations could reduce economic losses resulting from water shortfalls in periods of severe and sustained drought.
NTIS
Drought; Water Resources; Prolongation; Rio Grande (North America); Structural Basins

20010047603 Environmental Protection Agency, Subsurface Protection and Remediation Div., Ada, OK USA
Application of a Geographic Information System for Containment Leak Detection
Ross, R. R.; Beljin, M. S.; Vieux, B. E.; 2000; 32p; In English; Prepared in cooperation with Beljin and Associates, Cincinnati, OH
Report No.(s): PB2001-104741; EPA/600/A-01/029; No Copyright; Avail: National Technical Information Service (NTIS)

The use of physical and hydraulic containment systems for the isolation of contaminated ground water associated with hazardous waste sites has increased during the last decade. Existing methodologies for monitoring and evaluating leakage from hazardous waste containment system rely primarily on limited hydraulic head data. The number of hydraulic head monitoring points available at most sites employing physical containment systems may be insufficient to identify significant leakage. A general approach for evaluating the performance of containment systems based on estimations of apparent leakage rates is used to introduce a methodology for determining the number of monitoring points necessary to identify the hydraulic signature of leakage from a containment system. The probabilistic method is based on the principles of geometry probability. A raster-based GIS (IDRISI) was used to determine the critical dimensions of the hydraulic conditions using a three-dimensional ground-water flow model. MODRISI, a set of computer programs was used to integrate ground-water flow modeling results into the hydraulic signature assessment method.
NTIS
Geographic Information Systems; Contamination; Leakage; Detection; Pollution Control; Water Pollution

20010047609 Corps of Engineers, Washington, DC USA
Geophysical Exploration for Engineering and Environmental Investigations (Engineering and Design). CEWC-EG Engineer Manual 1110-1-1802
Aug. 31, 1995; 212p; In English
Report No.(s): PB2001-104693; EM-1110-1-1802; No Copyright; Avail: CASI; A03, Microfiche; A10, Hardcopy

This manual provides an introduction to geophysical exploration for engineering, geological, and environmental (to include Hazardous, Toxic and Radioactive Waste (HTRW)) investigations. Descriptions and guidance are provided for the geophysical methods typically used in these investigations.
NTIS
Environmental Engineering; Geophysics; Geology

20010047611 Department of Energy, Environmental Measurements Lab., New York, NY USA
Users' Guide for the Computer Program ISDMAP: Analysis and Mapping of In-situ Gamma-Ray Spectrometry and Soil Sample Data
Reginatto, M.; Bailey, P.; Shebell, P.; Nov. 2000; 64p; In English; Original contains color illustrations
Report No.(s): PB2001-104645; EML-610; No Copyright; Avail: CASI; A01, Microfiche; A04, Hardcopy

The computer program ISDMAP was written to analyze data from a set of in situ gamma-ray spectrometry measurements on a grid. It can also do a combined analysis of this type of data and data from soil samples. One well-known difficulty with attempting this type of analysis is that such sets of data can never provide enough information to determine a unique solution. This can be understood intuitively since a finite number of measurements can not be sufficient to determine a continuous distribution (this observation is not restricted to data collected with the in situ technique, but holds for any set of discrete measurements, such as a series of soil samples). One can, however, restrict to particular types of solutions by requiring that they satisfy other conditions in addition to the measurements, and this is the approach taken by ISDMAP. In ISDMAP, the data are analyzed in a different manner depending on whether the data is from a characterization survey or from a post-remediation survey. The characterization option creates a map of contamination in surface soil that is smooth and fits the data. The post-remediation option creates a map with a summary of potential hot spots over a constant background level, providing a map of hot spots that might be hidden in the data. This report describes the operation of ISDMAP in sufficient detail to allow a user to prepare the necessary input files and run the program. The program requires a PC with DOS or a DOS emulator (most Windows machines have this).
NTIS
Gamma Ray Spectrometers; User Manuals (Computer Programs); Computer Programs; Soil Sampling; Computer Aided Mapping; Soil Pollution

43
EARTH RESOURCES AND REMOTE SENSING

Includes remote sensing of earth features, phenomena and resources by aircraft, balloon, rocket, and spacecraft; analysis or remote sensing data and imagery; development of remote sensing products; photogrammetry; and aerial photographs. For instrumentation see 35 Instrumentation and Photography.

20010044092 Geological Survey, Environmental Management Technical Center, Onalaska, WI USA
Estimating Fetch for Navigation Pools in the Upper Mississippi River Using a Geographic Information System *Progress Report*
Rogala, James T.; Jul. 1997; 2p; In English
Report No.(s): AD-A327726; PSR-97-08; No Copyright; Avail: Defense Technical Information Center (DTIC)

Project Status Reports (PSRs) are internal Long Term Resource Monitoring Program documents whose purpose is to provide information on Program activities Because PSRs are not subject to peer review, they may not be cited. This report estimates fetch for navigation pools in the Upper Mississippi River.

DTIC
Navigation; Estimates; Water Waves

20010044095 Department of Energy, Environmental Measurements Lab., New York, NY USA
Fluence Evaluations for Applications of In situ Gamma-Ray Spectrometry in Non-Flat Terrain
Miller, K. M.; Feb. 1999; 48p; In English
Report No.(s): PB2001-104641; EML-603; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Evaluations of gamma-ray fluence are made for source geometries that depart from the flat ground geometry that is used in standard applications of in situ spectrometry. Geometries considered include uniform source distributions for soil mounds on top of flat terrain, cylindrical wells, and rectangular trenches. The results indicate that scaling the standard fluence values for flat terrain by the ratio of solid angle subtended by the soil to 2B leads to fluence estimates that are accurate to within a few percent. Practical applications of in situ spectrometry in non-flat terrain also appears to be simplified by the fact that the angular correction factor for a typical co-axial detector in these geometries may typically be about the same as that computed for flat ground.

NTIS
Fluence; Gamma Ray Spectrometers

20010044108 Environmental Protection Agency, National Exposure Research Lab., Las Vegas, NV USA
Remote Sensing Program for EPA FY 2000 Program Summary. Environmental Photographic Interpretation Center (EPIC)
Garofalo, D.; Feb. 2001; 58p; In English
Report No.(s): PB2001-104291; EPA/600/R-00/103; NERL-LV-ESD-00-193; No Copyright; Avail: National Technical Information Service (NTIS)

The Environmental Sciences Division of the Office of Research and Development in Las Vegas, Nevada, provides remote sensing and aerial imagery acquisition and interpretation support to the Program Offices and each of the 10 Regional Offices in the Environmental Protection Agency. In FY 99, EPIC initiated a new remote sensing research and development program. This Document describes program operations management procedures and types of projects conducted for requesting offices. In FY 2000, work was conducted on 126 Superfund aerial survey projects covering more than 120 specific waste sites. Finally, two miscellaneous projects providing general support to Superfund activities, including data management and report/film archive maintenance and support, and Quality Assurance (QA) and Standard Operating Procedure (SOP) development were budgeted from CERCLA funds. In FY 2000, work was initiated on eight Resource Conservation and Recovery Act (RCRA) projects covering 12 RCRA sites.

NTIS
Environment Protection; Project Management; Resources Management; Research and Development; Data Management; Remote Sensing; Aerial Photography

20010045644 Army War Coll., Carlisle Barracks, PA USA
The Digital Map of the Future: Will It Satisfy Our Information Needs?
Pierce, William G.; Apr. 10, 1998; 44p; In English
Report No.(s): AD-A343417; No Copyright; Avail: Defense Technical Information Center (DTIC)

Emerging digital technology is changing the tools commanders have available to see the battlespace. As part of this move to leverage technologies, the USA Army is moving to a digital map. This move should enhance all leaders' ability to visualize the battlespace. However, digital information is susceptible to distortion. This study reviews the Department of Defense architecture for the production, storage and dissemination of digital terrain products. Using the criteria for quality information as outlined in Field Manual 100-6, Information Operations, the digital terrain architecture is evaluated. In general, the architecture meets the criteria for information quality. There are two areas of concern. The first is precision of the data. Over the next ten years, the digital terrain data will be available at a level of precision previously unheard of. However, the level of resolution may not be sufficient to detect obstacles to maneuver. The second area of concern is usability. Not all Coalition partners will have the systems to process digital terrain data. In addition, there may be a cultural problem. Training the Army to move from the paper map to digital displays will require the full attention of all leaders for the next decade.
DTIC
Digital Data; Maps; Armed Forces (USA)

20010046956 Instituto Nacional de Pesquisas Espacias, Sao Jose dos Campos, Brazil
Influence of Remote Sensor Band Positioning and Bandwidth and of Atmospheric Effects on the Vegetation Index Determinations ***Influencia do Posicionamento e da Largura de Bandas de Sensores Remotos e dos Efeitos Atmosfericos na Determinacao de Indices de Vegetacao***
Moreira, Romero da Costa, Instituto Nacional de Pesquisas Espacias, Brazil; 2000; 182p; In Portuguese; Original contains color illustrations
Report No.(s): INPE-7528-TDI/735; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche; C01, CD-ROM

The influences of the positioning and width of red (R = 600-700 nm) and near-infrared (NIR = 750-1100 nm) bands on the determination of AVIRIS-derived vegetation indices (Vls = NDVI, SAVI, and ARVI), as well as the atmospheric effects, were investigated. by using the MODTRAN code, apparent radiance AVIRIS data were converted into surface and apparent reflectance images, respectively. The Vls were calculated from both dataset, and for three endmember spectra representative of green vegetation (GV), nonphotosyntetic vegetation (NPV) and soil (S). These endmember spectra were selected from the image itself through the sequential use of the minimum noise fraction (MNF) and pixel purity index (PPI) techniques. The objective was to identify the best RNIR band pair to optimize the contrast between GV and the other scene components. Narrow (10 nm) and broad bands (R with widths of 20 and 50 nm; and NI R of 100 and 200 nm) were simulated in the present investigation as well as spectral intervals equivalent to some broadband sensors (ASTER/Terra, AVHRR/NOAA 14, MODIS/Terra, MOMS-2, MSS/LANDSAT 5, HRVIR/Spot 4 and TM/LANDSAT 5). Finally, correlations between Vls and fraction values of VV, derived from a linear spectral unmixing model, were calculated and compared with results produced with the use of a field spectroradiometric dataset collected by Gleriani (1994). The results of the use of surface reflectance data show that bandwidth is not an important factor to affect spectral contrast if the R and NIR bands are not inserted into the red edge domain (690-750 nm). On the other hand, shifts in R-NIR band placement produce significant changes in contrast. The best results were obtained with the R band positioned around the chlorophyll absorption interval (677 nm), and the NIR band placed at shorter wavelengths (769 nm). However, the results can vary in the NIR interval for ARVI and SAVI depending on the gamma and L parameters used in their calculation. Atmospheric effects reduce the spectral contrast of the scene, especially when the NIR bands are placed at atmospheric absorption band intervals. From the broadband sensors investigated, MOMS, TM, ASTER, MODIS, HRVIR produce better spectral contrasts between GV and other scene components than AVHRR and MSS. However, if one considers both, atmospheric effects and contrast, MODIS presents the best results because of the positioning of its narrow NIR band in a very convenient atmospheric window. Although there is no complete agreement between the correlations of the Vls with the GV fraction values (unmixing model), and with the canopy parameters (Gleriani's experiment), the results indicate that the best R-NIR band pair to enhance contrast tends to be also the best estimator of the vegetation characteristics.
Author
Remote Sensors; Bandwidth; Atmospheric Effects; Vegetation; Absorption Spectra; Chlorophylls

20010046998 NASA Langley Research Center, Hampton, VA USA
Use of a GCM to Explore Sampling Issues in Connection with Satellite Remote Sensing of the Earth Radiation Budget
Fowler, Laura D., Colorado State Univ., USA; Wielicki, Bruce A., NASA Langley Research Center, USA; Randall, David A., Colorado State Univ., USA; Branson, Mark D., Colorado State Univ., USA; Gibson, Gary G., NASA Langley Research Center, USA; Denn, Fredrick M., Analytical Services and Materials, Inc., USA; Journal of Geophysical Research; Aug. 27, 2000; ISSN 0148-0227; Volume 105, No. D16, pp. 20,757-20,772; In English; Original contains color illustrations
Contract(s)/Grant(s): NAG1-1266
Report No.(s): Paper-2000JD900239; Copyright; Avail: Issuing Activity

Collocated in time and space, top-of-the-atmosphere measurements of the Earth radiation budget (ERB) and cloudiness from passive scanning radiometers, and lidar- and radar-in-space measurements of multilayered cloud systems, are the required combination to improve our understanding of the role of clouds and radiation in climate. Experiments to fly multiple satellites ”in formation” to measure simultaneously the radiative and optical properties of overlapping cloud systems are being designed. Because satellites carrying ERB experiments and satellites carrying lidars- or radars-in space have different orbital characteristics, the number of simultaneous measurements of radiation and clouds is reduced relative to the number of measurements made by each satellite independently. Monthly averaged coincident observations of radiation and cloudiness are biased when compared against more frequently sampled observations due, in particular, to the undersampling of their diurnal cycle, Using the Colorado State University General Circulation Model (CSU GCM), the goal of this study is to measure the impact of using simultaneous observations from the Earth Observing System (EOS) platform and companion satellites flying lidars or radars on monthly averaged diagnostics of longwave radiation, cloudiness, and its cloud optical properties. to do so, the hourly varying geographical distributions of coincident locations between the afternoon EOS (EOS-PM) orbit and the orbit of the ICESAT satellite set to fly at the altitude of 600 km, and between the EOS PM orbit and the orbits of the PICASSO satellite proposed to fly at the altitudes of 485 km (PICA485) or 705 km (PICA705), are simulated in the CSU GCM for a 60-month time period starting at the idealistic July 1, 2001, launch date. Monthly averaged diagnostics of the top-of-the-atmosphere, atmospheric, and surface longwave radiation budgets and clouds accumulated over grid boxes corresponding to satellite overpasses are compared against monthly averaged diagnostics obtained from hourly samplings over the entire globe. Results show that differences between irregularly (satellite) and regularly (true) sampled diagnostics of the longwave net radiative budgets are the greatest at the surface and the smallest in the atmosphere and at the top-of-the-atmosphere, under both cloud-free and cloudy conditions. In contrast, differences between the satellite and the true diagnostics of the longwave cloud radiative forcings are the largest in the atmosphere and at the top-of-the-atmosphere, and the smallest at the surface. A poorer diurnal sampling of the surface temperature in the satellite simulations relative to the true simulation contributes a major part to sampling biases in the longwave net radiative budgets, while a poorer diurnal sampling of cloudiness and its optical properties directly affects diagnostics of the longwave cloud radiative forcings. A factor of 8 difference in the number of satellite overpasses between PICA705 and PICA485 and ICESAT leads to a systematic factor of 3 difference in the spatial standard deviations of all radiative and cloudiness diagnostics.
Author
Atmospheric General Circulation Models; Earth Radiation Budget; Radiation Effects; Optical Properties; Earth Observing System (EOS); Surface Temperature

20010047566 University of Southern Mississippi, Center for Ocean and Atmospheric Modeling, Bay Saint Louis, MS USA
Barotropic Flow in the Vicinity of an Idealized Inlet - Simulations With the ADCIRC Model
Veeramony, Jayaram; Blain, Cheryl A.; Mar. 09, 2001; 30p; In English
Report No.(s): AD-A388118; NRL/FR/7320-01-9977; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The flow in the vicinity of an idealized tidal inlet is studied using the nonlinear finite-element model ADCIRC. The principal aim is to establish a database of results to identify, analyze, and explain the processes in and near tidal inlets of the Mississippi Sound region in the northeast Gulf of Mexico. Coastal waters in the northeast Gulf of Mexico are forced by a combination of tides, river runoff, and wind. The effects of these forcings, and that of advection, Coriolis acceleration, and barrier islands are studied. The two-dimensional (2D) depth-averaged results derived from the three-dimensional (3D) model computations are similar to those computed by the 2D model for the tidally driven flow, whereas they are significantly different for the wind- and river-induced flow. Counter-rotating eddies are produced by tides when convective terms are included in the simulation. Coriolis acceleration accounts for the asymmetry within and outside the inlet. The flow in the region is weakly nonlinear. The wind- and river-induced flows contribute mainly to the residual circulation. Both the magnitude and the direction of the flow change from the surface to the bottom. The presence of the barrier island modifies the direction of the tidally induced flow in the inlet.
DTIC
Barotropic Flow; Mathematical Models; Water Flow

20010047613 Federal Emergency Management Agency, Washington, DC USA
Remote Sensing: In Federal Disaster Operations. Standard Operating Procedures
Jun. 1999; 50p; In English
Report No.(s): PB2001-104498; 9321.1-PR; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Table of Contents: Record of changes; Foreword; Overview; Operations and procedures; Support requirements and procedures; Plans, Reports, and Records; Operating facilities; Training and exercises; Appendices and List of figures.
NTIS
Support Systems; Disasters

20010047667 Naval Research Lab., Oceanography Div., Stennis Space Center, MS USA

Hyperspectral Remote Sensing Imagery and the Detection of Subsurface Features

Barnard, A. H., Oregon State Univ., USA; Weidemann, Alan D., Naval Research Lab., USA; Pegan, W. Scott, Oregon State Univ., USA; Zaneveld, J. Ronald V., Oregon State Univ., USA; Rhea, W. Joseph, Naval Research Lab., USA; Davis, Curtiss O., Naval Research Lab., USA; Ocean Optics XV; Dec. 28, 2000; 12p; In English; Ocean Optics XV, 16-20 Oct. 2000, Monaco
Report No.(s): AD-A386264; NRL/PP7330-00/0057; Copyright; Avail: Defense Technical Information Center (DTIC)

The detection of features such as sediment plumes, bathymetry, bottom type, and internal waves using ocean color has received increased attention over the past few years due to increased interest in nearshore waters. Future remote sensing imaging systems may provide the necessary radiometric sensitivity and spatial resolution for the detection of these subsurface features on a routine basis. In this work we examine the utility in identifying subsurface features from high spatial and spectral resolution remote sensing measurements of reflectance in shallow water environments. A full suite of in water optical measurements was collected in a shallow water fjord in the summer of 1998. The average depth of the fjord is 30m and a partial sill is located near the mouth. High spatial resolution remote sensing imagery of the fjord was obtained by a hyperspectral spectrometer mounted on a small aircraft during several days concurrent with the in water samples. Imagery from one of the sampling days revealed the signature of an internal wave located near the sill in selected spectral bands. In this study we investigate the use of hyperspectral remote sensing data to predict the amplitude of the internal waves. We propose that subsurface features such as internal waves can be detected using high spatial resolution remote sensing imagery provided a strong gradient exists in the vertical distribution of the optical properties.
DTIC

Remote Sensing; Imaging Techniques; Spatial Resolution; Spectral Resolution; High Resolution

20010047677 Naval Research Lab., Oceanography Div., Stennis Space Center, MS USA

Variability in Measured and Modeled Remote Sensing Reflectance and Comparison of SeaWiFS and In Situ Chlorophyll A Distribution For Coastal Waters at LEO-15

Tozzi, S., Rutgers Univ., USA; Schofield, O., Rutgers Univ., USA; Moline, M. A., California Polytechnic State Univ., USA; Bergmann, T., Rutgers Univ., USA; Crowley, M., Rutgers Univ., USA; Arnone, R., Naval Research Lab., USA; Ocean Optics XV; Nov. 01, 2000; 7p; In English; Ocean Optics XV Conference, 16-20 Oct. 2000, Monaco
Report No.(s): AD-A386384; NRL/PP/7330-00-0055; No Copyright; Avail: CASI; A01, Microfiche; A02, Hardcopy

A data base of in situ bio-optical measurements and pigment samples were collected at the LEO-15 (Long-term Ecosystem Observatory) off the southern coast of New Jersey (USA). The data was used to quantify the impact of coastal upwelling on nearshore bulk apparent (AOP), inherent (IOP) optical properties and phytoplankton biomass concentration and composition. There was good qualitative agreement between the AOPs and IOPs in space and time. The measured IOPs were used as inputs to the Hydrolight radiative transfer model (RTE). Estimated spectral AOPs from the RTE were strongly correlated (generally R(sup 2) is greater than = 0.80) to measured AOPs. If optical closure between in-water measurements was achieve then the RTE was used to construct the spectral remote sensing reflectance. The modeled remote sensing reflectances were compared to satellite derived reflectance estimates from 4 different algorithms. Quantitative agreement between the satellite-measured and in-water modeled remote sensing reflectance was good but results were variable between the different models. The strength of the correlation and spectral consistency was variable with space and time. Correlations were highest in clear offshore waters and lowest in the nearshore turbid waters. In the nearshore waters, the correlation was strongest for blue wavelengths (400-555 nm) but lower for the red wavelengths of light.
DTIC

Data Bases; In Situ Measurement; Optical Measurement; Remote Sensing; Optical Properties

20010047998 Naval Research Lab., Stennis Space Center, MS USA

Digital Mapping, Charting, and Geodesy Analysis Program: Technical Review of MATT Performance Specification

Mesick, Hillary, Naval Research Lab., USA; Carter, Susan, Naval Research Lab., USA; Mar. 09, 2001; 6p; In English
Report No.(s): AD-A387685; NRL-MR/7440-01-8261; No Copyright; Avail: CASI; A01, Microfiche; A02, Hardcopy

The MATT Performance Specification being reviewed is similar to the Digital Nautical Chart (DNC) and Tactical Ocean Data (TOD) specifications, with specific Chief of Naval Operations (CNO) Special Chart features added for submarine navigation support data, and is specifically intended to support the US Navy requirements for subsurface digital navigation data to support the Navigation Sensor System Interface (NAVSSI). MATT portrays strategic information in support of naval operations. The

MATT is based on the feature content of the hardcopy Harbor, Approach, Coastal, and General charts and on the DNC, both produced by NIMA and augmented by additional information.
Author
Computer Aided Mapping; Functional Design Specifications; Nautical Charts

20010048178 NASA Marshall Space Flight Center, Huntsville, AL USA
Introduction to This Special Issue on Geostatistics and Geospatial Techniques in Remote Sensing
Atkinson, Peter, Southampton Univ., UK; Quattrochi, Dale A., NASA Marshall Space Flight Center, USA; Computers and Geosciences; 2000; ISSN 0098-3004; Volume 26, pp. 359; In English; Copyright; Avail: Issuing Activity; Abstract Only

The germination of this special Computers & Geosciences (C&G) issue began at the Royal Geographical Society (with the Institute of British Geographers) (RGS-IBG) annual meeting in January 1997 held at the University of Exeter, UK. The snow and cold of the English winter were tempered greatly by warm and cordial discussion of how to stimulate and enhance cooperation on geostatistical and geospatial research in remote sensing 'across the big pond' between UK and US researchers. It was decided that one way forward would be to hold parallel sessions in 1998 on geostatistical and geospatial research in remote sensing at appropriate venues in both the UK and the US. Selected papers given at these sessions would be published as special issues of C&G on the UK side and Photogrammetric Engineering and Remote Sensing (PE&RS) on the US side. These issues would highlight the commonality in research on geostatistical and geospatial research in remote sensing on both sides of the Atlantic Ocean. As a consequence, a session on "Geostatistics and Geospatial Techniques for Remote Sensing of Land Surface Processes" was held at the RGS-IBG annual meeting in Guildford, Surrey, UK in January 1998, organized by the Modeling and Advanced Techniques Special Interest Group (MAT SIG) of the Remote Sensing Society (RSS). A similar session was held at the Association of American Geographers (AAG) annual meeting in Boston, Massachusetts in March 1998, sponsored by the AAG's Remote Sensing Specialty Group (RSSG). The 10 papers that make up this issue of C&G, comprise 7 papers from the UK and 3 papers from the LIS. We are both co-editors of each of the journal special issues, with the lead editor of each journal issue being from their respective side of the Atlantic. The special issue of PE&RS (vol. 65) that constitutes the other half of this co-edited journal series was published in early 1999, comprising 6 papers by US authors. We are indebted to the International Association for Mathematical Geology for allowing us to use C&G as a vehicle to convey how geostatistics and geospatial techniques can be used to analyze remote sensing and other types of spatial data. We see this special issue of C&G. and its complementary issue of PE&RS. as a testament to the vitality and interest in the application of geostatistical and geospatial techniques in remote sensing. We also see these special journal issues as the beginning of a fruitful. and hopefully long-term relationship, between American and British geographers and other researchers interested in geostatistical and geospatial techniques applied to remote sensing and other spatial data.
Author
Remote Sensing; Computers; Geology; Geophysics; Periodicals

20010048651 Stanford Univ., Stanford, CA USA
Spectrometry of Pasture Condition and Biogeochemistry in the Central Amazon
Asner, Gregory P., Stanford Univ., USA; Townsend, Alan R., Colorado Univ., USA; Bustamante, Mercedes M. C., Brasilia Univ., Brazil; Geophysical Research Letters; Sep. 01, 1999; ISSN 0094-8276; Volume 26, No. 17, pp. 2769-2772; In English
Contract(s)/Grant(s): NAGW-5253
Report No.(s): Paper-1999GL900546; Copyright; Avail: Issuing Activity

Regional analyses of Amazon cattle pasture biogeochemistry are difficult due to the complexity of human, edaphic, biotic and climatic factors and persistent cloud cover in satellite observations. We developed a method to estimate key biophysical properties of Amazon pastures using hyperspectral reflectance data and photon transport inverse modeling. Remote estimates of live and senescent biomass were strongly correlated with plant-available forms of soil phosphorus and calcium. These results provide a basis for monitoring pasture condition and biogeochemistry in the Amazon Basin using spaceborne hyperspectral sensors.
Author
Spectrometers; Biogeochemistry; Amazon Region (South America); Grasslands; Phosphorus; Soils; Structural Basins

44
ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells; and solar, geothermal, windpower, and waterwave conversion systems; energy storage; and traditional power generators. For technologies related to nuclear energy production see 73 Nuclear Physics. For related information see also 07 Aircraft Propulsion and Power; 20 Spacecraft Propulsion and Power, and 28 Propellants and Fuels.

20010045804 Little (Arthur D.), Inc., Global Environment and Risk Group, Houston, TX USA
Deepwater Program: Literature Review, Environmental Risks of Chemical Products Used in Gulf of Mexico Deepwater Oil and Gas Operations, Volume 2, Appendices ***Final Report***
Boehm, P.; Turton, D.; Raval, A.; Caudle, D.; French, D.; Feb. 2001; 392p; In English
Contract(s)/Grant(s): MMS-01-98-CT-30900
Report No.(s): PB2001-104377; No Copyright; Avail: CASI; A17, Hardcopy; A04, Microfiche

An inventory of chemicals used in the Gulf of Mexico was compiled using data received from three major energy companies operating in the Gulf of Mexico; annual reports from World Oil magazine, Material Safety Data Sheets, and a review of Hudgins' 1991 report on chemical usage. The data set establishes a chemical inventory database containing information on chemical products, handling, physical and chemical properties, and toxicological data for selected chemicals and/or products. In addition, models were developed for offshore E&P operations to estimate the volume of chemical transported, stored, and expected to be used at any one time in the Gulf of Mexico. A subject of representative chemicals used in the deep water and shallow water were selected for detailed study based on the following criteria: chemicals used offshore in high volumes; potential impact on the environment and factors affecting fate and transport. A total of 17 spill scenarios was developed and modeled using Applied Science Associates' (ASA) chemical spill model CHEMMAP. For each of the chemicals modeled, habitat areas exposed to peak concentrations or mass loadings were tabulated. These peak exposure concentrations were compared against acute toxicity data to estimate the potential impact to the environment.
NTIS
Oils; Deep Water; Oil Recovery; Gases; Energy Sources

20010047560 Center for Army Analysis, Fort Belvoir, VA USA
Analysis of Deployable Applications of Photovoltaics in Theater (ADAPT) ***Final Report, Jan. 1999-July 2000***
Jones, Hugh W.; Mitchell, Ken R.; Jul. 2000; 58p; In English
Report No.(s): AD-A388088; CAA-R-00-3; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

ADAPT examines photovoltaics (PV) in both a military operations context and within a cost/benefit analysis framework. Both of these topics are now in the forefront of transforming the Army into a strategically responsive force that is dominant across the full spectrum of operations. This report illustrates that PV, as a renewable energy alternative to fossil fuels, has potential in both current and future Army deployments.
DTIC
Photovoltaic Conversion; Renewable Energy; Cost Analysis; Deployment; Solar Cells; Photovoltaic Effect

45
ENVIRONMENT POLLUTION

Includes atmospheric, water, soil, noise, and thermal pollution.

20010044084 Carnegie-Mellon Univ., Pittsburgh, PA USA
Numerical Modeling of Experimental DNAPL Release at Dover AFB ***Final Report, 1 Jul. 1997 - 31 Dec. 1998***
Liu, Ke, Carnegie-Mellon Univ., USA; Pantazidou, Marina, Carnegie-Mellon Univ., USA; Feb. 22, 2001; 14p; In English
Contract(s)/Grant(s): F49620-97-1-0506
Report No.(s): AD-A387594; Rept-1-52276; AFRL-SR-BL-TR-01-0157; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

This research investigated how numerical modeling of dense nonaqueous liquid phase (DNAPL) spills can assist in the planning of field experiments of controlled DNAPL releases. The procedure was first validated using existing data from a controlled release at the Borden test site, and then extended to hypothetical releases at the Dover site. The simulation results confirmed that the total release volume, the infiltration rate and the DNAPL injection head are important parameters for the design of controlled release experiments. Specifically, it was found that proper selection of the injection head and the release volume through several numerical simulations can aid in controlling the extent of the DNAPL-contaminated area in the field. Finally, it

was shown that considerable savings in computational time can be achieved by approximating the 3-D geometry with radial symmetric 2-D simulations. This is true provided that the soil distribution is relatively homogeneous at the horizontal plane, as it is the case at both Borden and Dover.
DTIC
Mathematical Models; Numerical Analysis; Ground Water; Contamination

20010044097 New York State Energy Research and Development Authority, Albany, NY USA
Conference Proceedings on the Environmental Monitoring, Evaluation, and Protection in New York: Linking Science and Policy
Dec. 1999; 156p; In English; Environmental Monitoring, Evaluation, and Protection in New York: Linking Science and Policy, 7-8 Dec. 1999, Albany, NY, USA
Report No.(s): PB2001-104581; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche
This conference highlighted the environmental research that is being supported in New York under the system benefits charge programs (referred to as the New York Energy Smart (SM) program). The primary purpose of this conference was to establish a forum for scientists and policy makers to share ideas on critical energy-related environmental issues in the region. This helps to ensure that our limited dollars for environmental research are used effectively, and most of all, that the scientific information we develop is relevant to the formulation of environmental policy. The conference itself was an experiment. We deliberately tried to mix technical presentations with policy overviews. We recognize the difficulty of doing this well, but it is exactly what we believe needs to be done more often.
NTIS
Environment Management; Environmental Monitoring; Conferences; Environment Protection

20010044107 Department of Transportation, Office of the Assistant Secretary for Transportation Policy, Washington, DC USA
Report to Congress. Feasibility of a USA Department of Transportation Multi-Modal Noise Model
January 2000; 68p; In English
Report No.(s): PB2001-104344; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche
This study reviews noise models employed by the various boards and agencies within the DOT including the Federal Aviation Administration, the Federal Highway Administration, the Federal Transit Administration, the Federal Railroad Administration, and the Surface Transportation Board. The Scope of this study is limited to transportation related noises as they effect people where they live, and other noise-sensitive receptors such as schools, medical facilities, and nursing homes. This study only considers psycho-acoustical and related responses such as annoyance, speech interference, and sleep disruption. It does not consider physiological responses or noise-induced hearing-loss. The study does not consider noise in other contexts such as effects of noise on visitors to parks and wilderness areas.
NTIS
Congressional Reports; Noise Pollution; Noise (Sound); Physiological Effects

20010044109 Albany Univ., Dept. of Earth and Atmospheric Studies, Albany, NY USA
Least Cost Control Strategies to Reduce Ozone in the Northeastern Urban Corridor *Final Report*
Trivikrama Rao, S.; Mount, T. D.; Dorris, G.; Sistla, G.; Oct. 1999; 164p; In English
Report No.(s): PB2001-104290; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche
The objectives are to establish a statistical representation of a complex photochemical air quality model (UAM-V) using a base year of 1995 and verify its validity, using the statistical representation, evaluate effects of reductions of ozone precursors in different geographical regions on ozone improvement in the Metro-East Corridor, and develop alternative, spatially focused control strategies and evaluate the emission-control costs associated with them. Using a variety of statistical methods, photochemical modeling, and economic analyses, the research attempted to distill the relative impacts of reductions in emissions of nitrogen oxides (NOx) and volatile organic compounds (VOC) in different geographical areas on ozone improvement in the Metro-East Corridor. The research developed quantitative factors which convey the expected ozone improvement in the Metro-East Corridor from N Ox and VOC emission reductions from different source types and source subregions. The research provided a ranking of emissions control alternative in terms of cost-effectiveness.
NTIS
Environment Models; Financial Management; Air Quality; Ozone; Economic Analysis; Pollution Control; Cost Effectiveness

20010044111 Wisconsin Univ., Space Science and Engineering Center, Madison, WI USA

The Continuation of Cloud Statistics for NASA Climate Change Studies ***Final Report, 18 Apr. 1999 - 17 Apr. 2001***

Wylie, Donald P., Wisconsin Univ., USA; [2001]; 51p; In English

Contract(s)/Grant(s): NAG1-2196; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The weather systems, cyclones, and anticyclones, along with air trajectories and cloud forms, are compared to past studies of the Arctic to assess compatibility of the four month study of the Arctic Cloud Experiment flights of the First ISCCP Regional Experiment (FIRE/ACE) with past climatologies. The frequency and movement of cyclones (lows) and anticyclones (highs) followed the general eastward and northeastward directions indicated by past studies. Most cyclones (lows) came from eastern Siberia and the Bering Sea to the south and moved north across the Bering Straight or Alaska into the Arctic Ocean. They generally weakened in central pressure as they moved poleward. Anticyclones (highs) were most common in the eastern Beaufort Sea near Canada in June and July as predicted from previous studies. However, many cyclones and anticyclones moved in westward directions which is rare in other latitudes. Erratic changes in shape and intensity on a daily basis also were observed. The National Center for Environmental Prediction (NCEP) analysis generally reflected the Surface Heat Budget in the Arctic (SHEBA) Ship World Meteorological Organization (WMO) observations which it used. However, NCEP temperatures were biased warm by 1.0 to 1.5 C in April and early May. In July when the surface temperature were at the freezing/thawing point, the NCEP analysis changed to a cold bias of -1.0 C. Dew points had smaller biases except for July where they were biased cold by -1.4 C. Wind speeds had a -2 m/s low bias for the six windiest days. Surface barometric pressures had consistently low biases from -1.2 to -2.8 hPa in all four months. Air parcel historical trajectories were mainly from the south or from local anticyclonic gyres in the Beaufort Sea. Most air came to the SHEBA Ship from the north Pacific Ocean or from Alaska and Canada and occasionally from eastern Siberia. Very few trajectories traced back across the pole to Europe and Central Asia. Cloud cover was high, as expected, from 69-86% of the time. Satellite data also indicate frequent stratus, altostratus, and cirrus clouds (occurring 61% of the time) above the expected boundary layer fog and Arctic stratus clouds.

Author

Anticyclones; Climate Change; Climatology; Cyclones; Meteorology; Satellite Observation; Clouds (Meteorology)

20010044112 Colorado State Univ., Dept. of Atmospheric Science, Fort Collins, CO USA

Analysis of the Diurnal Cycle of Precipitation and its Relation to Cloud Radiative Forcing using TRMM Products ***Final Report, 1 Jul. 1997 - 30 Jun. 2000***

Randall, David A., Colorado State Univ., USA; Fowler, Laura D., Colorado State Univ., USA; [2000]; 4p; In English

Contract(s)/Grant(s): NAG5-4749; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

By incorporating the Tropical Rain Measuring Mission (TRMM) satellite orbital information into the geodesic version of the Colorado State University General Circulation Model (CSU GCM), we are able to fly a satellite in the GCM, and sample the simulated atmosphere in the same way as the TRMM sensors sample the real atmosphere. The TRMM sampling statistics of precipitation and radiative fluxes at annual, intraseasonal, monthly-mean and composited diurnal time scales are evaluated by comparing the satellite-sampled against fully-sampled simulated atmospheres. This information provides a valuable guidance for efficient usage of TRMM data and future satellite mission planning.

Derived from text

Diurnal Variations; Sampling; Trmm Satellite; Precipitation (Meteorology)

20010044270 Department of Energy, Environmental Measurements Lab., New York, NY USA

Department of Energy, Office of Environmental Management, Quality Assessment Program ***Semiannual Report***

Greenlaw, P. D.; Berne, A.; Dec. 2000; 374p; In English; Original contains color illustrations

Report No.(s): PB2001-104646; EML-611; No Copyright; Avail: CASI; A16, Hardcopy; A03, Microfiche

This report presents the results from the analysis of the 53rd set of environmental quality assessment samples (QAP-LIII) that were received on or before December 2, 2000. This Quality Assessment Program (QAP) is designed to test the quality of the environmental measurements being reported to the Department of Energy by its contractors. Since 1976, real or synthetic environmental samples that have been prepared and thoroughly analyzed at the Environmental Measurements Laboratory (EML) have been distributed at first quarterly and then semi-annually to these contractors.

NTIS

Environment Management; Environmental Laboratories; Environmental Quality

20010044335 Colorado State Univ., Dept. of Atmospheric Science, Fort Collins, CO USA

Flying the TRMM Satellite in a GCM

Lin, Xin, Colorado State Univ., USA; Fowler, Laura D., Colorado State Univ., USA; Randall, David A., Colorado State Univ., USA; Mar. 05, 2001; 46p; In English

Contract(s)/Grant(s): NAS1-98125; NAG5-4749; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

By incorporating the Tropical Rainfall Measurement Mission (TRMM) satellite orbital information into the Colorado State University General Circulation Model (CSU GCM), we are able to 'fly' a satellite in the GCM, and sample the simulated atmosphere in the same way as the TRMM sensors sample the real atmosphere. The TRMM-sampled statistics for precipitation and radiative fluxes at annual, intraseasonal, monthly-mean and seasonal-mean diurnal time scales are evaluated by comparing the satellite-sampled against fully-sampled simulated atmospheres. The sampling rates of the TRMM sensors are significantly affected by the sensors' swath widths. The TRMM Microwave Imager (TMI) and the Visible Infrared Scanner (VIRS) sample each 2.25 x 2.25 degree grid box in the Tropics and subtropics about once per day, but at a different local time every day, while the Precipitation Radar (PR) and the Clouds and the Earth's Radiant Energy System (CERES) sensor visit each grid box about once every three days and twice per day, respectively. Besides inadequate samplings resulting from sensors' swath widths, there is a large, systematic diurnal undersampling associated with TRMM's orbital geometry for grid boxes away from the Equator. When only one month of TRMM data are used, this diurnal undersampling can lead to more daytime samples relative to nighttime samples in one hemisphere, and more nighttime samples relative to daytime samples in the other hemisphere. The resulting sampling biases (3-6 W m(exp-2)) are very pronounced in outgoing longwave radiation (OLR) over the subtropical land masses. The sampling errors in OLR monthly- and seasonal-means are less than 8 W m(exp-2) (5%) for each 2.25 x 2.25 degree grid box. The OLR monthly- and seasonal-means are not sensitive to diurnal undersamplings associated with the TRMM orbits and sensors' swath widths. However, this is not the case for total precipitation. Diurnal undersampling could produce errors as large as 20% in the Tropics and 40% in the subtropics, for the zonally averaged monthly-mean rain rates. The TRMM orbits sample each 2.25 x 2.25 degree grid box in the Tropics and subtropics 1-6 times for each hour of the day within a single season. The seasonal-mean diurnal cycles of precipitation and OLR are not well sampled for any one grid box. By either accumulating the satellite data for a long enough period, or averaging the data over a large area with a relatively uniform diurnal signal, the diurnal cycles of precipitation and OLR can be satisfactorily sampled. The effects TRMM sampling errors on the inferred tropical-mean hydrologic cycle and radiative fluxes are also evaluated. There are strong spurious oscillations associated with TRMM's orbital geometry, with periods of 23 days and 3-4 months, in tropical-mean daily and monthly precipitation. While the relative fluctuations of the sampled-OLR are negligible, the relative fluctuations of the sampled precipitation have magnitudes similar to those of the observed climate variability. Caution must therefore be used when applying TRMM observations of tropical-mean precipitation to interpret climate variations at intraseasonal and interannual scales.

Author

Atmospheric General Circulation Models; Climate; Trmm Satellite; Diurnal Variations; Sampling

20010044339 ManTech Environmental Technology, Inc., Corvallis, OR USA

Recommended Methods for Ambient Air Monitoring of NO, NO2, NO(y) and Individual NO(z) Species

McClenny, W. A.; Sep. 2000; 92p; In English

Report No.(s): PB2001-104379; No Copyright; Avail: National Technical Information Service (NTIS)

The most appropriate monitoring methods for reactive nitrogen oxides are identified subject to the requirements for diagnostic testing of air quality simulation models. Measurements must be made over one hour or less and with an uncertainty of equal to or less than 20% (10% for NO2) over a typical ambient concentration range extending from a lower limit of 1ppbv. NO, NO2, HNO3, PAN, and other reactive nitrogen oxides that exist at the 1ppbv level and above, along with the compound sets designated as NO(y), NO(x), and the difference, NO(z) are included in this measurement requirement. New and/or improved measurement techniques for NO2 monitoring including laser-induced fluorescence, photolytic conversion/NO,O3 chemiluminescence, differential optical absorption spectroscopy, and NO2/luminol chemiluminescence are examined with reference to literature citations and to field monitoring as part of the 1999 SOS Summer Field Study in Nashville, TN. Existing approaches to monitoring the other most prevalent reactive oxides of nitrogen are reviewed. At the lower end of the ambient monitoring range, research-grade instruments are often needed and operator skill, experience, and close attention are critical to proper instrument operation, calibration, and maintenance.

NTIS

Environmental Monitoring; Nitric Acid; Nitrogen Oxides; Ambience; Environment Models; Air Quality; Pollution Monitoring; Air Pollution

20010044341 Battelle Ocean Sciences, Duxbury, MA USA
Environmental Impacts of Synthetic Based Drilling Fluids
August 2000; 146p; In English
Contract(s)/Grant(s): MMS Proj. 15240
Report No.(s): PB2001-104361; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Synthetic based drilling fluids (SBFs) exhibit drilling performance comparable to oil based fluids (OBFs); however, synthetic base fluids are less toxic and degrade faster than mineral oils or diesels. Cuttings associated with certain SBFs may be discharged to waters of the Gulf of Mexico; OBF cuttings may not. Synthetics include paraffins, olefins, ethers, esters, and acetals. Most of the synthetics used in the Gulf are olefins although esters have also been used. Discharged SBF cuttings, containing some 5 to 15% synthetic, tend to clump and settle rapidly. Synthetics exhibit low toxicity and SBF cuttings don't harm biological communities in the water column. SBF cuttings may accumulate to high concentrations in sediments within about 200 m of discharging platforms. When this occurs, benthic communities are likely to be adversely affected by the synthetics and by physical burial. Usually, abundance of some species decreases and abundance of a few opportunistic species increases. This effect appears to be caused primarily by biodegradation of the synthetic base fluid, leading to oxygen depletion in sediments. The initial impact and rate of recovery of dependence on the nature of the synthetic, physical factors (e.g. water depth, strength of bottom currents, etc.), and the nature of the benthic community.
NTIS
Pollution Monitoring; Marine Environments; Water Pollution; Impact

20010045641 Zaromb Research Corp., Hinsdale, IL USA
A New Sampler for Atmospheric Bioaerosols in the Respirable Range ***Final Report, Jun. 1994 - Dec. 1996***
Birenzvige, Amnon; Akiyemi, Agnes N.; Zaromb, Solomon; Mar. 1998; 25p; In English
Contract(s)/Grant(s): DA Proj. 101-61102-A-71-A
Report No.(s): AD-A343318; ERDEC-TR-451; No Copyright; Avail: Defense Technical Information Center (DTIC)

This report describes a newly developed portable high-throughput liquid-absorption air sampler (PHTLAAS) and its effectiveness in capturing respirable particles. A detailed description of the sampler and its operation is followed by discussions of the testing procedures and the experimental results. The report ends with discussions on some potential applications of this sampler.
DTIC
Air Sampling; Samplers; Air Pollution; Aerosols; Chemical Warfare

20010045660 Naval Supply Center, Fleet and Industrial Supply Center, San Diego, CA USA
Disposal and Reuse of Fleet and Industrial Supply Center, Oakland Vision 2000 Maritime Development Environmental Impact Statement/Environmental Impact Report, Volume 2
Jul. 1997; 733p; In English
Report No.(s): AD-A327711; No Copyright; Avail: Issuing Activity

Section 4(f) of the Department of Transportation Act of 1966, codified in federal law at 49 U.S.C. 303, declares that It is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites.' Section 4(f) specifies that The Secretary of Transportation may approve a transportation program or project... requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land of an historic site of national, State, or local significance (as determined by the Federal, State, or local officials having jurisdiction over the park, area refuge, or site) only if: (1) there is no prudent and feasible alternative to using that land; and (2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.'
DTIC
Environmental Surveys; Recreation; Industrial Management

20010045661 Marine Corps Base Camp, Camp Pendleton, CA USA
Draft Environmental Impact Statement Santa Margarita River Flood Control Project (P-010), Basilone Road Bridge Replacement Project (P-030), and Draft Clean Water Act 404(b)(1) Evaluation, Camp Pendleton, California
Jun. 1997; 595p; In English
Report No.(s): AD-A327723; No Copyright; Avail: Defense Technical Information Center (DTIC)

Marine Corps Base (MCB) Camp Pendleton and Marine Corps Air Station (MCAS) Camp Pendleton maintain and operate facilities and provide services to support operations of aviation activities and units of operational forces of the USA Marine Corps

(USMC). MCB Camp Pendleton is the USMC's only west coast military installation where a comprehensive air, sea, and ground assault training scenario can be executed. Facilities and operations in the southern portion of MCB Camp Pendleton adjacent to the Santa Margarita River are located in the 100-year floodplain for the river. Heavy rainfall in 1993 resulted in the flooding of MCAS Camp Pendleton, portions of MCB Camp Pendleton and the destruction of Basilone Road Bridge. The readiness and ability to support the missions of MCB Camp Pendleton and MCAS Camp Pendleton were seriously jeopardized because of the flooding and resulting damage. The flood damage caused operations to cease in the flood damaged areas and reduced the ability of the installation to perform the required missions for a period of 7 months. The flooding threatened the safety of personnel working in a portion of MCB Camp Pendleton and MCAS Camp Pendleton. The flooding also damaged structures and facilities, including buildings in the historic Santa Margarita Ranch House complex, structures in the Chappo (22) Area, and Sewage Treatment Plant (STP) No. 3. to prevent future damage to property and disruption of essential operations, the MCB Camp Pendleton has proposed construction of a flood control project.
DTIC
Environmental Surveys; Flood Control; Flood Damage; Construction; Environment Management

20010045807 Kyushu Univ., Fukuoka, Japan
Kitakyushu Mode for Overcoming Industrial Pollution and its Applicability to Developing Countries
Katsuhara, Takeshi, Kyushu Univ., Japan; Matsumoto, Toru, Kyushu Univ., Japan; Nakayama, Hirofumi, Kyushu Univ., Japan; Technology Reports of Kyushu University; March 2001; ISSN 0023-2718; Volume 74, No. 2, pp. 115-122; In Japanese; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Kitakyushu City, long thriving as one of Japan's four major industrial zones, faced a serious environmental crisis in the rapid growth period of 1960's. However, the quality of air and water has since been dramatically improved due to the concerted all-out efforts made by the administration, enterprises and citizens supported by the campaign of mass media. First, an empirical study was made based on the so-called DPSER (Driving Forces, Pressures, States, Effects, Responses) analytical framework making the most of available local statistics. The paper also identified the salient characteristics, structure and mechanism of the approaches adopted by the City in order to solve the severe pollution. Second, the transferability of the "Kitakyushu Model" to the developing countries was discussed. With special respect to this concept, the categorized requirements of developing countries corresponding to the development stage of each recipient country were investigated in addition to the breakdown of supply possibility of Kitakyushu City as a supplier of environmental management resources.
Author
Air Quality; Air Pollution; Pollution Monitoring; Pollution Control; Cities

20010045818 NASA Goddard Space Flight Center, Greenbelt, MD USA
Earth: Earth Science and Health
Maynard, Nancy G., NASA Goddard Space Flight Center, USA; [2001]; 1p; In English; Department of Defense Pest Management Workshop, 26-28 Feb. 2001, Jacksonville, FL, USA; No Copyright; Avail: Issuing Activity; Abstract Only

A major new NASA initiative on environmental change and health has been established to promote the application of Earth science remote sensing data, information, observations, and technologies to issues of human health. NASA's Earth Sciences suite of Earth observing instruments are now providing improved observations science, data, and advanced technologies about the Earth's land, atmosphere, and oceans. These new space-based resources are being combined with other agency and university resources, data integration and fusion technologies, geographic information systems (GIS), and the spectrum of tools available from the public health community, making it possible to better understand how the environment and climate are linked to specific diseases, to improve outbreak prediction, and to minimize disease risk. This presentation is an overview of NASA's tools, capabilities, and research advances in this initiative.
Author
Earth Sciences; Health; Research and Development

20010045819 NASA Goddard Space Flight Center, Greenbelt, MD USA
Simulation Study of Effects of Solar Irradiance and Sea Surface Temperature on Monsoons and Global Circulation
Sud, Y. C., NASA Goddard Space Flight Center, USA; Walker, G. K., NASA Goddard Space Flight Center, USA; Mehta, V., NASA Goddard Space Flight Center, USA; Lau, W. K.-M., NASA Goddard Space Flight Center, USA; March 2001; 1p; In English; Monsoon Conference, 18-23 Mar. 2001, New Delhi, IN, USA; No Copyright; Avail: Issuing Activity; Abstract Only

A recent version of the GEOS 2 GCM was used to isolate the roles of the annual cycles of solar irradiation and/or sea-surface temperatures (SSTs) on the simulated circulation and rainfall. Four 4-year long integrations were generated with the GCM. The first integration, called Control Case, used daily-interpolated SSTs from a 30 year monthly SST climatology that was obtained

from the analyzed SST-data, while the solar irradiation at the top of the atmosphere was calculated normally at hourly intervals. The next two cases prescribed the SSTs or the incoming solar irradiance at the top of the atmosphere at their annual mean values, respectively while everything else was kept the same as in the Control Case. In this way the influence of the annual cycles of both external forcings was isolated.
Author
Solar Radiation; Irradiation; Sea Surface Temperature

20010046946 Colorado State Univ., Dept. of Atmospheric Science, Fort Collins, CO USA
Diurnal Variability of the Hydrologic Cycle and Radiative Fluxes: Comparisons Between Observation and a GCM
Lin, Xin, Colorado State Univ., USA; Randall, David A., Colorado State Univ., USA; Fowler, Laura D., Colorado State Univ., USA; Journal of Climate; Dec. 01, 2000; Volume 13, No. 23, pp. 4159-4179; In English; Original contains color illustrations
Contract(s)/Grant(s): NAS1-98125; NAG5-4749; NSF ATM-98-12384; Copyright; Avail: Issuing Activity

The simulated diurnal cycle is in many ways an ideal test bed for new physical parameterizations. The purpose of this paper is to compare observations from the Tropical Rainfall Measurement Mission, the Earth Radiation Budget Experiment, the International Satellite Cloud Climatology Project, the Clouds and the Earth's Radiant Energy System Experiment, and the Anglo-Brazilian Amazonian Climate Observation Study with the diurnal variability of the Amazonian hydrologic cycle and radiative energy budget as simulated by the Colorado State University general circulation model, and to evaluate improvements and deficiencies of the model physics. The model uses a prognostic cumulus kinetic energy (CKE) to relax the quasi-equilibrium closure of the Arakawa-Schubert cumulus parameterization. A parameter, alpha, is used to relate the CKE to the cumulus mass flux. This parameter is expected to vary with cloud depth, mean shear, and the level of convective activity, but up to now a single constant value for all cloud types has been used. The results of the present study show clearly that this approach cannot yield realistic simulations of both the diurnal cycle and the monthly mean climate state. Improved results are obtained using a version of the model in which alpha is permitted to vary with cloud depth.
Author
Diurnal Variations; Atmospheric General Circulation Models; Energy Budgets; Rain; Earth Radiation Budget Experiment; Hydrological Cycle

20010046974 Colorado Univ., Inst. for Arctic and Alpine Research, Boulder, CO USA
An Integrated Use of Experimental, Modeling and Remote Sensing Techniques to Investigate Carbon and Phosphorus Dynamics in the Humid Tropics ***Final Report***
Townsend, Alan R., Colorado Univ., USA; Asner, Gregory P., Colorado Univ., USA; Bustamante, Mercedes M. C., Brasilia Univ., Brazil; [2001]; 4p; In English
Contract(s)/Grant(s): NAGW-5253; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Moist tropical forests comprise one of the world's largest and most diverse biomes, and exchange more carbon, water, and energy with the atmosphere than any other ecosystem. In recent decades, tropical forests have also become one of the globe's most threatened biomes, subjected to exceptionally high rates of deforestation and land degradation. Thus, the importance of and threats to tropical forests are undeniable, yet our understanding of basic ecosystem processes in both intact and disturbed portions of the moist tropics remains poorer than for almost any other major biome. Our approach in this project was to take a multi-scale, multi-tool approach to address two different problems. First, we wanted to test if land-use driven changes in the cycles of probable limiting nutrients in forest systems were a key driver in the frequently observed pattern of declining pasture productivity and carbon stocks. Given the enormous complexity of land use change in the tropics, in which one finds a myriad of different land use types and intensities overlain on varying climates and soil types, we also wanted to see if new remote sensing techniques would allow some novel links between parameters which could be sensed remotely, and key biogeochemical variables which cannot. Second, we addressed to general questions about the role of tropical forests in the global carbon cycle. First, we used a new approach for quantifying and minimizing non-biological artifacts in the NOAA/NASA AVHRR Pathfinder time series of surface reflectance data so that we could address potential links between Amazonian forest dynamics and ENSO cycles. Second, we showed that the disequilibrium in C-13 exchanged between land and atmosphere following tropical deforestation probably has a significant impact on the use of 13-CO2 data to predict regional fluxes in the global carbon cycle.
Derived from text
Carbon Cycle; Deforestation; Ecosystems; Forests; Air Land Interactions

20010047501 Colorado Univ., Inst. for Arctic and Alpine Research, Boulder, CO USA
Land Use Effects on Atmospheric C-13 Imply a Sizable Terrestrial CO2 Sink in Tropical Latitudes
Townsend, Alan R., Colorado Univ., USA; Asner, Gregory P., Colorado Univ., USA; Tans, Pieter P., National Oceanic and

Atmospheric Administration, USA; White, James W. C., Colorado Univ., USA; [2000]; 16p; In English
Contract(s)/Grant(s): NAGW-5253; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Records of atmospheric CO2 and 13-CO2, can be used to distinguish terrestrial vs. oceanic exchanges of CO2 with the atmosphere. However, this approach has proven difficult in the tropics, partly due to extensive land conversion from C-3 to C-4 vegetation. We estimated the effects of such conversion on biosphere-atmosphere C-13 exchange for 1991 through 1999, and then explored how this 'land-use disequilibrium' altered the partitioning of net atmospheric CO2 exchanges between ocean and land using NOAA-CMDL data and a 2D, zonally averaged atmospheric transport model. Our results show sizable CO2 uptake in C-3-dominated tropical regions in seven of the nine years; 1997 and 1998, which included a strong ENSO event, are near neutral. Since these fluxes include any deforestation source, our findings imply either that such sources are smaller than previously estimated, and/or the existence of a large terrestrial CO2 sink in equatorial latitudes.
Author

Atmospheric Composition; Carbon 13; Carbon Dioxide; Carbon Dioxide Concentration; Earth Atmosphere

20010047503 NASA Goddard Inst. for Space Studies, New York, NY USA

The Role of Remote Sensing Displays in Earth Climate and Planetary Atmospheric Research

DelGenio, Anthony D., NASA Goddard Inst. for Space Studies, USA; [2001]; 51p; In English; Original contains color illustrations
Report No.(s): GCN-01-03; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The communities of scientists who study the Earth's climate and the atmospheres of the other planets barely overlap, but the types of questions they pose and the resulting implications for the use and interpretation of remote sensing data sets have much in common. Both seek to determine the characteristic behavior of three-dimensional fluids that also evolve in time. Climate researchers want to know how and why the general patterns that define our climate today might be different in the next century. Planetary scientists try to understand why circulation patterns and clouds on Mars, Venus, or Jupiter are different from those on Earth. Both disciplines must aggregate large amounts of data covering long time periods and several altitudes to have a representative picture of the rapidly changing atmosphere they are studying. This emphasis separates climate scientists from weather forecasters, who focus at any one time on a limited number of images. Likewise, it separates planetary atmosphere researchers from planetary geologists, who rely primarily on single images (or mosaics of images covering the globe) to study two-dimensional planetary surfaces that are mostly static over the duration of a spacecraft mission yet reveal dynamic processes acting over thousands to millions of years. Remote sensing displays are usually two-dimensional projections that capture an atmosphere at an instant in time. How scientists manipulate and display such data, how they interpret what they see, and how they thereby understand the physical processes that cause what they see, are the challenges I discuss in this chapter. I begin by discussing differences in how novices and experts in the field relate displays of data to the real world. This leads to a discussion of the use and abuse of image enhancement and color in remote sensing displays. I then show some examples of techniques used by scientists in climate and planetary research to both convey information and design research strategies using remote sensing displays.
Author

Atmospheric Circulation; Remote Sensing; Climatology; Geological Surveys; Planetary Atmospheres

20010047505 NASA Goddard Inst. for Space Studies, New York, NY USA

Major Optical Depth Perturbations to the Stratosphere from Volcanic Eruptions: Stellar-Extinction Period, 1961-1978

Stothers, Richard B., NASA Goddard Inst. for Space Studies, USA; [2001]; 54p; In English
Report No.(s): GCN-01-08; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

A revised chronology of stratospheric aerosol extinction due to volcanic eruptions has been assembled for the period 1961-1978, which immediately precedes the era of dedicated satellite measurements. On the whole, the most accurate data consist of published observations of stellar extinction, supplemented in part by other kinds of observational data. The period covered encompasses the important eruptions of Agung (1963) and Fuego (1974), whose dust veils are discussed with respect to their transport, decay, and total mass. The effective (area-weighted mean) radii of the aerosols for both eruptions are found to be 0.3-0.4 microns. It is confirmed that, among known tropical eruptions, Agung's dust was unique for a low-latitude eruption in remaining almost entirely confined to the hemisphere of its production. A new table of homogeneous visual optical depth perturbations, listed by year and by hemisphere, is provided for the whole period 1881-1978, including the pyrheliometric period before 1961 that was investigated previously.
Author

Volcanoes; Perturbation; Optical Thickness; Stratosphere; Aerosols

20010047506 NASA Goddard Space Flight Center, Greenbelt, MD USA

The Impact of Increasing Carbon Dioxide on Ozone Recovery

Rosenfield, Joan E., Maryland Univ. Baltimore County, USA; Douglass, Anne R., NASA Goddard Space Flight Center, USA; Considine, David B., Maryland Univ., USA; [2001]; 32p; In English; Original contains color illustrations; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We have used the GSFC coupled two-dimensional (2D) model to study the impact of increasing carbon dioxide from 1980 to 2050 on the recovery of ozone to its pre-1980 amounts. We find that the changes in temperature and circulation arising from increasing CO2 affect ozone recovery in a manner which varies greatly with latitude, altitude, and time of year. Middle and upper stratospheric ozone recovers faster at all latitudes due to a slowing of the ozone catalytic loss cycles. In the lower stratosphere, the recovery of tropical ozone is delayed due to a decrease in production and a speed up in the overturning circulation. The recovery of high northern latitude lower stratospheric ozone is delayed in spring and summer due to an increase in springtime heterogeneous chemical loss, and is speeded up in fall and winter due to increased downwelling. The net effect on the higher northern latitude column ozone is to slow down the recovery from late March to late July, while making it faster at other times. In the high southern latitudes, the impact of CO2 cooling is negligible. Annual mean column ozone is predicted to recover faster at all latitudes, and globally averaged ozone is predicted to recover approximately ten years faster as a result of increasing CO2.

Author

Carbon Dioxide; Ozone; Atmospheric Composition

20010047507 Columbia Univ., Center for Climate Systems, New York, NY USA

A Regional Model Study of Synoptic Features Over West Africa

Druyan, Leonard M., Columbia Univ., USA; Fulakeza, Matthew, Columbia Univ., USA; Lonergan, Patrick, Science Systems and Applications, Inc., USA; Saloum, Mahaman, Direction de la Meteorologie Nationale, Niger; [2001]; 52p; In English

Contract(s)/Grant(s): NSF ATM-97-25142

Report No.(s): GCN-01-10; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Synoptic weather features over West Africa were studied in simulations by the regional simulation model (RM) at the NASA/Goddard Institute for Space Studies. These pioneering simulations represent the beginning of an effort to adapt regional models for weather and climate prediction over West Africa. The RM uses a cartesian grid with 50 km horizontal resolution and fifteen vertical levels. An ensemble of four simulations was forced with lateral boundary conditions from ECMWF global analyses for the period 8-22 August 1988. The simulated mid-tropospheric circulation includes the skillful development and movement of several African wave disturbances. Wavelet analysis of mid-tropospheric winds detected a dominant periodicity of about 4 days and a secondary periodicity of 5-8 days. Spatial distributions of RM precipitation and precipitation time series were validated against daily rain gauge measurements and ISCCP satellite infrared cloud imagery. The time-space distribution of simulated precipitation was made more realistic by combining the ECMWR initial conditions with a 24-hr spin-up of the moisture field and also by damping high frequency gravity waves by dynamic initialization. Model precipitation ”forecasts” over the Central Sahel were correlated with observations for about three days, but reinitializing with observed data on day 5 resulted in a dramatic improvement in the precipitation validation over the remaining 9 days. Results imply that information via the lateral boundary conditions is not always sufficient to minimize departures between simulated and actual precipitation patterns for more than several days. In addition, there was some evidence that the new initialization may increase the simulations’ sensitivity to the quality of lateral boundary conditions.

Author

Synoptic Meteorology; Weather Forecasting; Weather; Climatology; Meteorology; Africa

20010047509 NASA Goddard Space Flight Center, Greenbelt, MD USA

Platform and Environmental Effects on Above- and In-Water Determinations of Water-Leaving Radiances

Hooker, Stanford B., NASA Goddard Space Flight Center, USA; Morel, Andre, Paris VI Univ., France; [2001]; 50p; In English; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A comparison of above- and in-water spectral measurements in Case-1 conditions showed the uncertainty in above-water determinations of water-leaving radiances depended on the pointing angle of the above-water instruments with respect to the side of the ship. Two above-water methods were used to create a diagnostic variable to quantify the presence of superstructure reflections which degraded the above-water intracomparisons of water-leaving radiances by 10.9-33.4% (for far-to-near viewing distances, respectively). The primary conclusions of the above- and in-water intercomparison of water-leaving radiances were as follows: a) the SeaWiFS 5% radiometric objective was achieved with the above-water approach, but reliably with only one method and only for about half the data; b) a decrease in water-leaving radiance values was seen in the presence of swell, although, wave crests were radiometrically brighter than the troughs; and c) standard band ratios used in ocean color algorithms remained

severely affected, because of the relatively low signal and, thus, proportionally significant contamination at the 555nm wavelength.
Author
Spectrum Analysis; Environment Effects; Radiance; Biogeochemistry

20010047599 New Mexico Tech, Socorro, NM USA
Hyperfiltration-Induced Precipitation of Sodium Chloride
Whitworth, T. M.; Gu, C.; Feb. 2001; 50p; In English; Original contains color illustrations
Report No.(s): PB2001-104869; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

In a previous WRRI-funded project, heavy metals including copper, cobalt, and lead, were successfully precipitated from initially undersaturated chloride solutions forced through clay membranes (hyperfiltration). Those metal chlorides are quite soluble, but not as soluble as sodium chloride, a common constituent of almost all waters. However, theoretical calculations suggested that it is not only possible to precipitate sodium chloride from an initially undersaturated solution passing through a clay membrane, but that it can be done at fluid pressures of less than 400 psi- pressures significantly less than those used in most reverse osmosis systems. Therefore, we tested the concept that clay membranes can concentrate and precipitate NaCl in a series of hyperfiltration experiments.
NTIS
Water Pollution; Filtration; Precipitates; Sodium Chlorides; Pollution Control

20010047605 Arctic and Antarctic Scientific Research Inst., Russian Federal Service for Hydrometeorology and Environmental Monitoring, Saint Petersburg, Russia
Russian Federal Climate Change Country Study (Cooperative Agreement DE-FCO2-93PO10118), Volume 1, Inventory of Technogenic GHG Emissions *Final Report*
Israel, Y. A.; Avdjushin, S. I.; 1997; 70p; In English
Contract(s)/Grant(s): DE-FC02-93PO-10118
Report No.(s): PB2001-104723; No Copyright; Avail: CASI; A01, Microfiche; A04, Hardcopy

In accordance with the Russian Federation Climate Change Country Study Workplan, Report on Task 1 includes the description of data collected and estimates of emissions of three direct and most important greenhouse gases: carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O).
NTIS
Climate Change; Russian Federation

20010047606 Department of Energy, Washington, DC USA
Mitigation Analysis for Hungary (Hungarian Country Study Team) *Interim Report*
Aug. 1996; 32p; In English; Original contains color illustrations
Report No.(s): PB2001-104721; No Copyright; Avail: National Technical Information Service (NTIS)

This paper describes options and measures for the different sectors of the Hungarian national economy, which may assure that the country will be able to fulfill her duties undertaken by signing and ratifying the Framework Convention on Climate Change (FCCC). These investigations were carried out in the framework of the U.S. Country Studies Program. The basic difficulty of the implementation of the FCCC in Hungary (and in any other countries with economies in transition) is that the country has to recover from a very deep economic recession and at the same time the emissions of greenhouse gases should be stabilized. For this reason Article 4.6. of the FCCC allows for the countries with economies in transition to select a base level different from 1990, which is the recommended base year in general. Hungary has chosen the yearly average emissions of the period 1985-1987 as a base level. Our investigations have proven that a temporary increase of the emissions is unavoidable in the next couple of years, but if the different mitigation options are used, the emissions will not reach those of the base period. However, mitigation requires a great amount of capital. It is expected that the country will need foreign support for the necessary investments and programs. In our study we focussed primarily on the energy and the forestry sector. In these sectors there are ongoing governmental programs, which can be considered as elements of the national mitigation strategy.
NTIS
Forest Management; Hungary; Air Pollution; Environment Protection; Resources Management; Energy Technology

20010047607 Energoproekt, Sofia, Bulgaria

Bulgaria Climate Change Country Study

Dec. 1997; 38p; In English; Original contains color illustrations

Contract(s)/Grant(s): DE-FC02-93PO-10099

Report No.(s): PB2001-104720; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Contents include the following: Annotation; Analysis of Forestry Policy. Identification of Greenhouse Gas Emissions Mitigation and Adaptation Measures in Regard to Climate Change. Analysis of the Technical and Economic Feasibility of the Measures; Gap Model Application (Changes in Biological Productivity); Action Plan in Agriculture Under Climate Change in Bulgaria; Current Climate, Climate Change Scenarios, Vulnerability and Adaptation of Major Agricultural Crops in Bulgaria; National Action Plan on Renewable Energy Sources Penetration in Bulgaria; Action Plan for Reduction of CH4 Emissions from Dumps and Landfills for Municipal Solid Wastes (MSW).

NTIS

Climate Change; Technology Assessment; Forest Management; Greenhouse Effect; Bulgaria; Air Pollution; Pollution Control

20010047612 Microelectronics Center of North Carolina, Research Triangle Park, NC USA

Implementation of the SMOKE Emission Data Processor and SMOKE Tool Input Data Processor in Models-3

Benjey, W. G.; Houyoux, M. R.; Susick, J. W.; 2000; 18p; In English

Report No.(s): PB2001-104620; EPA/600/A-01/027; No Copyright; Avail: National Technical Information Service (NTIS)

The U.S. Environmental Protection Agency has implemented Version 1.3 of SMOKE (Sparse Matrix Object Kernel Emission) processor for preparation of area, mobile, point, and biogenic sources emission data within Version 4.1 of the Models-3 air quality modeling framework. The SMOKE system includes MOBILE 5b to model on-road emissions and the Biogenic Emission Inventory System, Version 2 (BEIS 2) to model biogenic emissions. Although SMOKE may be operated from scripts outside of the Models-3 framework, integration within the system allows automatic registration and tracking of input and output files, as well as close coupling to the Community Multiscale Air Quality (CMAQ) modeling system and visualization tools by using the Net CDF I/O API data format convention. Models-3 also includes the SMOKE Tool to assist in preparation of emission input data for SMOKE.

NTIS

Environment Protection; Data Processing Equipment; Environment Models; Air Quality; Pollution Monitoring; Emission; Air Pollution

20010047624 Alabama A & M Univ., Dept. of Plant and Soil Science, AL USA

Pollution Control in Aqueous Solution by Hydroponic Cultivation of Plants *Final Report*

Garton, Stephen, Alabama A & M Univ., USA; Beyl, Caula, Alabama A & M Univ., USA; [1999]; 13p; In English

Report No.(s): AD-A387033; ARO-32441.1-EV-ISP; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

The primary objective of the project were to develop a research base to allow professionals in the Corps of Engineers to utilize plant cultivation methods to alleviate and remediate water pollution problems associated with various activities of the Army. A two-fold approach was used. The first involved the design, construction and implementation of pilot scale studies to assess the abilities and plant species, both aquatic and terrestrial, to remove pollutants from low quality waters, such as stormwater runoff from contaminated sites and wastewater. This experimental approach offers the opportunity to quantitatively evaluate plant growth and biomass distribution including the accumulation of dissolved materials in plant organs such as roots, stems, leaves and flowers. The second approach involved utilization of simulated storm and waste water as a source of nutrients for growing a commercial greenhouse crop, in this case a floricultural crop.

DTIC

Pollution Control; Water Pollution; Aqueous Solutions; Water Quality

20010047630 Geo-Centers, Inc., Fort Detrick, MD USA

The Use of Nontraditional Assays in an Integrated Environmental Assays in an Integrated Environmental Assessment of Contaminated Ground Water

Burton, Dennis T., Maryland Univ., USA; Gardner, Henry S., Army Biomedical Research and Development Lab., USA; Shedd, Tommy R., Army Biomedical Research and Development Lab., USA; Wolfe, Marilyn J., Experimental Pathology Labs., Inc., USA; Environmental Toxicology and Chemistry; 1997; ISSN 0730-7268; Volume 16, No. 9, pp. 1816-1820; In English; 15th Annual Meeting of the Society of Environmental Toxicology and Chemistry, 30 Oct. - 3 Nov. 1994, Denver, CO, USA; Sponsored by Society of Environmental Toxicology and Chemistry, USA

Contract(s)/Grant(s): DAMD17-93-C-3006; DAMD17-92-C-2066
Report No.(s): AD-A387062; Copyright; Avail: Defense Technical Information Center (DTIC)

The toxic potential of ground water contaminated with several probable carcinogenic heavy metals and halogenated solvents was evaluated using an integrated environmental assessment approach. A number of assays, which included acute toxicity, short-term chronic toxicity, genotoxicity, developmental toxicity and carcinogenicity, were used to assist in a hazard assessment. Comprehensive analytical chemistry was performed throughout the 9-month exposure to document the chemical characteristics of the ground water. An initiation-promotion protocol using a non-neoplastic concentration of diethylnitrosamine as an initiator in a 9-month chronic exposure of Japanese medaka (Oryzias latipes) was used to evaluate potential carcinogenicity of the ground water. The fish were exposed to groundwater concentrations of 1% and 10% ground water by volume. No significant lesions were found in the Japanese medaka exposed to groundwater concentrations at 1% and 10% ground water by volume. Likewise, no genotoxicity, developmental toxicity, acute toxicity or short-term chronic toxicity, were found at concentrations of is less than or equal to 10% ground water by volume. The negative results obtained in this study show that the potential hazard posed by low concentrations of a complex mixture containing suspect carcinogens may not be manifested at environmentally relevant concentrations.

DTIC

Assaying; Environmental Monitoring; Environmental Quality; Assessments; Water Pollution; Ground Water; Contamination; Hazards; Toxicity

20010047639 Health Effects Inst., Cambridge, MA USA

Ozone Exposure and Daily Mortality in Mexico City: A Time-Series Analysis

Loomis, D. P.; Borja-Aburto, V. H.; Bandiwala, S. I.; Shy, C. M.; Oct. 1996; 60p; In English
Report No.(s): PB2001-104502; HEI/RR-75; Copyright; Avail: National Technical Information Service (NTIS)

Daily death counts in Mexico City were examined in relation to ambient ozone levels during 1990-1992 for the purpose of investigating the acute, irreversible effects of air pollution, with emphasis on ozone exposure. Air pollution data were obtained from nine monitoring stations operated by the Departamento del Distrito Federal. Mortality data were provided by the Instituto Nacional de Estadistica, Geografia, E Informatica. Increases in numbers of deaths were positively associated with elevated air pollution levels on the same day and on the previous day. The magnitude of the increases was small but statistically significant, after Poisson regression models were used to adjust for temperature and long-term trends.

NTIS

Ozone; Time Series Analysis; Air Pollution; Exposure; Environmental Monitoring; Mexico

20010047842 NASA Goddard Inst. for Space Studies, New York, NY USA

Northern Hemisphere Winter Climate Response to Greenhouse Gas, Ozone, Solar and Volcanic Forcing

Shindell, Drew T., NASA Goddard Inst. for Space Studies, USA; Schmidt, Gavin A., NASA Goddard Inst. for Space Studies, USA; Miller, Ron L., NASA Goddard Inst. for Space Studies, USA; Rind, David, NASA Goddard Inst. for Space Studies, USA; August 2000; 46p; In English
Contract(s)/Grant(s): NSF ATM-00-02267
Report No.(s): GCN-01-02; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Goddard Institute for Space Studies (GISS) climate/middle atmosphere model has been used to study the impacts of increasing greenhouse gases, polar ozone depletion, volcanic eruptions, and solar cycle variability. We focus on the projection of the induced responses onto Northern Hemisphere winter surface climate. Changes in the model's surface climate take place largely through enhancement of existing variability patterns, with greenhouse gases, polar ozone depletion and volcanic eruptions primarily affecting the Arctic Oscillation (AO) pattern. Perturbations descend from the stratosphere to the surface in the model by altering the propagation of planetary waves coming up from the surface, in accord with observational evidence. Models lacking realistic stratospheric dynamics fail to capture these wave flux changes. The results support the conclusion that the stratosphere plays a crucial role in recent AO trends. We show that in our climate model, while ozone depletion has a significant effect, greenhouse gas forcing is the only one capable of causing the large, sustained increase in the AO observed over recent decades. This suggests that the AO trend, and a concurrent strengthening of the stratospheric vortex over the Arctic, are very likely anthropogenic in origin.

Author

Northern Hemisphere; Winter; Climate Models; Volcanology; Ozone Depletion; Solar Cycles; Greenhouse Effect

20010048006 Colorado Univ., Inst. for Arctic and Alpine Research, Boulder, CO USA

Unexprected Changes in Soil Phosphorus Dynamics Following Tropical Deforestation to Cattle Pasture

Townsend, Alan R., Colorado Univ., USA; Asner, Gregory P., Colorado Univ., USA; Cleveland, Cory C., Colorado Univ., USA; Lefer, Margaret E., Colorado Univ., USA; Bustamante, Mercedes M. C., Brasilia Univ., Brazil; [2001]; 46p; In English

Contract(s)/Grant(s): NAGW-5253; NAGW-8709; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Phosphorus (P) is widely believed to limit plant growth and organic matter storage in a large fraction of the world's lowland tropical rainforests. We investigated how the most common land use change in such forests, conversion to cattle pasture, affects soil P fractions along forest to pasture chronosequences in the central Brazilian Amazon and in southwestern Costa Rica. Our sites represent a broad range in rainfall, soil type, management strategies, and total soil P (45.2 - 1228.0 microng P / g soil), yet we found some unexpected and at times strikingly similar changes in soil P in all sites. In the Brazilian sites, where rainfall is relatively low and pasture management is more intense than in the Costa Rican sites, significant losses in total soil P and soil organic carbon (SOC) were seen with pasture age on both fine-textured oxisol and highly sandy entisol soils. However, P losses were largely from occluded, inorganic soil P fractions, while organic forms of soil P remained constant or increased with pasture age, despite the declines in SOC. In Costa Rica, SOC remained constant across the oxisol sites and increased from forest to pasture on the mollisols, while total soil P increased with pasture age in both sequences. The increases in total soil P were largely due to changes in organic P; occluded soil P increased only slightly in the mollisols, and remained unchanged in the older oxisols. We suggest that changes in the composition and/or the primary limiting resources of the soil microbial community may drive the changes in organic P. We also present a new conceptual model for changes in soil P following deforestation to cattle pasture.

Author

Chronology; Deforestation; Forests; Microorganisms; Organic Materials; Phosphorus; Rain Forests

20010048013 Colorado Univ., Boulder, CO USA

Satellite Observation of El Nino Effects on Amazon Forest Phenology and Productivity

Asner, Gregory P., Colorado Univ., USA; Townsend, Alan R., Colorado Univ., USA; Braswell, Bobby H., Max-Planck-Inst. for Biogeochemistry, Greece; Geophysical Research Letters; Apr. 01, 2000; ISSN 0094-8276; Volume 27, No. 7, pp. 981-984; In English

Contract(s)/Grant(s): NAGW-5253; NAG5-8709

Report No.(s): Paper-1999GL011113; Copyright; Avail: Issuing Activity

Climate variability may affect the functioning of Amazon moist tropical forests, and recent modeling analyses suggest that the carbon dynamics of the region vary interannually in response to precipitation and temperature anomalies. However, due to persistent orbital and atmospheric artifacts in the satellite record, remote sensing observations have not provided quantitative evidence that climate variation affects Amazon forest phenology or productivity, We developed a method to minimize and quantify non-biological artifacts in NOAA AVHRR satellite data, providing a record of estimated forest phenological variation from 1982-1993. The seasonal Normalized Difference Vegetation Index (NDVI) amplitude (a proxy for phenology) increased throughout much of the basin during El Nino periods when rainfall was anomalously low. Wetter La Nina episodes brought consistently smaller NDVI amplitudes. Using radiative transfer and terrestrial biogeochemical models driven by these satellite data, we estimate that canopy-energy absorption and net primary production of Amazon forests varied interannually by as much as 21% and 18%, respectively. These results provide large-scale observational evidence for interannual sensitivity to El Nino of plant phenology and carbon flux in Amazon forests.

Author

Satellite Observation; El Nino; Amazon Region (South America); Biogeochemistry; Forests; Tropical Regions; Phenology

20010048418 NASA Goddard Space Flight Center, Greenbelt, MD USA

Relative Contributions of the Saharan and Sahelian Sources to the Atmospheric Dust Load Over the North Atlantic

Ginoux, Paul, NASA Goddard Space Flight Center, USA; Chin, M., NASA Goddard Space Flight Center, USA; Torres, O., NASA Goddard Space Flight Center, USA; Prospero, J., NASA Goddard Space Flight Center, USA; Dubovik, O., NASA Goddard Space Flight Center, USA; Holben, B., NASA Goddard Space Flight Center, USA; [2000]; 1p; In English; Fall AGU Meeting, 15-19 Dec. 2000, San Francisco, CA, USA; Sponsored by American Geophysical Union, USA; No Copyright; Avail: Issuing Activity; Abstract Only

It has long been recognized that Saharan desert is the major source for long range transport of mineral dust over the Atlantic. The contribution from other natural sources to the dust load over the Atlantic has generally been ignored in previous model studies or been replaced by anthropogenically disturbed soil emissions. Recently, Prospero et.at. have identified the major dust sources over the Earth using TOMS aerosol index. They showed that these sources correspond to dry lakes with layers of sediment deposed in the late Holocene or Pleistocene. One of the most active of these sources seem to be the Bodele depression. Chiapello et al. have

analyzed the mineralogical composition of dust on the West coast of Africa. They found that Sahelian dust events are the most intense but are less frequent than Saharan plumes. This suggests that the Bodele depression could contribute significantly to the dust load over the Atlantic. The relative contribution of the Sahel and Sahara dust sources is of importance for marine biogeochemistry or atmospheric radiation, because each source has a distinct mineralogical composition. We present here a model study of the relative contributions of Sahara and Sahel sources to the atmospheric dust aerosols over the North Atlantic. The Georgia Tech/Goddard Global Ozone Chemistry Aerosol Radiation and Transport (GOCART) model is used to simulate dust distribution in 1996-1997. Dust particles are labeled depending on their sources. In this presentation, we will present the comparison between the model results and observations from ground based measurements (dust concentration, optical thickness and size distribution) and satellite data (TOMS aerosol index). The relative contribution of each source will then be analyzed spatially and temporally.
Author
Aerosols; Atmospheric Radiation; Dust; Lakes; Minerals; Ozone; Size Distribution; Soils

20010048419 NASA Goddard Space Flight Center, Greenbelt, MD USA
Validation of MODIS Aerosol Retrievals during PRIDE
Levy, R., Science Systems and Applications, Inc., USA; Remier, L., NASA Goddard Space Flight Center, USA; Kaufman, Y., NASA Goddard Space Flight Center, USA; Kleidman, R., Science Systems and Applications, Inc., USA; Holben, B., NASA Goddard Space Flight Center, USA; Russell, P., NASA Ames Research Center, USA; Livingston, J., NASA Ames Research Center, USA; [2000]; 1p; In English; AGU Fall Meeting, 15-19 Dec. 2000, San Francisco, CA, USA; Sponsored by American Geophysical Union, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The Puerto Rico Dust Experiment (PRIDE) was held in Roosevelt Roads, Puerto Rico from June 26 to July 24, 2000. It was intended to study the radiative and microphysical properties of Saharan dust transported into Puerto Rico. PRIDE had the unique distinction of being the first major field experiment to allow direct comparison of aerosol retrievals from MODIS (MODerate Imaging Spectro-radiometer - aboard the Terra satellite) with data from a variety of ground, shipboard and air-based instruments. Over the ocean the MODIS algorithm retrieves optical depth as well as information about the aerosol's size. During PRIDE, MODIS passed over Roosevelt Roads approximately once per day during daylight hours. Due to sunglint and clouds over Puerto Rico, aerosol retrievals can be made from only about half the MODIS scenes. In this study we try to "validate" our aerosol retrievals by comparing to measurements taken by sun-photometers from multiple platforms, including: Cimel (AERONET) from the ground, Microtops (handheld) from ground and ship, and the NASA-Ames sunphotometer from the air.
Author
Dust; Radioactive Contaminants; Radiometers; Photometers; Imaging Spectrometers; Aerosols

20010048654 NASA Ames Research Center, Moffett Field, CA USA
Comparison of Aerosol Single Scattering Albedos Derived by Diverse Techniques in Two North Atlantic Experiments
Russell, P. B., NASA Ames Research Center, USA; Redemann, J., Bay Area Environmental Research Inst., USA; Schmid, B., Bay Area Environmental Research Inst., USA; Bergstrom, R. W., Bay Area Environmental Research Inst., USA; Livingston, J. M., SRI International Corp., USA; McIntosh, D. M., Symtech Corp., USA; Hartley, S., Washington Univ., USA; Hobbs, P. V., Washington Univ., USA; Quinn, P. K., National Oceanic and Atmospheric Administration, USA; Carrico, C. M., Illinois Univ., USA; [2000]; 1p; In English
Contract(s)/Grant(s): RTOP 622-44-75-10; No Copyright; Avail: Issuing Activity; Abstract Only

Aerosol single scattering albedo w (the ratio of scattering to extinction) is important in determining aerosol climatic effects, in explaining relationships between calculated and measured radiative fluxes, and in retrieving aerosol optical depths from satellite radiances. Recently, two experiments in the North Atlantic region, TARFOX and ACE-2, determined aerosol w by a variety of techniques. The techniques included fitting of calculated to measured fluxes; retrievals of w from skylight radiances; best fits of complex refractive index to profiles of backscatter, extinction, and size distribution; and in situ measurements of scattering and absorption at the surface and aloft. Both TARFOX and ACE-2 found a fairly wide range of values for w at midvisible wavelengths, with 0.85 less than wmidvis less than 0.99 for the marine aerosol impacted by continental pollution. Frequency distributions of w could usually be approximated by lognormals in wmax-w, with some occurrence of bimodality, suggesting the influence of different aerosol sources or processing. In both TARFOX and ACE-2, closure tests between measured and calculated radiative fluxes yielded best-fit values of wmidvis of 0.90+/-0.04 for the polluted boundary layer. Although these results have the virtue of describing the column aerosol unperturbed by sampling, they are subject to questions about representativeness and possible artifacts (e.g., unknown gas absorption). The other techniques gave larger values for wmidvis for the polluted boundary

layer, with a typical result of wmidvis = 0.95+/-0.04, Current uncertainties in vv are large in terms of climate effects. More tests are needed of the consistency among different methods and of humidification effects on w.
Author
Aerosols; Backscattering; Frequency Distribution; Size Distribution; Air Sampling; Radiance; Climatology

20010048687 NASA Ames Research Center, Moffett Field, CA USA
Global- to Micro-Scale Evolution of the Pinatubo Aerosol: Using Composite Data Sets to Build the Picture and Assess Consistency of Different Measurements
Russell, P. B., NASA Ames Research Center, USA; Pueschel, R. F., NASA Ames Research Center, USA; Livingston, J. M., SRI International Corp., USA; Bergstrom, R., Bay Area Environmental Research Inst., USA; [1994]; 2p; In English; 4th International Aerosol Conference, 28 Aug. - 2 Sep. 1994, Los Angeles, CA, USA; Sponsored by American Association for Aerosol Research, USA
Contract(s)/Grant(s): RTOP 665-45-51-10; No Copyright; Avail: Issuing Activity; Abstract Only

This paper brings together experimental. evidence required to build realistic models of the global evolution of physical, chemical, and optical properties of the aerosol resulting from the 1991 Pinatubo volcanic eruption. Such models are needed to compute the effects of the aerosol on atmospheric chemistry, dynamics, radiation, and temperature. Whereas there is now a large and growing body of post-Pinatubo measurements by a variety of techniques, some results are in conflict, and a self-consistent, unified picture is needed, along with an assessment of remaining uncertainties. This paper examines data from photometers, radiometers, impactors, optical counters/sizers, and lidars operated on the ground, aircraft, balloons, and spacecraft.
Author
Volcanoes; Aerosols; Atmospheric Chemistry; Measuring Instruments

20010048737 Armstrong Lab., Occupation and Environmental Health Directorate, Wright-Patterson AFB, OH USA
Petroleum-Related Risk factors and Soil Screening Levels, *Jun. 1995 - Jul. 1996*
Staats, Dee Ann, Armstrong Lab., USA; Mattie, David R., Armstrong Lab., USA; Fisher, Jeffrey W., Armstrong Lab., USA; Jan. 01, 1996; 21p; In English
Contract(s)/Grant(s): AFRL-HE-WP-TR-2001-0019
Report No.(s): AD-A387434; Copyright; Avail: Defense Technical Information Center (DTIC)

In an effort to develop risk-based Soil Screening Levels (SSLs) for Total Petroleum Hydrocarbons (TPH) in weathered soils, literature reviews were conducted to identify information regarding toxicology and previously developed oral risk factors for neat petroleum products and their potential surrogates, in particular, long chain petroleum hydrocarbons (LCPHs). Oral reference doses (RfDs) were identified in the literature for hexane; nonane; gasoline; JP-4; JP-5; marine diesel fuel; and mineral oil. Alternative RfDss were developed for other petroleum-related chemicals where sufficient toxicological information was available. RfDss were developed for hexane; nonane; decane; C10-C11 isoparaffinic hydrocarbon; dearomatized white spirit C11-C12; gasoline; JP-4; JP-5; JP-7; JP-8; marine diesel fuel; mineral oil; and for petroleum wax. Then risk-based SSLs were estimated for each of these compounds using the oral RfDs and the child resident soil ingestion pathway. Finally, a general SSL of 25,000 mg/kg is proposed for LCPHs.
DTIC
Crude Oil; Petroleum Products; Risk; Soils

20010048886 United Nations, New York, NY USA
United Nations Framework Convention on Climate Change
1992; 38p; In English
Report No.(s): PB2001-104458; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.
NTIS
Conventions; Climate Change; Conferences; Ecosystems; Environment Protection

20010048915 Naval Facilities Engineering Command, Engineering Field Activity Northwest, Poulsbo, WA USA
Environmental Assessment: Conveyance and Reuse Naval Reserve Center Seattle, Seattle, WA
May 2000; 64p; In English
Report No.(s): AD-A387148; No Copyright; Avail: CASI; A01, Microfiche; A04, Hardcopy

The Proposed Action is the conveyance of the Naval Reserve Center Seattle, Seattle, Washington (NRC Seattle) to the City of Seattle for park and recreational reuse. The previous site of the NRC Seattle, the southern section of Lake Union, was vacated in April 1997. The relocation of NRC Seattle to NRC Everett reduced the unit's base operating support requirements, and provided a site for possible future economic development by the City of Seattle. The NRC Seattle property consists of 5.09 acres located in the south section of Lake Union between Waterways No. 3 and 4. Facilities on the property include the Armory Building, Neptune Hall, a parking area, and various other small storage facilities. The Armory Building is a historic building, eligible for listing on the National Register of Historic Places (NRHP). This building will be reused as a multi-use facility. Neptune Hall is eligible for listing on the NRHP because of its architectural significance to the Seattle region. The remaining structures will be demolished by the City of Seattle for establishing a green, open space, landscaped park. No significant environmental impacts have been identified for the proposed reuse.
Author
Relocation; Support Systems

20010048917 Iowa State Univ. of Science and Technology, Pesticide Toxicology Lab., Ames, IA USA
The Use of Vegetation to Enhance Degradation of Ethylene Glycol and Propylene Glycol: Prevention of Runoff and Movement to Surface Waters ***Final Report, 1 Mar. 1995 - 30 Jun. 1998***
Coats, Joel R., Iowa State Univ. of Science and Technology, USA; Anderson, Todd, Iowa State Univ. of Science and Technology, USA; Rice, Patricia, Iowa State Univ. of Science and Technology, USA; Phillips, Todd, Iowa State Univ. of Science and Technology, USA; Jan. 09, 2001; 129p; In English
Contract(s)/Grant(s): F29620-95-0144
Report No.(s): AD-A387224; AFRL-SR-BL-TR-01-0110; No Copyright; Avail: CASI; A02, Microfiche; A07, Hardcopy

There is a growing concern about the quantity of aircraft deicing agents (primarily ethylene glycol (EG) or propylene glycol (PG)) that migrate offsite and inadvertently contaminate the soil and water environments. However, it is known that vegetation can enhance the removal of man-made organic compounds and pollutants in soil environments by plant uptake and microbial degradation in the rhizosphere. Therefore, three objectives of this research were to: (1) determine the influence of rhizosphere microorganisms on the degradation of ethylene glycol (EG) and propylene glycol (PG); (2) to identify environmental variables affecting the degradation of EG and PG in soil; and (3) determine the influence of vegetation on EG and PG movement in soil. Results from these studies found that degradation of EG and PG was enhanced in rhizosphere soils compared with nonvegetated soils. Also, increased soil temperatures enhanced the mineralization of EG and PG, and aquatic emergent plants significantly enhanced mineralization of EG in surface water systems. Lastly, results from this study indicate vegetation reduced the quantity of PG and EG that moved through the soil profile.
Author
Degradation; Soils; Vegetation; Biodegradation; Deicing

46
GEOPHYSICS

Includes earth structure and dynamics, aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism. For related information see 47 Meteorology and Climatology; and 93 Space Radiation.

20010043950 Prairie View Agricultural and Mechanical Coll., TX USA
Proposal Coupling of Earth's Magnetosphere and Ionosphere in a Realistic Magnetic Field ***Final Report, 1 Jan. 1996 - 31 May 2000***
Huang, Tian-Sen; Le-Sager, Philippe; Petrov, Yuri V.; May 2000; 4p; In English
Contract(s)/Grant(s): F49620-96-1-0236
Report No.(s): AD-A387432; AFRL-SR-BL-TR-01-0126; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

This was a two part performance proposal consisting of (1) Completion of a computer simulation code to model the Earth's magnetosphere and ionosphere coupling in a realistic magnetic field; (2) development of a new plasma kinetic theory, the guiding field line approximation, and application of it to the calculation of plasma current in a steady state. We started with the ionospheric electrodynamics for a realistic magnetic field to solve Vasyliunas' coupling equation which represents the coupling of the Earth's

magnetosphere and ionosphere. Model was constructed on the basis of International Geomagnetic Reference Field, we assumed that no electric potential drop along field lines and no magnetospheric current exist except for a birkeland current that flows along a flux tube from one hemisphere to another.
DTIC
Coupling; Magnetosphere-Ionosphere Coupling; Planetary Ionospheres; Geomagnetism; Steady State

20010043990 Space Physics Research Inst., Sunnyvale, CA USA
Investigation of the Physical Processes Governing Large-Scale Tracer Transport in the Stratosphere and Troposphere, *1 Jan. 1996 - 31 May 1999*
Selkirk, Henry B., Space Physics Research Inst., USA; [2001]; 6p; In English
Contract(s)/Grant(s): NCC2-939; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This report summarizes work conducted from January 1996 through April 1999 on a program of research to investigate the physical mechanisms that underlie the transport of trace constituents in the stratosphere-troposphere system. The primary scientific goal of the research has been to identify the processes which transport air masses within the lower stratosphere, particularly between the tropics and middle latitudes. This research was conducted in collaboration with the Subsonic Assessment (SASS) of the NASA Atmospheric Effects of Radiation Program (AEAP) and the Upper Atmospheric Research Program (UARP). The SASS program sought to understand the impact of the present and future fleets of conventional jet traffic on the upper troposphere and lower stratosphere, while complementary airborne observations under UARP seek to understand the complex interactions of dynamical and chemical processes that affect the ozone layer. The present investigation contributed to the goals of each of these by diagnosing the history of air parcels intercepted by NASA research aircraft in UARP and AEAP campaigns. This was done by means of a blend of trajectory analyses and tracer correlation techniques.
Derived from text
Troposphere; Stratosphere; Trace Elements; Transport Properties; Air Masses

20010044085 NASA Goddard Space Flight Center, Greenbelt, MD USA
Total Ozone Mapping Spectrometer (TOMS) Level-3 Data Products User's Guide
McPeters, Richard D., NASA Goddard Space Flight Center, USA; Bhartia, P. K., NASA Goddard Space Flight Center, USA; Krueger, Arlin J., NASA Goddard Space Flight Center, USA; Herman, Jay R., NASA Goddard Space Flight Center, USA; Wellemeyer, Charles G., Raytheon ITSS, USA; Seftor, Colin J., Raytheon ITSS, USA; Byerly, William, Raytheon ITSS, USA; Celarier, Edward A., Software Corp. of America, USA; July 2000; 40p; In English
Report No.(s): NASA/TP-2000-209896; NAS 1.60:209896; Rept-2000-02532-0; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Data from the TOMS series of instruments span the time period from November 1978, through the present with about a one and a-half year gap from January 1994 through July 1996. A set of four parameters derived from the TOMS measurements have been archived in the form of daily global maps or Level-3 data products. These products are total column ozone, effective surface reflectivity, aerosol index, and erythermal ultraviolet estimated at the Earth surface. A common fixed grid of I degree latitude by 1.25 degree longitude cells over the entire globe is provided daily for each parameter. These data are archived at the Goddard Space Flight Center Distributed Active Archive Center (DAAQ in Hierarchical Data Format (HDF). They are also available in a character format through the TOMS web site at http://toms.gsfc.nasa.gov. The derivations of the parameters, the mapping algorithm, and the data formats are described. The trend uncertainty for individual TOMS instruments is about 1% decade, but additional uncertainty exists in the combined data record due to uncertainty in the relative calibrations of the various TOMS.
Derived from text
Total Ozone Mapping Spectrometer; Aerosols; Reflectance; Calibrating; Ozone

20010046483 Iowa Univ., Dept. of Physics and Astronomy, Iowa City, IA USA
Observational and theoretical analyses of polar cap/auroral region f(sub p) and 2 f(sub p) emissions using the polar and DE 1 satellites *Final Report, 1 Jun. 1999 - 31 May 2000*
Menietti, J. D., Iowa Univ., USA; May 17, 2001; 3p; In English
Contract(s)/Grant(s): NAG5-4497; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The objective of this proposal was to conduct a comprehensive observational and theoretical investigation, including 2-D numerical simulations of emissions that occur near f(sub p) and 2 f(sub p) as observed by the Dynamics Explorer 1 (DE 1) spacecraft in the mid-altitude polar magnetosphere. Electrostatic electron plasma waves (or Langmuir waves) and associated electromagnetic (ETD) radiation near f(sub p) and 2 f(sub p) have previously been observed associated with the Earth's foreshock and in coronal/solar wind type II and III solar radio bursts. The observations of similar emissions in the terrestrial polar

magnetosphere have not been previously reported and are important for a better understanding of the range of generation processes. We have been cataloging the location, electric and magnetic intensity, polarization, bandwidth, etc. of the emissions. The theoretical analysis included linear and nonlinear plasma theory. The goal was to fully describe the generation processes for both the f(sub p) (PF component) and 2 f(sub p) (H component) emissions. Although this goal was not completely accomplished, we have made significant advances in our understanding of these emissions.
Author
Polar Caps; Auroral Zones; Emission; Explorer 1 Satellite

20010046755 Army Construction Engineering Research Lab., Champaign, IL USA
Fragility Testing of a Power Transformer Bushing; Demonstration of CERL Equipment Fragility and Protection Procedure ***Final Report***
Wilcoski, James; Smith, Steven J.; Feb. 1997; 55p; In English
Report No.(s): AD-A341297; CERL/TR-97/57; No Copyright; Avail: Defense Technical Information Center (DTIC)

This report presents a demonstration of the CERL Equipment Fragility and Protection Procedure (CEFAPP) as used in the testing of a large power transformer bushing. CEFAPP defines the capacity of critical equipment by tests conducted on a shake table. Equipment capacity is defined in terms of amplitude of motions with respect to frequency that cause equipment failure. These spectral amplitudes can be defined in terms of either response spectrum or support motion spectral amplitude, both plotted with respect to frequency. Equipment failure may comprise loss of function, physical damage, or some measured response that is determined by the test engineer to be unacceptably high. The bushing failure mode defined in this application was leaking and slippage at the porcelain flange interface. The equipment capacity as defined by this failure envelope is later compared with the demand as defined by the user design spectra. This demand may be site specific or code based response spectra, or spectral motions at equipment installation location based on a detailed numerical analysis of the building in which the equipment is to be installed. For the bushing presented here, capacity is defined in terms of response spectrum of the shake table support motions that can be compared with site specific response spectra or design response spectra based on IEEE 693. Technical details of CEFAPP may be found in a companion report, USACERL Technical Report 97/58.
DTIC
Transformers; Bushings

20010046948 Colorado State Univ., Dept. of Atmospheric Science, Fort Collins, CO USA
Simulation of Upper Tropospheric Clouds with the Colorado State University General Circulation Model
Fowler, Laura D., Colorado State Univ., USA; Randall, David A., Colorado State Univ., USA; Journal of Geophysical Research; Mar. 27, 1999; ISSN 0148-0227; Volume 104, No. D6, pp. 6101-6121; In English
Contract(s)/Grant(s): NAS1-19951; NAG1-1266; NSF ATM-89-07414
Report No.(s): Paper-1998JD200074; Copyright; Avail: Issuing Activity

We have compared the climatology of upper tropospheric clouds simulated with the Colorado State University (CSU) general circulation model against cloud products retrieved by the International Satellite Cloud Climatology Project (ISCCP). Following the ISCCP cloud classification, upper tropospheric clouds are defined as clouds with cloud tops above 440 hPa. We refined our comparison by considering separately clouds with cloud tops above 180, 310, and 440 hPa in order to exhibit the optical characteristics of the highest clouds in the model and satellite cloud products. Four ranges of visible optical depths (tau) were used to distinguish cirrus (tau is less than or equal to 3.6) from optically thicker cirrostratus (3.6 is less than tau is less than or equal to 23) and deep convective clouds (tau is greater than 23) and to further differentiate between thin (0.02 is less than tau is less than or equal to 1.6) and thick (1.6 is less than tau is less than or equal to 3.6) cirrus. Results show that the CSU GCM simulates satisfactorily the zonally averaged distribution of upper tropospheric clouds when all values of tau are included but systematically underpredicts the frequency of occurrence of clouds with values of tau less than 3.6 when compared against ISCCP-DI data. This result reveals that simulated total-column optical depths for columns that include upper tropospheric clouds are too large relative to satellite-derived values. The CSU GCM simulates upper tropospheric clouds in the tropics more successfully than those in the middle latitudes. In the middle latitudes the model fails to simulate upper tropospheric clouds over the continents, especially over high plateaus and mountain ranges. Discrepancies between the CSU GCM and the ISCCP cloud products can be addressed in terms of our simple formulation of the optical thickness as a function of the prognostic liquid/ice water content, the prescribed value of the effective radius, and the geometrical thickness of the upper tropospheric model layers. We investigate the impact of the vertical resolution used in the GCM on the calculation of the optical depths of single-layer clouds using estimates of the geometrical thickness of cloudy layers from the Lidar In-Space Technology Experiment.
Author
Atmospheric General Circulation Models; Climatology; Clouds (Meteorology); Troposphere; Computerized Simulation

20010046966 NASA Marshall Space Flight Center, Huntsville, AL USA

Polar Spacecraft Based Comparisons of Intense Electric Fields and Poynting Flux Near and Within the Plasma Sheet-Tail Lobe Boundary to UVI Images: An Energy Source for the Aurora

Wygant, J. R., Minnesota Univ., USA; Keiling, A., Minnesota Univ., USA; Cattell, C. A., Minnesota Univ., USA; Johnson, M., Minnesota Univ., USA; Lysak, R. L., Minnesota Univ., USA; Temerin, M., California Univ., USA; Mozer, F. S., California Univ., USA; Kletzing, C. A., Iowa Univ., USA; Scudder, J. D., Iowa Univ., USA; Peterson, W., Lockheed Martin Corp., USA; Journal of Geophysical Research; Aug. 01, 2000; ISSN 0148-0227; Volume 105, No. A8, pp. 18,675-18,692; In English

Report No.(s): Paper-1999JA900500; Copyright; Avail: Issuing Activity; Abstract Only

In this paper, we present measurements from two passes of the Polar spacecraft of intense electric and magnetic field structures associated with Alfven waves at and within the outer boundary of the plasma sheet at geocentric distances of 4-6 R(sub E), near local midnight. The electric field variations have maximum values exceeding 100 mV/m and are typically polarized approximately normal to the plasma sheet boundary. The electric field structures investigated vary over timescales (in the spacecraft frame.) ranging front 1 to 30 s. They are associated with strong magnetic field fluctuations with amplitudes of 10-40 nT which lie predominantly ill the plane of the plasma sheet and are perpendicular to the local magnetic field. The Poynting flux associated with the perturbation fields measured at these altitudes is about 1-2 ergs per square centimeters per second and is directed along the average magnetic field direction toward the ionosphere. If the measured Poynting flux is mapped to ionospheric altitudes along converging magnetic field lines. the resulting energy flux ranges up to 100 ergs per centimeter squared per second. These strongly enhanced Poynting fluxes appear to occur in layers which are observed when the spacecraft is magnetically conjugate (to within a 1 degree mapping accuracy) to intense auroral structures as detected by the Polar UV Imager (UVI). The electron energy flux (averaged over a spatial resolution of 0.5 degrees) deposited in the ionosphere due to auroral electron beams as estimated from the intensity in the UVI Lyman-Birge-Hopfield-long filters is 15-30 ergs per centimeter squared per second. Thus there is evidence that these electric field structures provide sufficient Poynting flux to power the acceleration of auroral electrons (as well as the energization of upflowing ions and Joule heating of the ionosphere). During some events the phasing and ratio of the transverse electric and magnetic field variations are consistent with earthward propagation of Alfven surface waves with phase velocities of 4000-10000 kilometers per second. During other events the phase shifts between electric and magnetic fields suggest interference between upward and downward propagating Alfven waves. The E/B ratios are about an order of magnitude larger than typical values of C/SIGMA(sub p), where SIGMA(sub p), is the height integrated Pedersen conductivity. The contribution to the total energy flux at these altitudes from Poynting flux associated with Alfven waves is comparable to or larger than the contribution from the particle energy flux and 1-2 orders of magnitude larger than that estimated from the large-scale steady state convection electric field and field-aligned current system.

Author

Electric Fields; Ultraviolet Imagery; Auroras; Plasma Layers; Poynting Theorem

20010046991 NASA Ames Research Center, Moffett Field, CA USA

Application of Coupled-Cluster Methods to the Prediction and Interpretation of the Spectra of Molecules of Interest in Atmospheric Chemistry

Lee, Timothy J., NASA Ames Research Center, USA; [1994]; 1p; In English; 8th; International Congress of Quantum Chemistry, 19-23 Jun. 1994, Prague, Czechoslovakia

Contract(s)/Grant(s): RTOP 506-43-11; No Copyright; Avail: Issuing Activity; Abstract Only

The quality of fundamental vibrational frequencies determined using the CCSD(T) method (singles and doubles coupled-cluster theory plus a perturbational estimate of the effects of connected triple excitations) is shown to be very good, usually predicting band centers to within +/-8/cm. This approach is applied to several molecules of interest in atmospheric chemistry, including HNO, NO2(+), H2CO, and HOCl. The HNO molecule displays a large and unusual anharmonicity in the H-N stretch. For the calculation of ultraviolet (UV) spectra, the linear response CCSD (LRCCSD) approach (which is equivalent to EOM-CCSD) has been shown to yield vertical excitation energies that are accurate to approximately 0.1 eV for singly excited electronic states. This method together with more approximate methods is used to examine the UV spectra of several molecules important in stratospheric chemistry, including HOCl, Cl2O, ClOOCl, ClOOH, and HOOH.

Author

Atmospheric Chemistry; Predictions; Display Devices; Molecules

20010047012 Los Alamos National Lab., NM USA

Association of Energetic Neutral Atom Bursts and Magnetospheric Substorms

Jorgensen, A. M., Los Alamos National Lab., USA; Kepko, L., California Univ., USA; Henderson, M. G., Los Alamos National Lab., USA; Spence, H. E., Boston Univ., USA; Reeves, G. D., Los Alamos National Lab., USA; Sigwarth, J. B., Iowa Univ., USA;

Frank, L. A., Iowa Univ., USA; Journal of Geophysical Research; Aug. 01, 2000; ISSN 0148-0227; Volume 105, No. A8, pp. 18,753-18,763; In English
Contract(s)/Grant(s): NSF ATM-93-14239; NAG5-7706; NAG5-8039; NAG5-7712; UCRP-708
Report No.(s): Paper-1999JA000445; Copyright; Avail: Issuing Activity

In this paper we present evidence that short-lived bursts of energetic neutral atoms (ENAs) observed with the Comprehensive Energetic Particle and Pitch Angle Distribution/Imaging Proton Spectrometer (CEPPAD/IPS) instrument on the Polar spacecraft are signatures of substorms. The IPS was designed primarily to measure ions in situ, with energies between 17.5 and 1500 keV. However, it has also proven to be a very capable ENA imager in the range 17.5 keV to a couple hundred keV. It was expected that some ENA signatures of the storm time ring current would be observed. Interestingly, IPS also routinely measures weaker, shorter-lived, and more spatially confined bursts of ENAs with duration from a few tens of minutes to a few hours and appearing once or twice a day. One of these bursts was quickly associated with magnetospheric and auroral substorm activity and has been reported in the literature [Henderson et al., 19971. In this paper we characterize ENA bursts observed from Polar and establish statistically their association with classic substorm signatures (global auroral onsets, electron and ion injections, AL drops, and Pi2 onsets). We conclude that -90% of the observed ENA bursts are associated with classic substorms and thus represent a new type of substorm signature.
Author
Magnetic Storms; Energetic Particles; Magnetospheric Instability; Angular Distribution

20010047258 Aerospace Corp., El Segundo, CA USA
Ring Current Ion Composition during Solar Minimum and Rising Solar Activity: POLAR/CAMMICE/MICS Results
Pulkkinen, T. I.; Ganushkina, N.; Baker, D. N.; Turner, N. E.; Fennell, J. F.; Feb. 28, 2001; 47p; In English; Prepared in cooperation with Finnish Meteorological Inst., Helsinki, Finland; University of Colorado, Boulder, CO; Boston University, Boston, MA; Rutherford Appleton Lab, Chilton, Didcot, UK; and Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau,
Contract(s)/Grant(s): F04701-00-C-0009
Report No.(s): AD-A388184; TR-2000(8570)-7; SMC-TR-01-07; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report shows statistical results of the ring current ion composition and its variability as a function of solar cycle and magnetospheric activity. Spin-averaged energetic particle (1-200 keV) measurements from the POLAR/CAMMICE/MICS instrument are combined with geomagnetic indices as well as solar wind and IMF observations from the WIND spacecraft during a period from September 1996 to March 1999. The statistics are performed both for time-averaged values for all periods as well as for peak flux values during geomagnetic storms (defined as Dst less than -50 nT) that occurred during this period. The average O(+) energy density increases by about a factor of 5 during the rising phase of the solar cycle from the minimum values in 1996, while the average values of H(+) and He show variability but no consistently increasing trend. The O(+) flux is small (below 10%) compared to the hydrogen flux, and the average energy density ranges from a few percent at solar minimum to about 10% at high solar activity time in early 1999. The O(+) flux is typically smaller than the He(+) flux, reaching comparable values only during the latter part of the period when the solar activity increased. Analogously, the energy densities of O(+) and He(+) are about equal during 1996 and 1997, whereas the O(+) energy density is about twice the He(+) energy density during the higher solar activity period in 1998 and early 1999.
DTIC
Ring Currents; Solar Activity Effects; Geomagnetism; Solar Activity; Oxygen Ions; Helium Ions; Hydrogen Ions

20010047259 Cornell Univ., School of Electrical and Computer Engineering, Ithaca, NY USA
A Proposal to Establish a Preliminary AOES Element on Maui for Determining the Source of Wave Disturbances in the Mesophere ***Final Report, 1 Dec. 1999 - 30 Nov. 2000***
Kelley, Michael C.; Nov. 30, 2000; 9p; In English
Contract(s)/Grant(s): F49620-98-1-0339
Report No.(s): AD-A388187; AFRL-SR-BL-TR-01-0188; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Under this grant we have demonstrated that AEOS can be an important new observatory using all-sky imagers and a giant lidar as tools for middle atmospheric studies. Cornell University has invested in the all-sky imager, which has yielded valuable contributions to aeronomy (a total of 5 publications thus far). Three Cornell students have already visited the Maui site, taking airglow data and testing the ability to operate the camera remotely, and several images have been published from that work. In addition, we have designed and carried out a unique set of experiments using the sister facility to the Maui Observatory: the Starfire Optical Range. Working with other upper atmospheric researchers, we have re-opened research into one of nature's most

intriguing and least understood phenomena: long-lasting chemiluminescent meteor trails. This experience will be invaluable as the Maui-MLT initiative continues.
DTIC
Mesosphere; Optical Radar; Observatories; Aeronomy; Disturbances

20010047575 Northwest Research Associates, Inc., Bellevue, WA USA
Nonlinear Spectral Evolution of Atmospheric Gravity Waves ***Final Report, 15 May 1998 - 30 Nov. 2000***
Fritts, David C.; Nov. 30, 2000; 7p; In English
Contract(s)/Grant(s): F49620-98-C-0029
Report No.(s): AD-A388141; AFRL-SR-BL-TR-01-0202; No Copyright; Avail: CASI; A01, Microfiche; A02, Hardcopy

Our efforts during this research have included the following major emphasis: (1) performance of high resolution studies of KH instability in order to assess the dynamics and impact on optical propagation in support of the ABL program, (2) studies of wave breaking instability and nonlinear wave-wave interactions as other means of limiting wave amplitudes, generating turbulence, and contributing to spectral evolution and optical effects, (3) completion of 2D and 3D studies of vortex dynamics in stratification and shear, and (4) the continuing development of newer, more capable, and more efficient numerical codes for these studies.
DTIC
Spectra; Gravity Waves

20010047840 NASA Goddard Space Flight Center, Greenbelt, MD USA
Troposphere-Stratosphere Dynamic Coupling Under Strong and Weak Polar Vortex Conditions
Perlwitz, Judith, NASA Goddard Inst. for Space Studies, USA; Graf, Hans-F., Max-Planck-Inst. fuer Meteorologie, Germany; [2001]; 7p; In English
Report No.(s): GCN-01-05; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The relationship between Northern Hemisphere (NH) tropospheric and stratospheric wave-like anomalies of spherical zonal wave number (ZWN) 1 is studied by applying Canonical Correlation Analysis (CCA). A lag-correlation technique is used with 10-day lowpass filtered daily time series of 50- and 500-hPa geopotential heights. Generally stratospheric circulation is determined by ultralong tropospheric planetary waves. During winter seasons characterized either by any anomalously strong or weak polar winter vortex different propagation characteristics for waves of ZWN 1 are observed. The non-linear perspective of the results have implications for medium range weather forecast and climate sensitivity experiments.
Author
Tropospheric Waves; Northern Hemisphere; Atmospheric Circulation; Correlation; Stratosphere; Vortices

20010047990 NASA Langley Research Center, Hampton, VA USA
Raman Lidar Profiling of Water Vapor and Aerosols Over The Southern Great Plains
Ferrare, Richard A., NASA Langley Research Center, USA; Turner, David D., Pacific Northwest National Lab., USA; Heilman, Lorraine A., Science Applications International Corp., USA; Tooman, Tim P., Sandia National Labs., USA; Goldsmith, John E. M., Sandia National Labs., USA; Dubovik, Oleg, Science Systems and Applications, Inc., USA; Ogren, John A., National Oceanic and Atmospheric Administration, USA; [2001]; 3p; In English; Optical Remote Sensing of the Atmosphere Topical Meeting, 5-8 Feb. 2001, Coeur d'Alene, ID, USA; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Raman lidar profiles of aerosol extinction and water vapor are used to characterize the vertical variability of aerosols and water vapor over northern Oklahoma.
Author
Optical Radar; Water Vapor; Aerosols

20010048876 Space and Naval Warfare Systems Center, San Diego, CA USA
Parametric Study of Propagation in Evaporation Ducting and Subrefractive Conditions
Paulus, R. A.; Nov. 2000; 40p; In English
Report No.(s): AD-A388456; SSC/SD-TR-1844; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report quantifies propagation loss differences that result from approximating the full stability-dependent refractivity profiles with neutral-stability profiles parameterized by duct height. It also develops a parameterization for subrefractive profiles

and quantifies the propagation loss differences that result from approximating the full stability-dependent refractivity profiles with neutral-stability profiles parameterized by subrefractive layer height.
DTIC
Ducts; Evaporation; Refraction; Electromagnetic Radiation; Wave Propagation; Marine Meteorology

20010048910 Aerospace Corp., Lab. Operations, El Segundo, CA USA
Substorms and Magnetic Storms From the Satellite Charging Perspective
Fennell, J. F.; Koons, H. C.; Roeder, J. L.; Blake, J. B.; Feb. 28, 2001; 30p; In English; Original contains color plates
Report No.(s): AD-A388410; TR-2000(8570)-2; SMC-TR-01-10; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Sub storms and magnetic storms generate significant space weather effects in the inner magnetosphere. They change the dose rates experienced by satellites in many orbits and are directly linked to the occurrence of satellite charging. Substorms inject hot plasma into the nightside magnetosphere. The drifting electron component of this hot plasma can charge the surfaces of the satellites, leading to electrostatic discharges and associated satellite anomalies and sometimes failures. These occur in regions that are consistent with the expected motions of the substorm injected particles. The high-energy electron enhancements associated with many magnetic storms can be sufficient to cause charging of satellite elements even behind significant shielding. Not all magnetic storms result in flux enhancements sufficient to cause such internal charging. Because the induced voltages from the internal charging are usually not directly measured, the anomalies they cause are more difficult to link to the space environment and the magnetic storm related space weather. However, the anomaly statistics were sufficient to show linkage in a few cases. Data from different satellites will be used to show the measurement of surface charging from different regions of space and link the charging to electrostatic discharges and anomalies.
DTIC
Magnetic Storms; Artificial Satellites; Spacecraft Charging; Space Weather; Storms; High Temperature Plasmas; Aerospace Environments

47
METEOROLOGY AND CLIMATOLOGY

Includes weather observation forecasting and modification

20010043992 Colorado Univ., Boulder, CO USA
Collaborative Research: Climate Sensitivity of Thaw Lake Systems on the Alaska North Slope ***Final Report***
Zhang, Tingjun, Colorado Univ., USA; Jeffries, Martin O., Alaska Univ. Fairbanks, USA; [2001]; 6p; In English
Contract(s)/Grant(s): NAG5-4171; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

There are thousands of thaw (thermokarst) lakes on the North Slope of Alaska, where they cover as much as 40% of the land area. Their very name recognizes the fact that they owe their origin to the impact they have on the ground thermal regime, but there have been few quantitative studies of the impact of the lakes on atmosphere-land interactions in this tundra region.
Derived from text
Lakes; Sensitivity; Climate Change; Air Land Interactions

20010044090 Naval Research Lab., Marine Meteorology Div., Monterey, CA USA
Boundary Layer Effect on the Frontal Interaction with Mountain
Peng, Melinda S.; Powell, John; Williams, R. T.; Jan. 1997; 8p; In English
Report No.(s): AD-A327708; No Copyright; Avail: Defense Technical Information Center (DTIC)

A hydrostatic, primitive equation model with frontogenetical deformation forcing is used to simulate the passage of cold fronts over a two dimensional ridge. The model includes a K-theory boundary layer (PBL) parameterization with implicitly defined diffusion coefficients. Relative to the inviscid results, the PBL simulations produced reduced frontolysis on the upwind slope and reduced frontogenesis on the lee slope, resulting in significantly smaller frontogenetic variations over the mountain. This is caused by convergence forcing in the well-mixed layer offsetting the overall frontolytical forcing on the upwind slope, and greatly reduced lee side convergence forcing due to the PBL. In contrast to the inviscid results, the final downstream front is weaker in the mountain simulations than in the flat-topography control case when PBL effects are included.
DTIC
Inviscid Flow; Simulation; Boundary Layers; Deformation; Cold Fronts

20010044347 Colorado Univ., Program in Atmospheric and Oceanic Sciences, Boulder, CO USA

Satellite Remote Sensing of Tropical Precipitation and Ice Clouds for GCM Verification ***Final Report, 1 Jul. 1998 - 31 Dec. 2000***

Evans, K. Franklin, Colorado Univ., USA; Apr. 06, 2001; 9p; In English

Contract(s)/Grant(s): NAGW-7021; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This project, supported by the NASA New Investigator Program, has primarily been funding a graduate student, Darren McKague. Since August 1999 Darren has been working part time at Raytheon, while continuing his PhD research. Darren is planning to finish his thesis work in May 2001, thus some of the work described here is ongoing. The proposed research was to use GOES visible and infrared imager data and SSM/I microwave data to obtain joint distributions of cirrus cloud ice mass and precipitation for a study region in the Eastern Tropical Pacific. These joint distributions of cirrus cloud and rainfall were to be compared to those from the CSU general circulation model to evaluate the cloud microphysical amd cumulus parameterizations in the GCM. Existing algorithms were to be used for the retrieval of cloud ice water path from GOES (Minnis) and rainfall from SSM/I (Wilheit). A theoretical study using radiative transfer models and realistic variations in cloud and precipitation profiles was to be used to estimate the retrieval errors. Due to the unavailability of the GOES satellite cloud retrieval algorithm from Dr. Minnis (a co-PI), there was a change in the approach and emphasis of the project. The new approach was to develop a completely new type of remote sensing algorithm - one to directly retrieve joint probability density functions (pdf's) of cloud properties from multi-dimensional histograms of satellite radiances. The usual approach is to retrieve individual pixels of variables (i.e. cloud optical depth), and then aggregate the information. Only statistical information is actually needed, however, and so a more direct method is desirable. We developed forward radiative transfer models for the SSM/I and GOES channels, originally for testing the retrieval algorithms. The visible and near infrared ice scattering information is obtained from geometric ray tracing of fractal ice crystals (Andreas Macke), while the mid-infrared and microwave scattering is computed with Mie scattering. The radiative transfer is performed with the Spherical Harmonic Discrete Ordinate Method (developed by the PI), and infrared molecular absorption is included with the correlated k-distribution method. The SHDOM radiances have been validated by comparison to version 2 of DISORT (the community "standard" discrete-ordinates radiative transfer model), however we use SHDOM since it is computationally more efficient.

Derived from text

Remote Sensing; Satellite Observation; Ice Clouds; GOES Satellites; Cirrus Clouds; Rain; Microwave Imagery; Cloud Physics

20010045664 NASA Goddard Space Flight Center, Greenbelt, MD USA

Tropospheric Wind Measurements Obtained with the Goddard Lidar Observatory for Winds (GLOW): Validation and Performance

Gentry, Bruce M., NASA Goddard Space Flight Center, USA; [2001]; 1p; In English; Relocatable Optical and Radiowave Measurement Techniques Workshop, 1-2 Mar. 2001, State College, PA, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The Goddard Lidar Observatory for Winds (GLOW) is a mobile Doppler lidar system which uses direct detection Doppler lidar techniques to measure wind profiles from the surface into the lower stratosphere. GLOW is intended to be used as a field deployable system for studying atmospheric dynamics and transport and can also serve as a testbed to evaluate candidate technologies developed for use in future spaceborne systems. In September of 2000 GLOW participated in a three week intercomparison experiment at the GroundWinds facility in North Glen, NE. More than 50 hours of line-of-sight wind profile data was obtained in a wide variety of conditions including both day and night operation. Typical clear air lidar wind profiles extended to altitudes of 20 km with a 1 Ian vertical resolution and I minute averaging. A description of the mobile system is presented along with the examples of lidar wind profiles obtained with the Goddard system during the New Hampshire experiment.

Author

Troposphere; Wind (Meteorology); Wind Profiles

20010045820 NASA Goddard Space Flight Center, Greenbelt, MD USA

Evaluation of Cirrus Cloud Simulations Using ARM Data - Development of a Case Study Data Set

O'C.Starr, David, NASA Goddard Space Flight Center, USA; Demoz, Belay, Maryland Univ. Baltimore County, USA; Lare, Andrew, Emergent Corp.; Poellot, Michael, North Dakota Univ., USA; Sassen, Kenneth, Utah Univ., USA; Heymsfield, Andrew, National Center for Atmospheric Research, USA; Brown, Philip, UK Meteorological Office, UK; Mace, Jay, Utah Univ., USA; [2001]; 1p; In English; 2001 ARM Science Team Meeting, 19-23 Mar. 2001, Atlanta, GA, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Cloud-resolving models (CRMs) provide an effective linkage in terms of parameters and scales between observations and the parametric treatments of clouds in global climate models (GCMs). They also represent the best understanding of the physical

processes acting to determine cloud system lifecycle. The goal of this project is to improve state-of-the-art CRMs used for studies of cirrus clouds and to establish a relative calibration with GCMs through comparisons among CRMs, single column model (SCM) versions of the GCMs, and observations. This project will compare and evaluate a variety of CRMs and SCMs, under the auspices of the GEWEX Cloud Systems Study (GCSS) Working Group on Cirrus Cloud Systems (WG2), using ARM data acquired at the Southern Great Plains (SGP) site. This poster will report on progress in developing a suitable WG2 case study data set based on the September 26, 1996 ARM IOP case - the Hurricane Nora outflow case. The environmental data (input) will be described as well as the wealth of validating cloud observations. We plan to also show results of preliminary simulations. The science questions to be addressed derive significantly from results of the GCSS WG2 cloud model comparison projects, which will be briefly summarized.
Author
Cirrus Clouds; Simulation

20010045821 NASA Goddard Space Flight Center, Greenbelt, MD USA
Cirrus Parcel Model Comparison Project, Phase 1
Lin, R . F., Maryland Univ. Baltimore County, USA; Starr, D., NASA Goddard Space Flight Center, USA; DeMott, P. J., Colorado State Univ., USA; Cotton, R., UK Meteorological Office, UK; Sassen, K., Utah Univ., USA; Jensen, E., NASA Ames Research Center, USA; [2001]; 1p; In English; 2001 ARM Science Team Meeting, 19 - 23 Mar. 2001, Atlanta, GA, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The Cirrus Parcel Model Comparison is a project of the GEWEX Cloud System Study Working Group on Cirrus Cloud Systems (GCSS WG2). The primary goal of this project is to identify and quantify cirrus model sensitivities to the state of our knowledge of nucleation and microphysics. These factors are key to understanding microphysical development in cirrus and for developing realistic treatments of such processes in larger-scale models. Phase 1 of the project will be described.
Author
Cirrus Clouds; Scale Models

20010046479 Colorado State Univ., Dept. of Atmospheric Science, Fort Collins, CO USA
Use of TRMM Data to Test an Improved Parameterization of Stratiform Precipitation ***Annual Report***
Randall, David A., Colorado State Univ., USA; Fowler, Laura D., Colorado State Univ., USA; May 11, 2001; 5p; In English; Original contains color illustrations
Contract(s)/Grant(s): NAG5-9647; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

By incorporating the TRMM satellite orbital information into the most recent geodesic version of the Colorado State University General Circulation Model (CSU GCM), we are able to fly a satellite in the GCM, and sample the simulated atmosphere in the same way as the TRMM sensors sample the real atmosphere. The TRMM sampling statistics of precipitation and radiative fluxes at annual, intra-seasonal, monthly-mean and composited diurnal time scales are evaluated by comparing the satellite-sampled against fully-sampled simulated atmospheres. This information provides a valuable guidance for efficient usage of TRMM data and future satellite mission planning. We have also evaluated the effects of TRMM sampling errors on the inferred tropical-mean hydrologic cycle and radiative fluxes. We have found that there are strong spurious oscillations associated with the TRMM orbital geometry, with periods of 23 days and 3-4 months, in tropical-mean daily and monthly precipitation. Caution must therefore be used when applying TRMM observations of tropical-mean precipitation to interpret climate variations at intraseasonal and interannual scales.
Author
Geodesy; Geodetic Surveys; Data Acquisition; Atmospheric General Circulation Models; Hydrological Cycle

20010047279 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA
Formulation and Sensitivity Analysis of a Nonhydrostatic, Axisymmetric Tropical Cyclone Model
Hausman, Scott A.; Jan. 2001; 227p; In English; Original contains color plates
Report No.(s): AD-A388258; CI01-64; No Copyright; Avail: CASI; A11, Hardcopy; A03, Microfiche

This document contains model derivation, moist potential vorticity derivation, control experiment, and sensitivity experiment.
DTIC
Sensitivity Analysis; Tropical Meteorology; Cyclones; Tropical Storms

20010047504 NASA Goddard Space Flight Center, Greenbelt, MD USA

Correlation Between Cirrus Particle Optical Properties: Microphysics and Implications for Spaceborne Remote Sensing

Reichardt, Jens, NASA Goddard Space Flight Center, USA; Hess, M., Deutsches Zentrum fuer Luft- und Raumfahrt e.V., Germany; Reichardt, S., NASA Goddard Space Flight Center, USA; Behrendt, A., Kyoto Univ., Japan; McGee, T. J., NASA Goddard Space Flight Center, USA; [2001]; 22p; In English; Original contains color illustrations; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Cirrus measurements obtained with a ground-based polarization Raman lidar at 67.9 deg N in arctic winter reveal a strong correlation between the particle optical properties, specifically depolarization ratio and extinction-to-backscatter ratio, for ambient cloud temperatures above approximately -45 C, and an anti-correlation for colder temperatures. Similar correlations are evident in a 2-year midlatitude (53.4 deg N) cirrus data set. Scattering calculations show that the observed dependences can be interpreted in terms of the shapes and sizes of the cirrus ice particles. These findings suggest a retrieval method for determining cirrus extinction profiles from spaceborne lidar polarization data.

Author

Cirrus Clouds; Correlation; Remote Sensing; Optical Properties; Backscattering

20010047576 Colorado State Univ., Dept. of Physics, Fort Collins, CO USA

A Sodium Lidar Transmitter for Wind and Temperature Measurements at Arctic Lidar Observatory for Middle Atmosphere Research (ALOMAR) ***Final Report, 1 Mar. 1999-30 Nov. 2000***

She, Chiao-Yao, Colorado State Univ., USA; Nov. 30, 2000; 8p; In English

Contract(s)/Grant(s): F49620-99-1-0151

Report No.(s): AD-A388143; AFRL-SR-BL-TR-01-0186; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

As stated in the abstract of this DURIP proposal, quoted below, the goal is to deploy a state of the art sodium lidar transmitter and detector, based on recent innovations in sodium technology, at ALOMAR (Arctic Lidar Observatory for Middle Atmosphere Research) to take the advantage of the existing twin, steerable ALOMAR telescope mirrors (1.8 meter in diameter each) for thermal and dynamic studies in an arctic meosopause region. This objective has been largely completed and the lidar performance has been successfully tested. this lidar system is now being used for research.

DTIC

Transmitters; Optical Radar; Temperature Measurement; Wind Measurement; Sodium; Meteorological Radar; Atmospheric Temperature

20010047691 NASA Langley Research Center, Hampton, VA USA

Changes in Cirrus Cloudiness and their Relationship to Contrails

Minnis, Patrick, NASA Langley Research Center, USA; Ayers, J. Kirk, Analytical Services and Materials, Inc., USA; Palikonda, Rabindra, Analytical Services and Materials, Inc., USA; Doelling, David R., Analytical Services and Materials, Inc., USA; Schumann, Ulrich, Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Gierens, Klaus, Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; [2001]; 5p; In English; 12th Symposium on Global Change Studies and Climate Variations. AMS 81st Annual Meeting, 14-19 Jan. 2001, Albuquerque, NM, USA; Sponsored by Army Map Service, USA; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Condensation trails, or contrails, formed in the wake of high-altitude aircraft have long been suspected of causing the formation of additional cirrus cloud cover. More cirrus is possible because 10 - 20% of the atmosphere at typical commercial flight altitudes is clear but ice-saturated. Since they can affect the radiation budget like natural cirrus clouds of equivalent optical depth and microphysical properties, contrail -generated cirrus clouds are another potential source of anthropogenic influence on climate. Initial estimates of contrail radiative forcing (CRF) were based on linear contrail coverage and optical depths derived from a limited number of satellite observations. Assuming that such estimates are accurate, they can be considered as the minimum possible CRF because contrails often develop into cirrus clouds unrecognizable as contrails. These anthropogenic cirrus are not likely to be identified as contrails from satellites and would, therefore, not contribute to estimates of contrail coverage. The mean lifetime and coverage of spreading contrails relative to linear contrails are needed to fully assess the climatic effect of contrails, but are difficult to measure directly. However, the maximum possible impact can be estimated using the relative trends in cirrus coverage over regions with and without air traffic. In this paper, the upper bound of CRF is derived by first computing the change in cirrus coverage over areas with heavy air traffic relative to that over the remainder of the globe assuming that the difference between the two trends is due solely to contrails. This difference is normalized to the corresponding linear contrail coverage for the same regions to obtain an average spreading factor. The maximum contrail-cirrus coverage, estimated as the product of the

spreading factor and the linear contrail coverage, is then used in the radiative model to estimate the maximum potential CRF for current air traffic.
Derived from text
Environment Effects; Atmospheric Radiation; Cirrus Clouds; Cloud Cover; Contrails

20010047839 NASA Goddard Space Flight Center, Greenbelt, MD USA
Parameterizations of Depositional Growth of Cloud Ice in a Bulk Microphysical Scheme
Braun, Scott A., NASA Goddard Space Flight Center, USA; Ferrier, Brad S., National Centers for Environmental Prediction, USA; Tao, Wei-Kuo, NASA Goddard Space Flight Center, USA; Mar. 20, 2001; 20p; In English; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The conversion of cloud ice to snow by depositional growth, designated P(sub SFI), in the Goddard Cumulus Ensemble Model cloud physics parameterization is examined. The original formulation of P(sub SFI) is shown to produce excessive conversion of cloud ice to snow because of an implicit assumption that the relative humidity is 100% with respect to water even though the air may actually be quite less humid. Two possible corrections to this problem are proposed, the first involving application of a relative humidity dependent correction factor to the original formulation of P(sub SFI), and the second involving a new formulation of P(sub SFI) based on the equation for depositional growth of cloud ice.
Author
Cloud Physics; Ice; Parameterization; Cumulus Clouds

20010048005 NASA Ames Research Center, Moffett Field, CA USA
Possible Ursid Outburst on December 22, 2000
Jenniskens, Peter, Search for Extraterrestrial Intelligence Inst., USA; Lyytinen, Esko; Dec. 10, 2000; 3p; In English
Contract(s)/Grant(s): RTOP 344-32-20-10; RTOP 344-50-92-04; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The Ursid shower has broad Filament-type outbursts around the perihelion passage of parent 8P/Tuttle, but also isolated narrow outbursts at aphelion. We calculated Tuttle's dust trail encounters in the same way as for the Leonid showers. We discovered that it takes 6 centuries to change the orbit enough to bring the meteoroids to Earth's orbit. During that time, the meteoroids and comet separate in mean anomaly by 6 years, thus explaining the unusual aphelion occurrences. We predict enhanced activity on December 22, 2000, at around 7:29 LT.
Author
Micrometeoroids; Meteoroid Showers

20010048416 NASA Ames Research Center, Moffett Field, CA USA
Ice Nucleation in Deep Convection
Jensen, Eric, NASA Ames Research Center, USA; Ackerman, Andrew, NASA Ames Research Center, USA; Stevens, David, Lawrence Livermore National Lab., USA; [2001]; 1p; In English; European Geophysical Society Meeting, 25-30 Mar. 2001, Nice, France; Sponsored by European Geophysical Society, Unknown; No Copyright; Avail: Issuing Activity; Abstract Only

The processes controlling production of ice crystals in deep, rapidly ascending convective columns are poorly understood due to the difficulties involved with either modeling or in situ sampling of these violent clouds. A large number of ice crystals are no doubt generated when droplets freeze at about -40 C. However, at higher levels, these crystals are likely depleted due to precipitation and detrainment. As the ice surface area decreases, the relative humidity can increase well above ice saturation, resulting in bursts of ice nucleation. We will present simulations of these processes using a large-eddy simulation model with detailed microphysics. Size bins are included for aerosols, liquid droplets, ice crystals, and mixed-phase (ice/liquid) hydrometers. Microphysical processes simulated include droplet activation, freezing, melting, homogeneous freezing of sulfate aerosols, and heterogeneous ice nucleation. We are focusing on the importance of ice nucleation events in the upper part of the cloud at temperatures below -40 C. We will show that the ultimate evolution of the cloud in this region (and the anvil produced by the convection) is sensitive to these ice nucleation events, and hence to the composition of upper tropospheric aerosols that get entrained into the convective column.
Author
Convection; Crystals; Drops (Liquids); Freezing; Ice; Melting; Simulation

20010048422 NASA Goddard Space Flight Center, Greenbelt, MD USA

Remotely Sensed Precipitation from the January 2000 East Coast Blizzard

Chang, D.-E., George Mason Univ., USA; Weinman, J. A., NASA Goddard Space Flight Center, USA; [2000]; 1p; In English; Fall Meeting of the American Geophysical Union, 15-18 Dec. 2000, San Francisco, CA, USA; Sponsored by American Geophysical Union, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Initial precipitation forecasts of the January 2000 blizzard were unable to adequately alert emergency response along the eastern seaboard. Cyclogenesis, over the Gulf of Mexico was a contributing cause of that problem. We present distributions of precipitation derived from spaceborne microwave measurements from the Special Sensor Microwave/ Imager (SSM/I) and the TRMM Microwave Imager (TMI) supplemented by NWS operational radar and the National lightning Detection Network (NLDN) Long-Range (LR) product. The combined NWS radar and NLDN-LR data revealed the location of precipitation between 1/23 and 1/27/2000 over the US, the Gulf and the Atlantic Ocean. The remotely sensed precipitation distributions are compared to the precipitation inferred from coincident TMI observations.

Author

Coasts; Cyclogenesis; Detection; Forecasting; Microwave Imagery

20010048657 NASA Ames Research Center, Moffett Field, CA USA

The Colocation, or Lack Thereof, of Deep Convection and Cold Tropopause Temperatures in the Tropical Winter Western Pacific

Pfister, Leonhard, NASA Ames Research Center, USA; [2001]; 1p; In English; Tropopause Workshop, Bad Toetz, Germany; Sponsored by Stratospheric Processes and Their Role in Climate, Unknown; No Copyright; Avail: Issuing Activity; Abstract Only

Recent work has suggested that dehydration near the tropical tropopause during the northern hemisphere winter is separate in place and time from the actual transfer of mass from the troposphere to the stratosphere. In fact, some work suggests that dehydration takes place in an environment where the motion is downward, with such downward motion induced either by radiative cooling over cold cloud tops or turbulent heat flux divergence due to convection. Radiative heating and cooling rates at the tropical tropopause are quite small and very sensitive to the temperature profile and underlying cloudiness. Given this, the idea of downward motion in the region of coldest temperatures and dehydration implies that coldest temperatures and underlying cloudiness are colocated. This may not necessarily be the case. This paper attempts to explore, on a preliminary basis: (1) The sensitivity of radiative heating rates at the tropical tropopause to details of the temperature profile and underlying cloudiness and (2) the relative positions of high cold clouds and cold tropopause temperatures.

Author

Convection; Turbulent Heat Transfer; Cloud Cover; Dehydration; Stratosphere; Troposphere

20010048736 Meteorological Satellite Center, Tokyo, Japan

Monthly Report of the Meteorological Satellite Center *Monthly Report, Jan. 2001*

January 2001; 2p; In English; CD-ROM conforms to the ISO 9660 standard for volume and file structure; Copyright; Avail: Issuing Activity

The CD-ROM concerning the Monthly Report of the Meteorological Satellite Center (MSC) contains the observation data derived from the Geostationary Meteorological Satellite (GMS) of Japan and the polar orbital meteorological satellites operated by NOAA. The CD-ROM contains following observation data: Full Disk Earth's Cloud, Cloud Image of Japan and its Vicinity, Cloud Amount, Sea Surface Temperature, Cloud Motion Wind, Water Vapor Motion Wind, Equivalent Blackbody Temperature, OLR (Out-going Longwave Radiation), Solar Irradiation, Snow and Ice Index, Orbit Data, Attitude Data, VISSR Image Data Catalog, (Cartridge Magnetic Tape (CMT), Micro Film), TOVS (TIROS Operational Vertical Sounder) Vertical Profile of Temperature and Precipitable Water, and TOVS Total Ozone Amount. Although this user's guide is revised yearly, it may happen that a change of contents of the Monthly Report is not reflected in the user's guide, if the change is carried out between revisions of the user's guide. The latest contents of the Monthly Report and the detailed information of the contents are described in document files which are contained in the CD-ROM.

Author

Meteorological Satellites; Catalogs (Publications); Satellite Observation

48
OCEANOGRAPHY

Includes the physical, chemical and biological aspects of oceans and seas; ocean dynamics, and marine resources. For related information see also 43 Earth Resources and Remote Sensing.

20010044105 Louisiana State Univ., Coastal Marine Inst., Baton Rouge, LA USA
Biodegradation of Aromatic Heterocycles from Petroleum-Produced Water and Pyrogenic Sources in Marine Sediments ***Final Report***
Catallo, W. J.; Aug. 2000; 48p; In English
Contract(s)/Grant(s): MMS-14-35-0001-30660-19920
Report No.(s): PB2001-104360; MMS-2000-060; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report summarizes laboratory studies and associated technical development on the influence of hydrology on biogeochemical processes, particularly those that govern the transport and transformation of pollutant organic chemicals in wetland sediments. Aromatic heterocycles are of interest because of their apparent stability in aquatic sediments except for certain (turbulent, well-oxidized) conditions under which they are labile. It was found that the physicochemical and biological behavior of the sediments in the microcosms was similar to that observed in natural settings. The tidal systems exhibited oscillating Eh values, with significant amplitudes (40-180 mV/0.5 d). Transformation of the analytes was different in each of the hydrologic regimes, with the rate of transformation decreasing in the following order: drained, tidal, flooded. The results indicated that sediments and associated biota exposed to tides removed more of these compounds faster and to lower levels than a flooded sediment. The tidal systems were better able to transform these compounds. Promoting in situ remediation of these compounds would involve exposing as much contaminated sediment as possible to the action of tides, while minimizing the area exposed to prolonged flooding.
NTIS
Biodegradation; Biogeochemistry; Aromatic Compounds; Hydrology; Sediments; Crude Oil; Contaminants; Heterocyclic Compounds

20010044340 Alabama Univ., Marine Science Program, Dauphin Island, AL USA
Physical/Biological Oceanographic Integration Workshop for the DeSoto Canyon and Adjacent Shelf
Schroeder, W. W., Editor; Wood, C. F., Editor; December 2000; 182p; In English; Physical/Biological Oceanographic Integration Workshop for the DeSoto Canyon and Adjacent Shelf, 19-21 Oct. 1999, Mobile, AL, USA
Contract(s)/Grant(s): MMS-1435-01-99-CT-31035
Report No.(s): PB2001-104365; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

A Physical/Biological Oceanographic Integration Workshop for the DeSoto Canyon and Adjacent Shelf was convened on October 19-21, 1999, in Mobile, Alabama. The workshop was funded by Minerals Management Service (MMS) and co-hosted by The University of Alabama and the Dauphin Island Sea Lab. While MMS has supported substantial oceanographic studies in the northeastern Gulf of Mexico, demand for additional scientific information continues to be high. For example, results from recently completed, and ongoing studies have elucidated the necessity for coupled biological and physical oceanographic studies. This workshop brought together experts who summarized what was known about the area; determined critical issues; and provided input to the design of an integrated physical and biological study. Three multidisciplinary working groups were formed. Each working group identified critical components and processes which needed to be delineated, measured and modeled, as well as significant knowledge and/or data gaps germane to these components and processes, and then formulated recommendations for research that would assist MMS in designing an integrated physical and biological study to complete the Northeastern Gulf of Mexico Coastal and Marine Ecosystem Program.
NTIS
Marine Environments; Oceanography; Meteorology; Hydrography; Canyons; Continental Shelves

20010045656 Defense Logistics Agency, Richmond, VA USA
Decision Support Tools for the Assessment of Commodity Bid Offers Made to the Defense National Stockpile Center ***Final Report***
Zimmerman, Randy; Reid, Eleanor; Sep. 1997; 54p; In English
Report No.(s): AD-A329596; DLA-97-P70146; No Copyright; Avail: Defense Technical Information Center (DTIC)

This report documents a study of commodity bid offers made to the Defense National Stockpile Center (DNSC). The purpose of the study was to provide DNSC with better information about potential changes in market commodity prices. This report

provides the project findings of the new PC based price forecasting model, ”market basket” decision support package, and ”optimal” price methodology.
DTIC
Stockpiling; Decision Support Systems; Logistics

20010047640 National Oceanic and Atmospheric Administration, National Sea Grant Coll. Program, Silver Spring, MD USA
Aquatic Nuisance Species-Hazard Analysis and Critical Control Point Training Curriculum
Gunderson, J. L., Editor; Kinnunen, R. E., Editor; Feb. 2001; 86p; In English
Report No.(s): PB2001-104363; MN-SG-F11; MSG-00-4000; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The potential exists for aquatic nuisance species (ANS) to spread to uninfested waters through the transport of wild harvested baitfish and cultured fish. Baitfish and aquaculture operations are diverse and complex, as are the risks of spreading ANS. Most segments pose no or very low risk for spreading ANS. to deal effectively and fairly with this potential vector, it is important to characterize operations according to their risks of spreading ANS. Without adequate risk assessment of individual operations, regulations could be imposed that would unnecessarily negatively impact the economy of these industries and still not effectively reduce the risk of spreading ANS. One approach to this problem is to adapt the Hazard Analysis and Critical Control Point (HACCP-pronounced ’has-sip’) concept used by the seafood industry to minimize seafood consumption health risks. The advantage of this is that it effectively manages a diverse industry, it fosters partnership between industry and government regulators, and it is effective if properly applied. The HACCP approach concentrates on the points in the process that are critical to the safety of the product, minimizes risks, and stresses communication between regulators and the industry.
NTIS
Aquiculture; Fishes; Hazards; Health; Spreading; Risk

20010047663 Naval Research Lab., Oceanography Div., Stennis Space Center, MS USA
Shoreward Propagation of Internal Waves at the Malin Shelf Edge
Hallock, Zachariah R., Naval Research Lab., USA; Small, Justin, Defence and Evaluation Research Lab., UK; George, Jacob, Naval Research Lab., USA; Field, Robert L., Naval Research Lab., USA; Scott, John C., Defence and Evaluation Research Lab., UK; Continental Shelf Research; Dec. 27, 2000; ISSN 0278-4343; Volume 20, pp. 2045-2057; In English
Report No.(s): AD-A386241; NRL/JA/7332-98/0021; Copyright; Avail: Defense Technical Information Center (DTIC)

A novel analysis method, suitable for first-mode internal waves, is employed to examine moored temperature and current data at the Malin Shelf edge. Current velocity and temperature profile time series data from two moorings at the Malin Shelf edge for a five day period in August 1996 exhibit-high frequency (0.2-3.5h-1)variability which is attributed to bursts of internal wave activity. Analysis shows that the predominant direction of propagation direction is shoreward, perpendicular to depth contours. Explicit temporal variability of propagation direction and wave intensity are examined. Internal wave parameters estimated in the analysis are consistent with linear normal mode theory with respect to vertical structure. An independent estimate of phase propagation speed is also consistent with linear theory.
DTIC
Internal Waves; Wave Propagation

20010047679 Naval Research Lab., Ocean Optics Section, Stennis Space Center, MS USA
An Algorithm to Generate Modulation Transfer Function of Seawater from Scattering or Beam Attenuation Coefficient at Given Wavelength
McBride, Walton E., III, Planning Systems, Inc., USA; Haltrin, Vladimir I., Naval Research Lab., USA; Weidemann, Alan D., Planning Systems, Inc., USA; Ocean Optics XV; Jan. 09, 2001; 7p; In English; Ocean Optics XV, 16-20 Oct. 2000, Monaco
Report No.(s): AD-A386393; NRL/PP/7333-00/0015; No Copyright; Avail: CASI; A01, Microfiche; A02, Hardcopy

The objective of this presentation is to propose an algorithm to generate modulation transfer function (MTF) of seawater from the values of scattering and beam attenuation coefficients at any wavelength of light. The algorithm is implemented as a working FORTRAN code that outputs McLean and Fourier versions of MTF. The chlorophyll-based model of seawater optical properties, presented at Ocean Optics XIV and published in Applied Optics, with direct experimental measurements by Petzold and Mankovsky are used as a bases of proposed algorithm. This algorithm connects input coefficients with the MTF parameters-averages squares of cosine and scattering angle of the scattering phase function. An error analysis of the model shows that this algorithm is applicable to use in such applications as laser light propagation in seawater and estimation of visibility of submerged objects in the sea.
DTIC
Algorithms; Modulation Transfer Function; Scattering Functions

20010048024 Woods Hole Oceanographic Inst., MA USA
Sea Floor Samples Laboratory ***Final Report, Jan. 1995-Dec. 2000***
Broda, James E.; Curry, William B.; Apr. 06, 2001; 4p; In English
Contract(s)/Grant(s): N00014-95-1-0396
Report No.(s): AD-A388399; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The main objective of this proposal is to provide continuing support for the curatorial staff of the Wood 5 Mole Oceanographic Institution 5 sea floor samples laboratory. These personnel are responsible for the maintenance of the existing collection, as well as the execution of ongoing sampling programs. The curation component of this effort involves two phases, the initial processes of archiving and description; and secondly the distribution of these archived materials to investigators who need access to the extensive collection to further their research efforts. The consistent demand for these archived samples continues to demonstrate the value of the asset they represent to the community. Our goal is to insure that new additions to the collection are available are available in a timely manner to those who specified their collection, and that ready access of older material is maintained in an efficient and modern way. Our staff also supports projects that involve the acquisition of all types of marine geological samples. We are responsible for the design, preparation and deployment of specialized coring and other bottom sampling hardware that is available to the UNOLS community. The integration of curation and acquisition represents a unique blend of resources that provide users with all the fundamentals associated with sea floor samples.
DTIC
Ocean Bottom; Sampling

20010048885 Massachusetts Univ., Environmental Coastal and Ocean Sciences Program, Boston, MA USA
Laser-Induced Fluorescence of Pyrene and Other Polycyclic Aromatic Hydrocarbons (PAH) in Seawater
Rudnick, S. M.; Chen, R. F.; Talanta; Apr. 1998; ISSN 0039-9140; Volume 47, pp. 907-919; In English
Report No.(s): PB2001-104513; MITSG-01-8J; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Polycyclic aromatic hydrocarbons (PAH) in the marine environment are currently of great concern due to their potential carcinogencity. The standard methods of detection and quantification of PAH in seawater and sediments are costly, time-consuming and do not account for the heterogeneous nature of their distribution and sources. Laser-induced, time-resolved fluorescence spectroscopy may help to overcome these limitations. Several PAH have relatively long-lived stimulated fluorescence emission, which allow them to be detected among a background of more intense but shorter-lived chromophores. Using time-delayed techniques we have shown an ability to detect PAH principally pyrene, at environmental levels both in the laboratory and in situ in Boston Harbor and other study areas. Further development may lead to the rapid determination of several PAH in typical near-shore marine environments.
NTIS
Polycyclic Aromatic Hydrocarbons; Marine Environments; Spectroscopy; Laser Induced Fluorescence; Detection

51
LIFE SCIENCES (GENERAL)

Includes general research topics related to plant and animal biology (non-human); ecology; microbiology; and also the origin, development, structure, and maintenance, of animals and plants in space and related environmental conditions. For specific topics in life sciences see categories 52 through 55.

20010045663 ManTech Environmental Technology, Inc., Dayton, OH USA
Quantitative Assessment of Peroxisome Proliferation in B6C3F1 Mouse Liver after Subchronic Exposure to Trichloroethylene by Gavage ***Interim Report, Jul. 1994 - Nov. 1996***
Geiss, Kevin T.; Grabau, John H.; Lane, John W.; Latendresse, John R.; Randall, Gia M.; Jul. 1997; 28p; In English
Contract(s)/Grant(s): F41624-96-C-9010; AF Proj. 7757
Report No.(s): AD-A327962; AL/OE-TR-1997-0087; No Copyright; Avail: Defense Technical Information Center (DTIC)

Trichioroethylene (TCE), an industrial solvent and common groundwater contaminant, is hepatocarcinogenic in mice when given at high doses. One potential mechanism for TCE-induced liver tumors is the formation of excessive reactive oxygen species during lipid peroxidation. As reported in previous studies by analysis of protein levels, enzyme activity or transmission electron microscopy (TEM) examination of liver tissue, TCE exposure results in peroxisome proliferation. In this study, groups of mice were orally administered water, corn oil, or TCE (400, 800, 1200 mg/kg) in corn oil in equal volumes for 8 weeks (once/day, 5 days/week). We present data showing significant induction of mRNA levels for cytochrome P450 4A1 in high dose groups (3-30 times control) and glyce raldehyde-3-phosphate dehydrogenase (1.4-3.4 times control), as determined by Northern analysis

throughout the study. The induction of these genes is closely associated with peroxisome proliferation. In addition, gamma-glutamylcysteine synthetase mRNA displayed elevations in high dose groups (1.3 to 3.6 times control). The implication of peroxisome proliferation was verified by TEM examination and quantitation of peroxisome numbers. The evidence of peroxisome proliferation-associated gene induction throughout the 56-day exposures suggests that peroxisome proliferation could play a continuing role in the biological effects of a longer-term TCE exposure.
DTIC
Quantitative Analysis; Liver; Exposure; Biological Effects

20010046951 NASA Marshall Space Flight Center, Huntsville, AL USA
Distribution and Spectroscopy of Green Fluorescent Protein and Acyl-CoA: Cholesterol Acytransferase in Sf21 Insect Cells
Richmond, R. C., NASA Marshall Space Flight Center, USA; Mahtani, H., NASA Marshall Space Flight Center, USA; Lu, X., Dartmouth Medical School, USA; Chang, T. Y., Dartmouth Medical School, USA; Malak, H., Microcosm, Inc., USA; [2001]; 1p; In English; 2nd Pan-Pacific Basin Workshop on Microgravity Sciences, 2 May 2001, Pasadena, CA, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Acyl-CoA: cholesterol acyltransferase (ACAT) is thought to significantly participate in the pathway of cholesterol esterification that underlies the pathology of artherosclerosis. This enzyme is a membrane protein known to be preferentially bound within the endoplasmic reticulum of mammalian cells, from which location it esterifies cholesterol derived from low density lipoprotein. Cultures of insect cells were separately infected with baculovirus containing the gene for green fluroescent protein (GFP) and with baculovirus containing tandem genes for GFP and ACAT. These infected cultures expressed GFP and the fusion protein GCAT, respectively, with maximum expression occurring on the fourth day after infection. Extraction of GFP- and of GCAT-expressing cells with urea and detergent resulted in recovery of fluorescent protein in aqueous solution. Fluorescence spectra at neutral pH were identical for both GFP and GCAT extracts in aqueous solution, indicating unperturbed tertiary structure for the GFP moiety within GCAT. In a cholesterol esterification assay, GCAT demonstrated ACAT activity, but with less efficiency compared to native ACAT. It was hypothesized that the membrane protein ACAT would lead to differences in localization of GCAT compared to GFP within the respective expressing insect cells. The GFP marker directly and also within the fusion protein GCAT was accordingly used as the intracellular probe that was fluorescently analyzed by the new biophotonics technique of hyperspectral imaging. In that technique, fluorescence imaging was obtained from two dimensional arrays of cells, and regions of interest from within those images were then retrospectively analyzed for the emission spectra that comprises the image. Results of hyperspectral imaging of insect cells on day 4 postinfection showed that GCAT was preferentially localized to the cytoplasm of these cells compared to GFP. Furthermore, the emission spectra obtained for the localized GCAT displayed a peak blue shift from 518nm obtained in neutral aqueous solution to 505nm obtained in localized regions within the cells. This blue shift indicates change in the fluorescence coupling of the GFP moiety of GCAT. It is hypothesized that change in tertiary environment of GCAT, coincident with intracellular deposition of GCAT, follows from intracellular trafficking of GCAT leading to membrane interactions with the ACAT moiety, and/or self-assembly of GCAT, that alters the chromophore environment of the GFP moiety of GCAT. These findings introduce a new technique of biophotonic imaging to studies of intracellular protein trafficking and interactions. This technique of hyperspectral imaging could contribute to advancing the emergent field of proteomics. Because of the noninvasive nature of this technique, kinetic processes associated with intracellular protein trafficking, and interactions of proteins within cellular domains, can be considered for investigation within a single cell as well as a cell population.
Author
Cholesterol; Insects; Proteins; Cells (Biology); Genes; Spectroscopy

20010046961 NASA Marshall Space Flight Center, Huntsville, AL USA
Expression of the Acyl-Coenzyme A: Cholesterol Acyltransferase GFP Fusion Protein in Sf21 Insect Cells
Mahtani, H. K., Universities Space Research Association, USA; Richmond, R. C., NASA Marshall Space Flight Center, USA; Chang, T. Y., Dartmouth Medical School, USA; Chang, C. C. Y., Dartmouth Medical School, USA; [2001]; 1p; In English; 2001 NASA Cell Science Conference, 7 Mar. 2001, Houston, TX, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The enzyme acyl-coenzyme A:cholesterol acyltransferase (ACAT) is an important contributor to the pathological expression of plaque leading to artherosclerosis n a major health problem. Adequate knowledge of the structure of this protein will enable pharmaceutical companies to design drugs specific to the enzyme. ACAT is a membrane protein located in the endoplasmic reticulum.t The protein has never been purified to homogeneity.T.Y. Chang's laboratory at Dartmouth College provided a 4-kb cDNA clone (K1) coding for a structural gene of the protein. We have modified the gene sequence and inserted the cDNA into the BioGreen His Baculovirus transfer vector. This was successfully expressed in Sf2l insect cells as a GFP-labeled ACAT protein. The advantage to this ACAT-GFP fusion protein (abbreviated GCAT) is that one can easily monitor its expression as a function

of GFP excitation at 395 nm and emission at 509 nm. Moreover, the fusion protein GCAT can be detected on Western blots with the use of commercially available GFP antibodies. Antibodies against ACAT are not readily available. The presence of the 6xHis tag in the transfer vector facilitates purification of the recombinant protein since 6xHis fusion proteins bind with high affinity to Ni-NTA agarose. Obtaining highly pure protein in large quantities is essential for subsequent crystallization. The purified GCAT fusion protein can readily be cleaved into distinct GFP and ACAT proteins in the presence of thrombin. Thrombin digests the 6xHis tag linking the two protein sequences. Preliminary experiments have indicated that both GCAT and ACAT are expressed as functional proteins. The ultimate aim is to obtain large quantities of the ACAT protein in pure and functional form appropriate for protein crystal growth. Determining protein structure is the key to the design and development of effective drugs. X-ray analysis requires large homogeneous crystals that are difficult to obtain in the gravity environment of earth. Protein crystals grown in microgravity are often larger and have fewer defects than those grown on earth. The analysis of higher quality space-grown crystals will assist in structure-based drug design. We have successfully grown GCAT-infected Sf21 cells in both adhesion and suspension cultures. Expression levels of GCAT in cell lines such as Sf9 and High Five appear to be reduced. We intend to replicate GCAT expression in all three cell lines using the NASA rotating wall bioreactor which effectively duplicates a microgravity environment. The bioreactor itself could be launched to study the expression of the GFP and GCAT proteins in the actual microgravity environment achieved in orbit.
Author
Cholesterol; Insects; Coenzymes; Gene Expression

20010046962 NASA Marshall Space Flight Center, Huntsville, AL USA
Differentiation and Genomic Instability in a Human Mammary Cell Model
Richmond, R., NASA Marshall Space Flight Center, USA; Kale, R., Alabama A & M Univ., USA; Pettengill, O., Dartmouth Medical School, USA; [2001]; 1p; In English; 2001 NASA Cell Science Conference, 7 Mar. 2001, Houston, TX, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Harvest of prophylactic mastectomy specimens from an obligate heterozygote for ataxia-telangiectasia provided autologous fibroblasts as well epithelial cells (HMEC). The routine availability of these autologous cells has provided an opportunity to study cell-cell interactions in coculture and monoculture, and in 3-dimensional cultures grown in the NASA rotating bioreactor. HMEC and stromal fibroblasts grown in 2-dimensional monoculture were both observed to produce extracellular matrix. Similar matrix was encountered in 3-dimensional cultures containing HMEC. Metaphases were analyzed. For stromal fibroblasts, genomic aberrations were found in 18% of metaphase spreads. For HMEC, aberrations were greater such that a majority were found to be abnormal. The level of genomic instability determined for these noncancerous cells in 2-dimensional monoculture should be useful for generating a human cell model that can correlate the effects of differentiation in 3-dimensional coculture on the level of genomic instability.
Author
Genes; Epithelium; Mammary Glands; Differentiation (Biology); Cells (Biology)

20010046982 NASA Ames Research Center, Moffett Field, CA USA
Space Station Biological Research Project Habitat: Incubator
Nakamura, G. J., Lockheed Martin Corp., USA; Kirven-Brooks, M., Lockheed Martin Corp., USA; Scheller, N. M., NASA Ames Research Center, USA; [2001]; 4p; In English
Contract(s)/Grant(s): NAS2-14263
Report No.(s): SAE-01ICES-329; Copyright; Avail: Issuing Activity

Developed as part of the suite of Space Station Biological Research Project (SSBRP) hardware to support research aboard the International Space Station (ISS), the Incubator is a temperature-controlled chamber, for conducting life science research with small animal, plant and microbial specimens. The Incubator is designed for use only on the ISS and is transported to/from the ISS, unpowered and without specimens, in the Multi-Purpose Logistics Module (MPLM) of the Shuttle. The Incubator interfaces with the three SSBRP Host Systems; the Habitat Holding Racks (HHR), the Life Sciences Glovebox (LSG) and the 2.5 m Centrifuge Rotor (CR), providing investigators with the ability to conduct research in microgravity and at variable gravity levels of up to 2-g. The temperature within the Specimen Chamber can be controlled between 4 and 45 C. Cabin air is recirculated within the Specimen Chamber and can be exchanged with the ISS cabin at a rate of approximately equal 50 cc/min. The humidity of the Specimen Chamber is monitored. The Specimen Chamber has a usable volume of approximately equal 19 liters and contains two (2) connectors at 28v dc, (60W) for science equipment; 5 dedicated thermometers for science; ports to support analog and digital

signals from experiment unique sensors or other equipment; an Ethernet port; and a video port. It is currently manifested for UF-3 and will be launched integrated within the first SSBRP Habitat Holding Rack.
Author
International Space Station; Life Sciences

20010047010 Prins Maurits Lab. TNO, Rijswijk, Netherlands
Mass Spectrometric Investigations of Escherichia Coli Bacteria ***Final Report***
vanBaar, B. L. M., Prins Maurits Lab. TNO, Netherlands; Hulst, A. G., Prins Maurits Lab. TNO, Netherlands; deJong, A. L., Prins Maurits Lab. TNO, Netherlands; Wils, E. R. J., Prins Maurits Lab. TNO, Netherlands; March 2001; 32p; In English
Contract(s)/Grant(s): B99/KL/4FB
Report No.(s): TNO-TD-00-0077; TNO-PML-2000-A75; Copyright; Avail: Issuing Activity

Mass spectrometry (MS) was employed to establish its practical potential in identification of bacteria and to implement specific techniques at TNO-PML. Escherichia coli bacteria were chosen as an object of study, because of the availability of other studies for comparison. Laser MS ('MALDI' MS) of whole cells provided fingerprint type spectra of E. coli, sufficient for provisional identification, within fifteen minutes. More detailed identification was achieved by MALDI MS of E. coli cell lysates and by electrospray MS and tandem MS of such lysates. Information obtained from the amino acid sequence of E. coli proteins, as established by MALDI and electrospray tandem MS, was used to characterize the bacteria to standards of unequivocal identification.
Author
Mass Spectroscopy; Escherichia; Bacteria

20010047261 Naval Research Lab., Washington, DC USA
Modeling Viral Epidemiology in Connected Networks ***Interim Report, 1 Oct. 2000-1 Feb. 2001***
Spears, William M.; Billings, Lora; Schwartz, Ira B.; Mar. 26, 2001; 15p; In English
Report No.(s): AD-A388191; NRL/MR/6700--01-8537; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We derive some Markovian and differential equation models of viral epidemiology on connected networks. We examine the stability properties of endemic states for models based on contact rates derived from probabilistic concepts of connectivity. In particular, boundaries that delineate the onset of viral propagation in a connected network are derived and analyzed.
DTIC
Epidemiology; Mathematical Models; Markov Processes; Computer Viruses; Computer Networks

20010047262 Washington Univ., Grant and Contract Services, Seattle, WA USA
Molecular Quantitation of Breast Cancer Cells in the Peripheral Blood: Correlation With Clinical Stage at Presentation and Disease Course ***Annual Report, 1 Sep. 1999-31 Aug. 2000***
Sabath, Daniel E.; Sep. 2000; 12p; In English; Original contains color plates
Contract(s)/Grant(s): DAMD17-99-1-9439
Report No.(s): AD-A388205; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The overall objective of this project is to develop an assay to detect small numbers of breast cancer cells in a patient's peripheral blood. This assay would be used to test the hypothesis that the presence of circulating breast cancer cells would be predictive of stage at presentation or relapse. The first stage of this project has been to optimize a quantitative reverse transcriptase-polymerase chain reaction (qRT-PCR) to quantify breast cancer-specific RNA molecules in the peripheral blood. The result of this initial work was to select keratin 19 (K19) RNA as the best target for detecting small numbers of breast cancer cells. We have also selected an internal reference RNA ((beta)(2)-microglobulin), and we have optimized our protocol for extracting RNA from patient blood samples. Having optimized these parameters, we plan to use the qRT-PCR assay for K19 RNA to study patients with breast cancer, both at the time of presentation and after treatment.
DTIC
Assaying; Blood; Cancer; Mammary Glands; Cells (Biology)

20010047263 California Univ., San Francisco, CA USA
Estrogen-Modulated Response of Breast Cancer to Vitamin D and its Analogs: Role of IGF ***Annual Report, 1 Oct. 1996-30 Sep. 2000a***
Dolezalova, Hana; Goetzl, Edward J.; Oct. 2000; 30p; In English
Contract(s)/Grant(s): DAMD17-96-1-6218
Report No.(s): AD-A388206; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Dihydroxyvitamin D3 (VD3) affects essential cell processes such as proliferation, differentiation, and apoptosis in a diverse cell types, including cancer cells. In this study, we investigate whether VD3 could inhibit proliferation of breast cancer cells (BCCs) by suppressing the expression and signaling of endothelial differentiation gene-encoded G protein-coupled receptors (EDG Rs). EDG Rs transduce major effects of lysophospholipid growth factors (LGFs), such as lysophosphatidic acid (LPA) and sphingosine-1 phosphate (S1P), on estrogen receptor-negative and estrogen receptor-positive BCCs, including stimulation of proliferation and growth-independent functions. MDA-MB-453 and MCF-7 BCCs used in this study express predominantly Edg-3 is greater than 4 is greater than 5 and -2, but not Edg-1. We have shown that VD3, at 10(exp -10) to 10(exp -8) M, suppressed significantly mRNA levels of Edg-2, -3,-5, but not Edg-4 in both lines of BCCs as quantified by TaqMan real-time PCR. VD3 also inhibited proliferative responses of LGF-stimulated BCCs and modulated LPA- and S1P-induced SRE reporter responses of BCCs. These data identify a novel mechanism of VD3 action on the abnormal growth of BCCs and suggest that EDG Rs are potential targets for specific therapy of some human breast cancers.
DTIC
Cancer; Estrogens; Mammary Glands; Calciferol

20010047266 California Univ., Lawrence Berkeley Lab., Berkeley, CA USA
Novel Breast Tumor Metalloproteinase Inhibitor ***Annual Report, 15 Sep. 1999-14 Sep. 2000***
Banda, Michael J.; Oct. 2000; 17p; In English; Original contains color plates
Contract(s)/Grant(s): DAMD17-99-1-9103
Report No.(s): AD-A388213; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
Matrix Metalloproteinases (MMP) are a family of enzymes that degrade the extracellular matrix. Modulation of MMP activity may attenuate the invasiveness of some tumors. MMP activity may also be involved in breast tumor fibrosis because the balance of connective tissue synthesis and degradation is lost. Understanding factors that modulate MMP activity are therefore important to understanding breast tumor biology. We have identified a metalloproteinase inhibitor associated with an invasive breast tumor cell line. The inhibitor was determined not to be a TIMP (Tissue Inhibitor of Metalloproteinase) which are currently the only known metalloproteinase inhibitors. The novel inhibitor (CT-PCPE) was found to be the C-terminal portion of a protein known as Procollagen C-terminal Proteinase Enhancer (PCPE). Intact PCPE has no inhibitor activity. Activity was revealed only by proteolytic processing of the parent PCPE molecule. to investigate CT-PCPE in breast tumors, a plasmid containing the region of CT-PCPE homologous to TIMP was constructed. The structure of expressed CT-PCPE will be compared to TIMP in an effort to better understand CT-PCPE inhibition of MMP. In addition, a proteinase has been observed in the conditioned medium of tumor cell lines that process PCPE to CT-PCPE. Evidence suggests that this may be the proteinase responsible for PCPE processing.
DTIC
Proteins; Neoplasms; Inhibitors; Cancer; Mammary Glands

20010047269 Colorado State Univ., Fort Collins, CO USA
Role of Melatonin in the Prevention of Breast Cancer in Patients With Cystic Breast Disease ***Annual Report, 1 Sep. 1999-31 Aug. 2000***
Wells, Robert L.; Sep. 2000; 83p; In English
Contract(s)/Grant(s): DAMD17-99-1-9143
Report No.(s): AD-A388220; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche
Melatonin and breast cyst fluids (BCFs) both exert antiproliferative effects on breast cancer cells that may be mediated by growth factors. Our research was the first to identify melatonin in BCF and we hypothesize that it is responsible for BCF's antiproliferative properties. The primary objectives of this study are to establish a clinical BCF sample bank among patients with gross cystic breast disease in order to study the relationship between this disease, melatonin and related growth agents in BCF, and breast cancer risk. A laboratory effort will use BCF samples to elucidate the contribution of melatonin and related growth agents (EGP, TGF-beta, DHEA-S) to the oncostatic effects of BCFs in the MCF-7 human breast cancer cell model. Our progress to date includes the establishment of informed consent procedures and a BCF sample bank. Patient enrollment and BCF sample collection are on-going. Cell culture experiments have confirmed that physiological melatonin levels inhibit MCF-7 cell growth. We have also performed baseline melatonin, sodium, potassium, and TGF-beta measurements in BCF. Out of 17 subtasks specified in our Statement of Work, eight have either been completed or were initiated in year one and will remain on-going as patient enrollment progresses.
DTIC
Cancer; Cysts; Mammary Glands; Hormones

20010047270 New York Univ. Medical Center, New York, NY USA

The Role of the Complement Inhibitor CD59 on Breast Cancer Cells ***Final Report, 15 Sep. 1997-14 Sep. 2000***

Tomlinson, Stephen; Oct. 2000; 51p; In English

Contract(s)/Grant(s): DAMD17-97-1-7273

Report No.(s): AD-A388223; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

It is proposed that reversing the effects of CD59, a tumor cell expressed complement inhibitor, will allow effective immune-mediated clearance of tumor cells and improve prospects for successful immunotherapy. CD59 function is species selective, and we have determined species selectivity of human mouse and CD59, an important consideration for establishing human models of human cancer in rodents for the study of complement. We have expanded our study to include other tumor expressed complement inhibitors and have shown for the first time in vivo that expression of complement inhibitors on a tumor cell has functional consequences with regard to complement deposition and tumor growth. These studies have also established a rodent model of human breast cancer that is relevant for testing complement-associated immune mechanisms and may be relevant for pre-clinically evaluating complement activating anti-tumor antibodies. We have further identified the individual residues that confer human CD59 species selective activity. This data is an important step toward identifying the three dimensional structure of the CD59-C9 peptide ligand complex and may assist in design of CD59 inhibitors.

DTIC

Complement (Biology); Mammary Glands; Cancer; Inhibitors; Cells (Biology)

20010047282 Maryland Univ., Baltimore, MD USA

A Controlled Study Using Acupuncture as an Adjuvant to Treat Chemotherpay-Induced Nausea and Vomiting ***Annual Report, 1 Sep. 1999-31 Aug. 2000***

Lao, Lixing; Sep. 2000; 5p; In English

Contract(s)/Grant(s): DAMD17-99-1-9274

Report No.(s): AD-A387609; No Copyright; Avail: Defense Technical Information Center (DTIC)

This is a randomized, double blind controlled study designed to assess the effects of Electroacupuncture (EA) on nausea and vomiting induced by chemotherapy in breast cancer patients. The primary aim of this study is to evaluate the usefulness of HA as an adjuvant on N/v in chemotherapy patients who do not respond to conventional antiemetics. Seventy five outpatients will be recruited from the University of Maryland Baltimore (UMB) Cancer Center who have shown refractory to 5-HT3 antiemetic and randomized into three treatment groups (n--25 per group) : (1) HA: 10 Hz, 10 min, (2) HA: 100 Hz, 10 min, and (3) a sham acupuncture control group. Research team personnel have been hired and recruitment began in January 2000. As of August 31, forty-two patients have been screened, six were eligible, and four have consented to go on protocol and have now completed the study. The study has experienced difficulty with obtaining sufficient recruitment due to a relatively small breast cancer patient pool at the UMS Cancer Center. An amendment IRE requesting permission to expand the eligibility criteria to include all cancer chemotherapy patients has recently approved by IRE and DOD, and the expanded recruitment procedure will begin in Oct. 2000.

DTIC

Chemotherapy; Vomiting; Nausea; Medical Science; Antiemetics and Antinauseants

20010047283 Baylor Coll. of Medicine, Houston, TX USA

The Molecular Basis of the Response to Radiation ***Annual Report, 1 Jul. 1999 - 30 Jun. 2000***

Plon, Sharon; Jul. 2000; 18p; In English

Contract(s)/Grant(s): DAMD17-97-1-7284

Report No.(s): AD-A387637; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In the third year of this CDA Award we have continued to make progress towards all three Technical Objectives. The most challenging problem is the isolation of novel cDNAs encoding human homologs of yeast DNA damage response genes. Major efforts to isolate cDNAs for RAD9 and DUN1 during the previous year have not been successful. In contrast, two hybrid screens have resulted in the isolation of human homologs of RADl8 and RAD2l. Thus, the focus over year 3 has been the characterization of the human Rad2l protein in mammalian cells. We found alterations in expression of human Rad2l mRNA and protein in human breast cancer cell lines. This has lead to development of immunohistochemistry techniques to now expand this research to human breast cancer samples. In Technical Objective 3 we did not see alteration in RAD21 mRNA or Rad2 I protein phosphorylation in human cells exposed to DNA damage. However, we found that induction of the apoptotic pathway (as opposed to DNA damage itself) induces specific cleavage of the human RAD21 cohesin protein. This cleavage product may play a role in signalling subsequent events in apoptosis or result in aneuploidy in cells that survive the apoptotic response.

DTIC

Mammary Glands; Cancer; Radiation Damage; Radiation Tolerance; Deoxyribonucleic Acid; Proteins

20010047284 Columbia Univ., New York, NY USA

Effect of Green Tea Polyphenols on Breast Cancer Signaling

Cobrinik, David; Apr. 2000; 37p; In English

Contract(s)/Grant(s): DAMD17-98-1-8051

Report No.(s): AD-A387639; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This project aimed to define the effects of green tea polyphenols (GTPs) on cell signaling pathways and on mammary tumorigenesis in MMTV/c-neu transgenic mice. The studies showed that the major polyphenol in green tea, EGCG, did not impair erbB-2 tyrosine phosphorylation or EGF-dependent activation of MAP kinase in transformed or untransformed MCFlOA cells, and that orally administered green tea or GTPs did not inhibit mammary tumorigenesis. Subsequent studies focused on the mechanism by which EGCC inhibits mammary epithelial cell cycle progression. EGCG inhibited S phase entry in epidermal growth factor (EGF)-stimulated MCFlOA breast epithelial cells when provided in GO or mid Gl, but not when provided after the late G1 restriction point. EGCG induced p21 CIP1/WAF1/SDI1 inhibited cyclin Dl-associated pRB kinase activity, increased the association of p21 with cyclin Dl, and impaired pRB phosphorylation. EGCG induced p21 expression at the mRNA level. In addition, the ability of EGCG to induce p21 depended on the addition of EGE, indicating that EGCG synergizes with growth factor-dependent signals. While these findings provide a mechanism by which polyphenolic compounds may inhibit proliferation, their relevance to breast cancer chemoprevention remains unclear due to the lack of effect of tea polyphenols on tumorigenesis in MMTV/c-neu transgenic mice.

DTIC

Mammary Glands; Cancer; Phenols; Cells (Biology); Farm Crops; Beverages

20010047285 Duke Univ., Medical Center, Durham, NC USA

The Essential Role of Protein Phosphatase-1 in Mitogenic Signaling and Breast Cancer ***Annual Report, 1 Jul. 1999-30 Jun. 2000***

Oliver, Carey; Shenolikar, Shirish; Jul. 2000; 18p; In English

Contract(s)/Grant(s): DAMD17-98-1-8075

Report No.(s): AD-A387640; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Organization of the actin cytoskeleton is crucial for a diverse set of cell functions including cell division, intracellular signaling, cell shape, and motility. Cancerous cells demonstrate changes in cell adhesion and growth consistent with altered regulation of the actin cytoskeleton. Our research has focused on the regulation of protein phosphorylation, specifically signals mediated by protein phosphatase 1 (PPl), a serine/threonine phosphatase, in these processes. Current work is focused on a class of regulatory subunits, neurabin I and neurabin II, that direct PPl to the actin cytoskeleton. Neurabin I and neurabin II were cloned from rat tissue either as PPl or F-actin binding proteins and contain multiple domains. We have cloned homologs of these proteins from Xenopus laevis and C. elegans. The high degree of structural homology from worms to mammals in specific domains, such as the PPi binding domain and PDZ domain, begin to highlight regions most likely to be important for the in vivo function of these proteins in these diverse species. GFP-tagged constructs of full length neurabin I transfected into HEK-293 cells show that the full-length protein localizes to the actin cytoskeleton. A C-terminal truncation of the coiled-coil and PDZ domains also localizes neurabin I to the actin cytoskeleton and ca

DTIC

Cancer; Mammary Glands; Proteins; Phosphorylation; In Vivo Methods and Tests; Mitosis

20010047286 Utah Univ., Salt Lake City, UT USA

Construction and Characterization of Human Mammary Epithelial Cell Lines Containing Mutations in the p53 or BRCA1 Genes ***Final Report, 22 Sep. 1994-31 Dec. 1998***

White, Raymond L.; Jan. 1999; 59p; In English

Contract(s)/Grant(s): DAMD17-94-J-4464

Report No.(s): AD-A387641; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The overall goal of this project is to identify and characterize the consequences of human mammary epithelial cells (HMEC) that become deficient in normal p53 or BRCA-l gene functions. We have created retroviral vectors which allow us conditionally express the E6/E7 gene of human papillomavirus type 16 (HPVl6), dominant-negative p53 gene, or anti-sense BRCA-l gene. The consequences of transduction of these viral constructs into primary human mammary epithelial cells will be discovered through controlled in vitro comparisons between genetically altered derivatives and their isogenic parent cells. As we proposed in our last report, we are now focused our efforts on microarray-based comparisons to identify breast cancer related genes. During the past year we have successfully implemented the Microarray Spotting and Scanning techniques. This includes development of robust fluorescent labeling and hybridization protocols as well as the preparation and testing of over 23,000 minimally redundant cDNA

target samples for deposition on the microarray slides. We have compared expression profiles from several distinct breast cell lines we had created. We believe that this system will provide us critical information to our understanding of early breast carcinogenesis.
DTIC
Genes; Cancer; Mammary Glands; Mutations; Cells (Biology); Epithelium

20010047287 Mount Sinai Hospital, Toronto, Ontario Canada
Investigation of Trinucleotide Repeat Expansion in Familial Breast Cancer ***Annual Report, 1 Sep. 1999 - 1 Sep. 2000***
Ozcelik, Hilmi; Oct. 2000; 13p; In English
Contract(s)/Grant(s): DAMD17-99-1-9302
Report No.(s): AD-A387672; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Our approach is based on the hypothesis that genetic anticipation occurs in some breast cancer families, and is characterized by a decrease in age of onset of the disease in successive generations of affected family members. Our objective is to identify putative breast cancer predisposition gene(s) which have undergone intergenerational expansions of trinucleotide repeats during germline transmission from mother to daughter using the Rapid Expansion Detection System. Recent investigations in other genetic diseases have revealed that anticipation is the result of expansion of trinucleotide repeats in disease susceptibility genes. We have successfully established the system for fragmentation of the digested DNA and its extraction from the gel slices. This provides better resolution of the repeats in the genome. Ligation reaction in the presence of a designed positive Androgen Receptor control sample has been optimized and vertical gel separation conditions have been established. Currently we have been optimizing the method to increase the signal detection of the repeats. Our approach has the potential to allow the rapid identification of novel breast cancer predisposition genes which will provide obvious benefits for families with breast cancer, as well as the potential for insights into the pathobiology of this devastating disease.
DTIC
Cancer; Mammary Glands; Nucleotides; Diseases; Genetics

20010047288 National Center for Toxicological Research, Jefferson, AR USA
Novel Recruitment Techniques for a Study of Culture-Specific Diet, Metabolic Variability, and Breast Cancer Risk in African-American Women ***Annual Report, 1 Jul. 1999 - 1 Jul. 2000***
Ambrosone, Christine; Aug. 2000; 42p; In English
Contract(s)/Grant(s): MIPR-7JBJYXM8914
Report No.(s): AD-A387708; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Little is known regarding explanations for racial disparities in breast cancer incidence among younger women and tumor aggressiveness, perhaps because of the difficulty in enrolling African-Americans into research studies. The purpose of this pilot study was to develop a novel method of recruitment, focused primarily on minority women, and investigate previously unexplored risk factors in breast cancer epidemiology. Eligible cases and controls are contacted by women who are breast cancer survivors and asked to participate in the study. To date, interviews have been completed for 248 women with breast cancer, aged 29-75, and l37 community controls. The participation rate (the proportion of women who complete the study, is 76% for Caucasian women and 61% for African-Americans. The infrastructure for case-control epidemiological studies has been built, and a specimen bank was established to enable exploration of future hypotheses.
DTIC
Cancer; Mammary Glands; Races (Anthropology); Diets; Metabolism; Risk; Epidemiology

20010047544 Royal Coll. of Surgeons, Dublin, Ireland
Biological Effects of Calcium Hydroxyapatite Crystals in Breast Cancer ***Annual Report, 1 Aug. 1999 - 31 Jul. 2000***
McCarthy, Geraldine; Aug. 2000; 32p; In English
Contract(s)/Grant(s): DAMD17-97-1-7129
Report No.(s): AD-A388473; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Radiographic mammary microcalcifications are one of the most pertinent diagnostic markers of breast cancer. Breast tissue calcification in the form of hydroxyapatite (HA) crystals is strongly associated with malignant disease. HA crystals play a well-described role in a number of disease processes unrelated to the breast, including severe cartilage destruction. The characteristics of HA believed to be essential to pathogenesis include their ability to induce I) cell replication and 2) matrix metalloprotease (MMP) production, both of which may be relevant to growth and/or metastasis of breast cancer. The goal of this project is to test the hypothesis that HA crystals facilitate breast cancer progression because of their ability to induce mitogenesis and MMP production. We have shown that calcium HA crystals enhance mitogenesis in normal HF, non- malignant mammary cell lines (HMEC and Hs578BSt) and breast cancer cell lines (MCF-7 and Hs578T) alone or in co-culture. HA crystals enhance

the production of a variety of MMP in normal or breast cancer cell lines alone or in co-culture. In addition, HA crystals can enhance PGE2 production in some mammary cell lines by upregulation of cyclo-oxygenases (COX) 1 and 2. Finally, HA crystals induce IL-lb but not TNF-a in HF. Taken together, these data support the active role of calcium HA in breast cancer progression.
DTIC
Calcium; Biological Effects; Mammary Glands; Crystals; Calcification; Clinical Medicine

20010047546 Health Research, Inc., Buffalo, NY USA
DNA Binding Drugs Targeting the Regulatory DNA Binding Site of the ETS Domain Family Transcription Factor Associated With Human Breast Cancer ***Annual Report, 15 Jun. 1999 - 14 Jun. 2000***
Wang, Yong-Dong; Jul. 2000; 11p; In English
Contract(s)/Grant(s): DAMD17-97-1-7064
Report No.(s): AD-A388494; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Abnormal regulation of gene expression plays an important role in cancer. The first step in the regulation of gene expression requires the binding of transcription factor (TF) to its DNA response element in the gene promoter region. Therefore, interfering with TF-DNA complexes could be a powerful tool for blocking oncogene expression and elucidating how aberrant gene expression contributes to neoplastic phenotypes. The HER2/neu oncogene is amplified and transcriptionally upregulated in 25-30% of human breast cancers. This upregulation has been shown to depend on a highly conserved ETS binding site (EBS) and its upstream AP-2 binding site within the key regulatory region of the HER2/neu promoter. In this study, we investigated a new class of DNA minor groove binding ligands, hairpin pyrrole-imidazole polyamides, as potential TF-DNA inhibitor in gene expression. Several new polyamides were designed specifically targeted to these TF binding sites within HER2/neu promoter region. Polyamides represent a significant advancement in ligand design in that they can achieve a remarkable degree of sequence specificity and high affinity for predetermined DNA sequences.
DTIC
Deoxyribonucleic Acid; Mammary Glands; Clinical Medicine; Gene Expression

20010047547 Georgetown Univ., Washington, DC USA
Function of Maximal Microvessel Density in Breast Tumor Metastasis ***Final Report, 1 Jul. 1997 - 30 Jun. 2000***
McLeskey, Sandra; Jul. 2000; 16p; In English
Contract(s)/Grant(s): DAMD17-97-1-7132
Report No.(s): AD-A388506; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Abundant data implicates maximal microvessel density in breast and many other solid tumors as being a strong prognostic indicator. These data are gained by quantitating the number of microvessels in ”hot spots” of high-density tumor vasculature, implying that such hot spots have functional significance in the process of metastasis. We proposed that gene expression in the area of the microvascular hot spots is different from elsewhere in the tumor and that genes upregulated in these areas may be functioning to promote metastasis. We have produced experimental tumors in mice and harvested them so as to preserve spatial relationships within the tumor. Microvessel densities were quantitated in several areas of each tumor. Pulmonary metastases were also quantitated and correlated with the maximal microvessel density for each tumor. Areas of tumor adjacent to the microvascular hot spots in the most metastatic tumors were microdissected along with similar sized spots not associated with hot spots. RNA was extracted from these microdissected samples and used to synthesize cDNA. Microarray analysis will be used to discover genes differentially expressed in areas adjacent to hot spots compared with areas not associated with hot spots.
DTIC
Mammary Glands; Gene Expression; Tumors; Blood Vessels; Density (Number/Volume); Clinical Medicine

20010047548 Pennsylvania Univ., Medical Image Processing Group, Philadelphia, PA USA
The Role of Breast Cancer Derived Prostaglandin E2 in the Elaboration of a Therapeutic Immune Response ***Annual Report, 1 Jul. 1999-30 Jun. 2000***
Eck, Stephen; Jul. 2000; 23p; In English
Contract(s)/Grant(s): DAMD17-98-1-8328
Report No.(s): AD-A388513; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The principal goal was to understand why breast cancer cells are able to evade the host immune system despite the presence of tumor antigens and tumor antigen-specific T lymphocytes. We had previously demonstrated that tumor-derived prostaglandin E2 (PGE2) directly contributes to the lack of a significant immune response to breast cancer cells. However, the production of PGE2 by breast cancer cells did not completely explain the immune suppressive effect of breast cancer cells. We have subsequently demonstrated that GA733-2/mEGP, a type I cell surface breast cancer protein, is able to efficiently block the

presentation of a variety of antigens from dendritic cells (DC). Murine DC expressing mEGP were unable to stimulate allogeneic T cell responses or responses to model tumor antigens.
DTIC
Cancer; Mammary Glands; Prostaglandins; Immune Systems

20010047549 Sloan-Kettering Inst. for Cancer Research, New York, NY USA
Strategy Toward the Total Synthesis of Epothilones A and B ***Final Report, 1 Jul. 1997-30 Jun. 2000***
Lee, Chul Bom; Danieshafsky, S.; Jul. 2000; 34p; In English
Contract(s)/Grant(s): DAMD17-97-1-7146
Report No.(s): AD-A388515; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Having accomplished total syntheses of epothilone A and B, we have been engaged in a new stage of investigation that involves development of efficient strategies for a large scale epothilone preparation and search for more potent analogues. Efficient and processable syntheses of key building blocks of l2,l3-desoxyepothilone B (dEpoB) by catalytic asymmetric induction has been achieved. dEpoB is a potent anticancer agent, showing a highly promising therapeutic potential in the currently undergoing phase I study. The syntheses of two epothilone analogues, 15(S)-aza-l2,13-desoxyepothilone B and the epimeric l5(R)-aza-12,l3- desoxyepothilone B have been accomplished. Tubulin binding and cytotoxicity profiles of these analogues have also been investigated. Another epothilone, l2,l3-desoxyepothilone F (dEpoF), was synthesized and evaluated for antitumor potential. The results from an in vitro assay reveal that this new analogue is highly active against various tumor cell lines with a potency comparable to that of dEpoB. In particular, the growth of resistant tumor cells is inhibited by dEpoF at concentrations where paclitaxel (Taxol) is basically ineffective. A preliminary assessment of its in vivo activity is also promising. The new analogue, containing an additional hydroxyl group at C21, provides advantages over other epothilones in terms of water solubility and can serve as a readily functionalizable handle to produce other useful compounds for pertinent biological studies.
DTIC
Synthesis (Chemistry); Drugs; Cancer

20010047550 Mount Sinai School of Medicine, New York, NY USA
Role of the ATM Gene in Bilateral Breast Cancer Following Radiotherapy ***Annual Report, 11 Jul. 1999-10 Jul. 2000***
Rosenstein, Barry; Aug. 2000; 26p; In English
Contract(s)/Grant(s): DAMD17-97-1-7208
Report No.(s): AD-A388518; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The purpose of this project is to determine whether women who developed bilateral breast cancer following radiotherapy for an initial breast cancer had a higher incidence of heterozygosity for a mutation in the ATM gene than either breast cancer patients who did not develop a second breast cancer or bilateral breast cancer patients who did not receive radiotherapy. to accomplish this, during the first three years of this project, DNA samples were isolated from unilateral and bilateral breast cancer patients and screened for ATM mutations using a Non-radioisotopic RNase Cleavage-based Assay (NIRCA). However, not a single mutation was discovered from any of these patients which raised a concern as to the sensitivity of this assay. to address this concern, the PI of this project recently purchased an instrument for the performance of denaturing high performance liquid chromatography (DHPLC). This is a high throughput technique in which large numbers of DNA samples can be rapidly screened with a high degree of sensitivity and accuracy. During the fourth year of this study, representing a no-cost extension of this project, all of the DNA samples obtained from the unilateral and bilateral breast cancer patients will be re-screened for ATM mutations using DHPLC. We have begun this process with screening eight ATM exons and have already found eight patients possessing base sequence alterations that had previously gone undetected using NIRCA.
DTIC
Cancer; Mammary Glands; Radiation Therapy; Genes; Lymphocytes

20010047565 Harbor-UCLA Medical Center, Research and Education Inst., Torrance, CA USA
Brain Function, Structure, and Neurochemistry After Tamoxifen/Chemotherapy Assessed by Neuropsychologic Testing and H Magnetic Resonance Spectroscopy ***Annual Report***
Ernst, Thomas M.; Sep. 2000; 8p; In English
Report No.(s): AD-A388104; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The purpose of this cross-sectional pilot study is to evaluate the effects on brain function and neurochemistry in elderly women (>/= 65 years old) of two common treatment regimens for breast cancer, tamoxifen and/or chemotherapy, and their interaction. The study has a 2 x 2 design with the two treatment regimens (tamoxifen and chemotherapy) as two independent variables. During the first year of the study, 49 women were recruited in 3 of the 5 groups (14 treated with tamoxifen (patient

group), 18 women receiving estrogen replacement therapy (ERT) (positive control group), and 17 negative control subjects). On magnetic resonance spectroscopy (1H MRS), women who received tamoxifen (average 4.4 years) had no statistically significant differences in brain metabolite ratios compared to the negative control group. However, women who have received ERT (average is greater than 20 years) showed increased N-Acetyl/creatine (NA/Cr) ratio (+8%; p is less than 0.01) in the basal ganglia. These preliminary findings indicate that treatment with tamoxifen may not be associated with substantial negative effects on the brain. In contrast, since normal aging has been shown to be associated with decreases in NA/Cr, ERT may prevent or reduce some of the effects of normal aging on the brain. Ongoing efforts are being made to recruit subjects who received chemotherapy.
DTIC
Brain; Neurology; Biochemistry; Chemotherapy; Mammary Glands; Clinical Medicine

20010047567 Kansas Univ., Medical Center, Kansas City, KS USA
Mechanisms of Altered Control of Proliferation by Cyclic Amp/Protein Kinase a During Mammary Tumor Progression ***Annual Report***
Imagawa, Walter; Jun. 2000; 19p; In English
Contract(s)/Grant(s): DAMD17-97-1-7100
Report No.(s): AD-A388122; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

We hypothesize that alterations in the regulation of growth by cAMP during mammary tumor progression are related to MAP kinase (ERK, JNK, p38) signaling modules known to be affected by cAMP and pertussis toxin (PT)-sensitive G proteins. Mammary epithelial cells from normal mouse mammary glands were compared to ovarian-independent mouse mammary tumors (OIT) in serum-free, collagen gel cell culture. The role of cAMP-pathway responsive transcription factors in PT or PD98O59 (a specific ERK pathway inhibitor) inhibition of cAMP mitogenesis showed that CREB activation is not targeted by these inhibitors. Thus, other PT-sensitive or ERK-dependent cAMP pathways are involved. Further examination of lysophosphatidic acid (LPA) signaling showed that it can stimulate CREB and ATF2 phosphorylation, thus interacting with the cAMP pathway. The p38 inhibitor, SB2O2l9O (SB), was used to evaluate the importance of the PT-responsive p38 pathway in cAMP mitogenesis. Surprisingly it alone was mitogenic, activated ERK and JNK kinase activity and stimulated p38 phosphorylation. It synergized with LPA and cAMP in stimulating proliferation or normal mammary epithelium but inhibited the proliferation of OITs. These novel data implicate p38 as playing a central role in proliferation control. 11-89, a cAMP-dependent protein kinase A (PKA) inhibitor also stimulated proliferation of normal mammary epithelium but not OIT and could potentiate cAMP, and LPA mitogenesis suggesting that nonPKA pathways are critical for cAMP mitogenesis. Thus, while cAMP alone does not significantly stimulate MAP kinase activity it appears to participate in multiple kinase networks to affect proliferation. Proliferation of mammary epithelium is controlled by multiple pathways and it is the balance between positive and negative signals that determines the final proliferative response of the cells. These networks are disrupted at many points during mammary tumorigenesis.
DTIC
Proteins; Mammary Glands; Cyclic Amp; Clinical Medicine

20010047569 Baylor Coll. of Medicine, Houston, TX USA
Role of cdc37 in Breast Cancer ***Final Report, 15 Jun. 1997-14 Jun. 2000***
Stepanova, Lilia J.; Harper, Jeffrey; Jul. 2000; 32p; In English
Contract(s)/Grant(s): DAMD17-97-1-7234
Report No.(s): AD-A388124; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

p50CDC37 functions in the establishment of protein kinase signaling pathways by functioning in complex with molecular chaperone Hsp90. CDC37/Hsp90 complex plays a central role in the establishment of pathways that are directly implicated in cell cycle promotion and transformation. CDC37 targets intrinsically unstable kinases to the complex with Hsp90, and this transient interaction of newly synthesized kinases with the complex is necessary for their stabilization and/or folding and further activation. We created and analyzed a transgenic mouse model where CDC37 expression is driven by MMTV or PB promoter, directing the expression into breast or prostate epithelial cells, respectively. Our study show that CDC37 is a first identified chaperone functioning as an oncogene, and is capable of cooperating with other oncogenes such as c-myc, cyclin Dl and neu for transformation.
DTIC
Cancer; Mammary Glands; Cells (Biology)

20010047571 Stanford Univ., Aerosol Lab., Stanford, CA USA
Paclitaxel (Taxol) Resistance in Breast Cancer Cells ***Final Report***
Sikic, Branimir I.; Oct. 1998; 31p; In English
Contract(s)/Grant(s): DAMD17-94-J-4352
Report No.(s): AD-A388126; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The development of resistance to taxanes is the major clinical limitation in using these agents for treating breast cancer. P-glycoprotein (P-gp) is a multidrug transporter, the product of the MDRl gene and the major known mechanism of resistance to taxanes. In this project we sought to identify non-MDR1 mechanisms of resistance by developing relevant cellular models. We developed models of both uterine sarcoma and breast cancer resistant to taxol alone (mediated by P-gp) and the combination of taxol with PSC 833, a potent inhibitor of F-gp. The uterine sarcoma cells showed changes in beta-tubulin isotype profiles whereas the breast cancer cells did not. Both cell types were demonstrated to have alterations in apoptotic proteins, specifically BCL-2 up regulation and BAX down regulation. Genomic profiling yielded numerous genetic differences between the selected variants, the significance of which needs further investigation.
DTIC
Clinical Medicine; Mammary Glands; Cancer; Inhibitors

20010047572 Kansas Univ., Medical Center, Kansas City, KS USA
Mechjanisms of Altered Control of Proliferation by Cyclic Amp/Protein Kinase a During Mammary Tumor Progression ***Annual Report***
Imagawa, Walter; Jun. 2000; 19p; In English
Contract(s)/Grant(s): DAMD17-97-1-7100
Report No.(s): AD-A388127; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We hypothesize that alterations in the regulation of growth by cAMP during mammary tumor progression are related to MAP kinase (ERK, NC, p38) signaling modules known to be affected by cAMP and pertussis toxin (PT)-sensitive G proteins. Mammary epithelial cells from normal mouse mammary glands were compared to ovarian-independent mouse mammary tumors (OIT) in serum-free, collagen gel cell culture. The role of cAMP-pathway responsive transcription factors in PT or PD98059 (a specific ERK pathway inhibitor) inhibition of cAMP mitogenesis showed that CREB activation is not targeted by these inhibitors. Thus, other PT-sesnsitive or ERK-dependent cAMP pathways are involved. Further examination of lysophosphatidic acid (LPA) signaling showed that it can stimulate CREB and ATF2 phosphorylation, thus interacting with the cAMP pathway. The p38 inhibitor, SB2O219O (SB), was used to evaluate the importance of the PT-responsive p38 pathway in cAMP mitogenesis. Surprisingly it alone was mitogenic, activated ERK and NC kinase activity and stimulated p38 phosphorylation. It synergized with LPA and cAMP in stimulating proliferation or normal mammary epithelium but inhibited the proliferation of OITs. These novel data implicate p38 as playing a central role in proliferation control. H-89, a cAMP-dependent protein kinase A (PKA) inhibitor also stimulated proliferation of normal mammary epithelium but not OIT and could potentiate cAMP and LPA mitogenesis suggesting that nonPKA pathways are critical for cAMP mitogenesis. Thus, while cAMP alone does not significantly stimulate MAP kinase activity it appears to participate in multiple kinase networks to affect proliferation. Proliferation of mammary epithelium is controlled by multiple pathways and it is the balance between positive and negative signals that determines the final proliferative response of the cells. These networks are disrupted at many points during mammary tumorigenesis.
DTIC
Epithelium; Mammary Glands; Mitosis; Cells (Biology); Phosphorylation

20010047573 Texas Univ., Southwestern Medical School, Dallas, TX USA
Melvalonates, Ras and Breast Cancer ***Annual Report***
White, Michael A.; Sep. 2000; 8p; In English
Contract(s)/Grant(s): DAMD17-97-1-7093
Report No.(s): AD-A388129; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Therapy of any cancer is designed to control the growth of cancer cells while permitting the function and proliferation of normal cells. 6-fluoromevalonate (Fmev) can inhibit proliferation of leukemic cell lines while not affecting normal lymphocytes. Here, we are evaluating the ability of Fmev to selectively interfere with proliferation of breast cancer cells. We have shown that Fmev can inhibit proliferation of normal breast epithelial cells. However, the proliferation of epithelial cells expressing oncogenic Ras is inhibited by concentrations of Fmev that do not appreciably affect the proliferation of normal breast epithelial cells. These

results suggest that Fmev has potential efficacy as a breast cancer therapeutic. These observations are being extended with the use of breast tumor derived cells lines, and by an examination of the molecular mechanism of growth inhibition.
DTIC
Lymphocytes; Mammary Glands; Epithelium; Cells (Biology); Carcinogens; Cancer

20010047574 Naval Health Research Center, San Diego, CA USA
An Examination of Real-Time Heart Rate Variability During Laparoscopic Cholecystectomies and Radical Surgeries
Zaglaniczny, K.; Shoemaker, W.; Gorguze, D. S.; Woo, C.; Colombo, J.; Sep. 2000; 23p; In English
Report No.(s): AD-A388130; NHRC-00-47; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The physiologic status of patients undergoing surgical procedures requiring general anesthesia must be continuously monitored to ensure patient safety. New technologies capable of detecting even minute changes in physiologic status might be useful in providing feedback to operating room physicians as to any immediately resulting effects of their surgical interventions. The present study investigated autonomic nervous system (ANS) monitoring based on real-time Heart Rate Variability (n-HRV) as a technique for monitoring the physiologic status of patients undergoing surgery. This study analyzed ANS monitoring and hemodynamic data collected on two populations of general anesthesia patients at William Beaumont Hospital in Royal Oak, MI. The patient populations were composed of individuals undergoing laparoscopic cholecystectomies and radical surgeries. The ANS monitoring data collected included: 1) low-frequency area (LFa, in beats per minute squared), 2) high-frequency area (HFa), and 3) the ratio of low- to high-frequency areas (LFa/HFa = Ratio). The hemodynamic data collected included: 1) heart rate, 2) mean arterial pressure, 3) arterial hemoglobin oxygen saturation measured by pulse oxymetry, and 4) inspired fraction of oxygen concentration.
DTIC
Heart Rate; Variability; Surgery; Anesthesia; Physiology

20010047577 Texas Technological Univ., Health Science Center, Lubbock, TX USA
Role of the Cdk Inhibitor Sic 1 in Start ***Annual Report, 1 Aug. 1997-1 Aug. 2000***
Schneider, Brandt, Texas Technological Univ., USA; Sep. 2000; 17p; In English
Contract(s)/Grant(s): DAMD17-97-1-7196
Report No.(s): AD-A388144; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Cancer is essentially a disease of inappropriate proliferation due to a loss of normal cell cycle controls. The scope of this work was to study how cell cycle regulation by G1-phase Cyclin dependent kinases (Cdks) relates to breast cancer causation. The purpose of this proposal was to use yeast as an experimental system to examine the role of G1-Cdks in promoting cell cycle progression. The three major findings of this proposal are detailed below. First, we have shown that G1 cyclins are constitutively unstable and rate limiting for cell cycle progression 1. Second, the only essential function of G1 cyclins is to phosphorylate the B-type Cdk inhibitor, Sic1, and target it for degradation 2. Third, Sicl is one of few known in vivo substrates of yeast G1-Cdks 3. Sic1 mutants lacking several phosphorylation sites are stabilized and completely block cell cycle progression 1,3. Thus, the amount and phosphorylation state of Sic1 appears to determine the timing and size of cell division 3. by studying the mechanism of cell cycle control, we can begin to understand how cell cycle defects leads to abnormal proliferation, and how by preventing inappropriate proliferation, we may be able to reduce the incidence of breast cancers.
DTIC
Mammary Glands; Inhibitors; Cell Division; Cancer; Clinical Medicine; Molecular Biology

20010047579 Utah State Univ., Dept. of Nutrition and Food Science, Logan, UT USA
Biomimetic Sensor for Pathogenic Bacteria ***Final Report, 1 May-Sep 30 2000***
Walsh, Marie K.; De Wald, Daryll B.; Weimer, Bart C.; Mar. 05, 2001; 17p; In English
Contract(s)/Grant(s): F49620-00-1-0289; AF Proj. 2312
Report No.(s): AD-A388146; 4B969; AFRL-SR-BL-TR-01-0190; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This study investigated the assembly of a biomimetic sensor containing an osmotic receptor protein. The first objective of this research included the assembly and immobilization of fluorescently tagged liposomes. The second objective involved the expression and purification of an osmotic sensitive protein (MscL) and the incorporation of this protein into the liposome membrane. Liposomes (2 micron diameter) containing fluorescein labeled phospholipids and biotinylated phosphotidyl ethanolamine in the membranes and internalized soluble sulforhodamine were assembled. Liposomes were characterized with respect to composition, size, and shelf-life using confocal microscopy. Avidin was covalently attached to a glass surface for the immobilization of the biotinylated liposomes. Immobilization of fluorescent liposomes was confirmed with confocal microscopy. The liposomes contain a green/yellow lipid bilayer and a red interior. The cloning of recombinant MScL into an Escherichia coli

expression system yielded an MScL-thioredoxin fusion protein that was tagged with a blue fluorescent dye and incorporated into the membrane of the liposomes. The functionality of the proteosome was observed by the release of the water soluble sulforhodamine in the presence of high salt, 3 M, concentrations.
DTIC
Biomimetics; Bioengineering

20010047583 Cornell Univ., Medical Coll., New York, NY USA
Neutral Endopeptidase Inhibits Neuropeptide Mediated Growth of Androgen-Independent Prostate Cancer ***Annual Report, 16 Aug. 1999-15 Aug. 2000***
Dai, Jie; Sep. 2000; 104p; In English; Original contains color plates
Contract(s)/Grant(s): DAMD17-99-1-9530
Report No.(s): AD-A388155; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The objective of this project is to elucidate the involvement of neutral endopeptidase (NEP), a cell-surface peptidase which inactivates active peptides and reduces local concentrations of peptide available for receptor binding and signal transduction, in the growth inhibition of androgen-independent (Al) prostate cancer. During the first year of the fellowship, we have for the first time shown that overexpression of cell-surface NEP induces growth inhibition and apoptosis in Al-prostate cancer. This growth inhibition induced by NEP results from PC cells arresting in a Gi phase arrest of the cell cycle and leading to increased expression of p21 and dephosphorylated Rb protein. Induction of NEP can inhibit the tumorigenicity by using the orthotopic model of prostate cancer in which PC cells are directly injected into the prostate. NEP is also involved in integrin mediated signaling pathways. Recombinant NEP and induced NEP can inhibit the bombesin and endothelin-l stimulated FAK phosphorylation and cell migration. These studies will help delineate biological significance of Ni%P loss in the development and maintenance of androgen-independent prostate cancer, and indicate the potential for recombinant NEP or NEP directed gene therapy as therapy in patients Al PC.
DTIC
Prostate Gland; Cancer; Cells (Biology); Nerves; Radiation Therapy

20010047662 Army Medical Research Inst. of Chemical Defense, Biochemical Pharmacology Branch, Aberdeen Proving Ground, MD USA
Expression of Biologically Active Human Butyrylcholinesterase in the Cabbage Looper (Trichoplusia ni)
Platteborze, Peter L., Army Medical Research Inst. of Infectious Diseases, USA; Broomfield, Clarence A., Army Medical Research Inst. of Chemical Defense, USA; Biotechnology and Applied Biochemistry; 2000; Volume 31, pp. 225-229; In English
Report No.(s): AD-A386043; USAMRICD-P00-002; Copyright; Avail: Defense Technical Information Center (DTIC)

This investigation examined the utility of three recombinant protein-expression systems (COS cells, insect cells and insect larvae) to cost-effectively produce biologically active human butyrylcholinesterase (BuChE). It was determined that baculovirus-infected insect cells (Sf9 and High 5) expressed 3.5- and 8.3-fold, respectively, more active enzyme than COS-7 cells. Baculovirus-infected cabbage looper (Trichoplusia ni) insect larvae produced over 26 times more than High 5 cells; in fact, one baculovirus-infected insect larva provided more active protein than 100 ml of insect cell culture. Analysis of the larvally expressed proteins revealed that the vast majority of BuChE expressed was inactive due to extensive degradation that occurred in vivo. However, the active form of BuChE does have enzyme kinetics similar to those of its human serum counterpart. Cabbage looper larvae were also examined for their ability to serve as an in vivo animal model to study protection against anti-cholinesterase toxicity. This was unsuccessful due to their high tolerance to the very toxic organophosphorus compounds tested. This tolerance may be attributed at least in part to a novel endogenous organophosphorus acid anhydride hydrolase activity that is capable of hydrolysing the chemical-warfare nerve agents sarin (isopropyl methylphosphonofluoridate) and soman (pinacolyl methylphosphonofluoridate). These results show that cabbage looper larvae can serve as an inexpensive recombinant protein-expression system for human BuChE.
DTIC
Activity (Biology); Cells (Biology); Culture Techniques; Human Beings

20010047685 California Univ., Los Angeles, CA USA
Suppression of Vascular Growth in Breast Cancer ***Final Report, 30 Sep. 1994 - 30 Sep. 1999***
Iruela-Arispe, Luisa, California Univ., USA; October 1999; 17p; In English
Contract(s)/Grant(s): DAMD17-94-J-4346
Report No.(s): AD-A385653; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Thrombospondin-1 is an extracellular matrix protein that has been shown to modulate the response of endothelial cells to growth factors. Specifically the protein suppresses endothelial cell proliferation, migration and angiogenesis in vivo. this grant allowed us to ascertain the significance of thrombospondin for the suppression of the vasculature in mammary tumors. Utilizing null and TSP-1 overexpressing mice, we determined that the protein plays a mayor role in the size, architecture, and number of vessels in mammary tumors. We have also found that both CD-36 and alpha(sub 3)beta(sub 1) are critical signaling receptors for the anti-angiogenic effects mediated by TSP-1.
DTIC
Cardiovascular System; Growth; Mammary Glands; Cancer

20010047687 Florida Univ., Gainesville, FL USA
The Role of Cumulative Genetic Defects in NF1 Tumorigenesis ***Final Report, 1 Oct. 1998 - 30 Sep. 1999***
Wallace, Margaret, Florida Univ., USA; October 1999; 30p; In English
Contract(s)/Grant(s): DAMD17-98-1-8609
Report No.(s): AD-A385685; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

The purpose of this work is to understand the genetic basis of tumor pathogenesis in neurofibromatosis type 1 (NF1). This work will test the two-hit hypothesis in NF1 tumors (benign neurofibromas and MPNSTs), to assay for involvement of the TP53 gene in the various types of tumors, and to determine whether other loci contribute to the formation of NF1 tumors. This work is being done using human primary tumor samples, as well as using unique cell culture models derived from tumors and other sources of Schwann cells. The major accomplishments thus far include: strong evidence that the Schwann cell is genetically aberrant in neurofibromas and can be successfully enriched in culture (i.e. the clonal origin), that multiple genetic defects occur in many plexiform neurofibromas, that the two-hit hypothesis is supported in at least most tumors by genetic and protein assays, and that the TP53 gene is only abnormal in MPNSTs (the malignant tumors).
DTIC
Genetics; Defects; Tumors

20010048011 NASA Ames Research Center, Moffett Field, CA USA
Proton Pumps: Mechanism of Action and Applications
Lanyi, Janos K., California Univ., USA; Pohorille, Andrew, NASA Ames Research Center, USA; [2001]; 12p; In English
Contract(s)/Grant(s): RTOP 344-50-92-02; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Recent progress in understanding molecular structures and mechanisms of action of proton pumps has paved the way to their novel applications in biotechnology. Proton pumps, in particular bacteriorhodopsin and ATP synthases, are capable of continuous, renewable conversion of light to chemical, mechanical or electrical energy, which can be used in macro- or nano-scale devices. The capability of protein systems incorporated into liposomes to generate ATP, which can be further used to drive chemical reactions, and to act as molecular motors has been already demonstrated. Other possible applications of such biochemical devices include targeted drug delivery and biocatalytic re actors. All these devices might prove superior to their inorganic alternatives.
Derived from text
Molecular Structure; Protons; Biochemistry; Adenosine Triphosphate; Pumps

20010048019 Army Chemical Research and Development Center, Aberdeen Proving Ground, MD USA
Simulants for Transition States ***Final Report, Nov. 1994 - Feb. 1995***
White, William E.; Apr. 2001; 23p; In English
Contract(s)/Grant(s): PR-10262622A553
Report No.(s): AD-A388449; ECBC-TR-161; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Catalytic antibodies are proteins that catalyze chemical reactions by binding to the transition state and lowering the energy of activation. Transition state analogs are stable compounds that mimic the geometry and electronic structure of the transition structure. These haptens are conjugated to proteins and used to elicit the desired immunoglobulins. Catalytic antibodies have been used to accelerate hydrolysis and ammonolysis reactions, cis-trans isomerizations, Diels-Alder reactions, and to alter the product ratios for cyclization reactions.
DTIC
Chemical Reactions; Antibodies; Proteins; Catalysis

20010048022 RAND Corp., Santa Monica, CA USA

Army Medical Support to the Army After Next: Issues and Insights From the Medical Technology Workshop, 1999

Cecchine, Gary; Johnson, David; Perry, Walter; Anthony, C. R.; Golomb, Beatrice; Jan. 2001; 98p; In English; Medical Technology Workshop, 1999, Unknown

Contract(s)/Grant(s): DASW01-96-C-0004

Report No.(s): AD-A388409; RAND/MR-1270-A; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

This weeklong workshop focused primarily on identifying those portions of the Army's Medical Science and Technology Investment Strategy, principally Basic Research (6.1) and Applied Research (6.2) investment areas, that are essential to ensure that the Army will have the required medical capabilities to support the Army After Next (AAN) in 2025. The goal of the Medical Technology Workshop 1999 (MTW-99) was to support Army efforts to make the appropriate technology acquisition decisions by developing medical solutions for military requirements to protect and sustain the force.

DTIC

Medical Services; Medical Science; Biotechnology; Research and Development

20010048029 Army Research Lab., Sensors Directorate, Adelphi, MD USA

Fluorescence Spectra of Individual Flowing Airborne Biological Particles Measured in Real Time ***Progress Report, 1 Jul. 1998 - 1 Mar. 1999***

Pinnick, Ronald G.; Hill, Steven C.; Niles, Stanley; Pan, Yong-Le; Holler, Stephen; Feb. 2001; 29p; In English

Report No.(s): AD-A388322; ARL-TR-1961; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The UV-excited fluorescence spectra of individual flowing biological aerosol particles as small as 2 pm in diameter have been measured in real time (rates up to 10 particles per second). The particles are illuminated with a single shot from a Q-switched 266- or 351-nm laser. The signal-to-noise ratio and resolution of the spectra are sufficient for observing small line-shape differences among various types of bioaerosols (e.g., bacteria versus pollens) and between the same types of bioaerosol prepared under different conditions (e.g., the unstarved and four-month-starved E. coli strain DH5). Multiple-wavelength excitation provides additional information for distinguishing bioaerosols based on their fluorescence spectra.

DTIC

Fluorescence; Ultraviolet Spectra; Air Pollution; Aerosols

20010048411 NASA Ames Research Center, Moffett Field, CA USA

A Multi-Center Controlled Study of the Acute and Chronic Effects of Cooling Therapy for MS

Luna, Bernadette, NASA Ames Research Center, USA; Schwid, Steven W.; Cutter, Gary; Murray, Ronald; Bowen, James; Pellegrino, Richard; Guisado, Raul; Webbon, Bruce W.; [2000]; 1p; In English; 53rd Annual Meeting of the American Academy of Neurology, 5-11 May 2001, Philadelphia, PA, USA; Sponsored by American Academy of Neurology, USA

Contract(s)/Grant(s): RTOP 251-50-01; No Copyright; Avail: Issuing Activity; Abstract Only

To determine the acute and chronic effects of cooling therapy on patients with MS using objective functional performance measures and self-assessed measures of fatigue. Cooling demyelinated nerves can reduce conduction block, potentially improving symptoms of MS. Significant acute and chronic effects of cooling have not been demonstrated in a multi-center, controlled, blinded study using objective measures of neurologic function. Patients (N=84) with definite MS, mild to moderate disability (EDSS less than 6.0), and self-reported heat sensitivity were enrolled at 5 study sites. Acute effects of cooling were assessed by randomly assigning subjects to high-dose or low-dose cooling for one hour using an active cooling vest and cap (Life Enhancement Technologies, Santa Clara, CA). Settings were individualized to maintain the cooling garments at 55 F for the high-dose treatment and 70 F for the low-dose treatment. Both patients and examining investigators were blinded to treatment assignments. The MSFC and visual acuity/contrast sensitivity were assessed before and 30 minutes after treatment. The following week, subjects had an identical visit with the alternate cooling treatment. Chronic effects of cooling were assessed by randomly assigning the same subjects to unblinded daily home cooling or observation for 4 weeks. All subjects completed the Rochester Fatigue Diary (RFD) twice weekly and subjective measures of strength, cognition, and energy level daily. At the end of the period, subjects completed the Modified Fatigue Impact Scale (MFIS) and underwent another high-dose cooling session with assessment of the MSFC and vision. After a one-week washout period, subjects crossed over to the alternate 4-week treatment. Oral temperatures were reduced with both acute treatments (0.8 +/- .06 F, high and 0.5 +/- .06 F, low). While mean MSFC did not change significantly during individual cooling sessions, post hoc analysis pooling the 3 high-dose cooling sessions revealed an improvement in MSFC scores (acute phase 0.064 +/- 0.020, p = 0.0013; chronic phase 0.044 +/- 0.021, p = 0.0368) from before to after cooling. The change in MSFC scores during the acute cooling sessions was not related to the extent of change in oral temperatures. Both the RFD score

and the MFIS indicate a significantly lower fatigue level during the cooling month compared to observation (RFD, 2.53 +/- 0.83,p = 0.0033; MFIS 7.63 +/- 1.56, p = 0.0001).
Derived from text
Body Temperature; Contrast; Cooling; Disabilities; Nerves; Therapy

20010048658 NASA Ames Research Center, Moffett Field, CA USA
Effects of 2.0-g 1.75-g and 1.5-g Hypergravity on Pregnancy Outcome in Rats (Rattus norvegicus)
Mills, Nicole A., California Univ., USA; Baer, Lisa A., Lockheed Martin Corp., USA; Ronca, April E., NASA Ames Research Center, USA; [2001]; 1p; In English; Annual Experimental Biology Meeting, 29 Mar. - 4 Apr. 2001, Orlando, FL, USA
Contract(s)/Grant(s): RTOP 121-10-40; RTOP 121-40-10; RTOP 121-10-50; No Copyright; Avail: Issuing Activity; Abstract Only

In 1995, ten pregnant female rats were launched on the Space Shuttle (STS-70) on Gestational day(G) 11 of their 22-day pregnancy as part of the NASA/NIH.Rodent (R)2 Experiment. Following landing on G20, fetuses were harvested from half of the dams, while the remaining five dams underwent birth. Spaceflight did not interrupt pregnancy, alter litter sizes, or affect body weights or gender ratios of the fetuses or neonates. In the present study we used the NASA/NIH.R2 experimental paradigm to analyze the effects of hypergravity on pregnancy outcome. On G10, time-bred Sprague-Dawley rat dams were assigned to either G20 or Birth conditions, then further assigned to Hypergravity (HG) 2.0-g, HG 1.75-g, HG 1.5-g, Rotational Control (RC, 1.03), or Stationary Control (SC, 1.0-g) treatments. Dams were exposed to continuous centrifugation from G11 through G20, with brief daily stops for animal health checks and maintenance. For both the G20 and Birth dams, comparable litter sizes and litter gender ratios were observed across gravity conditions. However, centrifugation-exposed (HG and RC) fetuses and neonates showed significantly lower body masses (p less than 0.05) relative to SC offspring. HG 2.0-g offspring weighed significantly less than those in all other gravity conditions (p less than 0.05). The observed reductions in offspring body mass at 1.5-g and 1.75-g, can be attributed to the rotational component of centrifugation, rather than to increased gravitational load, whereas 2.0-g hypergravity exposure further exacerbated the gravity centrifugation effect on offspring body mass. Pregnant dams exposed to centrifugation weighed significantly less than SC dams (p less than 0.05), suggesting that centrifugation effects on maternal body mass may contribute to reduced size of the developing offspring. These findings are consistent with previous reports of non-pregnant adult animals suggesting that, whereas spaceflight has virtually no effect on body mass, centrifugation is associated with changes in body weight regulation.
Author
High Gravity Environments; Rats; Fetuses; Pregnancy; Centrifuging; Space Flight

20010048666 NASA Ames Research Center, Moffett Field, CA USA
Body Weight Gain During a Discrete Nursing Episode in Suckling Rats Reared at 1.5-g or 1.5-g Exceeds that of 1.0-g Controls and is Independent of Material Hypergravity Exposure
Ronca, April E., NASA Ames Research Center, USA; Baer, Lisa A., Lockheed Martin Corp., USA; Plaut, Karen, Vermont Univ., USA; Wade, Charles E., NASA Ames Research Center, USA; [2001]; 1p; In English; Annual Experimental Biology Meeting, 29 Mar. - 4 Apr. 2001, Orlando, FL, USA
Contract(s)/Grant(s): RTOP 121-10-40; RTOP 121-40-10; RTOP 121-10-50; No Copyright; Avail: Issuing Activity; Abstract Only

We recently reported that body weights of suckling rats reared during 1.5-g centrifugation are approximately 10% lower than those of 1.0-g controls. This finding raises the possibility that hypergravity exposed pups ingest less milk than controls due to either impairments in their ability to acquire milk from the nipple, or to decreased availability or palatability of their mother's milk. In the present study, we analyzed body weight gain in suckling rats reared during a discrete nursing episode following rearing at either 1.75-g, 1.5-g or 1.0-g. On Gestational day (G) 10 of the rats' 22-day pregnancy, time-bred SD rat dams were 1:1 matched based on body weight and assigned to either Hypergravity (HG) or Stationary Yoked Control (SYC) conditions and to either 1.75-g or 1.5-g conditions. Beginning on G11, HG dams and litters were exposed to 26 days of continuous centrifugation with brief daily stops for veterinary inspection and animal maintenance. On the day following birth (Postnatal day), litters were pooled within each condition then randomly re-assigned in equivalent proportions to HG and SYC dams. On P15, HG litters were removed from their mother's and placed in an incubator (33 C). Following a 4hr deprivation period, four neonates were tested from each litter, with two pups placed with either their own dam or the SYC dam; two pups from the yoked mother were paired with the HG pups. Pups were individually weighed, permitted to suckle for 75 min, then re-weighed. At the start of the test, the body weights of HG pups were significantly less than those of SYC pups (p less than 0.05). Relative to SYC pups, BG pups showed significantly greater proportional body weight gain (p less than 0.05), possibly due to augmented post-centrifugation feeding. Pup weight gain was

independent of maternal hypergravity exposure. Neither impairments in milk acquisition nor milk availability or palatibility of hypergravity-exposed dams cannot account for reduced body mass of hypergravity-reared offspring.
Author
Body Weight; Rats; Milk; High Gravity Environments; Birth; Pregnancy

20010048667 NASA Ames Research Center, Moffett Field, CA USA
Simulation of Peptides at Aqueous Interfaces
Pohorille, Andrew, NASA Ames Research Center, USA; Wilson, M., NASA Ames Research Center, USA; Chipot, C., NASA Ames Research Center, USA; [2001]; 1p; In English; American Chemical Society Meeting, 31 Mar. - 5 Apr. 2001, San Diego, CA, USA
Contract(s)/Grant(s): RTOP 344-38-22-06; No Copyright; Avail: Issuing Activity; Abstract Only

Behavior of peptides at water-membrane interfaces is of great interest in studies on cellular transport and signaling, membrane fusion, and the action of toxins and antibiotics. Many peptides, which exist in water only as random coils, can form sequence-dependent, ordered structures at aqueous interfaces, incorporate into membranes and self-assembly into functional units, such as simple ion channels. Multi -nanosecond molecular dynamics simulations have been carried out to study the mechanism and energetics of interfacial folding of both non-polar and amphiphilic peptides, their insertion into membranes and association into higher-order structures. The simulations indicate that peptides fold non-sequentially, often through a series of amphiphilic intermediates. They further incorporate into the membrane in a preferred direction as folded monomers, and only then aggregate into dimers and, possibly, further into ”dimers of dimers”.
Author
Simulation; Peptides; Membranes; Water

20010048674 Army Construction Engineering Research Lab., Champaign, IL USA
Characterization of Microbial Communities in an Anaerobic Fluidized Bioreactor Treating TNT Using Molecular Techniques ***Final Report***
Adrian, Neal R., Corps of Engineers, USA; Sanford, Robert A., Corps of Engineers, USA; Oh, Soon Hwan, Corps of Engineers, USA; Raskin, Lutgarde, Corps of Engineers, USA; February 2001; 25p; In English
Contract(s)/Grant(s): Proj. 622720D048
Report No.(s): AD-A388042; ERDC/CERL-TR-01-10; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

The objectives of this study were to characterize the microbial communities in two anaerobic bioreactors and to evaluate the impact of TNT on the microbial community in the same reactors. A better understanding of the microbial community will enable researchers to develop strategies to assess the performance of anaerobic bioreactors treating pinkwater as well as to optimize the biological treatment process.
Derived from text
Bioreactors; Microorganisms

20010048681 Wake Forest Univ., Bowman Gray School of Medicine, Winston-Salem, NC USA
ETACT-An Innovative Approach to Scintimammography ***Annual Report, 1 Jul. 1999 - 30 Jun. 2000***
Fahey, Frederic, Wake Forest Univ., USA; July 2000; 21p; In English
Contract(s)/Grant(s): DAMD17-98-1-8349
Report No.(s): AD-A387763; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

This project investigates the use of a novel approach to scintimammography (SMM) known as emission tuned aperture computed tomography (ETACT). In ETACT, a series of projections of the radionuclide distribution in the breast are acquired with fiducial markers. These data are reconstructed in tomographic slices. The hypothesis of this project is that ETACT will significantly increase the diagnosis accuracy of SMM, and can be applied in a simple, flexible, and practical manner. We have developed a simulation model for the acquisition process of ETACT and have used this tool to perform an evaluation of the aperture size appropriate for ETACT. It was determined that a 3 mm diameter aperture was optimal for ETACT. We performed a preliminary phantom evaluation with three tumor sizes and a 10:1 T/NT ratio. The 8 and 13 mm tumors were visible whereas the 6 mm was not. We will continue to work on our ETACT simulator to include attenuation and scatter. We will simulation ETACT data to evaluation projection number and divergence as a function of tumor size, location, and T/NT ratio. We will further evaluate ETACT and compare it to planar and SPECT imaging through phantom studies. We will develop an ETACT clinical prototype of the procedure.
Author
Apertures; Diagnosis; Imaging Techniques; Mammary Glands; Prototypes; Simulation; Tumors

20010048738 Armstrong Lab., Occupation and Environmental Health Directorate, Wright-Patterson AFB, OH USA
Processing and Immunohistochemical Staining of Rat NASAl Sections ***Final Report, Jan. - Dec. 1993***
Marit, Gary B., Armstrong Lab., USA; Cooper, Michael K., Armstrong Lab., USA; Latendresse, John R., Armstrong Lab., USA; [1993]; 6p; In English
Contract(s)/Grant(s): AF Proj. 6302
Report No.(s): AD-A387426; AFRL-HE-WP-TR-2001-0016; No Copyright; Avail: CASI; A01, Microfiche; A02, Hardcopy

We describe a simple method of processing rat nasal cavities for histological and immunohistologic examination in which a commercial product, HistoChoice, replaced formalin as the fixative. The nose was sectioned prior to decalcification, and enthylenediamine tetraacetic acid was used as the decalcifying agent. The entire processing period from collection of the specimen to slide preparation was less than 3 work days. Immunohistochemical procedures to measure cell proliferation and cytochrome P450 activity were applied to these specimens using capillary gap technology.
DTIC
Histochemical Analysis; Staining; Histology; Rats; Nose (Anatomy)

20010048742 Armstrong Lab., Occupation and Environmental Health Directorate, Wright-Patterson AFB, OH USA
The Role of Mouse Intestinal Microflora in the Metabolism of Trichloroethylene: An in Vivo Study
Lipscomb, John C., Armstrong Lab., USA; Moghaddam, Abdollah P., Armstrong Lab., USA; Abbas, Richat, Armstrong Lab., USA; Fisher, Jeffrey W., Armstrong Lab., USA; Human and Experimental Toxicology; [1995]; ISSN 0144-5952; Volume 16, pp. 629-635; In English
Report No.(s): AD-A387414; AFRL-HE-WP-TR-2001-0017; Copyright; Avail: Defense Technical Information Center (DTIC)

Both trichloroethylene and its metabolite, dichloroacetic acid, produce liver tumors peroxisome proliferation and other adverse cellular alterations in rodents. The hepatic mechanism by which dichloroacetic acid is formed is not conclusively demonstrated, but pharmacokinetic models have successfully associated its formation with trichloroacetic acid as immediate precursor. Previous investigations have shown that dichloroacetic acid is formed from trichloroacetic acid by gut microflora isolated in vitro. to determine the impact of gut microflora on dichloroacetic acid formation from a trichloroethylene dose in vitro, we developed a procedure which reduced gut microflora some 3 orders of magnitude below published levels. The administration of trichloroethylene to control mice and to mice whose gut was practically sterile resulted in equivalent concentrations of dichloroacetic acid and other metabolites in blood and liver, but significant different content of these metabolites in cecum contents. These data indicate that gut microflora contribute minimally, if at all, to the formation of circulating dichloroacetic acid under these conditions.
DTIC
Mice; Intestines; Microorganisms

20010048871 Emory Univ., Atlanta, GA USA
Metabotrobic Glutamate Receptor mGluR4 as a Novel Target for Parkinson's Disease ***Annual Report, 24 Sep. 1999-23 Sep. 2000***
Levey, Alan I.; Oct. 2000; 170p; In English
Contract(s)/Grant(s): DAMD17-98-1-8615
Report No.(s): AD-A388425; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

Parkinson's disease (PD) is characterized by a loss of substantial nigra dopaminergic neurons. Here we describe our progress in understanding the role of metabotropic glutamate receptors (mGluRs) as a novel target for the treatment of PD. We have localized mGluP4 in basal ganglia structures, and explored its role in mediating the electrophysiological effects of glutamate in rat brain slices. We have explored the efficacy of mGluP drugs in relieving motor symptoms in hemi-parkinsonian monkeys. We found that group III mGluRs are presynaptic on striatal-pallidal terminals and that they mediate a reduction in IPSC amplitude in the SNr. They also pre-synaptically inhibit EPSCs at the STN-SNr synapse. In this study, we have found that Groups I and II mGluRs also have critical roles in regulating basal ganglia function. Group II mGluRs mediate a presynaptic reduction of EPSCs in the SNr and group II agonist LY35474O reverses catalepsy in (a rodent) model of PD. Post-synaptic Group I mGluRs are involved in regulation of BG output nuclei by both excitation and disinhibition. Furthermore, comprehensive characterization of the roles of mGluRs in the basal ganglia raises the possibility that they may provide targets for novel therapeutic agents for treatment of PD.
DTIC
Parkinson Disease; Neurophysiology; Receptors (Physiology); Glutamates; Rats; Signs and Symptoms

20010048872 Stanford Univ., Stanford, CA USA

Energy- and Intensity-Modulated Electron Beam for Breast Cancer Treatment ***Annual Report, 1 Oct. 1998-30 Sep. 1999***

Chang, Ma M.; Oct. 1999; 197p; In English; Original contains color plates

Contract(s)/Grant(s): DAMD17-98-1-8156

Report No.(s): AD-A388427; No Copyright; Avail: CASI; A09, Hardcopy; A03, Microfiche

This project is aimed at exploring energy- and intensity-modulated radiotherapy (EIMRT) to deliver dose distributions that closely match the target volume and minimize the dose to critical normal structures. The scope includes (1) to characterize electron beams from Helium-filled accelerators for EIMRT, (2) to develop optimization algorithms for EIMRT using these electron beams, (3) to verify these optimized dose distributions using the Monte Carlo simulation technique, and (4) to compare the optimized dose plans obtained by EIMRT with conventional treatment plans and those obtained by photon intensity- modulated radiotherapy (IMRT). During the first year research, we have performed accurate Monte Carlo simulations of the electron beams in He-filled accelerators. Our results demonstrated that electron beams could be modulated to deliver superior dose distributions for EIMRT. We have implemented practical source models for clinical application and beam commissioning. Different dose algorithms have been compared for ”Inverse treatment planning” beamlet calculations. The results confirmed that the Monte Carlo method is needed to generate the dose distributions for EIMRT. Further studies will be performed to verify the dose plans for realistic patients. The outcome will determine whether EIMRT offers a significant advantage over conventional photon/electron treatment and over photon IMRT.

DTIC

Cancer; Electron Beams; Mammary Glands; Radiation Therapy; Monte Carlo Method

20010048873 Cold Spring Harbor Lab., New York, NY USA

Development and Use of Novel Tools to Directly Screen for Substrates of Cyclin Dependent Kinases ***Annual Report, 1 Jul. 1997-1 Jul. 2000***

Donovan, Joseph; Aug. 2000; 36p; In English; Original contains color plates

Contract(s)/Grant(s): DAMD17-97-1-7316

Report No.(s): AD-A388443; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The aim of this research is to gain further insights into the means by which cell proliferation is controlled by cyclin dependent kinases. to this end, a screen has been carried out for proteins that interact with the budding yeast cdk, CDC28. 10 novel interacting proteins have been identified in a two-hybrid screen using a Gal4/CDC28 fusion as the bait. Several of the putative interacting proteins have been shown to interact with specific cyclin-CDC28 kinase complexes. For each of the 10 two-hybrid positives the nature of the CDC28 interaction is currently being determined by biochemical means. The functional difference between cyclins in their abilities to induce and repress transcription has been investigated using the genomic technology of microarrays. In addition, the complete set of cell cycle regulated genes in yeast has been defined. This work has now been published (MBC 9:3273-3297 1998), and a full description and complete data sets are available on a public website at http://cellcycle-www.stanford.edu.

DTIC

Biochemistry; Cells (Biology); Genes; Deoxyribonucleic Acid; Cancer; Mammary Glands

20010048878 Maryland Univ., Baltimore, MD USA

Immunotherapeutic Cell-Based Vaccine to Combat Metastatic Breast Cancer ***Final Report, 1 Jul. 1997-30 Jun. 2000***

Pulaski, Beth; Rosenbert, S. O.; Jul. 2000; 51p; In English

Contract(s)/Grant(s): DAMD17-97-1-7152

Report No.(s): AD-A388495; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Because metastases spread to many different organs and few animal models accurately reflect the clinical progression of metastatic disease, it has been difficult to develop effective therapies to specifically target these lesions. We analyzed the poorly immunogenic mouse 4T1 mammary carcinoma and demonstrated that it is an excellent model for human metastatic breast cancer. Primary 4T1 tumors displayed signs of edema, extension to the peritoneal lining, and ulcerations of the skin, which are acute diagnostic indicators of human stage IV breast cancer. More importantly, the frequency and sites of metastasis were highly comparable between 4T1 and its human counterpart. In a post-operative system, where primary 4T1 tumor is surgically removed and survival is monitored, we showed that early metastases responsible for morbidity are established by 2 weeks and that survival of these mice extends a total of 5-7 weeks. We tested novel cell-based vaccines combining MHC class II, B7.l, SEB superantigen, and IL-12 in varying protocols where wildtype spontaneous metastases were pre-established ranging from 2-4 weeks.

DTIC

Mammary Glands; Cancer; Vaccines; Therapy

20010048895 NASA Ames Research Center, Moffett Field, CA USA

Development of a Feeder for Uninterrupted Centrifugation Studies

Mulenburg, Gerald M., NASA Ames Research Center, USA; Vasques, Marilyn F., NASA Ames Research Center, USA; Gundo, Daniel P., NASA Ames Research Center, USA; Griffith, Jon B., NASA Ames Research Center, USA; [1994]; 1p; In English; 18th Space Simulation Conference: Space Mission Success through Testing, 31 Oct. - 3 Nov. 1994, Baltimore, MD, USA

Contract(s)/Grant(s): RTOP 199-08-12; No Copyright; Avail: Issuing Activity; Abstract Only

A specialized paste diet feeder was developed in support of a hypergravity (2G) centrifuge study. The centrifuge study was to be compared to a previously flown Russian Cosmos spaceflight so experimental parameters of the 14 day spaceflight had to be duplicated. In order to duplicate at hyper G an experiment that took place in weightlessness, all other conditions must be as identical as possible. Stopping the centrifuge to provide maintenance for the animals causes unacceptable changes in experimental research results. Thus the experimental protocol required the delivery of a designated amount of paste diet at regular intervals for a two week period without stopping the centrifuge. A centrifuge and a stationary control cage, each containing 10 laboratory rats, were fitted with feeders that were calibrated to provide 140 plus or minus 2g of paste diet every 6 hours. This paper describes development of the feeder design and results of its operation over the two week experiment. The design philosophy and details of the feeder system are provided with recommendations for future such devices.

Author

Centrifuges; Feed Systems

20010048898 NASA Ames Research Center, Moffett Field, CA USA

ATP Synthesis in the Extremely Halophilic Bacteria

Hochstein, Lawrence I., NASA Ames Research Center, USA; [1994]; 1p; In English; 5th Symposium on Chemical Evolution and the Origin and Evolution of Life, 25-29 Apr. 1994, Mountain View, CA, USA

Contract(s)/Grant(s): RTOP 520-32-00; No Copyright; Avail: Issuing Activity; Abstract Only

The proton-translocating ATPases are multimeric enzymes that carry out a multitude of essential functions. Their origin and evolution represent a seminal event in the early evolution of life. Amino acid sequences of the two largest subunits from archaeal ATPases (A-ATPases), vacuolar ATPases (V-ATPases), and FOF1-ATP syntheses (FATPases) suggest these ATPases evolved from an ancestral vacuolar-like ATP syntheses. A necessary consequence of this notion is that the A-ATPases are ATP syntheses. With the possible exception of the A-ATPase from Halobacterium salinarium. no A-ATPase has been demonstrated to synthesize ATP. The evidence for this case is dubious since ATP synthesis occurs only when conditions are distinctively unphysiological. We demonstrated that ATP synthesis in H.saccharovorum is inconsistent with the operation of an A-type ATPase. In order to determine if this phenomenon was unique to H. saccharovorum, ATP synthesis was examined in various extremely halophilic bacteria with the goal of ascertaining if it resembled what occurred in a. saccharovorum, or was consistent with the operation of an A-type ATPase. A-, V-, and F-type ATPases respond singularly to certain inhibitors. Therefore, the effect of these inhibitors on ATP synthesis in several extreme halophiles was determined. Inhibitors that either blocked or collapsed proton-gradients inhibited the steady state synthesis of ATP thus verifying that synthesis took place at the expense of a proton gradient. Azide, an inhibitor of F-ATPases inhibited ATP synthesis. Since the arginine-dependent synthesis of ATP, which occurs by way of substrate-level phosphorylation, was unaffected by azide, it was unlikely that azide acted as an ”uncoupler.” N -ethylmaleimide and nitrate, which inhibit V- and A-ATPases, either did not inhibit ATP synthesis or resulted in higher steady-state levels of ATP. These results suggest there are two types of proton-motive ATPases in the extreme halophiles (and presumably in other Archaea). One, the V-like enzyme which, provides protons that are subsequently used for solute translocation. The other ATPase is the familiar and ubiquitous F-ATPase that functions as a reversible proton pump and is the ATP Synthase in the extreme halophiles. Thus, while the suggested evolution of the proton -translocating ATPases accounts for the relationship among these ATPases, this scheme does not account for the presence of F-ATPases in the Archaea. Discounting lateral gene transfer, perhaps an F-type ATPase evolved before the eucaryal-archaeal and bacterial bifurcation. The presence of V-type ATPases in the Bacterial Domain is consistent with this suggestion. Finally, it is of interest to note that if an F-type ATPase appeared before the bifurcation, an endosymbiotic event need not be invoked to explain the presence of F-ATPases in the Eucarya.

Author

Adenosine Triphosphate; Amino Acids; Azides (Inorganic); Azides (Organic); Bacteria; Enzyme Activity

20010048900 NASA Ames Research Center, Moffett Field, CA USA

Vitamin D Status in Monkey Candidates for Space Flight

Arnaud, S. B., NASA Ames Research Center, USA; Wronski, T. J., NASA Ames Research Center, USA; Koslovskeya, I., NASA Ames Research Center, USA; Dotsenko, R., NASA Ames Research Center, USA; Navidi, M., NASA Ames Research Center, USA; [1994]; 1p; In English; Ninth Workshop on Vitamin D, 28 May - 2 Jun. 1994, Orlando, FL, USA

Contract(s)/Grant(s): RTOP 199-26-12-02; RTOP 199-14-12-08; No Copyright; Avail: Issuing Activity; Abstract Only

In preparation for the Cosmos 2229 Biosatellite space flight experiments in Rhesus monkeys, we evaluated the status of vitamin D in animals of different origins: candidates for space flight raised in Moscow (IMBP) and animals housed at Ames Research Ctr. (ARC) for pilot studies. Diets at IMBP were natural foods found by analysis to contain 1.4% Ca, 2.8% P andis less than 240 IU D3/kg and at ARC standard monkey chow with 0.9% Ca, 0.5% P and 6600 IU D3/kg. We measured body weights (BW), serum calcium (TCa), total protein (TP), phosphorus (Pi), alkaline phosphatase (AP), 25-hydroxyvitamin D (25D) and 1,25-dihydroxyvitamin D (1,25D) in 16 IMBP and 15 ARC male animals and indices of bone formation in cancellous bone obtained from iliac crest biopsy of 6 IMBP and 13 ARC animals. BW were the same in juveniles at IMBP as ARC although ARC monkeys were born a year later. Mean(1SD) TCa and TP were higher and 25D lower (1819 vs. 93+18 ng/ml,p<.001)inIMBPthanARCanimals 1,25D (174156 vs. 212+77 pg/ml), Pi and AP were similar. In bone, osteoid and osteoblast surfaces averaged 38114% and 33+15% in all, with %vol. of osteoid higher in IMBP than ARC monkeys of the same BW (p<.05)Indicesofboneformatio were inversely related to 25D, not 1,25D. of interest are similar 1,25D levels associated with a wide range of substrate and extensive osteoid in bone of D replete animals.

Author

Bone Mineral Content; Calciferol; Males; Monkeys; Spaceborne Experiments

20010048908 Colorado Univ., Health Sciences Center, Denver, CO USA

Isolation of a Breast Cancer Tumor Suppressor Gene from Chromosome 3P ***Final Report, 23 Sep. 1994-22 Sep. 1999***

Drabkin, Harry, Colorado Univ., USA; Oct. 1999; 73p; In English

Contract(s)/Grant(s): DAMD17-94-J-4391

Report No.(s): AD-A386596; No Copyright; Avail: CASI; A01, Microfiche; A04, Hardcopy

Loss of tumor suppressor genes (TSGs) represent critical molecular events in the development and progression of breast cancer. Based on loss of heterozygosity (LOH) studies as well as direct cytogenetic studies of breast tumors, one or more TSGs likely resides on the short arm of chromosome 3 (3p) and appears to be involved in nearly 50% of breast cancers. Four distinct regions within 3p P12, P14, P21 (PROXIMAL) AND P21 (DISTAL) undergo recurrent deletions in human carcinomas and are the most likely sites for a breast cancer TSG. In this Final Progress Report, we describe the full spectrum of investigations we have conducted to identify tumor suppressor genes and to begin to understand their functions. Early in our studies, we demonstrated recurrent homozygous deletion or rearrangement in breast cancer cell lines involving 3p 14. The critical region was cloned and sequenced which led to the identification of several putative exons. We determined that 3p14 is subject to a high degree of genomic instability which is ongoing in some cases. We evaluated other 3p regions for involvement in breast cancer, as originally proposed, including the 3p21.31 and 3p21.33 homozgyous deletion regions as well as the interval between. Our studies led to the discovery of a novel patched-related gene, TRC8, which resides in a chromosomal region with frequent amplification in breast tumors. Current evidence suggests this gene will be important in early embryogenesis and may identify a new pathway for cancer development

DTIC

Cancer; Mammary Glands; Chromosomes; Genes; Suppressors

20010048914 Burnham Inst., La Jolla, CA USA

Conformationally Restricted Synthetic AIDS Vaccine ***Final Report, 1 Jul. 1995-31 Jan. 2001***

Satterthwait, Arnold C.; Feb. 2001; 67p; In English

Contract(s)/Grant(s): DAMD17-95-2-5017

Report No.(s): AD-A388497; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

It was proposed to develop a structure-based approach for synthetic vaccine development designed to recapitulate the activities of potent neutralizing monoclonal antibodies (MAbs) using constrained peptides as immunogens. We focused on two antibodies, a MAb 58.2 that binds a sequential V3 epitope and IgG bl2 that binds a discontinuous epitope, both on HIV-1 gp120. We validated the structure-based approach with a V3 mimetic using MAb 58.2 and demonstrated the enormous effect that peptide conformation can have on affinity and immunogenicity. We were unable to mimic the more challenging discontinuous IgG bl2 epitope despite considerable effort. The enormous affinity enhancements we observed for the constrained V3 peptide and dearth of potent HIV-1 neutralizing antibodies, particularly those specific for sequential epitopes, led us to an important discovery. It

suggested that new antibodies might be identified with constrained peptides that go undetected with peptides. It was found that several helix-stabilized gpl20 peptides detect new antibodies that go undetected with linear peptides implying a general phenomenon. Constrained peptides, tailored to mimic short, sequential regions of proposed neutralization sites might be used to widen the selection of template antibodies best suited for synthetic vaccine development.
DTIC
Vaccines; Acquired Immunodeficiency Syndrome; Antibodies; Immune Systems

52
AEROSPACE MEDICINE

Includes the biological and physiological effects of atmospheric and space flight (weightlessness, space radiation, acceleration, and altitude stress) on the human being; and the prevention of adverse effects on those environments. For psychological and behavioral effects of aerospace environments see 53 Behavioral Science. For the effects of space on animals and plants see 51 Life Sciences.

20010044091 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA
The Effects of Calcium Intake and Physical Activity on the Bone Mineral Content and Bone Mineral Density of the USA Naval Academy Midshipmen
Ogawa, Angela M.; Jul. 1997; 118p; In English
Report No.(s): AD-A327713; AFIT/CI-97-095; No Copyright; Avail: Defense Technical Information Center (DTIC)

Prevention of osteoporosis depends upon the identification of lifestyle factors that increase peak bone mass. We investigated the effects of calcium intake, weight bearing exercise (WBE), and strength training (ST) on total bone mineral content (TBMC) and bone mineral density (BMD) in 22 female and 13 male USA Naval Academy Midshipmen (MIDN). Each received 4 dual energy x-ray absorptiometry scans to measure TBMC and spine and hip BMD during the 2.8 year study period. Calcium intake was estimated at baseline and follow-up using a food frequency questionnaire. Frequency of WBE was determined at each visit using a questionnaire. The female's TBMC was predicted by calcium intake at baseline ($p<.01$)andincreasedduringthestudy ($p<.001$)asdidspineBMD.Atfollow-up calcium was a significant variable in a model predicting TBMC ($p<.001$), but was weaker than at baseline and not independent of body weight. In the male subjects, TBMC and spine BMD increased significantly ($p<.005$), ($p<.05$). Hip BMD did not increase in males or females. WBE was predictive of TBMC ($p<.01$), in female subjects weighing greater than 60 kg. This suggest that a threshold level of weight bearing (from body weight and exercise) is necessary to stimulate osteogenesis. We conclude that bone accretion occurs early in the third decade in MIDN and is highly influenced by body weight. Calcium in take and WBE in female MIDN may positively modify peak bone mass, although these effects were not independent of body weight.
DTIC
Calcium; Physical Exercise; Osteoporosis; Bone Mineral Content; Clinical Medicine

20010045529 NASA Ames Research Center, Moffett Field, CA USA
Alertness Management In Flight Operations: A NASA Education and Training Module
Rosekind, Mark R., NASA Ames Research Center, USA; Lebacqz, Victor J., NASA Ames Research Center, USA; Gander, Philippa H., San Jose State Univ., USA; Co, Elizabeth L., San Jose State Univ., USA; Weldon, Keri J., San Jose State Univ., USA; Smith, Roy M., San Jose State Univ., USA; Miller, Donna L., Sterling Software, Inc., USA; Gregory, Kevin B., Sterling Software, Inc., USA; [1994]; 1p; In English; The Association of Professional Sleep Societies Annual Meeting, 4-9 Jun., 1994, Boston, MA, USA
Contract(s)/Grant(s): RTOP 505-64-53; No Copyright; Avail: Issuing Activity; Abstract Only

Since 1980, the NASA Ames Fatigue Countermeasures Program has been conducting research on sleep, circadian rhythms, and fatigue in a variety of flight operations 1. An original goal of the program was to return the scientific and operational knowledge to the aviation industry. to meet this goal, the NASA Ames Fatigue Countermeasures Program has created an Education and Training Module entitled, "Strategies for Alertness Management in Flight Operations." The Module was designed to meet three objectives: 1) explain the current state of knowledge about the physiological mechanisms underlying fatigue, 2) demonstrate how this knowledge can be applied to improve flight crew sleep, performance, and alertness, and 3) offer countermeasure recommendations. The Module is composed of two components: 1) a 60-minute live presentation provided by a knowledgeable individual and 2) a NASA/FAA Technical Memorandum (TM) that contains the presentation materials and appendices with complementary information. The TM is provided to all individuals attending the live presentation. The Module content is divided into three parts: 1) basic information on sleep, sleepiness, circadian rhythms, fatigue, and how flight operations affect these physiological factors, 2) common misconceptions about sleep, sleepiness, and fatigue, and 3) alertness management

strategies. The Module is intended for pilots, management personnel, schedulers, flight attendants, and the many other individuals involved in the aviation system.
Author
Alertness; Wakefulness; Flight Operations; Education; Handbooks; Manuals

20010045533 NASA Ames Research Center, Moffett Field, CA USA
In Search of an Optoretinogram
Mulligan, Jeffrey B., NASA Ames Research Center, USA; MacLeod, Donald I. A., California Univ., USA; [1994]; 1p; In English; Vision Science and its Application Topical Meeting, 11-15 Feb., 1994, Santa Fe, NM, USA
Contract(s)/Grant(s): RTOP 505-64-53; No Copyright; Avail: Issuing Activity; Abstract Only

A sensitive apparatus was constructed to measure the infrared reflectance of human retinas in vivo. Changes in the light scattering properties of rod outer segments have been observed both in excised retinas and photoreceptor suspensions, motivating the present work. Unlike results of vitro studies, no visually evoked changes were observed, despite a very low noise level. Methods for improving the technique using modem developments in CCD cameras are discussed.
Author
Retina; Photoreceptors; Radiation Counters

20010045675 Institute for Human Factors TNO, Soesterberg, Netherlands
Desensitisation of Sailors *Final Report*
Bos, J. E., Institute for Human Factors TNO, Netherlands; Kistemaker, J. A., Institute for Human Factors TNO, Netherlands; Bles, W., Institute for Human Factors TNO, Netherlands; Apr. 06, 2001; 40p; In English
Contract(s)/Grant(s): 013.48307; TNO Proj. 783.3
Report No.(s): TD-2001-0131; TNO-TM-01-A027; Copyright; Avail: Issuing Activity

Building on the desensitization course for aviators who continuously suffer from air sickness, we created a course with the aim to make sailors who are chronically seasick less sensitive to the incapacitating ship motions. In this report we describe the following: (1) the procedures used in this training, (2) its effectiveness until now, (3) the tests flanking the courses, and (4) additional methods to improve our desensitization therapy.
Author
Desensitizing; Education; Motion Sickness

20010045837 Institute for Human Factors TNO, Soesterberg, Netherlands
Modeling Six Degrees of Freedom Motion Sickness *Interim Report*
Bos, J. E., Institute for Human Factors TNO, Netherlands; Bles, W., Institute for Human Factors TNO, Netherlands; Hosman, R. J. A. W., Institute for Human Factors TNO, Netherlands; Feb. 02, 2001; 40p; In English
Contract(s)/Grant(s): 28332; TNO Proj. 789.3
Report No.(s): TD-2000-0349; TNO-TM-01-A007; Copyright; Avail: Issuing Activity

With the reduction of crew aboard ships, the risk of mission failure due to seasickness increases. to anticipate these problems at the stage of ship design, we developed a model for the Royal Netherlands Navy capable of predicting the incidence of sickness by motion possibly varying in all its six degrees of freedom (DoF). In previous reports we explained the vestibular and control theoretical basis of this model, however failed to complete it for six DoF Here we give a solution to this problem. The main problem, the way gravity is estimated by an internal model, is now solved by re-routing one single estimate of gravity by primary afferents. In addition, we split the gravity conflict driving the physiological sickness symptoms in a slow magnitude dependent component and a fast angular component. Observed data taken from the literature, from experiments performed in the TNO ship motion simulator, and from crosscoupled Coriolis-effects (a typical angular motion illusion) are used to validate the model. Results are all like those observed. Though still in need of improvements, this six DoF MSI-model is unique, and satisfies the needs as set by the Royal Netherlands Navy. Besides being a prerequisite for reducing the adverse motion effects on crew in the early stage of ship design, the MSI-model can also be of use in the stage of ship operation. Considering weather, route, speed and heading enables the anticipation of deteriorated crew performance over the different operational possibilities.
Author
Human Performance; Motion Sickness; Models

20010046970 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA

Outcome Prediction of Eating Disorders: Can Admission Data Forecast Outcome Needs at Discharge

Gouthro, Linda D.; Jul. 18, 1997; 107p; In English

Report No.(s): AD-A327712; AFIT/CI-97-094; Copyright; Avail: Defense Technical Information Center (DTIC)

Prior research has examined the eating disorders in terms of etiology, predictive factors, treatment modalities, clinical course, and outcome with variable results and minimal consensus. No research was found linking collected assessment data to discharge needs, nor was research addressing the impact of discharge planning on successful treatment outcome identified. The purpose of this study was to determine if data collected for individuals during the initial assessment phase of an eating disorders program could predict the nature of discharge needs at the time of treatment completion. Using a data collection tool developed by the researcher, a one time retrospective chart review of 29 female subjects treated in an outpatient eating disorders program between 1994 and 1996 was accomplished. Using the Statistical Package for the Social Sciences, descriptive statistics were used to assess the characteristics of the sample population, analysis of variance was employed to examine differences between diagnostic groups for particular variables and a Chi-square test was applied to test for associations. Probability levels were set at .05 for statistical significance and .10 to indicate a trend. Although limited by available data, several significant findings were noted. Women diagnosed with Bulimia Nervosa (BN) had significantly higher admission Global Assessment of Functioning versus women with Anorexia Nervosa (AN); those with AN were positively linked to a family history of mood disorders; a significant relationship existed between BN and a family history of eating disorders and to brothers having a psychiatric history; a link between treatment involvement and a) discharge type and b) clinical outcome; and a positive relationship between those with AN and the lack of follow through with discharge plans.

DTIC

Eating; Disorders; Etiology; Clinical Medicine

20010046972 NASA Ames Research Center, Moffett Field, CA USA

Three Dimensional Cross-Sectional Properties From Bone Densitometry

Cleek, Tammy M., NASA Ames Research Center, USA; Whalen, Robert T., NASA Ames Research Center, USA; [2001]; 16p; In English

Contract(s)/Grant(s): RTOP 199-26-12-34; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Bone densitometry has previously been used to obtain cross-sectional properties of bone in a single scan plane. Using three non-coplanar scans, we have extended the method to obtain the principal area Moments of inertia and orientations of the principal axes at each cross-section along the length of the scan. Various 5 aluminum phantoms were used to examine scanner characteristics to develop the highest accuracy possible for in vitro non-invasive analysis of mass distribution. Factors considered included X-ray photon energy, initial scan orientation, the included angle of the 3 scans, and Imin/Imax ratios. Principal moments of inertia were accurate to within 3.1% and principal angles were within 1 deg. of the expected value for phantoms scanned with included angles of 60 deg. and 90 deg. at the higher X-ray photon energy. Low standard deviations in error also 10 indicate high precision of calculated measurements with these included angles. Accuracy and precision decreased slightly when the included angle was reduced to 30 deg. The method was then successfully applied to a pair of excised cadaveric tibiae. The accuracy and insensitivity of the algorithms to cross-sectional shape and changing isotropy (Imin/Imax) values when various included angles are used make this technique viable for future in vivo studies.

Author

Cross Sections; Bones; Density Measurement; Mass Distribution

20010047265 Alabama Univ., Birmingham, AL USA

An Eye Oximeter for Combat Casualty Care ***Final Report, 15 Dec. 1997 - 30 Nov. 1999***

Denninghoff, Kurt; Dec. 1999; 287p; In English

Contract(s)/Grant(s): DAMD17-98-1-8007

Report No.(s): AD-A388210; No Copyright; Avail: CASI; A13, Hardcopy; A03, Microfiche

A noninvasive, rapidly applicable technique that provides a reliable index of oxygen delivery during shock resuscitation would be a valuable adjunct to patient management. Subject: The team at UAB and UAH is generating instrumentation and scientific data suggesting that retinal vessel oxygen saturations (both arterial and venous) may be used to identify bleeding prior to changes in vital signs and to help optimize oxygen delivery during the resuscitation of trauma victims. Purpose: The purpose of this work is to development a noninvasive tool for measuring a hemodynamic parameter to aid in the triage and treatment of combat casualties who may be bleeding or have bled substantially. Scope: The scope of this work includes the investigation of the optical properties of the retina and developing the techniques required to accurately measure retinal large vessel oxygen saturations. As this work is being accomplished we have used models of blood loss to demonstrate the potential efficacy of this

measurement in the evaluation and treatment of combat casualties. We have constructed Eye Oximeters (EOX) for measuring the oxygen saturation of blood in retinal veins and arteries. We have found that absolute calibration of the measurement in yorkshire swine is problematic secondary to back reflections and pigment variations in the retina. In order to demonstrate the correlation between retinal venous oxygen saturation, cardiac output and mixed venous oxygen saturation, we have identified a subspecies of swine, the sinclair swine, which has no pigmentation in the retina. The EOX has been used in Sinclair swine studies to demonstrate proof of concept. Retinal venous oxygen saturation correlates with cardiac output and mixed venous oxygen saturation during profound blood loss and subsequent resuscitation.
DTIC
Hemodynamic Responses; Oximetry; Retina; Medical Equipment

20010047665 Naval Health Research Center, Brooks AFB, TX USA
Health Effects of Electromagnetic Fields in the Frequency Range 300 Hz to 10 MHz ***Final Report***
Olsen, Richard G., Naval Health Research Center, USA; Proceedings of International Seminar on Health Effects of Exposure to Electromagnetic Fields in the Frequency Range 300 Hz to 10 MHz; 1999, pp. 45-51; In English; International Seminar on Health Effects of Exposure to Electromagnetic Fields in the Frequency Range 300 Hz to 10 MHz, 7-8 Jun. 1999, Maastricht, Netherlands
Report No.(s): AD-A386245; ICNIRP-8/99; ISBN 3-9804789-7-1; Copyright; Avail: Defense Technical Information Center (DTIC)

This report briefly describes typical electromagnetic exposure situations within the frequency range under consideration. Exposures in military settings can be divided into three non-overlapping groups, the 400 Hz power frequency, submarine communication systems at 10 to 30 kHz (VLF), and that part of the 2 to 30 MHz communications band that is within the range of consideration (2-10 MHz). The author draws from his 20-plus years of experience as a Navy researcher in the area of Bioelectromagnetics. Examples of documented exposures are given along with mention of applicable exposure limits and exclusions.
DTIC
Health; Electromagnetic Fields; Exposure

20010047671 NASA Ames Research Center, Moffett Field, CA USA
Effect of Rehydration Fluid Osmolality on Plasma Volume and Vasopressin in Resting Dehydrated Men
Geelen, Ghislaine, NASA Ames Research Center, USA; Greenleaf, J. E., NASA Ames Research Center, USA; Keil, L. C., NASA Ames Research Center, USA; [1994]; 3p; In English
Contract(s)/Grant(s): RTOP 199-18-12-07; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Elevated plasma vasopressin concentration [PVP], which may act as a dipsogen, decreases promptly following the ingestion of fluids in many mammals including humans. The purpose for this study was to determine whether fluids of varied electrolyte and carbohydrate composition and osmolality (Osm] would modify post-drinking decreases in [PVP] which could be attributed to interaction with plasma volume (PV)- or fluid-electrolyte interactive hormones. Five men (23-41 yr, 78.0 +/- SD 8.2 kg), water deprived for 24 h, drank six fluids (12 ml/kg, at 16.5C in 4.0-6.2 min): water (30 m0sm/kg), NaCl (70 mOsm/kg), NaCl + NaCitrate (270 mOsm/kg), NaCl + 9.7% glucose (650 mOsm/kg), and two commercial drinks containing various ionic and carbohydrate contents (380 and 390 mOsm/kg). Blood (20 ml/sample) was drawn at -5 min before and at +3, +9, +15, +30, and +70 min after drinking. Heart rate, blood pressures, and plasma renin activity, {Na+], [K+], [Osm], aldosterone, atrial natriuretic peptide, and epinephrine concentrations were unchanged after drinking. Post-drinking [PVP] decreased from 1.7 - 3.7 pg/ml within 3 min with all fluids independently of their composition, [Osm], or delta PV; with maximal depression to 0.1-0.7 pg/ml (pis less than 0.05) by 15 min. The continued [PVP] depression with all fluids from 15 to 70 min was accompanied by unchanged plasma (Osm] but 1.8-7.6% increases (pis less than 0.05) in PV with 3) fluids (2 commercial and NaCitrate) and no change with the others. Percent changes in mean [PVP] and plasma norepinephrine concentrations [PNE] at 15 min correlated -0.70 (Pis less than 0.10) suggesting that about half the variability in [PVP I I depression was associated with [PNE]. Thus, part of the mechanism for post-drinking [PVP] depression may involve a drinking stimulated norepinephrine (neural) factor.
Author
Blood; Catecholamine; Dehydration; Drinking; Males; Physiology; Hemodynamics; Aldosterone; Electrolyte Metabolism

20010047672 Old Dominion Univ., Research Foundation, Norfolk, VA USA
External Validity Considerations of a Biocybernetic System for Adaptive Automation ***Final Report***
Scerbo, Mark W., Old Dominion Univ., USA; Eischeid, Todd M., Old Dominion Univ., USA; [2001]; 3p; In English
Contract(s)/Grant(s): NAG1-2254; ODURF Proj. 101461; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The report discusses the results of a research project aimed at generating a software application library termed the DAQ EEG Processor (or DEP) that collects and processes raw electroencephalographic data. The purpose of this system is to reduce raw EEG data in real time into information that is useful to researchers, such as power bands and indices of engagement. DEP improves upon existing EEG processing systems in that it can be seamlessly integrated into many software development environments to provide realtime data. DEP takes advantage of Microsoft Corporation's Component Object Model Technology (COM), which, in short, allows language independent, inter-application communication and transfer of data. According to the COM specification, COM objects can be written in different languages, run in different process spaces and on different platforms. As long as the objects adhere to the specification, they can communicate.
Derived from text
Computer Programs; Data Reduction; Real Time Operation; Biodynamics

20010047684 Army Research Inst. of Environmental Medicine, Military Nutrition Div., Natick, MA USA
Nutrient Intakes and Characteristics of Normal Weight, Female Military Personnel Consuming Foods Reduced in Fat or Energy Content
Arsenault, J. E., Army Research Inst. of Environmental Medicine, USA; Cline, A. D., Louisiana State Univ., USA; Appetite; 2000; ISSN 0195-6663; Volume 34, pp. 227-233; In English
Report No.(s): AD-A385592; Copyright; Avail: Defense Technical Information Center (DTIC)
The nutritional implications of consuming reduced fat or reduced energy foods (RED) were examined in 50 women who were participating in a larger study of iron status while enrolled in the U.S. Army Medical Department Officer Basic Course. The subjects recorded their food intake for a 7-day period. Reduced fat or reduced energy foods were identified as foods labeled "reduced-calorie, reduced-fat, diet, of low-calorie". The women were divided into two groups, those eating is greater than 14 RED per week (N = 28) and those eating is less than or equal to 14 RED (N = 22). The > 14 RED group tended to be Caucasian, single, had a lower body mass index (21.2 vs 22.5), and exercised more. The mean daily intake of the is greater than 14 RED group was significantly higher in carbohydrate, dietary fiber, thiamin, riboflavin, niacin, vitamin B6, folacin, calcium, phosphorus, magnesium, iron, zinc, potassium, and sodium, and significantly lower in cholesterol. The percentage of energy from fat was significantly lower in the is greater than 14 RED group than the is less than or equal to RED group (pis less than 0.01). There was no significant difference in energy intake between the two groups. More women in the is greater than 14 RED group used dietary supplements. The is greater than 14 group consumed more dairy products and less sweetened beverages. These results demonstrate that the consumption of reduced fat or energy foods did not have a significant impact on total energy intake in these normal weight women. Individuals consuming these foods may subsequently consume less energy from fat and improve the nutrient composition of their diet by selecting healthier food choices.
DTIC
Food Intake; Eating; Females

20010047686 Children's Hospital, Boston, MA USA
Natural History of Plexiform Neurofibromas in NF1 ***Annual Report, 1 Oct. 1998 - 30 Sep. 1999***
Korf, Bruce, Children's Hospital, USA; October 1999; 168p; In English
Contract(s)/Grant(s): DAMD17-98-1-8611
Report No.(s): AD-A385657; No Copyright; Avail: CASI; A02, Microfiche; A08, Hardcopy
This report marks the completion of the first year of the project "Natural History of Plexiform Neurofibromas in NF1." The goals of the project are to test the utility of volumetric MRI in the measurement of plexiform neurofibromas, to use this approach to develop a body of normative data on the growth of plexiform neurofibromas, and to establish an infrastructure including radiology, statistical analysis, clinical database, tissue bank, and pathology review that will facilitate future clinical trials. This first year was devoted to developing the infrastructure of the project and initiating subject recruitment. Major accomplishments include holding a conference at the Banbury Center at which the protocol was refined, establishing MRI data transfer between the participating centers and the radiology analysis facility at WorldCare, creation of the clinical data entry forms, and establishing the communications between the participating centers and the coordinating center in Boston. Patient recruitment has begun, but has been delayed because of a longer than anticipated time required for the approval by the army IRB of the local informed consents. This process is nearing completion, and it is anticipated that subject recruitment will be complete within an additional six months.
DTIC
Magnetic Resonance; Spectrum Analysis; Imaging Techniques; Neurology; Fibrosis; Tissues (Biology); Cells (Biology)

20010047690 Battelle Memorial Inst., Medical Research and Evaluation Facility, Columbus, OH USA

A Medical Research and Evaluation Facility (MREF) and Studies Supporting the Medical Chemical Defense Program ***Final Report, 31 Jan. 1989 - 31 Dec. 2000***

Olson, Carl T., Battelle Memorial Inst., USA; December 2000; 51p; In English

Contract(s)/Grant(s): DAMD17-89-C-9050

Report No.(s): AD-A385319; No Copyright; Avail: CASI; A01, Microfiche; A04, Hardcopy

This is a report of research performed between 1989 and 2000 by Battelle's Medical Research and Evaluation Facility in support of the U.S. Army Medical Research and Materiel Command.

DTIC

Medical Science; Chemical Defense; Defense Program

20010047999 Air Force Research Lab., Flight Stress Protection Div., Brooks AFB, TX USA

Functional Imaging of Brain Areas Involved in the Processing of Coherent and Incoherent Wide Field-of-View Visual Motion ***Final Report, 1 Jan. 1997 - 31 Mar. 1998***

Previc, Fred H., Air Force Research Lab., USA; Liotti, Marlo, Air Force Research Lab., USA; Blakemore, Colin, Air Force Research Lab., USA; Beer, Jeremy, Air Force Research Lab., USA; Fox, Peter, Air Force Research Lab., USA; Nov. 06, 1999; 11p; In English

Contract(s)/Grant(s): AF Proj. 2301

Report No.(s): AD-A387856; AFRL-HE-BR-TR-2001-0051; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

The brain areas involved in processing wide field-of-view (FOV) coherent and incoherent visual stimuli were studied using positron emission tomography (PET). The brains of nine subjects were scanned as they viewed texture patterns moving in the roll plane. Five visual conditions were used: (1) coherent clockwise (CW) wide-FOV (>100 deg) roll motion; (2) coherent counterclockwise (CCW) wide-FOV roll motion; (3) wide-FOV incoherent motion; (4) CCW motion confined to the central visual field (approx. 55 deg); and (5) a stationary control texture. The region most activated by the coherent-motion stimulus relative to the static one was the medial-occipital cortex, whereas both the medial- and lateral-occipital cortices were activated by incoherent motion relative to the static texture. Portions of the retroinsular parietal-temporal cortex, superior insula, putamen, and vestibulocerebellum responded specifically to the coherence of the stimulus, whereas a widespread lateralized activation was observed upon subtracting the CW scans from the CCW scans. The results indicate separate neural regions for processing wide-FOV motion versus stimulus coherence.

Author

Brain; Field of View; Visual Fields; Visual Stimuli; Vision

20010048003 Army Research Inst. of Environmental Medicine, Biophysics and Biomedical Modeling Div., Natick, MA USA

Models Useful for Predicting Human Responses to the Environment: Application to Hazard Material Operations

Gonzalez, Richard R., Army Research Inst. of Environmental Medicine, USA; Journal of the Human-Environmental System; 2000; Volume 4, No. 1, pp. 1-10; In English

Report No.(s): AD-A387744; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Mathematical modeling of the thermal responses allows testing of wide performance limitations in individuals exposed to environmental extremes. One important application is in the determination of hazard materials (HAZMAT) workers' endurance times to execute a task. The simulation approach is especially important when operation settings with such individuals are restricted to finite thermal limits necessary to protect the individual. In essence, the ideal mathematical model of thermal strain (both heat and cold stress) should incorporate all essential variables active in the thermoregulation. Although almost an insolvable task, a great many worthwhile models do a reliable job describing the heat balance equation. Models are quite useful in a first approach prediction of physiological effector response (sweating rate, skin blood flow, etc.), particularly when a given metabolic activity stays constant over the time of the given exposure. Early forerunners of rational thermal models employed elements of heat exchange that predict physiologic response and incorporate extensive descriptions of the passive system in terms of a steady-state bio-heat equation. In our Institute, a significant database has been collected from human experimental studies and wide clothing systems by which predictive modeling equations can be developed for individuals working in various environments. One model developed takes into consideration different clothing ensembles, varied levels of aerobic fitness in a population, and effects of progressive dehydration to heat stress/exercise. This review encompasses approaches conventionally used in both rational and operational models and presents a comparison between measured and predicted core temperature responses during exercise and environmental exposure often encountered during HAZMAT operations.

Author

Data Bases; Heat Balance; Heat Tolerance; Mathematical Models; Physiological Responses; Prediction Analysis Techniques; Thermoregulation

20010048026 Crew System Ergonomics Information Analysis Center, Wright-Patterson AFB, OH USA

Expanded Air Force Physical Fitness Battery: Muscle Strength, Muscle Endurance, and Flexibility Considered. Workshop Proceedings

Palmer, Barbara; Copnstable, Stephen; Baumgartner, Neal; Oct. 30, 1997; 15p; In English

Contract(s)/Grant(s): SPO900-94-D-0001

Report No.(s): AD-A388376; CSERIAC-PR-97-001; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This Proceedings document summarizes the discussion that took place during the Expanded Physical Fitness Workshop, sponsored by the US Air Force Office for Prevention and Health Services Assessment and supported by the Crew System Ergonomics Information Analysis Center (CSERIAC), held at the Dayton Airport Inn, Dayton, Ohio, on July 31, l997. The purpose of this meeting was to attain consensus among a group of subject-matter experts on the advantages and disadvantages to the Air Force of adding strength and flexibility components to its fitness program.

DTIC

Conferences; Human Factors Engineering; Physical Fitness; Muscular Strength

20010048027 Crew System Ergonomics Information Analysis Center, Wright-Patterson AFB, OH USA

Expanded Air Force Physical Fitness Battery: Muscle Strength, Muscle Endurance, and Flexibility Considered, Volume 1 ***Final Report***

Palmer, Barbara; Soest, Jennifer; Oct. 30, 1997; 77p; In English

Contract(s)/Grant(s): SPO900-94-D-0001

Report No.(s): AD-A388375; CSERIAC-RA-97-003A; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The current Air Force fitness test is a submaximal cycle ergometry test which is used to estimate cardiovascular fitness. Interest in adding to this fitness requirement has arisen from several quarters. CSERIAC, the Crew System Ergonomics Information Analysis Center, produced this Review & Analysis that analyzes advantages and disadvantages to the Air Force of adding muscle strength, muscle endurance, and flexibility requirements to the Air Force fitness battery. It was concluded that of the benefits of strength training, improved deployment preparedness, safe and efficient everyday work performance, and safer aerobic and team activity are most important to the Air Force. Secondly, although the evidence is not absolutely conclusive, the preservation of bone mass through strength training is also important to the Air Force, especially as more women enter, and retire from, the Air Force. The benefits of flexibility training are less clear. While flexibility training seems to be a universal prescription in fitness and health texts, the scientific data do not universally support the purported benefits of flexibility training, especially in the area of sports injury protection. However, on the basis of recommendations of other fitness programs and the opinions of subject-matter experts, and because better flexibility may reduce lower back pain and prevent injury from falls, it is suggested that the Air Force add flexibility training to its program.

DTIC

Human Factors Engineering; Systems Analysis; Physical Fitness; Electric Batteries; Muscles; Muscular Strength; Human Tolerances

20010048174 Massachusetts Univ. Medical Center, Worcester, MA USA

Effects of Meditation-Based Stress Reduction in Younger Women with Breast Cancer ***Annual Report, 30 Sep. 1996 - 29 Sep. 1997***

Hebert, James R.; Oct. 1997; 20p; In English

Contract(s)/Grant(s): DAMD17-94-J-4475

Report No.(s): AD-A341389; No Copyright; Avail: Defense Technical Information Center (DTIC)

The Breast Research Initiative for Determining Effective Skills for Coping with Cancer (BRIDGES) consists of a prospective, randomized intervention trial with sixty women in each of three arms: (1) the UMASS mindfulness meditation-based Stress Reduction and Relaxation Program (SR & RP); (2) a nutrition education program (NEP) developed specifically for BRIDGES; and (3) a usual care control group. The 180 women under age 65 with Stage I or Stage II breast cancer enrolling into this randomized trial are being evaluated for: (1) psychological and behavioral indices of functions and coping; (2) Quality of Life (QOL) measures; (3) compliance with the interventions and with medical treatment regimes; and (4) biochemical/immunological measures consisting of cytokines and melatonin. Analyses will be conducted to test hypotheses related to the three specific aims of the study: (1) SR&RP effect on QOL; (2) SR & RI & NEP effects on immune parameters; and (3) durability/decay of intervention-related effects. As of 30 September l997, the study had closely adhered to the Statement of Work agreed upon at the time the grant was awarded. One hundred seventy-eight women were recruited and randomized into the study. Most subjects

(90%) who have been randomized and begun the study have been retained. All data have been collected as per protocol stipulations.
DTIC
Behavior; Cancer; Stress Relaxation; Mammary Glands; Education

20010048665 NASA Ames Research Center, Moffett Field, CA USA
Hypergravity Effects on the Mother-Offspring System in Mammals
Ronca, April E., NASA Ames Research Center, USA; [2001]; 1p; In English; International Society for Gravitational Physiology Meeting, 22-29 Apr. 2001, Budapest, Hungary
Contract(s)/Grant(s): RTOP 121-10-40; No Copyright; Avail: Issuing Activity; Abstract Only

In 1995, ten pregnant female rats were launched on the Space Shuttle (STS-70) on Gestational day (G) 11 of their 22-day pregnancy as part of the NASA/NIH.Rodent (R)2 Experiment. Following landing on G20, fetuses were harvested from half of the dams, 0 g while the remaining five dams underwent birth. Spaceflight did not interrupt pregnancy, alter litter sizes, or affect body weights or gender ratios of the fetuses or neonates. Analyses of rats exposed to Hypergravity (HG) at 2.0-g, HG 1.75-g, HG 1.5-g were also conducted. Dams were exposed to continuous centrifugation from G I I through G20, with brief daily stops for animal health checks and maintenance. For both the G20 and Birth dams, comparable litter sizes and litter gender ratios were observed across gravity conditions. However, centrifugation-exposed (HG and RC) fetuses and neonates showed significantly lower body masses (p less than 0.05) relative to SC offspring. FIG 2.0-g offspring weighed significantly less than those in all other gravity conditions (p less than 0.05). Changes in the mothers care of the young will be discussed.
Author
Rats; Space Flight; Progeny; Pregnancy; Gravitation; Females; Birth

20010048676 Social Sectors Development Strategies, Inc., Natick, MA USA
Proposed Explanations for Excess Injury Among Veterans of the Persian Gulf War and a Call gor Greater Attention from Policymakers and Researchers
Bell, N. S., Social Sectors Development Strategies, Inc., USA; Amoroso, P. J., Army Research Inst. of Environmental Medicine, USA; Wegman, D. H., Massachusetts Univ., USA; Senier, L., Social Sectors Development Strategies, Inc., USA; March 2001; 8p; In English
Report No.(s): AD-A387929; M99-44; No Copyright; Avail: CASI; A01, Microfiche; A02, Hardcopy

Death rates among US veterans of the Persian Gulf War were lower than rates among non-deployed veterans and the US population at large, with the exception of injury deaths; returning veterans were at significantly greater risk of injury mortality. Similar patterns of excess injury mortality were documented among US and Australian veterans returning from Vietnam. In spite of these consistent findings little has been done to explain these associates and in particular to determine whether or not, and how, war-related exposures influence injury risk among veterns returning home after deployments.
Author
Mortality; Rates (Per Time); Risk

20010048739 Johns Hopkins Univ., Baltimore, MD USA
An Advocacy Campaign to Promote Physical Activity Among Adolescents in Fairfax County, Virginia
Woodward, Kelly H., Johns Hopkins Univ., USA; Feb. 12, 2001; 31p; In English
Report No.(s): AD-A387424; C101-53; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Physical inactivity is one of the leading caused of disease and premature death in the USA. The risk of all-cause mortality in physically inactive persons is twice that in persons who are physically active. Higher levels of physical activity are associated with a lower risk of mortality. Regular physical activity confers many health benefits including preventing cardiovascular disease, hypertension, diabetes, colon cancer and some mental illnesses. There have been a variety of types of physical activity shown to have these health benefits and it is believed that most Americans can achieve desirable levels of regular physical activity.
DTIC
Physical Fitness; Risk; Mortality; Medical Services

20010048829 Defence Science and Technology Organisation, Aeronautical and Maritime Research Lab., Melbourne, Australia
DSTO International Conference on Health and Usage Monitoring
Forsyth, Graham F., Editor, Defence Science and Technology Organisation, Australia; February 2001; 112p; In English; DSTO International Conference on Health and Usage Monitoring, 19-20 Feb. 2001, Melbourne, Australia; See also 20010048830 through 20010048851
Report No.(s): DSTO-GD-0262; AR-011-655; Copyright; Avail: Issuing Activity

The concept of On-Condition Maintenance implies the need for Condition Monitoring to close the loop. Condition monitoring may be implemented at many levels requiring various degree of complication. As relatively fragile machines with catastrophic outcomes possible for many failure types, aircraft have always used some degree on monitoring. Recently, engines, mechanical systems, and airframes on both fixed-wing aircraft and helicopters are being fitted with permanent monitoring systems. These systems are also becoming more integrated to the extent that some are now called 'Health and Usage Monitoring Systems' or HUMS. Following a successful conference in February 1999, DSTO have again sponsored an International Conference on Conference on Health and Usage Monitoring in conjunction with the Australian International Airshow in February, 2001.
Author
Systems Health Monitoring; Aircraft Maintenance; Aircraft Reliability

20010048875 Defence Science and Technology Organisation, Combatant Protection and Nutrition Branch, Melbourne Australia
The Measurement of Human Body-Fluid Volumes: Resting Fluid Volumes Before and After Heat Acclimation
Patterson, Mark J.; Stocks, Jodie M.; Taylor, Nigel A.; Amos, Denys; Jan. 2001; 38p; In English; Prepared in cooperation with Australian Catholic Univ. and Wollongong Univ.
Report No.(s): AD-A388448; DSTO-RR-0195; DODA-AR-011-541; Copyright; Avail: Defense Technical Information Center (DTIC)

The study evaluated changes in human body-fluid volumes accompanying a 21-day heat- acclimation regime. Eight unacclimatized males, were studied for 22 consecutive days, including 19 days of heat exposure. Heat stress tests and acclimation trials were undertaken at 40 degrees C and relative humidity 60%. Total body water increased from Day 1 to 8 but a further 13 days acclimation did not elicit a further increase. This trend was reflected within the extracellular space, with the extracellular fluid volume significantly elevated after 8 days, without further expansion beyond Day 8. A plasma volume expansion of 18% was evident by Day 8, and, by Day 22, had increased to 23.6% of pre-acclimation levels. The interstitial fluid volume increase from Day 1 to Day 8 was not significant. Proportionally more of the extracellular fluid volume expansion occurred within the plasma volume and was ascribed to increases in the total plasma protein which accompanied acclimation. The intracellular volume remained stable and erythrocyte volume was similarly unaltered. Body-fluid enlargement was restricted therefore to the extracellular compartment. It was concluded that the plasma volume was expanded rapidly in response to heat acclimation, with the majority of this expansion taking place within the first 8 days. A unique observation was the tendency for the plasma volume to remain elevated from Day 8 to Day 22, indicating that further heat acclimation would maintain this expanded volume.
DTIC
Body Fluids; Heat Acclimatization; Human Body; Males; Stress Measurement

20010048912 Hershey (Milton S.) Medical Center, Hershey, PA USA
Fluid Flow Sensitivity of Bone Cells as a Function of Age ***Annual Report, 1 Oct. 1999 - 30 Sep. 2000***
Jacobs, Christopher R., Hershey (Milton S.) Medical Center, USA; October 2000; 113p; In English
Contract(s)/Grant(s): DAMD17-98-1-8509
Report No.(s): AD-A387129; No Copyright; Avail: CASI; A02, Microfiche; A06, Hardcopy

In the second year of the project we have completed aim one and have completed half of aim two. For aim one, we have demonstrated our hypothesis to be true, namely that gap junctional intercellular communication modulates the PGE2 response of bone cells to oscillating fluid flow. Interestingly, we found that PGE2 release in response to oscillating flow does not appear to involve intracellular calcium. This has important implications because it indicates that other second messengers, such as the cyclic AMP pathway, may be important in transducing the fluid flow signal in to the PGE2 response. Additionally, the differential effect of oscillating fluid flow on intracellular calcium versus PGE2 may prove to be a powerful tool in further investigations of the bone cell mechanotransduction pathway. We have begun work on our second task (aim two) and have determined that while the [Ca2+] response to fluid flow does decrease as a function of age, gap junctional intercellular communication does not. These results have produced numerous scientific presentations and abstracts as well as one manuscript in review and two manuscripts in preparation. Finally, the results have been incorporated into two applications to the NIH which have been approved for funding.
Author
Bones; Oscillating Flow; Adaptation

53
BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

20010045534 NASA Ames Research Center, Moffett Field, CA USA
Additional Twists on A Continuous Barber - Pole Illusion
Mulligan, J. B., NASA Ames Research Center, USA; Beutter, B. R., NASA Ames Research Center, USA; [1994]; 1p; In English; The Association for Research in Vision & Ophthalmology, 1-6 May, 1994, Sarasota, FL, USA
Contract(s)/Grant(s): RTOP 505-64-53 and 199-16-12-3; No Copyright; Avail: Issuing Activity; Abstract Only

The barber pole illusion is a well-known example of how the perceived direction of motion of an inherently ambiguous one-dimensional pattern is influenced by the shape of the area covered by the pattern. Similar effects may be observed for a stimulus which is restricted to a narrow band of spatial frequencies: when a sinusoidal grating is drifted behind a two-dimensional Gaussian contrast window having unequal standard deviations, the direction of perceived motion is biased in the direction of the major axis of the elliptical window (Mulligan, ARVO 1991). We have extended these results to provide insight into possible mechanisms responsible for the effect.
Author
Motion Perception; Area; Visual Perception; Perceptual Errors

20010045535 NASA Ames Research Center, Artificial Intelligence Research Branch, Moffett Field, CA USA
Human Frontal Lobes and AI Planning Systems
Levinson, Richard, NASA Ames Research Center, USA; [1994]; 1p; In English; The Second International Conference on AI Planning Systems, 15-17 Jun., 1994, Chicago, IL, USA
Contract(s)/Grant(s): RTOP 233-02-07; No Copyright; Avail: Issuing Activity; Abstract Only

Human frontal lobes are essential for maintaining a self-regulating balance between predictive and reactive behavior. This paper describes a system that integrates prediction and reaction based on neuropsychological theories of frontal lobe function. In addition to enhancing our understanding of deliberate action in humans' the model is being used to develop and evaluate the same properties in machines. First, the paper presents some background neuropsychology in order to set a general context. The role of frontal lobes is then presented by summarizing three theories which formed the basis for this work. The components of an artificial frontal lobe are then discussed from both neuropsychological and AI perspectives. The paper concludes by discussing issues and methods for evaluating systems that integrate planning and reaction.
Author
Neurology; Neuropsychiatry; Human Behavior

20010045657 Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA USA
Principal Scientist Colloquium ***Final Report, Jun. 1993 - Jun 1995***
May 1996; 65p; In English
Report No.(s): AD-A327703; ARI-SR-26; No Copyright; Avail: Defense Technical Information Center (DTIC)

In June of 1995, the U.S. Army Research Institute for the Behavioral and Social Sciences held a Principal Scientist Colloquium in which fifteen scientists from nine ARI research units presented results from their recent in-house research. This report presents the top three papers from the colloquium plus abstracts from all the other papers. The three top papers, printed in their entirety, are: (1) Unaided Night Vision Training; (2) How to Make Decisions About the Effectiveness of Device-Based Training; and (3) Understanding and Improving Tactical Problem Solving.
DTIC
Night Vision; Problem Solving; Scientists

20010047013 Army Aviation and Missile Command, Aeroflightdynamics Directorate, Moffett Field, CA USA
Evaluation of Helmet Mounted Display Alerting Symbology
DeMaio, Joe, Army Aviation and Missile Command, USA; September 2000; 40p; In English
Contract(s)/Grant(s): RTOP 581-31-22
Report No.(s): NASA/TM-2000-209603; NAS 1.15:209603; AFDD/TR-00-A-009; A-000023; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Proposed helicopter helmet mounted displays will be used to alert the pilot to a variety of conditions, from threats to equipment problems. The present research was performed under the NASA Safe All-weather Flight Operations Research (SAFOR) program supported by a joint Army/NASA research agreement. The purpose of the research was to examine ways to

optimize the alerting effectiveness of helmet display symbology. The research used two approaches to increasing the effectiveness of alerts. One was to increase the ability of the alert to attract attention by using the entire display surface. The other was to include information about the required response in the alert itself. The investigation was conducted using the NASA Ames Research Center's six-degree-of-freedom vertical motion simulator (VMS) with a rotorcraft cockpit. Helmet display symbology was based on the AH-64's pilot night vision system (PNVS), cruise mode symbology. A standardized mission was developed, that consisted of 11 legs. The mission included four tasks, which allowed variation in the frequency of alerts. The general trend in the data points to a small benefit from both the full-screen alert and the partial information alert.
Author
Helmet Mounted Displays; H-60 Helicopter; Night Vision

20010047617 Institute for Human Factors TNO, Soesterberg, Netherlands
Evaluation Selection Process ***Final Report Evaluatie Selectie Proces***
vanVliet, A. J., Institute for Human Factors TNO, Netherlands; Gaillard, A. W. K., Institute for Human Factors TNO, Netherlands; Mar. 14, 2001; 25p; In English
Contract(s)/Grant(s): 013.41403; TNO Proj. 791.2
Report No.(s): TD-2000-0366; TNO-TM-01-A022; Copyright; Avail: Issuing Activity
The main purpose of this project is to ascertain how the present procedures, organization and execution of the selection process can be improved in order to reduce unnecessary and unwanted selection losses.
Derived from text
Selection; Human Factors Engineering; Military Technology

20010047991 Civil Aeromedical Inst., Oklahoma City, OK USA
Latent Trait Theory Analysis of Changes in Item Response Anchors
Farmer, W. L., Civil Aeromedical Inst., USA; Thompson, R. C., Civil Aeromedical Inst., USA; Heil, S. K. R., Oklahoma Dept.of Mental Health and Substance Abuse Services, USA; Heil, M. C., Civil Aeromedical Inst., USA; February 2001; 18p; In English
Contract(s)/Grant(s): AM-B-99-HRR-516
Report No.(s): AD-A388056; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy
The purpose of this study was to evaluate the effect that modifications in item response anchors have on responses to survey items. Twenty-nine items were administered in 1993 and 1995 as part of a more extensive attitude survey to two random samples of Federal Aviation Administration employees. Changes in the response scales (five-point Likert) between the two survey administrations ranged from no change at all to extensive re-anchoring of the response categories. Item responses were modeled via two-parameter graded response models based on item response theory. Changes in the way the item responses functioned between both years were assessed using the differential item functioning (DIF) method recommended by Muraki. Twenty-four of the 29 items displayed significant levels of DIRF, indicating that the response categories did not measure the constructs of interest in a similar fashion across the two administrations. Items whose response anchors had been changed substantially exhibited significant DIF more frequently than those where the change in anchors was less drastic. These results suggest that researchers and practitioners take a conservative approach when considering the revision of measuring scales for a particular set of items.
Author
Human Behavior; Management; Random Sampling; Surveys

20010048678 New Mexico State Univ., Computing Research Lab., Las Cruces, NM USA
Modeling Mental Workload ***Final Report, 12 Feb. 1996 - 30 Sep. 1997***
Schvaneveldt, Roger W., New Mexico State Univ., USA; Reid, Gary B., Wright Lab., USA; Rice, Sean, New Mexico State Univ., USA; Gomez, Rebecca L., New Mexico State Univ., USA; September 1997; 44p; In English
Contract(s)/Grant(s): F41624-96-1-0003; AF Proj. 7184
Report No.(s): AD-A387779; AFRL-HE-WP-SR-2000-0010; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy
The primary objective of the research project was to investigate models for monitoring and predicting subjective workload in the control of complex systems. Such models would enable systems to use workload levels to distribute tasks optimally in addition to identifying levels of workload, which could lead to a serious breakdown in performance. In the aircraft-pilot system, for example, such capabilities could provide warnings to the pilot of high workload levels and could also assess ways of reducing

the pilot's workload by offering to assume control of some ongoing tasks. In this initial project, we tried to determine how well a model can assess workload using information about task requirements and task performance.
Author
Aircraft Pilots; Complex Systems; Workloads (Psychophysiology); Mental Performance

20010048868 Nevada Univ., Las Vegas, NV USA
The Effects of Level of Training on Employee Perceived Empowerment, Commitment and Job Performance
Backeberg, Pamela Dawn, Nevada Univ., USA; Jan. 18, 2001; 64p; In English
Report No.(s): AD-A387232; AFIT-CI01-1; No Copyright; Avail: CASI; A01, Microfiche; A04, Hardcopy

Billions of dollars are spent yearly on employee training. Yet employers often find it difficult to measure whether the training has any real effect. Due to the vast resources allocated to training, it is important to fully understand its impact. The purpose of this study was to determine the effects of level of training on employees' perceived psychological empowerment, commitment, and resultant job performance within the hospitality industry. Data were collected from 158 Air Force employees working on one of two military bases in the areas of food service, lodging, recreation, fitness, linen exchange, and mortuary affairs. Specifically, this research focused on training received by Air Force service personnel. As employees attained higher levels of training, they perceived themselves as more influential and were rated by supervisors as better performers. Implications for future research are discussed.
Author
Human Performance; Personnel; Education; Psychological Effects

20010048870 Harvard Univ., Holyoke Center, Cambridge, MA USA
Individual Differences in Visual Cognition ***Final Report, 1 Mar. 1999 - 29 Feb. 2000***
Kosslyn, Stephen M., Harvard Univ., USA; Sep. 02, 2001; 2p; In English
Contract(s)/Grant(s): F49620-99-1-0114
Report No.(s): AD-A387134; AFRL-SR-BL-TR-01-0120; No Copyright; Avail: CASI; A01, Microfiche; A01, Hardcopy

Our research using positron emission tomography (PET) has revealed the brain regions that are selectively activated by specific tasks developed to assess various visual-spatial abilities. We have also been obtaining convergent evidence showing that when activity in those areas are inhibited by Transcranial Magnetic Stimulation (TMS), so is performance on the relevant tasks. Furthermore, previous studies have shown that TMS (applied at a different frequency) can also be used to facilitate processing; indeed, it may be possible to boost an individual's 'visual intelligence' following this procedure. A frameless stereotactic device (Radionics' Optical Tracking System) was purchased with these funds to allow us to use the subjects' brain scans to localize the sites of cortical activation more precisely and thereby be able to direct TMS to very specific loci in a given person's brain. However, Radionics has failed to comply with their agreement to provide the service and software necessary to 'read' the brain imaging data; therefore the equipment has ben unusable. The Harvard Office of the General Counsel successfully negotiated a refund, which was received in early February 2001. The funds will be used to purchase a similar, but less expensive and more effective device; in addition, the remainder of the funds will be used to purchase a Diffuse Optical Tomography system. This reallocation of funds was approved by our Program Officer.
Author
Brain; Cognition; Imaging Techniques; Optical Tracking

20010048884 NASA Ames Research Center, Moffett Field, CA USA
Shared Problem Models and Crew Decision Making
Orasanu, Judith, NASA Ames Research Center, USA; [1994]; 1p; In English; Western European Association for Aviation Psychology, 28-31 Mar. 1994, Dublin, Ireland
Contract(s)/Grant(s): RTOP 199-06-12; No Copyright; Avail: Issuing Activity; Abstract Only

The importance of crew decision making to aviation safety has been well established through NTSB accident analyses: Crew judgment and decision making have been cited as causes or contributing factors in over half of all accidents in commercial air transport, general aviation, and military aviation. Yet the bulk of research on decision making has not proven helpful in improving the quality of decisions in the cockpit. One reason is that traditional analytic decision models are inappropriate to the dynamic complex nature of cockpit decision making and do not accurately describe what expert human decision makers do when they make decisions. A new model of dynamic naturalistic decision making is offered that may prove more useful for training or aiding cockpit decision making. Based on analyses of crew performance in full-mission simulation and National Transportation Safety Board accident reports, features that define effective decision strategies in abnormal or emergency situations have been identified. These include accurate situation assessment (including time and risk assessment), appreciation of the complexity of the problem,

sensitivity to constraints on the decision, timeliness of the response, and use of adequate information. More effective crews also manage their workload to provide themselves with time and resources to make good decisions. In brief, good decisions are appropriate to the demands of the situation and reflect the crew's metacognitive skill. Effective crew decision making and overall performance are mediated by crew communication. Communication contributes to performance because it assures that all crew members have essential information, but it also regulates and coordinates crew actions and is the medium of collective thinking in response to a problem. This presentation will examine the relation between communication that serves to build performance. Implications of these findings for crew training will be discussed.
Author
Decision Making; Flight Crews; Aeronautics

54
MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human factors engineering; bionics, man-machine, life support, space suits and protective clothing. For related information see also 16 Space Transportation and 52 Aerospace Medicine..

20010044352 NASA Ames Research Center, Moffett Field, CA USA
3-D Sound for Virtual Reality and Multimedia
Begault, Durand R., NASA Ames Research Center, USA; August 2000; 244p; In English
Contract(s)/Grant(s): RTOP 548-15-12
Report No.(s): NASA/TM-2000-209606; NAS 1.15:209606; IH-010; No Copyright; Avail: CASI; A11, Hardcopy; A03, Microfiche

Technology and applications for the rendering of virtual acoustic spaces are reviewed. Chapter 1 deals with acoustics and psychoacoustics. Chapters 2 and 3 cover cues to spatial hearing and review psychoacoustic literature. Chapter 4 covers signal processing and systems overviews of 3-D sound systems. Chapter 5 covers applications to computer workstations, communication systems, aeronautics and space, and sonic arts. Chapter 6 lists resources. This TM is a reprint of the 1994 book from Academic Press.
Author
Three Dimensional Models; Acoustics; Sound Waves; Virtual Reality; Human-Computer Interface; Signal Processing; Psychoacoustics

20010045709 Institute for Human Factors TNO, Soesterberg, Netherlands
Armoured Vehicle Driving with a Head-Slaved Indirect Viewing System: Field Experiments ***Interim Report***
Oving, A. B., Institute for Human Factors TNO, Netherlands; vanErp, J. B. F., Institute for Human Factors TNO, Netherlands; Feb. 06, 2001; 35p; In English
Contract(s)/Grant(s): 19346; TNO Proj. 788.1
Report No.(s): TD-2000-0350; TNO-TM-01-A008; Copyright; Avail: Issuing Activity

To investigate whether drivers can adequately steer their armoured vehicle with an indirect viewing system, We investigated the effects on driving and viewing behaviour of chauffeurs driving under armour with periscopes or with a head slaved camera system. Experienced chauffeurs performed driving tests on paved terrain and on an off-the-road circuit in different viewing conditions. In general, driving performance improves with the camera system as compared to driving with periscopes. The advantage is most clear for maneuvering in small spaces, and with obstacles on the right side of the vehicle, Off-the-road, chauffeurs drive faster and safer with the camera system than with periscopes. However, almost half of the drivers had serious complaints about motion sickness. The most probable cause for this is the fact that the cameras can not compensate for the roll component of the drivers head motions. This may results in a tilted world, especially when taking curves. A head slaved camera monitor system improves driving performance compared to driving with periscopes, but is only practicable when the motion sickness problem is solved.
Author
Cameras; Periscopes; Motion Sickness

20010045710 Institute for Human Factors TNO, Soesterberg, Netherlands
Force Perception: A Literature Survey ***Final Report***
Oving, A. B., Institute for Human Factors TNO, Netherlands; deVries, S. C., Institute for Human Factors TNO, Netherlands; vanVeen, H. A. H. C., Institute for Human Factors TNO, Netherlands; Feb. 12, 2001; 50p; In English

Contract(s)/Grant(s): 69032; TNO Proj. 788.1
Report No.(s): TD-2000-0353; TNO-TM-01-B003; Copyright; Avail: Issuing Activity

In teleoperation applications, primarily visual and auditory information displays are used to support the human operator of a remote manipulator. Haptic information, such as how an object feels or the level of applied force, are not always fed back to the operator, although inclusion of force feedback has often been shown to improve the performance of the operator. Knowledge of the fundamental principles that govern perception of muscular force and related sensations is a necessity to successfully design and evaluate displays that provide such haptic cues. Therefore, we conducted a review of the psychophysical literature on force. We gave specific attention to parameters of force magnitude assessment and discrimination capability regarding force and the related sensations of stiffness, viscosity and mass. These parameters provide useful knowledge for the design and evaluation process of haptic displays. The literature study was performed using library databases and the Internet as well as literature references from the accumulated body of literature. The collected literature extensively covers force magnitude perception. Perception of force direction and of the derived quantities stiffness, viscosity and mass has been covered not quite as well. There are clear gaps in the body of knowledge related to the perception of object related and haptically determinable quantities. An experimental study in this area could yield valuable insights.
Author
Display Devices; Touch; Feedback

20010045834 Institute for Human Factors TNO, Soesterberg, Netherlands
Differential Selection of Pilots: An Exploration of Possibilities ***Final Report Differentieele Selectie van Vliegers: Een Verkenning van Mogelijkheden***
vanVliet, A. J., Institute for Human Factors TNO, Netherlands; Jan. 26, 2001; 17p; In Dutch
Contract(s)/Grant(s): 30310; TNO Proj. 791.2
Report No.(s): TD-2000-0347; TNO-TM-01-A005; Copyright; Avail: Issuing Activity

In order to achieve a good fit between pilot and aircraft the Royal Netherlands Air Force is interested in identifying criteria which could facilitate the correspondence between pilot and aircraft. Not only do physiological, psychomotor and cognitive aspects play a role but psychosocial aspect could also be of importance. Which factors are most suitable in predicting an optimal fit will be research by means of a literature survey and a number of interviews. The literature survey is focussed on those criteria which are used to select pilots for military aircraft and if available will supply criteria which can be applied towards differential selection of pilots. The gained insights will be augmented with information based on interviews held with RNLAF representatives. The analysis of the reported findings and held interviews revealed that differential selection of pilots is possible by assessing future pilots on two dimensions: actual performance and information processing capacity. These dimensions reflect the differences between the aircraft in the following manner: Attack aircraft (F16, Apache) necessitate high information processing capabilities. Furthermore, fighters (F16) require very high performance capabilities of their pilots. In contrast, transport aircraft (Cougar, Chinook and Bolkow) are not that demanding with respect to both dimensions. Differential selection of pilots with respect to aircraft type is possible. Implementation of such a system would require adapting the selection procedure in such a manner that military transport pilots and military attack pilots can be distinguished based on their information processing capabilities. In a later phase, during initial training Apache pilots and F16 pilots can be distinguished based on their actual performance in an ”extended trail” situation. In this training situation ”air combat” capabilities will be assessed and used as criterion for selecting the F16 pilots.
Author
Pilot Selection; Human Factors Engineering; Aircraft Pilots

20010045836 Institute for Human Factors TNO, Soesterberg, Netherlands
Fit of Caps and Gloves ***Interim Report Pasvorm van Handschoenen en de Woodland Zomer- En Winterpet***
Daanen, H. A. M., Institute for Human Factors TNO, Netherlands; Krul, A. J., Institute for Human Factors TNO, Netherlands; Feb. 20, 2001; 23p; In English
Contract(s)/Grant(s): 10313; TNO Proj. 789.2
Report No.(s): TD-2000-0356; TNO-TM-01-A013; Copyright; Avail: Issuing Activity

The Clothing and Personal Equipment Office of the Netherlands Defense organization has asked TNO Human Factors to investigate the fit of the military summer and winter caps and leather parade gloves. The results may help the Office to improve the sizing system. The dimensions of the supplied caps and gloves were measured accurately. Also, the head circumference and several hand dimensions were determined in 45 subjects. Every subject had to fit test the caps and gloves and had to rate the quality of fit.
Author
Clothing; Gloves

20010047252 Naval Air Warfare Center, Aircraft Div., Patuxent River, MD USA
GVP Status Update Briefing to ATEDS/SA
Dunn, Richard S.; Jan. 2000; 13p; In English
Report No.(s): AD-A388175; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
This presentation is an update on GVP status and progress review.
DTIC
Human Factors Engineering; Software Development Tools; Visual Aids

20010047556 Federal Aviation Administration, Technical Center, Atlantic City, NJ USA
NAS Infrastructure Management System Build 1.5 Computer-Human Interface ***Final Report***
Ahlstrom, Vicki; Koros, Anton; Newman, Richard; Jan. 2001; 49p; In English; Prepared in collaboration with Logicon/Federal Data Corporation.
Report No.(s): AD-A388070; DOT/FAA/CT-TN01/01; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
Human factors engineers from the National Airspace System (NAS) Human Factors Branch (ACT-530) of the Federal Aviation Administration William J. Hughes Technical Center conducted an evaluation of the NAS Infrastructure Management System (NIMS) Build 1.5 computer-human interface (CHI) software. They conducted the evaluation at the NIMS Premier Facility (NPF) during November 1998. Five Airway Facilities Specialists serving as representative users employed scripts exercising the three applications that comprise NIMS Build 1.5. This software represented an interim build, and the NPF server did not represent the anticipated final configuration. This placed limits on the scope and content of the evaluation. The results of the evaluation indicated that system functionality could be improved by addressing several CHI areas. The human factors engineers determined that NIMS Build 1.5 has the potential to support an Operations Control Center Specialist in a centralized monitoring and control facility. However, at its tested maturity level, it was not capable of providing this support in an operational environment. They concluded that the majority of issues identified could be mitigated through the application of human engineering principles.
DTIC
National Airspace System; Management Information Systems; Human-Computer Interface; Software Engineering; Computer Programs; Software Reliability

20010047658 Crew System Ergonomics Information Analysis Center, Wright-Patterson AFB, OH USA
Gateway, Volume 4
Landis, Jeffrey A., Editor, Crew System Ergonomics Information Analysis Center, USA; Cochran, R. Anita, Editor, Crew System Ergonomics Information Analysis Center, USA; July 1993; 21p; In English
Contract(s)/Grant(s): SPO900-94-D-0001
Report No.(s): AD-A386196; CSERIAC-GWIV2; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy
This issue contains articles on the following subjects: (1) Forensic Human Factors Psychology, Part 1; (2) Clumsy Automation, Practitioner Tailoring, and System Disaster; (3) The US Army Safety Center and Human Factors; (4) Chronic Motion Sickness Treated with Cognitive Behavioral Training; and (5) Cardiorespiratory Measures and Their Role in Studies of Performance.
Author
Human Factors Engineering; Safety Factors; Human Behavior

20010047659 Crew System Ergonomics Information Analysis Center, Wright-Patterson AFB, OH USA
Gateway, Volume 4
Landis, Jeffrey A., Editor, Crew System Ergonomics Information Analysis Center, USA; Cochran, R. Anita, Editor, Crew System Ergonomics Information Analysis Center, USA; November 1993; 21p; In English
Contract(s)/Grant(s): SPO900-94-D-0001
Report No.(s): AD-A386200; CSERIAC-GWIV3; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy
This issue contains articles on the following subjects: (1) Forensic Human Factors Psychology, Part 2: A Model for the Development of Safer Products; (2) Cobwebs in a Virtual Attic; (3) A3I: Building the MIDAS Touch for Model-Based Crew Station Design; (4) Naturalistic Decision Making: Implications for Design; and (5) Ideas and Opinions of a Human Factors Pioneer: An Interview with Arnold Wasserman.
Author
Human Factors Engineering; Product Development; Decision Making; Information Systems

20010047660 Crew System Ergonomics Information Analysis Center, Wright-Patterson AFB, OH USA

Gateway, Volume 3

Landis, Jeffrey A., Editor, Crew System Ergonomics Information Analysis Center, USA; Cochran, R. Anita, Editor, Crew System Ergonomics Information Analysis Center, USA; 1992; 16p; In English

Contract(s)/Grant(s): SPO900-94-D-0001

Report No.(s): AD-A386205; CSERIAC-GWIII5; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

This issue contains articles on the following subjects: 1) Do Pilots Need Human Factors Training; 2) Computational Models of Human Performance; and 3) Jack The Human Factor for Computer Aided Design.

DTIC

Human Factors Engineering; Mathematical Models; Computerized Simulation

20010047661 Crew System Ergonomics Information Analysis Center, Wright-Patterson AFB, OH USA

Gateway, Volume 4

Landis, Jeffrey A., Editor, Crew System Ergonomics Information Analysis Center, USA; Cochran, R. Anita, Editor, Crew System Ergonomics Information Analysis Center, USA; 1993; 16p; In English

Contract(s)/Grant(s): SPO900-94-D-0001

Report No.(s): AD-A386208; CSERIAC-GWIV4; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

This issue contains articles on the following subjects: 1) Automation and Human-Computer Interaction in Manufacturing; 2) The eyes: Reflector of Attentional Processes; 3) Proceedings of the Working Group on Electronic Imaging of the Human Body; and 4) INFORUM Data Collection and Consensus Building Groupware System.

DTIC

Human-Computer Interface; Automatic Control; Eye (Anatomy); Data Acquisition

20010047681 Air Force Research Lab., Brooks AFB, TX USA

Breathing Resistance Properties of the Combat Ace (TLSS Phase IV B and C) Chemical Defense Respirator ***Final Report, 9 Sep. 1985 - 30 Sep. 1998***

Morgan, Thomas R., Air Force Research Lab., USA; Russell, Roberta L., Air Force Research Lab., USA; Holden, Ronald D., Air Force Research Lab., USA; Oct. 16, 2000; 17p; In English

Report No.(s): AD-A385559; AFRL-HE-BR-TR-2000-139; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

Positive Pressure Breathing for G (PBG), under the program name COMBAT EDGE, is used to provide acceleration protection in high performance fighters. This work compares its breathing resistance to a chemical hardened version of the system (COMBAT ACE) and the standard Aircrew Eye-Repository Protection (AERP) system. COMBAT EDGE was seen to meet ASCC (Air Standardization Coordinating Committee) Standard 61/22A over most of its performance range, but its integration into COMBAT ACE resulted in a loss of ASCC compliance. In spite of this, test-subject questionnaires revealed no reports of air hunger or reduced acceleration protection, and its breathing resistance was appreciably less than the standard AERP. This suggests that the COMBAT EDGE breathing system can be chemically hardened into COMBAT ACE without perceptible effect on its protective capability.

DTIC

Breathing Apparatus; Pressure Breathing; Oxygen Masks; Chemical Defense; Respirators; Attack Aircraft

20010048177 NASA Marshall Space Flight Center, Huntsville, AL USA

Radiation Shielding Materials

Adams, James H., Jr., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; AIAA Conference, 9 Jan. 2001, Reno, NV, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA; No Copyright; Avail: Issuing Activity; Abstract Only

NASA has relied on the materials to provide radiation shielding for astronauts since the first manned flights. Until very recently existing materials in the structure of manned spacecraft as well as the equipment and consumables onboard have been taken advantage of for radiation shielding. With the advent of the International Space Station and the prospect of extended missions to the Moon or Mars, it has been found that the materials, which were included in the spacecraft for other reasons, do not provide adequate shielding. For the first time materials are being added to manned missions solely to improve the radiation shielding. It is now recognized that dual use materials must be identified/developed. These materials must serve a purpose as part of the spacecraft or its cargo and at the same time be good shielding. This paper will review methods for evaluating the radiation

shielding effectiveness of materials and describe the character of materials that have high radiation shielding effectiveness. Some candidate materials will also be discussed.
Author
Radiation Shielding; Absorbers (Materials); Electromagnetic Absorption; Electromagnetic Shielding; Reactor Materials

59
MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

Includes general topics and overviews related to mathematics and computer science. For specific topics in these areas see categories 60 through 67.

20010048906 Center for Mathematics and Computer Science, Amsterdam, Netherlands
Incremental Dynamics. Information Systems
vanEijck, D. J. N., Center for Mathematics and Computer Science, Netherlands; Nov. 1998; ISSN 1386-3681; 36p; In English
Report No.(s): PB2001-103035; INS-R9811; Copyright; Avail: National Technical Information Service (NTIS)

An incremental semantics for a logic with dynamic binding is developed on the basis of a variable free notation for dynamic logic. The variable free indexing mechanism guarantees that active registers are never overwritten by new quantifier actions. The resulting system has the same expressive power as Dynamic Predicate Logic or Discourse Representation Theory, but comes with a more well behaved consequence relation. A calculus for dynamic reasoning with anaphora is presented and its soundness and completeness are established. Incremental dynamic logic provides an explicit account of anaphoric context and yields new insight into the dynamics of anaphoric linking in reasoning.
NTIS
Calculus; Information Systems; Semantics; Natural Language (Computers)

20010048907 Center for Mathematics and Computer Science, Amsterdam, Netherlands
Axiomatising Dynamic Logics for Anapora. Information Systems
vanEijck, D. J. N., Center for Mathematics and Computer Science, Netherlands; Nov. 1998; ISSN 1386-3681; 32p; In English
Report No.(s): PB2001-103034; INS-R9812; Copyright; Avail: National Technical Information Service (NTIS)

A new task put on the agenda of philosophical logic by the recent dynamic turn, the account for the dynamics of anaphoric context shifts in reasoning, is taken up. The paper gives a sequent axiomatisation of some well known dynamic anaphora logics. The calculi are shown to be sound and complete. They differ from earlier calculi for the dynamics of anaphoric context in that they take the notion of anaphoric context change from premiss to conclusion as starting point of the analysis, and they do not rely on an implicit translation to first order predicate logic.
NTIS
Information Systems; Predicate Logic; Semantics; Calculi

60
COMPUTER OPERATIONS AND HARDWARE

Includes hardware for computer graphics, firmware and data processing. For components see 33 Electronics and Electrical Engineering. For computer vision see 63 Cybernetics, Artificial Intelligence and Robotics.

20010044086 Pennsylvania Univ., Philadelphia, PA USA
A Well Tempered Mammographic Display ***Annual Report, 1 Sep. 1996 - 31 Aug. 1997***
Kundel, Harold, Pennsylvania Univ., USA; Sep. 1997; 16p; In English
Contract(s)/Grant(s): DAMD17-96-1-6153
Report No.(s): AD-A344615; No Copyright; Avail: Defense Technical Information Center (DTIC)

This proposal addresses the development of a softcopy display for digital mammography that seeks to couple optimally the visual system to the displayed image without excessive human-machine interaction. It also breaks away from two traditional approaches to workstation display design, namely trying to make the softcopy image look like hardcopy and using observer determined window-level and rove-zoom function. The display is calibrated by using both the perceptually standard curve for the monitor and an observer derived display based upon the just noticeable difference in contrast over the intensity range of the monitor. The image is equalized to fit the prescribed intensity range. There is also a built in scanning procedure derived from

eye-position observation on skilled mammographers. The calibration procedures are being tested and the scanning procedure is being developed.
DTIC
Cancer; Mammary Glands; Man Machine Systems; Display Devices

20010045528 NASA Ames Research Center, Numerical Aerodynamic Simulation Facility, Moffett Field, CA USA
Applications Performance on NAS Intel Paragon XP/S - 15#
Saini, Subhash, NASA Ames Research Center, USA; Simon, Horst D., NASA Ames Research Center, USA; [1994]; 1p; In English; The European Conference on High-Performance Computing and Networking, 18-20 Apr., 1994, Munich, Germany, Germany
Contract(s)/Grant(s): NAS2-12961; RTOP 536-01-11; No Copyright; Avail: Issuing Activity; Abstract Only

The Numerical Aerodynamic Simulation (NAS) Systems Division received an Intel Touchstone Sigma prototype model Paragon XP/S- 15 in February, 1993. The i860 XP microprocessor with an integrated floating point unit and operating in dual -instruction mode gives peak performance of 75 million floating point operations (NIFLOPS) per second for 64 bit floating point arithmetic. It is used in the Paragon XP/S-15 which has been installed at NAS, NASA Ames Research Center. The NAS Paragon has 208 nodes and its peak performance is 15.6 GFLOPS. Here, we will report on early experience using the Paragon XP/S- 15. We have tested its performance using both kernels and applications of interest to NAS. We have measured the performance of BLAS 1, 2 and 3 both assembly-coded and FORTRAN coded on NAS Paragon XP/S- 15. Furthermore, we have investigated the performance of a single node one-dimensional FFT, a distributed two-dimensional FFT and a distributed three-dimensional FFT Finally, we measured the performance of NAS Parallel Benchmarks (NPB) on the Paragon and compare it with the performance obtained on other highly parallel machines, such as CM-5, CRAY T3D, IBM SP I, etc. In particular, we investigated the following issues, which can strongly affect the performance of the Paragon: a. Impact of the operating system: Intel currently uses as a default an operating system OSF/1 AD from the Open Software Foundation. The paging of Open Software Foundation (OSF) server at 22 MB to make more memory available for the application degrades the performance. We found that when the limit of 26 NIB per node out of 32 MB available is reached, the application is paged out of main memory using virtual memory. When the application starts paging, the performance is considerably reduced. We found that dynamic memory allocation can help applications performance under certain circumstances. b. Impact of data cache on the i860/XP: We measured the performance of the BLAS both assembly coded and FORTRAN coded. We found that the measured performance of assembly-coded BLAS is much less than what memory bandwidth limitation would predict. The influence of data cache on different sizes of vectors is also investigated using one-dimensional FFTs. c. Impact of processor layout: There are several different ways processors can be laid out within the two-dimensional grid of processors on the Paragon. We have used the FFT example to investigate performance differences based on processors layout.
Derived from text
Operating Systems (Computers); Computer Systems Design; Software Development Tools; Software Engineering; Virtual Memory Systems

20010045646 Naval Postgraduate School, Monterey, CA USA
Transient Analysis of the 72 Inch TAC-4 Ruggedized Rack (CLIN 0003AA) Subjected to Simulated Shock Loading
Oesterreich, Mark H.; Shin, Y. S.; Mar. 1998; 47p; In English
Report No.(s): AD-A343515; NPS-ME-98-001; No Copyright; Avail: Defense Technical Information Center (DTIC)

The finite element modeling and subsequent static and modal analyses of the 72 inch TACA Rugged Rack computer system (CLIN 0003AA) was discussed in a previous report titled Modal Analysis of the 72 inch TAC-4 Ruggedized Rack (CLIN 0003A). Follow on transient analysis using these results have been performed to determine the rack's transient response to simulated shock inputs. This rack is designed to allow incorporation of commercial off the shelf (COTS) computer systems for naval tactical computing requirements while still meeting MIL-STD-901D, the applicable military shock specification.
DTIC
Transient Response; Shock Tests; Ruggedness

20010046856 NASA Ames Research Center, Numerical Aerodynamic Simulation Facility, Moffett Field, CA USA
Performance of BLAS 3, FFTs and NAS Parallel Benchmarks on Cray T3D
Saini, Subhash, NASA Ames Research Center, USA; Simon, Horst D., NASA Ames Research Center, USA; [1994]; 1p; In English; Cray User Group Spring '94 Conference, 14-18 Mar., 1994, San Diego, CA, USA
Contract(s)/Grant(s): NAS2-12961; RTOP 536-01-11; No Copyright; Avail: Issuing Activity; Abstract Only

Recently, a Cray T3D Emulator has been made available on the Cray Y-MP and C90 computers. The Pittsburgh Supercomputer Center has acquired a CRAY T3D system and many other centers like Jet Propulsion Laboratory (JPL) will have it by the end of 1994. The Cray T3D system is the firstphase system in Cray Research, Inc.'s (CRI) three-phase massively parallel processing (MPP) program. This system features a heterogeneous architecture that closely couples DEC's ALPHA microprocessors and CRI's parallel-vector technology, i.e. the Cray Y-MP and Cray C90. The Cray T3D Emulator will give prospective users a valuable experience in developing high performance applications on the MPP system. This emulator runs programs written in CRI's MPP FORTRAN programming model (data sharing and work sharing) or Parallel Virtual Machine (PVM) programming model. It will help the users to study data layout, data locality, and data reference patterns thereby providing feedback which will enable one to write more efficient parallel codes. An overview of the Cray T3D hardware, software, and three of its available programming models is presented.The Cray FORTRAN Programming Model comprising (a) Data Sharing, (b) Worksharing and (c) Message Passing, will be discussed with examples. We have also implemented distributed BLAS 3 (matrix-matrix multiplication) in data parallel model (using only CSHIFT); worksharing model using block distribution and collapsed distribution; and message passing model using PVM. We have also implemented 2D and 3D FFTs for radix-2 using PVM. The performance of NAS Parallel 'Benchmarks (NPB) on CRAY T3D will be compared with other highly parallel systems such as CM-5, Paragon, C90 etc.

Author

Computer Programming; Computer Programs; FORTRAN; Software Development Tools; Software Engineering

20010047047 North Carolina State Univ., Raleigh, NC USA

The Rabi Quantum Computer

Krutar, Rudolph A., North Carolina State Univ., USA; New Information Processing Techniques for Military Systems; April 2001, pp. 5-1 - 5-7; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A02, Hardcopy

Thomas Carlysle once wrote: "Our main business is not to see what lies dimly at a distance, but to do what lies clearly at hand." Totally ignoring that advice, I set about to examine how a quantum computer might eventually be exploited. (A quantum computer uses strange but real effects in Quantum Mechanics to explore many possibilities at the same time with the same hardware.) There are currently just four known quantum computer algorithms. The possibilities are staggering, but are not likely to be realized by attending only to what lies clearly at hand. Yes, we might be able to factor large numbers, search databases in fewer steps, evaluate simple global properties of arbitrary predicates, and simulate quantum systems. But we might also be able to factor complicated problems, search databases of large images and sounds, evaluate interesting properties of complicated functions, and simulate sound and weather systems. No one currently has any idea how to do anything that complicated on a quantum computer. The research community therefore needs to focus on what has to be done to liberate the imaginations of students everywhere, so they can rework the foundations of their fields to exploit the exponential potential of quantum computers.

Author

Quantum Computers; Quantum Computation; Quantum Mechanics

20010047586 Cornell Univ., Dept. of Computer Science, Ithaca, NY USA

Platform for Principled Experimentation of Hard Computational Problems ***Final Report, 15 Mar. 1999-14 Mar. 2000***

Gomes, Carla P.; Mar. 2000; 5p; In English

Contract(s)/Grant(s): F49620-99-1-0195

Report No.(s): AD-A388170; AFRL-SR-BL-TR-01-0205; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Our research in the area of computational complexity of combinatorial problems involves intensive use of computational resources. Traditionally, researchers with such compute intensive needs use supercomputers in a time and node sharing fashion. There are some problems with this approach: (a) Supercomputers tend to be very expensive to acquire (millions of dollars) and to maintain. Also the competition used to be quite weak. (b) Because supercomputers are expensive, parts required to repair them are expensive also, thus the maintenance costs are high. (c) A number of researchers have access to supercomputers competing for CPU time (and occasionally other resources), thus quite often one has to wait weeks until his/her tasks are run. (d) It is expensive to run something on a supercomputer (since supercomputers are themselves expensive), thus quite big grants are required to do anything serious.

DTIC

Commercial Off-The-Shelf Products; Architecture (Computers); Supercomputers

20010047673 NASA Ames Research Center, Moffett Field, CA USA

1993 Gordon Bell Prize Winners

Karp, Alan H., Hewlett-Packard Labs., USA; Simon, Horst, Computer Sciences Corp., USA; Heller, Don, Rice Univ., USA; [1994]; 12p; In English

Contract(s)/Grant(s): RTOP 536-01-11; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Gordon Bell Prize recognizes significant achievements in the application of supercomputers to scientific and engineering problems. In 1993, finalists were named for work in three categories: (1) Performance, which recognizes those who solved a real problem in the quickest elapsed time. (2) Price/performance, which encourages the development of cost-effective supercomputing. (3) Compiler-generated speedup, which measures how well compiler writers are facilitating the programming of parallel processors. The winners were announced November 17 at the Supercomputing 93 conference in Portland, Oregon. Gordon Bell, an independent consultant in Los Altos, California, is sponsoring $2,000 in prizes each year for 10 years to promote practical parallel processing research. This is the sixth year of the prize, which Computer administers. Something unprecedented in Gordon Bell Prize competition occurred this year: A computer manufacturer was singled out for recognition. Nine entries reporting results obtained on the Cray C90 were received, seven of the submissions orchestrated by Cray Research. Although none of these entries showed sufficiently high performance to win outright, the judges were impressed by the breadth of applications that ran well on this machine, all nine running at more than a third of the peak performance of the machine.

Derived from text

Competition; Parallel Processing (Computers); Supercomputers

20010047772 Connecticut Univ., Dept. of Electrical and Computer Engineering, Storrs, CT USA

Analysis of the Westland Data Set

Wen, Fang, Connecticut Univ., USA; Willett, Peter, Connecticut Univ., USA; Deb, Somnath, Qualtech Systems, Inc., USA; [2001]; 13p; In English; SPIE Aerosense Conference, 16-20 Apr. 2001, Orlando, FL, USA; Sponsored by International Society for Optical Engineering, USA

Contract(s)/Grant(s): NASA-008-SC-1002; DAAG55-98-C-0057; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The ”Westland” set of empirical accelerometer helicopter data with seeded and labeled faults is analyzed with the aim of condition monitoring. The autoregressive (AR) coefficients from a simple linear model encapsulate a great deal of information in a relatively few measurements; and it has also been found that augmentation of these by harmonic and other parameters call improve classification significantly. Several techniques have been explored, among these restricted Coulomb energy (RCE) networks, learning vector quantization (LVQ), Gaussian mixture classifiers and decision trees. A problem with these approaches, and in common with many classification paradigms, is that augmentation of the feature dimension can degrade classification ability. Thus, we also introduce the Bayesian data reduction algorithm (BDRA), which imposes a Dirichlet prior oil training data and is thus able to quantify probability of error in all exact manner, such that features may be discarded or coarsened appropriately. Author

Data Acquisition; Accelerometers; Helicopters; Error Analysis; Data Reduction

20010048415 Computer Sciences Corp., Moffett Field, CA USA

Are Fibre Channel SANs a Commodity?

Becker, Jeff, Computer Sciences Corp., USA; Jacob, Matt, Computer Sciences Corp., USA; [2000]; 2p; In English; USENIX Annual Technical Meeting, June 2001, Boston, MA, USA; Sponsored by USENIX, Unknown; No Copyright; Avail: Issuing Activity; Abstract Only

The goal of this work is to evaluate the feasibility of putting together a Fibre Channel Storage Area Network with heterogeneous hardware running both open-source and commercial operating systems. Adherence to the Fibre Channel Specification is supposed to guarantee interoperability in such an environment. We also want to evaluate how difficult it might be to put together a SAN using open-source components. While all the commercial vendors provide Fibre Channel support, this comes at a cost, e.g., not only O/S and drivers, but usually an expensive support contract. The open-source model could lower the cost of building and maintaining a SAN. of course, for this to be the case, the open-source platforms would have to provide the functionality to construct a SAN. We are assembling a Fibre Channel SAN from heterogeneous hardware (i386, alpha, sparc) running *BSD, Linux, Tru64, NT and Solaris operating systems. We are running several tests to investigate the level of Fibre Channel support provided by each OS. Our current testbed is specified in the table below. Currently, it only contains open-source platforms. We plan to add a PC running OpenBSD, as well as the following commercial systems: Sun Ultra 1/Solaris, DEC AlphaServer 4000/Tru64 UNIX, Pentium Pro PC/Windows NT.

Derived from text

Evaluation; Feasibility; Commodities; Fibers; Memory (Computers)

61
COMPUTER PROGRAMMING AND SOFTWARE

Includes software engineering, computer programs, routines, algorithms, and specific applications, e.g., CAD/CAM. For computer software applied to specific applications, see also the associated category.

20010045532 NASA Ames Research Center, Artificial Intelligence Research Branch, Moffett Field, CA USA
A Logical Account of Diagnosis with Multiple Theories
Pandurang, P., NASA Ames Research Center, USA; [1994]; 1p; In English; (AAAI-94) Twelfth National Conference on Artificial Intelligence, 31 Jul. - 4 Aug., 1994, Seattle, WA, USA
Contract(s)/Grant(s): RTOP 232-01-03; No Copyright; Avail: Issuing Activity; Abstract Only

Model-based diagnosis is a powerful, first-principles approach to diagnosis. The primary drawback with model-based diagnosis is that it is based on a system model, and this model might be inappropriate. The inappropriateness of models usually stems from the fundamental tradeoff between completeness and efficiency. Recently, Struss has developed an elegant proposal for diagnosis with multiple models. Struss characterizes models as relations and develops a precise notion of abstraction. He defines relations between models and analyzes the effect of a model switch on the space of possible diagnoses. In this paper we extend Struss's proposal in three ways. First, our account of diagnosis with multiple models is based on representing models as more expressive first-order theories, rather than as relations. A key technical contribution is the use of a general notion of abstraction based on interpretations between theories. Second, Struss conflates component modes with models, requiring him to define models relations such as choices which result in non-relational models. We avoid this problem by differentiating component modes from models. Third, we present a more general account of simplifications that correctly handles situations where the simplification contradicts the base theory.
Author
Diagnosis; Clinical Medicine; Models

20010045638 BDM Federal, Inc., Albuquerque, NM USA
Sustaining and Improving Structured Simulation-Based Training
Bessemer, David W.; Myers, William E.; May 1998; 29p; In English
Contract(s)/Grant(s): AF Proj. A793
Report No.(s): AD-A344895; No Copyright; Avail: Defense Technical Information Center (DTIC)

The U.S. Army Simulation, Training, and Instrumentation Command (STRICOM) is developing the Close Combat Tactical Trainer (CCTT) to support maneuver training for platoon and company units. The CCTT is the first part of the Combined Army Tactical Training (CATT) system providing operational training for combined arms forces on a virtual battlefield. The U.S. Army Research Institute (ARI) also is developing structured CCTT training support packages (TSPs) for required mission and task training. Successful structured training in the Virtual Training Program (VTP) with Simulation Networking (SIMNET) established a model for similar CaT training. This report examines integrated system management needed to implement successful training with the CCTT and its TSPs. While CCTT development has focused on simulation requirements, and TSP development has focused on training requirements, total system management has been a secondary consideration. Conceived in a Total Quality Management (TQM) framework, the report proposes processes designed to sustain and improve the training effectiveness of the CCTT throughout system life. The emphasis is on continuous monitoring of training process and products to provide management feedback, and establishing process action teams to define and solve system problems. The report identifies some training process indicators, and possible management support tools.
DTIC
Computerized Simulation; Defense Program; Education

20010045639 Pennsylvania Univ., Philadelphia, PA USA
MediSIM: Simulated Medical Corpsmen for Medical Forces Planning and Training ***Final Report, 8 Sep. 1994 - 30 Sep. 1997***
Badler, Norman; Oct. 1997; 14p; In English
Contract(s)/Grant(s): DAMD17-94-J-4486
Report No.(s): AD-A343165; No Copyright; Avail: Defense Technical Information Center (DTIC)

The MediSim system extends virtual environment technology to allow medical personnel to interact with and train on simulated casualties. The casualty model employs a three-dimensional animated human body that displays appropriate physical and behavioral responses to injury and/or treatment. Medical corpsmen behaviors were developed to allow the actions of simulated medical personnel to conform to both military practice and medical protocols during patient assessment and

stabilization. A trainee may initiate medic actions through a mouse and menu interface; a VR interface has also been created by Stansfield's research group at Sandia National Labs.
DTIC
Computerized Simulation; Models; Virtual Reality; Education; Casualties; Three Dimensional Bodies

20010046751 Army Research Lab., Advanced Computational and Information Sciences Directorate, Aberdeen Proving Ground, MD USA
Implementation of Spread Spectrum Image Steganography ***Final Report, Jun. 1999-Aug. 2000***
Brundick, Frederick S.; Marvel, Lisa M.; Mar. 2001; 32p; In English
Report No.(s): AD-A387599; ARL-TR-2433; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
Steganographic techniques are useful to convey hidden information by using various types of typically-transmitted multimedia data as cover for concealed communication. Spread Spectrum Image Steganography (SSIS) is a data-hiding/hidden-communication method that uses digital imagery as a cover signal. This report describes an SSIS prototype system for embedding messages in images and extracting messages from stegoimages. The components, which were written in the Java and C programming languages, were kept modular to provide a workbench for further experimentation. We discuss experiments that were performed with the system, along with possible avenues of future research to improve the SSIS process.
DTIC
Spread Spectrum Transmission; Digital Techniques; Computer Programming; Imagery

20010046753 Standard Object Systems, Inc., USA
Software Package for Speaker Independent or Dependent Speech Recognition Using Standard Objects for Phonetic Speech Recognition
Pfister, M.; Feb. 09, 1998; 46p; In English
Contract(s)/Grant(s): N61339-96-C-0088
Report No.(s): AD-A341198; No Copyright; Avail: Defense Technical Information Center (DTIC)
The research identified the overall requirements of an end to end phonetic speech recognition process for a speech recognition software product (SPSR). The effort has focused on expanding the existing Standard Objects for Phonetic Speech Recognition technology to the design of innovative software for a speaker independent continuous speech recognition system that can exploit the current parallel digital signal processing and mircocomputer technology. This software product for speech recognition will be developed in Phase 2 for use in speech recognition for air traffic control training.
DTIC
Air Traffic Control; Speech Recognition; Software Engineering; Object-Oriented Programming

20010046756 California Univ., Berkeley, CA USA
Reactive Control of Distributed Interactive Simulations
Kohn, W., California Univ., USA; Remmel, J. B., California Univ., USA; Nerode, A., California Univ., USA; Mar. 31, 1998; 63p; In English
Contract(s)/Grant(s): DAAH04-96-1-0341
Report No.(s): AD-A344363; ARO-35873.78-MA-MUR; No Copyright; Avail: Defense Technical Information Center (DTIC)
In this paper we propose a distributed control architecture for Distributed Interactive Simulation (DIS) applications which allows for the dynamic integration and communication of interacting processes using intelligent control agents cooperating via a logic communication network. The type of DIS applications which we discuss include the interactive simulation initiative of the US Army to create a realistic warfare training environment by using high speed communications to permit real time interaction between geographically dispersed warfare simulations with actual combat units in the field, cooperative game playing, and virtual manufacturing.
DTIC
Distributed Interactive Simulation; Telecommunication

20010046757 Cornell Univ., Mathematical Sciences Inst., Ithaca, NY USA
Basic Forward Chaining Construction for Logic Programs
Marek, V. W.; Nerode, A.; Remmel, J. B.; Jun. 1997; 14p; In English
Contract(s)/Grant(s): DAAH04-96-1-0341
Report No.(s): AD-A344500; TR-97-01; ARO-35873.66-MA-MUR; No Copyright; Avail: Defense Technical Information Center (DTIC)

One of the problems which motivated this paper is how do we deal with inconsistent information. For example, suppose that we want to develop an expert system using logic programming with negation as a failure. One problem is that the resulting program may be inconsistent in the sense that the program has no stable model. That is the experts may not be consistent. The question then becomes how can we eliminate some of the clauses so that we can get a consistent program. That is, at a minimum, we would like to select a subprogram of the original program which has a stable model. In this paper, we shall present a basic Forward Chaining type construction which can be applied to any general logic program. All stable models of the original program will be constructed by our Forward Chaining construction for suitable orderings. Moreover, we shall show that for finite propositional logic programs, our construction will run in polynomial time.
DTIC
Expert Systems; Logic Programming; Mathematical Logic

20010046861 Virginia Polytechnic Inst. and State Univ., Blacksburg, VA USA
Design Space Exploration for MDO on a Teraflop Computer ***Final Report, 1 Feb. 1998 - 31 Jan. 2001***
Grossman, Bernard, Virginia Polytechnic Inst. and State Univ., USA; Watson, Layne T., Virginia Polytechnic Inst. and State Univ., USA; Mason, William H., Virginia Polytechnic Inst. and State Univ., USA; [2001]; 5p; In English; Original contains color illustrations
Contract(s)/Grant(s): NAG2-1180; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche
The objective of this project was to make efficient use of massively parallel computation for exploration of high-dimensional aircraft-configuration design space.
Author
Aircraft Configurations; Massively Parallel Processors; Parallel Processing (Computers)

20010046990 Computer Sciences Corp., Moffett Field, CA USA
High Performance Distributed Computing in a Supercomputer Environment: Computational Services and Applications Issues
Kramer, Williams T. C., Computer Sciences Corp., USA; Simon, Horst D., NASA Ames Research Center, USA; [1994]; 1p; In English; Third International Symposium on High-Performance Distributed Computing, 3-6 Aug. 1994, San Francisco, CA, USA
Contract(s)/Grant(s): RTOP 536-01-11; No Copyright; Avail: Issuing Activity; Abstract Only
This tutorial proposes to be a practical guide for the uninitiated to the main topics and themes of high-performance computing (HPC), with particular emphasis to distributed computing. The intent is first to provide some guidance and directions in the rapidly increasing field of scientific computing using both massively parallel and traditional supercomputers. Because of their considerable potential computational power, loosely or tightly coupled clusters of workstations are increasingly considered as a third alternative to both the more conventional supercomputers based on a small number of powerful vector processors, as well as high massively parallel processors. Even though many research issues concerning the effective use of workstation clusters and their integration into a large scale production facility are still unresolved, such clusters are already used for production computing. In this tutorial we will utilize the unique experience made at the NAS facility at NASA Ames Research Center. Over the last five years at NAS massively parallel supercomputers such as the Connection Machines CM-2 and CM-5 from Thinking Machines Corporation and the iPSC/860 (Touchstone Gamma Machine) and Paragon Machines from Intel were used in a production supercomputer center alongside with traditional vector supercomputers such as the Cray Y-MP and C90.
Author
Massively Parallel Processors; Supercomputers; Parallel Processing (Computers)

20010047053 Reliable Software Technologies Corp., Dulles, VA USA
Assessing Survivability Using Software Fault Injection
Voas, Jeffrey, Reliable Software Technologies Corp., USA; New Information Processing Techniques for Military Systems; April 2001, pp. 11-1 - 11-10; In English; See also 20010047042; Copyright Waived; Avail: CASI; A02, Hardcopy
In this paper, we present an approach and experimental results from using software fault injection to assess information survivability. We define information survivability to mean the ability of an information system to continue to operate in the presence of faults, anomalous system behavior, or malicious attack. In the past, finding and removing software flaws has traditionally been the realm of software testing. Software testing has largely concerned itself with ensuring that software behaves correctly - an intractable problem for any non-trivial piece of software. In this paper, we present ”off-nominal” testing techniques, which are not concerned with the correctness of the software, but with the survivability of the software in the face of anomalous events and malicious attack. Where software testing is focused on ensuring that the software computes the specified function

correctly, we are concerned that the software continues to operate in the presence of faults, unusual system events or malicious attacks.
Author
Computer Programs; Injection; Software Reliability; Program Verification (Computers)

20010047069 Defence Evaluation Research Agency, Malvern, UK
Information Visualisation in Battle Management
Varga, Margaret, Defence Evaluation Research Agency, UK; McQueen, Steve, Defence Evaluation Research Agency, UK; Rossi, Adrian, Defence Evaluation Research Agency, UK; New Information Processing Techniques for Military Systems; April 2001, pp. 26-1 - 26-7; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A02, Hardcopy

Visualisation is often thought of as simply the use of computer systems to display processed data graphically, often in a rather colourful and complex manner. More generally, however, visualisation is the human's capacity to utilize effectively and efficiently the output from a computer in order to understand data. Military operations today depend heavily on the C(sup 4)ISR (Command Control, Communications, Computing, Intelligence, Surveillance and Reconnaissance) framework. Unfortunately many military systems make it difficult for users to develop a useful understanding of the information relevant to immediate requirements which is contained within the massive amount of data that flows from the various intelligence sources. The users may not be able to use the systems to extract the information from the data, or they may not be able to create displays that allow them to see what they need. Potential information sources may be ignored, or not well used, because techniques for extracting information are deficient. As a consequence, users of many current systems discard much data unassessed. Strategic and tactical actions, simulation and training are all seen to be significantly less efficient than they might be because commanders are not able to access, assimilate and exploit all the available information. New technologies and data sources now envisaged will require radically improved ways for allowing users to interact with data. Interaction is critical, but at present information is usually presented to commander-,, analysts and executives as a passive situation display. Effective visualisation requires the users to interact closely with the visual, auditory and perhaps haptic displays. This paper describes the UK Master Battle Planner (MBP). The MBP is an Air Tasking Order planning tool, which aims to provide an adaptive, decision-centered, visualisation environment for UK Joint force commanders. The MBP's developing mission assessment component is also described.
Author
Military Operations; Telecommunication; Command and Control; Information Systems

20010047071 Office of Naval Research, Arlington, VA USA
A Framework for Multidimensional Information Presentation Using Virtual Environments
Matzke, Sarah Monique, Office of Naval Research, USA; Schmorrow, Dylan D., Office of Naval Research, USA; New Information Processing Techniques for Military Systems; April 2001, pp. 28-1 - 28-5; In English; See also 20010047042; Copyright Waived; Avail: CASI; A01, Hardcopy

A variety of Virtual Environment (VE) systems exist today and there are as many terms to them. Synthetic environments, virtual reality (VR), and VEs, to name a few, all refer to a simulation of some operational environment. The gamut of VEs runs anywhere from desktop displays to fully immersive and interactive scenes. What these systems share is the need to capture, process, and present data. Presented effectively, the information can enable a user to make timely and informed decisions. This paper will provide some examples of current VE technology and present a framework for VE systems. The paper will also address some of the future directions and challenges facing the evolution of VE technology.
Author
Display Devices; Simulation; Virtual Reality

20010047072 Naval Research Lab., Washington, DC USA
Distributed Collaborative Virtual Reality Framework for System Prototyping and Training
Guleyupoglu, Suleyman, Naval Research Lab., USA; Ng, Henry, Naval Research Lab., USA; New Information Processing Techniques for Military Systems; April 2001, pp. 29-1 - 29-8; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A02, Hardcopy

The significant impact Information Technology has made in the lives of most people in the last decade or two is undeniable. Coupled with other enabling technologies, many tasks get accomplished more efficiently and reliably nowadays. However, there are instances where the adoption of these technologies takes longer for variety of reasons. System prototyping and training of war fighters has been an area where enabling technologies can be better utilized. One of the keys to the success of military operations with the least amount of casualties is a well-trained group of people fighting the war. It is also essential that they are well

accustomed to the environment in which they operate and comfortable with it. to achieve this, live training would be ideal in almost all cases except where it would pose a significant safety risk. This, of course, is not possible in reality as the resources available for training is limited in the real world. In this paper, we address the use of enabling technologies in the military and describe a framework that takes advantage of several state-of-the-art technologies to perform combat system design, evaluation and training. The framework uses virtual reality and distributed computing technologies to provide users (trainees, trainers, or combat system designers) an immersive environment to interact with the combat system and the other users. The framework allows participants to collaborate on the same mission or activity in the virtual environment without the need to be at the same geographical location. There are numerous benefits to systems based on this framework. It is possible to bring together participants into the same virtual environment as opposed to doing this in the physical world that may be costly and sometimes difficult logistically. The cost of training is significantly cheaper since the initial cost and maintenance of computer equipment is usually less than the cost of real combat systems. The framework allows new weapon systems, for example a combat information center, to be built virtually so that users can conduct a walk-through and make suggestions on the design of the system. In other words, the end users can actively participate in the early design phase of a new combat system.
Derived from text
Virtual Reality; Training Devices; Information Systems; Prototypes; Systems Engineering

20010047230 NASA Glenn Research Center, Cleveland, OH USA
Web-Based Distributed Simulation of Aeronautical Propulsion System
Zheng, Desheng, AYT Corp., USA; Follen, Gregory J., NASA Glenn Research Center, USA; Pavlik, William R., AYT Corp., USA; Kim, Chan M., NASA Glenn Research Center, USA; Liu, Xianyou, AYT Corp., USA; Blaser, Tammy M., NASA Glenn Research Center, USA; Lopez, Isaac, NASA Glenn Research Center, USA; April 2001; 14p; In English; 10th International Symposium on High Performance Distributed Computing, 7-9 Aug. 2001, San Francisco, CA, USA; Sponsored by Institute of Electrical and Electronics Engineers, USA
Contract(s)/Grant(s): NAS3-00180; RTOP 704-31-63
Report No.(s): NASA/TM-2001-210818; NAS 1.15:210818; E-12733; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

An application was developed to allow users to run and view the Numerical Propulsion System Simulation (NPSS) engine simulations from web browsers. Simulations were performed on multiple INFORMATION POWER GRID (IPG) test beds. The Common Object Request Broker Architecture (CORBA) was used for brokering data exchange among machines and IPG/Globus for job scheduling and remote process invocation. Web server scripting was performed by JavaServer Pages (JSP). This application has proven to be an effective and efficient way to couple heterogeneous distributed components.
Author
Computer Programs; Propulsion System Performance; Computerized Simulation

20010047255 Rice Univ., Dept. of Electrical and Computer Engineering, Houston, TX USA
Optimizing VHDL Intermediate Forms ***Final Report, 16 Sep. 1997-17 Sep. 2000***
Cooper, Keith D.; Bennett, John; Torczon, Linda; Mar. 2001; 13p; In English
Contract(s)/Grant(s): F33615-97-C-1125; AF Proj. ARPA
Report No.(s): AD-A388180; AFRL-IF-WP-TR-2001-1514; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This program was based on leveraging software compiler optimization expertise to further improve upon hardware compiler optimization techniques for Field Programmable Gate Arrays (FPGAs).
DTIC
Optimization; Compilers; Hardware Description Languages

20010047388 NASA Glenn Research Center, Cleveland, OH USA
LabVIEW Interface Concepts Used in NASA Scientific Investigations and Virtual Instruments
Roth, Don J., NASA Glenn Research Center, USA; Parker, Bradford H., NASA Goddard Space Flight Center, USA; Rapchun, David A., Global Science and Technology, Inc., USA; Jones, Hollis H., NASA Goddard Space Flight Center, USA; Cao, Wei, West Virginia Univ., USA; February 2001; 28p; In English; Original contains color illustrations
Contract(s)/Grant(s): RTOP 708-31-13
Report No.(s): NASA/TM-2001-210683; E-12610; NAS 1.15:210683; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This article provides an overview of several software control applications developed for NASA using LabVIEW. The applications covered here include (1) an Ultrasonic Measurement System for nondestructive evaluation of advanced structural

materials, an Xray Spectral Mapping System for characterizing the quality and uniformity of developing photon detector materials, (2) a Life Testing System for these same materials, (3) and the instrument panel for an aircraft mounted Cloud Absorption Radiometer that measures the light scattered by clouds in multiple spectral bands. Many of the software interface concepts employed are explained. Panel layout and block diagram (code) strategies for each application are described. In particular, some of the more unique features of the applications' interfaces and source code are highlighted. This article assumes that the reader has a beginner-to-intermediate understanding of LabVIEW methods.
Author
Computer Programs; Virtual Reality; Measuring Instruments; Software Development Tools

20010047490 Computer Sciences Corp., Moffett Field, CA USA
Incremental Parallelization of Non-Data-Parallel Programs Using the Charon Message-Passing Library
VanderWijngaart, Rob F., Computer Sciences Corp., USA; [2000]; 11p; In English; Tenth SIAM Conference on Parallel Processing for Scientific Computing, 12-14 Mar. 2001, Portsmouth, VA, USA; Sponsored by Society for Industrial and Applied Mathematics, USA
Contract(s)/Grant(s): NASA Order A-61812-D; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Message passing is among the most popular techniques for parallelizing scientific programs on distributed-memory architectures. The reasons for its success are wide availability (MPI), efficiency, and full tuning control provided to the programmer. A major drawback, however, is that incremental parallelization, as offered by compiler directives, is not generally possible, because all data structures have to be changed throughout the program simultaneously. Charon remedies this situation through mappings between distributed and non-distributed data. It allows breaking up the parallelization into small steps, guaranteeing correctness at every stage. Several tools are available to help convert legacy codes into high-performance message-passing programs. They usually target data-parallel applications, whose loops carrying most of the work can be distributed among all processors without much dependency analysis. Others do a full dependency analysis and then convert the code virtually automatically. Even more toolkits are available that aid construction from scratch of message passing programs. None, however, allows piecemeal translation of codes with complex data dependencies (i.e. non-data-parallel programs) into message passing codes. The Charon library (available in both C and FORTRAN) provides incremental parallelization capabilities by linking legacy code arrays with distributed arrays. During the conversion process, non-distributed and distributed arrays exist side by side, and simple mapping functions allow the programmer to switch between the two in any location in the program. Charon also provides wrapper functions that leave the structure of the legacy code intact, but that allow execution on truly distributed data. Finally, the library provides a rich set of communication functions that support virtually all patterns of remote data demands in realistic structured grid scientific programs, including transposition, nearest-neighbor communication, pipelining, gather/scatter, and redistribution. At the end of the conversion process most intermediate Charon function calls will have been removed, the non-distributed arrays will have been deleted, and virtually the only remaining Charon functions calls are the high-level, highly optimized communications. Distribution of the data is under complete control of the programmer, although a wide range of useful distributions is easily available through predefined functions. A crucial aspect of the library is that it does not allocate space for distributed arrays, but accepts programmer-specified memory. This has two major consequences. First, codes parallelized using Charon do not suffer from encapsulation; user data is always directly accessible. This provides high efficiency, and also retains the possibility of using message passing directly for highly irregular communications. Second, non-distributed arrays can be interpreted as (trivial) distributions in the Charon sense, which allows them to be mapped to truly distributed arrays, and vice versa. This is the mechanism that enables incremental parallelization. In this paper we provide a brief introduction of the library and then focus on the actual steps in the parallelization process, using some representative examples from, among others, the NAS Parallel Benchmarks. We show how a complicated two-dimensional pipeline-the prototypical non-data-parallel algorithm- can be constructed with ease. to demonstrate the flexibility of the library, we give examples of the stepwise, efficient parallel implementation of nonlocal boundary conditions common in aircraft simulations, as well as the construction of the sequence of grids required for multigrid.
Derived from text
Messages; Architecture (Computers); Distributed Memory; Data Structures

20010047563 Houston Univ., TX USA
Fast (Parallel) Algorithms for Spherical Transforms and Many-Body Interactions with Applications in Electrostratics, Image Processing and Chemistry ***Final Report, 1 Jun. 1996-31 Jul. 1999***
Johnsson, S. L.; Mirkovic, Dragan; Feb. 28, 2001; 12p; In English
Contract(s)/Grant(s): F49620-96-1-0289
Report No.(s): AD-A388096; AFRL-SR-BL-TR-01-195; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The main accomplishments during this grant period are in the following areas: (1) Fast parallel algorithms for Legendre and spherical transforms. The accomplishments in this area effectively break down into two subareas, namely: (a) Development of fast algorithms for the discrete Legendre transform (FLT). (b) Development of factorizations of the Fourier transform (FFT) and the cosine transform (FCT) adapted for the use in spherical transforms. (2) Fast N-body algorithms. (3) Efficient parallel codes for electromagnetic field computations.
DTIC
Many Body Problem; Algorithms; Spherical Harmonics; Parallel Processing (Computers); Transformations (Mathematics)

20010047585 Georgia Inst. of Tech., School of Psychology, Atlanta, GA USA
Enhancing Problem Solving Through Subgoal Learning: The Use of Examples and Computerized Training Environments ***Final Report, 1 Apr. 1998-30 Nov. 2000***
Catrambone, Richard; Feb. 28, 2000; 6p; In English
Contract(s)/Grant(s): F49620-98-1-0362
Report No.(s): AD-A388164; AFRL-SR-BL-TR-01-0182; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche
This research has focused on the development of training examples designed to help learners solve novel problems more effectively in domains such as probability and algebra. It has also examined the development of computer-based learning environments, also with the goal of helping learners to acquire knowledge in a way that helps them to transfer to new problems. An additional area of inquiry has been on the development of computer-based tools for carrying out tasks. The common thread among these projects has been the use of a task analysis (or instructional design analysis) to guide the development of the materials and tools. The results of the studies have indicated that materials and tools designed after such an analysis produce significantly better learning and task performance compared to materials that are designed in other ways. Issues concerning how the materials are presented are also important, but seem to be less important than making sure they are based on a task analysis.
DTIC
Computer Assisted Instruction; Problem Solving

20010047774 NASA Langley Research Center, Hampton, VA USA
Computational Analysis of a Pylon-Chevron Core Nozzle Interaction
Thomas, Russell H., NASA Langley Research Center, USA; Kinzie, Kevin W., NASA Langley Research Center, USA; Pao, S. Paul, NASA Langley Research Center, USA; [2001]; 14p; In English; 7th AIAA/CEAS Aeroacoustics Conference, 28-30 May 2001, Maastricht, Netherlands; Sponsored by American Inst. of Aeronautics and Astronautics, USA; Original contains color illustrations
Report No.(s): AIAA Paper 2001-2185; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche
In typical engine installations, the pylon of an engine creates a flow disturbance that interacts with the engine exhaust flow. This interaction of the pylon with the exhaust flow from a dual stream nozzle was studied computationally. The dual stream nozzle simulates an engine with a bypass ratio of five. A total of five configurations were simulated all at the take-off operating point. All computations were performed using the structured PAB3D code which solves the steady, compressible, Reynolds-averaged Navier-Stokes equations. These configurations included a core nozzle with eight chevron noise reduction devices built into the nozzle trailing edge. Baseline cases had no chevron devices and were run with a pylon and without a pylon. Cases with the chevron were also studied with and without the pylon. Another case was run with the chevron rotated relative to the pylon. The fan nozzle did not have chevron devices attached. Solutions showed that the effect of the pylon is to distort the round Jet plume and to destroy the symmetrical lobed pattern created by the core chevrons. Several overall flow field quantities were calculated that might be used in extensions of this work to find flow field parameters that correlate with changes in noise.
Author
Analysis (Mathematics); Computation; Distortion; Flow Distribution; Noise Reduction; Trailing Edges; Nozzle Efficiency

20010047985 Florida Univ., Dept. of Aerospace Engineering Mechanics and Engineering Science, Gainesville, FL USA
Design Space Exploration for MDO on a Teraflop Computer ***Final Report, 1 Feb. 1998 - 31 Jan. 2001***
Haftka, Raphael, Florida Univ., USA; [2001]; 2p; In English
Contract(s)/Grant(s): NAG2-1179; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche
The objective of this work was to develop global optimization techniques suitable for identifying promising regions in high dimensional aircraft configuration design space. Different optimization methods have been examined to evaluation their ability

to efficiently search the design space to locate promising regions. Multistart local optimization methods as well as global search techniques were examined and modified to compare their performance on high dimensional design space.
Author
Design Optimization; Algorithms; Computer Programs

20010048000 Connecticut Univ., Dept. of Electrical and Computer Engineering, Storrs, CT USA
Comparison of Fault Detection Algorithms for Real-time Diagnosis in Large-Scale System, Appendix E ***Final Report***
Kirubarajan, Thiagalingam, Connecticut Univ., USA; Malepati, Venkat, Qualtech Systems, Inc., USA; Deb, Somnath, Qualtech Systems, Inc., USA; Ying, Jie, Connecticut Univ., USA; [2001]; 14p; In English; SPIE Aerosense Conference, 16-20 Apr. 2001, Orlando, FL, USA; Sponsored by International Society for Optical Engineering, USA
Contract(s)/Grant(s): NAS2-99048; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In this paper, we present a review of different real-time capable algorithms to detect and isolate component failures in large-scale systems in the presence of inaccurate test results. A sequence of imperfect test results (as a row vector of I's and O's) are available to the algorithms. In this case, the problem is to recover the uncorrupted test result vector and match it to one of the rows in the test dictionary, which in turn will isolate the faults. In order to recover the uncorrupted test result vector, one needs the accuracy of each test. That is, its detection and false alarm probabilities are required. In this problem, their true values are not known and, therefore, have to be estimated online. Other major aspects in this problem are the large-scale nature and the real-time capability requirement. Test dictionaries of sizes up to 1000 x 1000 are to be handled. That is, results from 1000 tests measuring the state of 1000 components are available. However, at any time, only 10-20% of the test results are available. Then, the objective becomes the real-time fault diagnosis using incomplete and inaccurate test results with online estimation of test accuracies. It should also be noted that the test accuracies can vary with time --- one needs a mechanism to update them after processing each test result vector. Using Qualtech's TEAMS-RT (system simulation and real-time diagnosis tool), we test the performances of 1) TEAMSAT's built-in diagnosis algorithm, 2) Hamming distance based diagnosis, 3) Maximum Likelihood based diagnosis, and 4) HidderMarkov Model based diagnosis.
Author
Algorithms; Real Variables; Error Analysis; Maximum Likelihood Estimates; Systems Analysis; Real Time Operation

20010048004 Institute for Computer Applications in Science and Engineering, Hampton, VA USA
Tactical Conflict Detection and Resolution in a 3-D Airspace ***Final Report***
Dowek, Gilles, Institut National de Recherche d'Informatique et d'Automatique, France; Munoz, Cesar, Institute for Computer Applications in Science and Engineering, USA; Geser, Alfons, Institute for Computer Applications in Science and Engineering, USA; April 2001; 20p; In English; Fourth International Air Traffic Management R and D Seminar, Unknown
Contract(s)/Grant(s): NAS1-97046; RTOP 505-90-52-01
Report No.(s): NASA/CR-2001-210853; NAS 1.26:210853; ICASE-2001-7; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This paper presents an algorithm for detection and resolution of air traffic conflicts in a 3-dimensional (3-D) airspace for two aircraft, namely ownship and intruder. A conflict is a projected incursion of the intruder aircraft within the protected zone of the ownship. A solution is a single maneuver, to be performed by the ownship, that effectively keeps the required minimum separation without cooperation of the intruder aircraft. The input to the algorithm is the state information, i.e., horizontal position, altitude, ground track, and vertical and ground speed, of both aircraft. The algorithm outputs a set of solutions. Each solution modifies only one state parameter of the ownship: ground track, ground speed, or vertical speed. The proposed algorithm is suitable for formal verification.
Author
Algorithms; Air Traffic; Three Dimensional Models

20010048012 Computer Sciences Corp., Moffett Field, CA USA
A Comparison of Parameter Study Creation and Job Submission Tools
DeVivo, Adrian, Computer Sciences Corp., USA; Yarrow, Maurice, Computer Sciences Corp., USA; McCann, Karen M., Computer Sciences Corp., USA; [2001]; 8p; In English
Contract(s)/Grant(s): NASA Order A-61812-D; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

We consider the differences between the available general purpose parameter study and job submission tools. These tools necessarily share many features, but frequently with differences in the way they are designed and implemented For this class of features, we will only briefly outline the essential differences. However we will focus on the unique features which distinguish

the ILab parameter study and job submission tool from other packages, and which make the ILab tool easier and more suitable for use in our research and engineering environment.
Author
Computerized Simulation; Elastic Properties; Comparison

20010048043 Army Research Lab., Sensors Directorate, Adelphi, MD USA
Feasibility of the MUSIC Algorithm for the Active Protection System ***Final Report, Sep. - Oct. 2000***
Ly, Canh; Mar. 2001; 15p; In English
Report No.(s): AD-A388270; ARL-MR-501; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

An active protection system (APS) requires accurate knowledge of the doppler frequency of an incoming projectile. In this report, I consider two methods of computing the doppler frequency the multiple signal classification (MUSIC) algorithm and power spectral density (PSD) with the use of fast Fourier transform (1024-point FFT). Normally, MUSIC has been used to improve the resolution of multiple closely spaced targets. In this application, MUSIC is used to estimate accurately a single doppler frequency. In this report, I compared the results of the estimation of the doppler frequency of an assumed head-on projectile using FSD and the MUSIC algorithm; I wanted to determine whether the MUSIC algorithm performs better than PSD in terms of accuracy and processing time.
DTIC
Feasibility; Algorithms; Classifications; Protection

20010048187 NASA Ames Research Center, Moffett Field, CA USA
Equilibrium and Dynamics Properties of Poly(oxyethylene) Melts and Related Poly(alkylethers) from Simulations and Ab Initio Calculations
Smith, Grant D., Eloret Corp., USA; Jaffe, R. L., NASA Ames Research Center, USA; Yoon, D. Y., International Business Machines Corp., USA; [1994]; 1p; In English; American Physical Society Meeting, 21-25 Mar. 1994, Pittsburgh, PA, USA
Contract(s)/Grant(s): RTOP 232-01-04; No Copyright; Avail: Issuing Activity; Abstract Only

Molecular dynamics simulations of POE melts have been performed utilizing a potential force field parameterized to reproduce conformer energies and rotational energy barriers in dimethoxyethane as determined from ab initio electronic structure calculations. Chain conformations and dimensions of POE from the simulations were found to be in good agreement with predictions of a rotational isomeric state (RIS) model based upon the ab initio conformational. energies. The melt chains were found to be somewhat extended relative to chains at theta conditions. This effect will be discussed in light of neutron scattering experiments which indicate that POE chains are extended in the melt relative to theta solutions. The conformational characteristics of POE chains will also be compared with those of other poly (alkylethers), namely poly(oxymethylene), poly(oxytrimethylene) and poly(oxytetramethylene). Local conformational dynamics were found to be more rapid than in polymethylene. Calculated C-H vector correlation times were found to be in reasonable agreement with experimental values from C-13 NMR spin-lattice relaxation times. The influence of ionic salts on local conformations and dynamics will also be discussed.
Author
Molecular Dynamics; Simulation; Polyethylenes; Equilibrium

20010048408 Defence Science and Technology Organisation, Information Technology Div., Salisbury, Australia
Component-Based Engineering of Knowledge-Enabled Systems: Research Vision and Strategy
Goodburn, D. P. J., Defence Science and Technology Organisation, Australia; Pattison, T. R., Defence Science and Technology Organisation, Australia; Vernik, R. J., Defence Science and Technology Organisation, Australia; February 2001; 36p; In English; Original contains color illustrations
Report No.(s): DSTO-GD-0271; DODA-AR-011-705; Copyright; Avail: Issuing Activity

Australia's Strategic Policy assigns the highest capability development priority to the achievement of the "knowledge edge" over our adversaries and identifies a single Command Support System that exhibits flexibility, cost-effectiveness, robustness and adaptivity as being an important enabler of the knowledge edge. This emphasis on the knowledge edge is reinforced in the Defence 2000 White Paper, which states that the knowledge edge "will be the foundation of our military capability over the coming decades". The Software Systems Engineering (SSE) group of ITD is currently conducting research into new software engineering principles and practices, collectively referred to as component-based software engineering (CBSE), which are expected to meet the requirements of cost-effectiveness and flexibility in the development of command support systems. In addition, knowledge-based techniques, and in particular intelligent agents, provide the opportunity to incorporate adaptivity and robustness into software systems through the use of machine-learning, automated reasoning and encapsulation of domain knowledge. In this paper we outline an extension of the Software Systems Engineering Group's research into CBSE to investigate ways in which

intelligent agents can be used to exploit the combined advantages of component-based software engineering and knowledge-based techniques for the development of software for military applications.
Author
Applications Programs (Computers); Command Guidance; Computer Programming; Machine Learning; Procedures; Software Engineering; Support Systems

20010048903 Center for Mathematics and Computer Science, Amsterdam, Netherlands
Latour: A Tree Visualisation System
Herman, I., Center for Mathematics and Computer Science, Netherlands; Melancon, G., Center for Mathematics and Computer Science, Netherlands; deRuiter, M. M., Center for Mathematics and Computer Science, Netherlands; Delest, M., Center for Mathematics and Computer Science, Netherlands; Apr. 1999; ISSN 1386-3681; 22p; In English
Report No.(s): PB2001-103041; INS-R9904; Copyright; Avail: National Technical Information Service (NTIS)
This paper presents some of the most important features of a tree visualization system called Latour, developed for the purposes of information visualization. This system includes a number of interesting and unique characteristics, for example the provision for visual cues based on complexity metrics on graphs, which represent general principles that, in our view, graph based information visualization systems should generally offer.
NTIS
Information Systems; Visual Stimuli; Computer Programs

62
COMPUTER SYSTEMS

Includes computer networks and distributed processing systems. For information systems see 82 Documentation and Information Science. For computer systems applied to specific applications, see the associated category.

20010045637 Logistics Management Inst., McLean, VA USA
A Database for Decision-Making in Training and Distributed Learning Technology *Final Report*
Stouffer, Virginia; Apr. 1998; 46p; In English
Contract(s)/Grant(s): DASW01-95-C-0019
Report No.(s): AD-A344842; LMI-PR702T1; No Copyright; Avail: Defense Technical Information Center (DTIC)
LMI created a relational database to examine institutional training issues with an emphasis on converting classroom training to distributed learning courses. The database was used to cluster schoolhouse courses to identify subject groups for possible consolidation and to identify the courses promising the highest return if converted to distributed learning. Distributed learning course conversion requirements are outlined and conversion issues highlighted. A framework for incorporating data about distributed learning courseware into the existing training database was devised and a plan for a national electronic courseware redistribution network was recommended. (Electronic courseware is software that enables distributed learning.). The report describes information now available in the institutional training database, potential benefits of distributed learning conversion, and difficulties in assessing return on investment from the conversion. Military training stages, courseware classification schemes by content and occupation, and existing military distributed learning practitioners are also described.
DTIC
Decision Making; Relational Data Bases; Education; Distributed Processing

20010045642 Army Training and Doctrine Command, Fort Monroe, VA USA
Information Management: Automation, Information Systems for TRADOC Organizations and Installations
Oct. 01, 1997; 44p; In English
Report No.(s): AD-A343345; TRADOC-25-72; No Copyright; Avail: Defense Technical Information Center (DTIC)
This pamphlet provides procedures for documenting requirements for information systems and for acquiring information system equipment and information services for U.S. Army Training and Doctrine Command (TRADOC) organizations and installations. It is a consolidated source of information that includes aspects of requirements management, resourcing, acquisition and contracting.
DTIC
Information Management; Armed Forces (USA); Procurement

20010045828 NASA Langley Research Center, Hampton, VA USA

In-Flight Characterization of the Electromagnetic Environment Inside an Airliner

Moeller, Karl J., NASA Langley Research Center, USA; Dudley, Kenneth L., NASA Langley Research Center, USA; Quach, Cuong C., NASA Langley Research Center, USA; Koppen, Sandra V., Lockheed Martin Engineering and Sciences Co., USA; March 2001; 150p; In English

Contract(s)/Grant(s): RTOP 522-14-21-01

Report No.(s): NASA/TP-2001-210831; L-18041; NAS 1.60:210831; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

In 1995, the NASA Langley Research Center conducted a series of experimental measurements that characterized the electromagnetic environment (EME) inside a Boeing 757 airliner while in flight, Measurements were made of the electromagnetic energy coupled into a commercially configured aircraft as it was flown in close proximity to ground-based radio frequency (RF) transmitters operating at approximately 26, 173. and 430 MHz. The goal of this experiment was to collect data for the verification of analytical predictions of the internal aircraft response to an external stimulus. This paper describes the experiment, presents the data collected by it, and discusses techniques used to compute both the magnitude of the electric field illuminating the aircraft and its direction of propagation relative to a coordinate system fixed to the aircraft. The latter is determined from Global Positioning System (GPS) and aircraft Inertial Reference Unit (IRU) data. The paper concludes with an examination of the shielding effectiveness of the test aircraft. as determined by comparison of' the measured internal EME and computed external EME.

Author

Aircraft Performance; Flight Characteristics; In-Flight Monitoring; Electromagnetic Environment Experiment

20010046754 Calspan Corp., Buffalo, NY USA

Advanced Intelligence Information System Hyper Toolkit ***Final Report, May 1994 - Jan. 1997***

Guewa, John R., Calspan Corp., USA; Gallo, Steven M., Calspan Corp., USA; Neal, Jeannette G., Calspan Corp., USA; Stringer, Matt S., Calspan Corp., USA; Feb. 1998; 68p; In English

Contract(s)/Grant(s): F30602-94-C-0186; AF Proj. 3482

Report No.(s): AD-A341295; RL-TR-97-218; No Copyright; Avail: Defense Technical Information Center (DTIC)

In this rapidly changing world, intelligence analysts analyze the latest information on foreign systems and trends and produce assessments of the present and anticipated future capabilities of particular countries. For these assessments to be of maximum utility to operational planners and national decision makers, it is necessary to: (1) reduce the time it takes to produce and disseminate intelligence products and information; and (2) provide better and more effective ways of packaging and presenting the information to facilitate its access and understanding. to help address these problems, this effort focused on the development of the Hyper ToolKit to provide efficient means for creating and maintaining electronic linked multimedia documents and information spaces, particularly in World Wide Web (WWW) formats (e.g., HTML), to provide fast dissemination and online viewing by the intelligence community via electronic means such as Intelink and other networks, dial-up facilities, CDROM, etc. The Hyper ToolKit includes popular off the shelf word processing and media editing tools to enable users to work with familiar tools; support for information organization; and automation of lower level publishing operations via rule based processes for automated hyperlink insertion, linked wallet sized image generation and insertion, format conversion, special character handling, table of contents generation, header and footer generation, etc. The Hyper ToolKit has been developed under contract to Rome Laboratory for intelligence analysts at the National Air Intelligence Center (NAIC), at WPAFB OH.

DTIC

Internets; Hypertext; Intelligence; Communication Networks; Information Systems

20010047253 Naval Air Warfare Center, Aircraft Div., Patuxent River, MD USA

Using HLA to Transmit Real-Time Sensor Imagery

Silbert, Mark; Schibler, William; Curran, Gordon; Jan. 2000; 6p; In English

Report No.(s): AD-A388178; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

An initiative, called Modular Avionics Integration Network/Modular Avionics Integration Laboratory (MAIN/MAIL), was started in FY99 to create a coordinated approach among Naval Air Warfare Center (NAWC) laboratories to support more efficient use of both external and internal capabilities and facilities through interoperable network connectivity. This three-year effort will ensure that the Navy makes maximum use of the laboratory resources available, and through networking, provides a capability for multiple center participation in shared program developments. MAIN/MAIL uses the Defense Modeling and Simulation Office (DMSO) High Level Architecture (HLA) to facilitate this interoperability and reusability. to demonstrate the capability,

three demonstrations have been planned each showing progressively more sophisticated data sharing. These demonstrations have been labeled Demo A, B, and C.
DTIC
Real Time Operation; Imagery; Image Processing

20010047487 NASA Ames Research Center, Moffett Field, CA USA
Computation of External Aerodynamics for a Canard Rotor/Wing Aircraft
Pandya, S. A., NASA Ames Research Center, USA; Aftosmis, M. J., NASA Ames Research Center, USA; [2001]; 18p; In English; 39th AIAA Aerospace Sciences Meeting and Exhibit, 8-11 Jan. 2001, Reno, NV, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The aerodynamic loads on a Canard Rotor/Wing vehicle are investigated using inviscid numerical simulations in order to understand the flight characteristics of the vehicle during conversion from rotor craft to fixed-wing flight. A series of numerical simulations at seven azimuthal rotor indices are presented covering a quarter turn of the rotor With symmetry arguments, these simulations produce 25 data points for a complete rotation. A Cartesian mesh approach is used to compute the flow field about a configuration with faired-over engine inlet and exhaust that matches the wind tunnel geometry. These simulations were performed using meshes with approximately nine Million Cartesian cells. to better understand the aerodynamic effects of the rotor hub on the configuration, the same set of simulations were repeated for a hub-less geometry. Overall loads for both configurations are similar but are due to somewhat different aerodynamic mechanisms.
Author
Aerodynamic Loads; Computation; Rotors; Loads (Forces); Canard Configurations; Fixed Wings

20010047545 General Accounting Office, Washington, DC USA
Computer Security: Weaknesses Continue to Place Critical Federal Operations and Assets at Risk
Apr. 05, 2001; 24p; In English; Testimony before the Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Respresentatives.
Report No.(s): AD-A388474; GAO-01-600T; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

I am pleased to be here today to discuss our analysis of information security audits at federal agencies. As with other large organizations, federal agencies rely extensively on computerized systems and electronic data to support their missions. Accordingly, the security of these systems and data is essential to avoiding disruptions in critical operations, data tampering, fraud, and inappropriate disclosure of sensitive information. Today, I will summarize the results of our analysis of information security audits performed by us and by agency inspectors general since July 1999 at 24 major federal departments and agencies. In summarizing these results, I will discuss the types of pervasive weaknesses that we and agency inspectors general have identified. I will then describe the serious risks that these weaknesses pose at selected individual agencies of particular interest to this subcommittee, and the major common weaknesses that agencies need to address. Finally, I will describe the management improvements that are needed to resolve these weaknesses and the significant challenges that remain.
Author (DTIC)
Congressional Reports; USA; Computer Information Security

20010047559 General Accounting Office, Washington, DC USA
INFORMATION SECURITY: Safeguarding of Data in Excessed Department of Energy Computers
Mar. 2001; 30p; In English
Report No.(s): AD-A388087; GAO-01-469; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The computer systems that support the Department of Energy s (DOE) civilian research and development programs house enormous amounts of data and information. Although unclassified, some of the information in these systems is nevertheless sensitive and must be protected from inappropriate access or disclosure. For example, these systems might house controlled scientific and technical information such as proprietary data or information that is export controlled. For this reason, DOE property management regulations require the agency to clear the hard drives of all computers before they are transferred into the excess category for reuse or disposal. On February 16, 2001, we briefed your office on our review of the safeguarding of data in excessed DOE computers.
DTIC
Computer Information Security; Management Information Systems; Information Systems; Research

20010047618 NASA Glenn Research Center, Cleveland, OH USA

Application of Mobile-ip to Space and Aeronautical Networks

Leung, Kent, Cisco Systems, Inc., USA; Shell, Dan, Cisco Systems, Inc., USA; Ivancic, William D., NASA Glenn Research Center, USA; Stewart, David H., Verizon, USA; Bell, Terry L., Lockheed Martin, USA; Kachmar, Brian A., Analex Corp., USA; February 2001; 12p; In English; 2001 Aerospace Conference, 10-17 Mar. 2001, Big Sky, MT, USA; Sponsored by Institute of Electrical and Electronics Engineers, USA

Contract(s)/Grant(s): RTOP 322-20-2A

Report No.(s): NASA/TM-2001-210590; NAS 1.15:210590; E-12548; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The National Aeronautics and Space Administration (NASA) is interested in applying mobile Internet protocol (mobile-ip) technologies to its space and aeronautics programs. In particular, mobile-ip will play a major role in the Advanced Aeronautic Transportation Technology (AAT-F), the Weather Information Communication (WINCOMM), and the Small Aircraft Transportation System (SATS) aeronautics programs. This paper describes mobile-ip and mobile routers--in particular, the features, capabilities, and initial performance of the mobile router are presented. The application of mobile-router technology to NASA's space and aeronautics programs is also discussed.

Author

Internets; Protocol (Computers); Data Links

20010047644 General Accounting Office, Washington, DC USA

INFORMATION SECURITY: Challenges to Improving DOD's Incident Response Capabilities

Mar. 2001; 29p; In English

Report No.(s): AD-A388058; GAO-01-341; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Department of Defense (DOD) depends on interconnected information systems and communications networks for critical combat and business operations. Many of these systems and networks are interconnected through the public telecommunications infrastructure, including the Internet, and they may be targeted by an increasing variety of cyber attacks. If successful, these attacks could result in the loss or corruption of critical data, damage to information systems, or disruption of military operations. to address such threats, DOD has established organizations, known as computer incident response capabilities, at various locations worldwide. These organizations engage in a range of activities associated with preventing, detecting, and responding to computer incidents.

DTIC

Information Systems; Internets; Defense Program; Data Processing; Computer Information Security

20010048690 NASA Ames Research Center, Moffett Field, CA USA

Conformational Characteristics of Poly(tetrafluoroethylene) (PTFE) Based Upon Ab Initio Electronic Structure Calculations on Model Molecules

Smith, Grant D., Eloret Corp., USA; Jaffe, R. L., NASA Ames Research Center, USA; Yoon, D. Y., International Business Machines Corp., USA; [1994]; 1p; In English; American Physical Society Meeting, 21-24 Mar. 1994, Pittsburgh, PA, USA

Contract(s)/Grant(s): RTOP 232-01-04; No Copyright; Avail: Issuing Activity; Abstract Only

Conformational energy contours of perfluoroalkanes, determined from ab initio calculations, confirm the well-known spitting of trans states into two minima at plus or minus 17 degrees but also show that the gauche states split as well, with minima at plus or minus 124 degrees and plus or minus 84 in order to relieve steric crowding. The directions of such split distortions from the perfectly staggered states are strongly coupled for adjacent pairs of bonds in a manner identical to the intradyad pair for poly (isobutylene) chains. These conformational characteristics are fully represented by a six-state rotational isomeric state (RIS) model for PTFE comprised of t(+), t(-), g(sup +)+, g(sup +)-, g(sup -) + and g(sup -)-states, located at the split energy minima. The resultant 6 x 6 statistical weight matrix is described by first-order interaction parameters for the g+(+) (ca. 0.6 kcal/mol) and g+- (ca. 2.0 kcal/mol) states, and second order parameters for the g(sup +)+g(sup +)+ (ca 0.6 kcal/mol) and g(sup +)+g(sup -)+ (ca. 1.0 kcal/mol) states. This six-state RIS model, without adjustment of the geometric or energy parameters as determined from the ab initio calculations, predicts the unperturbed chain dimensions and the fraction of gauche bonds as a function of temperature for PTFE in good agreement with available experimental values.

Author

Polytetrafluoroethylene; Electronic Structure; Molecules

63
CYBERNETICS, ARTIFICIAL INTELLIGENCE AND ROBOTICS

Includes feedback and control theory, information theory, machine learning, and expert systems. For related information see also 54 Man/System Technology and Life Support.

20010045640 Kensal Consulting, Tucson, AZ USA
Dual Use Telemedicine Support System for Pathology ***Annual Report, 1 Oct. 1996 - 30 Sep. 1997***
Preston, Kendall; Conti, Diane; Oct. 1997; 114p; In English
Contract(s)/Grant(s): DAMD17-94-J-4500
Report No.(s): AD-A343181; No Copyright; Avail: Defense Technical Information Center (DTIC)

The research reported here involves upgrading the technology of the two telepathology workstations (TSS) previously built under this grant and the design and fabrication of the more compact PC Microscope (PCM). The TSS are being retrofitted to incorporate a diode array with a seven micrometer spacing. Enhancements have been made to the system software to simplify the user interface. The Luke Mayo 1996 Telepathology Study concluded that the TSS does permit full specimen, full color imaging that can be displayed on the computer screen, successfully transmitted for remote consultation by ISDN, and conveniently archived for future reference (Virtual Microscopy). For the PCM: (1) The PCI Stepper Motor Control Printed Circuit Board has been designed and is being fabricated. (2) Electronic imaging hardware has been designed and developed. (3) Two test enclosures for the video camera have been designed, developed and fabricated. (4) Fabrication drawings for and initial testing of the optical and mechanical systems have been completed. (5) The software logic and interface necessary for each of the user modes have been implemented. An extension of time is requested to complete all TSS retrofits, complete the PCM, and establish solid experiments using the TSS and the PCM. No additional funds are required.
DTIC
Pathology; Telemedicine; Support Systems; Information Systems; Aerospace Medicine

20010045649 Hughes Aircraft Co., Tucson, AZ USA
Design Evaluation for Personnel, Training and Human Factors (DEPTH) ***Final Report, 1 Oct. 1991 - 12 Sep. 1997***
Ianni, John D.; Lane, Ken; Jan. 17, 1998; 34p; In English
Contract(s)/Grant(s): F33615-91-C-0001; AF Proj. 2940
Report No.(s): AD-A343646; AFRL-HE-WP-TR-1998-0007; No Copyright; Avail: Defense Technical Information Center (DTIC)

Design Evaluation for Personnel, Training and Human Factors (DEPTH) was a five phase program to develop software to facilitate maintainability assessment of weapon systems. This three dimensional (3-D) graphical simulation of human activity was primarily intended to facilitate man-machine design analyses of complex systems. by importing computer aided design (CAD) data, the human figure models and analysis algorithms can help to ensure components can be seen, reached, lifted and removed by most maintainers. These simulations are also useful for logistics data capture, training, and task analysis. DEPTH was also found to be useful in obtaining task descriptions for technical manuals.
DTIC
Computer Aided Design; Human Factors Engineering; Personnel Development; Man Machine Systems; Design Analysis; Personnel Management; Education

20010046949 Institute for Human Factors TNO, Soesterberg, Netherlands
Driving with Head-Slaved Camera Systems: A Literature Survey ***Interim Report Rijden met Hoofdvolgende Camerasystemen: Een Literatuuroverzicht***
Bakker, N. H., Institute for Human Factors TNO, Netherlands; vanErp, J. B. F., Institute for Human Factors TNO, Netherlands; vanWinsum, W., Institute for Human Factors TNO, Netherlands; Jul. 27, 2000; 44p; In English
Contract(s)/Grant(s): A99/KL/346; TNO Proj. 788.1
Report No.(s): TNO-TD-2000-0151; TNO-TM-00-A041; Copyright; Avail: Issuing Activity

The present literature review focuses at two issues. Chapters 2 and 3 discuss the effects of indirect viewing and viewing deficits on driving behaviour. to order the available data, a distinction is made between peripheral vision and foveal vision. Restriction of peripheral vision (i.e., field of view) will degrade course control, speed estimation, and time to contact estimates. Degraded foveal vision (contrast and resolution) will affect lane keeping and object detection. Since direct evidence for the effects of image quality degradation related to indirect viewing systems is scarce, part of the conclusions is based on indirect evidence such as the relation between vision deficits and accidents. An important aspect in this respect is the fact that drivers with visual deficits are able to adjust their driving behaviour (e.g., reducing their speed, or avoiding driving at night), which reduces the

correlations in accident analyses. However, this observation also shows that drivers are able to make the best of degraded visual information. Besides field size and image quality, stereo vision may be an important parameter for indirect viewing systems. For this parameter little experimental data are available. This is especially true for data on the relation between stereo vision and off-the-road driving. However, it is expected that the role of stereo vision increases under degraded visual conditions. The second issue that is reviewed here is the use of head-slaved systems in vehicles. This issue is very relevant if the system employs movable cameras. An ecological approach to controlling the viewing direction of cameras is to make them head-slaved. Such a control mechanism is thought to enlarge the situational awareness of the driver, and reduce the occurrence of disorientation. However, employing a head-slaved system in combination with a head-mounted display, may also have less favourable aspects, regarding e.g. the weight on the head, visual comfort, and the effects of vehicle vibration.
Author
Cameras; Automobiles; Fovea; Viewing; Helmet Mounted Displays; Binocular Vision

20010047009 Institute for Human Factors TNO, Technische Menskunde, Soesterberg, Netherlands
Digital Adaptively Controlled ANR System ***Final Report ANR-Systeem met Adaptief Digitaal Regelcircuit***
Verhave, J. A., Institute for Human Factors TNO, Netherlands; Steeneken, H. J. M., Institute for Human Factors TNO, Netherlands; Apr. 17, 2001; 19p; In Dutch
Contract(s)/Grant(s): 48391; TNO Proj. 786.4
Report No.(s): TNO-TD-2000-0354; TNO-TM-01-A011; Copyright; Avail: Issuing Activity

Feedback based ANR-systems are normally designed for a stable operation. However, this leads to a reduced performance. Therefore it is attractive to design an adaptive algorithm which automatically optimizes the system parameters for different applications. Digital ANR allows for dynamic optimisation of system performance in order to eliminate the effect of user dependent acoustical conditions under the earmuff or the type of ambient noise. Four algorithms were developed which automatically tune some system parameters as loop gain and compensation network response. The criteria used for this optimization are: sound attenuation, level at the ear, speech intelligibility, and an adaptation of the speech signal for users with a slight hearing loss. Monitoring of the noise dose is also performed by a specific algorithm.
Derived from text
Digital Systems; Adaptive Control; Algorithms

20010047068 Near East Univ., Dept. of Computer Engineering, Lefkosa, Turkey
Automatic Detection of Military Targets Utilising Neural Networks and Scale Space Analysis
Khashman, A., Near East Univ., Turkey; New Information Processing Techniques for Military Systems; April 2001, pp. 25-1 - 25-6; In English; See also 20010047042; Copyright Waived; Avail: CASI; A02, Hardcopy

This paper reports on a new approach to detecting military targets. The novel idea is based on combining neural network arbitration and scale space analysis to automatically select one optimum scale for the entire image at which object edge detection can be applied. Thus, introducing new measures to solve many of the problems existing in the discipline of image processing, such as: (1) poor edge detection in medium-contrast images; (2) speed of recognition; and (3) high computational cost. This new approach to edge detection is formalized in the Automatic Edge Detection Scheme (AEDS).
Derived from text
Neural Nets; Target Acquisition; Edge Detection; Image Processing

20010047390 NASA Glenn Research Center, Cleveland, OH USA
Project Integration Architecture: Architectural Overview
Jones, William Henry, NASA Glenn Research Center, USA; February 2001; 14p; In English; Simulation Interoperability Workshop, 25-30 Mar. 2001, Orlando, FL, USA; Sponsored by Simulation Interoperability Standards Organization, USA
Contract(s)/Grant(s): RTOP 704-10-23
Report No.(s): NASA/TM-2001-210750; E-12678; NAS 1.15:210750; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Project Integration Architecture (PIA) implements a flexible, object-oriented, wrapping architecture which encapsulates all of the information associated with engineering applications. The architecture allows the progress of a project to be tracked and documented in its entirety. by being a single, self-revealing architecture, the ability to develop single tools, for example a single graphical user interface, to span all applications is enabled. Additionally, by bringing all of the information sources and sinks of a project into a single architectural space, the ability to transport information between those applications becomes possible,

Object-encapsulation further allows information to become in a sense self-aware, knowing things such as its own dimensionality and providing functionality appropriate to its kind.
Author
Object-Oriented Programming; Architecture (Computers); Information Systems; Encapsulating

20010047600 Massachusetts Inst. of Tech., Sea Grant Coll. Program, Cambridge, MA USA
Small, High Performance Autonomous Underwater Vehicles, *25 Sep. - 12 Oct. 2000*
Bellingham, J. G.; Oct. 2000; 20p; In English
Contract(s)/Grant(s): NA86-RG-0074
Report No.(s): PB2001-104774; MITSG-01-4; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

During the fall of 2000 the MIT AUV Lab deployed two Odyssey IIc class AUVs to Elba Italy. The AUVs were equipped and operated to support the Generic Oceanographic Array Technology (GOATS) 2000 field experiment. GOATS is an Office of Naval Research Joint Research Project that includes contributors from NATO SACLANTCEN, the MIT Department of Ocean Engineering, the MIT Sea Grant College Program, and others. The MIT AUVs were the primary mobile sensor platform for multi-static acoustic experiments. These efforts included study of buried objects and scattering from sand ripples.
NTIS
North Atlantic Treaty Organization (NATO); Underwater Vehicles; Marine Environments; Marine Technology; Oceanography; Remotely Piloted Vehicles

20010048038 Naval Air Warfare Center, Aircraft Div., Patuxent River, MD USA
Selecting the Most Efficient Reed Solomon Codes to Eliminate Jamming
Benjamin, Henderson; Jan. 1999; 7p; In English
Report No.(s): AD-A388296; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Reed-Solomon (RS) codes are, perhaps, the most widely applied channel codes in practice due to its ability to detect and correct random and burst errors. In today's military combat environment, the ability to communicate determines who wins or losses. For this reason electronic warfare (EW) and information warfare (IW) have become an area for many discussions and much research. Jamming environments, especially intentional jamming as in military applications, are confronted with the effects of nonrandom errors. The catalog of Reed-Solomon (RS) codes is a rather long one. to select a proper code for a given application, the system designer is compelled to deal with numerous tables, graphs and equations. I have reported the results of designing an artificial neural network (NN) from which one can select the most "efficient" RS code for a specific application. In this article I present the continuation of my work, in development of an artificial NN for selection of RS codes to eliminate intentional jamming. Student version of the MATLAB Neural Networks Toolbox is used for NN simulation. The Levenberg-Marquardt learning algorithm is used to train the NN. The resultant NN has six inputs, eleven units in the hidden layer, and one unit in the output layer. The output is "k". The test data results show the accuracy of selecting the correct code dimension is 98.04%.
DTIC
Jamming; Military Technology; Reed-Solomon Codes; Algorithms

64
NUMERICAL ANALYSIS

Includes iteration, differential and difference equations, and numerical approximation.

20010045650 Strang Cancer Prevention Center, New York, NY USA
Statistical Methods for Analyzing Time-Dependent Events in Breast Cancer Chemoprevention Studies *Annual Report, 30 Sep. 1996 - 29 Sep. 1997*
Wong, George Y.; Nov. 1997; 12p; In English
Contract(s)/Grant(s): DAMD17-94-J-4332
Report No.(s): AD-A343655; No Copyright; Avail: Defense Technical Information Center (DTIC)

The overall aim of our research proposal is the statistical inference of nonparametric estimates, the restribution-to-the-inside estimator (RTIE), and the generalized maximum likelihood estimator (GMLE), for the survival function of a time-to-event variable that is subject to interval censoring. The RTIE, which is proposed by us, has a closed-form expression and is equal to the GMLE under a homogeneous condition. The GMLE is the standard optimal procedure in survival analysis. However, no closed-form expression for the GMLE is available, and asymptotic distribution theory for it has been limited. Our research efforts in the third year have focused on the asymptotic inference of the GMLE under conditions more general than the discrete

distribution assumption that we previously imposed on the censoring variables. Additionally, we have derived an asymptotic nonparametric the sample test procedure for comparing two populations. Finally, we have begun investigating the asymptotic inference of Cox regression model for interval-censored data by establishing consistency of the GMLE of the model parameters under finite assumptions on both the survival and censoring distributions.
DTIC
Clinical Medicine; Asymptotic Series; Cancer; Mammary Glands

20010046071 Computer Sciences Corp., Moffett Field, CA USA
Interference Lattice-based Loop Nest Tilings for Stencil Computations
VanderWijngaart, Rob F., Computer Sciences Corp., USA; Frumkin, Michael, Computer Sciences Corp., USA; [2000]; 11p; In English; Tenth SIAM Conference on Parallel Processing for Scientific Computing, 12-14 Mar. 2001, Portsmouth, VA, USA
Contract(s)/Grant(s): NASA Order A-61812-D; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A common method for improving performance of stencil operations on structured multi-dimensional discretization grids is loop tiling. Tile shapes and sizes are usually determined heuristically, based on the size of the primary data cache. We provide a lower bound on the numbers of cache misses that must be incurred by any tiling, and a close achievable bound using a particular tiling based on the grid interference lattice. The latter tiling is used to derive highly efficient loop orderings. The total number of cache misses of a code is the sum of (necessary) cold misses and misses caused by elements being dropped from the cache between successive loads (replacement misses). Maximizing temporal locality is equivalent to minimizing replacement misses. Temporal locality of loop nests implementing stencil operations is optimized by tilings that avoid data conflicts. We divide the loop nest iteration space into conflict-free tiles, derived from the cache miss equation. The tiling involves the definition of the grid interference lattice an equivalence class of grid points whose images in main memory map to the same location in the cache-and the construction of a special basis for the lattice. Conflicts only occur on the boundaries of the tiles, unless the tiles are too thin. We show that the surface area of the tiles is bounded for grids of any dimensionality, and for caches of any associativity, provided the eccentricity of the fundamental parallelepiped (the tile spanned by the basis) of the lattice is bounded. Eccentricity is determined by two factors, aspect ratio and skewness. The aspect ratio of the parallelepiped can be bounded by appropriate array padding. The skewness can be bounded by the choice of a proper basis. Combining these two strategies ensures that pathologically thin tiles are avoided. They do not, however, minimize replacement misses per se. The reason is that tile visitation order influences the number of data conflicts on the tile boundaries. If two adjacent tiles are visited successively, there will be no replacement misses on the shared boundary. The iteration space may be covered with pencils larger than the size of the cache while avoiding data conflicts if the pencils are traversed by a scanning-face method. Replacement misses are incurred only on the boundaries of the pencils, and the number of misses is minimized by maximizing the volume of the scanning face, not the volume of the tile. We present an algorithm for constructing the most efficient scanning face for a given grid and stencil operator. In two dimensions it is based on a continued fraction algorithm. In three dimensions it follows Voronoi's successive minima algorithm. We show experimental results of using the scanning face, and compare with canonical loop orderings.
Derived from text
Stencil Processes; Discretization (Mathematics); Structured Grids (Mathematics); Computational Grids; Tiles

20010047486 NASA Ames Research Center, Moffett Field, CA USA
Residual Distribution Schemes for Conservation Laws Via Adaptive Quadrature
Barth, Timothy, NASA Ames Research Center, USA; Abgrall, Remi, Bordeaux 1 Univ., France; [2000]; 34p; In English; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This paper considers a family of nonconservative numerical discretizations for conservation laws which retains the correct weak solution behavior in the limit of mesh refinement whenever sufficient order numerical quadrature is used. Our analysis of 2-D discretizations in nonconservative form follows the 1-D analysis of Hou and Le Floch. For a specific family of nonconservative discretizations, it is shown under mild assumptions that the error arising from non-conservation is strictly smaller than the discretization error in the scheme. In the limit of mesh refinement under the same assumptions, solutions are shown to satisfy an entropy inequality. Using results from this analysis, a variant of the "N" (Narrow) residual distribution scheme of van der Weide and Deconinck is developed for first-order systems of conservation laws. The modified form of the N-scheme supplants the usual exact single-state mean-value linearization of flux divergence, typically used for the Euler equations of gasdynamics, by an equivalent integral form on simplex interiors. This integral form is then numerically approximated using an adaptive quadrature procedure. This renders the scheme nonconservative in the sense described earlier so that correct weak solutions are still obtained in the limit of mesh refinement. Consequently, we then show that the modified form of the N-scheme can be easily applied to general (non-simplicial) element shapes and general systems of first-order conservation laws equipped with an entropy inequality where exact mean-value linearization of the flux divergence is not readily obtained, e.g. magnetohydrodynamics, the

Euler equations with certain forms of chemistry, etc. Numerical examples of subsonic, transonic and supersonic flows containing discontinuities together with multi-level mesh refinement are provided to verify the analysis.
Author
Differential Equations; Entropy; Grid Generation (Mathematics); Inequalities; Magnetohydrodynamics

20010047993 Institute for Computer Applications in Science and Engineering, Hampton, VA USA
High-Order/Spectral Methods on Unstructured Grids, 1, Time-Domain Solution of Maxwell's Equations ***Final Report***
Hesthaven, J. S., Brown Univ., USA; Warburton, T., Brown Univ., USA; March 2001; 46p; In English
Contract(s)/Grant(s): NAS1-97046; F49620-1-0426; RTOP 505-90-52-01
Report No.(s): NASA/CR-2001-210836; NAS 1.26:210836; ICASE-2001-6; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We present an ab initio development of a convergent high-order accurate scheme for the solution of linear conservation laws in geometrically complex domains. As our main example we present a detailed development and analysis of a scheme suitable for the time-domain solution of Maxwell's equations in a three-dimensional domain. The fully unstructured spatial discretization is made possible by the use of a high-order nodal basis, employing multivariate Lagrange polynomials defined oil the triangles and tetrahedra. Careful choices of the unstructured nodal grid points ensure high- order/ spectral accuracy, while the equations themselves are satisfied in a discontinuous Galerkin form with the boundary conditions being enforced weakly through a penalty term. Accuracy, stability, and convergence of the semi-discrete approximation to Maxwell's equations is established rigorously and bounds on the global divergence error are provided. Concerns related to efficient implementations are. discussed in detail. This sets the stage for the presentation of examples, verifying the theoretical results, as well as illustrating the versatility, flexibility, and robustness when solving two- and three-dimensional benchmarks in computational electromagnetics. Pure scattering as well as penetration is discussed and high parallel performance of the scheme is demonstrated.
Author
Boundary Conditions; Computational Electromagnetics; Computational Grids; Domains; Maxwell Equation; Unstructured Grids (Mathematics)

65
STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; time series and analysis; and stochastic processes.

20010045648 Naval Postgraduate School, Monterey, CA USA
An Analysis of Institutional and Non-Institutional Factors Affecting Naval Aviator Retention
Rasch, Kevin H.; Mar. 1998; 93p; In English
Report No.(s): AD-A343640; No Copyright; Avail: Defense Technical Information Center (DTIC)

The objective of this thesis is to quantitatively examine the effect of several institutional and non-institutional factors that have traditionally impacted Naval aviator retention. It uses a unique database that includes summarized continuation rate information for pilots from each subcommunity by year group and commissioning source. The effects of varying unemployment rates, air transportation industry hiring rates, aviation continuation pay (ACP) opportunities and changing minimum service requirement (MSR) policies are measured statistically to determine their relative significance in impacting aviator continuation rates. The study analyzed the continuation rate behavior between 1990 and 1996 for aviators in year groups 1984 through 1989. Results from the statistical analysis indicate that institutional factors such as changing MSR policies and ACP availability have a greater impact than non-institutional factors such as unemployment rates and air transportation industry hiring rates. Specifically, recent changes in MSR policies have been successful in increasing continuation rates while ACP has not been successful in increasing retention.
DTIC
Aerospace Industry; Retention (Psychology); Aircraft Pilots

20010045713 Institute TNO of Applied Physics, Delft, Netherlands
Numerical and Experimental Studies to Multi-Point Source Characterization ***Final Report***
Termeer, M. K., Institute TNO of Applied Physics, Netherlands; vanBeek, P. J. G., Institute TNO of Applied Physics, Netherlands; deJong, C. A. F., Institute TNO of Applied Physics, Netherlands; Dec. 31, 2000; 66p; In English; Original contains color illustrations

Contract(s)/Grant(s): A00/KM/136; TNO Proj. 008.01604/01.01
Report No.(s): TD-000293; TPD-RPT-000145; Copyright; Avail: Issuing Activity

Several studies to structure borne sound source characterisation in multi-point situations are performed. Both numerical and experimental aspects are discussed by means of a small electromotor like structure and a simplified Diesel engine. Main topic of interest is the origin and effect of errors in both experimental and numerical based methods to characterize structure borne, sound sources. The effect of omitting certain degrees of freedom (for example rotations) on the source I characterisation is investigated numerically.

Author

Numerical Analysis; Experimentation; Characterization; Point Sources; Error Analysis

20010047551 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA

Hidden Markov Models for Visual Speech Synthesis in Limited Data Environments

Arb, Harold A.; Mar. 20, 2001; 237p; In English

Report No.(s): AD-A388523; AFIT/DS/ENG/01-01; No Copyright; Avail: CASI; A11, Hardcopy; A03, Microfiche

This work presents a new approach for estimating control points (facial locations that control movement) to allow the artificial generation of video with apparent mouth movement (visual speech) time-synced with recorded audio. First, Hidden Markov Models (HMMs) are estimated for each visual speech category (viseme) present in stored video data, where a category is defined as the mouth movement corresponding to a given sound and where the visemes are further categorized as trisemes (a viseme in the context of previous and following visemes). Next, a decision tree is used to cluster and relate states in the HMMs that are similar in a contextual and statistical sense. The tree is also used to estimate HMMs that generate sequences of visual speech control points for trisemes not occurring in the stored data. An experiment is described that evaluates the effect of several algorithm variables, and a statistical analysis is presented that establishes appropriate levels for each variable by minimizing the error between the desired and estimated control points. The analysis indicates that the error is lowest when the process is conducted with three-state left-to right no skip HMMs trained using short-duration dynamic features, a high log-likelihood threshold, and a low outlier threshold. Also, comparisons of mouth shapes generated from the artificial control points and the true control points (estimated from video not used to train the HMMs) indicate that the process provides accurate estimates for most trisemes tested in this work. The research presented here thus establishes a useful method for synthesizing realistic audio-synchronized video facial features.

DTIC

Markov Processes; Speech; Mathematical Models; Algorithms

20010047703 Brown Univ., Providence, RI USA

Distributed Planning and Control for Applications in Transportation Scheduling ***Final Report, Jun. 1991 - May 1995***

Dean, Thomas, Brown Univ., USA; Mar. 1998; 48p; In English

Contract(s)/Grant(s): F30602-91-C-0041; AF Proj. G684

Report No.(s): AD-A341323; RL-TR-97-242; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The research addresses combinatorial problems in transportation planning and scheduling. This work addresses fundamental problems in real time planning and crisis decision making. Problems of uncertainty and incomplete information are dealt with by employing a stochastic domain model called a Markov decision process (MDP). Complexity in decision making is dealt with by using iterative techniques and decision theory to allocate computational resources at runtime. MASE is a simulation and development environment for problems involving multiple interacting agents. MASE provides robust and efficient communication and negotiation facilities to support distributed solutions to planning and utilities problems. MASE or its underlying communication subsystem running in a stand alone configuration can be used by distributed components implemented in C, C++, or Common Lisp. Discusses a complementary approach to envelope based methods for solving large MDPs, i.e., MDPs involving a very large number of states. This approach works by decomposing a large MDP into several smaller MDPs which are weakly coupled. A solution is obtained by solving each of the smaller MDPs individually and then combining these local solutions to obtain a global solution. An overview is provided on a proposed new direction of research for embedded planning and scheduling. Described is a general model for embedded planning and control systems. This model describes the rudiments of a software specification framework that is critical to any significant progress on real time systems of any complexity.

DTIC

Markov Processes; Mathematical Models; Planning; Scheduling; Transportation; Decision Making

20010048015 Florida State Univ., Tallahassee, FL USA
Some Problems in Probability, Statistics and Reliability ***Final Report, 15 Feb. 1997 - 30 Sep. 2000***
Sethuraman, Jayaram; Feb. 12, 2001; 10p; In English
Contract(s)/Grant(s): DAAG55-97-1-0024
Report No.(s): AD-A388460; ARO-35904.1-MA; No Copyright; Avail: CASI; A01, Microfiche; A02, Hardcopy

Research was carried out in the areas of Image Analysis modeling the phenomena of conformation and coupling. Markov Chain Monte Carlo methods - their limitations and range of applicability, Bayesian Nonparametric Computations - approximations and convergence, predicting a random variable based on a discretized covariate, Flow Models - flows in queues with finite capacity buffers and flows in networks with losses and capacity controls, and survey articles on modem nonparametric methods.

DTIC
Probability Theory; Reliability; Image Analysis; Mathematical Models

20010048025 Naval Research Lab., Monterey, CA USA
Using Legendre Functions for Spatial Covariance Approximation and Investigation of Radial Nonisotrophy for NOGAPS Data ***Final Report***
Franke, Richard; Jan. 2001; 50p; In English
Report No.(s): AD-A388378; NRL/MR/7531--01-7242; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report gives the results of an investigation into the approximation of a two-month history of pressure height innovation data from NOGAPS. Two ideas were investigated. The first investigation was prompted by the fact that all positive definite functions on the sphere have an expansion in terms of Legendre functions with positive coefficients. It was found that for all levels the approximation of the covariance data for pressure height innovations by Legendre functions led to positive coefficients for up to 25 terms except at the some low and high levels. The approximation was constrained to be near zero at distances greater than about 0.6 radians. The interlevel data was approximated indirectly using thickness approximations and these approximations also predominantly led to positive coefficients except when some of the high and low levels were involved. Positive aspects of the scheme are that the least squares approximation is linear and that the interlevel approximations are obtained by a transformation on the coefficients of the single level and thickness approximations without regard to parameters related to correlation distance used by some other methods.

DTIC
Legendre Functions; Covariance; Approximation; Anisotropy

20010048904 Center for Mathematics and Computer Science, Amsterdam, Netherlands
Structure of the Space of Product-Form Models. Probability, Networks and Algorithms
Bayer, N., Center for Mathematics and Computer Science, Netherlands; Boucherie, R. J., Center for Mathematics and Computer Science, Netherlands; Apr. 1999; ISSN 1386-3681; 30p; In English
Report No.(s): PB2001-103038; PNA-R9806; Copyright; Avail: National Technical Information Service (NTIS)

No abstract available.

NTIS
Probability Theory; Algorithms; Markov Chains; Mathematical Models

66
SYSTEMS ANALYSIS AND OPERATIONS RESEARCH

Includes mathematical modeling of systems; network analysis; mathematical programming; decision theory; and game theory.

20010043991 NASA Dryden Flight Research Center, Edwards, CA USA
Nonstationary Dynamics Data Analysis with Wavelet-SVD Filtering
Brenner, Marty, NASA Dryden Flight Research Center, USA; Groutage, Dale, Naval Surface Warfare Center, USA; April 2001; 24p; In English; 42nd AIAA/ASME/ASME/AHS/ASC Structures, Structural Dynamics and Materials Conference, 16-19 Apr. 2001, Seattle, WA, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA
Contract(s)/Grant(s): RTOP 529-50-04-00-RR
Report No.(s): NASA/TM-2001-210391; H-2445; NAS 1.15:210391; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Nonstationary time-frequency analysis is used for identification and classification of aeroelastic and aeroservoelastic dynamics. Time-frequency multiscale wavelet processing generates discrete energy density distributions. The distributions are processed using the singular value decomposition (SVD). Discrete density functions derived from the SVD generate moments that detect the principal features in the data. The SVD standard basis vectors are applied and then compared with a transformed-SVD, or TSVD, which reduces the number of features into more compact energy density concentrations. Finally, from the feature extraction, wavelet-based modal parameter estimation is applied.
Author
Aeroelasticity; Aeroservoelasticity; Wavelet Analysis; Probability Distribution Functions; Density Distribution

20010045647 Naval Postgraduate School, Monterey, CA USA
Partial-Enumeration for Planar Network Interdiction Problems
Boyle, Michael R.; Mar. 1998; 56p; In English
Report No.(s): AD-A343529; No Copyright; Avail: Defense Technical Information Center (DTIC)
In the network interdiction problem, an interdictor destroys a set of arcs in a capacitated network through which an adversary will maximize flow. The interdictor's primary objective is to use his limited resources to minimize that maximum flow, but other objectives may be important. Therefore, we describe algorithms for enumerating near optimal interdiction sets in planar networks so that these sets may be evaluated with respect to secondary criteria, e.g., safety of attacking forces, collateral damage, etc. Our algorithms are based on enumerating near shortest paths or cycles in the dual of a planar network; they find a single optimum interdiction set in pseudo polynomial time. We implement one algorithm applicable to s-t planar networks (s and t must lie on the perimeter of the network) and solve problems with up to 800 nodes and 1247 arcs. An example of computational results on that largest network is: The algorithm enumerates all 19 solutions that are within 50% of optimal in 0.15 seconds on a 300 MHz Pentium 2 PC. We also propose, but do not implement, a somewhat less efficient extension of this algorithm to solve problems on general planar networks.
DTIC
Enumeration; Algorithms; Networks; Systems Analysis

20010045658 George Mason Univ., Fairfax, VA USA
Solving Large-Scale Combinatorial Optimization Problems
Aug. 1996; 6p; In English
Contract(s)/Grant(s): N00014-90-J-1324
Report No.(s): AD-A327597; No Copyright; Avail: Defense Technical Information Center (DTIC)
Optimization problems are concerned with the efficient use or allocation of limited resources to meet desired objectives. These problems are characterized by the large number of alternatives that satisfy the basic conditions of each problem. The selection of a particular solution as the best solution to a problem depends on some goal or overall objective. The versatility of the combinatorial model stems from the fact that in many practical problems, activities or resources, such as machines, airplanes, missile target sites, and people are indivisible. Also, many problems have only a finite number of alternative choices and consequently can appropriately be formulated as combinatorial problems. We refer the reader to the following texts and their bibliographical references for further review of some of these important engineering and managerial decision problems: Combinatorial and Integer Programming (Nemhauser and Wolsey), Applied Mathematical Programming (Bradley, Hax and Magnanti), Principles of Operations Research (Wagner), and Model Building in Mathematical Programming (Williams).
DTIC
Combinatorial Analysis; Problem Solving; Mathematical Programming; Operations Research

20010045659 Naval Command, Control and Ocean Surveillance Center, Research, Development Technology and Engineering Div., San Diego, CA USA
Independent Research ***Annual Report, Oct. 1995 - Sep. 1996***
Oct. 1996; 184p; In English
Report No.(s): AD-A327694; NRAD-TD-2933; No Copyright; Avail: Defense Technical Information Center (DTIC)
This report presents brief summaries of Independent Research (IR) projects. Three projects are described in detail: (1) Optical Fiber Devices Based on Index of Refraction Changes in Highly Overcoupled Fused-Fiber Couplers; (2) Tidal Exchange at the Bay-Ocean Boundary; and (3) Detection Algorithms Derived from Gaussian Mixture and Hidden Markov Noise Models with Applications to Radar and Sonar. This report is submitted in response to ONR INST 3900.37 of 3 June 1994. The work detailed in this report was carried out at the Naval Command, Control and Ocean Surveillance Center RDT&E Division during FY 96.

Three selected Independent Research (IR) projects are described in detail. Lists of all active projects and those transitioned since the last report are provided. Lists of publications and patents stemming from the IR program are also provided.
DTIC
Fiber Optics; Optical Equipment; Oceans; Surveillance; Research and Development

20010047065 Defence Evaluation Research Agency, Pattern and Information Processing, Malvern, UK
Convoy Planning in a Digitized Battlespace
Harrison, S. A., Defence Evaluation Research Agency, UK; New Information Processing Techniques for Military Systems; April 2001, pp. 22-1 - 22-10; In English; See also 20010047042; Copyright Waived; Avail: CASI; A02, Hardcopy

In this paper we present a formal specification of a convoy planning problem in terms of a time-space network. We apply advanced heuristic techniques to this model and evaluate the approach on a number of realistic scenarios based on the UK MoD's Scenario Advisory Group (SAG) settings. The results demonstrate that the method described is an effective approach for solving practical instances of convoy planning. We also describe an automated planning tool that has been developed, based on the techniques described in this paper and which has been used to plan simulated movements of realistic size. The tool runs on a laptop, is fast and reduces planning time from man-hours to a few seconds. The value of the techniques described in this paper is not limited to this one application. Hence, we review a representative set of military applications where we expect these techniques to be equally beneficial.
Derived from text
Planning; Software Development Tools; Personal Computers; Computer Programs

20010047066 Physics and Electronics Lab. TNO, Maritime Command and Control, The Hague, Netherlands
An Information Filtering and Control System to Improve the Decision Making Process Within Future Command Information Centres
Maas, Hans L. M. M., Physics and Electronics Lab. TNO, Netherlands; Wynia, Sikke Jan, Physics and Electronics Lab. TNO, Netherlands; Sorensen, Morten Heine, Terma Elektronisk Industri A/S, Denmark; Houtsma, Maurice A. W., Hollandse Signaalapparaten N.V., Netherlands; New Information Processing Techniques for Military Systems; April 2001, pp. 23-1 - 23-13; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A03, Hardcopy

This paper describes the achieved research results within several national and international C2 and information-management projects to develop concepts for balancing the information push with an operator's information need in order to meet the requirement to avoid/suppress information overload situations. The paper starts with an analysis and syntheses of the information overload problem. A model is used to describe the causes and the consequences of information overload on the operator's behaviour and performance in a command information centre of naval vessels. Research has shown that an increasing amount of time is needed for gathering and discriminating relevant information. from the actual information push while less time is left for analysing the relevant information in more details and taking correct and original decisions. Information overload is seen as a serious threat for the quality and performance of mission execution. The blueprint for an adaptive information management support concept is based on merging several information management support approaches: (1). Approaches to estimate and/or measure and control the operator's information overload; (2). Information exchange concepts; and (3). Information handling within several kind of tasks: Skill based, rule-based and knowledge-based tasks. Based on the complexity of the problem, an information management concept is discussed to control and filter the information flows adaptively for skill and rule dominated tasks.
Derived from text
Information Flow; Information Management; Decision Making

20010047067 Industrieanlagen-Betriebsgesellschaft m.b.H., Ottobrunn, Germany
Comprehensive Approach to Improve Identification Capabilities
Stroscher, Christoph, Industrieanlagen-Betriebsgesellschaft m.b.H., Germany; Schneider, Frank, Industrieanlagen-Betriebsgesellschaft m.b.H., Germany; New Information Processing Techniques for Military Systems; April 2001, pp. 24-1 - 24-4; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A01, Hardcopy

The process and the prototype presented here, are dedicated to improve the overall identification capability. This is aimed to be achieved by making available all identification related information, - i.e. local and remote data -, fusing and interpreting them, and supporting the decision process by offering a recommendation together with all explanation that might be desired. The paper presents a solution that uses the Identification Data Combining Process (IDCP) according to draft STANAG 4162 as

baseline. The prototype, assisting in identifying airborne objects, is the result of an experimental system using simulated as well as live data in a German Control and Reporting Centre (CRC).
Author
Computer Techniques; Improvement; Identifying; Data Transfer (Computers); Multisensor Fusion; Decision Support Systems

20010047070 Naval Research Lab., Advanced Information Technology, Washington, DC USA
BARS: Battlefield Augmented Reality System
Julier, Simon, Naval Research Lab., USA; Baillot, Yohan, Naval Research Lab., USA; Lanzagorta, Marco, Naval Research Lab., USA; Brown, Dennis, Naval Research Lab., USA; Rosenblum, Lawrence, Naval Research Lab., USA; New Information Processing Techniques for Military Systems; April 2001, pp. 27-1 - 27-7; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A02, Hardcopy

Many future military operations are expected to occur in urban environments. These complex, 3D battlefields are extremely demanding and introduce many challenges to the dismounted warfighter. These include limited visibility, lack of familiarity with the environment, sniper threats, concealment of enemy forces, ineffective communications, and a general problem of locating and identifying enemy and friendly forces. Better situational awareness is required for effective operation in the urban environment, We believe that situational awareness needs cannot be met using traditional approaches such as radios, maps and handheld displays and more powerful display paradigms are needed, We are researching mobile augmented reality (AR) through the development of the Battlefield Augmented Reality System (BARS) in collaboration with Columbia University. The system consists of a wearable computer, a wireless network system and a tracked see-through Head Mounted Display (HMD). The user's perception of the environment is enhanced by superimposing graphics onto the user's field of view. The graphics are registered (aligned) with the actual environment. For example, an augmented view of a building could include a wireframe plan of its interior, icons to represent reported locations of snipers and the names of adjacent streets. This paper describes the major challenges and the current implementation of BARS. In particular, we stress the need for high value graphical displays which provide the relevant, critical information for a user's current context. These displays should be precisely registered with the environment. There are three major research areas. First, an information distribution system is being developed which distributes to a mobile user only a relevant subset of the common tactical picture. Second, to prevent information overload, we have developed an intelligent filter which selects and prioritizes the type of augmented information which is needed by a user's mission profile. Finally, high performance tracking and calibration systems are required to achieve accurate registration. We describe a general calibration framework that allows precision registration to be carried out in the field.
Author
Military Operations; Information Systems; Computer Networks; Field of View

20010048841 Textron Bell Helicopter, USA
Implementing HUMS in the Military Operational Environment
Augustin, M., Textron Bell Helicopter, USA; Heather, A., Smiths Industries Aerospace, UK; DSTO International Conference on Health and Usage Monitoring; February 2001, pp. 89; In English; See also 20010048829; Copyright; Abstract Only; Available from CASI only as part of the entire parent document

Several Military programs including the UK MOD, US Navy, US Army, and Australian DSTO to name a few are now implementing or planning the implementation of Commercial Off-the-shelf Health and Usage Monitoring Systems (HUMS) originally developed in the Commercial Sector. Operational Requirements very widely from those of the fleet of helicopters used in the offshore oil industry. Much has been learned in dealing with these issues in the fielding and implementation of HUMS in the Canadian Forces fleet of 100 CH146 Griffon Helicopters. An engineering team has been working together with the Canadian Forces since early 1994 to develop, install, and support the introduction to service of this fully functional HUMS system in the Canadian Forces Fleet. The Canadian Forces are currently the largest military user of HUMS in the world and with a wide variety of operational roles assigned to the Griffon there have been many unique challenges associated with the commissioning of this system. The experience has highlighted the differences between military and civil operational environments and has led to different approaches being taken to those developed previously with the predominantly offshore civilian HUMS operators that dominated the initial application of HUMS in the early 90's This paper reviews the approach taken and experience gained over the last several years of operation. Particular reference is made to the configuration of a HUMS to the military flight operational environment and the development of Helicopter Manufacturer backed HUMS threshold and alarm levels. Both factors being essential to ensure the early detection of mechanical anomalies within the helicopter while avoiding false alarms. Other issues

include maintaining Data Base Integrity across the fleet, training, and the need for support across Canada and worldwide as the Griffons are deployed to field and remote areas.
Author
Commercial Off-The-Shelf Products; Systems Health Monitoring

20010048905 Center for Mathematics and Computer Science, Amsterdam, Netherlands
Programming with Dynamic Predicate Logic. Information Systems
vanEijck, D. J. N., Center for Mathematics and Computer Science, Netherlands; Nov. 1998; ISSN 1386-3681; 50p; In English
Report No.(s): PB2001-103036; INS-R9810; Copyright; Avail: National Technical Information Service (NTIS)

We propose to bring together two research traditions, computation with first order logic from computer science, and dynamic interpretation of first order logic from natural language semantics. We define a new executable process interpretation for first order logic, and show that it is a faithful approximation of the dynamic interpretation procedure for first order formulas. We then demonstrate the dynamic logic programming alternative to destructive assignment and show how to obtain a versatile logic programming language by adding constructs for bounded choice and for bounded and unbounded iteration. Finally, we show that the operational semantics for first order logic given in Apt and Bezem is an approximation of our executable semantics. It follows that the operational semantics is faithful to the dynamic interpretation of first order logic. Our results relate a recent turn in executable computational interpretation of FOL formulas to a research tradition from natural language semantics, and suggest a new paradigm of dynamic logic programming that combines imperative power with dynamic declarative semantics.
NTIS
Information Systems; Natural Language (Computers); Semantics; Predicate Logic; Logic Programming

67
THEORETICAL MATHEMATICS

Includes algebra, functional analysis, geometry, topology set theory, group theory and and number theory.

20010045531 NASA Ames Research Center, Moffett Field, CA USA
Hyperbolic Prismatic Grid Generation and Solution of Euler Equations on Prismatic Grids
Pandya, S. A., NASA Ames Research Center, USA; Chattot, JJ, California Univ., USA; Hafez, M. M., California Univ., USA; [1994]; 1p; In English; The 14th International Conference on Numerical Methods in Fluid Dynamics, 11-15 Jul., 1994, Bangalore, India, India; No Copyright; Avail: Issuing Activity; Abstract Only

A hyperbolic grid generation method is used to generate prismatic grids and an approach using prismatic grids to solve the Euler equations is presented. The theory of the stability and feasibility of the hyperbolic grid generation method is presented. The hyperbolic grid generation method of Steger et al for structured grids is applied to a three dimensional triangularized surface definition to generate a grid that is unstructured on each successive layer. The grid, however, retains structure in the body-normal direction and has a computational cell shaped like a triangular prism. In order to take advantage of the structure in the normal direction, a finite-volume scheme that treats the unknowns along the normal direction implicitly is introduced and the flow over a sphere is simulated.
Author
Hyperbolic Coordinates; Computational Grids; Grid Generation (Mathematics); Structured Grids (Mathematics)

70
PHYSICS (GENERAL)

Includes general research topics related to mechanics, kinetics, magnetism, and electrodynamics. For specific areas of physics see categories 71 through 77. For related instrumentation see 35 Instrumentation and Photography; for geophysics, astrophysics or solar physics see 46 Geophysics, 90 Astrophysics, or 92 Solar Physics.

20010048172 North Carolina State Univ., Raleigh, NC USA
Systems of Nonlinear Hyperbolic Partial Differential Equations ***Final Report***
Shearer, Michael; Dec. 1997; 6p; In English
Contract(s)/Grant(s): DAAH04-94-G-0043
Report No.(s): AD-A344449; ARO-32562.12-MA; No Copyright; Avail: Defense Technical Information Center (DTIC)

This project concerns properties of wave propagation in partial differential equations that are nonlinear and of hyperbolic type. The research is driven largely by applications to granular materials (notably soils in the current grant period), and to the propagation of shock waves in nonlinear elastic materials. Results utilize a combination of mathematical analysis and numerical simulation.
DTIC
Shock Waves; Partial Differential Equations; Nonlinear Equations; Shock Wave Propagation

71
ACOUSTICS

Includes sound generation, transmission, and attenuation. For noise pollution see 45 Environment Pollution. For aircraft noise see also 02 Aerodynamics and 07 Aircraft Propulsion Propulsion and Power.

20010044087 SACLANT Undersea Research Centre, La Spezia, Italy
Resonance Scattering Analysis by Autoregressive Models Applied to Air-Filled, Cylindrical, Thin Walled Shells in Water
Tesei, A.; Fox, W.; Maguer, A.; Lovik, A.; Oct. 1997; 74p; In English
Report No.(s): AD-A344638; SACLANTCEN-SR-265; No Copyright; Avail: Defense Technical Information Center (DTIC)
Autoregressive (AR) parametric spectral estimation of the scatterer transfer function is applied to the analysis of acoustic scattering by elastic objects. in accordance with Resonance Scattering Theory (RST), the specular and resonance components of the scattering field are differentiated. AR models and consequent resonance analysis are applied to both the global scattering response and to the resonance component separately. The AR-based representation is useful for detecting and localizing resonances in the frequency domain. The capability of AR models to estimate resonance frequencies accurately is shown. Among the extracted poles of the AR model, a subset of resonance frequencies is selected and processed in order to characterize a scattering object in terms of geometrical and geophysical parameters on the basis of analytical matching relations, derived from the RST. The targets considered are elastic, cylindrical, thin walled shells in water under free-field conditions. Analysis is performed on simulated and real data in the ka range (0,50).
DTIC
Acoustic Scattering; Acoustic Resonance; Geophysics; Resonance Scattering

20010044089 Department of the Navy, Washington, DC USA
Ultra-Broadband Hydrophone
Woodall, Roger L., Inventor; Dec. 02, 1997; 7p; In English; Supersedes US-Patent-Appl-SN-624833
Patent Info.: Filed 22 Mar. 1996; US-Patent-Appl-SN-624,833; US-Patent-5,694,375
Report No.(s): AD-D018809; No Copyright; Avail: Defense Technical Information Center (DTIC)
The present invention relates to an ultra broadband hydrophone which has two major electronic components and one mechanical component. The first electronic component comprises a flux gate magnetometer for sensing changes in an ambient magnetic field and for creating an electrical signal representative of the ambient magnetic field. The second electronic component comprises an electrical circuit for demodulating the electrical signal and a low pass filter for smoothing the demodulated signal. The mechanical component is a magnetic diaphragm for receiving acoustic pressure waves and for causing changes in the ambient magnetic field in response to the received acoustic pressure waves. In a preferred embodiment, the hydrophone of the present invention also includes a sub-Hertz differential magnetic field winding for generating a differential magnetic field which nulls the ambient magnetic field about the flux gate magnetometer.
DTIC
Broadband; Hydrophones

20010045635 Naval Postgraduate School, Monterey, CA USA
Robotic Manipulation on a Moving Platform Utilizing Force Sensing and Sonar Ranging
Raphael, Roy A., Naval Postgraduate School, USA; Mar. 1998; 132p; In English
Report No.(s): AD-A344722; No Copyright; Avail: Defense Technical Information Center (DTIC)
Robotic manipulators are widely used in industry where the environment may be too hostile for workers. However, their application has been limited to an industrial setting where the robot is mounted on a stationary base. It is of great interest to expand the application of the robot manipulator to where it is mounted on an autonomous delivery vehicle. This application would enable the delivery vehicle not only to locate objects in a hostile environment, but also to perform tasks that would entirely remove the human being from the hostile environment. This thesis explores the feasibility of implementing a manipulator on an autonomous

vehicle. A Zebra-ZERO Force Control Robot is mounted on a moving platform for feasibility simulations of an autonomous delivery vehicle. The Zebra-ZERO system consists primarily of a robotic arm with six degrees of freedom, a six-axis force sensor mounted at the end of the manipulator, and supporting computer hardware and software. In this thesis, the capability of the Zebra-ZERO system is expanded by integrating it with an external sonar ranging system. The sonar ranging system provides range feedback that is critical for positioning the manipulator while it is mounted on a moving platform. Test results demonstrate that the manipulator mounted on a moving platform is able to compensate for random platform motions and successfully perform various manipulation tasks.
DTIC
Robotics; Manipulators; Sonar; Robot Arms

20010045651 Naval Research Lab., High Frequency Acoustics Section, Stennis Space Center, MS USA
Normal-Incidence, High-Frequency Bottom Penetration in the Soft Gassy Sediment of Eckernforde Bay, Germany ***Final Report***
Wilson, Marcia A.; Apr. 23, 1998; 51p; In English
Report No.(s): AD-A343728; NRL/MR/7174--98-8091; No Copyright; Avail: Defense Technical Information Center (DTIC)
Normal incidence, high frequency acoustic bottom penetration measurements were made in the gassy sediment of Eckernfoerde Bay, Germany. Measurements were made of water sediment insertion loss and signal level as a function of frequency and hydrophone depth. Results showed that hydrophones located in a gassy sublayer had signal levels that were higher than the signal level at a hydrophone located just below the sediment water interface. This increase in amplitude is attributed to reverberation from free methane bubbles excited near and above their resonant frequency.
DTIC
Acoustic Measurement; Resonant Frequencies; Penetration; Sediments; Underwater Acoustics

20010045655 Department of the Navy, Washington, DC USA
Underwater Sensing Device for Ocean Floor Contact
Lazauski, Colin J., Inventor, Department of the Navy, USA; Dec. 09, 1997; 7p; In English; Supersedes US-Patent-Appl-SN-649860
Patent Info.: Filed 10 May 1996; US-Patent-Appl-SN-649,860; Us-Patent-5,696,738
Report No.(s): AD-D018812; No Copyright; Avail: US Patent and Trademark Office
An underwater sensing device for measuring or sensing an underwater condition proximate the floor of an ocean, lake or similar body of water. The sensing device includes an underwater sensing device mounting member and an underwater sensing device sensor, such as a hydrophone, mounted on the mounting member. The mounting member has known acoustic properties including a thickness and a largest dimension, each of which is a function of an acoustic wavelength in the underwater environment The sensing device can also include acoustic diffraction reducing members disposed around the edges of the mounting member. The sensing device can also include first and second underwater sensors disposed on either side of the mounting member so that one of the sensors faces away from the underwater floor. An underwater sensing device switch, such as a gravity switch, activates the sensor that faces away from the underwater floor.
DTIC
Acoustic Properties; Ocean Bottom; Underwater Acoustics; Detection

20010045668 Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Technische Menskunde, Soesterberg, Netherlands
Dose-Response Relationships for Infrasound ***Final Report Dosis-Effectrelaties voor Infrageluid***
Vos, J., Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Netherlands; Drullman, R., Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Netherlands; Feb. 23, 2001; 22p; In Dutch
Contract(s)/Grant(s): 40350; TNO Proj. 786.3
Report No.(s): TD-2000-0358; TNO-TM-01-A015; Copyright; Avail: Issuing Activity
Within the context of a research project on 'Non-Lethal Weapons,' an up-to-date review was required with regard to 1) the effects of infrasound on the health and functioning of human beings, and 2) the availability of adequate systems for the production of infrasound. In a literature study, the existing information about infrasound effects was assessed and structured. Relevant auditory (including perception, hearing damage, physiological alterations, task performance, fatigue) and non-auditory (including

vestibular functioning, respiration, body vibration) effects of infrasound (0.1 - 20 Hz) were determined as a function of sound pressure level and sound frequency.
Derived from text
Infrasonic Frequencies; Acoustics; Noise (Sound); Sound Pressure; Auditory Tasks; Hearing; Eardrums; Auditory Defects

20010045806 Honeywell Engines and Systems, Phoenix, AZ USA
Small Engine Technology (SET) Task 23 ANOPP Noise Prediction for Small Engines, Wing Reflection Code ***Final Report***
Lieber, Lysbeth, Honeywell Engines and Systems, USA; Brown, Daniel, Honeywell Engines and Systems, USA; November 2000; 114p; In English; Original contains color illustrations
Contract(s)/Grant(s): NAS3-27483; NCC2-5300; NCC2-1052; NAG5-6900; RTOP 522-81-13-01
Report No.(s): NASA/CR-2000-210630; Rept-21-11144; NAS 1.26:210630; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The work performed under Task 23 consisted of the development and demonstration of improvements for the NASA Aircraft Noise Prediction Program (ANOPP), specifically targeted to the modeling of engine noise enhancement due to wing reflection. This report focuses on development of the model and procedure to predict the effects of wing reflection, and the demonstration of the procedure, using a representative wing/engine configuration.
Author
Aerodynamic Configurations; Engine Noise; Noise Prediction (Aircraft); Wings; Models

20010045832 Defence Science and Technology Organisation, Melbourne, Australia
Modelling Acoustic Backscatter From Near-Normal Incidence Echosounders - Sensitivity Analysis of the Jackson Model
Mulhearn, P. J., Defence Science and Technology Organisation, Australia; September 2000; 52p; In English; Original contains color illustrations
Report No.(s): DSTO-TN-0304; AR-011-565; Copyright; Avail: Issuing Activity

For a number of years systems, such as RoxAnn and QTC-View, have been attached to ships' echosounders in order to estimate sediment bottom types from the acoustic returns. In this report the physics of acoustic backscatter is examined, at near-normal incidence grazing angles, to determine if these systems can be made less empirical. The Jackson model is used to examine backscatter versus grazing angle, for angles between 65 and 90 degrees, at a frequency of 50 kHz. This is a typical frequency for a standard ship's echosounder. Backscatter predicted by the Jackson model depends on six input parameters and a range of different physical mechanisms. In order to simplify interpretation of results, it seems worthwhile to examine the sensitivity of the model results to different input parameters as a function of sediment type. It is likely that not all six parameters will always be needed, and that some scattering mechanisms can be ignored in some cases. Backscatter versus time for a pulsed system will be examined in a subsequent report. From the model the level of the backscatter and the shape of the backscatter versus grazing angle curve depend principally on the size of surface roughness, the ratio of sediment acoustic impedance to that of water, and a volume scattering coefficient. Other model parameters may be replaced by constants. The Kirchhoff approximation describes well the surface backscatter component, for all but the very roughest surfaces. It is concluded that it should be possible to separately estimate the surface roughness height, the volume backscatter and the sediment's acoustic impedance from acoustic returns. Sediment impedance is well correlated with other sediment properties which can then be estimated.
Author
Acoustic Scattering; Scatter Propagation; Backscattering; Angles (Geometry); Sensitivity Analysis

20010045833 NASA Langley Research Center, Hampton, VA USA
Database of Inlet and Exhaust Noise Shielding for Wedge-Shaped Airframe
Gerhold, Carl H., NASA Langley Research Center, USA; Clark, Lorenzo R., NASA Langley Research Center, USA; April 2001; 20p; In English; Original contains color illustrations
Contract(s)/Grant(s): RTOP 706-81-12-01
Report No.(s): NASA/TM-2001-210840; L-18053; NAS 1.15:210840; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

An experiment to measure the noise shielding of the blended wing body design concept was developed using a simplified wedge-shaped airframe. The experimental study was conducted in the Langley Anechoic Noise Research Facility. A wideband, omnidirective sound source in a simulated engine nacelle was held at locations representative of a range of engine locations above the wing. The sound field around the model was measured with the airframe and source in place and with source alone, using an-array of microphones on a rotating hoop that is also translated along an axis parallel to the airframe axis. The insertion loss was determined from the difference between the two resulting contours. Although no attempt was made to simulate the noise

characteristics of a particular engine, the broadband noise source radiated sound over a range of scaled frequencies encompassing 1 and 2 times the blade passage frequency representative of a large, high-bypass-ratio turbofan engine. The measured data show that significant shielding of the inlet-radiated noise is obtained in the area beneath and upstream of the model. The data show the sensitivity of insertion loss to engine location.
Author
Engine Noise; Noise Measurement; Airframes; Blended-Wing-Body Configurations

20010047011 Institute TNO of Applied Physics, Delft, Netherlands
A Validation of Underwater Sound Predictions Against Data of the M-Frigate ***Final Report***
Vermeulen, R. C. N., Institute TNO of Applied Physics, Netherlands; Termeer, M. K., Institute TNO of Applied Physics, Netherlands; Lemmen, R. L. C., Institute TNO of Applied Physics, Netherlands; deJong, C. A. F., Institute TNO of Applied Physics, Netherlands; Dec. 31, 2000; 28p; In English; Original contains color illustrations
Contract(s)/Grant(s): A00/KM/139; TNO Proj. 008.01608/01.01
Report No.(s): TNO-TD-000294; TPD-RPT-000146; Copyright; Avail: Issuing Activity

This report describes a validation study comparing the results of the state-of-the-art calculation methods and tools developed at TNO TPD with measurements performed on an M-frigate. The validation covers the calculation and comparison with measurements of several input mobilities and the related power ratio between input power and underwater sound radiation. These quantities highly determine the acoustic effectiveness of a ship design. The input mobilities have been determined using a combination of FEM and BATSOFT. The power ratio has been determined using SEA. The calculated input mobilities and power ratios of machinery foundations show a good agreement with measurements. The calculated Foundation Transfer Functions obtained from the mobilities and power ratio shows a very good agreement with the measurements
Author
Underwater Acoustics; Sound Waves; Acoustic Propagation

20010047228 NASA Glenn Research Center, Cleveland, OH USA
Gust Acoustic Response of a Swept Rectilinear Cascade Using The Space-Time CE/SE Method
Wang, X. Y., Taitech, Inc., USA; Himansu, A., Taitech, Inc., USA; Jorgenson, P. C., NASA Glenn Research Center, USA; Chang, S. C., NASA Glenn Research Center, USA; [2001]; 14p; In English; 2001 Fluids Engineering Division Summer Meeting, 29 May - 1 Jun. 2001, New Orleans, LA, USA; Sponsored by American Society of Mechanical Engineers, USA
Contract(s)/Grant(s): NAS3-97186; RTOP 708-90-43
Report No.(s): NASA/TM-2001-210815; NAS 1.15:210815; E-12730; FEDSM-2001-18134; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The benchmark problem 3 in Category 3 of the third Computational Aero-Acoustics (CAA) Workshop sponsored by NASA Glenn Research Center is solved using the space-time conservation element and solution element (CE/SE) method. This problem concerns the unsteady response of a rectilinear swept cascade to an incident gust. The acoustic field generated by the interaction of the gust with swept at plates in the cascade is computed by solving the 3D nonlinear Euler equations using the space-time CE/SE method. A parallel version of the 3D CE/SE Euler solver is employed to obtain numerical solutions for several sweep angles. Numerical solutions are presented and compared with the analytical solutions.
Author
Acoustics; Dynamic Response; Numerical Analysis; Sound Fields

20010047409 Pratt and Whitney Aircraft, East Hartford, CT USA
Linearized Unsteady Aerodynamic Analysis of the Acoustic Response to Wake/Blade-Row Interaction ***Final Report***
Verdon, Joseph M., Pratt and Whitney Aircraft, USA; January 2001; 94p; In English
Contract(s)/Grant(s): NAS3-27727; RTOP 706-81-11
Report No.(s): NASA/CR-2001-210713; E-12660; NAS 1.26:210713; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The three-dimensional, linearized Euler analysis, LINFLUX, is being developed to provide a comprehensive and efficient unsteady aerodynamic scheme for predicting the aeroacoustic and aeroelastic responses of axial-flow turbomachinery blading. LINFLUX couples a near-field, implicit, wave-split, finite-volume solution to far-field acoustic eigensolutions, to predict the aerodynamic responses of a blade row to prescribed structural and aerodynamic excitations. It is applied herein to predict the acoustic responses of a fan exit guide vane (FEGV) to rotor wake excitations. The intent is to demonstrate and assess the LINFLUX analysis via application to realistic wake/blade-row interactions. Numerical results are given for the unsteady pressure responses of the FEGV, including the modal pressure responses at inlet and exit. In addition, predictions for the modal and total acoustic

power levels at the FEGV exit are compared with measurements. The present results indicate that the LINFLUX analysis should be useful in the aeroacoustic design process, and for understanding the three-dimensional flow physics relevant to blade-row noise generation and propagation.
Author
Three Dimensional Flow; Unsteady Aerodynamics; Unsteady Flow; Aerodynamic Characteristics; Linear Equations; Euler Equations of Motion

20010047485 NASA Ames Research Center, Moffett Field, CA USA
Sound Emission of Rotor Induced Deformations of Generator Casings
Polifke, W., Technische Univ. Munich, Germany; Mueller, B., Uppsala Univ., Sweden; Yee, H. C., NASA Ames Research Center, USA; [2001]; 9p; In English; 7th AIAA/CEAS Aeroacoustics Conference, 28-30 May 2001, Maastricht, Netherlands; Sponsored by American Inst. of Aeronautics and Astronautics, USA
Report No.(s): AIAA Paper 2001-2274; Copyright Waived; Avail: CASI; A02, Hardcopy; A01, Microfiche

The casing of large electrical generators can be deformed slightly by the rotor's magnetic field. The sound emission produced by these periodic deformations, which could possibly exceed guaranteed noise emission limits, is analysed analytically and numerically. From the deformation of the casing, the normal velocity of the generator's surface is computed. Taking into account the corresponding symmetry, an analytical solution for the acoustic pressure outside the generator is round in terms of the Hankel function of second order. The normal velocity or the generator surface provides the required boundary condition for the acoustic pressure and determines the magnitude of pressure oscillations. For the numerical simulation, the nonlinear 2D Euler equations are formulated In a perturbation form for low Mach number Computational Aeroacoustics (CAA). The spatial derivatives are discretized by the classical sixth-order central interior scheme and a third-order boundary scheme. Spurious high frequency oscillations are damped by a characteristic-based artificial compression method (ACM) filter. The time derivatives are approximated by the classical 4th-order Runge-Kutta method. The numerical results are In excellent agreement with the analytical solution.
Author
Acoustic Emission; Rotors; Deformation; Generators; Coverings

20010047616 Institute for Human Factors TNO, Soesterberg, Netherlands
Assessment Methods for Personal Active Noise Reduction Systems in Military Applications ***Final Report***
Steeneken, H. J. M., Institute for Human Factors TNO, Netherlands; Verhave, J. A., Institute for Human Factors TNO, Netherlands; Feb. 13, 2001; 17p; In English
Contract(s)/Grant(s): 38364; TNO Proj. 786.4
Report No.(s): TD-2000-0355; TNO-TM-01-A012; Copyright; Avail: Issuing Activity

In a field evaluation it was found that many commercial Active Noise Reduction (ANR) systems are not suitable for military application (e.g. very high noise levels). Appropriate assessment methods are required to predict the performance of these systems. An international co-operation was initiated to select such assessment methods. Also a round robin test was started in which five laboratories from Canada, France, the Netherlands, UK, and the USA work together. Each participant supplied a specific systems for participation in the test. For the Netherlands the system developed by TNO-Human Factors (HF) was used. The results of the assessment activities will be evaluated by a special NATO RTO task group. This group will also disseminate the results.
Author
Human Factors Engineering; Military Technology; Noise Reduction

20010047702 Naval Postgraduate School, Dept. of Oceanography, Monterey, CA USA
An Analysis of the Effects of Energy Spreading Loss and Transmission Loss on Low Frequency Active Sonar Operations in Shallow Water
Adams, Brian S., Naval Postgraduate School, USA; Sep. 1997; 74p; In English
Report No.(s): AD-A341298; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Energy Spreading Loss (ESL) is qualitatively defined as the reduction in peak power level due to energy spreading of a transmitted acoustic pulse in tune. An analysis of the impact of bathymetric geometry and sediment type on ESL and TL associated with the Low Frequency Active/Compact Low Frequency Active (LFA/CLFA) sonar operations was conducted utilizing the FEPE.
DTIC
Energy Dissipation; Shallow Water; Sonar; Spreading; Transmission Loss; Underwater Acoustics

20010047833 NASA Glenn Research Center, Cleveland, OH USA

GAP Noise Computation by The CE/SE Method

Loh, Ching Y., Taitech, Inc., USA; Chang, Sin-Chung, NASA Glenn Research Center, USA; Wang, Xiao Y., Taitech, Inc., USA; Jorgenson, Philip C. E., NASA Glenn Research Center, USA; February 2001; 12p; In English; 2001 Fluid Engineering Division Summer Meeting, 29 May - 1 Jun. 2001, New Orleans, LA, USA; Sponsored by American Society of Mechanical Engineers, USA

Contract(s)/Grant(s): RTOP 708-90-43

Report No.(s): NASA/TM-2001-210703; E-12634; NAS 1.15:210703; FEDSM-2001-18136; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A typical gap noise problem is considered in this paper using the new space-time conservation element and solution element (CE/SE) method. Implementation of the computation is straightforward. No turbulence model, LES (large eddy simulation) or a preset boundary layer profile is used, yet the computed frequency agrees well with the experimental one.

Author

Noise (Sound); Conservation Laws; Aeroacoustics

20010048018 Defence Science and Technology Organisation, Melbourne Australia

Modelling Acoustic Backscatter from Near-Normal Incidence Echosounders - Sensitivity Analysis of the Jackson Model

Mulhearn, P. J.; Sep. 2000; 46p; In English; Original contains color plates

Report No.(s): AD-A388451; DSTO-TN-0304; DODA-AR-011-565; Copyright; Avail: Defense Technical Information Center (DTIC)

For a number of years systems, such as RoxAnn and QTC-View, have been attached to ships' echosounders in order to estimate sediment bottom types from the acoustic returns. In this report the physics of acoustic backscatter is examined, at near-normal incidence grazing angles, to determine if these systems can be made less empirical. The Jackson model is used to examine backscatter versus grazing angle, for angles between 65 and 90 degrees, at a frequency of 50 kHz. This is a typical frequency for a standard ship's echosounder. Backscatter predicted by the Jackson model depends on six input parameters and a range of different physical mechanisms. In order to simplify interpretation of results, it seems worthwhile to examine the sensitivity of the model results to different input parameters as a function of sediment type. It is likely that not all six parameters will always be needed, and that some scattering mechanisms can be ignored in some cases. Backscatter versus time for a pulsed system will be examined in a subsequent report. From the model the level of the backscatter and the shape of the backscatter versus grazing angle curve depend principally on the size of surface roughness, the ratio of sediment acoustic impedance to that of water, and a volume scattering coefficient. Other model parameters may be replaced by constants. The Kirchhoff approximation describes well the surface backscatter component, for all but the very roughest surfaces. It is concluded that it should be possible to separately estimate the surface roughness height, the volume backscatter and the sediment's acoustic impedance from acoustic returns. Sediment impedance is well correlated with other sediment properties which can then be estimated.

DTIC

Backscattering; Sensitivity Analysis; Acoustic Scattering; Echo Sounding

20010048405 NASA Glenn Research Center, Cleveland, OH USA

Fan Noise Reduction: An Overview

Envia, Edmane, NASA Glenn Research Center, USA; February 2001; 16p; In English; 39th Aerospace Sciences Meeting and Exhibit, 8-11 Jan. 2001, Reno, NV, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA

Contract(s)/Grant(s): RTOP 781-30-11

Report No.(s): NASA/TM-2001-210699; NAS 1.15:210699; E-12630; AIAA Paper 2001-0661; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Fan noise reduction technologies developed as part of the engine noise reduction element of the Advanced Subsonic Technology Program are reviewed. Developments in low-noise fan stage design, swept and leaned outlet guide vanes, active noise control, fan flow management, and scarfed inlet are discussed. In each case, a description of the method is presented and, where available, representative results and general conclusions are discussed. The review concludes with a summary of the accomplishments of the AST-sponsored fan noise reduction research and a few thoughts on future work.

Author

Aerodynamic Noise; Fan Blades; Noise Reduction

20010048407 Taitech, Inc., Cleveland, OH USA

Computational Aeroacoustics by the Space-Time CE/SE Method ***Final Report***

Loh, Cling Y., Taitech, Inc., USA; February 2001; 16p; In English; Second Aeroacoustics Workshop of Germany (SWING), 6-7 Oct. 2000, Braunschweig, Germany

Contract(s)/Grant(s): NAS3-97186; RTOP 708-90-43

Report No.(s): NASA/CR-2001-210680; NAS 1.26:210680; E-12523-1; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In recent years, a new numerical methodology for conservation laws-the Space-Time Conservation Element and Solution Element Method (CE/SE), was developed by Dr. Chang of NASA Glenn Research Center and collaborators. In nature, the new method may be categorized as a finite volume method, where the conservation element (CE) is equivalent to a finite control volume (or cell) and the solution element (SE) can be understood as the cell interface. However, due to its rigorous treatment of the fluxes and geometry, it is different from the existing schemes. The CE/SE scheme features: (1) space and time treated on the same footing, the integral equations of conservation laws are solve(for with second order accuracy, (2) high resolution, low dispersion and low dissipation, (3) novel, truly multi-dimensional, simple but effective non-reflecting boundary condition, (4) effortless implementation of computation, no numerical fix or parameter choice is needed, an((5) robust enough to cover a wide spectrum of compressible flow: from weak linear acoustic waves to strong, discontinuous waves (shocks) appropriate for linear and nonlinear aeroacoustics. Currently, the CE/SE scheme has been developed to such a stage that a 3-13 unstructured CE/SE Navier-Stokes solver is already available. However, in the present paper, as a general introduction to the CE/SE method, only the 2-D unstructured Euler CE/SE solver is chosen as a prototype and is sketched in Section 2. Then applications of the CE/SE scheme to linear, nonlinear aeroacoustics and airframe noise are depicted in Sections 3, 4, and 5 respectively to demonstrate its robustness and capability.

Author

Aeroacoustics; Numerical Analysis; Finite Volume Method; Conservation Laws; Sound Waves; Boundary Conditions; Aerodynamic Noise

20010048409 NASA Ames Research Center, Moffett Field, CA USA

High Order Difference Method for Low Mach Number Aeroacoustics

Mueller, B., Uppsala Univ., Sweden; Yee, H. C., NASA Ames Research Center, USA; [2001]; 2p; In English; European Congress on Computational Methods in Applied Sciences and Engineering, 4-7 Sep. 2001, Swansea, UK; No Copyright; Avail: Issuing Activity; Abstract Only

A high order finite difference method with improved accuracy and stability properties for computational aeroacoustics (CAA) at low Mach numbers is proposed. The Euler equations are split into a conservative and a symmetric non- conservative portion to allow the derivation of a generalized energy estimate. Since the symmetrization is based on entropy variables, that splitting of the flux derivatives is referred to as entropy splitting. Its discretization by high order central differences was found to need less numerical dissipation than conventional conservative schemes. Owing to the large disparity of acoustic and stagnation quantities in low Mach number aeroacoustics, the split Euler equations are formulated in perturbation form. The unknowns are the small changes of the conservative variables with respect to their large stagnation values. All nonlinearities and the conservation form of the conservative portion of the split flux derivatives can be retained, while cancellation errors are avoided with its discretization opposed to the conventional conservative form. The finite difference method is third-order accurate at the boundary and the conventional central sixth-order accurate stencil in the interior. The difference operator satisfies the summation by parts property analogous to the integration by parts in the continuous energy estimate. Thus, strict stability of the difference method follows automatically. Spurious high frequency oscillations are suppressed by a characteristic-based filter similar to but without limiter. The time derivative is approximated by a 4-stage low-storage second-order explicit Runge-Kutta method. The method has been applied to simulate vortex sound at low Mach numbers. We consider the Kirchhoff vortex, which is an elliptical patch of constant vorticity rotating with constant angular frequency in irrotational flow. The acoustic pressure generated by the Kirchhoff vortex is governed by the 2D Helmholtz equation, which can be solved analytically using separation of variables.

Derived from text

Aeroacoustics; Finite Difference Theory; Accuracy; Stability; Computation; Entropy; Mach Number; Sound Pressure

72
ATOMIC AND MOLECULAR PHYSICS

Includes atomic and molecular structure, electron properties, and atomic and molecular spectra. For elementary particle physics see 73 Nuclear Physics.

20010045652 Georgetown Univ., Washington, DC USA
Breast Cancer Cell Metabolism Studied by MRS ***Annual Report, 1 Jul. 1996 - 30 Jun. 1997***
Woosley, Raymond; Cohen, Jack S.; Jul. 1997; 18p; In English
Contract(s)/Grant(s): DAMD17-94-J-4032
Report No.(s): AD-A343795; No Copyright; Avail: Defense Technical Information Center (DTIC)

It is proposed to study the metabolism of intact breast cancer cells using non-invasive magnetic resonance spectroscopy (MRS) methods. Magnetic resonance imaging (MRI) has been shown to have some value in assessing breast lumps, but lacks specificity. MRS can in principle provide this specificity. In order to evaluate the potential of MRS, systematic studies will be carried out on cell lines selected for the progressive estrogen independent phenotype and the effects of hormones and tamoxifen. The cell studies will provide basic information on the metabolic profile of different BC cell lines in the progression from estrogen and drug sensitive to estrogen independent and drug resistant phenotypes. Cells are embedded in gels and are examined in the MR spectrometer while undergoing perfusion. Previous studies have mainly used carbohydrate (agarose) gels. But, based on preliminary results, we will use a protein gel (Matrigel) for which the cells have surface receptors, so that their metabolism can be monitored while they are proliferating. This allows the effects not only of different phenotypes, but also of hormones, and antiestrogens such as tamoxifen, as well as certain drugs and drug combinations to be evaluated. Both 31P and proton MR methods will be applied. The results will be of significance not only to understanding the fundamental biological processes involved, but also to the observation of in vivo MRS of breast lumps.
DTIC
Imaging Techniques; Mammary Glands; Metabolism; Magnetic Resonance; Spectroscopy; Cells (Biology)

20010046487 Los Alamos Scientific Lab., NM USA
Energetic Neutral Atom Imaging with the POLAR CEPPAD/ IPS Instrument : Initial Forward Modeling Results
Henderson, M. G., Los Alamos Scientific Lab., USA; Reeves, G. D., Los Alamos Scientific Lab., USA; Moore, K. R., Los Alamos Scientific Lab., USA; Spence, H. E., Boston Univ., USA; Jorgensen, A. M., Boston Univ., USA; Fennell, J. F., Aerospace Corp., USA; Blake, J. B., Aerospace Corp., USA; Roelof, E. C., Johns Hopkins Univ., USA; Physics and Chemistry of the Earth; 1999; ISSN 1464-1917; Volume 24, Nos. 1-3, pp. 203-108; In English
Contract(s)/Grant(s): NAGW-2691; NAGW-4729; NASA Order S-19511-E; Copyright; Avail: Issuing Activity

Although the primary function of the CEPPAD/IPS instrument on Polar is the measurement of energetic ions in-situ, it has also proven to be a very capable Energetic Neutral Atom (ENA) imager. Raw ENA images are currently being constructed on a routine basis with a temporal resolution of minutes during both active and quiet times. However, while analyses of these images by themselves provide much information on the spatial distribution and dynamics of the energetic ion population in the ring current. detailed modeling is required to extract the actual ion distributions. In this paper. we present the initial results of forward modeling an IPS ENA image obtained during a small geo-magnetic storm on June 9, 1997. The equatorial ion distribution inferred with this technique reproduces the expected large noon/midnight and dawn/dusk asymmetries. The limitations of the model are discussed and a number of modifications to the basic forward modeling technique are proposed which should significantly improve its performance in future studies.
Author
Ion Distribution; Imaging Techniques; Neutral Atoms; Spatial Distribution; Temporal Resolution; Ions

20010046488 Los Alamos Scientific Lab., NM USA
Charge Exchange Contribution to the Decay of the Ring Current, Measured by Energetic Neutral Atoms (ENAs)
Jorgensen, A. M., Los Alamos Scientific Lab., USA; Henderson, M. G., Los Alamos Scientific Lab., USA; Roelof, E. C., Johns Hopkins Univ., USA; Reeves, G. D., Los Alamos Scientific Lab., USA; Spence, H. E., Boston Univ., USA; Journal of Geophysical Research; Feb. 01, 2001; ISSN 0148-0227; Volume 106, No. A2, pp. 1931-1937; In English
Contract(s)/Grant(s): NAG5-7706; NAG5-8039
Report No.(s): Paper-2001AJA000124; Copyright; Avail: Issuing Activity

In this paper we calculate the contribution of charge exchange to the decay of the ring current. Past works have suggested that charge exchange of ring current protons is primarily responsible for the decay of the ring current during the late recovery phase, but there is still much debate about the fast decay of the early recovery phase. We use energetic neutral atom (ENA)

measurements from Polar to calculate the total ENA energy escape. to get the total ENA escape we apply a forward modeling technique, and to estimate the total ring current energy escape we use the Dessler-Parker-Sckopke relationship. We find that during the late recovery phase of the March 10, 1998 storm ENAs with energies greater than 17.5 keV can account for 75% of the estimated energy loss from the ring current. During the fast recovery the measured ENAs can only account for a small portion of the total energy loss. We also find that the lifetime of the trapped ions is significantly shorter during the fast recovery phase than during the late recovery phase, suggesting that different processes are operating during the two phases.
Author
Charge Exchange; Energy Dissipation; Ring Currents; Protons

20010046954 NASA Marshall Space Flight Center, Huntsville, AL USA
Hydrogen Absorbing Materials for Use as Radiation Shielding During Extended Space Flight Missions
Grugel, Richard N., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; 4th Pacific Rim International Conference, 11-15 Dec. 2001, Honolulu, HI, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Minimizing radiation exposure from the galactic cosmic ray (GCR) environment during extended space missions is particularly crucial to crew health and safety. Here, an ideal candidate for shielding would be pure solid or liquid hydrogen, a material that effectively fragments heavy ions into ones of lower mass and energy that are more easily attenuated. Unfortunately, utilizing pure hydrogen is not presently feasible. It is, however, known that the hydrogen content of other materials (for example, metal hydrides, palladium alloys, and organic compounds) can exceed that of pure solid hydrogen and thus merit consideration as shielding candidates. This presentation will discuss an ongoing effort to develop novel shielding from such materials in concert with a coordinated testing/evaluation and modeling effort.
Author
Radiation Shielding; Space Missions; Hydrogen; Absorbers (Materials)

20010046988 NASA Ames Research Center, Moffett Field, CA USA
Theoretical Dipole Moment for the X211 State of NO
Langhoff, Stephen R., NASA Ames Research Center, USA; Bauschlicher, Charles W., Jr., NASA Ames Research Center, USA; Partridge, Harry, NASA Ames Research Center, USA; [1994]; 1p; In English
Contract(s)/Grant(s): RTOP 232-01-04; No Copyright; Avail: Issuing Activity; Abstract Only

The dipole moment function for the X(sup 2)II state of NO is studied as a function of the completeness in both the one- and n-particle spaces. Einstein coefficients are presented that are significantly more accurate than previous tabulations for the higher vibrational levels. The theoretical values give considerable insight into the limitations of recently published ratios of Einstein coefficients measured by spectrally resolved infrared chemiluminescence.
Author
Vibration; Coefficients; Infrared Radiation; Nitrogen

20010046992 NASA Ames Research Center, Moffett Field, CA USA
Development of New Open-Shell Perturbation and Coupled-Cluster Theories Based on Symmetric Spin Orbitals
Lee, Timothy J., NASA Ames Research Center, USA; [1994]; 1p; In English; Electron Correlation in Atoms and Molecules: New Methods and Applications, 15-18 Jun. 1994, Bratislava, Slovenia
Contract(s)/Grant(s): RTOP 232-01-04; No Copyright; Avail: Issuing Activity; Abstract Only

A new spin orbital basis is employed in the development of efficient open-shell coupled-cluster and perturbation theories that are based on a restricted Hartree-Fock (RHF) reference function. The spin orbital basis differs from the standard one in the spin functions that are associated with the singly occupied spatial orbital. The occupied orbital (in the spin orbital basis) is assigned the delta(+) = 1/square root of 2(alpha+Beta) spin function while the unoccupied orbital is assigned the delta(-) = 1/square root of 2(alpha-Beta) spin function. The doubly occupied and unoccupied orbitals (in the reference function) are assigned the standard alpha and Beta spin functions. The coupled-cluster and perturbation theory wave functions based on this set of ”symmetric spin orbitals” exhibit much more symmetry than those based on the standard spin orbital basis. This, together with interacting space arguments, leads to a dramatic reduction in the computational cost for both coupled-cluster and perturbation theory. Additionally, perturbation theory based on ”symmetric spin orbitals” obeys Brillouin’s theorem provided that spin and spatial excitations are both considered. Other properties of the coupled-cluster and perturbation theory wave functions and models will be discussed.
Author
Open Clusters; Perturbation Theory; Wave Functions; Theorems; Excitation

20010047280 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA

Characterizing Actinide Transport and Speciation Using Nuclear Magnetic Resonance Tracer Techniques

Caputo, Daniel F.; Sep. 2000; 308p; In English

Report No.(s): AD-A388260; No Copyright; Avail: CASI; A14, Hardcopy; A03, Microfiche

There is a general lack of understanding of how actinides migrate in environmental systems. This lack of understanding stems from the fact that there is limited experience with many actinides in the environment, and due to the complex chemical reactivity of most actinide species. With a limited understanding of actinide environmental behavior, it is very difficult to predict and model environmental transport, which is necessary to determine the release of actinides to the biosphere from current and proposed radioactive waste disposal sites. to overcome the shortfall in the knowledge base of actinide environmental behavior, it is necessary to develop new tools and to take new approaches in increasing the awareness of actinide transport and chemical speciation. It is with this challenge that the application of nuclear magnetic resonance imaging (NMRI) to study actinide transport and speciation was employed.

DTIC

Radioactive Wastes; Actinide Series; Imaging Techniques

20010047492 NASA Ames Research Center, Moffett Field, CA USA

D1((2)B2g) to D0((2)Au) Fluorescence from the Matrix-Isolated Perylene Cation Following Laser Excitation into the D5(2)B3g) and D2 ((2)B3g) Electronic States

Chillier, Xavier D. F., NASA Ames Research Center, USA; Stone, Bradley M., NASA Ames Research Center, USA; Joblin, Christine, NASA Ames Research Center, USA; Salama, Farid, NASA Ames Research Center, USA; Allamandola, Louis J., NASA Ames Research Center, USA; [2001]; 23p; In English; Sponsored in part by American Association for Engineering Education

Contract(s)/Grant(s): RTOP 344-02-06-01; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Fluorescence spectra of the perylene cation, pumped by direct laser excitation via the D(sub 2)((2)B(sub 3g)) (left arrow) D(sub 0)((2)A(sub u)) and D(sub 5)(2)B(sub 3g)) (left arrow) D(sub 0)((2)A(sub u)) transitions, are presented. Direct excitation into the D5 or D2 states is followed by rapid non-radiative relaxation to D1 that, in turn,relaxes radiatively. Excitation spectroscopy across the D(sub 2)((2)B(sub 3g)) (left arrow) D(sub 0)((2)A(sub u)) transition near 730 nm shows that site splitting plays little or no role in determining the spectral substructure in the ion spectra. Tentative assignments for ground state vibrational frequencies are made by comparison of spectral intervals with calculated normal mode frequencies.

Author

Cations; Electron States; Excitation; Fluorescence

20010048744 NASA Marshall Space Flight Center, Huntsville, AL USA

The First Flight of ATIC: Preliminary Results on Li, Be, B Nuclei

Zatsepin, V. I., Moscow State Univ., Russia; [2001]; 1p; In English; International Cosmic Ray Conference, 7-15 Aug. 2001, Hamburg, Germany; No Copyright; Avail: Issuing Activity; Abstract Only

Preliminary results on the spectra of Li, Be, B nuclei obtained in the first flight of Advanced Thin Ionization Calorimeter (ATIC) will be presented.

Author

Calorimeters; Beryllium; Boron; Nuclei (Nuclear Physics); Spectra; Lithium

20010048883 NASA Ames Research Center, Moffett Field, CA USA

Molecular Spectroscopy by Ab Initio Methods

Bauschlicher, Charles W., Jr., NASA Ames Research Center, USA; Langhoff, Stephen R., NASA Ames Research Center, USA; Partridge, Harry, NASA Ames Research Center, USA; [1994]; 1p; In English

Contract(s)/Grant(s): RTOP 232-01-04; No Copyright; Avail: Issuing Activity; Abstract Only

Due to recent advances in methods and computers, the accuracy of ab calculations has reached a point where these methods can be used to provide accurate spectroscopic constants for small molecules; this will be illustrated with several examples. We will show how ab initio calculations where used to identify the Hermann infrared system in N2 and two band systems in CO. The identification of all three of these band systems relied on very accurate calculations of quintet states. The analysis of the infrared spectra of cool stars requires knowledge of the intensity of vibrational transitions in SiO for high nu and J levels. While experiment can supply very accurate dipole moments for nu = 0 to 3, this is insufficient to construct a global dipole moment function. We show how theory, combined by the experiment, can be used to generate the line intensities up to nu = 40 and J = 250. The spectroscopy of transition metal containing systems is very difficult for both theory and experiment. We will discuss the identification of the

ground state of Ti2 and the spectroscopy of AlCu as examples of how theory can contribute to the understanding of these complex systems.
Author
Molecular Spectroscopy; Dipole Moments; Nitrogen; Spectrum Analysis; Stellar Spectra

73
NUCLEAR PHYSICS

Includes nuclear particles; and reactor theory. For space radiation see 93 Space Radiation. For atomic and molecular physics see 72 Atomic and Molecular Physics. For elementary particle physics see 77 Physics of Elementary Particles and Fields. For nuclear astrophysics see 90 Astrophysics.

20010045536 Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro, Brazil
QCD evolution of the gluon density in a nucleus
Ayala Filho, A. L., Rio Grande do Sul Univ., Brazil; Ducati, M. B. Gay, Rio Grande do Sul Univ., Brazil; Levin, E. M., Centro Brasileiro de Pesquisas Fisicas, Brazil; Apr. 1996; ISSN 0029-3865; 57p; In English
Report No.(s): DE97-604623; HEP-PH-9604383; CBPF-NF-020/96; No Copyright; Avail: Department of Energy Information Bridge

The Glauber approach to the gluon density in a nucleus, suggested by A. Mueller, is developed and studied in detail. Using the GRV parameterization for the gluon density in a nucleon, the value as well as energy and Q(sup 2) dependence of the gluon density in a nucleus is calculated. It is shown that the shadowing corrections are under theoretical control and are essential in the region of small x. The change crucially the value of the gluon density as well as the value of the anomalous dimension of the nuclear structure function, unlike of the nucleon one. The systematic theoretical way to treat the correction to the Glauber approach is developed and a new evolution equation is derived and solved. It is shown that the solution of the new evolution equation can provide a self consistent matching of 'soft' high energy phenomenology with 'hard' QCD physics.
DOE
Gluons; Nucleons; Quantum Chromodynamics

20010048410 NASA Ames Research Center, Moffett Field, CA USA
Plasma Reactor Modeling and Validation Experiments
Meyyappan, M., NASA Ames Research Center, USA; Bose, D., Eloret Corp., USA; Hash, D., NASA Ames Research Center, USA; Hwang, H., NASA Ames Research Center, USA; Cruden, B., Eloret Corp., USA; Sharma, S. P., NASA Ames Research Center, USA; Rao, M. V. V. S.; [2001]; 1p; In English; IOP Congress, 18-21 Mar. 2001, Brighton, UK; Sponsored by Institute of Physics, Unknown
Contract(s)/Grant(s): RTOP 755-30-01; No Copyright; Avail: Issuing Activity; Abstract Only

Plasma processing is a key processing stop in integrated circuit manufacturing. Low pressure, high density plum reactors are widely used for etching and deposition. Inductively coupled plasma (ICP) source has become popular recently in many processing applications. In order to accelerate equipment and process design, an understanding of the physics and chemistry, particularly, plasma power coupling, plasma and processing uniformity and mechanism is important. This understanding is facilitated by comprehensive modeling and simulation as well as plasma diagnostics to provide the necessary data for model validation which are addressed in this presentation. We have developed a complete code for simulating an ICP reactor and the model consists of transport of electrons, ions, and neutrals, Poisson's equation, and Maxwell's equation along with gas flow and energy equations. Results will be presented for chlorine and fluorocarbon plasmas and compared with data from Langmuir probe, mass spectrometry and FTIR.
Author
Manufacturing; Low Pressure; Density (Mass/Volume); Plasmas (Physics); Nuclear Reactors; Integrated Circuits; Deposition; Chlorine

20010048682 NASA Ames Research Center, Moffett Field, CA USA
Rotational Energy Transfer in N2
Huo, Winifred M., NASA Ames Research Center, USA; [1994]; 1p; In English; DAMOP Annual Meeting: Heavy-Particle Collisions, 18-21 Apr. 1994, Crystal City, VA, USA
Contract(s)/Grant(s): RTOP 232-01-04; No Copyright; Avail: Issuing Activity; Abstract Only

Using the N2-N2 intermolecular potential of van der Avoird et al. rotational energy transfer cross sections have been calculated using both the coupled state (CS) and infinite order sudden (IOS) approximations. The rotational energy transfer rate constants at 300 K, calculated in the CS approximation, are in reasonable agreement with the measurements of Sitz and Farrow. The IOS approximation qualitatively reproduces the dependence of the rate constants on the rotational quantum numbers, but consistently overestimates their magnitudes. The treatment of exchange symmetry will be discussed.
Author
Nitrogen; Energy Transfer; Physical Chemistry

74
OPTICS

Includes light phenomena and the theory of optical devices. For lasers see 36 Lasers and Masers.

20010047233 National Center for Microgravity Research on Fluids and Combusiton, Cleveland, OH USA
Novel Diffusivity Measurement Technique ***Final Report***
Rashidnia, Nasser, National Center for Microgravity Research on Fluids and Combusiton, USA; April 2001; 14p; In English
Contract(s)/Grant(s): NCC3-544; RTOP 101-43-0B
Report No.(s): NASA/CR-2001-210577; NAS 1.26:210577; E-12544; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A common-path interferometer (CPI) system was developed to measure the diffusivity of liquid pairs. The CPI is an optical technique that can be used to measure changes in the gradient of the refraction index of transparent materials. This system uses a shearing interferometer that shares the same optical path from a laser light source to the final imaging plane. Hence, the molecular diffusion coefficient of liquids can be determined using the physical relations between changes in the optical path length and the liquid phase properties. The data obtained with this interferometer were compared with similar results from other techniques and demonstrated that the instrument is superior in measuring the diffusivity of miscible liquids while keeping the system very compact and robust. CPI can also be used for studies in interface dynamics and other diffusion-dominated-process applications.
Author
Diffusion Coefficient; Imaging Techniques; Interferometers; Liquid Phases

20010047627 Colorado School of Mines, Center for Welding, Joining and Coatings Research, Golden, CO USA
Fiber Optic Sensor for Diffusible Hydrogen Determination in High Strength Steel
Smith, Rodney D., II, DCH Technology, USA; Olson, David L., Colorado School of Mines, USA; Wildeman, Thomas R., Colorado School of Mines, USA; Benson, David K., National Renewable Energy Lab., USA; Proceeding of SPIE Photonics West; 2000; 12p; In English; SPIE Photonics West, 2000, Bellingham, WA, USA; Sponsored by International Society for Optical Engineering, USA
Contract(s)/Grant(s): DAAG55-98-1-0085
Report No.(s): AD-A387051; ARO-37378.16-MS; Copyright; Avail: Defense Technical Information Center (DTIC)

With the increasing use of higher strength steels, the hydrogen content necessary to promote hydrogen assisted cracking (HAC) has become very small. This much lower hydrogen content level is approaching the uncertainty level of present diffusible hydrogen analytical practices, thus requiring the development of new analytical techniques. Efforts are being made to develop more sensitive and less time consuming methods for hydrogen measurement. An advanced design for a transition metal oxide based fiber optic diffusible hydrogen sensor has therefore been developed. The sensor allows measurement of hydrogen content directly from a welded structure, eliminating the need for duplicate welded coupons. The sensor generates the necessary analytical signal in less than one hour, and has been calibrated to yield results in ml H2/100 g weld metal. The sensor is also extremely sensitive to hydrogen and relatively inexpensive. The sensor shows excellent promise as an advanced hydrogen measurement technique, and research is continuing to establish procedures for transfer to industry.
DTIC
Fiber Optics; Optical Measuring Instruments; Hydrogen; Sensitivity; Gas Detectors

20010047678 Naval Research Lab., Oceanography Div., Stennis Space Center, MS USA
Empirical Algorithms to Restore a Complete Set of Inherent Optical Properties of Seawater Using Any Two of These Properties
Haltrin, Vladimir I., Naval Research Lab., USA; Canadian Journal of Remote Sensing; Oct. 17, 2000; Volume 26, No. 5, pp. 440-445; In English
Report No.(s): AD-A386388; NRL/JA/7331-99-0036; Copyright; Avail: Defense Technical Information Center (DTIC)

This work analyzes available experimental and in situ information obtained by different investigators and presents it in the form of simple usable algorithms and codes. The following independent algorithms are presented: 1) the retrieval of backscattering coefficient through the measurements of beam attenuation and beam scattering coefficients, 2) the retrieval of angular scattering coefficient through the measurements of beam attenuation and absorption coefficients, 3) the retrieval of downward and upward mean cosines in the depth regime through the Gordon's parameter that depends on backscattering and absorption coefficient, 4) the retrieval of diffuse attenuation and diffuse reflection coefficients through the Gordon's parameter. The applicability of these algorithms is discussed and examples of their applications are presented.
DTIC
Algorithms; Optical Properties; Absorptivity

20010048749 NASA Marshall Space Flight Center, Huntsville, AL USA
A Simple Approach of CCD Camera Calibration for Optical Diagnostics Instrumentation
Cha, Soyoung Stephen, Illinois Univ., USA; Leslie, Fred W., NASA Marshall Space Flight Center, USA; Ramachandran, Narayanan, Universities Space Research Association, USA; [2001]; 1p; In English; SPIE International Symposium, 30 Jul. 2001, San Diego, CA, USA; Sponsored by International Society for Optical Engineering, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Solid State array sensors are ubiquitous nowadays for obtaining gross field images in numerous scientific and engineering applications including optical diagnostics and instrumentation. Linear responses of these sensors are often required as in interferometry, light scattering and attenuation measurements, and photometry. In most applications, the linearity is usually taken to be granted without thorough quantitative assessment or correction through calibration. Upper-grade CCD cameras of high price may offer better linearity: however, they also require linearity checking and correction if necessary. Intermediate- or low-grade CCD cameras are more likely to need calibration for linearity . Here, we present two very simple approaches: one for quickly checking camera linearity without any additional setup and one for precisely correcting nonlinear sensor responses. It is believed that after calibration, those sensors of intermediate or low grade can function as effectively as their expensive counterpart.
Author
CCD Cameras; Calibrating; Correction; Diagnosis

20010048754 NASA Marshall Space Flight Center, Huntsville, AL USA
Fresnel Lens
Watson, Michael D., NASA Marshall Space Flight Center, USA; Scott, Steve, Reflexite, Inc., USA; Lamb, David, Minnesota Mining and Mfg. Co., USA; [2001]; 1p; In English; No Copyright; Avail: Issuing Activity; Abstract Only

Fresnel lenses span the full range of sizes from lens a few micrometers in diameter to lens several meters in diameter. These lenses are utilized in various fields including optical communication, theatrical lighting, office equipment, video entertainment systems, solar concentrators, and scientific research instruments. These lenses function either as diffractive or refractive optical elements depending on the geometrical feature size of the lens. The basic functions of these lenses is described followed by an overview of fabrication methods. A summary of applications is then provided illustrating the rich variety of applications for which fresnel lenses may be designed to fulfill.
Author
Diffractive Optics; Fabrication; Fresnel Lenses; Refractivity

75
PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion. For ionospheric plasmas see 46 Geophysics. For space plasmas see 90 Astrophysics.

20010044351 Texas Univ., Inst. for Fusion Studies, Austin, TX USA
Assessment of Compact Low Neutron Fusion Reactor Concepts ***Final Report, 15 Jun. 1999 - 30 Nov. 2000***
Wong, H. V.; Kotschenreuther, M. T.; Breizman, B. N.; VanDam, J. W.; Hazeltine, Richard D.; Feb. 16, 2000; 36p; In English
Contract(s)/Grant(s): N00014-99-1-0888
Report No.(s): AD-A387427; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

A brief summary of our results is as follows. We find that, in the proton-boron colliding beam fusion reactor, the power which must be supplied to maintain an optimal colliding beam configuration is estimated to be as least 5.1 times greater than the fusion power. This implies that effective power conversion efficiencies to electrical power in excess of 84% will be required.

Furthermore, if the transverse collisional spread of the proton beam is to be limited by electron drag, the boron density is constrained to have magnitudes will below the optimal value at which the fusion power is maximized.
DTIC
Nuclear Fusion; Neutrons; Boron; Proton Beams

20010047989 Stanford Univ., Thermosciences Div., Stanford, CA USA
Infrared Signature Masking by Air Plasma Radiation ***Final Report, 1 Jun. 1997 - 31 Oct. 2000***
Kruger, Charles H., Stanford Univ., USA; Laux, C. O., Stanford Univ., USA; March 2001; 62p; In English; Original contains color illustrations
Contract(s)/Grant(s): NAG2-1079; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This report summarizes the results obtained during a research program on the infrared radiation of air plasmas conducted in the High Temperature Gasdynamics Laboratory at Stanford University under the direction of Professor Charles H. Kruger, with Dr. Christophe O. Laux as Associate Investigator. The goal of this research was to investigate the masking of infrared signatures by the air plasma formed behind the bow shock of high velocity missiles. to this end, spectral measurements and modeling were made of the radiation emitted between 2.4 and 5.5 micrometers by an atmospheric pressure air plasma in chemical and thermal equilibrium at a temperature of approximately 3000 K. The objective was to examine the spectral emission of air species including nitric oxide, atomic oxygen and nitrogen lines, molecular and atomic continua, as well as secondary species such as water vapor or carbon dioxide. The cold air stream injected in the plasma torch contained approximately 330 parts per million of CO2, which is the natural CO2 concentration in atmospheric air at room temperatures, and a small amount of water vapor with an estimated mole fraction of 3.8x10(exp -4).
Author
Infrared Signatures; Masking; Plasma Radiation; Spectral Emission; Spectrum Analysis

20010048414 NASA Ames Research Center, Moffett Field, CA USA
A Coupled Plasma-Sheath Model for High Density Sources
Bose, Deepak, Eloret Corp., USA; Govindan, T. R., NASA Ames Research Center, USA; Meyyappan, M., NASA Ames Research Center, USA; [2000]; 1p; In English; 15th International Symposium on Plasma Chemistry, 9-13 Jul. 2001, Orleans, France
Contract(s)/Grant(s): NAS2-99092; RTOP 632-62-01; No Copyright; Avail: Issuing Activity; Abstract Only

High density, low pressure plasmas are used for etching and deposition in microelectronics fabrication processes. The process characteristics are strongly determined by the ion energy distribution (IED) and the ion flux arriving at the substrate that are responsible for desorption of etch products and neutral dissociation at the surface. The ion flux and energy are determined by a self- consistent modeling of the bulk plasma, where the ions and the neutral radicals are produced, and the sheath, where the ions are accelerated. Due to their widely different time scales, it is a formidable task to self-consistently resolve non-collisional sheath in a high density bulk plasma model. In this work, we first describe a coupled plasma-sheath model that attempts to resolve the non-collisional sheath in a reactor scale model. Second, we propose a semianalytical radio frequency (RF) sheath model to improve ion dynamics.
Author
Density (Mass/Volume); Low Pressure; Plasmas (Physics); Plasma Sheaths; Flux (Rate); Etching; Deposition

20010048753 NASA Marshall Space Flight Center, Huntsville, AL USA
Large-Scale Mini-Magnetosphere Plasma Propulsion (M2P2) Experiments
Winglee, R. M., Washington Univ., USA; Slough, J., Washington Univ., USA; Ziemba, T., Washington Univ., USA; Euripides, P., Washington Univ., USA; Gallagher, D., NASA Marshall Space Flight Center, USA; Craven, P., NASA Marshall Space Flight Center, USA; Adrian, M. L., NASA Marshall Space Flight Center, USA; Tomlinson, W., Southwest Research Inst., USA; Cravens, J., Southwest Research Inst., USA; Burch, J., Southwest Research Inst., USA; [2001]; 1p; In English; Charging Conference, 27 Apr. 2001, Noordwijk, Netherlands; No Copyright; Avail: Issuing Activity; Abstract Only

Mini-Magnetosphere Plasma Propulsion (M2P2) is an innovative plasma propulsion system that has the potential to propel spacecraft at unprecedented speeds of 50 to 80 km/s, with a low power requirement of approx. 1 kW per 100 kg of payload and -1 kg of neutral gas [fuel] consumption per day of acceleration. Acceleration periods from several days to a few months are envisioned. High specific impulse and efficiency are achieved through coupling of the spacecraft to the 400 km/s. solar wind through an artificial magnetosphere. The mini-magnetosphere or inflated magnetic bubble is produced by the injection of cold dense plasma into a spacecraft-generated magnetic field envelope. Magnetic bubble inflation is driven by electromagnetic processes thereby avoiding the material and deployment problems faced by mechanical solar sail designs. Here, we present the theoretical design of M2P2 as well as initial results from experimental testing of an M2P2 prototype demonstrating: 1) inflation

of the dipole magnetic field geometry through the internal injection of cold plasma; and 2) deflection of and artificial solar wind by the prototype M2P2 system. In addition, we present plans for direct laboratory measurement of thrust imparted to a prototype M2P2 by an artificial solar wind during the summer of 2001.
Author
Plasma Propulsion; Magnetospheres; Cold Plasmas; Magnetic Field Configurations; Thrust Measurement

76
SOLID-STATE PHYSICS

Includes condensed matter physics, crystallography, and superconductivity. For related information see also 33 Electronics and Electrical Engineering and 36 Lasers and Masers.

20010043949 Howard Univ., Washington, DC USA
Development of Novel Photoconductive Liquid Crystals for Large Area Photodetectors ***Final Report, 1 Mar. 1996 - 30 Apr. 1998***
Pollack, Steven K.; Apr. 1998; 4p; In English
Contract(s)/Grant(s): F49620-96-1-0016; AF Proj. 1660
Report No.(s): AD-A387443; AFRL-SR-BL-TR-01-0127; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Attempts were made to develop liquid crystals based on the Pd/Cu-mediated cyclization of o-iodo-trimethylethynylbenzenes. We found that the palladation of the triazene protected intermediate led to a stable organo-palladium complex, frustrating further reaction. An alternative route, using the dehydrofluorination of triazene functional trifluorostryenes led to the desired building block. Unfortunately, cyclization proved unsuccessful.
DTIC
Liquid Crystals; Product Development; Photometers; Palladium

20010044346 NASA Marshall Space Flight Center, Huntsville, AL USA
A Compact X-Ray System for Macromolecular Crystallography
Gubarev, Mikhail, NASA Marshall Space Flight Center, USA; Ciszak, Ewa, NASA Marshall Space Flight Center, USA; Ponomarev, Igor, X-Ray Optical Systems, Inc., USA; Gibson, Walter, State Univ. of New York, USA; Joy, Marshall, NASA Marshall Space Flight Center, USA; Review of Scientific Instruments; October 2000; ISSN 0034-6748; Volume 71, No. 10, pp. 3900-3904; In English; Copyright; Avail: Issuing Activity

We describe the design and performance of a high flux x-ray system for a macromolecular crystallography that combines a microfocus x-ray generator (40 micrometer full width at half maximum spot size at a power level of 46.5 W) and a collimating polycapillary optic. The Cu Ka lpha x-ray flux produced by this optimized system through a 500,um diam orifice is 7.0 times greater than the x-ray flux previously reported by Gubarev et al. [M. Gubarev et al., J. Appl. Crystallogr. 33, 882 (2000)]. The x-ray flux from the microfocus system is also 2.6 times higher than that produced by a rotating anode generator equipped with a graded multilayer monochromator (green optic, Osmic Inc. CMF24-48-Cu6) and 40% less than that produced by a rotating anode generator with the newest design of graded multilayer monochromator (blue optic, Osmic, Inc. CMF12-38-Cu6). Both rotating anode generators operate at a power level of 5000 W, dissipating more than 100 times the power of our microfocus x-ray system. Diffraction data collected from small test crystals are of high quality. For example, 42 540 reflections collected at ambient temperature from a lysozyme crystal yielded R(sub sym)=5.0% for data extending to 1.70 A, and 4.8% for the complete set of data to 1.85 A. The amplitudes of the observed reflections were used to calculate difference electron density maps that revealed positions of structurally important ions and water molecules in the crystal of lysozyme using the phases calculated from the protein model.
Author
Crystallography; X Rays; Rotating Generators; Electron Density (Concentration); Molecules

20010046750 Advanced Technologies for Optical Materials, Tomsk, Russia
Research of Possibility of Semi-Conducting CdGeAs2 Making by the Way of Deep Impurities Doping ***Final Report***
Voevodine, Valeri G.; Jan. 22, 2001; 13p; In English
Report No.(s): AD-A387713; EOARD-ISTC-99-7006; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report results from a contract tasking Advanced Technologies for Optical Materials (ATOM) as follows: The contractor will develop methods of semi-conducting high-resistance CdGeAs2 crystal production by way of control doping by the impurities Cu, Au, Zn, Sc, and Se. Selection of the most promising impurities and optimization of the doping technology will allow

minimization of optical loses in CdGeAs2-crystals and related to manufacture of ternary CdGeAs2 crystals with low absorption coefficient for practical purposes of nonlinear optics
DTIC
Nonlinear Optics; Optical Materials; Semiconductor Devices; Cadmium Compounds; Additives; Germanium Compounds; Arsenic Compounds

20010047498 NASA Ames Research Center, Moffett Field, CA USA
Modeling of Current-Voltage Characteristics in Large Metal-Semiconducting Carbon Nanotube Systems
Yamada, Toshishige, NASA Ames Research Center, USA; [2000]; 23p; In English
Contract(s)/Grant(s): NASA Order A-61812-D; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A model is proposed for two observed current-voltage (I-V) patterns in recent experiment with a scanning tunneling microscope tip and a carbon nanotube [Collins et al., Science 278, 100 (1997)]. We claim that there are two contact modes for a tip (metal)-nanotube (semiconductor) junction depending whether the alignment of the metal and the semiconductor band structures is (1) variable (vacuum-gap) or (2) fixed (touching) with V. With the tip grounded, the tunneling case in (1) would produce large dI/dV with V is greater than 0, small dI/dV with V is less than 0, and I = 0 near V = 0 for an either n- or p-nanotube. However, the Schottky mechanism in (2) would result in forward current with V is less than 0 for an n-nanotube, while with V is greater than 0 for an p-nanotube. The two observed I-V patterns are thus entirely explained by a tip-nanotube contact of the two types, where the nanotube must be n-type. We apply this model to the source-drain I-V characteristics in a long nanotube-channel field-effect-transistor with metallic electrodes at low temperature [Zhou et al., Appl. Phys. Lett. 76, 1597 (2000)], and show that two independent metal-semiconductor junctions in series are responsible for the observed behavior.
Author
MSM (Semiconductors); Schottky Diodes; N-Type Semiconductors; P-Type Semiconductors; Semiconductor Junctions; Field Effect Transistors; Carbon; Nanotubes

20010047499 NASA Ames Research Center, Moffett Field, CA USA
Potential Energy Curves and Transport Properties for the Interaction of He with Other Ground-state Atoms
Partridge, Harry, NASA Ames Research Center, USA; Stallcop, James R., NASA Ames Research Center, USA; Levin, Eugene, Eloret Corp., USA; [2001]; 58p; In English
Contract(s)/Grant(s): NAS2-99092; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The interactions of a He atom with a heavier atom are examined for 26 different elements, which are consecutive members selected from three rows (Li - Ne, Na - Ar, and K,Ca, Ga - Kr) and column 12 (Zn,Cd) of the periodic table. Interaction energies are determined wing high-quality ab initio calculations for the states of the molecule that would be formed from each pair of atoms in their ground states. Potential energies are tabulated for a broad range of Interatomic separation distances. The results show, for example, that the energy of an alkali interaction at small separations is nearly the same as that of a rare-gas interaction with the same electron configuration for the dosed shells. Furthermore, the repulsive-range parameter for this region is very short compared to its length for the repulsion dominated by the alkali-valence electron at large separations (beyond about 3-4 a(sub 0)). The potential energies in the region of the van der Waals minimum agree well with the most accurate results available. The ab initio energies are applied to calculate scattering cross sections and obtain the collision integrals that are needed to determine transport properties to second order. The theoretical values of Li-He total scattering cross sections and the rare-gas atom-He transport properties agree well (to within about 1%) with the corresponding measured data. Effective potential energies are constructed from the ab initio energies; the results have been shown to reproduce known transport data and can be readily applied to predict unknown transport properties for like-atom interactions.
Author
Potential Energy; Transport Properties; Ground State; Helium Atoms

20010047500 NASA Ames Research Center, Moffett Field, CA USA
Nanotubes in Nanoelectronics: Transport, Growth and Modeling
Anantram, M., NASA Ames Research Center, USA; Delzeit, Lance, NASA Ames Research Center, USA; Cassell, Alan, NASA Ames Research Center, USA; Han, Jie, NASA Ames Research Center, USA; Meyyappan, M., NASA Ames Research Center, USA; [2001]; 26p; In English; Advanced Research Workshop on Semiconductor Nanostructures, 5-9 Feb. 2001, Queenstown, New Zealand
Contract(s)/Grant(s): RTOP 632-62-01; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Carbon nanotube (CNT) baud nanotechnology appears to be promising for future Theoretical analysis and results for the ballistic current carrying capacity of nanotube wires am presented. Aspects of metal-nanotube coupling are examined. Results am also presented for chemical vapor deposition of CNT from hydrocarbon feedstock.
Author
Carbon; Nanotubes; Nanotechnology

20010047554 NASA Marshall Space Flight Center, Huntsville, AL USA
Optical Characterization of Bulk ZnSeTe Solid Solutions
Su, Ching-Hua, NASA Marshall Space Flight Center, USA; Feth, S., NASA Marshall Space Flight Center, USA; Zhu, Shen, NASA Marshall Space Flight Center, USA; Lehoczky, S. L., NASA Marshall Space Flight Center, USA; Wang, Ling Jun, Tennessee Univ., USA; Journal of Applied Physics; Nov. 01, 2000; ISSN 0021-8979; Volume 88, No. 9, pp. 5148-5152; In English; Copyright; Avail: Issuing Activity

Optical characterization was performed on wafers sliced from crystals of ZnSe, ZnTe, and ZnSe(1-x)Te(x)(0 less than x less than 0.4) grown by physical vapor transport. Energy band gaps at room temperature were determined from optical transmission measurements on 11 wafers. A best fit curve to the band gap versus composition x data gives a bowing parameter of 1.45. This number lies between the value of 1.23 determined previously on ZnSeTe bulk crystals and the value of 1.621 reported on ZnSeTe epilayers. Low-temperature photoluminescence (PL) spectra were measured on six samples. The spectra of ZnSe and ZnTe were dominated by near band edge emissions and no deep donor-acceptor pairs were observed. The PL spectrum exhibited a broad emission for each of the ZnSe(1-x)Te(x) samples, 0.09 less than x less than 0.39. For x=0.09, this emission energy is about 0.2 eV lower than the band gap energy measured at low temperature. As x increases the energy discrepancy gradually decreases and reduces to almost zero at x=0.4. The single broad PL emission spectra and the spectra measured as a function of temperature were interpreted as being associated with the exciton bound to Te clusters because of the high Te content in these samples.
Author
Solid Solutions; Zinc Tellurides; Selenium; Light Transmission; Characterization

20010047625 Cincinnati Univ., Nanoelectronics Lab., OH USA
Blue Emission from Tm-doped GaN Electroluminescent Devices
Stecki, A. J., Cincinnati Univ., USA; Garter, M., Cincinnati Univ., USA; Lee, D. S., Cincinnati Univ., USA; Heikenfeld, J., Cincinnati Univ., USA; Birkhahn, R., Cincinnati Univ., USA; Applied Physics Letters; Oct. 11, 1999; ISSN 0003-6951; Volume 75, No. 15, pp. 2184-2186; In English
Contract(s)/Grant(s): DAAD19-99-1-0348
Report No.(s): AD-A387034; ARO-40045.5-EL; Copyright; Avail: Defense Technical Information Center (DTIC)

Blue emission has been obtained at room temperature from Tm-doped GaN electroluminescent devices. The GaN was grown by molecular beam epitaxy on Si(111) substrates using solid sources (for Ga and Tm) and a plasma source for N2. Indium-tin-oxide was deposited on the GaN layer and patterned to provide both the bias (small area) and ground (large are) transparent electrodes. Strong blue light emission under the bias electrode was observable with the naked eye at room temperature. The visible emission spectrum consists of a main contribution in the blue region at 477 nm corresponding to the Tm transition from the (1)G4 to the (3)H6 ground state. A strong near-infrared peak was also observed at 802 nm. The relative blue emission efficiency was found to increase linearly with bias voltage and current beyond certain turn-on levels.
DTIC
Light Emission; Visible Spectrum; Thulium; Doped Crystals; Gallium Nitrides; Electroluminescence

20010047668 Minnesota Univ., Dept. of Chemical Engineering and Materials Science, Minneapolis, MN USA
The Physicochemical Origins of Coincident Epitaxy in Molecular Overlayers: Lattice Modeling Versus Potential Energy Calculations
Last, Julie A., Minnesota Univ., USA; Hooks, Daniel E., Minnesota Univ., USA; Hillier, Andrew C., Minnesota Univ., USA; Ward, Michael D., Minnesota Univ., USA; Journal of Physical Chemistry B; 1999; Volume 103, pp. 6723-6733; In English
Report No.(s): AD-A386273; Copyright; Avail: Defense Technical Information Center (DTIC)

The physicochemical basis for epitaxial stabilization of coincident molecular overlayers is illustrated by comparison of optimum overlay-substrate configurations calculated with potential energy (PE) methods and a simple geometric lattice misfit modeling algorithm (EpiCalc) that neglects molecular orientations and intermolecular potentials. Using beta-bis(ethylenedithio)tetrathiafulvalene triiodide (beta-ET2I3), perylenetetracarboxylic diimide (PTCDI), and perylenetetracarboxylic dianhydride (PTCDA) overlayers on a graphite substrate as examples, both methods predict identical optimum azimuthal overlayer orientations for each overlayer that also agree with experimental observations. PE calculations for

three hypothetical PTCDA overlayers, with identical lattice parameters but different molecular orientations, predict coincidence at the same azimuthal orientation for all overlayers.
DTIC
Epitaxy; Lattice Parameters; Potential Energy; Energy Methods; Stabilization

20010048179 NASA Marshall Space Flight Center, Huntsville, AL USA
Synthesis of ZnO:As Films Using Off-Axis Sputtering Deposition
Zhu, Shen, Universities Space Research Association, USA; Su, Ching-Hua, NASA Marshall Space Flight Center, USA; Lehoczky, S. L., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; 13th International Conference on Crystal Growth, 30 Jul. - 4 Aug. 2001, Kyoto, Kyoto, Japan, Japan; No Copyright; Avail: Issuing Activity; Abstract Only

As a novel oxide semiconductor material, ZnO is interesting for use in many applications. For fabricating electronic devices, it is important to have n- and p- type ZnO materials. Arsenic has been proven to be one of the p-type dopants for ZnO materials. However, information in studying the ZnAsO ternary compound films has been scarce. In order to investigate the morphology, structure and electrical properties of ZnAsO ternary compounds, ZnO:As films have been synthesized using off-axis sputtering deposition on various substrates including (100) Si and (0001) sapphire crystals. Films are grown under various growth conditions. ZnO:As targets with the atomic weight ratios of arsenic to zinc from 0.01 to 0.10 are used for film synthesis. The growth temperatures and pressures range from 350 to 550C and 5 to 150 mTorr, respectively. Argon to oxygen gas ratio for film growth is varied to examine the film quality as well. Film surface morphology, crystal structure, and compositions, are characterized using atomic force microscopy, x-ray diffraction, and energy dispersive spectroscopy, respectively. The compositions of target material and ZnO:As films grown under various conditions are then assessed. The electrical properties were also measured. The detail of these measurements will be discussed in the presentation.
Author
Crystal Structure; Electrical Properties; Morphology; Zinc Oxides; Arsenic; Sputtering; Thin Films

20010048741 Rensselaer Polytechnic Inst., Electrical, Computer and Systems Engineering Dept., Troy, NY USA
Selective Growth of CdTe on Si and GaAs Substrates using Metalorganic Vapor Phase Epitaxy
Zhang, R., Rensselaer Polytechnic Inst., USA; Bhat, I., Rensselaer Polytechnic Inst., USA; Journal of Electronic Materials; [2000]; Volume 29, No. 6, pp. 2000; In English
Contract(s)/Grant(s): N00014-98-I-0767
Report No.(s): AD-A387419; No Copyright; Avail: CASI; A01, Microfiche; A02, Hardcopy

Epitaxy lateral overgrowth (ELO) is a new technique to grow low-defect-density thin films on lattice-mismatched substrates. For the ELO growth of CdTe and HgCdTe on Si substrate to be successful, the first requirements is that the growth should be selective. to that end, we have used several mask materials, and several growth conditions in order to obtained selective growth. A number of growth-experiments have been carried out, with temperatures in the range from 380 C to 550 C, and pressures in the range from 380 torr to less than 20 torr. Perfectly selective growth of CdTe has been achieved on Si and GaAs substrates using Si3N4 as the mask layer. Successful lateral epitaxial growth of CdTe was also achieved.
DTIC
Cadmium Tellurides; Mercury Cadmium Tellurides; Vapor Phase Epitaxy

20010048746 NASA Marshall Space Flight Center, Huntsville, AL USA
Bridgman Growth of Detached GeSi Crystals
Volz, M. P., NASA Marshall Space Flight Center, USA; Schweizer, M., NASA Marshall Space Flight Center, USA; Kaiser, N., Freiburg Univ., Germany; Cobb, S. D., NASA Marshall Space Flight Center, USA; Vujisic, L., Cape Simulations, Inc., USA; Motakef, S., Cape Simulations, Inc., USA; Szofran, F. R., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; 13th International Conference on Crystal Growth, 30 Jul. - 4 Aug. 2001, Kyoto, Japan; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The growth of detached crystals by the Bridgman technique, in which the growing crystal is not in contact with the crucible wall, has been observed both on earth and in microgravity conditions. Such detachment has particularly been in evidence in microgravity experiments, where the pressure head of the molten sample is absent. At present, the mechanisms contributing to the detachment are not completely understood and until recently detachment has not been reproducibly obtained. Key parameters which must be considered are the contact angle between the melt and the crucible and the growth angle. Another essential parameter is the pressure difference between the annular gap around the solid below the melt and the volume above the melt. Here we present results of the growth of Ge(0.98)Si(0.02) using adjustments in the applied temperature profile to control the pressure difference between the bottom and top of the melt. The technique is less susceptible to sample contamination than controlling the

pressure by connecting the crucible to external gas sources. Using this technique, a pressure difference is created by decreasing the temperature in the volume above the melt while the sample is molten but prior to growth. A maximum pressure difference approximately equal to the pressure head of the molten sample can thus be obtained. Several GeSi crystals were grown in pyrolitic boron nitride crucibles. When a pressure difference was applied, samples were reproducibly grown mostly detached. For comparison, samples were also grown in a configuration in which gas could pass freely between the gap below the melt and the volume above the melt and no pressure difference could be established. These samples were initially attached. Existence of detachment was determined both by measuring the radius of the samples with a profilometer and by observations of the sample surfaces with optical and electron microscopy. The gap thickness between the crucible and detached crystal was on the order of 10 micron. The surfaces of the attached areas of the crystals had the same shape as the interior crucible wall whereas in the detached areas the crystal facets could usually be observed.
Author
Bridgman Method; Crystals; Detachment; Crystal Growth; Germanium Compounds; Silicon Compounds

20010048748 NASA Marshall Space Flight Center, Huntsville, AL USA
Transport Phenomena of Off-Axis Sputtering Deposition
Zhu, S., NASA Marshall Space Flight Center, USA; Su, C., NASA Marshall Space Flight Center, USA; Lehoczky, S. L., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; 2nd Pan-Pacific Basin Workshop, 1 May 2001, Pasadena, CA, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Various high quality epitaxial films, especially oxides, have been synthesized using off-axis sputtering deposition. In this presentation, we report the experiment results of ZnO films grown by the off-axis sputtering deposition. Films were synthesized in temperatures ranged from room temperature to 600 C, and pressures from 5 mTorr to 150 mTorr. Film growth rate was measured by surface profilometer, ellipsometer, and wavelength dispersive spectrometry. Due to the collisions between the sputtered species and the residue gases, the kinetic energy of species was reduced and the transport of depositing species changed from a ballistic movement for low pressure to a diffusive drift for high pressure in which the transport species were almost thermalized. The measurements show an increase of growth rates along the gravity vector when the Knudsen number of transport species is less than 0.05, which suggests that gravity affected the transport characterization in off-axis sputtering deposition. Because the product of pressure (p) and travel distance (d) of sputtered species, pd, exceeds several mTorr-cm during film deposition, the classical simulations for sputtering process in high vacuum system may not be applied. Based on these experimental measurements, a transport process of the off-axis sputtering deposition is proposed. Several models including the Monte Carlo method and gravity-driven flow dynamics simulation will be discussed.
Author
Characterization; Deposition; Sputtering; Transport Properties; Zinc Oxides; Crystal Growth; Thin Films

20010048755 NASA Marshall Space Flight Center, Huntsville, AL USA
The Effect of the Wall Contact and Post-Growth C001-Down on Defects in CdTe Crystals Grown by Contactless PVT
Palosz, W., Universities Space Research Association, USA; Grasza, K., Polish Academy of Sciences, Poland; Dudley, M., State Univ. of New York, USA; Raghothamachar, B., State Univ. of New York, USA; Cai, L., State Univ. of New York, USA; Durose, K., Durham Univ., UK; Halliday, D., Durham Univ., UK; Boyall, N. M., Durham Univ., UK; [2001]; 1p; In English; ICCG13, 30 Jul. 2001, Kyoto, Japan; No Copyright; Avail: Issuing Activity; Abstract Only

In crystal growth, the quality of the final material may depend, among other factors, on its interaction with the walls of the ampoule during and after the growth, and on the rate of the crystal cool-down at the end of ate the process. to investigate the above phenomena, a series of CdTe crystal growth processes was carried out, The crystals were grown by physical vapor transport without contact with the side walls of the silica glass ampoules, applying the Low Supersaturation Nucleation technique. The source temperature was 930 C, the undercooling was a few degrees. The crystals, having the diameter of 25 mm, grew at the rate of a few mm per day. The post-growth cool-down to the room temperature was conducted at different rates, and lasted from a few minutes to four days. The crystals were characterized using chemical etching low temperature luminescence, and Synchrotron White Beam X-ray Topography techniques. The dislocation (etch pit) density was measured and its distribution was analyzed by comparison with Poisson curves and with the Normalized Radial Distribution Correlation Function. It was found that the contact of the crystal with silica leads to a strain field and high (in the 105 sq cm range) dislocation (etch pit) density. Similar defect concentrations were found in crystals subjected to fast post-growth cool-down. Typical EPD values for lower cool-down rates and in regions not affected by wall interactions are in the lower 10(exp 4) sq cm range. In some areas the actual dislocation density

was about 10(exp 3) sq cm or even less. No apparent effect of the cool-down rate on polygonization was observed. A fine structure could be discerned in low-temperature PL spectra of crystals with low dislocation density.
Author
Crystal Growth; Vapors; Silicon Dioxide; Polygonization; Distribution Functions; Cadmium Tellurides

20010048756 NASA Marshall Space Flight Center, Huntsville, AL USA
Formation of Residual Gases from Source Materials in Closed Crystal Growth Systems
Palosz, W., Universities Space Research Association, USA; [2001]; 1p; In English; ICCG13, 30 Jul. 2001, Kyoto, Japan; No Copyright; Avail: Issuing Activity; Abstract Only

Different, non-constituent cases are present in crystal growth systems and may affect processes like growth rate in PVT or voids formation and detached solidification in melt growth systems. The presence of the gas may be detrimental or advantageous depending on its amount and composition, and on the process in question. The presence of the cases, their amount and composition, can be caused and changed by diffusion through and desorption from the growth container material. We have investigated these phenomena for silica glass ampoules. We also found, that residual cases can be generated by the source materials: even very high purity commercial elements and compounds may contain trace amounts of impurities, particularly oxides. The oxides may have low volatilities themselves but their reaction with other species, particularly carbon and hydrogen, may produce volatile compounds like water or carbon oxides. The amount of the gas and its composition is dependent on the original purity of the material (oxide contaminants) and the heat treatment of the source prior to sealing. In many cases. particularly at temperatures below about 900 C and in well-outgassed ampoules, this mechanism dominates. The problem is of a particular importance in sealed systems where the amount and composition of the gas cannot be directly controlled. Therefore, a reasonable knowledge and understanding of the origin, composition, magnitude, and change with time of gases present in sealed ampoules may be important for a meaningful control and interpretation of crystal growth processes. We have investigated this phenomenon in more details for a number of elements and compounds, primarily for II-VI and IV-VI materials. Different source pre-treatment and annealing procedures were applied, and subsequent consecutive annealings and measurements were done to determine the origin and development of the gas in the systems.
Author
Residual Gas; Crystal Growth; Trace Contaminants; Solidification; Gas Composition

20010048891 NASA Ames Research Center, Moffett Field, CA USA
A Coupled-Cluster Study of XON (X=H, F, Cl), and the XON (left and right arrow) XNO Transition States
Lee, Timothy, NASA Ames Research Center, USA; [1994]; 1p; In English
Contract(s)/Grant(s): RTOP 232-01-04; No Copyright; Avail: Issuing Activity; Abstract Only

The XON molecules (X=H, F, and Cl) have been studied using the singles and doubles coupled-cluster method that includes a perturbational estimate of the effects of connected triple excitations, CCSD(T), in conjunction with a double polarized triple-zeta basis set. The equilibrium geometries, dipole moments, harmonic vibrational frequencies and infrared intensities have been predicted. The X-O bond distance is shown to be abnormally long for X=F and Cl, and this is attributed to the degree of ionic bonding and the stability of NO(+). Based on Mulliken population analyses, it is shown that there is a significant degree of X(-), ON(+) ionic bonding character for FON and ClON, whereas for HON the ionic character is reduced and best described as H(+), NO(-). The stability of the XON molecule relative to the XNO isomer is shown to increase in the order HON<FON<CION, although even CION is 27.0 plus or minus 1.0 kcal/mol (O K) less stable than CINO. The XON (left and right arrow) XNO transition states are also investigated. FON and CION possess the lowest barrier heights to isomerization (7.2 plus or minus 1.0 kcal/mol at O K), but these are sufficiently large to suggest that isomerization should not be rapid at low temperatures.
Author
Nitrogen Oxides; Ions; Molecular Clusters

20010048894 NASA Ames Research Center, Moffett Field, CA USA
Achieving Chemical Accuracy with Coupled-Cluster Theory
Lee, Timothy J., NASA Ames Research Center, USA; Scuseria, Gustavo E., Rice Univ., USA; [1994]; 1p; In English; No Copyright; Avail: Issuing Activity; Abstract Only

Due to formal and computational advances in coupled-cluster theory over the past few years, it is now possible to obtain very accurate molecular geometries, vibrational frequencies, heats of formation, binding energies, and vertical electronic excitation

energies. The present monograph reviews the advances that have lead to the current state-of-the art, and also summarizes selected examples from the published literature.
Author
Molecular Clusters; Computational Chemistry

80
SOCIAL AND INFORMATION SCIENCES (GENERAL)

Includes general research topics related to sociology; educational programs and curricula.

20010045708 Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Technische Menskunde, Soesterberg, Netherlands
Innovating of the Technical Education OCLOG ***Final Report Innoveren van de Technische Opleidingen***
Bots, M. J., Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Netherlands; Timmer, A., Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Netherlands; Veldhuis, G. J., Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Netherlands; Riemersma, J. B. J., Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Netherlands; Jan. 31, 2001; 46p; In Dutch
Contract(s)/Grant(s): 10346; TNO Proj. 790.2
Report No.(s): TD-2000-0348; TNO-TM-01-A006; Copyright; Avail: Issuing Activity

The 'opleidingscentrum Logistiek' requested TNO-TM to answer the following questions: (1) What future developments are relevant for the education of mechanics and technicians? (2) What needs and problems arise from those future developments? and (3) Which educational concepts can be used to solve the problems and address the needs? The first two questions were answered by means of an extensive context and training analysis. A number of people were interviewed, documents were analysed and classes were visited.
Author
Training Analysis; Education

20010047622 Instituto Nacional de Pesquisas Espacias, Sao Jose dos Campos, Brazil
First Space School Education Model for Adolescents ***1 Escola do Espaco: Modelo de Educacao para Adolescentes***
Sausen, Tania Maria, Instituto Nacional de Pesquisas Espacias, Brazil; Avila, Joao, Instituto Nacional de Pesquisas Espacias, Brazil; 2000; 49p; In Portuguese
Report No.(s): INPE-7519-NTC/339; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The first Space School was a pilot project created by the National Institute for Space Research, and carried out together with the Brazilian Space Agency-BSA(AE B) and the Airspace Technical Center-ATC (CTA) from November 16 to 19, 1999 in the installations of the Institute in Sao Jose dos Campos, Sao Paulo. Its purpose was to disseminate the space activities between the student community at the grammar and high school levels so that they would be motivated in utilizing their benefits better, as well as become interested in the professions directed towards this area. Twenty-two students (10 girls and 10 boys) of the 8th grade of grammar school and 1st and 2nd grades of secondary school from municipal, state and private schools in the municipality of Sao Jose dos Campos, took part in the Space School. The students had theoretical and hands-on classes on the several topics of the space area, and among them: how to build a satellite, how to build a satellite launching vehicle, remote sensoring, meteorology, astronomy and astrophysics, the Brazilian Space Program and lecture given by the Brazilian astronaut. The classes were given by the INPE and CTA researchers themselves, in the auditoriums and laboratories of these two institutions. The success of this first experiment has stimulated the organizers to continue this project in the coming years.
Author
Education; Aerospace Sciences

20010047994 NASA, Washington, DC USA
Education and Public Outreach ***Annual Report, FY 2000***
Sakimoto, Philip, Editor, NASA, USA; [2000]; 154p; In English; Original contains color illustrations; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

This Annual Report is a summary of nearly 400 Education and Public Outreach (E/PO) products and activities developed or carried out in FY2000 under NASA's Office of Space Science (OSS) E/PO program. It includes products and activities developed by OSS missions and research programs, innovative space science concepts developed under the Initiative to Develop Education through Astronomy and Space Science (IDEAS) Program, projects initiated under the Minority University Education

and Research Partnership Initiative in Space Science, and a number of additional comprehensive or special purpose programs managed by OSS at NASA Headquarters. Taking into account the fact that many of the activities reported involve multiple events that took place in a variety of venues, the total number of E/PO events reported for FY2000 is over 1,500, with events having taken place in all 50 states, the District of Columbia, one US Territory (Guam), and four foreign nations (Australia, Canada, Mexico, and Peru).
Author
Space Programs; Education; Public Relations

20010048412 NASA Ames Research Center, Moffett Field, CA USA
Can Distributed Volunteers Accomplish Massive Data Analysis Tasks?
Kanefsky, Bob, NASA Ames Research Center, USA; Barlow, Nadine G., University of Central Florida, USA; Gulick, Virginia C., NASA Ames Research Center, USA; [2000]; 1p; In English; Lunar and Planetary Science Conference, 12-16 Mar. 2001, Houston, TX, USA; No Copyright; Avail: Issuing Activity; Abstract Only

The science community is accustomed to interacting with the public for two main purposes: outreach to adults (since they are the patrons upon whose good will future funding will depend), and education for children (since they are the reservoir from which the next generation's talent must be drawn). We suggest that a third relationship can now be fruitful, one that has been little used until now - with the notable exception of the astronomy community. Astronomy has a long history of relying on non-professionals for some observations. Important contributions have been made by amateur astronomers in several areas of research including monitoring dust storms on Mars, timing asteroid occultations, and discovering comets. Note that three distinct contributions are being made by amateur astronomers: they supply their own instrumentation, provide access to observing sites around the Globe, and contribute their innate powers of perception.
Derived from text
Education; Exploration; Mars Atmosphere; Dust Storms

20010048673 Georgia Inst. of Tech., School of Psychology, Atlanta, GA USA
Enhancing Problem Solving Through Subgoal Learning: The Use of Examples and Computerized Training Environments
Catrambone, Richard, Georgia Inst. of Tech., USA; Feb. 28, 2001; 7p; In English
Contract(s)/Grant(s): F49620-98-1-0362
Report No.(s): AD-A387970; AFRL-SR-BL-TR-01-0182; No Copyright; Avail: CASI; A01, Microfiche; A02, Hardcopy

This research has focused on the development of training examples designed to help learners solve novel problems more effectively in domains such as probability and algebra. It has also examined the development of computer-based learning environments, also with the goal of helping learners to acquire knowledge in a way that helps them to transfer to new problems. An additional area of inquiry has been on the development of computer-based tools for carrying out tasks. The common thread among these projects has been the use of a task analysis (instructional design analysis) to guide the development of the materials and tools. The results of the studies have indicated that materials and tools designed after such an analysis produce significantly better learning and task performance compared to materials that are designed in other ways. Issues concerning how the materials are presented are also important, but seem to be less important than making sure they are based on a task analysis.
Author
Computer Techniques; Design Analysis; Education; Problem Solving

81
ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

20010046983 RECOM Technologies, Inc., Moffett Field, CA USA
Action-Based Planning
Lansky, Amy L., RECOM Technologies, Inc., USA; [1994]; 1p; In English; AL Planning Systems (SIPS'94), 15-17 Jun. 1994, Chicago, IL, USA
Contract(s)/Grant(s): RTOP 233-01-02; No Copyright; Avail: Issuing Activity; Abstract Only

This paper presents an approach to domain representation and planning that is fundamentally different from traditional methods; an approach based strictly on actions and their interrelationships, rather than on state-based goals and preconditions. In particular, we focus on the action-based planner COLLAGE, describe its methods for plan-construction, and contrast them with

more traditional approaches to planning. Experiences with COLLAGE in realistic domains have shown that the action-based approach is not only more natural to use, but can also be more cost-efficient than traditional planning methods.
Author
Planning; Costs; Domains; Goals

20010047601 NATO Committee on the Challenges of Modern Society, Brussels, Belgium
NATO/CCMS Pilot Study. Evaluation of Demonstrated and Emerging Technologies for the Treatment and Clean Up of Contaminated Land Groundwater (Phase 3) ***Annual Report***
Jan. 2001; 258p; In English, 26-30 Jun. 2000, Wiesbaden, Germany
Report No.(s): PB2001-104768; NATO-244; EPA/542/R-01/001; No Copyright; Avail: National Technical Information Service (NTIS)

The Council of the North Atlantic Treaty Organization (NATO) established the Committee on the Challenges of Modern Society (CCMS) in 1969, CCMS was charged with developing meaningful programs to share information among countries on environmental and societal issues that complement other international endeavors and to provide leadership in solving specific problems of the human environment. A fundamental precept of CCMS involves the transfer of technological and scientific solutions among nations with similar environmental challenges. The management of contaminated land and groundwater is a universal problem among industrialized countries, requiring the use of existing, emerging, innovative, and cost-effective technologies. This document reports on the second meeting of the Phase III Pilot Study on the Evaluation of Demonstrated and Emerging Technologies for the Treatment and Clean Up of Contaminated Land and Groundwater.
NTIS
Contamination; Cost Effectiveness; Ground Water; North Atlantic Treaty Organization (NATO); Pollution Control; Water Pollution; Environmental Monitoring; Water Treatment; Environmental Cleanup

20010047602 NATO Committee on the Challenges of Modern Society, Brussels, Belgium
NATO/CCMS Pilot Study: Evaluation of Demonstrated and Emerging Technologies for the Treatment and Clean Up of Contaminated Land and Groundwater (Phase 3). Special Session on Decision Support Tools
Jan. 2001; 146p; In English, 26-30 Jun. 2000, Wiesbaden, Germany
Report No.(s): PB2001-104767; NATO-245; EPA/542/R-01/002; No Copyright; Avail: National Technical Information Service (NTIS)

The Council of the North Atlantic Treaty Organization (NATO) established the Committee on the Challenges of Modern Society (CCMS) in 1969, CCMS was charged with developing meaningful programs to share information among countries on environmental and societal issues that complement other international endeavors and to provide leadership in solving specific problems of the human environment. A fundamental precept of CCMS involves the transfer of technological and scientific solutions among nations with similar environmental challenges. The management of contaminated land and groundwater is a universal problem among industrialized countries, requiring the use of existing, emerging, innovative, and cost-effective technologies. This document summarizes the special session on decision support systems from the third meeting of the Phase III Pilot Study on the Evaluation of Demonstrated and Emerging Technologies for the Treatment and Clean Up of Contaminated Land and Groundwater.
NTIS
North Atlantic Treaty Organization (NATO); Decision Support Systems; Ground Water; Contamination; Pollution Control; Environmental Monitoring; Water Pollution; Environmental Cleanup

20010047638 Institute for Human Factors TNO, Soesterberg, Netherlands
Distributed Decision Making ***Final Report Gedistribueerde Besluitvorming: Eindrapport***
Schraagen, J. M. C., Institute for Human Factors TNO, Netherlands; Mar. 27, 2001; 24p; In Dutch; Original contains color illustrations
Contract(s)/Grant(s): 013.60061; TNO Proj. 791.1
Report No.(s): TD-2000-0368; TNO-TM-01-8005; Copyright; Avail: Issuing Activity

Distributed decision making is the task faced by organizations in which the information and responsibility for decision making is distributed among individuals within the organization, who are often distributed geographically. The topic of 'distributed decision making' has gained attention through advances in technology. Those advances have increased the distance over which individuals can maintain contact, the speed with which information and instructions can be shared, and the amount of information being created. Research could consider what can be distributed in distributed decision-making systems (e.g., information, responsibility, opportunities to receive feedback). It could also consider over what these things are being distributed

(e.g., time, space, individuals, units), the nature of the distributional network (e.g., hierarchical, horizontal), and the relevance of external factors (e.g., time pressure, interruption of network, noise in transmission). In order to study the effects and interactions of these factors, we developed a new experimental task environment. We developed a new research paradigm for studying distributed decision making. We also performed a first assessment of the research paradigm in the domain of planning by a task group staff. The research paradigm in its present stage constitutes a solid base for scientific research on team performance and distributed decision making. DIDMET's main advantage is its flexible and user friendly configuration and authoring system, which makes it easier for the user to define and modify scenarios, and to analyse data.
Author
Decision Making; Human Performance; Procedures

20010048888 Naval Postgraduate School, Monterey, CA USA
Using Effective Contractual Incentives to Obtain Superior Contractor Performance
Venable, Timothy B., Naval Postgraduate School, USA; December 2000; 130p; In English
Report No.(s): AD-A387215; No Copyright; Avail: CASI; A02, Microfiche; A07, Hardcopy

The purpose of this thesis is to provide the reader with the ability to analyze the effectiveness of incentives and to document innovative approaches to incentive contracting that can be applied to Cost-Plus-Award-Fee (CPAF) contracts. While a CPAF contract is a vehicle to obtain products or services needed by the Government, it also acts as a management tool for the awarding entity, which focuses on the impact of meeting or exceeding award criteria. The need for improved procurement effectiveness necessitates the exploration of innovative arrangements. Contracting officers must take advantage of reforms and become innovative in their approach to provide best value in programs. More efficient ways of doing business are available and must be capitalized upon. Changes in the regulations have given the contracting officer the freedom to innovate. They must use this new freedom in order to meet DoD's expanding requirements with increasingly limited resources. The use of innovative incentives to contractor performance is beginning a period of renaissance. Numerous Government entities have embraced the use of innovative arrangements in the effort to get goods and services better, faster, and cheaper. The contracting officer must determine which incentives are most effective for a program based upon numerous variables.
Author
Contract Incentives; Contractors

20010048893 Sterling Software, Inc., Moffett Field, CA USA
Managing People's Data
Le, Diana, Sterling Software, Inc., USA; [1994]; 1p; In English; ACW FY'94 Technical Paper Contest, 1994
Contract(s)/Grant(s): RTOP 536-01-11; No Copyright; Avail: Issuing Activity; Abstract Only

Just imagine a mass storage system that consists of a machine with 2 CPUs, 1 Gigabyte (GB) of memory, 400 GB of disk space, 16800 cartridge tapes in the automated tape silos, 88,000 tapes located in the vault, and the software to manage the system. This system is designed to be a data repository; it will always have disk space to store all the incoming data. Currently 9.14 GB of new data per day enters the system with this rate doubling each year. to assure there is always disk space available for new data, the system. has to move data reside from the expensive disk to a much less expensive medium such as the 3480 cartridge tapes. Once the data is archived to tape, it should be able to move back to disk when someone wants to access it and the data movement should be transparent to the user. Now imagine all the tasks that a system administrator must perform to keep this system running 24 hour a day, 7 days a week. Since the filesystem maintains the illusion of unlimited disk space, data that comes to the system must get moved to tapes in an efficient manner. This paper will describe the mass storage system running at the Numerical Aerodynamic Simulation (NAS) at NASA Ames Research Center in both software and hardware aspects, then it will describe all of the tasks the system administrator has to perform on this system.
Author
Data Storage; Computer Systems Design

82
DOCUMENTATION AND INFORMATION SCIENCE

Includes information management; information storage and retrieval technology; technical writing; graphic arts; and micrography. For computer documentation see 61 Computer Programming and Software.

20010045645 Department of the Army, Washington, DC USA
Research, Development, and Acquisition: Army Acquisition Policy
Reimer, Dennis J.; Hudson, Joel B.; Jan. 15, 1998; 66p; In English
Report No.(s): AD-A343448; AR-70-1; No Copyright; Avail: Defense Technical Information Center (DTIC)

This regulation implements the Army's acquisition policy for ACAT I through IV programs (Table 4-1) and assigns responsibilities to Army organizations in accordance with Department of Defense Directive (DoDD) 5000.1, and Department of Defense Regulation 5000.2-R. The Army will follow the guidance and procedures contained in DoDD 5000.1 and DoD 5000.2-R as a general model for ACAT II, III, and IV programs, while streamlining and tailoring the procedures within statutory and program requirements. This regulation also establishes policies implementing the Army's acquisition workforce management responsibilities (Title XII, PL 101-510, National Defense Authorization Act for Fiscal Year 1991, Defense Acquisition Workforce Improvement Act (DAWIA), Department of Defense Directive 5000.52, Department of Defense Manual 5000.52-M), and Department of Defense Instruction 5000.58 and Clothing and Individual Equipment acquisition and responsibilities.
DTIC
Defense Program; Research and Development; Regulations

20010045824 Human Resources Research Organization, Alexandria, VA USA
Documentation of Validity for the AT-SAT Computerized Test Battery, Volume 2 ***Final Report***
Ramos, R. A., Human Resources Research Organization, USA; Heil, Michael C., Civil Aeromedical Inst., USA; Manning, Carol A., Civil Aeromedical Inst., USA; March 2001; 186p; In English
Report No.(s): DOT/FAA/AM-01/6; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

This document is a comprehensive report on a large-scale research project to develop and validate a computerized selection battery to hire Air Traffic Control Specialists (ATCSs) for the Federal Aviation Administration (FAA). The purpose of this report is to document the validity of the Air Traffic Selection and Training (AT-SAT) battery according to legal and professional guidelines. An overview of the project is provided, followed by a history of the various job analyses efforts. Development of predictors and criterion measures are given in detail. The document concludes with the presentation of the validation of predictors and analyses of archival data.
Author
Air Traffic Controllers (Personnel); Selection; Assessments

20010046481 NASA, Washington, DC USA
University Program Management Information System ***Annual Report, FY 2000***
[2001]; 692p; In English
Report No.(s): NASA/TM-2001-210692; NAS 1.15:210692; No Copyright; Avail: CASI; A99, Hardcopy; A06, Microfiche

As basic policy, NASA believes that colleges and universities should be encouraged to participate in the nation's space and aeronautics program to the maximum extent practicable. Indeed, universities are considered as partners with government and industry in the nation's aerospace program. NASA' objective is to have them bring their scientific, engineering, and social research competence to bear on aerospace problems and on the broader social, economic, and international implications of NASA's technical and scientific programs. It is expected that, in so doing, universities will strengthen both their research and their educational capabilities to contribute more effectively to the national well being. This annual report is one means of documenting the NASA-university relationship, frequently denoted, collectively, as NASA's University Program. This report is consistent with agency accounting records, as the data is obtained from NASA's Financial and Contractual Status (FACS) System, operated by the Financial Management Division and the Procurement Office. However, in accordance with interagency agreements, the orientation differs from that required for financial or procurement purposes. Any apparent discrepancies between this report and other NASA procurement or financial reports stem from the selection criteria for the data.
Author
Education; Financial Management; Management Information Systems; Project Management; University Program; NASA Programs

20010046758 General Accounting Office, Office of Special Investigations, Washington, DC USA
Investigators' Guide to Sources of Information
Apr. 01, 1997; 115p; In English
Report No.(s): AD-A344502; GAO/OSI-97-2; No Copyright; Avail: Defense Technical Information Center (DTIC)

This is a five part guide to sources of information about people, property, business, and finance. The five parts are: local and state governments; federal agencies; directories, reference works, and other sources; electronic databases; and the Internet. The guide includes an index and Internet addresses where applicable.

DTIC

Data Bases; Information Systems; Internets

20010046967 NASA Marshall Space Flight Center, Huntsville, AL USA
Determination of an Optimal Commercial Data Bus Architecture for a Flight Data System
Crawford, Kevin, NASA Marshall Space Flight Center, USA; Johnson, Martin, NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; International Telemetering Conference, 22-25 Oct. 2001, Las Vegas, NV, USA
Contract(s)/Grant(s): CDDF Proj. 2000-06; No Copyright; Avail: Issuing Activity; Abstract Only

NASA/Marshall Space Flight Center (MSFC) is continually looking for methods to reduce cost and schedule while keeping the quality of work high. MSFC is NASA's lead center for space transportation and microgravity research. When supporting NASA's programs several decisions concerning the avionics system must be made. Usually many trade studies must be conducted to determine the best ways to meet the customer's requirements. When deciding the flight data system, one of the first trade studies normally conducted is the determination of the data bus architecture. The schedule, cost, reliability, and environments are some of the factors that are reviewed in the determination of the data bus architecture. Based on the studies, the data bus architecture could result in a proprietary data bus or a commercial data bus. The cost factor usually removes the proprietary data bus from consideration. The commercial data bus's range from Versa Module Eurocard (VME) to Compact PCI to STD 32 to PC 104. If cost, schedule and size are prime factors, VME is usually not considered. If the prime factors are cost, schedule, and size then Compact PCI, STD 32 and PC104 are the choices for the data bus architecture. MSFC's center director has funded a study from his discretionary fund to determine an optimal low cost commercial data bus architecture. The goal of the study is to functionally and environmentally test Compact PCI, STD 32 and PC 104 data bus architectures. This paper will summarize the results of the data bus architecture study.

Author

Avionics; Channels (Data Transmission); Data Systems

20010047042 Research and Technology Organization, Information Systems Technology Panel, Neuilly-sur-Seine, France
New Information Processing Techniques for Military Systems ***Les Nouvelles Techniques de Traitement de l'Information pour les Systemes Militaires***
April 2001; 300p; In English; New Information Processing Techniques for Military Systems, 9-11 Oct. 2000, Istanbul, Turkey; See also 20010047043 through 20010047072; CD-ROM contains full text document in PDF format
Report No.(s): RTO-MP-049; AC/323(IST-017)TP/8; ISBN 92-837-1061-4; Copyright Waived; Avail: CASI; A13, Hardcopy; A03, Microfiche; C01, CD-ROM

This volume contains the Technical Evaluation Report, 2 Keynote Addresses and 29 unclassified papers, presented at the Information Systems Technology Panel Symposium held in Istanbul, Turkey, 9-11 October 2000. The papers were presented under the following headings: Information Systems and Techniques I; Information Systems and Techniques II; Security and Reliability; Communications; Detection, Fusion, Decision Support; and Virtual Reality and Human-Computer Interface.

Author

Conferences; Data Processing; Information Systems; Military Operations; Command and Control; Multisensor Fusion; Fuzzy Systems; Decision Making

20010047043 Physics and Electronics Lab. TNO, The Hague, Netherlands
Information Exchange in Support of C2-Interoperability
Driesenaar, Freek N., Physics and Electronics Lab. TNO, Netherlands; New Information Processing Techniques for Military Systems; April 2001, pp. 1-1 - 1-8; In English; See also 20010047042; Copyright Waived; Avail: CASI; A02, Hardcopy

Large organizations, such as NATO and the armed forces of its member countries, cannot function without the availability of accurate, timely, complete and consistent information. The quality of every decision that is made depends largely on the quality of the information on which the decision is based. This makes information an essential resource for any organization that must be managed carefully. Due to the intensified level of co-operation between NATO countries, it has become crucial that information

can also be shared between armed forces. National forces are deployed ever more often in crisis management situations and (disaster-)relief operations throughout the world, requiring them to work together closely with forces of other countries. Fast and effective collaboration requires a method for information dissemination that is flexible and open. The need to share information between countries translates directly to the requirement that information can be exchanged between their command & control (C2) systems. For this to be possible, the systems must agree to exchange and interpret information. in a standardised (unambiguous) way. In other words: the systems must he interoperable. This paper focuses on two existing information exchange standards: ADatP-3 (based on formatted messages) and ATCCIS (based on database replication). After describing and analysing both ADatP-3 and ATCCIS separately, the paper compares the two information exchange standards. Ideas are set forward for a unified approach which tries to capture the best of the two worlds and the paper ends with suggestions for future work.
Derived from text
Selective Dissemination of Information; Information Transfer; Information Flow; Standardization

20010047044 National Aerospace Lab., Amsterdam, Netherlands
Potentials of Advanced Database Technology for Military Information Systems
Choenni, Sunil, National Aerospace Lab., Netherlands; Bruggeman, Ben, Royal Netherlands Naval Coll., Netherlands; New Information Processing Techniques for Military Systems; April 2001, pp. 2-1 - 2-11; In English; See also 20010047042; Copyright Waived; Avail: CASI; A03, Hardcopy

Research and development in database technology evolves in several directions, which are not necessarily divergent. A number of these directions might be promising for military information systems as well. In this paper, we discuss the potentials of multi-media databases and data mining. Both directions focus on the handling of a vague information need of a user. In general, data mining systems allow a higher degree of vagueness than multi-media systems. Information systems that are able to handle vague information needs adequately will improve the decision making process of militaries.
Author
Data Bases; Data Mining; Genetic Algorithms; Data Base Management Systems

20010047045 Industrieanlagen-Betriebsgesellschaft m.b.H., Ottobrunn, Germany
Information Processing as a Key Factor for Modern Federations of Combat Information Systems
Krusche, Stefan, Industrieanlagen-Betriebsgesellschaft m.b.H., Germany; Tolk, Andreas, Industrieanlagen-Betriebsgesellschaft m.b.H., Germany; New Information Processing Techniques for Military Systems; April 2001, pp. 3-1 - 3-8; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A02, Hardcopy

Building flexible collaborations of different heterogeneous military units just in time is one of the key factors to perform joint and combined operations successfully, It is one of the most important prerequisites to and challenges for information systems to support these collaborations with user-adapted information to the warfighter where it is needed. For information systems, this is a requirement to adequately build federations of different and heterogeneous data and information sources on the basis of the existing data bases. This objective is only achieved by a new approach towards information sharing based on data mediation techniques which enable the configuration for different information systems towards a global information source to support military business processes across systems, nations and unit borders. One of the key factors for data mediation techniques is, that it is not an isolated technical solution to gain interoperability between different information systems, but is integrated in an overall data management process, which produces standard business objects for data exchange and standard mediation rules to configure the technical solution. In NATO, this process already has started in form of respective NATO Data Administration Group (NDAG) activities, that aims; at the development of standardized data elements. Data Mediation means to establish federations of heterogeneous data sources on the basis of a common data exchange format while the data and systems itself are kept where and as they are. In other words, on the basis of the data administration and management processes the integration of legacy systems becomes possible without having to change the systems itself. This paper provides an over-view of this new integration technique and its relation to already ongoing NATO activities.
Author
Data Management; Data Processing; Data Systems

20010047046 Forschungsgesellschaft fuer Angewandte Naturwissenschaften, Werthoven, Germany
Architecture for Flexible Command and Control Information Systems (INFIS)
Wunder, M., Forschungsgesellschaft fuer Angewandte Naturwissenschaften, Germany; New Information Processing Techniques for Military Systems; April 2001, pp. 4-1 - 4-6; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A02, Hardcopy

Next generation CCIS will be leaner and more flexible. The previous trend to decentralize the computer power increased the complexity of local devices. Now it is more and more difficult to achieve the requirements of higher mobility and simpler access to information services.
Derived from text
Command and Control; Information Systems; Systems Management

20010047048 Defence Evaluation Research Agency, Portsdown, UK
Challenges for Joint Battlespace Digitization (JBD)
Hamid, S., Defence Evaluation Research Agency, UK; White, I., Defence Evaluation Research Agency, UK; Gibson, C., Defence Evaluation Research Agency, UK; New Information Processing Techniques for Military Systems; April 2001, pp. 6-1 - 6-13; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A03, Hardcopy

This paper highlights several important areas in achieving extensive integration of military command and control systems. The discussion in the paper focuses on two areas where technology per se is deficient, and that must be considered carefully against the stronger tides of technology push in systems design and acquisition. These areas are the human factors aspects of system design, and the challenge of information management.
Author
Military Operations; Command and Control; Digital Techniques

20010047049 AURA Ltd., Brno, Czech Republic
Information System for Logistics: Modern Tool for Logisticians
Burival, Zdenek, AURA Ltd., Czech Republic; Reha, Jaroslav, Army of the Czech Republic, Czechoslovakia; New Information Processing Techniques for Military Systems; April 2001, pp. 7-1 - 7-6; In English; See also 20010047042; Copyright Waived; Avail: CASI; A02, Hardcopy

The article in its first part characterizes main features, capabilities and architecture of the Information System for Logistics (ISL). The second part describes the way and main principles used for building the ISL. The authors used in the article their experience acquired during their work in the joint development team of the ISL built for the Ministry of Defense and the Army of the Czech Republic.
Author
Information Systems; Logistics; Maintenance; Logistics Management

20010047050 Federal Armed Forces Univ., Inst. for Applied Systems Science and Operations Research, Munich, Germany
On the Development of Command and Control Modules for Combat Simulations Models on Battalion Down to Single Item Level
Hofmann, Hans W., Federal Armed Forces Univ., Germany; Hofmann, Marko, Federal Armed Forces Univ., Germany; New Information Processing Techniques for Military Systems; April 2001, pp. 8-1 - 8-12; In English; See also 20010047042; Copyright Waived; Avail: CASI; A03, Hardcopy

The paper contains an overview on the design principles and main characteristics of a family of new, strictly object-oriented combat simulation models called COSIMAC (COmbat SImulation Model with Automated Control), developed at our Institute since 1995. They are designed as closed models which means, that a detailed modeling of the highly complicated CI processes is indispensible. Additionally, the option of an interactive man/machine interface is implemented, which offers the possibility of manual control on different command & control levels for playing against computer generated (and controlled) forces, for experimenting with ”unconventional” decisions, and for developing and improving the rule system in a trial-and-error fashion. Furthermore, the paper describes a general architecture for the design of command & control modules, which offers the possibility of describing tactical/operational intentions and concepts of operation in a kind of battle management language (multilayer tactical language concept), the terrain representation, attrition and movement modeling, the development of terrain and situation assessment modules, which are - together with a set of so-called planning functions and spatial and procedural templates - a prerequisite for the rule systems that generate adequate tactical missions and orders for the assigned units or simulated objects, and, finally, the main results, conclusions and future developments of the project.
Author
Command and Control; Combat; Simulation; Models; Automatic Control

20010047051 Military Technical Inst. of Electronics, Prague, Czech Republic

The Czech Approach in the Development of a NATO Interoperable Ground Forces Tactical Command and Control System

Snajder, Milan, Military Technical Inst. of Electronics, Czech Republic; Horak, Jaroslav, Military Technical Inst. of Electronics, Czech Republic; Jindra, Vaclav, DeIINFO s.r.o., Czech Republic; Nesrsta, Ladislav, DeIINFO s.r.o., Czech Republic; New Information Processing Techniques for Military Systems; April 2001, pp. 9-1 - 9-9; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A02, Hardcopy

This paper describes systems engineering and system architecture design and development of the Ground Forces Tactical Command and Control System (GF-TCCS) of the Army of the Czech Republic. The design objective of the GF-TCCS is to provide automation support to commanders and their staff, based on the mission and phase of operations. The objective system will use a high proportion of commercial-off-the-shelf networking software, GIS products and government-off-the-shelf equipment, including military mobile radios and switches, tactical platforms (e.g. trucks, containers, armored personal carriers).
Author

Computer Systems Design; Architecture (Computers); Software Development Tools; Software Engineering; Computer Programs

20010047052 Federal Armed Forces Univ., Inst. for Geo Information and Land Development, Munich, Germany

Principles and Application of Geographic Information Systems and Internet/Intranet Technology

Reinhardt, Wolfgang, Federal Armed Forces Univ., Germany; New Information Processing Techniques for Military Systems; April 2001, pp. 10-1 - 10-10; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A02, Hardcopy

The paper presented consists of three main parts. In the first part we roughly outline the state of the art of Geographic Information Systems (GIS) mainly with respect to technology and data. Within this part we also give some examples where GIS is applied in military applications. The second part gives an overview of architectures and some technical aspects of GIS-Internet/Intranet solutions, compares the different approaches and discusses the potential of this technology in general. Furthermore some examples demonstrate the practical use of GIS and Internet/Intranet. As the World Wide Web (WWW) gains more and more significance and there is a large demand of GIS applications in the Internet/Intranet we introduce the main principles of this technology. Especially we explain how Geographic Information Systems can be connected to the world wide web and which extensions are necessary to transfer and to view Geographic data. In this part we also show how the Virtual Reality Modelling Language (VRML) can be used in this field. Part of this is based on results of some projects conducted for the AMilGeo (Amt fur Militarisches Geowesen) of the German Federal Armed Forces as well as on other civilian projects. In the third part of the paper we demonstrate the potential of the GIS and Internet/Intranet technology for civilian and military applications. Besides we discuss the main advantages of GIS and Internet/Intranet, such as Ease of Use or the possibility to access up-to-date information in various databases. Furthermore we show how the connection of Internet and telecommunication can be used in GIS.
Author

Geographic Information Systems; Internets; World Wide Web; Data Transfer (Computers)

20010047054 Aptima, Inc., Woburn, MA USA

Model-Based Design of Information-Rich Command Organizations

Serfaty, Daniel, Aptima, Inc., USA; New Information Processing Techniques for Military Systems; April 2001, pp. KN2-1 - KN2-11; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A03, Hardcopy

This paper describes a breakthrough organization/team design method-a systematic, formal, quantitative approach to designing a team that best fits the mission to be accomplished. The Team Integrated Design Environment (TIDE) is a tool set designed to support this method, enabling the quantitative definition of requirements for command teams operating in complex mission environments. The TIDE methods and tools represent a powerful methodology to create novel organizational structures, based on operational mission variables, using quantitative methods. We know of no other methods that provide a similar formal framework for this type of design. This paper explains what it means to design a team or an organization and describes the TIDE method for team design. Then it presents some initial empirical results that indicate that optimally designed teams can outperform teams that use more traditional organizational structures, and discusses how the team design process must be altered to focus on different concerns, depending on the nature of the team being designed and the environment in which that team must function.
Derived from text

Design Analysis; Teams; Organizations; Command and Control

20010047056 Centre d'Etudes et de Recherches, Toulouse, France

Security Architectures for COTS Based Distributed Systems

Bieber, Pierre, Centre d'Etudes et de Recherches, France; Siron, Pierre, Centre d'Etudes et de Recherches, France; New Information Processing Techniques for Military Systems; April 2001, pp. 13-1 - 13-7; In English; See also 20010047042
Contract(s)/Grant(s): CTI-971B552; Copyright Waived; Avail: CASI; A02, Hardcopy

The paper describes two experiments in the design of security architectures for distributed systems that are implemented with Commercial Off The Shelf components. We added security components to protect information exchanged in a Distributed Interactive Simulation environment. We added a role-based access control component to a Workflow tool implemented with CORBA technologies. The two experiments followed the same approach that includes four steps (threat analysis, security policy definition, selection of security components and architecture efficiency evaluation).
Author

Computer Information Security; Access Control; Data Transmission; Architecture (Computers); Computer Systems Design

20010047057 Military Technical Academy, Computer Engineering Dept., Bucharest , Romania

Design Aspects in a Public Key Infrastructure for Network Applications Security

Patriciu, Victor-Valeriu, Military Technical Academy, Romania; Serb, Aurel, Military Technical Academy, Romania; New Information Processing Techniques for Military Systems; April 2001, pp. 14-1 - 14-12; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A03, Hardcopy

Computer security is a vitally important consideration in modem systems. Typically, the military and banking areas have had detailed security systems. This paper will concentrate on an interesting area of software security based on public key cryptographic technology. The Public Key system makes it possible for two parties to communicate securely without either having to know or trust the other party. This is possible because a third party that both the other parties trust identifies them, and certifies that their keys are genuine. This third party is called the Certification Authority, or CA. CA guarantees that they are who they claim to be. The CA does this by registering each user's identification information, and issuing them with a set of Private keys and a set of Public Key Certificates. A worldwide Public Key Infrastructure (PKI) that supports international, government, and state policies/regulations will not be available in the near future. In the meantime, organizations and corporations can utilize this security technology to satisfy current business needs. Many organizations are choosing to manage their own Certificate Authority (CA) instead of outsourcing this function to a third party (i.e., Verisign, Thawte, GTE CyberTrust, GlobalSign). Our paper try to analyse the main design issues for a Public Key Infrastructure (PKI), needed to secure the most important network applications: Web access authentication and server-client communication confidentiality, VPN over Internet implementation, secure (signed) document and e-mail interchange.
Author

Computer Information Security; Communication Networks; Warning Systems; Certification

20010047058 Technische Univ., Inst. fuer Informatik, Munich, Germany

Developing Correct Safety Critical, Hybrid, Embedded Systems

Pretschner, Alexander, Technische Univ., Germany; Slotosch, Oscar, Technische Univ., Germany; Stauner, Thomas, Technische Univ., Germany; New Information Processing Techniques for Military Systems; April 2001, pp. 15-1 - 15-12; In English; See also 20010047042; Copyright Waived; Avail: CASI; A03, Hardcopy

Several aspects of the development process of correct safety critical discrete and hybrid embedded systems are discussed. The general process and its support by the CASE tool AUTOFOCUS is outlined. This is illustrated along the lines of a simplified version of NASA's Mays Polar Lander. It is argued that specific aspects of hybrid systems do require the modification of classical theories on software development, and these modifications are discussed. The paper concludes by focusing on one part of the development process, namely testing. A novel approach to the automated generation of test cases for discrete as well as hybrid systems is presented. The Mars lander's crash serves as an example for the derivation of meaningful test cases.
Author

Software Development Tools; Computer Programming; Safety

20010047063 Defence Evaluation Research Agency, Malvern, UK

An Overview of Information Fusion

Whitaker, G. D., Defence Evaluation Research Agency, UK; New Information Processing Techniques for Military Systems; April 2001, pp. 20-1 - 20-8; In English; See also 20010047042; Original contains color illustrations; Copyright Waived; Avail: CASI; A02, Hardcopy

This paper provides an introduction to, and overview of, the field of information fusion within a wider data and information fusion and processing context. It starts by considering the aims and objectives of research and development programmes in this area. In particular, asking what are we trying to achieve by such fusion from the end user (military commander?) point of view. The main emphasis of the paper is on military systems and reference is made to work at the UK's Defence Evaluation and Research Agency (DERA) for examples but the paper has more general relevance. Some of the common operational and logistical difficulties associated with current information fusion systems are highlighted. In other words, 'Why is making sense of data difficult?'' The differences and similarities between data and information and between their fusion and processing are discussed. The role of information fusion systems is to address some or all of these difficulties and so provide more effective systems for a range of different applications and users. The means by which this is accomplished is then described in terms of fusing information at various levels of abstraction. Reference is made to models, architectures and frameworks that have been developed independently within the USA and the UK and that help structure and clarify the whole process. Current research aims to further improve our capabilities in this important, force-multiplying technology. Some people and nations aspire to information dominance in modem conflicts and the same can be said for modem businesses. To achieve or even approach this goal requires a vigorous and healthy research programme. Some of the current key research activities in this area are summarized. Most of this research is targeted on specific, near-term applications. The paper concludes with a personal perspective on the main future, longer-term research challenges.
Author
Information Systems; Information; Research and Development

20010047064 Defence Evaluation Research Agency, Fareham, UK
Processing and Fusion of Electro-Optic Information
Davies, I., Defence Evaluation Research Agency, UK; New Information Processing Techniques for Military Systems; April 2001, pp. 21-1 - 21-5; In English; See also 20010047042; Copyright Waived; Avail: CASI; A01, Hardcopy

The UK Defence Evaluation and Research Agency (DERA) has been researching over many years the use of knowledge-based techniques for the automation of information fusion within combat management systems functions. All-source automated data fusion techniques have successfully been demonstrated at the platform level and are currently embodied in a testbed called CMISE (Combat Management Integrated Support Environment). This makes use of own platform sensor data and tracks from other platforms via data-link for the automatic construction of the platform's tactical picture. The Data Fusion Module (DIM) within CMISE correlates at two levels, track and multi-track. Track correlation joins tracks from similar sources to form multi-tracks and multi-track correlation joins multi-tracks (from dissimilar sources) to form vehicles. Tracks and multi-tracks are correlated by a rule-based system using multi-hypothesis techniques supported by probability based algorithms. The data sources currently correlated by CMISE are radar, Electronic Support Measures (ESM), data-link, sonar, Identification Friend or Foe (IFF), plans and geographic information. This paper describes the modelling of an EO sensor and the effects of including data from such sensors in a fused tactical picture. DERA has been evolving the capabilities of CMISE in support of the applied research programme for over ten years. The requirement for a substantial increase in the level of automated support system comes from: a rapid increase in the amount of data available to Command. More sensors are available, producing more data; in the drive to improve the extent and quality of tactical information, automated methods are potentially faster, more reliable and more consistent than manual methods; increases in hostile target mobility and weapon lethality particularly in the littoral battlespace, stressing the importance of accurate and timely identification of targets; pressures to reduce platform through-life costs, particularly through reduction of manning. As well as addressing the above issues, automating the tactical picture compilation process allows operators to focus attention on situation assessment and resource allocation (actually fighting the ship) instead of being consumed by the mundane and repetitive track fusion and identification tasks for which automation is more suited.
Derived from text
Electro-Optics; Support Systems; Management Systems; Automatic Control; IFF Systems (Identification); Multisensor Fusion; Data Processing

20010047256 Army Construction Engineering Research Lab., Champaign, IL USA
Geospatial Data Repository: Sharing Data Across the Organization and Beyond ***Final Report***
Ruiz, Marilyn O.; Feb. 2001; 5p; In English
Report No.(s): AD-A388181; ERDC/CERL-TN-01-1; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Historically, the organizational framework for geospatial data has been site- and software-specific. Key issues with this framework include: duplication of data themes, uncertainty about the content of data themes, loss of institutional knowledge, time-consuming data requests, and unintentional release or misuse of data. Geographic Information System (GIS) data management options have expanded rapidly over the past several years. Software and hardware advances have provided better

network access to spatial data, allowed more complex geospatial data models, and have made the integration of GIS and database management systems a reality. This short Technical Note discusses a five-part approach to creating a data repository that addresses the problems of the historical organizational framework for geospatial data. Fort Hood, Texas was the site used to develop the prototype. A report documenting the complete study will be available in late Spring 2001.
DTIC
Geographic Information Systems; Data Management; Computer Networks; Data Base Management Systems; Data Bases

20010047543 General Accounting Office, Washington, DC USA
Report to the Chairman, Committee on Health, Education, Labor and Pensions, US Senate. Medical Privacy Regulation: Questions Remain About Implementing the New Consent Requirement
Apr. 2001; 18p; In English
Report No.(s): AD-A388468; GAO-01-584; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Although there is a strong consensus supporting the protection of patient confidentiality, views differ as to the best ways in practice to achieve that goal. Pressures are increasing from insurers, providers, and researchers to draw on medical records to study treatment outcomes and monitor expenditures, activities that are becoming increasingly common as medical records are computerized and large databases compiled. In recognition of these trends, the Health Insurance Portability and Accountability Act of 1996 called for the development of comprehensive privacy standards that would establish rights for patients with respect to their medical records and define the conditions for using and disclosing personally identifiable health information. 1 On December 28, 2000, the Department of Health and Human Services (HHS) issued the final regulation on privacy, and it is now under review by the Congress and the new Secretary of HHS. 2
DTIC
Congressional Reports; Regulations; Health; Records Management

20010047582 General Accounting Office, Information Management and Technology Div., Washington, DC USA
Information Management: Electronic Dissemination of Government Publications
Mar. 2001; 88p; In English; Report to Congressional Committees.
Report No.(s): AD-A388154; GAO/IMTEC-01-428; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The Government Printing Office (GPO) is the principal agent for federal printing. Specifically, all printing for the three branches of government with a few exceptions is required to be done by GPO. GPO also disseminates and sells government publications through programs managed by the Superintendent of Documents. The Superintendent disseminates government publications to the public through the depository library program and sells publications online, through 23 bookstores, and by mail order. Until recently, the dissemination and sales programs dealt mostly in paper, microfiche, or CD-ROM formats. However, advances in electronic publishing technologies and the availability of government publications on the World Wide Web are affecting paper-based dissemination and sales and are raising questions about the direction and future of the Federal Depository Library Program. The conference report 1 for the legislative branch appropriations for 2001 required that we submit to you, by March 30, 2001, a study on electronic dissemination of government information. Specifically, we were required to
DTIC
Governments; Information Flow; Information Transfer; Information Management; Information Dissemination

20010047656 Research and Development Labs., Culver City, CA USA
USA Air Force Summer Research Program, Volume 9, Rome Laboratory ***Final Report***
Moore, Gary, Research and Development Labs., USA; December 1998; 76p; In English
Contract(s)/Grant(s): F49620-93-C-0063
Report No.(s): AD-A387492; AFRL-SR-BL-TR-00-0985-Vol-9; No Copyright; Avail: CASI; A01, Microfiche; A05, Hardcopy

The US Air Force Summer Research Program (USAF-SRP) is designed to introduce university, college, and technical institute faculty members, graduate students, and high school students to Air Force research. This is accomplished by the faculty members (Summer Faculty Research Program, SFRP), graduate students (Graduate Student Research Program, GSRP), and high school students (High School Apprenticeship Program, HSAP) being selected on a nationally advertised competitive basis during the summer intersession period to perform research at Air Force Research Laboratory (AFRL) Technical Directorates, Air Force Air Logistics Centers (ALC), and other AF Laboratories. This volume consists of a program overview, program management statistics, and the final technical reports from the GSRP participants at the Rome Laboratory.
Author
Education; Project Management; Research and Development; Laboratories

20010048010 NASA Ames Research Center, Moffett Field, CA USA

Developing Distributed Collaboration Systems at NASA: A Report from the Field

Becerra-Fernandez, Irma, Florida International Univ., USA; Stewart, Helen, NASA Ames Research Center, USA; Knight, Chris, NASA Ames Research Center, USA; [2001]; 5p; In English; Florida Workshop on Distributed Collaboration, 4-5 Mar. 2001, Miami, FL, USA; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Web-based collaborative systems have assumed a pivotal role in the information systems development arena. While business to customers (B-to-C) and business to business (B-to-B) electronic commerce systems, search engines, and chat sites are the focus of attention, web-based systems span the gamut of information systems that were traditionally confined to internal organizational client server networks. For example, the Domino Application Server allows Lotus Notes (trademarked) uses to build collaborative intranet applications and mySAP.com (trademarked) enables web portals and e-commerce applications for SAP users. This paper presents the experiences in the development of one such system: Postdoc, a government off-the-shelf web-based collaborative environment. Issues related to the design of web-based collaborative information systems, including lessons learned from the development and deployment of the system as well as measured performance, are presented in this paper. Finally, the limitations of the implementation approach as well as future plans are presented as well.

Author

Electronic Commerce; Computer Networks; Information Systems

20010048173 Naval Postgraduate School, Monterey, CA USA

Application of the Wenger Taxonomy for Classifying Goods Procured by the Federal Government to Commercial Off-The-Shelf Computer Hardware Equipment

Harrison, William M.; Dec. 1997; 148p; In English

Report No.(s): AD-A341481; No Copyright; Avail: Defense Technical Information Center (DTIC)

The Wenger Taxonomic Model provides a means to classify goods procured by the Federal Government so as to provide procurement professionals with strategic buying insight. Several aspects of the model have been explored by various researchers. These researchers have found that the model is both valid and useful. This study focuses on application of the Wenger Taxonomic Model to Commercial Off-the-Shelf computer hardware equipment procured by a specific buying activity. It proposes a slightly different version of the Wenger Taxonomic Model. It also proposes five areas where the model would help procurement professionals make smarter Information Technology investments. These areas are: (1) cost-benefit analysis source selection evaluation, (2) warranty purchases, (3) contingency contracting, and (4) evaluating the organizational impact of Information Technology acquisitions.

DTIC

Acquisition; Taxonomy; Commercial Off-The-Shelf Products

20010048675 European Office of Aerospace Research and Development, London, UK

EUROGRAM: European Office of Aerospace Research and Development, *Nov. - Dec. 2000*

[2000]; 18p; In English

Report No.(s): AD-A388034; TR-00-06; No Copyright; Avail: CASI; A01, Microfiche; A03, Hardcopy

EOARD has completed one of our best-ever years supporting AFRL international efforts. In fiscal year 2000, EOARD organized a near-record 256 Window on Science visits, and broke records for conferences supported (87) and research contracts awarded (132).

Author

Research and Development; International Cooperation

20010048677 Research and Development Labs., Culver City, CA USA

Summer Research Program: 1996 Summer Faculty Research Program, Volume 2B, Armstrong Laboratory *Final Report*

Moore, Gary, Research and Development Labs., USA; December 1996; 435p; In English

Contract(s)/Grant(s): F49620-93-C-0063

Report No.(s): AD-A387780; AFRK-SR-BL-TR-00-0728-Vol-2B; No Copyright; Avail: CASI; A04, Microfiche; A19, Hardcopy

The US Air Force Summer Research Program (USAF-SRP) is designed to introduce university, college, and technical institute faculty members, graduate students, and high school students to Air Force research. This is accomplished by the faculty members (Summer Faculty Research Program, SFRP), graduate students (Graduate Student Research Program, GSRP), and high school students (High School Apprenticeship Program, HSAP) being selected on a nationally advertised competitive basis during the summer intersession period to perform research at Air Force Research Laboratory (AFRL) Technical Directorates, Air Force

Air Logistics Centers (ALC), and other AF Laboratories. This volume consists of a program overview, program management statistics, and the final technical reports from the GSRP participants at the Armstrong Laboratory.
Author
Education; Project Management; Students; Laboratories

20010048679 Research and Development Labs., Culver City, CA USA
Summer Reserach Program: 1997 Summer Faculty Research Program, Volume 2A, Armstrong Laboratory
Moore, Gary, Research and Development Labs., USA; December 1997; 391p; In English
Contract(s)/Grant(s): F49620-93-C-0063
Report No.(s): AD-A387770; AFRL-SR-BL-TR-00-0751-Vol-2A; No Copyright; Avail: CASI; A04, Microfiche; A17, Hardcopy

The US Air Force Summer Research Program (USAF-SRP) is designed to introduce university, college, and technical institute faculty members, graduate students, and high school students to Air Force research. This is accomplished by the faculty members (Summer Faculty Research Program, SFRP), graduate students (Graduate Student Research Program, GSRP), and high school students (High School Apprenticeship Program, HSAP) being selected on a nationally advertised competitive basis during the summer intersession period to perform research at Air Force Research Laboratory (AFRL) Technical Directorates, Air Force Air Logistics Centers (ALC), and other AF Laboratories. This volume consists of a program overview, program management statistics, and the final technical reports from the GSRP participants at the Armstrong Laboratory.
Author
Education; Logistics; Project Management; Research and Development; Laboratories

20010048680 Research and Development Labs., Culver City, CA USA
Summer Research Program: 1997 Summer Faculty Research Program, Volume 3B, Phillips Laboratory
Moore, Gary, Research and Development Labs., USA; December 1997; 211p; In English
Contract(s)/Grant(s): F49620-93-C-0063
Report No.(s): AD-A387768; AFRL-SR-BL-TR-00-0754-Vol-3B; No Copyright; Avail: CASI; A03, Microfiche; A10, Hardcopy

The US Air Force Summer Research Program (USAF-SRP) is designed to introduce university, college, and technical institute faculty members, graduate students, and high school students to Air Force research. This is accomplished by the faculty members (Summer Faculty Research Program, SFRP), graduate students (Graduate Student Research Program, GSRP), and high school students (High School Apprenticeship Program, HSAP) being selected on a nationally advertised competitive basis during the summer intersession period to perform research at Air Force Research Laboratory (AFRL) Technical Directorates, Air Force Air Logistics Centers (ALC), and other AF Laboratories. This volume consists of a program overview, program management statistics, and the final technical reports from the GSRP participants at the Phillips Laboratory.
Author
Education; Logistics; Project Management; Laboratories

20010048743 Research and Development Labs., Culver City, CA USA
Summer Research Program: 1996 Summer Research Extension Program, Volume 1, Armstrong Laboratory Program Management Report
Moore, Gary, Research and Development Labs., USA; December 1996; 460p; In English
Contract(s)/Grant(s): F49620-93-C-0063
Report No.(s): AD-A387433; No Copyright; Avail: CASI; A04, Microfiche; A20, Hardcopy

The USA Air Force Summer Research Program (USAF-SRP) is designed to introduce university, college, and technical institute faculty members, graduate students, and high school students to Air Force research. This is accomplished by the faculty members (summer faculty Research Program (SFRP)), graduate students (Graduate Student Research Program (GSRP)), and high school students (High School Apprenticeship Program (HSAP)) being selected on a national advertised competitive basis during the summer intersession period to perform research at Air Force Research Laboratory (AFRL) Technical Directorates, Air Force Air Logistics Centers (ALC), and other AF Laboratories. The management volume consists of a program overview, program management statistics, a listing of the participants, and an abstract for each participants summer research.
DTIC
Research and Development; Summer; Armed Forces (USA); Laboratories

20010048752 Research and Development Labs., Culver City, CA USA

Summer Research Program: 1994 Program Management Report, Volume 1

Moore, Gary, Research and Development Labs., USA; December 1994; 497p; In English

Report No.(s): AD-A387325; No Copyright; Avail: CASI; A04, Microfiche; A21, Hardcopy

The USA Air Force Summer Research Program (USAF-SRP) is designed to introduce university, college, and technical institute faculty members, graduate students, and high school students to Air Force research. This is accomplished by the faculty members, graduate students, and high school students being selected on a nationally advertised competitive basis during the summer intersession period to perform research at Air Force Research Laboratory (AFRL) Technical Directorates and Air Force Air Logistics Center (ALC). The management volume consists of a program overview, program management statistics, a listing of the participants, and an abstract for each participants summer research.

DTIC

Summer; Research and Development; Armed Forces (USA); Project Management; Laboratories

20010048890 San Jose State Univ., CA USA

A Compositional Relevance Model for Adaptive Information Retrieval

Mathe, Nathalie, San Jose State Univ., USA; Chen, James, RECOM Software, Inc., USA; [1994]; 1p; In English; AAAI'94 Twelfth National Conference on Artificial Intelligence, 31 Jul. - 4 Aug. 1994, Seattle, WA, USA

Contract(s)/Grant(s): RTOP 232-01-03; No Copyright; Avail: Issuing Activity; Abstract Only

There is a growing need for rapid and effective access to information in large electronic documentation systems. Access can be facilitated if information relevant in the current problem solving context can be automatically supplied to the user. This includes information relevant to particular user profiles, tasks being performed, and problems being solved. However most of this knowledge on contextual relevance is not found within the contents of documents, and current hypermedia tools do not provide any easy mechanism to let users add this knowledge to their documents. We propose a compositional relevance network to automatically acquire the context in which previous information was found relevant. The model records information on the relevance of references based on user feedback for specific queries and contexts. It also generalizes such information to derive relevant references for similar queries and contexts. This model lets users filter information by context of relevance, build personalized views of documents over time, and share their views with other users. It also applies to any type of multimedia information. Compared to other approaches, it is less costly and doesn't require any a priori statistical computation, nor an extended training period. It is currently being implemented into the Computer Integrated Documentation system which enables integration of various technical documents in a hypertext framework.

Author

Information Retrieval; Artificial Intelligence

84
LAW, POLITICAL SCIENCE AND SPACE POLICY

Includes: aviation law; space law and policy; international law; international cooperation; and patent policy

20010047290 Judge Advocate General's School, Charlottesville, VA USA

The Law of Federal Labor-Management Relations

Sep. 2000; 314p; In English

Report No.(s): AD-A387749; JA-211; No Copyright; Avail: CASI; A14, Hardcopy; A03, Microfiche

This compilation of cases and materials on labor-management relations is designed to provide primary source materials for students in the Graduate Course and those attending Continuing Legal Education courses in Administrative and Civil Law at The Judge Advocate General's School, U.S. Army. The casebook contains an introduction to the practice of federal sector labor law, addresses the process by which a union becomes an exclusive representative of a group of employees, representational rights, collective bargaining, impasse procedures, grievances and arbitration, and judicial review.

DTIC

Labor; Employee Relations; Personnel Management; Law (Jurisprudence)

85
TECHNOLOGY UTILIZATION AND SURFACE TRANSPORTATION

Includes aerospace technology transfer; urban technology; surface and mass transportation. For related information see 03 Air Transportation and Safety, 16 Space Transportation and Safety, and 44 Energy Production and Conversion. For specific technology transfer applications see also the category where the subject is treated.

20010047604 National Inst. of Standards and Technology, Advanced Technology Program, Gaithersburg, MD USA
Winning an Award from the Advanced Technology Program: Pursuing R&D Strategies in the Public Interest and Benefiting from a Halo Effect
Feldman, M. P.; Kelley, M. R.; Mar. 2001; 64p; In English; Original contains color illustrations
Report No.(s): PB2001-104726; NISTIR-6577; No Copyright; Avail: CASI; A01, Microfiche; A04, Hardcopy

This paper addresses two questions: (1) how attributes of a firm's R&D strategy relate to the goals of the Advanced Technology Program and affect the chances of winning an award from the program; and (2) how winning an award affects a firm's success in raising additional funds for the proposed research project. Using data from a 1999 survey of the firms that applied for ATP funding in 1998, we find that award-winners are more likely to behave in ways that enhance the transfer of knowledge to, and the take up of technology by, other firms. Compared to non-winning applicants, award winning firms exhibit a greater willingness to share their research findings with other firms and are more embedded in a network of linkages to other firms. The award-winning group is also more likely to include projects and firms that open up new pathways to innovation. We also find award-winning firms have greater success in attracting additional funding for their ATP projects from other sources. Hence, ATP increases spending on risky R&D projects by other actors in the U.S. innovation system.
NTIS
Research and Development; Technology Transfer; Strategy

20010047614 National Inst. of Standards and Technology, Advanced Technology Program, Gaithersburg, MD USA
Development, Commercialization, and Diffusion of Enabling Technologies ***Progress Report, 1993-1997***
Powell, J. W.; Lellock, K. L.; Apr. 2000; 78p; In English
Report No.(s): PB2000-102107; NISTIR-6491; No Copyright; Avail: National Technical Information Service (NTIS)

This report presents a statistical picture of progress in early 1998 as reported by 539 organizations which received ATP awards during the period from 1993 through 1997. The study provides evidence that the ATP has funded projects with considerable opportunity for broad economic benefit. More specifically, participants in 261 projects have identified more than 1,200 potential uses of their technologies under development, and outlined business plans for nearly 1,000 of these. Acceleration of R&D, and collaboration with other organizations for R&D and for commercializing their technologies, are reported by 86 percent of participants having received at least one year of ATP funding.
NTIS
Technology Utilization; Commercialization; Research and Development

20010047621 NASA, Washington, DC USA
Aerospace Technology Innovation, Volume 9
Turner, Janelle, Editor, NASA, USA; Cousins, Liz, Editor, National Technology Transfer Center, USA; January/February 2001; 24p; In English; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Commercializing technology is a daunting task. of every 11 new product ideas, only one will successfully make it to the marketplace. Fully 46% of new product investment becomes sunk in cost. Yet, a few good companies consistently attain an 80% technology commercialization success rate and have lead the way in establishing best practices. The NASA Incubator program consists of nine incubators, each residing near a NASA research center. The purpose of the incubators is to use the best practices is to use the best practices of technology commercialization to help early stage businesses successfully launch new products that incorporate NASA technology.
Derived from text
Commerce; Procedures; Technology Utilization; Commercialization

89
ASTRONOMY

Includes observations of celestial bodies, astronomical instruments and techniques; radio, gamma-ray, x-ray, ultraviolet, and infrared astronomy; and astrometry.

20010043997 Smithsonian Astrophysical Observatory, Cambridge, MA USA
XTE Observations of the Intraday Variable BL LAC S5 0716+714 in a coordinated Multiwavelength Study ***Final Report, 15 Aug. 1996 - 14 Feb. 2001***
Worrall, D. M., Smithsonian Astrophysical Observatory, USA; April 2001; 8p; In English
Contract(s)/Grant(s): NAG5-3355; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

S5 0716+714 was observed with the Rossi X-ray Timing Explorer (RXTE) between 6 and 22 April 1996 as part of a multifrequency monitoring campaign for this source observed to show extreme intra-day variability (IDV) at a number of frequencies. There were 24 distinct epochs of observation ('views') with the RXTE Proportional Counter Array (PCA), each lasting on average 3-4 ks. There were a number of technical problems with the data. During view 10 no Proportional Counter Unit (PCU) was on. A gain change (from gain epoch 2 to gain epoch 3) took place during view 11, on 15 April 1996. No data were received for view 18. Views 10, 11 and 18 have been omitted from our analysis. There were two distinct pointings of the telescope in views 4 and 17 (all the other observations have only one pointing), and in many of the pointings the data are broken by periods where the high voltage was turned off during South Atlantic Anomaly (SAA) passages and Earth occultations. Originally no filter file was available for views 21 and 22, and for the second pointing of view 17, because housekeeping data were missing, but these data were supplied when the observations were reprocessed in early 1998. For most of the remaining observations only three PCUs were on; the exceptions are views 23, 24 (four PCUs) and 17, 19, 20, 21 and 22 (five PCUs). All working PCUs have been analyzed. The third part of the first pointing of view 17 was found to be very short and is discarded from our analysis. The second part of observation 2 is pointed far off-axis and is discarded.
Derived from text
Variable Stars; X Ray Astronomy; Frequency Measurement

20010045810 Colorado Univ., Joint Inst. for Lab. Astrophysics, Boulder, CO USA
RXTE Observations M87: Investigating the Non-Thermal Continuum ***Final Report, Apr. 1998 - Apr. 2001***
Reynolds, Christopher S., Colorado Univ., USA; [2001]; 2p; In English
Contract(s)/Grant(s): NAG5-7329; No Copyright; Avail: Issuing Activity; Abstract Only

This is the final report for NASA grant NAG5-7329, awarded for the RXTE Cycle 3 Guest Observer Program, "RXTE Observations of M87: Investigating the nonthermal continuum". This grant totaled $8000 and was spent over 3 years (4/1998-4/2001). It supported analysis of RXTE observations of the nearby giant elliptical galaxy M87 with the RXTE satellite. The main aim of these observations was to search for non-thermal emission from the core of M87 and the famous jet. This grant also partially funded supporting theoretical work. The observational campaign was performed in December 1997 and January 1998, and we were given the final data tape in April 1998. Sebastian Heinz (then a graduated student in our group) and I started to work on the data immediately. The results of our detailed analysis were submitted to the Astrophysical Journal in November 1998, and accepted for publication in March 1999. Tile paper was published in August, 1999. The journal reference is: A RXTE study of N187 and the core of the Virgo cluster, Reynolds C.S.,Heinx S., Fabian A.C., Begelman M.C., 1999, ApJ, 102, 1999. During this first year of the project, this grant supported Mr. Heinz's travel to the Paris Texas Symposium in December 1998, as well as providing funds for necessary maintenance of our computer system.
Derived from text
Continuums; Thermal Emission; Elliptical Galaxies; X Ray Timing Explorer; Astrophysics

20010046752 Alpha Technology, Huntsville, AL USA
Human Exploration Missions Study: Space Surveillance Telescope Transfer to and Station at a Halo Orbit at the Earth-Sun Libration Point L2 ***Final Report***
Dauro, Vincent A., Sr., Alpha Technology, USA; Jan. 31, 2001; 20p; In English
Contract(s)/Grant(s): NASA Order H-32390-D; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This study was undertaken to determine mission profile and delta velocity requirements to place a telescope at the Earth-Sun libration point L2. The program, Integrated Mission Program (IMP), was selected to be used in the investigation. A description of IMP and its capabilities may be found in the Addenda. The Addenda also contains the libration halo equations, constants and

other parameters. Comments regarding the chaotic nature of numerical integration near the libration points are also attached in the Addenda. A basic two stage S/C with a simple mission profile was selected. This profile is shown.
Author
Numerical Integration; Mission Planning; Satellite Orbits

20010047488 Arizona Univ., Steward Observatory, Tucson, AZ USA
Kinds of Astronomy-5
Ennico, Kimberly, Arizona Univ., USA; [2001]; 8p; In English; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Astronomers study light and basically, almost everything we know about the universe has been figured out through the study of light gathered by telescopes on the earth, in the earth's atmosphere, and in space. This light comes in many different colors, the sum of which comprises what is commonly I known as the electromagnetic (EM) spectrum. Unfortunately, the earth's atmosphere blocks almost all of wavelengths in the EM spectrum. Only the visible (400-700 mn) and radio (approx. 1-150 m) "windows" are accessible from the ground, and thus have the longest observational "history." These early restrictions on the observational astronomer also gave rise to classifying "kinds" of astronomy based on their respective EM portion, such as the term "radio astronomy."
Author
Color; Earth Atmosphere; Electromagnetic Spectra

20010048009 NASA, Washington, DC USA
Space-Based Astronomy: An Educator Guide with Activities for Science, Mathematics, and Technology Education
Vogt, Gregory L., NASA, USA; [2001]; 106p; In English
Report No.(s): NASA/EG-2001-01-122-HQ; NAS 1.19:01-122-HQ; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

If you go to the country, far from city lights, you can see about 3,000 stars on a clear night. If your eyes were bigger, you could see many more stars. With a pair of binoculars, an optical device that effectively enlarges the pupil of your eye by about 30 times, the number of stars you can see increases to the tens of thousands. With a medium-sized telescope with a light-collecting mirror 30 centimeters in diameter, you can see hundreds of thousands of stars. With a large observatory telescope, millions of stars become visible. This curriculum guide uses hands-on activities to help students and teachers understand the significance of space-based astronomy--astronomical observations made from outer space. It is not intended to serve as a curriculum. Instead, teachers should select activities from this guide that support and extend existing study. The guide contains few of the traditional activities found in many astronomy guides such as constellation studies, lunar phases, and planetary orbits. It tells, rather, the story of why it is important to observe celestial objects from outer space and how to study the entire electromagnetic spectrum. Teachers are encouraged to adapt these activities for the particular needs of their students. When selected activities from this guide are used in conjunction with traditional astronomy curricula, students benefit from a more complete experience.
Author
Astronomy; Education; Experimentation

20010048423 NASA Goddard Space Flight Center, Greenbelt, MD USA
LISA Telescope Sensitivity Analysis
Waluschka, Eugene, NASA Goddard Space Flight Center, USA; [2001]; 1p; In English; 4th Amaldi Conference, 8-13 Jul. 2001, Unknown; No Copyright; Avail: Issuing Activity; Abstract Only

The results of a LISA telescope sensitivity analysis will be presented, The emphasis will be on the outgoing beam of the Dall-Kirkham' telescope and its far field phase patterns. The computed sensitivity analysis will include motions of the secondary with respect to the primary, changes in shape of the primary and secondary, effect of aberrations of the input laser beam and the effect the telescope thin film coatings on polarization. An end-to-end optical model will also be discussed.
Author
Sensitivity Analysis; Telescopes; Laser Beams

90
ASTROPHYSICS

Includes cosmology; celestial mechanics; space plasmas; and interstellar and interplanetary gases and dust.

20010045666 Smithsonian Astrophysical Observatory, Cambridge, MA USA
Three Classes of Kuiper Belt Objects: Theory and Observations ***Final Report, 15 Feb. 1999 - 14 Feb. 2001***
Holman, Mathew J., Smithsonian Astrophysical Observatory, USA; May 2001; 2p; In English
Contract(s)/Grant(s): NAG5-8198; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

As part of the Origins of Solar Systems program our team conducted a dynamically motivated search for three classes of Kuiper belt objects (distant comets near and beyond the orbit of Neptune). Our strategy has been to exploit variations in the sky density of Kuiper belt that result from the gravitational influence of Neptune. by searching two regions of the sky, one nearly 90 degrees from Neptune and one nearly opposite Neptune, and comparing the number of objects discovered in each region we are able to constrain the relative populations of resonant and non-resonant objects, a fundamental quantity in Kuiper belt formation models. In addition, by searching at a variety of angles above the plane of the solar system we have constrained the inclination distribution of Kuiper belt objects. We have conducted four searches for this program. One was in February 1999 and August 2000 at the Canada-France-Hawaii telescope (3.6-meter), and another was in May 1999 and Oct. 2000 at the Kitt Peak National Observatory (4-meter). In addition, a search for Uranian satellites was conducted.
Author
Kuiper Belt; Solar System; Comets; Natural Satellites

20010045813 California Inst. of Tech., Submillimeter Observatory, Pasadena, CA USA
Filamentary Structure and Helical Magnetic Fields in the Environment of a Starless Dense Core
Falgarone, E., Ecole Normale Superieure, France; Pety, J., Institut de Radio Astronomie Millimetrique, France; Phillips, T. G., California Inst. of Tech., USA; [2001]; 34p; In English
Report No.(s): Rept-2001-5; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The environment of L1512, a starless dense core, has been mapped at high angular resolution in the CO-12(J=2-1) line over more than 1 pc and a few positions observed in the CO-12(J=3-2) and J=4-3 lines. The gas outside the dense core is structured in several filaments, roughly 1 pc long and approx. 0.1 pc thick, converging at the dense core position. Small longitudinal (approx. 1 km/s pc) but large transverse (up to 8 km/ s pc) velocity gradients are observed. Remarkably, the transverse gradients can be seen to change sign periodically along at least one of the filaments. Thus, there are oscillations in the toroidal velocity within the filaments which may be a signature of a magneto-hydrodynamical instability developing in filaments permeated by a helical magnetic field. In the case of L1512, according to the analysis of Fiege &, Pudritz, the growth rate of the instability is low, corresponding to a timescale of the order of a Myr. We deduce from the wavelength of the oscillations that the toroidal component of the magnetic field dominates the poloidal component. The toroidal component helps confine the filaments which are not otherwise confined, either by self-gravity (m/m(sub vir) approx. 0.2) or by the pressure of the galactic HI layer or external turbulent pressure. We find that the velocity gradients in the vicinity of the dense core provide an estimate for an upper limit to the accretion rate onto the dense core of M = 4 x 10(exp -6) Solar Mass/yr. For the gas characteristics in the filaments, we find that a broad range of density and temperature is allowed for the gas, between n(sub H2) =2 x 10(exp 3)/cc for the coldest case (Tk= 20 K) down to n(sub H2) = 180/cc for the warmest (Tk= 250 K).
Author
Confinement; Planetary Cores; Mapping; Stellar Mass; Magnetic Field Configurations

20010046950 Colorado Univ., Joint Inst. for Lab. Astrophysics, Boulder, CO USA
Warping and Precession of Accretion Disks in X-Ray Binaries ***Final Report, 1 Apr. 1997 - 31 Mar. 2001***
Begelman, Mitchell C., Colorado Univ., USA; Maloney, Philip R., Colorado Univ., USA; [2001]; 2p; In English
Contract(s)/Grant(s): NAG5-4061; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

This proposal covers research on the radiation-driven warping instability discovered by Pringle. In the first two years of funding under this proposal we concentrated on and essentially completed study of the eigenmodes of the radiation-driven warping instability in the linear regime.
Derived from text
Accretion Disks; X Ray Binaries; Precession; Warpage

20010046960 NASA Marshall Space Flight Center, Huntsville, AL USA

The Sunyaev-Zeldovich Effect Spectrum of Abell 2163

LaRoque, S., NASA Marshall Space Flight Center, USA; Reese, E. D., NASA Marshall Space Flight Center, USA; Holder, G. P., NASA Marshall Space Flight Center, USA; Carlstrom, J. E., NASA Marshall Space Flight Center, USA; Holzapfel, W. L., NASA Marshall Space Flight Center, USA; Joy, M. K., NASA Marshall Space Flight Center, USA; Grego, L., NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; No Copyright; Avail: Issuing Activity; Abstract Only

We present a measurement of the Sunyaev-Zeldovich effect (SZE) at 30 GHz for the galaxy cluster Abell 2163. Combining this data point with previous measurements at 140, 220, and 270 GHz from the SuZIE and Daibolo experiments, we construct them most complete SZE spectrum to date. The spectrum is fitted to determine the compton y parameter and the peculiar velocity for this cluster; our results are y_0=3.6 x 10(circumflex)4 and v_p=360 km s(circumflex)-1. These results include corrections for contamination by Galactic dust emission; we find the contamination level to be much less than previously reported. The dust emission, while strong, is distributed over much larger angular scales than the cluster signal and contributes little to the measured signal when the proper SZE observing strategy is taken into account.
Author

Sunyaev-Zeldovich Effect; Galactic Clusters; Spectra

20010046980 NASA Ames Research Center, Moffett Field, CA USA

Assessment of the Interstellar Processes Leading to Deuterium Enrichment in Meteoritic Organics

Sandford, Scott A., NASA Ames Research Center, USA; Bernstein, Max P., NASA Ames Research Center, USA; Dworkin, Jason P., NASA Ames Research Center, USA; [2001]; 41p; In English
Contract(s)/Grant(s): RTOP 344-37-44-01; RTOP 344-38-12-04; RTOP 344-50-92-02; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The presence of isotopic anomalies is the most unequivocal demonstration that meteoritic material contains circumstellar or interstellar components. In the case of organic compounds in meteorites and interplanetary dust particles (IDPs), the most useful isotopic tracer has been deuterium (D). We discuss four processes that are expected to lead to D enrichment in interstellar materials and describe how their unique characteristics can be used to assess their relative importance for the organics in meteorites. These enrichment processes are low temperature gas phase ion-molecule reactions, low temperature gas-grain reactions, gas phase unimolecular photodissociation, and ultraviolet photolysis in D-enriched ice mantles. Each of these processes is expected to be associated with distinct regiochemical signatures (D placement on the product molecules, correlation with specific chemical functionalities, etc.), especially in the molecular population of polycyclic aromatic hydrocarbons (PAHs). We describe these differences and discuss how they may be used to delineate the various interstellar processes that may have contributed to meteoritic D enrichments. We also briefly discuss how these processes may affect the isotopic distributions in C, 0, and N in the same compounds.
Author

Anomalies; Deuterium; Interplanetary Dust; Meteoritic Composition; Organic Compounds

20010047001 NASA Ames Research Center, Moffett Field, CA USA

Photoevaporation of Disks Around Young Stars

Hollenbach, David, NASA Ames Research Center, USA; [1994]; 1p; In English, 11-14 Jan. 1994, Arlington, VA, USA; Sponsored by American Astronomical Society, USA
Contract(s)/Grant(s): RTOP 188-44-53; No Copyright; Avail: Issuing Activity; Abstract Only

Young massive stars produce sufficient Lyman continuum luminosity phi to have a significant effect on the structure and evolution of the accretion disks surrounding diem. We show that inside a critical disk radius r(sub g), an isothermal 10(exp 4) K atmosphere forms with a scale height that increases with r(sup3/2) for r less than or equal to r(sub g). For r less than or equal to r(sub g), the diffuse field caused by hydrogen recombinations to the ground state in the atmosphere produces a steadily evaporating disk. The mass loss from this outer region of the disk is of order 10(exp -5) Mo/yr phi(sub 49)1/2, where phi(sub 49) is defined as phi/10(exp 49) photons/s. The mass loss has two important consequences. First, the slow (10-50 km/s) wind that results may explain the long life of unresolved ultracompact HII regions. Secondly, the dependence on phi implies that accretion through the disk onto the star will be quenched once the photoevaporation rate exceeds the accretion rate. This may act to limit the mass of the forming star.
Author

Evaporation; Accretion Disks; Massive Stars; Luminosity; Photons; Continuums

20010047006 NASA Ames Research Center, Moffett Field, CA USA

The Infrared Reflection Nebula Around the Protostellar System in S140

Harker, D., NASA Ames Research Center, USA; Bregman, J., NASA Ames Research Center, USA; Tielens, A. G. G. M., NASA Ames Research Center, USA; Temi, P., NASA Ames Research Center, USA; Rank, D., NASA Ames Research Center, USA;
[1994]; 1p; In English
Contract(s)/Grant(s): RTOP 352-02-03; No Copyright; Avail: Issuing Activity; Abstract Only

We have studied the protostellar system in S140 at 2.2, 3.1 and 3.45 microns using a 128x128 InSb array at the Lick Observatory 3m telescope. Besides the protostellar sources, the data reveal a bright infrared reflection nebula. We have developed a simple model of this region and derived the physical conditions. IRSI is surrounded by a dense dusty disk viewed almost edge-on. Photons leaking out through the poles illuminate almost directly north and south the inner edge of a surrounding shell of molecular gas, Analysis of the observed colors and intensities of the NIR light, using Mie scattering theory, reveal that the dust grains in the molecular cloud are somewhat larger than in the general diffuse interstellar medium. Moreover, the incident light has a ”cool” color temperature, approximately equals 800K, and likely originates from a dust photosphere close to the protostar. Finally, we find little H2O ice associated with the dusty disk around IRSI. Most of the 3.1 micron ice extinction arises instead from cool intervening molecular cloud material. We have compared our infrared dust observations with millimeter and radio observations of molecular gas associated with this region. The large scale structure observable in the molecular gas is indicative of the interaction between the protostellar wind and the surrounding molecular cloud rather than the geometry of the protostellar disk. We conclude that S140 is a young blister formed by this outflow on the side of a molecular cloud and viewed edge-on.
Author

Interstellar Matter; Nebulae; Infrared Reflection; Spectral Reflectance; Millimeter Waves; Molecular Clouds; Protostars

20010047008 California Inst. of Tech., Submillimeter Observatory, Pasadena, CA USA

A SCUBA Survey of the NGC 2068/2071 Protoclusters

Motte, F., Max-Planck-Inst. fuer Radioastronomie, Germany; Andre, P., Commissariat a l’Energie Atomique, France; Ward-Thompson, D., Cardiff Univ., UK; Bontemps, S., Observatoire de Bordeaux, France; [2001]; 10p; In English
Report No.(s): Rept-2001-6; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

We report the results of a submillimeter dust continuum survey of the protoclusters NGC 2068 and NGC 2071 in Orion B carried out at 850 micrometers and 450 micrometers with SCUBA on JCMT. The mapped region is approx. 32 ft x 18 ft in size (approx. 4 pc x 2 pc) and consists of filamentary dense cores which break up into small-scale (approx. 5000 AU) fragments, including 70 starless condensations and 5 circumstellar envelopes/disks. The starless condensations, seen on the same spatial scales as protostellar envelopes, are likely to be gravitationally bound and pre-stellar in nature. Their mass spectrum, ranging from approx. 0.3 solar mass to approx. 5 solar mass), is reminiscent of the stellar initial mass function (IMF). Their mass-size relation suggests that they originate from gravitationally-driven fragmentation. We thus argue that pre-collapse cloud fragmentation plays a major role in shaping the IMF.
Author

Dust; Surveys; Submillimeter Waves; Stellar Mass; Mass Spectra

20010047502 NASA Ames Research Center, Moffett Field, CA USA

Constraints on the Composition of Trojan Asteroid 624 Hektor

Cruikshank, Dale P., NASA Ames Research Center, USA; DalleOre, Cristina M., NASA Ames Research Center, USA; Roush, Ted L., NASA Ames Research Center, USA; Geballe, Thomas R., Gemini Observatory, USA; Owen, Tobias C., Institute for Astronomy, USA; deBergh, Catherine, Observatoire de Paris-Meudon, France; Cash, Michael D., Stanford Univ., USA; Hartmann, William K., Planetary Science Inst., USA; [2001]; 46p; In English
Contract(s)/Grant(s): RTOP 344-30-30-01; RTOP 344-32-20-01; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We present a composite spectrum of Trojan asteroid 624 Hektor, 0.3-3.6 microns, which shows that there is no discernible 3-micron absorption band. Such a band would indicate the presence of OH or H2O- bearing silicate minerals, or macromolecular carbon-rich organic material of the kind seen on the low-albedo hemisphere of Saturn’s satellite Iapetus (Owen et al. 2000). The absence of spectral structure is itself indicative of the absence of the nitrogen-rich tholins (which show a distinctive absorption band attributed to N-H). The successful models in this study all incorporate the mineral pyroxene (Mg, Fe SiO3, the composition of hypersthene), which matches the red color of Hektor. Pyroxene is a mafic mineral common in terrestrial and lunar lavas, and is also seen in Main Belt asteroid spectra. An upper limit to the amount of crystalline H20 ice (30-micron grains) in the surface layer of Hektor is 3 weight percent. The upper limit for serpentine, as a representative of hydrous silicates, is much less stringent, at 40 percent, based on the shape of the spectral region around 3 gm. Thus, the spectrum at 3 gm does not preclude the presence of a few weight percent of volatile material in the surface layer of Hektor. All of the models we calculated require elemental carbon

to achieve the low geometric albedo that matches Hektor. This carbon could be of organic or inorganic origin. By analogy, other D-type asteroids could achieve their red color, low albedo, and apparent absence of phyllosilicates, from compositions similar to the models presented here.
Author
Trojan Asteroids; Mineralogy; Absorption Spectra; Silicates; Organic Materials

20010047508 NASA Goddard Space Flight Center, Greenbelt, MD USA
The X-Ray Globular Cluster Population in NGC 1399
Angelini, Lorella, NASA Goddard Space Flight Center, USA; Loewenstein, Michael, NASA Goddard Space Flight Center, USA; Mushotzky, Richard F., NASA Goddard Space Flight Center, USA; [2001]; 12p; In English; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We report on X-ray sources detected in the Chandra images of the elliptical galaxy NGC 1399 and identified with globular clusters (GCs). The 8'x 8' Chandra image shows that a large fraction of the 2-10 keV X-ray emission is resolved into point sources, with a luminosity threshold of 5 x 10 (exp 37) ergs s-1. These sources are most likely Low Mass X-ray Binaries (LMXBs). More than 70% of the X-ray sources, in a region imaged by Hubble Space Telescope (HST), are located within GCs. Many of these sources have super-Eddington luminosity (for an accreting neutron star) and their average luminosity is higher than the remaining sources. This association suggests that, in giant elliptical galaxies, luminous X-ray binaries preferentially form in GCs. The spectral properties of the GC and non-GC sources are in most cases similar to those of LMXBs in our galaxy. Two of the brightest sources, one of which is in GC, have a much softer spectra as seen in the high state black hole. The "apparent" super-Eddington luminosity in many cases may be due to multiple LMXB systems within individual GC, but with some of the most extreme luminous systems containing massive black holes.
Author
Globular Clusters; X Rays; Neutron Stars; Elliptical Galaxies; X Ray Binaries; X Ray Astronomy

20010048661 NASA Ames Research Center, Moffett Field, CA USA
Identifying Organic Molecules in Space: The AstroBiology Explorer (ABE) MIDEX Mission Concept
Sandford, Scott A., NASA Ames Research Center, USA; Allamandola, Louis, NASA Ames Research Center, USA; Bregman, Jesse, NASA Ames Research Center, USA; Ennico, Kimberly, NASA Ames Research Center, USA; Greene, Thomas, NASA Ames Research Center, USA; Hudgins, Douglas, NASA Ames Research Center, USA; Strecker, Donald, NASA Ames Research Center, USA; [2001]; 1p; In English; 46th Annual SPIE Meeting, San Diego, CA, USA
Contract(s)/Grant(s): RTOP 624-08-01; No Copyright; Avail: Issuing Activity; Abstract Only

Infrared spectroscopy in the 2.5-16 micron range is a principle means by which organic compounds are detected and identified in space. Ground-based, airborne, and spaceborne IR spectral studies have already demonstrated that a significant fraction of the carbon in the interstellar medium (ISM) resides in the form of complex organic molecular species. Unfortunately, neither the distribution of these materials nor their genetic and evolutionary relationships with each other or their environments are well understood. The Astrobiology Explorer (ABE) is a MIDEX mission concept currently under study at NASA's Ames Research Center in collaboration with Ball Aerospace and Technologies Corporation. ABE will conduct IR spectroscopic observations to address outstanding important problems in astrobiology, astrochemistry, and astrophysics. The core observational program would make fundamental scientific progress in understanding (1) the evolution of ices and organic matter in dense molecular clouds and young forming stellar systems, (2) the chemical evolution of organic molecules in the ISM as they transition from AGB outflows to planetary nebulae to the general diffuse ISM to H II regions and dense clouds, (3) the distribution of organics in the diffuse ISM, (4) the nature of organics in the Solar System (in comets, asteroids, satellites), and (5) the nature and distribution of organics in local galaxies. The technical considerations of achieving these science objectives in a MIDEX-sized mission will be described.
Author
Organic Compounds; Organic Materials; Planetary Nebulae; Molecular Gases; Interstellar Matter; Infrared Spectroscopy; Exobiology; Atmospheric Chemistry; Biology

20010048662 NASA Ames Research Center, Moffett Field, CA USA
Detecting and Identifying Organic Molecules in Space: The AstroBiology Explorer (ABE) MIDEX Mission Concept
Sandford, Scott A., NASA Ames Research Center, USA; [2001]; 1p; In English; Annual Meetin of the NASA Astrobiology Institute, Washington, DC, USA
Contract(s)/Grant(s): RTOP 624-08-01; No Copyright; Avail: Issuing Activity; Abstract Only

Infrared spectroscopy in the 2.5-16 microns (4000-625/cm) range is a principle means by which organic compounds are detected and identified in space. Ground-based, airborne, and spaceborne IR spectral studies have already demonstrated that a

significant fraction of the carbon in the interstellar medium (ISM) resides in the form of complex organic molecular species. Unfortunately, neither the distribution of these materials nor their genetic and evolutionary relationships with each other or their environments are well understood. The Astrobiology Explorer (ABE) is a MIDEX (Medium-class Explorer) mission concept currently under study at NASA's Ames Research Center in collaboration with Ball Aerospace and Technologies Corporation. ABE will conduct IR spectroscopic observations to address outstanding important problems in astrobiology, astrochemistry, and astrophysics. The core observational program would make fundamental scientific progress in understanding (1) the evolution of ices and organic matter in dense molecular clouds and young forming stellar systems, (2) the chemical evolution of organic molecules in the ISM as they transition from AGB outflows to planetary nebulae to the general diffuse ISM to H II regions and dense clouds, (3) the distribution of organics in the diffuse ISM, (4) the nature of organics in the Solar System (in comets, asteroids, satellites), and (5) the nature and distribution of organics in local galaxies. Both the scientific goals of the mission and how they would be achieved will be discussed.
Author
Infrared Spectroscopy; Organic Compounds; Organic Materials; Planetary Nebulae; Interstellar Matter; Identifying; Carbon; Atmospheric Chemistry

20010048663 NASA Ames Research Center, Moffett Field, CA USA
The AstroBiology Explorer (ABE) MIDEX Mission Concept: Exploring the Links Between the Interstellar Medium and Meteorites
Sandford, Scott A., NASA Ames Research Center, USA; Allamandola, Louis J., NASA Ames Research Center, USA; Bregman, Jesse, NASA Ames Research Center, USA; Ennico, Kimberly, NASA Ames Research Center, USA; Greene, Thomas, NASA Ames Research Center, USA; Hudgins, Douglas, NASA Ames Research Center, USA; Strecker, Donald, Ball Aerospace and Technologies Corp., USA; [2001]; 1p; In English; 64th Annual Meeting of the Meteoritical Society, Vatican City, Italy
Contract(s)/Grant(s): RTOP 344-37-44-01; No Copyright; Avail: Issuing Activity; Abstract Only

Infrared spectroscopy in the 2.5-16 micron range is a principle means by which organic compounds can be detected and identified in space via their vibrational transitions. Ground-based, airborne, and spaceborne IR spectral studies have already demonstrated that a significant fraction of the carbon in the interstellar medium (ISM) resides in the form of complex organic molecular species. Furthermore, the presence of D-enriched organics in meteorites suggests that a portion of these materials survives incorporation into protosolar nebulae. Unfortunately, neither the distribution of these materials nor their genetic and evolutionary relationships with each other or their environments are well understood. The Astrobiology Explorer (ABE) is a MIDEX mission concept currently under study at NASA's Ames Research Center in collaboration with Ball Aerospace and Technologies Corporation. ABE will conduct IR spectroscopic observations to address outstanding important problems in astrobiology, astrochemistry, and astrophysics. The core observational program would make fundamental scientific progress in understanding (1) the evolution of ices and organic matter in dense molecular clouds and young forming stellar systems, (2) the chemical evolution of organic molecules in the ISM as they transition from AGB outflows to planetary nebulae to the general diffuse ISM to HII regions and dense clouds, (3) the distribution of organics in the diffuse ISM, (4) the nature of organics in the Solar System (in comets, asteroids, satellites), and (5) the nature and distribution of organics in local galaxies. In addition, ABE will attempt to detect and quantify deuterium enrichments in a select set of these materials and environments. This should assist both with understanding the chemical processes that occur in these environments and with establishing any links that exist between interstellar and meteoritic organics.
Author
Astrophysics; Biology; Infrared Spectroscopy; Interstellar Matter; Meteorites; Carbon; Atmospheric Chemistry

20010048689 NASA Ames Research Center, Moffett Field, CA USA
What Can Interplanetary Dust Particles Tell Us About Interstellar Dust?
Sandford, Scott A., NASA Ames Research Center, USA; [1994]; 1p; In English; IAU General Assembly, 23-24 Aug. 1994, The Hague, Netherlands; Sponsored by International Astronomical Union, Netherlands
Contract(s)/Grant(s): RTOP 452-33-93; No Copyright; Avail: Issuing Activity; Abstract Only

Dust is injected into the interplanetary medium by both comets and asteroids and there is reason to believe that particles from both of these types of sources are represented in the population of interplanetary dust collected in the stratosphere. The presence of isotopic anomalies and of adjacent mineral and carbonaceous phases that are chemically unequilibrated indicates that these particles contain primitive materials that have avoided many of the alteration processes that have affected most other extraterrestrial materials since their aggregation in the Solar nebula. This suggests that many of the subcomponents of the collected dust may have a chemical and isotopic 'memory' that extends back through the formation of the Solar System and therefore reflects the properties of interstellar dust populations. Indeed, it is possible that some of the subcomponents of the collected dust

could have been true interstellar dust grains prior to the formation of the Solar nebula. The implications of this possibility will be discussed in light of our present knowledge of interplanetary dust.
Author
Cosmic Dust; Interplanetary Dust; Solar System

20010048759 NASA Marshall Space Flight Center, Huntsville, AL USA
The Mechanism Responsible for High Concentrations of Be-7 in the Near Space
Panasyuk, M. I., Moscow State Univ., Russia; Nymmik, R. A., Moscow State Univ., Russia; Kuzhevskii, B. M., Moscow State Univ., Russia; Kulikauskas, V. S., Moscow State Univ., Russia; Zhuravlev, D. A., Moscow State Univ., Russia; Phillips, G. W., Naval Research Lab., USA; Share, G. H., Naval Research Lab., USA; King, S. E., Naval Research Lab., USA; August, R. A., Naval Research Lab., USA; Tylka, A. J., Naval Research Lab., USA; [2001]; 3p; In English; International Nuclear Physics Conference, 30 Jul. - 3 Aug. 2001, Berkeley, CA, USA; No Copyright; Avail: Issuing Activity; Abstract Only

In 1990 an unexpectedly high concentration of Be-7 was discovered on the LDEF satellite surface, facing in the RAM direction. The search for an explanation of this high concentration of Be-7 which is in thermal equilibrium in the upper atmosphere, led the researchers to the hypothesis of Be-7 transport by vertical turbulent fluxes from deeper layers in the Earth's atmosphere, where Be-7 is produced as a result of nuclear reactions between solar energetic protons (which penetrated there after a solar flare) and terrestrial atmosphere elements. The experiments carried out during 1995-1999 on 'Resource F1' and 'Cosmos' satellites not only confirmed the existence of high Be-7 concentrations at altitudes of about 200 km, but also permitted to establish correlation between the concentration of Be-7 in the upper atmosphere and flare activity on the Sun. More detailed analysis of the whole set of experimental data on Be-7 measurements at satellite altitudes showed, that the appearance of high Be-7 concentrations in the upper atmosphere of the Earth is a more complicated phenomenon. Two more mechanisms , explaining the observed effect can be indicated. Firstly, the observed concentrations could be associated with direct penetration of energetic Be-7 nuclei, originating in flares, into the terrestrial atmosphere. Calculations show, that in solar cosmic rays the flux of Be-7 nuclei should be maximum in comparison to the fluxes of other Beryllium isotopes. Secondly, the high concentration of Be-7 in the upper atmosphere of the Earth could be explained by solar wind penetration through the polar zones. Theoretical analysis of active processes including flares, occurring in the solar atmosphere, leads to the conclusion, that radioactive Beryllium is constantly present in the solar atmosphere, and, possibly, is the main isotope of solar Beryllium.
Author
Radioactivity; Solar Atmosphere; Nuclear Physics; Beryllium 7

20010048879 NASA Ames Research Center, Moffett Field, CA USA
Organic Chemistry of Meteorites
Chang, S., NASA Ames Research Center, USA; [1994]; 1p; In English; 207th ACS National Meeting, 13-18 Mar. 1994, San Diego, CA, USA; Sponsored by American Chemical Society, USA
Contract(s)/Grant(s): RTOP 185-52-22; No Copyright; Avail: Issuing Activity; Abstract Only

Studies of the molecular structures and C,N,H-isotopic compositions of organic matter in meteorites reveal a complex history beginning in the parent interstellar cloud which spawned the solar system. Incorporation of interstellar dust and gas in the protosolar nebula followed by further thermal and aqueous processing on primordial parent bodies of carbonaceous, meteorites have produced an inventory of diverse organic compounds including classes now utilized in biochemistry. This inventory represents one possible set of reactants for chemical models for the origin of living systems on the early Earth. Evidence bearing on the history of meteoritic organic matter from astronomical observations and laboratory investigations will be reviewed and future research directions discussed.
Author
Biochemistry; Carbonaceous Meteorites; Interstellar Matter; Meteoritic Composition; Organic Chemistry

20010048899 NASA Ames Research Center, Moffett Field, CA USA
Interstellar Ice and Dust: The Feedstock of the Solar System
Allamandola, L. J., NASA Ames Research Center, USA; [1994]; 1p; In English; NSCORT Symposium, 13-18 Mar. 1994, San Diego, CA, USA
Contract(s)/Grant(s): RTOP 452-33-93; No Copyright; Avail: Issuing Activity; Abstract Only

Studying the chemical and isotopic composition of interstellar ice and dust provides insight into the composition and chemical history of the solid bodies in the solar nebula and the nature of the material subsequently brought into the inner part of the solar system by comets and meteorites. It is now possible to probe the composition of these microscopic interstellar particles (some hundreds of light years away), thanks to substantial progress in two areas: astronomical spectroscopic techniques in the

middle-infrared, the spectral region most diagnostic of composition; and laboratory simulations which realistically reproduce the critical conditions in various interstellar environments. High quality infrared spectra of many different astronomical sources, some associated with dark molecular clouds, and others in the diffuse interstellar medium (DISM) are now available. What comparisons of these spectra with laboratory spectra tell us about the complex organic components of these materials is the subject of this talk. Most interstellar material is concentrated in large molecular clouds where simple molecules are formed by gas phase and dust grain surface reactions. Gaseous species (except H2) striking the cold (10K) dust will stick, forming an icy grain mantle. This accretion, coupled with energetic particle bombardment and UV photolysis, will produce a complex chemical mixture containing volatile, non-volatile, and isotopically fractionated species. One can compare spectra of the diffuse and dense interstellar medium with the spectra of analogs produced in the laboratory under conditions which mimic those in these different environments. In this way one can determine the composition and abundances of the major constituents present and place general constraints on the types and relative abundances of organics coating the grains. Ices in dense clouds contain H2O, CH3OH, CO, perhaps some NH3 and H2CO, as well as nitriles and ketones or esters. There is some evidence that the later, more complex species, are also present on the grains in the DISM. The evidence for these materials, in addition to carbon rich materials such as amorphous carbon, microdiamonds, and polycyclic aromatic hydrocarbons will be reviewed and the possible connection with meteoritic organics will be discussed.

Author

Ice; Interstellar Matter; Solar System; Chemical Composition; Isotopes; Cosmic Dust

91
LUNAR AND PLANETARY SCIENCE AND EXPLORATION

Includes planetology; selenology; meteorites; comets; and manned and unmanned planetary and lunar flights. For spacecraft design or space stations see 18 Spacecraft Design, Testing and Performance.

20010043986 NASA Ames Research Center, Moffett Field, CA USA

NASA Kennedy Space Center Scientific and Technical Information Output-2001: A Wind Tunnel Study on the Mars Pathfinder (MPF) Lander Descent Pressure Sensor

Soriano, J. Francisco, NASA Ames Research Center, USA; Coquilla, Rachael V., California Univ., USA; Wilson, Gregory R., Jet Propulsion Lab., California Inst. of Tech., USA; Seiff, Alvin, San Jose State Univ., USA; Rivell, Tomas, NASA Ames Research Center, USA; April 2001; 26p; In English; Original contains color illustrations

Report No.(s): NASA/TM-2001-210253; NAS 1.15:210253; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The primary focus of this study was to determine the accuracy of the Mars Pathfinder lander local pressure readings in accordance with the actual ambient atmospheric pressures of Mars during parachute descent. In order to obtain good measurements, the plane of the lander pressure sensor opening should ideally be situated so that it is parallel to the freestream. However, due to two unfavorable conditions, the sensor was positioned in locations where correction factors are required. One of these disadvantages is due to the fact that the parachute attachment point rotated the lander's center of gravity forcing the location of the pressure sensor opening to be off tangent to the freestream. The second and most troublesome factor was that the lander descends with slight oscillations that could vary the amplitude of the sensor readings. In order to accurately map the correction factors required at each sensor position, an experiment simulating the lander descent was conducted in the Martian Surface Wind Tunnel at NASA Ames Research Center. Using a 115 scale model at Earth ambient pressures, the test settings provided the necessary Reynolds number conditions in which the actual lander was possibly subjected to during the descent. In the analysis and results of this experiment, the readings from the lander sensor were converted to the form of pressure coefficients. With a contour map of pressure coefficients at each lander oscillatory position, this report will provide a guideline to determine the correction factors required for the Mars Pathfinder lander descent pressure sensor readings.

Author

Mars Pathfinder; Mars Surface; Oscillations; Position (Location); Scale Models; Simulation; Wind Tunnel Models; Wind Tunnel Tests; Pressure Sensors

20010043987 Science Applications International Corp., Chantilly, VA USA

Mafic Intrusions in the Lunar Crust ***Final Report, 20 Apr. 2000 - 19 Apr. 2001***

Tompkins, Stephanie, Science Applications International Corp., USA; [2001]; 3p; In English

Contract(s)/Grant(s): NASW-00023

Report No.(s): Rept-01-1360-04-1822-001-4; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

This report documents progress with respect to: (1) Determining detailed lunar crust stratigraphy from impact craters, and (2) remote sensing applications of lunar impact melt spectra.
Author
Stratigraphy; Lunar Crust; Impact Melts; Lunar Craters

20010044353 Lunar and Planetary Inst., Houston, TX USA
Lunar and Planetary Science XXXII
Lunar and Planetary Science XXXII; 2001; ISSN 0161-5297; In English; 32nd; Lunar and Planetary Science XXXII, 12-16 March, 2001, Houston, TX, USA; Sponsored by Lunar and Planetary Inst., USA; See also 20010044354 through 20010045497; CD-ROM contains the entire conference proceedings presented in PDF format
Report No.(s): LPI-Contrib-1080; No Copyright; Avail: CASI; C01, CD-ROM

This CD-ROM publication contains the extended abstracts that were accepted for presentation at the 32nd Lunar and Planetary Science Conference held at Houston, TX, March 12-16, 2001. The papers are presented in PDF format and are indexed by author, keyword, meteorite, program and samples for quick reference.
Derived from text
Conferences; Meteorites; Meteoritic Composition; Planetary Geology; Planetary Craters

20010044354 NASA Johnson Space Center, Houston, TX USA
Rb-SR and Sm-Nd Isotopic Constraints on the Genesis of Lunar Green and Orange Glasses
Shih C.-Y., Lockheed Martin Space Operations, USA; Nyquist, L., NASA Johnson Space Center, USA; Reese, Y., Lockheed Martin Space Operations, USA; Wiesmann, H., Lockheed Martin Space Operations, USA; Schwandt, C., Lockheed Martin Space Operations, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Rb-SR and Sm-Nd isotopic compositions of lunar green and orange glasses suggest that orange glass and high-Ti mare basalts can be produced by partial melting of hybrid sources composed of early LMO cumulate mixing with late-stage LMO Ti-rich cumulates. Additional information is contained in the original extended abstract.
Derived from text
Composition (Property); Isotopic Labeling; Isotopes; Rubidium Isotopes; Strontium Isotopes; Samarium Isotopes; Neodymium Isotopes

20010044355 Academy of Sciences (USSR), Inst. of Ore Deposits, Petrography, Mineralogy and Geochemistry, Moscow, USSR
'Pristine' Lunar Glasses: Why Not of Impact Origin?
Dikov, Yu. P., Academy of Sciences (USSR), USSR; Yakovlev, O. I., Academy of Sciences (USSR), USSR; Gerasimov, M. V., Academy of Sciences (USSR), USSR; Wlotzka, F., Max-Planck-Inst. fuer Chemie, Germany; Huth, J., Max-Planck-Inst. fuer Chemie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): INTAS-97-11084; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Experimental simulation of an impact of chondritic projectile into lunar mare basalt resulted in the production of glass spherules compositionally resembling "pristine" lunar glasses. A<dditionalinformationisconained in the original extended abstract..
Derived from text
Experimentation; Lunar Maria; Computerized Simulation; Impact; Basalt

20010044356 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Lunar Mare Basalts: Mineralogical Variations with Time
Hiesinger, H., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Wolf, U., Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Germany; Neukum, G., Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We performed crater counts for approx. 220 basalt units exposed in the mare region of the lunar nearside. Combined with new mineralogical data, these data allow a detailed investigation of the relationship between mineralogy and age of a basalt. Additional information is contained in the original extended abstract.
Derived from text
Basalt; Lunar Maria; Craters

20010044357 Wisconsin Univ., Natural and Applied Sciences, Green Bay, WI USA
Characteristics of Lava Ponds on the Moon's North Rim as Indicators of Magma Transport Mechanisms
Yingst, R. A., Wisconsin Univ., USA; Theno, T. W., Space Explorers, Inc., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Analysis of morphological, compositional and volumetric characteristics of individual eruptive phases on the Moon"s north rim provides evidence that places constraints on possible theories of basaltic magma rise through a low-density crust. Additional information is contained in the original extended abstract.
Derived from text
Lava; Moon; Magma

20010044358 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Ascent and Eruption of Mare Basalts on the Moon
Wilson, L., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Dike propagation mechanics impose severe limitations on the volumes of magma that can be brought to shallow depths on the Moon by buoyancy alone. Large volume eruptions and intrusions require magma reservoirs close to the base of the crust. Additional information is contained in the original extended abstract.
Derived from text
Basalt; Moon; Maria; Ascent

20010044359 Proxemy Research, Inc., Laytonsville, MD USA
Validity of Convective Plume Rise Models for Volcanic Eruptions on Mars
Glaze, L. S., Proxemy Research, Inc., USA; Baloga, S. M., Proxemy Research, Inc., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We identify conditions required for valid application of convective plume rise models to large-scale volcanic plumes on Mars. Our results suggest that Mars plumes may rise to altitudes substantially less than previously thought. Additional information is contained in the original extended abstract.
Derived from text
Mars Surface; Mars Volcanoes; Plumes

20010044360 University Coll., Dept. of Geomatic Engineering, London, UK
Explosive Volcanic Eruptions on Mars: Misconceptions and New Insights
Mitchell, K. L., University Coll., UK; Wilson, L., Lancaster Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Some misconceptions about the explosivity of martian volcanism are discussed, and new insights from numerical modelling are presented. We demonstrate how volcanic activity on Mars may have been more explosive than previously believed. Additional information is contained in the original extended abstract.
Derived from text
Mars Volcanoes; Mathematical Models; Explosives

20010044361 Geological Survey, Flagstaff, AZ USA

Layered Material of Variable Albedo on Mars: Possible Late Noachian to Early Amazonian Tephra?

Chapman, M. G., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The light, intermediate, and dark layered, massive, and thin (or LMT) mesa unit outcrops in MOC images, at mostly equatorial latitudes on Mars, have a range of ages and may be tephra layers formed by volcano-ice interactions. Additional information is contained in the original extended abstract.

Derived from text

Albedo; Mars Surface; Image Analysis

20010044362 NASA Goddard Space Flight Center, Greenbelt, MD USA

Evolution and Erosion of Tyrrhena and Hadriaca Paterae, Mars: New Insights from MOC and MOLA

Gregg, T. K. P., Buffalo Univ., USA; Crown, D. A., Pittsburgh Univ., USA; Sakimoto, S. E. H., NASA Goddard Space Flight Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Investigation of Hadriaca and Tyrrhena Paterae, Mars, using MOC and MOLA data reveals new information about caldera formation, channel development, and lava flow-field emplacement. Additional information is contained in the original extended abstract.

Derived from text

Erosion; Mars Surface; Research

20010044363 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA

Mineralogical Anomalies in Mars Nili Patera Caldera Observed with Thermal Emission Spectrometer Data

Ruff, S. W., Arizona State Univ., USA; Hamilton, V. E., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

TES has detected thermal infrared spectral anomalies in the floor of Nili Patera caldera indicating different mineralogy than the rest of Syrtis Major. Additional information is contained in the original extended abstract.

Derived from text

Mineralogy; Anomalies; Mars Surface; Thermal Emission

20010044364 NASA, Washington, DC USA

Small Martian North Polar Volcanoes: Topographic Implications for Eruptive Styles

Sakimoto, S. E. H., Maryland Univ., USA; Garvin, J. B., NASA, USA; Bradley, B. A., Caelum Research Corp., USA; Wong, M., California Univ., USA; Frawley, J. J., Raytheon STX Corp., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-8565; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We characterize and model small volcanoes in the martian mid-latitude and near-polar regions. Regional differences and possible latitude-dependent geometry parameters hint that subsurface volatiles may be significant for polar eruptions. Additional information is contained in the original extended abstract.

Derived from text

Mars Surface; Volcanoes; Topography; Models

20010044365 Lancaster Univ., Environmental Science Dept., UK

Estimated Volcanic Eruption Conditions During a Large Flank Eruption on Elysium Mons, Mars, Using Mars Global Surveyor Data

Wilson, L., Lancaster Univ., UK; Mouginis-Mark, P. J., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We use data from MOLA and MOC as input into a numerical model the formation of a channel formation on the flanks of Elysium Mons, Mars. Calculated lava volume is 33-36 cubic km, flow rate 5000 to 15000 m/s, and the eruption lasted 26 to 80 days. Additional information is contained in the original extended abstract.
Derived from text
Estimating; Volcanology; Mathematical Models; Lava; Mars Surface

20010044366 Geological Survey, Flagstaff, AZ USA
Evidence for Magmatically Driven Catastrophic Erosion on Mars
Tanaka, K. L., Geological Survey, USA; Kargel, J. S., Geological Survey, USA; Hoffman, N., La Trobe Univ., Australia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Some large highland plains and many depressions in volcanic areas on Mars may result from catastrophic surface and subsurface erosion induced by shallow intrusions. The crust appears to be readily eroded and may be rich in carbon dioxide. Additional information is contained in the original extended abstract.
Derived from Text
Erosion; Mars Surface; Mars Volcanoes

20010044367 International Research School of Planetary Sciences, Pescara, Italy
Subsurface Models for the Formation of Mound-like Morphologies on Mars
Ori, G. G., International Research School of Planetary Sciences, Italy; Komatsu, G., International Research School of Planetary Sciences, Italy; Ormo, J., International Research School of Planetary Sciences, Italy; Marinangeli, L., International Research School of Planetary Sciences, Italy; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Several features on Mars have been interpreted as the product of gas releases from the subsurface. Most described features resemble mud volcanoes. Moreover, subsurface gas releases on the Earth are strictly linked to chemosynthetic biota. Additional information is contained in the original extended abstract.
Derived from text
Mars Surface; Volcanoes; Landforms; Models

20010044368 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
The Elysium/Utopia Flows: Characteristics from Topography and a Model of Emplacement
Russell, P. S., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A model of laterally-propagating dikes disrupting a groundwater-confining cryosphere in NW Elysium accounts for the major features and their topographic relationships. Additional information is contained in the original extended abstract.
Derived from text
Ground Water; Models; Disrupting; Planetary Cryospheres

20010044369 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Syria Planum, Mars: A Major Volcanic Construct in the Early History of Tharsis
Webb, Benjamin M., Brown Univ., USA; Head, James W., III, Brown Univ., USA; Kortz, Brian E., Brown Univ., USA; Pratt, Stephen, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Syria Planum is a major constructional edifice in excess of 2000 km diameter dominated by radial dike emplacement, flow aprons, and proximal small shield development, and represents a distinctive volcanic center of Noachian-Hesperian age. Additional information is contained in the original extended abstract.
Derived from text
Mars Surface; Volcanoes

20010044370 Hawaii Univ., Inst. of Geophysics and Planetology, Honolulu, HI USA
Martian Volcanoes Seen in Cross-Section in Mars Orbiter Camera Images
Mouginis-Mark, P. J., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mars Orbiter Camera (MOC) images are used to observe parts of martian volcanoes in cross-section. Several examples of lava flow units and possible ash layers are described. Additional information is contained in the original extended abstract.
Derived from text
Mars Volcanoes; Image Analysis; Lava

20010044371 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Terrestrial Analogs for Martian Volcanic Features Seen in MOC Images
Keszthelyi, L., Arizona Univ., USA; McEwen, A. S., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Comparison of MOC images to terrestrial analogs suggests that basaltic lavas dominate the plains of Mars, alkalic lavas cap the shield volcanoes, and reworked mafic pyroclastic materials produce many of the ”sedimentary” layered terrains. Additional information is contained in the original extended abstract.
Derived from Text
Basalt; Lava; Mars Surface; Mars Volcanoes

20010044372 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Extinct Radioactivities and the R-Process Jet
Cameron, A. G. W., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

All extinct radioactive species in the solar nebula were injected from a core-collapse supernova. I discuss primarily the products expected from an r-process jet in this supernova, and various supporting astrophysical observations. Additional information is contained in the original extended abstract.
Derived from text
Planetary Nebulae; Radioactivity; Solar Corona

20010044373 Arizona State Univ., Dept. of Physics and Astronomy, Tempe, AZ USA
Injection of Radioactivities into the Forming Solar System: High-Resolution Simulations
Vanhala, H. A. T., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

High-resolution simulations of the injection of short-lived radioactivities into the forming solar system suggests that the distribution of radionuclides in the early solar system could have been inhomogeneous. Additional information is contained in the original extended abstract.
Derived from text
Injection; Radioactive Isotopes; Simulation

20010044374 Carnegie Institution of Washington, Washington, DC USA
Gas Giant Protoplanet Formation: Disk Instability Models with Detailed Thermodynamics and Radiative Transfer
Boss, A. P., Carnegie Institution of Washington, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Disk instability models including radiative transfer in the diffusion approximation and detailed thermodynamics lead to the formation of clumps similar to those in locally isothermal models, supporting the hypothesis of gas giant protoplanet formation by this mechanism. Additional information is contained in the original extended abstract.
Derived from Text
Thermodynamics; Radiative Transfer; Protoplanets

20010044375 Nicolaus Copernicus Univ., Torun, Poland

Diversity of Planetary Systems from Evolution of Solids in Protoplanetary Disks

Kornet, K., Nicolaus Copernicus Univ., Poland; Stepinski, T. F., Lunar and Planetary Inst., USA; Rozyczka, M., Nicolaus Copernicus Univ., Poland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We investigate dependence of planetary system size and mass on initial conditions of forming nebula. We find that in most cases either no planetary system or large system forms. Solar system can be obtained from a restricted set of initial conditions. Additional information is contained in the original extended abstract.

Derived from text

Planetary Mass; Planetary Systems; Solids

20010044376 NASA Ames Research Center, Moffett Field, CA USA

Electrostatic Enhancement of Coagulation in Protoplanetary Nebulae

Marshall, J., Search for Extraterrestrial Intelligence Inst., USA; Cuzzi, J., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Microgravity experiments suggest that electrostatic forces (overwhelmed by normal Earth gravity) could greatly enhance cohesive strength of preplanetary aggregates. Cohesive forces may be 103 times larger than those for van der Waals adhesion. Additional information is contained in the original extended abstract.

Derived from text

Gravitational Effects; Electrostatics; Augmentation; Coagulation

20010044377 Maryland Univ., Dept. of Astronomy, College Park, MD USA

The Effect of the Internal Configuration of Rubble Piles on Collision Outcome

Leinhardt, Z. M., Maryland Univ., USA; Richardson, D. C., Maryland Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present results from numerical simulations of collisions between gravitationally bound aggregates of loose material (rubble piles) in order to investigate the effect of the internal configuration on collision outcome. Additional information is contained in the original extended abstract.

Derived from Text

Collisions; Simulation; Planetary Evolution

20010044378 Arizona Univ., Tucson, AZ USA

The Edge of the Solar System

Malhotra, R., Arizona Univ., USA; Allen, R. L., Michigan Univ., USA; Bernstein, G. M., Michigan Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Our medium-wide and -deep Kuiper Belt survey, deep enough to detect KBOs of diameter approx. greater than 160 km at a distance of 65 AU, detected 24 objects, none beyond 53 AU. We discuss the implications for the distant planetesimal disk. Additional information is contained in the original extended abstract.

Derived from Text

Solar System; Surveys

20010044379 Carnegie Institution of Washington, Dept. of Terrestrial Magnetism, Washington, DC USA

Formation of Jupiter: Core Accretion Model with Fragmentation

Inaba, S., Carnegie Institution of Washington, USA; Wetherill, G. W., Carnegie Institution of Washington, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We investigate formation of the Jovian core including fragmentation. The mass of the Jovian core becomes large enough to capture a large amount of gas and complete Jupiter in 2 m.y. There is still a problem of an excess of Jupiter cores. Additional information is contained in the original extended abstract.
Derived from Text
Cores; Jupiter (Planet); Formations

20010044380 Maryland Univ., Dept. of Astronomy, USA
Asteroid Formation with a Pre-Existing Jupiter
Kortenkamp, Stephen J., Maryland Univ., USA; Wetherill, George W., Carnegie Institution of Washington, USA; Inaba, Satoshi, Carnegie Institution of Washington, USA; Trilling, David E., Pennsylvania Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

If Jupiter formed quickly by the disk-instability mechanism, then growth of Ceres-size asteroids requires: (1) little or no migration of Jupiter before dissipation of the solar nebula, or (2) some asteroid growth prior to Jupiter"s formation. Additional information is contained in the original extended abstract.
Derived from Text
Asteroids; Growth

20010044381 Southwest Research Inst., Dept. of Space Studies, Boulder, CO USA
The Role of Giant Planets in Terrestrial Planet Formation
Levison, H. F., Southwest Research Inst., USA; Dones, L., Southwest Research Inst., USA; Agnor, C., Southwest Research Inst., USA; Canup, R., Southwest Research Inst., USA; Duncan, M. J., Queens Univ., Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present a progress report of a continuing study of the coupling between outer planetary system architecture and inner planetary system formation. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Evolution; Gas Giant Planets; Growth

20010044382 Planetary Science Inst., Tucson, AZ USA
Planetary Accretion: The First 5 Million Years
Weidenschilling, S. J., Planetary Science Inst., USA; Davis, D. R., Planetary Science Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A new simulation of accretion yields planet-sized bodies within a few MY inside 2 AU, aided by migration of planetary embryos. Growth is slower at larger distances; runaway does not go to completion in the asteroid region. Additional information is contained in the original extended abstract.
Derived from text
Asteroids; Growth; Computerized Simulation

20010044383 Southwest Research Inst., Boulder, CO USA
Outcomes of Planet-Scale Collisions
Canup, R. M., Southwest Research Inst., USA; Asphaug, E., California Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present results from a preliminary study of impacts between planet-scale objects. Using an SPH method, we investigate the dependence of the mass and angular momentum contained in ejected debris on the colliding mass, collisional angular momentum, and impact energy. Additional information is contained in the original extended abstract.
Derived from Text
Collisions; Planetary Mass; Impact

20010044384 Carnegie Institution of Washington, Dept. of Terrestrial Magnetism, Washington, DC USA

The Harold Masursky Lecture: An Earth in Moon's Clothing?, or Mercury as an Object Lesson on Approaches to Planetary Exploration

Solomon, Sean C., Carnegie Institution of Washington, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Two missions to orbit Mercury, MESSENGER and BepiColombo, will be launched this decade. We will explore both the reasons why Mercury exploration has languished for so long and the scientific objectives and expected data sets for the two missions. Additional information is contained in the original extended abstract.

Derived from Text

Mercury (Planet); Space Missions

20010044385 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

The Nebular Shock Wave Model for Chondrule Formation: Constraints Imposed by Chondrule Cooling Rates

Hood, L. L., Arizona Univ., USA; Ciesla, F. J., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We investigate physical conditions under which the nebular shock wave model for chondrule formation can yield chondrule cooling rates that are consistent with meteoritic constraints. The plausibility of these conditions is then examined. Additional information is contained in the original extended abstract.

Derived from Text

Shock Waves; Computerized Simulation; Nebulae; Chondrule; Growth

20010044386 Carnegie Institution of Washington, Washington, DC USA

Melting of Chondrules and Type B CAIs by Nebular Shocks

Desch, S. J., Carnegie Institution of Washington, USA; Connolly, H. C., Jr., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We examine the role of radiation in melting chondrules and type B CAIs in nebula shocks. We show that including radiation reduces the cooling rates of these objects to observed values. Additional information is contained in the original extended abstract.

Derived from Text

Chondrule; Melting; Radiation Effects

20010044387 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA

Polymineralic Inclusions in Chondrule Silicates from Carbonaceous Chondrites: Records of Heating and Cooling in the Early Solar System

Hua, Xin, Arizona State Univ., USA; Sharp, Thomas G., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The inclusions within chondrule silicate grains are important because they may provide evidence for chondrule formation processes or parallel processes that could constrain models of the environment and conditions of chondrule formation. Additional information is contained in the original extended abstract.

Derived from Text

Chondrule; Silicates; Meteoritic Composition

20010044388 NASA Johnson Space Center, Houston, TX USA

Evidence for Chondrules Formed by Partial Melting in CR2 Meteorites PCA91082 and EET92042

Lofgren, G. E., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

CR2 meteorites PCA91082 and EET92042 contain partially melted (PM) chondrules. PM textures suggest a restricted melting range of 5-60 % which may be a consequence of the high melting temperatures of the Type 1 chondrules in these meteorites. Additional information is contained in the original extended abstract.
Derived from Text
Chondrule; Melting; Meteorites

20010044389 New Mexico Univ., Dept. of Earth and Planetary Sciences, Albuquerque, NM USA
Trace Element Distribution in an Al-rich Chondrule from the Mokoia CV3 Chondrite
Jones, R. H., New Mexico Univ., USA; Shearer, C. K., New Mexico Univ., USA; Schilk, A. J., Idaho National Engineering and Environmental Lab., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NRA97-282; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have studied an Al-rich chondrule from Mokoia. SIMS analyses of plagioclase and pyroxene show that the bulk chondrule REE pattern was originally like group II CAIs. The chondrule must have had precursor material that was a condensation product. Additional information is contained in the original extended abstract.
Derived from text
Chondrites; Chondrule; Meteoritic Composition; Isotope Ratios

20010044390 Geological Survey, Reston, VA USA
Chondrules with Inhomogeneous Mesostasis in Highly Unequilibrated Ordinary Chondrites: Further Evidence for Secondary Processing of Chondrules
Grossman, Jeffrey N., Geological Survey, USA; Brearley, Adrian J., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A population of chondrules in unequilibrated ordinary chondrites (UOCs) contains inhomogeneous mesostasis, with K- and Na-rich areas. These chondrules probably crystallized albite and later experienced open-system aqueous alteration of residual glass to form phyllosilicates. Additional information is contained in the original extended abstract.
Derived from text
Chondrites; Chondrule; Meteoritic Composition

20010044391 California Inst. of Tech., Div. of Geological and Planetary Sciences, Pasadena, CA USA
Constraints on the Evolution of Chondrules Based on the Moderately Volatile Elements Sulfur, Sodium, and Potassium
Beckett, J. R., California Inst. of Tech., USA; Stolper, E. M., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We calculated vapor pressures of gaseous species over molten or partially molten Semarkona chondrules. Type IAs show evidence for partial equilibration with a coexisting gas, losing significant S and generally gaining Na but other chondrules didn't. Additional information is contained in the original extended abstract.
Derived from Text
Chondrule; Meteoritic Composition; Vapor Pressure

20010044392 Tokyo Univ., Dept. of Earth and Planetary Sciences, Hongo, Japan
Chemical and Isotopic Fractionation of K During Chondrule Formation in Ambient Gas
Nagahara, Hiroko, Tokyo Univ., Japan; Ozawa, Kazuhito, Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Chemical and isotopic fractionation of K through evaporation and condensation during chondrule formation was experimentally and theoretically investigated. Back reaction plays a key role for chemical fractionation with scarce isotopic fractionation. Additional information is contained in the original extended abstract.
Derived from Text
Chemical Fractionation; Chondrule; Evaporation

20010044393 Oxford Univ., Dept. of Earth Sciences, Oxford, UK

Magnesium Isotope Ratio Heterogeneity in Allende Chondrules Determined by UV Laser Ablation and Multicollector ICPMS

Young, E. D., Oxford Univ., UK; Ash, R. D., Oxford Univ., UK; Galy, A., Cambridge Univ., UK; Belshaw, N. S., Oxford Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A new UV laser/MC-ICPMS method for obtaining precise measurements of Mg-25/Mg-24 and Mg-26/Mg-24 in situ in geological materials shows that chondrules from the Allende meteorite exhibit mass-dependent variations in magnesium isotope ratios is greater than 1. Additional information is contained in the original extended abstract.

Derived from Text

Allende Meteorite; Chondrule; Isotope Ratios; Magnesium Isotopes

20010044394 Osaka Univ., Graduate School of Science, Toyonaka, Japan

Experimental Reproduction of Rims in Barred Olivine Chondrules by Evaporation

Osada, Y., Osaka Univ., Japan; Tsuchiyama, A., Osaka Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We succeeded in reproducing rims in barred olivine (BO) chondrules in a laboratory by evaporation during cooling in vacuum. This strongly suggests that BO chondrules were formed in an open system. Textures similar to the classic BO were also formed. Additional information is contained in the original extended abstract.

Derived from text

Chondrule; Cooling; Evaporation; Experimentation

20010044395 Smithsonian Institution, Center for Earth and Planetary Sciences, Washington, DC USA

Near-Nadir Radar Scattering from Venus

Campbell, Bruce A., Smithsonian Institution, USA; Shepard, Michael K., Bloomsburg Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format Contract(s)/Grant(s): NAG5-4545; NAG5-7964; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Analysis of Magellan altimeter data using a fractal-surface scattering model. Additional information is contained in the original extended abstract.

Derived from Text

Fractals; Radar Scattering; Venus Surface

20010044396 Cornell Univ., Dept. of Astronomy, Ithaca, NY USA

Surface Properties of Venus from Arecibo 12.6 cm Radar Observations

Carter, Lynn M., Cornell Univ., USA; Campbell, Donald B., Cornell Univ., USA; Margot, Jean-Luc, California Inst. of Tech., USA; Campbell, Bruce A., Smithsonian Institution, USA; Dorris, James R., III, Cornell Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We used the Arecibo radar system to create Stokes parameter and degree of linear polarization maps of Venus. Two prominent linearly polarized features are near impact craters with associated parabolic deposits. Maxwell Montes also shows some linear polarization. Additional information is contained in the original extended abstract.

Derived from text

Linear Polarization; Radar Tracking; Surface Properties; Venus Surface; Planetary Mapping

20010044397 Imperial Coll. of Science and Technology, TH Huxley School, London, UK

Venusian Impact Craters Triangulated by Magellan

Cochrane, C. G., Imperial Coll. of Science and Technology, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A third Synthetic Aperture Radar (SAR) image is our only validation for features on Venus is less than 12 km. Magellan imaged all of 36 craters three times, providing a data set that is representative of the crater population as a whole. Its quality is discussed, and an example of radar layover analyzed. Additional information is contained in the original extended abstract.
Derived from text
Craters; Venus Surface; Radar Imagery

20010044398 Academy of Sciences (USSR), Vernadsky Inst., Moscow, USSR
Rates of Volcanism and Rifting on Venus After Formation of Regional Plains
Basilevsky, Alexander T., Academy of Sciences (USSR), USSR; Head, James W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Analysis of the relation of post-regional plains impact craters to rifts and volcanic deposits shows that rates of rifting and volcanism did not change significantly during this time. Additional information is contained in the original extended abstract.
Derived from Text
Craters; Geological Faults; Venus Surface; Volcanoes; Volcanology

20010044399 Southern Methodist Univ., Dept. of Geological Sciences, Dallas, TX USA
Venus Diapirs: Thermal or Compositional?
Hansen, V. L., Southern Methodist Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Large plateaus/rises and small coronae reflect diapir size, buoyancy, and origin. Large plateau/rise forming thermals rise from the CMBL cooling the core. Small compositional diapirs spawned by broad mantle upwellings form coronae cooling the mantle Additional information is contained in the original extended abstract.
Derived from Text
Plateaus; Venus (Planet); Venus Surface; Planetary Geology

20010044400 Geological Survey of Canada, Ottawa, Ontario Canada
Geological Implications of Giant Radiating and Linear Graben Systems in Northern Guinevere Planitia/Beta Regio (264-312 E, 24-60 N), Venus
Ernst, R. E., Geological Survey of Canada, Canada; Head, J. W., Brown Univ., USA; Desnoyers, D. W., Geological Survey of Canada, Canada; Grosfils, E. B., Pomona Coll., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A detailed map of radiating and linear graben systems in a 4000 x 4000 km region of Venus is used to explore stratigraphic relationships with plains and fracture belt units and to estimate the global mantle plume abundance. Additional information is contained in the original extended abstract.
Derived from Text
Venus Surface; Venus (Planet); Stratigraphy; Planetary Geology; Geological Faults

20010044401 Keele Univ., School of Earth Sciences and Geography, UK
A 400 km Scale Strike-Slip Zone near the Boundary of Thetis Regio, Venus
Tuckwell, G. W., Keele Univ., UK; Ghail, R. C., Imperial Coll. of Science and Technology, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Detailed structural mapping and analysis has revealed a large-scale strike-slip zone near the boundary of Thetis Regio. The structure shows clear transtensional deformation within an extensional jog, revealing the kinematics of the deformation zone. Additional information is contained in the original extended abstract.
Derived from text
Deformation; Venus (Planet); Venus Surface; Planetary Geology; Geological Faults

20010044402 Southern Methodist Univ., Dept. of Geological Sciences, Dallas, TX USA
Regional Lineament Patterns in Rusalka Planitia
Young, D. A., Southern Methodist Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Rusalka Planitia, Venus bears a pervasive radial array of lineaments. This presentation will cover the nature, timing, and subsequent influence of this structural suite on the planitias evolution. Additional information is contained in the original extended abstract.
Derived from text
Structural Properties (Geology); Venus (Planet); Planetary Geology; Venus Surface

20010044403 University Coll., Dept. of Geological Sciences, London, UK
Small Scale Tectonism on Venus: An Experimental and Image-based Study
Balme, M. R., University Coll., UK; Sammonds, P. R., University Coll., UK; Vita-Finzi, C., University Coll., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present a new, qualitative methodology, based on fracture mechanics, used to investigate closely spaced parallel fractures on the volcanic plains of Venus. Additional information is contained in the original extended abstract.
Derived from Text
Fracture Mechanics; Fractures (Materials); Tectonics; Venus (Planet); Planetary Geology

20010044404 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Identification of Polygonal Patterns on Venus Using Mathematical Morphology
Moreels, P., Jet Propulsion Lab., California Inst. of Tech., USA; Smrekar, S. E., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We develop a detection and recognition model to fully automatize the identification of polygonal faults present in many of the Magellan SAR images. Our segmentation model is based on a modified watershed algorithm. Additional information is contained in the original extended abstract.
Derived from text
Algorithms; Venus (Planet); Venus Surface; Planetary Geology; Planetary Mapping

20010044405 Massachusetts Inst. of Tech., Dept. of Earth, Atmospheric and Planetary Sciences, Cambridge, MA USA
The Long-Term Stability of the Martian Polar Caps as Inferred by D/H Ratios and Laser Altimetry Data
Zuber, Maria T., Massachusetts Inst. of Tech., USA; Wieczorek, Mark A., Massachusetts Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We use martian D/H ratios to constrain the quantity of water that is present in the martian polar caps. by comparing this value with recently derived estimates from laser altimetry data, the evolutionary history of the polar caps can be inferred. Additional information is contained in the original extended abstract.
Derived from text
Mars (Planet); Mars Surface; Polar Caps; Stability; Water

20010044406 Geological Survey, Flagstaff, AZ USA
MOC Photoclinometry of the Polar Layered Deposits on Mars
Herkenhoff, K. E., Geological Survey, USA; Kirk, R. L., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mars Orbiter Camera (MOC) images of the south polar layered deposits show evidence for layering on the same scale as observed in the north polar layered deposits. The layers are approximately 10 m thick, and are expressed as terraces with moderate slope variations. Additional information is contained in the original extended abstract.
Derived from text
Mars Surface; Planetary Geology; Polar Caps; Terraces (Landforms); Stratigraphy; Topography

20010044407 Copenhagen Univ., Dept. of Geophysics, Denmark

Scarps, Troughs and Ice Flow in the North Polar Cap on Mars

Hvidberg, C. S., Copenhagen Univ., Denmark; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A coherence between observed surface topography of the north polar ice cap on Mars and flow of the cap is established based on an ice flow model and discussed in relation to accumulation/ablation, scarps, and age of surface layers. Additional information is contained in the original extended abstract.

Derived from Text

Mars Surface; Polar Caps; Surface Layers; Topography; Planetary Geology

20010044408 Brown Univ., Dept. of Geological Sciences, Providence, RI USA

An Investigation of Proposed Glacial Landforms in the Hellas Basin, Mars

Thomson, B. J., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mars Orbiter Laser Altimeter (MOLA) and Mars Orbiter Camera (MOC) data are used to examine proposed moraines, esker-like ridges, dissected terrain, and lacustrine deposits in the Hellas Basin and surrounding regions. Additional information is contained in the original extended abstract.

Derived from Text

Landforms; Mars Surface; Structural Basins; Planetary Geology; Planetary Mapping

20010044409 NASA Ames Research Center, Moffett Field, CA USA

Hellas as a Possible Site of Ancient Ice-covered Lakes

Moore, J. M., NASA Ames Research Center, USA; Wilhelms, D. E., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We propose that the interior of Hellas held ice-covered lakes early in Mars history. The best support comes from the correlation of landforms and deposits along the basin periphery at the Mars Orbiting Laser Altimeter (MOLA)-measured approximately -5.8 km contour. Additional information is contained in the original extended abstract.

Derived from text

Lakes; Landforms; Mars Surface; Planetary Geology; Mars (Planet)

20010044410 Geological Survey, Flagstaff, AZ USA

New Evidence for Ancient Glaciation and Modern Debris-covered Glaciers in Nonpolar Regions of Mars

Kargel, J. S., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mars Global Surveyor images from the Mars Orbiter Camera (MOC) and altimetry data from the Mars Orbiter Laser Altimeter (MOLA) provide new impetus to consider glaciation as an important process in the past and even currently in certain subpolar areas of Mars. Additional information is contained in the original extended abstract.

Derived from text

Debris; Glaciers; Mars Surface; Planetary Geology

20010044411 Cornell Univ., Dept. of Astronomy, Ithaca, NY USA

Composition and Mineralogy of the Martian North Polar Dune Deposits: Constraints from TES and HST Observations

NoeDobrea, E. Z., Cornell Univ., USA; Bell, J. F., III, Cornell Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-4333; STSCi-GO-08152; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Analysis of Mars Global Survey Thermal Emission Spectrometer (MGS TES) spectra of the martian North Polar dune deposits. Mineralogy constrained through the use of a linear mixing model to match minerals from the ASU mineral library to the spectra. Additional information is contained in the original extended abstract.
Derived from text
Deposits; Dunes; Mars (Planet); Mineralogy; Mars Surface; Planetary Geology; Polar Caps

20010044412 Colorado Univ., Cooperative Inst. for Research in Environmental Sciences, Boulder, CO USA
Linear Spectral Unmixing of Ice and Non-Ice Regions of the North Polar Cap
Nolin, A. W., Colorado Univ., USA; Farrand, W. H., Space Science Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Spectral mixture analysis of merged Mars Orbiter Camera (MOC) and Mars Orbiter Laser Altimeter (MOLA) data over the North Polar Cap indicate that multiple ice compositions are present on the North Polar Cap. Additional information is contained in the original extended abstract.
Derived from text
Mars Surface; Polar Caps; Spectral Mixture Analysis; Mars (Planet); Ice

20010044413 Paris-Sud Univ., Equipe de Planetologie, Orsay, France
Debris Flows on Mars: Analogy with Terrestrial Periglacial Environment and Climatic Implications
Costard, F., Paris-Sud Univ., France; Forget, F., Paris VI Univ., France; Mangold, N., Paris-Sud Univ., France; Mercier, D., Paris Univ., France; Peulvast, J. P., Paris-Sud Univ., France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The analogy between debris flows in Greenland (Jameson Land) and debris flows on Mars suggest that some of these landforms are only due to the presence of liquid water in the first meters of the martian subsurface. Such interpretation involves some recent climate changes. Additional information is contained in the original extended abstract.
Derived from Text
Analogies; Climatology; Landforms; Mars (Planet); Debris; Planetary Geology

20010044414 NASA Ames Research Center, Moffett Field, CA USA
Snow and Ice Melt Flow Features on Devon Island, Nunavut, Arctic Canada as Possible Analogs for Recent Slope Flow Features on Mars
Lee, Pascal, Search for Extraterrestrial Intelligence Inst., USA; Cockell, Charles S., British Antarctic Survey, UK; Marinova, Margarita M., Massachusetts Inst. of Tech., USA; McKay, Christopher P., Arizona Univ., USA; Rice, James W., Jr., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Based on morphologic and contextual analogs from Devon Island, Arctic Canada, the recent martian slope flow features reported by Malin and Edgett are reinterpreted as being due not necessarily to groundwater seepage but possibly to snow or ice melt. Additional information is contained in the original extended abstract.
Derived from text
Ice; Landforms; Mars Surface; Planetary Geology; Seepage

20010044415 Wheaton Coll., Norton, MA USA
The Formation of Arbela Sulcus and Other Smooth Linear Features on Ganymede: Possible Crustal Spreading and Shear
Collins, G. C., Wheaton Coll., USA; Head, J. W., III, Brown Univ., USA; Pappalardo, R. T., Brown Univ., USA; Nixon, B., Brown Univ., USA; Giese, B., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Wagner, R., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Galileo G28 images of Arbela Sulcus, a linear region of bright smooth terrain on Ganymede, suggest formation by crustal spreading and horizontal shear. Is this mode of formation typical for all such regions on Ganymede? Additional information is contained in the original extended abstract.
Derived from text
Ganymede; Spreading; Terrain; Crusts; Satellite Surfaces

20010044416 Imperial Coll. of Science and Technology, T. H. Huxley School, London, UK
Unravelling the Kinematics of Marius Regio, Ganymede
Ghail, Richard, Imperial Coll. of Science and Technology, UK; Thomas, Constantine, Lancaster Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mapping of northern Marius Regio, Ganymede (from the Galileo G8 image) reveals a long tectonic history of simple block rotations with transtensional and transpressional adjustments, that account for the range of observed structures and terrains. Additional information is contained in the original extended abstract.
Derived from Text
Ganymede; Tectonics; Terrain; Satellite Surfaces; Kinematics

20010044417 Hawaii Univ., Honolulu, HI USA
Comparing Carbon-Dioxide Distributions on Ganymede and Callisto
Hibbitts, C. A., Hawaii Univ., USA; Pappalardo, R., Brown Univ., USA; Klemaszewski, J., Arizona State Univ., USA; McCord, T. B., Hawaii Univ., USA; Hansen, G. B., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Carbon dioxide is found in the optical surfaces of Ganymede and Callisto. The CO2 is likely hosted in the non-ice materials and is endogenic. Low-energy particles in the magnetosphere alters the surface, increasing the CO2 on the trailing side of Callisto Additional information is contained in the original extended abstract..
Derived from Text
Callisto; Carbon Dioxide; Ganymede; Satellite Surfaces

20010044418 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Of Course Ganymede and Callisto Have Oceans: Application of a Principle of Maximum Entropy Production to Icy Satellite Convection
Lorenz, R. D., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Internal oceans on Ganymede, Callisto, and Titan are predicted by the principle that convective heat flows self-organize to maximize their production of entropy. This idea also works for the Earth's interior and the climates of Mars, Titan, and Earth. Additional information is contained in the original extended abstract.
Derived from Text
Convective Heat Transfer; Entropy; Oceans; Icy Satellites; Maximum Entropy Method

20010044419 NASA Ames Research Center, Moffett Field, CA USA
Circumjovian Disk Clearing After Gap-Opening and the Formation of a Partially Differentiated Callisto
Mosqueira, I., NASA Ames Research Center, USA; Estrada, P. R., Cornell Univ., USA; Cuzzi, J., NASA Ames Research Center, USA; Squyres, S. W., Cornell Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; Sponsored in part by the PGG program; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We look into the possibility that Callisto's accretional history straddled the time during which Jupiter opened a gap in the solar nebula and occurred over an extended period from a very extended very low density disk. Additional information is contained in the original extended abstract.
Derived from Text
Accretion Disks; Evolution (Development); Callisto

20010044420 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Galilean Satellite Surface Non-Ice Constituents: New Results from the Cassini/Huygens VIMS Jupiter Flyby in the Context of the Galileo NIMS Results

McCord, T. B., Hawaii Univ., USA; Brown, R., Arizona Univ., USA; Baines, K., Jet Propulsion Lab., California Inst. of Tech., USA; Bellucci, G., Consiglio Nazionale delle Ricerche, Italy; Bibring, J.-P., Institut d'Astrophysique, France; Buratti, B., Jet Propulsion Lab., California Inst. of Tech., USA; Capaccioni, F., Consiglio Nazionale delle Ricerche, Italy; Cerroni, P., Consiglio Nazionale delle Ricerche, Italy; Clark, R., Geological Survey, USA; Coradini, A., Consiglio Nazionale delle Ricerche, Italy; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Cassini mission Visible and Infrared Mapping Spectrometer (VIMS) is currently returning data for the Galilean satellites. Examples of the new satellite data and the initial interpretations will be presented in the context of the Galileo NIMS data and results. Additional information is contained in the original extended abstract.

Derived from text

Galilean Satellites; Infrared Imagery; Mapping; Satellite Surfaces

20010044421 Lafayette Coll., Dept. of Physics, Easton, PA USA

Stable and Metastable High Pressure Phases of the Sulfuric Acid-Magnesium Sulfate-Water System: Applications to Europa

Hogenboom, D. L., Lafayette Coll., USA; Kargel, J. S., Geological Survey, USA; Daly, M. E., Lafayette Coll., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Experimental study of the pressure dependence of eutectic melting and metastable transitions in the H2SO4-H2O system and H2SO4-MgSO4-H2O system. Eutectic shifts toward water-rich compositions with increased P to 200 MPa much like MgSO4-H2O system. Additional information is contained in the original extended abstract.

Derived from Text

Europa; Eutectics; High Pressure; Melting; Metastable State; Pressure Dependence

20010044422 Northwestern Univ., Dept. of Materials Science and Engineering, Evanston, IL USA

Pressure-induced Transformation Plasticity of Water Ice

Dunand, D. C., Northwestern Univ., USA; Schuh, C., Northwestern Univ., USA; Goldsby, D. L., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Transformation plasticity (TP) is a low-viscosity deformation mechanism which occurs during phase transformation of a low-stressed material. Pressure-induced TP may be important for the dynamics of icy satellites and the earth's interior. Additional information is contained in the original extended abstract.

Derived from Text

Plastic Properties; Phase Transformations

20010044423 Nantes Univ., Lab. de Planetologie et Geodynamique, France

The Pressure Dependence of the Eutectic Composition in the System MgSO4-H2O: Implications for the Deep Liquid Layer of Icy Satellites

Grasset, O., Nantes Univ., France; Mevel, L., Nantes Univ., France; Mousis, O., Nantes Univ., France; Sotin, C., Nantes Univ., France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Experiments on the MgSO4-H2O system in the range [0 - 1 GPa] - [100 - 300 K] are conducted. Results on the stability of sulfate hydrates will be presented. Implications for the endogenic processes occurring within icy satellites will be discussed. Additional information is contained in the original extended abstract.

Derived from Text

Eutectics; Pressure Dependence; Stability; Icy Satellites

20010044424 NASA Johnson Space Center, Houston, TX USA

Mineralogy of Tagish Lake, a Unique Type 2 Carbonaceous Chondrite

Gounelle, M., Museum of Natural History, UK; Zolensky, M. E., NASA Johnson Space Center, USA; Tonui, E., NASA Johnson Space Center, USA; Mikouchi, T., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have identified in Tagish Lake an abondant carbonate-poor lithology and a less common carbonate-rich lithology. Tagish Lake shows similarities and differences with CMs and CI1s. It is a unique carbonaceous chondrite recording specific aqueous alteration conditions. Additional information is contained in the original extended abstract.

Derived from Text

Carbonaceous Chondrites; Lakes; Lithology; Mineralogy

20010044425 NASA Johnson Space Center, Houston, TX USA

Matrix Mineralogy of the Tagish Lake Carbonaceous Chondrite: TEM and FTIR Studies

Keller, L. P., NASA Johnson Space Center, USA; Flynn, G. J., State Univ. of New York, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Transmission electron microscope (TEM) and Fourier-transform infrared (FTIR) spectroscopy studies of Tagish Lake matrix show that it is similar to CI chondrites, but dissimilar to CM. Additional information is contained in the original extended abstract.

Derived from text

Lakes; Mineralogy; Carbonaceous Chondrites

20010044426 Chicago Univ., Dept. of the Geophysical Sciences, Chicago, IL USA

Petrography and Mineral Chemistry of the Chondrule, Inclusion and Olivine Populations in the Tagish Lake Carbonaceous Chondrite

Simon, S. B., Chicago Univ., USA; Grossman, L., Chicago Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We subjected a small amount of Tagish Lake to freeze-thaw disaggregation to isolate the dense, high-temperature, fraction. Study of this population of objects is an important step in the comparison of Tagish Lake with other carbonaceous chondrites. Additional information is contained in the original extended abstract.

Derived from Text

Carbonaceous Chondrites; Meteoritic Composition; Petrography; Mineralogy

20010044427 NASA Johnson Space Center, Houston, TX USA

Noble Gas Isotopic Signatures and X-Ray and Electron Diffraction Characteristics of Tagish Lake Carbonaceous Chondrite

Nakamura, T., Kyushu Univ., Japan; Noguchi, T., Ibaraki Univ., Japan; Zolensky, M. E., NASA Johnson Space Center, USA; Takaoka, N., Kyushu Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Noble gas isotopic signatures and X-ray and electron diffraction characteristics of Tagish Lake indicate that it is a unique carbonaceous chondrite rich in saponite, Fe-Mg-Ca carbonate, primordial noble gases, and presolar grains. Additional information is contained in the original extended abstract.

Derived from Text

Carbonaceous Chondrites; Rare Gases; Mineralogy; Chemical Composition; Isotopic Labeling

20010044428 Washington Univ., Physics Dept., Saint Louis, MO USA

Hydrogen Isotopic Measurements of the Tagish Lake Meteorite

Messenger, S., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In an ion microprobe study of Tagish Lake matrix material we find commonly elevated D/H ratios, reaching 700 above SMOW. These values are higher than typical CI and CM chondrites, but lower than CR and LL3 chondrites and IDPs. Additional information is contained in the original extended abstract.
Derived from text
Carbonaceous Chondrites; Chemical Composition; Matrix Materials

20010044429 Museum of Natural History, London, UK
Continued Investigation of the Light Element Geochemistry of Tagish Lake
Grady, Monica M., Museum of Natural History, UK; Franchi, I. A., Open Univ., UK; Verchovsky, A. B., Open Univ., UK; Wright, I. P., Open Univ., UK; Pillinger, C. T., Open Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have determined the abundance and isotopic composition of two separate carbonate generations within Tagish Lake. Nitrogen isotope analysis of the chondrite shows it to be organic-rich, with N-15 values higher than in CI and CM chondrites. Additional information is contained in the original extended abstract.
Derived from text
Geochemistry; Carbonaceous Chondrites; Chemical Composition; Isotope Ratios

20010044430 Arizona State Univ., Dept. of Chemistry and Biochemistry, Tempe, AZ USA
Soluble Organics in the Tagish Lake Meteorite: A Preliminary Assessment
Pizzarello, Sandra, Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A preliminary study of the soluble organics present in the Tagish Lake meteorite has been conducted. Water and solvent soluble compounds were identified. Additional information is contained in the original extended abstract.
Derived from Text
Meteorites; Water; Chemical Composition; Organic Materials

20010044431 Open Univ., Planetary and Space Sciences Research Inst., Milton Keynes, UK
Analysis of Tagish Lake Macromolecular Organic Material
Gilmour, I., Open Univ., UK; Pearson, V. K., Open Univ., UK; Sephton, M. A., Open Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Macromolecular material is, by far, the major organic component of meteorites. Flash pyrolysis GCMS has been used to investigate this organic component in Tagish Lake. It is more condensed, less substituted than Murchson. Additional information is contained in the original extended abstract.
Derived from text
Carbonaceous Chondrites; Organic Materials; Chemical Composition

20010044432 Open Univ., Planetary and Space Sciences Research Inst., Milton Keynes, UK
Insight into the Evolution of the Tagish Lake Carbonaceous Chondrite by Analysis of the Oxygen Isotopic Composition of Extracted Water and Moessbauer Spectroscopy
Baker, L., Open Univ., UK; Franchi, I. A., Open Univ., UK; Bland, P. A., Open Univ., UK; Wright, I. P., Open Univ., UK; Pillinger, C. T., Open Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Analysis of oxygen isotopes in water from Tagish Lake together with Moessbauer spectroscopy suggest some similarities to the CI group of meteorites but also suggest differences in the extent of parent body hydrothermal alteration. Additional information is contained in the original extended abstract.
Derived from text
Carbonaceous Chondrites; Oxygen Isotopes; Chemical Composition

20010044433 Chicago Univ., Enrico Fermi Inst., Chicago, IL USA

Oxygen Isotopic Composition of the Tagish Lake Carbonaceous Chondrite

Clayton, R. N., Chicago Univ., USA; Mayeda, T. K., Chicago Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We use oxygen isotopes to show the relationship of the Tagish Lake chondrite to the CM2 and CI1 groups. Tagish Lake underwent hydration at low temperature in a water-rich environment. Additional information is contained in the original extended abstract.

Derived from text

Carbonaceous Chondrites; Oxygen Isotopes; Chemical Composition; Isotope Ratios

20010044434 NASA Johnson Space Center, Houston, TX USA

In-Situ Oxygen Isotopic Composition of Individual Minerals in Tagish Lake, a Unique Type 2 Carbonaceous Meteorite

Engrand, C., Centre National de la Recherche Scientifique, France; Gounelle, M., Museum of Natural History, UK; Duprat, J., Centre National de la Recherche Scientifique, France; Zolensky, M. E., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-3871; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We measured the oxygen isotopic composition of individual minerals in Tagish Lake. The relationship with carbonaceous chondrites is confirmed. We found very O-16 enriched olivines. The carbonates will require a dedicated study of their C and O isotopes. Additional information is contained in the original extended abstract.

Derived from text

Carbonaceous Chondrites; Carbonaceous Meteorites; Isotopes; Chemical Composition; Mineralogy

20010044435 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA

Oxygen Isotopic Anatomy of Tagish Lake: Relationship to Primary and Secondary Minerals in CI and CM Chondrites

Leshin, L. A., Arizona State Univ., USA; Farquhar, J., California Univ., San Diego, USA; Guan, Y., Arizona State Univ., USA; Pizzarello, S., Arizona State Univ., USA; Jackson, T. L., California Univ., San Diego, USA; Thiemens, M. H., California Univ., San Diego, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Ion probe analyses of olivine from Tagish Lake are similar to other C chondrites, but slightly more O-16 rich. Stepped extraction of carbonate shows O-17 values higher than CI or CM chondrites. Tagish Lake may be a new, unique C2 chondrite. Additional information is contained in the original extended abstract.

Derived from Text

Carbonaceous Chondrites; Olivine; Oxygen Isotopes

20010044436 NASA Johnson Space Center, Houston, TX USA

Calibration of Cosmic Ray-produced Nuclides in Meteorites by Normalization to 40K - Application to the Tagish Lake Meteorite

Lindstrom, D. J., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Preliminary results for cosmic ray-induced nuclides in the Tagish Lake meteorite are obtained by estimating detection efficiency from 40K count rates and using published K content. Additional information is contained in the original extended abstract.

Derived from Text

Nuclides; Meteorites; Aluminum 26; Experimentation

20010044437 Los Alamos National Lab., NM USA

Preliminary Results from the Lunar Prospector Alpha Particle Spectrometer

Lawson, S. L., Los Alamos National Lab., USA; Feldman, W. C., Los Alamos National Lab., USA; Moore, K. R., Los Alamos National Lab., USA; Lawrence, D. J., Los Alamos National Lab., USA; Maurice, S., Observatoire Midi-Pyrenees, France; Belian, R. D., Los Alamos National Lab., USA; Binder, A. B., Lunar Research Inst., USA; Lunar and Planetary Science XXXII; 2001;

In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Data measured using the Lunar Prospector Alpha Particle Spectrometer were surveyed to search for surface deposits of polonium-210. Preliminary results show that a marginal, yet statistically-significant, signal was indeed detected on the lunar front side. Additional information is contained in the original extended abstract.

Derived from Text

Polonium 210; Lunar Surface; Detection

20010044438 Notre Dame Univ., Dept. of Civil Engineering and Geological Science, IN USA

The Siderophile Element Budget of the Moon: A Reevaluation, Part 1

Neal, C. R., Notre Dame Univ., USA; Ely, J. C., Notre Dame Univ., USA; Jain, J. C., Notre Dame Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New platinum-group element (PGE: Ru, Rh, Pd, Os, Ir, Pt) data demonstrate that the Moon is not as depleted in these elements as once thought. Additional information is contained in the original extended abstract.

Derived from Text

Moon; Lunar Composition; Platinum; Chemical Composition

20010044439 Hawaii Univ., Inst. of Geophysics and Planetology, Honolulu, HI USA

Lunar Anorthosite: A Global Layer

Peterson, C. A., Hawaii Univ., USA; Hawke, B. R., Hawaii Univ., USA; Lucey, P. G., Hawaii Univ., USA; Taylor, G. J., Hawaii Univ., USA; Blewett, D. T., Hawaii Univ., USA; Spudis, P. D., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Lunar anorthosite has been identified from ground-based near infrared reflection spectroscopy and spacecraft multispectral imagery. A global layer of anorthosite remains largely intact but mostly buried. South Pole-Aitken basin ejecta covers much of it. Additional information is contained in the original extended abstract.

Derived from Text

Anorthosite; Lunar Crust; Spectroscopy

20010044440 Lamont-Doherty Geological Observatory, Palisades, NY USA

Anorthosites and the Lunar Magma Ocean: New Calculations and Constraints

Longhi, John, Lamont-Doherty Geological Observatory, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New calculations show that a magma ocean similar to the Earth's upper mantle (PUM) produces sufficient differentiated liquids that are suitable potential parents of lunar ferroan anorthosites (LFA) when initial bottom pressures are in the range of 30 to 40 kb. Additional information is contained in the original extended abstract.

Derived from Text

Anorthosite; Magma; Lunar Surface; Crystallization

20010044441 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA

The Curious Case of the Lunar Magnesian Granulitic Breccias

Korotev, R. L., Washington Univ., USA; Jolliff, B. L., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Magnesian granulitic breccias have high Th/Sm ratios, they are not related to Mg-suite plutonic rocks in any straightforward manner, and they may have an igneous rock precursor that is not yet recognized among our samples of the Moon. Additional information is contained in the original extended abstract.

Derived from Text

Lunar Rocks; Breccia; Chemical Composition; Granular Materials

20010044442 NASA Johnson Space Center, Houston, TX USA

Chemical Variation of Silicate Mineral Phases in Lunar Feldspathic Granulitic Impactites: Implications for Thermal Histories and Provenances

Fincke, E. M., NASA Johnson Space Center, USA; Ryder, G., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report on the internal variation and abundances of minor elements of silicate phases in lunar granulitic impactites to assess their thermal histories and the pre-metamorphic provenances of the minerals and the process that assembled the rocks. Additional information is contained in the original extended abstract.

Derived from Text

Metamorphism (Geology); Mineralogy; Minerals; Lunar Rocks; Granular Materials

20010044443 New Mexico Univ., Dept. of Earth and Planetary Sciences, Albuquerque, NM USA

Chemical Dichotomy of the Mg-Suite. Insights from a Comparison of Trace Elements in Silicates from a Variety of Lunar Basalts

Shearer, C. K., New Mexico Univ., USA; Papike, J. J., New Mexico Univ., USA; Hagerty, J., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Trace element analyses of silicates in the Mg-suite and other lunar igneous rocks are used to evaluate models for the origin of the Mg-suite. Additional information is contained in the original extended abstract.

Derived from Text

Basalt; Lunar Rocks; Silicates; Magnesium

20010044444 Massachusetts Inst. of Tech., Dept. of Earth, Atmospheric and Planetary Sciences, Cambridge, MA USA

Lunar Mantle Composition and Thermal History: Constraints from Phase Equilibrium Studies

ElkinsTanton, L. T., Massachusetts Inst. of Tech., USA; Grove, T. L., Massachusetts Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Results of experimental phase equilibrium and compositional modeling studies are presented for the Apollo 15 green glasses. When combined with other phase equilibrium results, they help constrain lunar mantle composition and temperature between 3.3 and 3.5 Ga. Additional information is contained in the original extended abstract.

Derived from Text

Lunar Mantle; Chemical Composition; Glass

20010044445 NASA Ames Research Center, Moffett Field, CA USA

Temperature Dependence of Cryogenic Ammonia-Water Ice Mixtures and Implications for Icy Satellite Surfaces

Dalton, J. B., III, NASA Ames Research Center, USA; Curchin, J. M., Geological Survey, USA; Clark, R. N., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Infrared spectra of ammonia-water ice mixtures reveal temperature-dependent absorption bands due to ammonia. These features, at 1.04, 2.0, and 2.25 microns, may shed light on the surface compositions of the Galilean and Saturnian satellites. Additional information is contained in the original extended abstract.

Derived from text

Temperature Dependence; Infrared Spectra; Satellite Surfaces; Absorption Spectra

20010044446 Tokyo Univ., Dept. of Earth and Planetary Sciences, Japan

Condensation Kinetics of Forsterite

Inaba, H., Tokyo Univ., Japan; Tachibana, S., Tokyo Univ., Japan; Nagahara, H., Tokyo Univ., Japan; Ozawa, K., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Evaporation experiments of forsterite in the presence of own gas have been carried out with the Knudsen technique. The condensation coefficient is obtained, and the results are applied to evaluate the growth of forsterite grain in the solar nebula. Additional information is contained in the original extended abstract.
Derived from text
Kinetics; Forsterite; Condensing

20010044447 Harvard-Smithsonian Center for Astrophysics, Cambridge, MA USA
A Thermodynamic and Kinetic Model of Metal Condensation: Implications for the Evolution of the Nebular Source Regions of Chondrites
Petaev, Michail I., Harvard-Smithsonian Center for Astrophysics, USA; Wood, John A., Harvard-Smithsonian Center for Astrophysics, USA; Meibom, Anders, Stanford Univ., USA; Krot, A. N., Hawaii Univ., USA; Keil, Klaus, Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Modeling growth and simultaneous diffusional equilibration of the zoned metal grains in CH chondrites reveals that the condensation zoning profiles were substantially modified by diffusion while the grains were growing in the nebula. Additional information is contained in the original extended abstract.
Derived from text
Chondrites; Diffusion; Thermodynamics; Kinetics; Condensing

20010044448 Rutgers - The State Univ., Dept. of Geological Sciences, Piscataway, NJ USA
Growth of Zoned Fe-Ni Metal Grains by Condensation: The Cooling Rate Constraint Inferred from Experimental Studies Under Nebular Conditions
Xiong, Y. -L., Rutgers - The State Univ., USA; Hewins, R. H., Rutgers - The State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Using a typical radius of approximately 100 microns for zoned Fe-Ni metal grains in QUE94411 and PAT91546 as a constraint, we model the growth of zoned Fe-Ni metal grains by condensation as a function of cooling rate. The preferred cooling rate is approximately 0.04 K/hr. Additional information is contained in the original extended abstract.
Derived from Text
Granular Materials; Cooling; Chondrites

20010044449 Tokyo Univ., Dept. of Earth and Planetary Sciences, Japan
Condensation Kinetics of Metallic Iron and Its Application to Condensation of Metal in the Solar Nebula
Tachibana, S., Tokyo Univ., Japan; Nagahara, H., Tokyo Univ., Japan; Ozawa, K., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Condensation kinetics of metallic iron has been investigated based on evaporation experiments under controlled ambient vapor pressure conditions to discuss the condensation behavior of metal grains in the solar nebula. Additional information is contained in the original extended abstract.
Derived from text
Ambience; Evaporation; Kinetics; Condensing

20010044450 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA
An Experimental Investigation of Fe-Si Alloy Corrosion in the Solar Nebula
Zega, Thomas J., Arizona State Univ., USA; Lauretta, Dante S., Arizona State Univ., USA; Buseck, Peter R., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAGR-4308; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have performed an experimental study of Fe-Si alloy corrosion under dust-rich nebular conditions. The reaction products are silica and fayalite. Additional information is contained in the original extended abstract.
Derived from text
Corrosion; Reaction Products; Fayalite

20010044451 Chicago Univ., Dept. of the Geophysical Sciences, Chicago, IL USA

Siderophile Element Concentrations in Bencubbinite Metals

Campbell, A. J., Chicago Univ., USA; Humayun, M., Chicago Univ., USA; Weisberg, M. K., City Univ. of New York, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Trace siderophile element measurements are presented for metal grains in Bencubbin, Gujba, Weatherford, and Hammadah al Hamra 237. Proposed formation mechanisms for this metal are evaluated. Additional information is contained in the original extended abstract.

Derived from Text

Meteoritic Composition; Trace Elements; Chondrites

20010044452 California Univ., Inst. of Geophysics and Planetary Physics, Los Angeles, CA USA

Compositional Studies of Bencubbin Dark Silicate Host and an OC Clast: Relationships to Other Meteorites and Implications for Their Origin

Kallemeyn, G. W., California Univ., USA; Rubin, A. E., California Univ., USA; Wasson, J. T., California Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New compositional analyses of Bencubbin and Gujba host materials and an ordinary chondrite (OC) clast from Bencubbin are presented. Their relationship to other meteorites and their origin by condensation processes in the solar nebular or an impact plume are discussed. Additional information is contained in the original extended abstract.

Derived from text

Chondrites; Meteoritic Composition

20010044453 Arizona State Univ., Dept. of Chemistry and Biochemistry, Tempe, AZ USA

Troilite-Silicate-Metal Inclusions and Rims in the Bishunpur LL3.1 Chondrite: Products of Impact-induced Sulfur Mobilization on a Primitive Asteroid

Kojima, T., Arizona State Univ., USA; Lauretta, D. S., Arizona State Univ., USA; Buseck, P. R., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Dark-colored inclusions and chondrule rims in Bishunpur consist of silicate and minor metal fragments individually surrounded by troilite. The texture and mineralogy suggest that they formed by mobilization of troilite during an impact event. Additional information is contained in the original extended abstract.

Derived from Text

Chondrites; Chondrule; Meteoritic Composition; Troilite; Mineralogy

20010044454 Massachusetts Univ., Dept. of Geosciences, Amherst, MA USA

Olivine Zoning and Retrograde Olivine-Orthopyroxene-Metal Equilibration in Types 5 and 6 Ordinary Chondrites

Reisener, R. J., Massachusetts Univ., USA; Petaev, M., Harvard-Smithsonian Center for Astrophysics, USA; Goldstein, J. I., Massachusetts Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We observed systematic olivine Fa zoning near olivine-metal interfaces in types 5 and 6 ordinary chondrites. A thermodynamic study suggests that the olivine zoning formed by localized silicate-metal reactions during metamorphic cooling. Additional information is contained in the original extended abstract.

Derived from Text

Chondrites; Olivine; Thermodynamics; Zone Melting

20010044455 Chicago Univ., Chicago, IL USA

The Duration of Ordinary Chondrite Metamorphism Inferred from Tungsten Microdistribution in OC Metal

Humayun, M., Chicago Univ., USA; Campbell, A. J., Chicago Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This presentation describes W and Re behavior during ordinary chondrite metamorphism with implications for the duration of parent body metamorphism derived from Hf-W chronology. Additional information is contained in the original extended abstract.
Derived from text
Chondrites; Metamorphism (Geology); Tungsten

20010044456 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Impact-darkening Via High Strain-Rate Deformation During Impact: Spectral and Chemical Analyses
vanderBogert, C. H., Brown Univ., USA; Schultz, P. H., New Brunswick Univ., Canada; Spray, J. G., New Brunswick Univ., Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The behavior of FeNi and FeS as darkening agents in the experimental friction-melts differs between L and H compositions, a difference which also appears in some black ordinary chondrite spectra. Additional information is contained in the original extended abstract.
Derived from Text
Darkening; Spectrum Analysis; Chemical Analysis; Chondrites

20010044457 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA
Shock-induced Melt Veins in Chondrites: Crystallization History vs. Shock History
Sharp, T. G., Arizona State Univ., USA; Xie, Z., Arizona State Univ., USA; Tomioka, N., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have examined 11 melt-vein-bearing L chondrites that range from shock stage S3 to S6 to determine how melt-vein texture and mineralogy correlate with the shock stage. Textural and mineralogical evidence indicates crystallization during adiabatic decompression. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Crystallization; Melts (Crystal Growth); Mineralogy

20010044458 Case Western Reserve Univ., Dept. of Geology, Cleveland, OH USA
Possible Meteorite Stranding Surfaces on the Greenland Ice Sheet
Harvey, R. P., Case Western Reserve Univ., USA; Meibom, A., Stanford Univ., USA; Haack, H., Copenhagen Univ., Denmark; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Using lessons learned in Antarctica, we have critically examined regions of the Greenland icecap in an effort to locate potential meteorite surfaces. Several sites in Northeast Greenland are excellent prospects. Additional information is contained in the original extended abstract.
Derived from Text
Meteorites; Landing Sites; Site Selection

20010044459 California Inst. of Tech., Lindhurst Lab. of Experimental Geophysics, Pasadena, CA USA
Chicxulub Ejecta Dynamics
OKeefe, John D., California Inst. of Tech., USA; Stewart, Sarah T., California Inst. of Tech., USA; Ahrens, Thomas J., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-8915; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We modeled in detail the ejecta dynamics associated with the Chicxulub impact. We determined: (1) ejecta trajectories, (2) stratigraphic motions, (3) depth of ejecta stages, (4) thermodynamic histories of the ejecta particles, and (5) the final ejecta distribution. Additional information is contained in the original extended abstract.
Derived from text
Thermodynamics; Ejecta; Stratigraphy; Meteorite Craters

20010044460 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

The Distribution of Wildfires Ignited by High-Energy Ejecta from the Chicxulub Impact Event

Kring, D. A., Arizona Univ., USA; Durda, D. D., Southwest Research Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The distribution of high-energy ejecta from the Chicxulub impact event was heterogeneous and, thus, so was atmospheric heating. Wildfires likely occurred in North America, South America, Africa, and Asia, but fires elsewhere depend on the trajectory of the projectile. Additional information is contained in the original extended abstract.

Derived from Text

Fires; Meteoritic Damage; Spatial Distribution; Atmospheric Heating; Ejecta

20010044461 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Climate Forcing from the Stratospheric Injection of Impact-produced Sulfur

Pierazzo, E., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This work assesses the climate forcing associated with the stratospheric production of sulfate aerosols from the reaction of various loads of S-bearing gases and water vapor released during the Chicxulub impact event, 65 Myr ago. Additional information is contained in the original extended abstract.

Derived from Text

Aerosols; Sulfates; Meteoritic Damage; Climate Change

20010044462 Brown Univ., Dept. of Geological Sciences, Providence, RI USA

Measurement of Oblique Impact-generated Shear Waves

Dahl, J. M., Brown Univ., USA; Schultz, P. H., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-3877; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Experimental strain measurements reveal that oblique impacts can generate shear waves with displacements as large as those in the P-wave. Large oblique impacts may thus be more efficient sources of surface disruption than vertical impacts. Additional information is contained in the original extended abstract.

Derived from Text

Displacement; S Waves; Strain Measurement; Seismology

20010044463 Academy of Sciences (USSR), Inst. for Dynamics of Geospheres, Moscow, USSR

Tektite Production in Oblique Impacts

Artemieva, N. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; Sponsored in part by the ESF-IMPACT travel grant.; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Results of 3D numerical modeling of oblique impacts and melt ejection show that high velocity (35-40 km/s) impacts into a dry target at impact angles of 30 to 50 degrees seems to be the best candidates for tektite-productive events. Additional information is contained in the original extended abstract.

Derived from Text

Tektites; Three Dimensional Models; Meteorite Craters

20010044464 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Chemical Reduction of Impact Processed Materials

Wasserman, A. A., Arizona Univ., USA; Melosh, H. J., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Impact melts and other products of rapid heating and cooling of silicates often contain very reduced species. This work models a simple system, silica liquid condensing from a vapor, to investigate oxygen depletion in more complicated systems. Additional information is contained in the original extended abstract.

Derived from Text

Reduction (Chemistry); Meteorite Craters; Computerized Simulation

20010044465 Delaware Univ., Dept. of Geology, Newark, DE USA

SR and Nd Data for Upper Eocene Spherule Layers

Liu, Shaobin, Delaware Univ., USA; Glass, B. P., Delaware Univ., USA; Ngo, H. H., California Inst. of Tech., USA; Papanastassiou, D. A., California Inst. of Tech., USA; Wasserburg, G. J., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-8251; NSF EAR-99-03811; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

SR and Nd data for clinopyroxene-bearing (cpx) spherules from three sites support conclusions that there is only one cpx spherule layer and that the source crater may be Popigai. Additional information is contained in the original extended abstract.

Derived from text

Pyroxenes; Spherules; Strontium; Neodymium

20010044466 Wien Univ., Inst. of Geochemistry, Austria

Geochemistry of Surficial Sediments near the Chesapeake Bay Impact Structure and the Search for Source Rocks of the North American Tektites

Koeberl, Christian, Wien Univ., Austria; Kruger, F. Johan, Witwatersrand Univ., South Africa; Poag, C. W., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): FWF Proj. Y58-GEO; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The chemical and isotopic composition of Paleocene to mid Eocene sediments from the Chesapeake Bay crater area was found to differ from that of average North American tektites. Additional information is contained in the original extended abstract.

Derived from Text

Geochemistry; Isotopes; Sediments; Tektites

20010044467 New Brunswick Univ., Geology Dept., Fredericton, New Brunswick Canada

Highly Shocked Low Density Sedimentary Rocks from the Haughton Impact Structure, Devon Island, Nunavut, Canada

Osinski, G. R., New Brunswick Univ., Canada; Spray, J. G., New Brunswick Univ., Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; Sponsored in part by the Nunavut Research Institute (NRI), and the Polar Continental Shelf Project (PCSP); No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present the preliminary results of a detailed investigation of the shock effects in highly shocked, low density sedimentary rocks from the Haughton impact structure. We suggest that some textural features can be explained by carbonate-silicate immiscibility. Additional information is contained in the original extended abstract.

Derived from Text

Sedimentary Rocks; Textures; Carbonates; Shock Layers

20010044468 Geological Survey of Czech Republic, Prague, Czech Republic

Stable Isotope Study of Carbonates from the Ries Meteorite Crater - Evidence for Impact-induced Carbonate Decomposition

Skala, R., Geological Survey of Czech Republic, Czech Republic; Zak, K., Geological Survey of Czech Republic, Czech Republic; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Stable isotope composition of carbonates from suevite of the Ries crater differs from that of pre-impact target materials. Samples of low O-18 could probably represent carbonates formed by back-reaction of evolved CO2 with residual CaO. Additional information is contained in the original extended abstract.

Derived from Text

Carbonates; Oxygen 18; Decomposition; Isotope Ratios; Meteorite Craters

20010044469 Oberlin Coll., Geology Dept., OH USA

Spherules in a Paleoproterozoic Dolomite Layer in the Ketilidian Orogen of South Greenland are Candidates for Ejecta from the Vredefort Structure

Simonson, B. M., Oberlin Coll., USA; Chadwick, B., Exeter Univ., UK; Claeys, P., Museum fuer Naturkunde, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Millimeter-scale spherules form approximately 18% of a single meter-thick dolomite layer in the Ketilidian orogen. Previously thought to be microfossils, their splash-form shapes and replaced spinels suggest they are impact ejecta potentially coeval with Vredefort. Additional information is contained in the original extended abstract.

Derived from text

Spherules; Ejecta; Petrography

20010044470 Washington Univ., Dept. of Earth and Space Sciences, Seattle, WA USA

Planetary Gases and Fullerenes at the Permian-Triassic Boundary

Becker, Luann, Washington Univ., USA; Poreda, Robert J., Rochester Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Fullerenes (C-60+ to C-70+) containing trapped noble gases with ratios indicating a 'planetary' component, the most common noble gas signature in carbonaceous chondrites, have been detected in sediments coincident with the Permian-Triassic boundary. Additional information is contained in the original extended abstract.

Derived from Text

Carbonaceous Chondrites; Fullerenes; Rare Gases

20010044471 NASA Goddard Space Flight Center, Greenbelt, MD USA

MOLA Science Team A Mars' Year of Topographic Mapping with the Mars Orbiter Laser Altimeter

Smith, David E., NASA Goddard Space Flight Center, USA; Zuber, Maria T., Massachusetts Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mars Orbiter Laser Altimeter (MOLA) has operated at Mars for a full Mars year and provided a new geodetic and geophysical view of the planet. As the spacecraft enters into the Extended Mission, MOLA will concentrate its observations on the seasonal variability of the icecaps and martian clouds. Additional information is contained in the original extended abstract.

Derived from Text

Mars Surface; Planetary Mapping; Mars Missions

20010044472 NASA Goddard Space Flight Center, Greenbelt, MD USA

Gravity/Topography Admittances and Lithospheric Evolution on Mars: The Importance of Finite-Amplitude Topography

McGovern, Patrick J., Lunar and Planetary Inst., USA; Solomon, Sean C., Carnegie Institution of Washington, USA; Smith, David E., NASA Goddard Space Flight Center, USA; Zuber, Maria T., Massachusetts Inst. of Tech., USA; Neumann, Gregory A., Massachusetts Inst. of Tech., USA; Head, J. W., III, Brown Univ., USA; Phillips, Roger J., Washington Univ., USA; Simons, Mark, California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We calculate localized gravity/topography admittances for Mars, in order to estimate elastic lithosphere thickness. A finite-amplitude correction to modeled gravity is required to properly interpret admittances in high-relief regions of Mars. Additional information is contained in the original extended abstract.

Derived from Text

Lithosphere; Mars Surface; Thickness; Topography

20010044473 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Analyses of Mars Topography, Gravity and Aroid: Implications for Tharsis and Hellas

Turcotte, D. L., Cornell Univ., USA; Shcherbakov, R., Cornell Univ., USA; Malamud, B. D., University Coll., UK; Kucinskas, A. B., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Correlations between topography, gravity, and aroid can provide important constraints on the structure and tectonic evolution of Mars. Additional information is contained in the original extended abstract.
Derived from Text
Gravitation; Mars Surface; Tectonics; Topography; Lithosphere

20010044474 Cambridge Univ., Bullard Labs., Cambridge, UK
Crustal and Elastic Thickness Estimates at the Martian Hemispheric Dichotomy
Nimmo, F., Cambridge Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Gravity and topography give an elastic thickness at the crustal dichotomy of less than 20 km. If isostatically compensated, the mean crustal thickness is about 50-75 km, similar to previous independent estimates. Additional information is contained in the original extended abstract.
Derived from Text
Gravitation; Thickness; Topography; Mars Surface; Lithosphere

20010044475 Colorado Univ., Dept. of Physics, Boulder, CO USA
Long-Wavelength Topography and Gravity Anomalies of Mars and Their Implications to the Formation of Tharsis Rise
Zhong, S., Colorado Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We study internal and surface loading for Mars with viscous and viscoelastic rheology. We show that convection models with a viscous rheology greatly overestimate the geoid and that the low degree geoid may be largely induced by surface loading of the Tharsi Additional information is contained in the original extended abstract.s.
Derived from Text
Gravity Anomalies; Mars Surface; Topography; Rheology; Lithosphere

20010044476 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Relaxation of Crustal Thickness Variations on Mars: Implications for Thermal Evolution
Parmentier, E. M., Brown Univ., USA; Zuber, M. T., Massachusetts Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A long wavelength crustal thickness variation on Mars, plausibly dating from early crustal differentiation, constrains the thermal evolution, particularly the amount of secular cooling of the mantle or rate of convective heat transfer. Additional information is contained in the original extended abstract.
Derived from Text
Thickness; Mars Surface; Variations; Planetary Crusts

20010044477 Lunar and Planetary Inst., Houston, TX USA
Mantle Convection on Mars with Enhanced Crustal Radioactivity: Implications for Geophysical and Geological Observables
Kiefer, Walter S., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

I use finite element simulations to study the effect of enrichments in crustal radioactivity on the nature of mantle convection on Mars. I consider the effects on mantle temperature, mechanical lithosphere thickness, magma production, and the core heat flux. Additional information is contained in the original extended abstract.
Derived from text
Convection; Planetary Mantles; Mars Surface; Radioactivity

20010044478 State Univ. of New York, Dept. of Geosciences, Stony Brook, NY USA

Crustal Heat Production and the Thermal Evolution of Mars

McLennan, Scott M., State Univ. of New York, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The crust of Mars has an LIL-enriched basaltic composition on average, and greater than 50% of the planet's heat producing elements were differentiated into the crust very early in Mars' history. Additional information is contained in the original extended abstract.

Derived from text

Basalt; Planetary Crusts; Mars Surface; Planetary Mantles

20010044479 Brown Univ., Dept. of Geological Sciences, Providence, RI USA

Implications of Magma Ocean Cumulate Overturn for Mars

Hess, P. C., Brown Univ., USA; Parmentier, E. M., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Differentiation of a martian magma produced a gravitationally unstable cumulate pile resulting in cumulate overturn and an iron-rich lower mantle. Additional information is contained in the original extended abstract.

Derived from Text

Planetary Mantles; Mars Surface; Magma

20010044480 Beloit Coll., WI USA

Extending the Solidus for a Model Iron-rich Martian Mantle Composition to 25 GPa

Schmerr, N. C., Beloit Coll., USA; Fei, Y., Carnegie Institution of Washington, USA; Bertka, C., Carnegie Institution of Washington, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Multianvil experiments utilizing a model anhydrous martian mantle composition were used to determine the solidus. This study provides solidus data for this model composition at the mid-mantle (15 GPa) to core/mantle boundary (25 GPa) of Mars. Additional information is contained in the original extended abstract.

Derived from Text

Solidus; Planetary Mantles; Mars (Planet)

20010044481 McGill Univ., Dept. of Earth and Planetary Sciences, Montreal, Quebec Canada

Paleomagnetic Pole Positions and Reversals of Mars

Arkani-Hamed, J., McGill Univ., Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The paleomagnetic pole positions determined from small isolated magnetic anomalies of Mars are largely cluster in a circle of 1500 km radius centered at 5 N,45 W. Also, the magnetization directions of some nearby magnetic anomalies suggest the core field reversals. Additional information is contained in the original extended abstract.

Derived from Text

Magnetic Anomalies; Magnetic Poles; Paleomagnetism; Mars (Planet)

20010044482 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Modeling and Paleomagnetic Pole Positions for Two Magnetic Anomalies in the Northern Polar Region of Mars

Hood, L. L., Arizona Univ., USA; Zakharian, A., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

An analysis of Mars Global Surveyor (MGS) magnetometer data from the northern polar region yields estimates for paleomagnetic pole positions for two anomalies that are located in a region north of Olympus Mons and south of the present rotational pole. Additional information is contained in the original extended abstract.

Derived from Text

Magnetic Anomalies; Magnetic Poles; Mars Surface; Paleomagnetism; Polar Regions

20010044483 Tennessee Univ., Planetary Geosciences Inst., Knoxville, TN USA

Lunar Meteorite Dhofar 026: A Second-Generation Impact Melt

Cohen, B. A., Tennessee Univ., USA; Taylor, L. A., Tennessee Univ., USA; Nazarov, M. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Petrology and mineral-chemistry of lunar highlands meteorite Dhofar 026 show that it is a crystalline impact melt of FAN-type material. Crystalline spherules within the meteorite are earlier impact melt fragments derived from a basaltic precursor. Additional information is contained in the original extended abstract.

Derived from text

Impact Melts; Petrology; Spherules; Meteorites; Mineralogy

20010044484 California Univ., Space Sciences Lab., Berkeley, CA USA

Exposure Histories of Lunar Meteorites Northwest Africa 032 and Dhofar 081

Nishiizumi, K., California Univ., USA; Caffee, M. W., Lawrence Livermore National Lab., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format Contract(s)/Grant(s): W-7405-eng-48; NAG5-4992; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We measured cosmogenic nuclides, CL-36, Al-26, and Be-10 in Northwest Africa 032 and Dhofar 081 lunar meteorites. The ejection depths, exposure ages, and terrestrial ages of two lunar meteorites were investigated. Additional information is contained in the original extended abstract.

Derived from Text

Exposure; Meteorites; Lunar Rocks

20010044485 Washington Univ., Dept. of Earth and Planetary Science, Saint Louis, MO USA

Formation of Carbonate and Oxyhydroxide Minerals by Impact of a Volatile-rich Body

Zeigler, R. A., Washington Univ., USA; Jolliff, B. L., Washington Univ., USA; Wang, A., Washington Univ., USA; Korotev, R. L., Washington Univ., USA; Kremser, D. T., Washington Univ., USA; Haskin, L. A., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Lunar regolith particle 65903,16-7 shows evidence for in situ formation of siderite and possibly goethite by a fluid derived from the impact of a volatile-rich body. The presence of siderite and goethite is confirmed by EMPA and Raman spectroscopy. Additional information is contained in the original extended abstract.

Derived from Text

Carbonates; Siderites; Iron Oxides; Lunar Rocks

20010044486 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA

Terrestrial Alteration of Lunar Meteorites Dar Al Gani 262 and 400

Floss, Christine, Washington Univ., USA; Crozaz, Ghislaine, Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

SIMS measurements of lunar meteorites DaG 262 and 400 show that some phases are affected by terrestrial alteration, resulting in elevated LREE, SR, and Ba. However, other phases are unaltered and suggest affinities to FANs and Mg-suite highland rocks. Additional information is contained in the original extended abstract.

Derived from text

Meteorites; Lunar Rocks; Mineralogy; Contamination

20010044487 NASA Goddard Space Flight Center, Greenbelt, MD USA

Lunar Crustal Magnetism: Correlations with Geology

Halekas, J. S., California Univ., USA; Mitchell, D. L., California Univ., USA; Lin, R. P., California Univ., USA; Frey, S., California Univ., USA; Acuna, M. H., NASA Goddard Space Flight Center, USA; Hood, L. L., Arizona Univ., USA; Binder, A. B., Lunar Research Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

With Lunar Prospector reflectometry data we now have sufficient surface coverage to allow detailed comparisons between crustal magnetism and geology. We find substantial evidence that lunar magnetism is dominated by the effects of impact processes. Additional information is contained in the original extended abstract.
Derived from Text
Lunar Crust; Lunar Magnetic Fields; Magnetic Properties

20010044488 Massachusetts Inst. of Tech., Dept. of Earth, Atmospheric and Planetary Sciences, Cambridge, MA USA
A Serenitatis Origin for the Imbrian Grooves and South Pole-Aitken Thorium Anomaly
Wieczorek, Mark A., Massachusetts Inst. of Tech., USA; Zuber, Maria T., Massachusetts Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Antipodal to the Imbrium basin is a distinctive geomorphologic unit that has been attributed to either the convergence of basin ejecta or seismic energy. We show that ejecta from an oblique Serenitatis impact could have formed the 'Imbrian grooves'. Additional information is contained in the original extended abstract.
Derived from text
Grooves; Lunar Maria; Lunar Surface

20010044489 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Origin and Implications of the Imbrium Sculpture
Schultz, P. H., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Imbrium Sculpture is proposed to be the result of grazing impacts by spalls from the Imbrium asteroid. This interpretation allows new estimates for the size and impact angle for the Imbrium-forming asteroid. Additional information is contained in the original extended abstract.
Derived from Text
Grooves; Lunar Maria; Hypervelocity Impact; Lunar Surface

20010044490 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA
Basin Contributions to the Stratigraphy of the Apollo 16 Landing Site
Haskin, Larry A., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-4172; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Ejecta deposit modeling suggests that the megaregolith at the Apollo 16 landing site is dominated by Imbrium and Serenitatis ejecta, and Nectaris ejecta are a minor componen Additional information is contained in the original extended abstract.t.
Derived from Text
Ejecta; Stratigraphy; Thickness; Deposits

20010044491 Oregon State Univ., Coll. of Oceanic and Atmospheric Sciences, Corvallis, OR USA
Ar-40 - Ar-39 Ages of Apollo 16 Impact Melt Rocks by Laser Step Heating
Dalrymple, G. B., Oregon State Univ., USA; Ryder, G., Lunar and Planetary Inst., USA; Duncan, R. A., Oregon State Univ., USA; Huard, J. J., Oregon State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New laser step heating Ar ages on six Apollo 16 impact melts of differing composition are consistent with a lunar cataclysmic impacting era starting at 3.90 Ga and lasting little more than 50 Ma. Additional information is contained in the original extended abstract.
Derived from Text
Impact Melts; Lunar Rocks; Chronology

20010044492 Bern Univ., Physikalisches Inst., Bern, Switzerland
The Antiquity Indicator Ar-40/Ar-36 for Lunar Surface Samples Calibrated by U-235 - Xe-136 Dating
Eugster, O., Bern Univ., Switzerland; Terribilini, D., Bern Univ., Switzerland; Polnau, E., Bern Univ., Switzerland; Kramers, J., Bern Univ., Switzerland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the

entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Xe from U-235 fission in lunar soil 74261 allows us to calculate the time, 3.25 Ga ago, when this soil was pre-exposed on the lunar surface to cosmic, solar, and atmospheric particles. A calibration curve for the time dependency of trapped Ar-40/Ar-36 is derived. Additional information is contained in the original extended abstract.

Derived from Text

Chronology; Argon Isotopes; Lunar Soil; Isotope Ratios

20010044493 Tasmania Univ., School of Earth Sciences, Hobart, Australia

Highly Siderophile (Re-PGE) and Lithophile Element Geochemistry of Apollo 17 LKFM Impact Melts

Norman, M. D., Tasmania Univ., Australia; Bennett, V. C., Australian National Univ., Australia; Ryder, G., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Highly siderophile element characteristics of mafic, KREEP-rich impact melts from Apollo 17 are consistent with an EH chondrite impactor. Additional information is contained in the original extended abstract.

Derived from text

Mineralogy; Kreep; Impact Melts; Lunar Surface

20010044494 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Re-Os in Lunar Soils and Meteoritic Siderophiles on the Lunar Surface

Chen, J. H., California Inst. of Tech., USA; Papanastassiou, D. A., Jet Propulsion Lab., California Inst. of Tech., USA; Wasserburg, G. J., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-8251; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Re-Os isotopes in lunar soils indicate approximately chondritic Re, Os, and Os isotopic compositions and substantial Re/Os fractionation, possibly due to the terminal lunar cataclysm. Additional information is contained in the original extended abstract.

Derived from Text

Isotopic Labeling; Lunar Soil; Rhenium Isotopes

20010044495 Wisconsin Univ., Dept. of Nuclear Engineering, Madison, WI USA

Lunar Cataclysm? Depends on What "Cataclysm" Means

Schmitt, H. H., Wisconsin Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Combined with the geographical bias of the Apollo landings, the best explanation for an apparent 'lunar cataclysm' at 3.9 b.y. is the global effect of the ejecta and secondary impacts related to the formation of the young large basins. Additional information is contained in the original extended abstract.

Derived from Text

Lunar Evolution; Impact; Chronology

20010044496 Chicago Univ., Dept. of the Geophysical Sciences, Chicago, IL USA

Single Stage Evaporation of Solar Condensate Dust to Make CAIS

Ebel, D. S., Chicago Univ., USA; Grossman, L., Chicago Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Cooling rates and peak T are found, to predict observed chemical and isotopic compositions, and melilite zoning, of Type A and B CAIs, by cooling, evaporating, and crystallizing solar condensate precursors instantly heated in 1 microbar pure H2. Additional information is contained in the original extended abstract.

Derived from text

Condensates; Isotopic Labeling; Dust; Evaporation; Cooling

20010044497 Chicago Univ., Enrico Fermi Inst., Chicago, IL USA

Effect of Diffusion on the Kinetic Isotopic Fractionation of Silicate Liquids by Evaporation

Richter, F. M., Chicago Univ., USA; Davis, A. M., Chicago Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The effects of diffusion on kinetic isotopic fractionation during evaporation of silicate liquids are modeled and applied to the evaporation of CMAS melts and to a recently published discussion of K isotopic fractionation during evaporation. Additional information is contained in the original extended abstract.

Derived from text

Diffusion; Fractionation; Isotope Ratios; Kinetics; Evaporation

20010044498 Tokyo Inst. of Tech., Tokyo, Japan

Mg-25 Diffusion in Ekermanite, Gehlenite and Ek30Geh70 Solid Solution

Ito, M., Tokyo Inst. of Tech., Japan; Yurimoto, H., Tokyo Inst. of Tech., Japan; Morioka, M., Tokyo Univ., Japan; Nagasawa, H., Gakushuin Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have determined Mg-25 diffusion coefficients in endmembers of melilite, ekermanite, and gehlenite, and Ek70-Geh30 solid solution crystals along the a-axis, and evaluated the compositional dependence of Mg diffusion coefficient in melili. Additional information is contained in the original extended abstract.

Derived from text

Diffusion Coefficient; Magnesium Isotopes; Mineralogy

20010044499 California Inst. of Tech., Div. of Geological and Planetary Sciences, Pasadena, CA USA

Experimental Constraints on Type B CAI Formation: (1) fO2 Variations in Spinel Minor Element Partitioning, (2) Sub-Solidus Re-Equilibration Effects

Connolly, H. C., Jr., California Inst. of Tech., USA; Burnett, D. S., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Our experimental results on an average type B CAI for spinelliquid field at a range of fO2 conditions show that observed abundances of Ti and V of spinels enclosed by fassaites may have been, at least in part, produced by sub-solidus re-equilibration. Additional information is contained in the original extended abstract.

Derived from text

Spinel; Crystallization; Experimentation

20010044500 Tokyo Inst. of Tech., Dept. of Earth and Planetary Sciences, Tokyo, Japan

Non-Stoichiometric Al-rich Spinel in an Ultra-Refractory Inclusion from CO Chondrite

Yurimoto, H., Tokyo Inst. of Tech., Japan; Rubin, A. E., California Univ., USA; Itoh, S., Tokyo Inst. of Tech., Japan; Wasson, J. T., California Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We describe a unique refractory inclusion having nonstoichiometric Al-rich spinel in the exceptionally pristine CO3.0 chondrite Yamato 81020. This inclusion was generated by two-stage heating events within a span of 0.2 million years. Additional information is contained in the original extended abstract.

Derived from Text

Spinel; Inclusions; Petrography; Isotope Ratios

20010044501 Hawaii Univ., School of Ocean and Earth Science and Technology, Honolulu, HI USA

O-16-poor Refractory Inclusions in CB Chondrites

Krot, A. N., Hawaii Univ., USA; McKeegan, K. D., California Univ., USA; Russell, S. S., Museum of Natural History, UK; Meibom, A., Stanford Univ., USA; Weisberg, M. K., Kingsborough Community Coll., USA; Zipfel, J., Max-Planck-Inst. fuer Chemie, Germany; Keil, K., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

CAIs from Hammadah al Hamra 237 and QUE 94411 have O-16-poor compositions with O-17 ranging from -6 to -10 for all analyzed minerals (grossite, hibonite, melilite, pyroxene, spinel), suggesting formation in an isotopically distinct reservoir. Additional information is contained in the original extended abstract.
Derived from Text
Inclusions; Meteoritic Composition; Chondrites; Mineralogy

20010044502 Tokyo Inst. of Tech., Dept. of Earth and Planetary Sciences, Tokyo, Japan
High Precision Mapping of O Isotopes of a CAI, HN3-1, Using SIMS with SCAPS
Kunihiro, T., Tokyo Inst. of Tech., Japan; Nagashima, K., Tokyo Inst. of Tech., Japan; Yurimoto, H., Tokyo Inst. of Tech., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We developed a new isotope imaging technique using a two-dimensional solid-state ion detector. We succeeded in quantitative three O isotope mapping a CAI, HN3-1, within micron resolution and permil accuracy. Additional information is contained in the original extended abstract.
Derived from text
Imaging Techniques; Oxygen Isotopes; Isotope Ratios; Meteorites

20010044503 Seoul National Univ., Dept. of Earth Science Education, Korea, Republic of
Two Forsterite-bearing Refractory Inclusions in Allende Having Oxygen Isotopic Compositions Similar to Chondrules
Choi B.-G., Seoul National Univ., Korea, Republic of; Yurimoto, H., Tokyo Inst. of Tech., Japan; Wasserburg, G. J., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): KRF-2000-015-DS0045; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report two forsterite-bearing refractory inclusions in Allende. They consist of spinel, olivine, pyroxene (and anorthite) and O-isotopic compositions of the minerals are similar to chondrules in carbonaceous chondrites. Additional information is contained in the original extended abstract.
Derived from Text
Oxygen Isotopes; Inclusions; Chemical Composition; Chondrites

20010044504 Tokyo Inst. of Tech., Dept. of Earth and Planetary Sciences, Tokyo, Japan
Two Generations of Olivine-Growth in an Amoeboid Olivine Aggregate from the Allende Meteorite
Imai, H., Tokyo Inst. of Tech., Japan; Yurimoto, H., Tokyo Inst. of Tech., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present petrologic and oxygen isotopic studies of Mg-rich and Fe-rich olivines in an amoeboid olivine aggregate (AOA) from the Allende meteorite in order to constrain the formation processes of olivines. Additional information is contained in the original extended abstract.
Derived from text
Petrology; Oxygen Isotopes; Olivine; Chondrites

20010044505 California Inst. of Tech., Div. of Geological and Planetary Sciences, Pasadena, CA USA
The Blue Angel Revisited
Wasserburg, G. J., California Inst. of Tech., USA; Huss, G. R., Arizona State Univ., USA; Papanastassiou, D. A., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Blue Angel is a hibonite-rich calcite-bearing CAI from Murchison that has condensation textures. We have measured Al-Mg isotopic systematics by ion probe and find a good isochron with (Al-26/Al-27)(sub o) = 5x10(exp -5). Implications are discussed. Additional information is contained in the original extended abstract.
Derived from Text
Isotope Ratios; Inclusions; Aluminum; Magnesium

20010044506 California Univ., Dept. of Earth and Space Sciences, Los Angeles, CA USA

Extinct Radionuclide Abundances in Ca, Al-rich Inclusions from the CV Chondrites Allende and Efremovka: A Search for Synchronicity

McKeegan, K. D., California Univ., USA; Chaussidon, M., Centre National de la Recherche Scientifique, France; Krot, A. N., Hawaii Univ., USA; Robert, F., National Museum of Natural History, France; Goswami, J. N., Physical Research Lab., India; Hutcheon, I. D., Lawrence Livermore National Lab., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report new Be-B data on four Ca, Al-rich Inclusions (CAIs) and initial comparisons to the Al-Mg record in the same inclusions. Additional information is contained in the original extended abstract.

Derived from Text

Inclusions; Meteoritic Composition; Radioactive Isotopes; Calcium Isotopes; Aluminum 26

20010044507 Smithsonian Institution, Dept. of Mineral Sciences, Washington, DC USA

Extinct Be-10 in CAIs from Vigarano, Leoville, and Axtell

MacPherson, G. J., Smithsonian Institution, USA; Huss, G. R., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Evidence for extinct Be-10 was found in three Type A, one Type B, and one FUN CAIs (Ca, Al-rich inclusions) from Vigarano, Leoville, and Axtell. Initial Be-10/Be-9 is in the range 0.6 to 1.5x10(exp -3) and does not strictly correlate with Al-26/Al-27, so the two systems are decoupled. Additional information is contained in the original extended abstract.

Derived from Text

Beryllium Isotopes; Meteoritic Composition; Isotope Ratios; Aluminum Isotopes

20010044508 Tokyo Univ., Dept. of Earth and Planetary Science, Japan

Boron Isotopic Compositions in Chondrules: Anorthite-rich Chondrules in the Yamato 82094 (CO3) Chondrite

Sugiura, N., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Boron isotopic compositions and Be/B ratios were measured in anorthite in chondrules. B isotopic anomalies are small. But they appear to be correlated with Be/B ratios, suggesting the presence of live Be-10 at the time of chondrule formation. Additional information is contained in the original extended abstract.

Derived from Text

Chondrites; Chondrule; Meteoritic Composition; Isotope Ratios; Boron Isotopes

20010044509 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Lithospheric Thickness Variations from Gravity and Topography in Areas of High Crustal Remanent Magnetization on Mars

Smrekar, S. E., Jet Propulsion Lab., California Inst. of Tech., USA; Raymond, C. A., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Large regions of intense crustal re- manent magnetization were fortuitously discovered on Mars by the Mars Global Surveyor (MGS) spacecraft. Gravity and topography admittance studies are used to examine lithospheric structure in the areas of intense magnetization. Areas with positively magnetized crust appear to have thinner crust and elastic lithosphere than negatively magnetized crust. Additional information is contained in the original extended abstract.

Derived from Text

Thickness; Lithosphere; Magnetic Effects; Crusts; Mars Surface; Topography

20010044510 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Constraints on Sources of Strong Crustal Magnetism in the Southern Highlands of Mars

Raymond, C. A., Jet Propulsion Lab., California Inst. of Tech., USA; Smrekar, S. E., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Magnetic models, guided by results of gravity-topography admittance studies, suggest that the anomaly pattern in the central southern highlands of Mars results from large blocks of coherently magnetized crust separated by 'non-magnetic' areas. Additional information is contained in the original extended abstract.
Derived from text
Magnetic Anomalies; Mars Surface; Magnetic Properties; Crusts

20010044511 NASA Goddard Space Flight Center, Greenbelt, MD USA
Interpretation of a Magnetic Map of the Valles Marineris Region, Mars
Purucker, M. E., NASA Goddard Space Flight Center, USA; Langlais, B., Institut fuer Psychogerontologie, France; Mandea, M., Institut fuer Psychogerontologie, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A magnetic map of Valles Marineris is interpreted in terms of left-lateral faulting, the first evidence for substantial strike-slip faulting here. Surface exposures of highly magnetic material may exist in the walls of Valles Marineris. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Mapping; Mars Surface; Magnetic Fields

20010044512 Nevada Univ., Mackay School of Mines, Reno, NV USA
Structural Style and Mode of Extension in the Northern Tempe Rift
Wilkins, Scott J., Nevada Univ., USA; Schultz, Richard A., Nevada Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Through analysis of topography and images at North Tempe Fossae, we interpret the rift to consist of planar fault geometries at depth with a possibility for an asymmetric half-graben structure. Extension is approximately 2 km and appears to systematically decrease along-strike away from Tharsis. Interestingly, structural styles in the southernmost portion of this region are suggestive of oblique rifting. Additional information is contained in the original extended abstract.
Derived from Text
Geological Faults; Mars Surface

20010044513 Massachusetts Inst. of Tech., Dept.of Earth, Atmospheric and Planetary Sciences, Cambridge, MA USA
Crustal Thickness Control on Martian Wrinkle Ridge Spacing
Montesi, Laurent G. J., Massachusetts Inst. of Tech., USA; Zuber, Maria T., Massachusetts Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The spacing of wrinkle ridges in the martian northern lowlands is about twice that in ridged plains. This can be explained by the thinner crust in the lowlands: there is no ductile lower crust, making the brittle upper lithosphere twice thicker. Additional information is contained in the original extended abstract.
Derived from Text
Geological Faults; Mars Surface; Crusts; Deformation

20010044514 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Morphology of Wrinkle Ridges on Lunae and Solis Plana, Mars from MOLA Topography: Implications for Their Kinematic Development
Tate, A., Colorado Univ., USA; Golombek, M. P., Jet Propulsion Lab., California Inst. of Tech., USA; Mueller, K. J., Colorado Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mars Orbiter Laser Altimeter (MOLA) topography is used to define the detailed morphology and kinematic development of martian wrinkle ridges on Lunae and Solis Plana. Changes in ridge morphology suggest they form as fault-propagation folds, often with significant backthrusts. Additional information is contained in the original extended abstract.
Derived from Text
Kinematics; Mars (Planet); Morphology; Geological Faults; Planetary Geology

20010044515 Nevada Univ., Mackay School of Mines, Reno, NV USA
Elevation Offsets Across Wrinkle Ridges: Key to Structural Width
Okubo, Chris H., Nevada Univ., USA; Schultz, Richard A., Nevada Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In a slope-corrected profile, an elevation offset reflects a baseline termination on the wrinkle ridge. The full structural width of a wrinkle ridge can be measured along a baseline that extends sufficiently such that the elevation offset diminishes to zero. Additional information is contained in the original extended abstract.
Derived from Text
Elevation; Geological Faults

20010044516 Nevada Univ., Mackay School of Mines, Reno, NV USA
Displacement-Length Scaling in 3-D as a Probe of Planetary Fault Dimensions
Schultz, Richard A., Nevada Univ., USA; Fossen, Haakon, Bergen Univ., Norway; Watters, Thomas R., Smithsonian Institution, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Displacement-length scaling of terrestrial and planetary faults provides a useful tool to evaluate their growth histories and dimensions. New scaling relationships for 3-D suggest proportional growth and nonuniform depths of faulting for populations on Mars and Mercury. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Geology; Geological Faults; Three Dimensional Models; Chronology

20010044517 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Northern Lowlands on Mars: Evidence for Widespread Volcanic Flooding and Tectonic Deformation in the Early Hesperian
Head, Joseph W., III, Brown Univ., USA; Pratt, Stephen, Brown Univ., USA; Kreslavsky, Mikhail A., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Detrended northern lowland topography shows that surface deposits are underlain by an Early Hesperian regional volcanic unit with a basin-wide system of sub-parallel wrinkle ridges, part of a global circum-Tharsis system approximately 7000 km wide. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Tectonics; Topography; Volcanoes

20010044518 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Amazonian Faulting: Is Mars Tectonically Active Today?
Anderson, R. C., Jet Propulsion Lab., California Inst. of Tech., USA; Dohm, J. M., Arizona Univ., USA; Golombek, M. P., Jet Propulsion Lab., California Inst. of Tech., USA; Baker, V., Arizona Univ., USA; Ferris, J., Arizona Univ., USA; Hare, T., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Preliminary analysis of Amazonian structures indicate that Mars may still be tectonically active. Additional information is contained in the original extended abstract.
Derived from Text
Tectonics; Structural Analysis; Mars (Planet)

20010044519 NASA Goddard Space Flight Center, Greenbelt, MD USA
A Very Large Population of Likely Buried Impact Basins in the Northern Lowlands of Mars Revealed by MOLA Data
Frey, H. V., NASA Goddard Space Flight Center, USA; Shockey, K. M., Maryland Univ., USA; Frey, E. L., South River High School, USA; Roark, J. H., Science Systems and Applications, Inc., USA; Sakimoto, S. E. H., Maryland Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

High resolution Mars Orbiter Laser Altimeter (MOLA) data have revealed a large number of subdued quasi-circular depressions (QCDs) is greater than 50 km diameter in the northern lowlands of Mars which are generally not visible in Viking imagery and which may be buried ancient impact basins. Additional information is contained in the original extended abstract.
Derived from text
Structural Basins; Mars Surface; Planetary Geology

20010044520 Kharkov Astronomical Observatory, Kharkov, Ukraine
Stealth Craters in the Northern Lowlands of Mars: Evidence for a Buried Early Hesperian Unit
Kreslavsky, M. A., Kharkov Astronomical Observatory, Ukraine; Head, J. W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Numerous shallow smooth circular depressions in the northern lowlands of Mars are impact craters on an Early Hesperian substrate covered with the Vastitas Borealis Formation material. Additional information is contained in the original extended abstract.
Derived from Text
Craters; Mars Surface; Planetary Geology

20010044521 NASA Goddard Space Flight Center, Greenbelt, MD USA
The Chemical Composition of Asteroid 433 Eros: End of Mission Results of the NEAR Shoemaker X-Ray/Gamma-Ray Spectrometer
Trombka, J. I., NASA Goddard Space Flight Center, USA; Squyres, S. W., Cornell Univ., USA; Brueckner, J., Max-Planck-Inst. fuer Chemie, Germany; Boynton, W. V., Arizona Univ., USA; Reedy, R. C., Los Alamos National Lab., USA; McCoy, T. J., Smithsonian Institution, USA; Gorenstein, P., Smithsonian Astrophysical Observatory, USA; Evans, L. G., Computer Science Corp., USA; Arnold, J. R., California Univ., USA; Starr, R. D., Catholic Univ. of America, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Status of the NEAR X-ray/gamma-ray spectrometer, end of mission status. Additional information is contained in the original extended abstract.
Derived from Text
Near Earth Asteroid Rendezvous Mission; Asteroids; Postmission Analysis (Spacecraft)

20010044522 NASA Goddard Space Flight Center, Greenbelt, MD USA
Could 433 Eros have a Primitive Achondritic Composition?
Burbine, T. H., Smithsonian Institution, USA; McCoy, T. J., Smithsonian Institution, USA; Nittler, L. R., NASA Goddard Space Flight Center, USA; Bell, J. F., III, Cornell Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-3871; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

One of the goals of the NEAR (Near Earth Asteroid Rendezvous) mission to 433 Eros is to determine if it has a meteoritic analog. We are currently investigating if primitive achondrites have bulk compositions and spectral properties similar to Eros. Additional information is contained in the original extended abstract.
Derived from Text
Achondrites; Analogs; Meteorites; Chemical Composition

20010044523 Johns Hopkins Univ., Applied Physics Lab., Laurel, MD USA
Color Variations on Eros from NEAR Shoemaker Multispectral Imaging
Murchie, Scott, Johns Hopkins Univ., USA; Robinson, Mark, Northwestern Univ., USA; Clark, Beth, Cornell Univ., USA; Thomas, Pete, Cornell Univ., USA; Joseph, Jonathan, Cornell Univ., USA; Domingue, Dominque, Johns Hopkins Univ., USA; Li Han, Northwestern Univ., USA; Bussey, Ben, Northwestern Univ., USA; Veverka, Joseph, Cornell Univ., USA; Izenberg, Noam, Johns Hopkins Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Eros's surface exhibits large albedo variations due to exposure of bright materials on slopes. A difference in the relationship of albedo and color between Eros and the moon shows that space weathering's effects are different on Eros. Additional information is contained in the original extended abstract.
Derived from Text
Albedo; Color; Variations; Eros Asteroid

20010044524 Johns Hopkins Univ., Applied Physics Lab., Laurel, MD USA
Comparison of Color and Spectral Properties of Eros Using NIS Plus MSI
Izenberg, N., Johns Hopkins Univ., USA; Bell, J. F., III, Cornell Univ., USA; Clark, B. E., Cornell Univ., USA; Murchie, S., Johns Hopkins Univ., USA; Gaffey, M., Rensselaer Polytechnic Inst., USA; Wellnitz, D., Maryland Univ., USA; McFadden, L., Maryland Univ., USA; Robinson, M., Northwestern Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This abstract presents preliminary correlation and comparison of NIS (Near Infrared Spectrometer) and MSI (Multispectral Imager) spectral data. MSI short wavelength data is added to NIS spectra to produce more robust spectral analysis of the surface of Eros. Additional information is contained in the original extended abstract.
Derived from text
Emission Spectra; Spectrum Analysis; Eros Asteroid; Mineralogy; Surface Properties

20010044525 NASA Johnson Space Center, Houston, TX USA
Recent, Ground-based, Near-Infrared Spectral Observations of Asteroid 433 Eros
Kelley, M. S., NASA Johnson Space Center, USA; Gaffey, M. J., Rensselaer Polytechnic Inst., USA; Vilas, F., NASA Johnson Space Center, USA; Hardersen, P. S., Rensselaer Polytechnic Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New, ground-based, near-IR data were obtained for NEA 433 Eros using the SpeX instrument at the NASA Infrared Telescope Facility. Results of spectral analyses will be compared with previous work, and compositional interpretations will be discussed. Additional information is contained in the original extended abstract.
Derived from Text
Near Infrared Radiation; Spectrum Analysis; Eros Asteroid

20010044526 NASA Ames Research Center, Moffett Field, CA USA
Thermo-Reflectance Spectra of Eros: Unambiguous Detection of Olivine
Lucey, P. G., Hawaii Univ., USA; Hinrichs, J. L., Hawaii Univ., USA; Urquhart-Kelly, M., NASA Ames Research Center, USA; Wellnitz, D., Maryland Univ., USA; Bell, J. F., III, Cornell Univ., USA; Clark, B. E., Cornell Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Olivine is readily detected on 433 Eros using the new thermo-reflectance spectral technique applied to near-IR spectra obtained at Eros by the NEAR spacecraft. Additional information is contained in the original extended abstract.
Derived from Text
Near Infrared Radiation; Olivine; Reflectance; Spectrum Analysis; Eros Asteroid

20010044527 Northwestern Univ., Evanston, IL USA
The Geology of Eros
Robinson, M. S., Northwestern Univ., USA; Thomas, P. C., Cornell Univ., USA; Veverka, J., Cornell Univ., USA; Murchie, S., Johns Hopkins Univ., USA; Barnouin-Jha, O., Johns Hopkins Univ., USA; Bussey, D. B. J., Northwestern Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Eros is highly irregular in shape, is marked by a variety of structural features, and is strikingly rounded and degraded at all scales. High resolution images (1 m/pixel) reveal a complicated surface layer with much evidence for a widespread mobile regolith. Additional information is contained in the original extended abstract.
Derived from Text
Surface Layers; Regolith; Eros Asteroid

20010044528 Johns Hopkins Univ., Applied Physics Lab., Laurel, MD USA

Structural Geology of Eros from NEAR Shoemaker Imaging

Prockter, L. M., Johns Hopkins Univ., USA; Thomas, P. C., Cornell Univ., USA; Joseph, J., Cornell Univ., USA; Robinson, M. S., Northwestern Univ., USA; Milne, A., Northwestern Univ., USA; Bussey, D. B. J., Northwestern Univ., USA; Veverka, J., Cornell Univ., USA; Murchie, S., Johns Hopkins Univ., USA; Cheng, A., Johns Hopkins Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Using images from the NEAR Shoemaker mission, we present results on the structural geology of Eros. Additional information is contained in the original extended abstract.

Derived from text

Data Acquisition; Geology; Eros Asteroid

20010044529 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

The Porosity of Eros and Implications for Its Internal Structure

Wilkison, S. L., Northwestern Univ., USA; Robinson, M. S., Northwestern Univ., USA; Thomas, P. C., Cornell Univ., USA; Veverka, J., Cornell Univ., USA; McCoy, T. J., National Museum of Natural History, USA; Murchie, S. L., Johns Hopkins Univ., USA; Prockter, L., Johns Hopkins Univ., USA; Yeomans, D., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We estimate the porosity of Eros to be between 21-33%. Based on this porosity range and morphologic observations of the surface, we suggest that the asteroid is heavily fractured (but not a rubble pile). Additional information is contained in the original extended abstract.

Derived from text

Porosity; Computation

20010044530 California Univ., Dept. of Earth Sciences, Santa Cruz, CA USA

Brazil Nuts on Eros: Size-Sorting of Asteroid Regolith

Asphaug, E., California Univ., USA; King, P. J., California Univ., USA; Swift, M. R., California Univ., USA; Merrifield, M. R., Nottingham Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We consider the hypothesis that frequent cratering produces size- or compositionally-sorted asteroid regolith, affecting the structure, texture, and in extreme cases the shape of asteroids. Additional information is contained in the original extended abstract.

Derived from Text

Eros Asteroid; Cratering; Regolith

20010044531 NASA, Washington, DC USA

Preliminary Impact Crater Dimensions on 433 Eros from the NEAR Laser Rangefinder and Imager

Barnouin-Jha, O. S., Johns Hopkins Univ., USA; Garvin, J. B., NASA, USA; Cheng, A. F., Johns Hopkins Univ., USA; Zuber, M., Massachusetts Inst. of Tech., USA; Smith, D., NASA Goddard Space Flight Center, USA; Neumann, G., Massachusetts Inst. of Tech., USA; Murchie, S., Johns Hopkins Univ., USA; Veverka, J., Cornell Univ., USA; Robinson, M., Northwestern Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report preliminary observations obtained from the NEAR Laser Rangefinder (NLR) and NEAR Multispectral Imager (MSI) for approx. 300 craters seen on 433 Eros to address Eros crater formation and degradation processes. Additional information is contained in the original extended abstract.

Derived from Text

Eros Asteroid; Dimensional Analysis; Impact; Meteorite Craters

20010044532 NASA Goddard Space Flight Center, Greenbelt, MD USA

Fractal Analyses of Small Scale Features on Eros

Cheng, A. F., Johns Hopkins Univ., USA; Barnouin-Jha, O., Johns Hopkins Univ., USA; Zuber, M. T., Massachusetts Inst. of Tech., USA; Veverka, Joseph, Cornell Univ., USA; Smith, D. E., NASA Goddard Space Flight Center, USA; Neumann, G. A., NASA Goddard Space Flight Center, USA; Robinson, M. S., Northwestern Univ., USA; Thomas, P. C., Cornell Univ., USA; Garvin, J. B., NASA Goddard Space Flight Center, USA; Murchie, S., Johns Hopkins Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We will discuss the fractal nature of surface structures on asteroid 433 Eros. Additional information is contained in the original extended abstract.

Derived from Text

Eros Asteroid; Surface Roughness

20010044533 Hawaii Univ., Inst. of Geophysics and Planetology, Honolulu, HI USA

Eros: A Comprehensive Model

Bell, Jeffrey F., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The NEAR spacecraft has discovered a unique crater size distribution on Eros strongly deficient in small craters, and a remarkable abundance of boulders. These results can be explained if the asteroid belt is severely depleted in small objects by the Yarkovsky Effect. Additional information is contained in the original extended abstract.

Derived from Text

Craters; Size Distribution; Eros Asteroid

20010044534 Witwatersrand Univ., Impact Cratering Research Group, Johannesburg, South Africa

Pseudotachylites, Pseudotachylitic Breccias, and Other Melt Breccias in Impact Settings: A Discussion

Reimold, W. U., Witwatersrand Univ., South Africa; Gibson, R. L., Witwatersrand Univ., South Africa; Dressler, B. O., Dressler (B. O.), Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A variety of melt breccias of impact and/or tectonic origin may occur in impact settings. Differentiation, classification, and models of origin for such breccias are discussed, with special reference to the Vredefort Structure. Additional information is contained in the original extended abstract.

Derived from Text

Breccia; Impact Melts

20010044535 Rensselaer Polytechnic Inst., Planetary Sciences Lab., Troy, NY USA

Planar Deformation Feature Orientations and Distribution in Quartz Grains from the Carrizo Sand Formation in South Texas: Relation to the Bee Bluff Structure

Jurena, D. J., Rensselaer Polytechnic Inst., USA; French, B. M., Smithsonian Institution, USA; Gaffey, M. J., Rensselaer Polytechnic Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Bee Bluff structure has been debated as to its possible impact origin. We have found PDF"s there in a higher concentration than in other locations and having dominant orientation patterns consistent with impacts in porous sedimentary rocks. Additional information is contained in the original extended abstract.

Derived from text

Sedimentary Rocks; Porosity; Deformation

20010044536 Yamaguchi Univ., Faculty of Sciences, Japan

Shocked Quartz and Diaplectic Glass at Miura (Kagawa-Takamatsu) Crater, Japan: New Evidence for an Impact Origin

Miura, Yasunori, Yamaguchi Univ., Japan; Rampino, Michael R., New York Univ., USA; Kedves, Miklos, Yamaguchi Univ., Japan; Uedo, Yuki, Yamaguchi Univ., Japan; Maeda, Taro, Yamaguchi Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Recent sampling has produced evidence of shocked quartz and diaplectic glass with suevite-like rocks, confirming the impact origin of Miura (Kagawa-Takamatsu) crater, Japan. Additional information is contained in the original extended abstract.
Derived from Text
Breccia; Meteorite Craters; Rocks

20010044537 Max-Planck-Inst. fuer Chemie, Mainz, Germany
Two Novel Shock-induced Very Dense Polymorphs of Rutile in Suevite from the Ries Crater, Germany: Implications for Peak-Shock Pressures and Post-Shock Temperatures
ElGoresy, A., Max-Planck-Inst. fuer Chemie, Germany; Chen, M., Guanzhou Inst. of Geochemistry, China; Gillet, Ph., Ecole Normale Superieure, France; Dubrovinsky, L., Uppsala Univ., Sweden; Graup, G., Max-Planck-Inst. fuer Chemie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report two new natural shock-induced very dense polymorphs of rutile from suevites of the Ries Crater, Germany. This finding sets entirely new parameters for a robust estimation of peak-shock pressures and post-shock temperatures not accounted for befo Additional information is contained in the original extended abstract.re.
Derived from Text
Breccia; Meteorite Craters; Shock Heating

20010044538 SRI International Corp., Menlo Park, CA USA
Evidence for Kinetic Effects on Shock Wave Metamorphism: Laboratory Experiments Compared with Inferences from Studies of Natural Impact Craters
DeCarli, P. S., SRI International Corp., USA; Bowden, E., University Coll., UK; Sharp, T. G., Arizona State Univ., USA; Jones, A. P., University Coll., UK; Price, G. D., University Coll., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Laboratory calibrations of shock metamorphism are in substantial disagreement with inferences from studies of material in natural large impact craters. This disagreement is interpreted as evidence for kinetic effects. Additional information is contained in the original extended abstract.
Derived from Text
Shock Waves; Craters; Metamorphism (Geology)

20010044539 Witwatersrand Univ., Impact Cratering Research Group, Johannesburg, South Africa
Shock Pressure Distribution in the Vredefort Impact Structure, South Africa: Evidence from Feldspar and Ferromagnesian Minerals
Gibson, R. L., Witwatersrand Univ., South Africa; Reimold, W. U., Witwatersrand Univ., South Africa; Ashley, A. J., Witwatersrand Univ., South Africa; Koeberl, C., Wien Univ., Austria; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A petrographic study of the Archean gneisses of the core of the Vredefort structure revealed widespread evidence of shock deformation and shock melting in feldspar and ferromagnesian minerals. Processes involved in their formation are discussed. Additional information is contained in the original extended abstract.
Derived from Text
Pressure Distribution; Petrography; Minerals; Impact Melts; Feldspars

20010044540 Lunar and Planetary Inst., Houston, TX USA
Mass Flux During the Ancient Lunar Bombardment: The Cataclysm
Ryder, G., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The mass of projectiles hitting the Moon during the Nectarian-Early Imbrian epochs is incompatible with a smooth decline in impacting from crustal formation and was a cataclysm in the Earth-Moon system. Its intensity on Earth could not sterilize oceans Additional information is contained in the original extended abstract..
Derived from Text
Moon; Projectiles; Lunar Rocks; Crusts; Cratering

20010044541 Raytheon Co., Tucson, AZ USA
Lunar Meteorite Source Crater Size: Constraints from Impact Simulations
Head, J. N., Raytheon Co., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Hydrocode simulations show that craters 450 m across are viable sources of the lunar meteorites. The number of such craters expected to form in the last 0.1 Ma agrees with the CRE data. Samples from older events are underrepresented. Additional information is contained in the original extended abstract.
Derived from Text
Lunar Craters; Dimensional Analysis

20010044542 Lunar and Planetary Inst., Houston, TX USA
The Impact Angles of Different Crater Forms on Venus and the Moon
Herrick, R. R., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Surveys of the Venusian and lunar crater populations were performed to empirically determine the onset angle of various oblique impact forms. Additional information is contained in the original extended abstract.
Derived from Text
Lunar Craters; Impact; Shapes

20010044543 Kent Univ., Physics Lab., Canterbury, UK
Hypervelocity Impact Craters in Ammonia-Water Ice
Grey, I. D. S., Kent Univ., UK; Burchell, M. J., Kent Univ., UK; Johnson, E., Kent Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present new data on hypervelocity impacts using spherical 1 mm diameter stainless steel projectiles at velocities of 5 km s -1 were incident onto thick ice targets of water and ammonia-water mixes at a temperature of 153 K. Additional information is contained in the original extended abstract.
Derived from Text
Ammonia; Hypervelocity Impact; Craters; Water; Ice

20010044544 Ecole Normale Superieure, Laboratoire des Sciences de la Terre, Lyon, France
Rheology of Megaregolith from Wave Length of Martian Lobate Ejecta Deposits
Baratoux, D., Ecole Normale Superieure, France; Delacourt, C., Ecole Normale Superieure, France; Allemand, P., Ecole Normale Superieure, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The sinuosity of lobate martian craters is analysed using image analysis techniques. From dimensional analysis, we demonstrate that the wave length of the lobes allow us to obtain some quantitative results on the rheology of the megaregolith during the impact event. Additional information is contained in the original extended abstract.
Derived from Text
Dimensional Analysis; Mars Craters; Rheology

20010044545 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Impact Glass Strewnfields on Mars
Schultz, P. H., Brown Univ., USA; Mustard, J. F., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New experimental results allow first-order estimates for the downrange ejecta velocity distribution. When applied to Mars, they predict strewnfields from oblique impacts, consistent with MOC and TES results. Additional information is contained in the original extended abstract.
Derived from Text
Estimates; Ejecta; Impact Melts; Mars (Planet)

20010044546 Brown Univ., Geological Sciences Dept., Providence, RI USA
Giant Dike Swarms and Related Graben Systems in the Tharsis Province of Mars
Wilson, L., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We model the rise of magmas from mantle plume heads to form giant dike swarms and related graben on Mars. Measurements on graben in SW and S Tharsis begin to constrain dike magma densities and regional stress conditions at the time of emplacement. Additional information is contained in the original extended abstract.
Derived from text
Mars Surface; Magma; Plumes; Models; Planetary Mantles

20010044547 Paris-Sud Univ., Equipe de Planetologie, Orsay, France
Structural Control for Catastrophic Debris Flows on Mars
Costard, F., Paris-Sud Univ., France; Mangold, N., Paris-Sud Univ., France; Peulvast, J. P., Paris-Sud Univ., France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The aim of this study is to suggest a relationship between tectonic features (wrinkle ridges), the presence of subsurface volatile materials and the observed large-scale debris flows on Mars. Additional information is contained in the original extended abstract.
Derived from Text
Debris; Flow Characteristics; Mars (Planet)

20010044548 Nevada Univ., Dept. of Geological Sciences, Reno, NV USA
Modeling Scarp Evolution: Potential to Date Faulting and Paleoshorelines on Mars
Wilkins, Scott J., Nevada Univ., USA; Schultz, Richard A., Nevada Univ., USA; Anderson, John G., Nevada Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present the first considerations and examples of the diffusion equation applied to model scarp evolution on Mars. Scarp morphology has considerable potential to provide a quantitative measure of the timing of fault and paleoshoreline formation. Additional information is contained in the original extended abstract.
Derived from Text
Mathematical Models; Diffusion; Paleontology

20010044549 Whitman Coll., Walla Walla, WA USA
Wrinkle Ridge Formation North of Orcus Patera, Mars
Silver, Matthew H., Whitman Coll., USA; Gendaszek, Andrew S., Carleton Coll., USA; Grosfils, Eric B., Pomona Coll., USA; Sakimoto, Susan E. H., Maryland Univ., USA; Mendelson, Carl V., Beloit Coll., USA; Bleacher, Jacob E., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We use topography data obtained from the Mars Orbiter Laser Altimeter to characterize the morphology of wrinkle ridges north of Orcus Patera. Our results compare well to the predictions of models which support deep fault penetration. Additional information is contained in the original extended abstract.
Derived from text
Topography; Data Acquisition; Calderas; Volcanoes; Mars (Planet)

20010044550 Buffalo Univ., Dept. of Geology, NY USA

Possible Mechanisms of Stress in Hesperia Planum, Mars; Digital Analysis of Mare-type Wrinkle Ridges

Goudy, C. L., Buffalo Univ., USA; Gregg, T. K. P., Buffalo Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The origin of orthogonal mare-type wrinkle ridges within Hesperia Planum, Mars, is unknown. We are applying GIS techniques to determine their formation. Additional information is contained in the original extended abstract.

Derived from text

Mars Surface; Digital Data; Data Processing

20010044551 La Trobe Univ., Victorian Inst. of Earth and Planetary Science, Melbourne, Australia

Structural State of Mars from MOLA Implies a Cooling Planet

Hoffman, N., La Trobe Univ., Australia; Lark, A., Planet 3D, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Most terrains on Mars show evidence of late-stage contraction of the surface. The lithosphere of Mars has also thickened with time and volcanism reduced, implying that significant net planetary cooling has occurred, similar to Mercury. Additional information is contained in the original extended abstract.

Derived from Text

Lithosphere; Mars Surface; Planetary Geology; Volcanology

20010044552 Planetary Science Inst., Tucson, AZ USA

Marte Vallis and the Cerberus Plains: Evidence of Young Water Flow on Mars

Berman, D. C., Planetary Science Inst., USA; Hartmann, W. K., Planetary Science Inst., USA; Burr, D. M., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We examine the relationship between apparent fluvial channels and lava flows among the young lavas of the Elysium plains and Cerberus plains. A sequence of lava flows and water release appears to have occurred extending into recent geologic time. Additional information is contained in the original extended abstract.

Derived from Text

Mars (Planet); Lava; Water Flow

20010044553 Pomona Coll., Claremont, CA USA

Morphology of the Marte Valles Channel System, Mars

Moller, S. C., Pomona Coll., USA; Poulter, K. E., Colorado Coll., USA; Grosfils, E. B., Pomona Coll., USA; Sakimoto, S. E. H., Maryland Univ., USA; Mendelson, C. V., Beloit Coll., USA; Bleacher, J. E., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Marte Valles channel system near Orcus Patera, Mars is reassessed with MOLA topography. We find evidence of ponding, increasing cross-sectional area downstream suggesting multiple sources, and possible intertwined volcanism and water flow. Additional information is contained in the original extended abstract.

Derived from Text

Morphology; Volcanology; Water Flow; Mars Surface

20010044554 Arizona State Univ., Dept. of Geology, Tempe, AZ USA

Hydrologic History of South Elysium Basin-North Terra Cimmeria Area, Mars

Nelson, D. M., Arizona State Univ., USA; Farmer, J. D., Arizona State Univ., USA; Greeley, R., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Geologic mapping of the Terra Cimmeria outflow channels suggests a prolonged hydrologic history, sustained by tectonic and volcanic interactions with the ground water-crysophere system. Additional information is contained in the original extended abstract.
Derived from Text
Geological Surveys; Mars Surface; Mapping; Ground Water

20010044555 Eoetvoes LORANd Univ., Dept. of Physical Geography, Budapest, Hungary
Analysis of the Meanders of Some Runoff Channels on Mars
Kereszturi, A., Eoetvoes LORANd Univ., Hungary; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Morphometrical and morphological analysis of runoff channels on Mars. Results: possible connection between the meanders" parameters and the channel width, which may be the base of a future method for paleodischarge estimations. Additional information is contained in the original extended abstract.
Derived from text
Morphology; Mars Surface; Landforms

20010044556 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA
Application of Terrestrial Geomorphic Threshold Theory to the Analysis of Small Channels on Mars
Rosenshein, E. B., Arizona State Univ., USA; Greeley, R., Arizona State Univ., USA; Arrowsmith, J. R., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New terrestrial work on the geomorphic thresholds for channel initiation use the drainage area above a channel head vs. the slope at the channel head to delineate surface process types. This method has been used to characterize martian landscapes. Additional information is contained in the original extended abstract.
Derived from text
Geomorphology; Mars Surface; Terrain; Topography

20010044557 Smithsonian Institution, Center for Earth and Planetary Studies, Washington, DC USA
High Resolution Morphometric Studies of Martian Valley Networks in the Lapygia Region
Craddock, Robert A., Smithsonian Institution, USA; Franz, Geoffrey A., Smithsonian Institution, USA; Cook, Anthony C., Smithsonian Institution, USA; Howard, Alan D., Virginia Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present detailed information on valley network morphometry in the Iapygia region based on high resolution digital elevation models produced by combining MOLA data with Viking stereophotogrammetric data. Additional information is contained in the original extended abstract.
Derived from Text
Geology; Mars Surface; Valleys; Morphology

20010044558 Lancaster Univ., Dept. of Environmental Science, UK
Gorgonum Chaos: Are the Seepage-Runoff Features Really Recent?
Leone, G., Lancaster Univ., UK; Wilson, L., Lancaster Univ., UK; Orofino, V., Lecce Univ., Italy; Fonti, S., Lecce Univ., Italy; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We discuss the alleged runoff features in Gorgonum Chaos, Mars, which have been suggested as recent features. We conclude that they are more likely of Amazonian age. Additional information is contained in the original extended abstract.
Derived from Text
Seepage; Mars Surface; Drainage

20010044559 Colorado Univ., Lab. for Atmospheric and Space Physics, Boulder, CO USA

Martian Hydrothermal Systems: Relationship Between Magnetic Anomalies and Valley Networks

Harrison, K. P., Colorado Univ., USA; Grimm, R. E., Colorado Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Hydrothermal circulation may explain the spatial correlation between concentrated magnetic anomalies and valley networks. Numerical models show that hydrothermal discharge spans a comparable range as the inferred discharge from valley networks. Additional information is contained in the original extended abstract.

Derived from Text

Mathematical Models; Hydrothermal Systems; Magnetic Anomalies

20010044560 National Air and Space Museum, Center for Earth and Planetary Studies, Washington, DC USA

Valley Evolution in Margaritifer Sinus, Mars

Grant, J. A., National Air and Space Museum, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Valley morphometry suggests formation via localized ground-water discharge enabled by surface-fed recharge. Precipitation was largely relegated to subsurface entry by high surface-infiltration capacities. Discharge occurred at exposed aquitards. Additional information is contained in the original extended abstract.

Derived from Text

Evolution (Development); Mars Surface; Ground Water; Drainage

20010044561 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

The Modification of Mars Fluvial Surfaces

Bourke, M. C., Oxford Univ., UK; Zimbelman, J. R., National Air and Space Museum, USA; Finnegan, D., Indiana State Univ., USA; Banerdt, B., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The identification of fluvial deposits on Mars is impaired by modifying geological processes. An analysis of surface patterns of superimposed dunes and channels in paleoflood environments in Washington State and Australia can yield information on buried surfaces. Additional information is contained in the original extended abstract.

Derived from Text

Mars Surface; Planetary Geology; Revisions

20010044562 Virginia Univ., Dept. of Environmental Sciences, Charlottesville, VA USA

Cratering and Fluvial Erosion in Noachian Terra Cimmeria, Mars

Irwin, R. P., III, Virginia Univ., USA; Howard, A. D., Virginia Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The disruption of catchments by impact craters, divide breaching, valley morphology, and the source of water are discussed for part of the Terra Cimmeria, Mars. Large, integrated catchments are identified that pre-date degraded Noachian craters. Additional information is contained in the original extended abstract.

Derived from Text

Mars Surface; Water; Craters; Impact Melts

20010044563 NASA Ames Research Center, Moffett Field, CA USA

Prolonged Ponding Episode in C-Newton Crater in Recent Geological Times on Mars

Grin, E. A., NASA Ames Research Center, USA; Cabrol, N. A., NASA Ames Research Center, USA; Wynn-Williams, D. D., British Antarctic Survey, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present the morphological evidence that supports the existence of a lake in a recent past in C-Newton crater. We assess the astrobiological potential of this environment. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Craters; Mars (Planet); Morphology

20010044564 NASA Goddard Space Flight Center, Greenbelt, MD USA
Constraints on Gusev Basin Infill from the Mars Orbiter Laser Altimeter (MOLA) Topography
Carter, B. L., Maryland Univ., USA; Frey, H., NASA Goddard Space Flight Center, USA; Sakimoto, S. E. H., Maryland Univ., USA; Roark, J., Science Systems and Applications, Inc., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

MOLA topography provides volume estimates for Gusev crater based on higher resolution. Revisiting work previously done by Grin and Cabrol (1997), we find a substantial increase in original sedimentation estimates. Additional information is contained in the original extended abstract.
Derived from Text
Estimates; Topography; Mars (Planet); Planetary Craters

20010044565 Szeged Univ., Faculty of Science, Szeged, Hungary
Comparisons of the Ancient Meandering Riverbeds in the Chryse Region, Mars, and on the Tisza Flooded Basin in the Carpathian Basin, Earth
Rakonczai, J., Szeged Univ., Hungary; Hargitai, H., Eoetvoes LORANd Univ., Hungary; Birczi Sz., Eoetvoes LORANd Univ., Hungary; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Hydrogeomorphologic comparisons of meandering martian riverbeds, Chryse Region, and recent/ancient riverbeds of Tisza, Carpathian Basin imply: (1) presence of flowing water; (2) by left-over valleys a longer history of flowings on Mars. Additional information is contained in the original extended abstract.
Derived from Text
Carpathian Mountains (Europe); Mars (Planet); Hydrogeology; Morphology

20010044566 Bemidji State Univ., MN USA
The Beaches of Lake Agassiz, an Analog for Martian Shorelines
Mason, D., Bemidji State Univ., USA; Caddy, B., Bemidji State Univ., USA; Melchior, R., Bemidji State Univ., USA; Annexstad, J., Bemidji State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Similarities between glacial Lake Agassiz shorelines and martian analogs are noted. Reasons for differences are suggested. Additional information is contained in the original extended abstract.
Derived from Text
Shorelines; Mars (Planet); Analogies; USA

20010044567 Tokyo Univ., Graduate School of Frontier Science, Hongo, Japan
Tsunami Generation and Propagation in Possible Ancient Ocean on Mars
Matsui, T., Tokyo Univ., Japan; Takamiya, I., Tokyo Univ., Japan; Imamura, F., Tohoku Univ., Japan; Tajika, E., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We study generation and propagation of impact-induced tsunami on Mars by using numerical models. We find that maximum tsunami height is more than 60 m at some coastal regions, which suggests we may find some evidence of tsunami on Mars. Additional information is contained in the original extended abstract.
Derived from Text
Tsunami Waves; Mars (Planet)

20010044568 Brown Univ., Dept. of Geologic Sciences, Providence, RI USA

Global Distribution of Unique Surface Processes Imaged by the Mars Orbital Camera

Rifkin, M. K., Brown Univ., USA; Mustard, J. F., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have examined more than 8000 high resolution MOC images for evidence of several unique surface morphologies, and mapped the global distribution of these features. The results are presented and discussed here. Additional information is contained in the original extended abstract.

Derived from Text

Image Analysis; Mars Surface; Mapping; Data Processing

20010044569 Geological Survey, Flagstaff, AZ USA

Young Dark Mantles and Light Flows in Valles Marineris, Mars

Lucchitta, B. K., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

MOC images of VM show that most dark materials are wind deposits, but some may come from pyroclastic vents. Light flows and intricate deformations in west Candor Chasma may be due to volatiles in interior deposits and mobilization of older layers. Additional information is contained in the original extended abstract.

Derived from Text

Planetary Mantles; Mars Surface; Volcanology

20010044570 Cornell Univ., Center for Radiophysics and Space Research, Ithaca, NY USA

Modeling Martian Dust Avalanches

Sullivan, R., Cornell Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A numerical model for martian dust avalanches has been developed and applied to MOC and MOLA data. Results are consistent with the dust avalanche hypothesis when a reasonable range of material properties is fitted against observations. Additional information is contained in the original extended abstract.

Derived from Text

Mathematical Models; Mars Surface; Dust; Avalanches

20010044571 Pittsburgh Univ., Dept. of Geology and Planetary Science, Pittsburgh, PA USA

Morphologic and Topographic Analyses of Martian Debris Aprons Using Mars Global Surveyor Datasets

Pierce, Timothy L., Pittsburgh Univ., USA; Crown, David A., Pittsburgh Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Morphologic and topographic analyses of eastern Hellas debris aprons indicate consistent relationships between distinct surface textures and geomorphic features and constrain emplacement mechanisms. Additional information is contained in the original extended abstract.

Derived from Text

Geomorphology; Topography; Debris; Mars (Planet)

20010044572 Fernbank Science Center, Dept. of Space Sciences, Atlanta, GA USA

Dark Slope Streaks and Associated Layered Deposits on the Southwestern Floor of Cassini Impact Basin, Mars

Albin, E. F., Fernbank Science Center, USA; King, J. D., Georgia Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Several recent slope streaks and associated layered deposits, found within the Cassini impact basin, are discussed. A possible mechanism for producing long and continuous slope streaks is considered. Additional information is contained in the original extended abstract.

Derived from Text

Deposits; Slopes; Mars (Planet); Planetary Boundary Layer

20010044573 International Research School of Planetary Sciences, Pescara, Italy

Thin Linear Features on Mars Visible in MOC Images: The Occurrences in the Hellas Basin

Ormo, J., International Research School of Planetary Sciences, Italy; Komatsu, G., International Research School of Planetary Sciences, Italy; Rossi, A. P., International Research School of Planetary Sciences, Italy; DiSimone, S., International Research School of Planetary Sciences, Italy; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We performed a systematic analysis of thin linear features (LF) in the Hellas Basin where they are especially frequent. The LF were classified and mapped. The variety in appearance is great, which may suggest different causes for their formation. Additional information is contained in the original extended abstract.

Derived from Text

Data Management; Mars Surface; Structural Basins

20010044574 La Trobe Univ., Victorian Inst. of Earth and Planetary Sciences, Melbourne, Australia

Fresh Polar Channels on Mars as Evidence of Continuing CO2 Vapour-supported Density Flows

Hoffman, N., La Trobe Univ., Australia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A set of gullies and channels is located at 71 deg south, within the annual CO2 polecap. Mean temperatures are approx. 200 K which implies: 1) At least some of the channels flow on an annual basis 2) Dense CO2 vapour-supported flows is far more likely than liquid water. Additional information is contained in the original extended abstract.

Derived from Text

Mars Surface; Carbon Dioxide

20010044575 California Inst. of Tech., Pasadena, CA USA

Surface Runoff Features on Mars: Testing the Carbon Dioxide Formation Hypothesis

Stewart, S. T., California Inst. of Tech., USA; Nimmo, F., Cambridge Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We examine the hypothesis that carbon dioxide or clathrate formed the recent martian gullies, and conclude that it is unlikely, based on the likely reservoirs and flow characteristics of these compounds. Additional information is contained in the original extended abstract.

Derived from Text

Mars Surface; Drainage; Carbon Dioxide; Flow Characteristics

20010044576 Wuerzburg Univ., Geographisches Inst., Germany

Morphologic Hints for CO2 as Active Agent in Martian Relief Dynamics

Joens H.-P., Wuerzburg Univ., Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The relief of recently discovered valleys on Mars suggest CO2-activities, rather than H2O-activities. Additional information is contained in the original extended abstract.

Derived from Text

Atmospheric Composition; Carbon Dioxide; Mars Atmosphere

20010044577 Brown Univ., Dept. of Geological Sciences, Providence, RI USA

Characterization of Features Associated with Volatile Removal in the Martian North Circumpolar Region

Fishbaugh, Kathryn E., Brown Univ., USA; Head, James W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

High resolution MOLA data is used to classify and describe features associated with removal of volatiles in the martian north circumpolar region. Some of these features are linked to retreat of the polar cap, while some may predate cap formation. Additional information is contained in the original extended abstract.
Derived from Text
Volatile Organic Compounds; Mars Surface; Polar Caps

20010044578 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Meltback of Hesperian-aged Ice-rich Deposits at the South Pole: Evidence for Proglacial Drainage Channels and Lakes
Head, J. W., III, Brown Univ., USA; Milkovich, S., Brown Univ., USA; Pratt, S., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Small channels connect craters adjacent to the decayed remnants of the Dorsa Argentea Formation, suggesting that when meltback occurred, water flooded from crater to crater creating a series of lakes. Additional information is contained in the original extended abstract.
Derived from Text
Topography; Data Acquisition; Volatile Organic Compounds; Ice; Deposits

20010044579 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Observations of Layered Deposits in the Northern Polar Region of Mars: A Preliminary Analysis
Milkovich, S. M., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We examined MOC images of layered terrain in the northern polar region of Mars. Individual layers show great variability, indicating that additional processes besides climatic cycles are at work in their formation. Additional information is contained in the original extended abstract.
Derived from Text
Image Analysis; Formations; Mars Surface; Polar Regions; Deposits

20010044580 Malin Space Science Systems, San Diego, CA USA
Seasonal Changes in Frost Cover in the Martian South Polar Region: Mars Global Surveyor MOC and TES Monitoring of the Richardson Crater Dune Field
Supulver, K. D., Malin Space Science Systems, USA; Edgett, K. S., Malin Space Science Systems, USA; Malin, M. C., Malin Space Science Systems, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mars Global Surveyor MOC and TES observations of the dune field in Richardson Crater (72S,180W) are presented. The dune field was observed over the course of four seasons to monitor seasonal changes in temperature, albedo, and frost cover. Additional information is contained in the original extended abstract.
Derived from Text
Annual Variations; Frost; Mars Surface; Polar Regions

20010044581 Brown Univ., Dept. of Geological Science, Providence, RI USA
Origin of Sinuous Ridges in the Dorsa Argentea Formation: New Observations and Tests of the Esker Hypothesis
Head, J. W., III, Brown Univ., USA; Hallet, Bernard, Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The characteristics of sinuous ridges on Mars are compared to criteria from glacier physics and Earth field observations for eskers and found to be similar. Additional information is contained in the original extended abstract.
Derived from Text
Glacial Drift; Mars Surface; Observation

20010044582 Nevada Univ., Dept. of Geology, Reno, NV USA

Re-Exploring the Formation of Martian Sinuous Ridges

Metzger, S. M., Nevada Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Reinvigorated interest in martian Sinuous Ridges stems from formation interpretations that may provide clues to Mars" past climate. This report will review, summarize, and relate MSR formation models to MGS-testable processes. Additional information is contained in the original extended abstract.

Derived from Text

Mars Environment; Climate; Models; Mars (Planet)

20010044583 NASA Goddard Space Flight Center, Greenbelt, MD USA

Mars' Volcanic Surface Compositions: Distributions and Boundaries Examined Using Multiple Orbiter Datasets

Rogers, D., Arizona State Univ., USA; Christensen, P., Arizona State Univ., USA; Bandfield, J. L., NASA Goddard Space Flight Center, USA; Christensen, P., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

MGS TES data is used at high resolution to map small regions of basalt in Mars' northern hemisphere. With the exception of 2 outliers, the northern extent of the highland basalt appears to correspond with the northern edge of the cratered highlands. Additional information is contained in the original extended abstract.

Derived from Text

Mars Surface; Mars Volcanoes; Composition (Property); Basalt

20010044584 Planetary Science Inst., Tucson, AZ USA

Mars: Chronological Studies of the Large Volcanoes in Tharsis

Grier, Jennifer, Planetary Science Inst., USA; Bottke, William, Southwest Research Inst., USA; Berman, Daniel C., Planetary Science Inst., USA; Hartmann, William K., Planetary Science Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We are beginning a study of age and morphology relations among Tharsis volcanics, with crater counts using new age calibrations. On Olympus Mons, averages over large areas give characteristic ages of a few hundred My, but youngest flows have ages in range 5-50 My. Additional information is contained in the original extended abstract.

Derived from Text

Mars Volcanoes; Mars Surface; Morphology; Chronology

20010044585 Hawaii Univ., Inst. of Geophysics and Planetology, Honolulu, HI USA

Slopes of Martian Volcanoes

Kallianpur, K., Hawaii Univ., USA; Mouginis-Mark, P. J., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We use MOLA data to derive slope maps of 9 volcanoes on Mars. Tharsis volcanoes have the same shape as Galapagos volcanoes with deep calderas. Alba Patera is very similar to Tyrrhena Patera. Slopes greater than 7 degrees are common on Elysium Mons Additional information is contained in the original extended abstract.

Derived from Text

Mars Volcanoes; Slopes; Shapes

20010044586 California State Univ., Fullerton, CA USA

Orcus Patera, Mars: Impact Crater or Volcanic Caldera?

vanderKolk, D. A., California State Univ., USA; Tribbett, K. L., Vassar Coll., USA; Grosfils, E. B., Pomona Coll., USA; Sakimoto, S. E. H., Maryland Univ., USA; Mendelson, C. V., Beloit Coll., USA; Bleacher, J. E., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A re-evaluation of volcanic versus impact origins for Orcus Patera, Mars using new Mars Global Surveyor images and topography. Additional information is contained in the original extended abstract.
Derived from Text
Volcanoes; Calderas; Mars Craters

20010044587 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Morphologic and Topographic Characterization of Syrtis Major, Mars with MOLA Data
Hiesinger, H., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We make use of high-resolution Mars Orbiter Laser Altimeter (MOLA) and MGS data in order to characterize the topography and morphology of the Syrtis Major volcanic complex and to investigate its origin and geologic evolution. Additional information is contained in the original extended abstract.
Derived from Text
Morphology; Topography; Mars Surface

20010044588 Space Science Inst., Boulder, CO USA
Possible Hydrovolcanic Landforms Observed in MOC NA Imagery: A Preliminary Survey
Farrand, W. H., Space Science Inst., USA; Gaddis, L. R., Geological Survey, USA; Blundell, S., Integrated Geoscience, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In a preliminary survey of MOC NA imagery, a number of features resembling table mountains, tuff rings, and near craters have been identified. Their locations and geologic significance will be discussed. Additional information is contained in the original extended abstract.
Derived from Text
Craters; Landforms; Igneous Rocks; Image Analysis; Magma; Liquids; Mars (Planet)

20010044589 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Candidate Subglacial Volcanoes in the South Polar Region of Mars
Ghatan, G. J., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

MOLA data support the classification of several features in the south polar region of Mars as volcanoes, and suggest a possible sub-glacial origin for these volcanoes. Additional information is contained in the original extended abstract.
Derived from Text
Glaciers; Volcanoes; Mars Surface

20010044590 Pomona Coll., Geology Dept., Claremont, CA USA
Topographic Constraints on Magma Reservoir Volume and Depth for Small Near-Polar Volcanoes in the Northern Plains of Mars
Grosfils, E. B., Pomona Coll., USA; Sakimoto, S. E. H., Maryland Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Shallow, edifice-centered depressions may form when subsurface magma melts ground ice. Here, assuming variable porosities, we use MOLA data and thermal calculations to explore the minimum sill volume, thickness and depth required to produce the observed depressions. Additional information is contained in the original extended abstract.
Derived from Text
Magma; Mars Surface; Volcanoes; Topography

20010044591 Geological Survey, Flagstaff, AZ USA
Geometric Calibration of the Mars Orbiter Cameras and Coalignment with the Mars Orbiter Laser Altimeter
Kirk, R. L., Geological Survey, USA; Becker, T. L., Geological Survey, USA; Eliason, E. M., Geological Survey, USA; Anderson, J., Geological Survey, USA; Soderblom, L. A., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English;

See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present geometric distortion polynomials for the Mars Orbiter Camera (MOC) WA red and blue cameras based on preflight data, and alignment parameters of the 3 MOC cameras and Mars Orbiter Laser Altimeter (MOLA) based on comparison of flight data taken simultaneously. All are good to is less than 100 m on ground. Additional information is contained in the original extended abstract.

Derived from Text

Laser Altimeters; Mars (Planet); Cameras

20010044592 University Coll., Dept. of Geomatic Engineering, London, UK

Automated Registration of MDIM with MOLA Tracks

Kim, J. R., University Coll., UK; Muller J.-P., University Coll., UK; Morley, J. G., University Coll., UK; Mitchell, K. L., University Coll., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have developed a method for the automatic registration of Mars Orbiter Laser Altimeter (MOLA) tracks and optical images by means of a crater detection algorithm and a specialized matching function for the photogrammetric DEM creation with MOLA reference using stereo photogrammetric methods. Additional information is contained in the original extended abstract.

Derived from Text

Laser Altimeters; Mars Craters; Image Resolution

20010044593 Geological Survey, Flagstaff, AZ USA

ISIS Image Processing Capabilities for MGS/MOC Imaging Data

Eliason, E. M., Geological Survey, USA; Anderson, J. A., Geological Survey, USA; Barrett, J. M., Geological Survey, USA; Becker, K. J., Geological Survey, USA; Becker, T. L., Geological Survey, USA; Cook, D. A., Geological Survey, USA; Soderblom, L. A., Geological Survey, USA; Sucharski, T. L., Geological Survey, USA; Thompson, K. T., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The ISIS system provides image processing capabilities for the Mars Orbiting Camera (MOC) imaging. Software tools exist to read the mission-produced MGS/MOC data products and produce radiometrically and geometrically rectified images suitable for scientific analysis. Additional information is contained in the original extended abstract.

Derived from Text

Image Processing; Cameras; Mars (Planet)

20010044594 Geological Survey, Flagstaff, AZ USA

PIGWAD: Successfully Evolving with a Few Growing Pains

Hare, T. M., Geological Survey, USA; Tanaka, K. L., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Planetary Interactive GIS-on-the-Web Analyzable Database (PIGWAD) currently provides online GIS database and analysis support for the research and academic planetary science communities. Additional information is contained in the original extended abstract.

Derived from Text

Data Bases; Mars (Planet); Geographic Information Systems; Image Processing

20010044595 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Status of Mars Global Surveyor Science Data Archives

Slavney, S., Washington Univ., USA; Arvidson, R. E., Washington Univ., USA; Guinness, E. A., Washington Univ., USA; Springer, R. J., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Mars Global Surveyor has been in orbit around Mars since September 1997, completing its primary mission on January 31, 2001. As of that date the spacecraft had completed more than 8000 mapping orbits. Data from its science instruments, radio

science experiment, and SPICE files have been released regularly to the NASA Planetary Data System (PDS) as described in the MGS Archive Plan and Addendum and are available online. Additional information is contained in the original extended abstract.
Derived from Text
Mars Global Surveyor; Data Bases; Planetary Mapping

20010044596 Geological Survey, Astrogeology Team, Flagstaff, AZ USA
Mars Orbiter Large-Scale Topographic Maps
Rosiek, M. R., Geological Survey, USA; Kirk, R., Geological Survey, USA; Howington-Kraus, E., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Work is underway to produce large-scale topographic maps of Mars from Viking Orbiter imagery. The maps will be based on the horizontal control from the revised MARS Digital Image Mosaic (MDIM) and vertical control from Mars Orbiter Laser ALtimeter (MOLA). Photogrammetry and photoclinometry to derive digital elevation models. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Mars Photographs; Viking Orbiter Spacecraft; Elevation; Imagery

20010044597 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Global Digital Image Mosaics of Mars: Assessment of Geodetic Accuracy
Kirk, R., Geological Survey, USA; Archinal, B. A., Geological Survey, USA; Lee, E. M., Geological Survey, USA; Davies, M. E., RAND Corp., USA; Colvin, T. R., RAND Corp., USA; Duxbury, T. C., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A revised global image mosaic of Mars (MDIM 2.0) was recently completed by USGS. Comparison with high-resolution gridded Mars Orbiter Laser Altimeter (MOLA) digital image mosaics will allow us to quantify its geodetic errors; linking the next MDIM to the MOLA data will help eliminate those errors. Additional information is contained in the original extended abstract.
Derived from Text
Mosaics; Mars Surface; Imagery; Planetary Mapping; Geodetic Accuracy

20010044598 Lyon-1 Univ., Laboratoire des Sciences de la Terre, Lyon, France
New Local DEM Derived from Combination of High-Resolution Viking Images and the High-Precision MOLA Data Set
Delacourt, C., Lyon-1 Univ., France; Allemand, P., Lyon-1 Univ., France; Baratoux, D., Lyon-1 Univ., France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Topographic mapping is essential for understanding geologic processes. Digital Elevation Models of Mars can be computed from interpolated Mars Orbiter Laser Altimeter or stereophotogrammetric analysis of Viking images. We present a method to register and combine these two data sets. Additional information is contained in the original extended abstract.
Derived from Text
Mars Photographs; Topography; Planetary Mapping; Mars Surface

20010044599 Geological Survey, Flagstaff, AZ USA
So What Did Mars Pathfinder Land On? Results from MOLA Topography
Tanaka, K. L., Geological Survey, USA; Skinner, J. A., University of Northern Arizona, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Mars Pathfinder (MPF)landing site occurs at the confluence of Ares,Simud,and Tiu Valles. Although commonly called the Ares Vallis site,different workers arrived at different source channels for the flood-plain materials at the landing site using Viking data.Those who interpreted channel flow from morphology suggested that Tiu Vallis was the source,whereas others using thermal inertia and albedo variations to infer grain size changes concluded that res Vallis was the source.In Mars Orbiter Camera images,the MPF site shows a dominant pattern of northwest-trending ridges interpreted to be eolian dunes.Very subtle northeast-trending lineations in the same images were interpreted as geomorphic features formed by flooding from Tiu Vallis. A digital elevation model(DEM) of the MPF site region constructed from Mars Orbiter Laser Altimeter (MOLA) data released as

of the time of this writing.We used the data to interpolate an elevation grid having a 500-m cell size. Additional information is contained in the original extended abstract.
Derived from Text
Mars Pathfinder; Mars Surface; Topography; Landing Sites

20010044600 Geological Survey, Flagstaff, AZ USA
Mapping the Sagan Memorial Station Site: Geometric Control with Self-Calibration of the IMP Camera and Implications for Future Mars Landers
Kirk, R. L., Geological Survey, USA; Howington-Kraus, E., Geological Survey, USA; Cook, D., Geological Survey, USA; Hare, T. M., Geological Survey, USA; Becker, K., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A major element of USGS participation in the Mars Pathfinder mission was identified early on as the post-realtime production of the highest possible quality cartographic products from Imager for Mars Pathfinder (IMP) images. The cornerstone of these products, and their equivalents from future Mars lander missions, is a highly accurate geometric control solution, derived by photogrammetric bundle-block adjustment, yielding the improved estimates of the camera angles needed to make seamless products (plus estimate of the positions of object points in the landing site, which are useful for controlling additional images not in the original solution). A second key element is a digital topographic model (DTM) of the landing site, compiled from the stereoimagery, that is as detailed as practically possible and has been subjected to thorough quality control and editing to eliminate stereomatching errors. This abstract describes the difficult process by which we recently arrived at a satisfactory sitewide control solution for Mars Pathfinder; in our poster we will show a sampling of the derived data products based on the control solution. The key lesson of our experience is that achieving the desired subpixel accuracy of the control network required us to refine some of the geometric parameters of the IMP by including them as unknowns in the bundle-block adjustment, a process known as self-calibration. Refinement of the camera parameters by self-calibration will be necessary for future Mars lander missions also, and should be planned for and carried out early in the mission. Because the DTM data from IMP were collected (manually) before the self-calibration process, a special effort was necessary to reconcile them with the improved camera information. Additional information is contained in the original extended abstract.
Derived from Text
Mars Pathfinder; Topography; Mars Surface; Landing Sites

20010044601 Geological Survey, Flagstaff, AZ USA
Photometry of the Martian Atmosphere: An Improved Practical Model for Cartography and Photoclinometry
Kirk, R., Geological Survey, USA; Thompson, K. T., Geological Survey, USA; Lee, E. M., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This abstract describes recent work on approximate modeling of radiative transfer in the martian atmosphere with applications to the photometric normalization of images for cartographic products and for quantifying and improving the accuracy of topographic models obtained by photoclinometry, also known as shape-from-shading. Our photometric model for normalization of images in cartography has been improved by adding a correction for directional atmospheric scattering. We also apply the model to estimate systematic errors in photoclinometry for Mars. Additional information is contained in the original extended abstract.
Derived from Text
Mars Atmosphere; Topography; Mars Surface

20010044602 Maine Univ., Dept. of Natural Sciences, Farmington, ME USA
Geomorphic Mapping and Analysis of the Eastern Medusae Fossae Region of Mars
Takagi, M., Maine Univ., USA; Zimbelman, J. R., National Air and Space Museum, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A geomorphic map of the MC-8SE quadrangle on Mars is used to examine hypotheses of origin for the Medusae Fossae Formation, as well as to characterize the regional setting of these enigmatic materials. Additional information is contained in the original extended abstract.
Derived from Text
Geomorphology; Mars Surface; Planetary Mapping; Planetary Geology

20010044603 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Geomorphic Mapping of Cerberus Plains, Mars

Lanagan, P. D., Arizona Univ., USA; McEwen, A., Arizona Univ., USA; Link, L. S., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A geomorphic map of pristine volcanic and fluvial of the Cerberus plains, Mars, is presented. Units are identified on the basis of high-resolution Mars Orbiter Camera (MOC) images and low-resolution Viking basemaps. Additional information is contained in the original extended abstract.

Derived from text

Geomorphology; Mars Surface; Planetary Geology; Planetary Mapping

20010044604 Franklin and Marshall Coll., Lancaster, PA USA

Age Relationships and Chronology for the Orcus Patera Region of Mars

Yoburn, J. B., Franklin and Marshall Coll., USA; Yazzie, R., Crownpoint Inst. of Tech., USA; Mendelson, C. V., Beloit Coll., USA; Grosfils, E. B., Pomona Coll., USA; Bleacher, J. E., Arizona State Univ., USA; Sakimoto, S. E. H., Maryland Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Recent water and lava flows on the surface of Mars have renewed interest in radiometrically dating rock samples from specific locations on the planet. Here we examine a region and attempt to assign relative and absolute ages to its features. Additional information is contained in the original extended abstract.

Derived from Text

Chronology; Mars Surface; Time Measurement

20010044605 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA

Preliminary Stratigraphy of Terra Meridiani, Mars

Hynek, B. M., Washington Univ., USA; Arvidson, R. E., Washington Univ., USA; Phillips, R. J., Washington Univ., USA; Seelos, F. P., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Stratigraphic analyses reveal that the Terra Meridiani hematite locale is not an isolated deposit; rather it is situated in the middle of a complex layered sequence of bedforms that extend hundreds of kilometers and bury Noachian cratered terrain. Additional information is contained in the original extended abstract.

Derived from Text

Hematite; Mars Surface; Planetary Geology; Stratigraphy

20010044606 Brown Univ., Dept. of Geological Sciences, Providence, RI USA

Geology of the Argyre Basin, Mars: New Insights from MOLA and MOC

Hiesinger, H., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Several models have been proposed for the geologic evolution of the Argyre basin, Mars. We use high-resolution Mars Orbiter Laser Altimeter (MOLA) and Mars Orbiter Camera (MOC) data in order to test the plausibility of these hypotheses. Additional information is contained in the original extended abstract.

Derived from Text

Mars Surface; Planetary Geology; Chronology; Structural Basins

20010044607 Arizona State Univ., Dept. of Geology, Tempe, AZ USA

South Polar Region of Mars: Preliminary 1:3,000,000-Scale Mapping Results

Kolb, E. J., Arizona State Univ., USA; Tanaka, K. L., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present several preliminary results of our south of lat 65 S 1:3,000,000-Scale mapping of Mars. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Planetary Mapping; Polar Regions; Terrain

20010044608 Colorado Univ., Lab. for Atmospheric and Space Physics, Boulder, CO USA
Photometric Analysis of Jupiters Main Ring with Galileo SSI and NIMS Imaging
Brooks, S. M., Colorado Univ., USA; Esposito, L. W., Colorado Univ., USA; Throop, H. B., Arizona Univ., USA; Showalter, M. R., Stanford Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present the findings of our photometric analysis of both Galileo Solid State Imaging experiment (SSI) and Near Infrared Mapping Spectrometer (NIMS) data of the Jovian main ring. Our results are discussed in the context of previous work. In particular, we reconcile the seemingly disparate results from earlier research. Additional information is contained in the original extended abstract.
Derived from Text
Photometry; Jupiter Rings; Image Analysis

20010044609 Jadavpur Univ., Physics Dept., Calcutta, India
Theoretical Study of Constraints on the C Ring Parameters of Saturn at the Titan -1:0 Resonance
Bhattacharyya, Abhijit, Jadavpur Univ., India; Chakrabarti, S.andip K., Jadavpur Univ., India; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We study the particle dynamics inside Saturn's ring by analytical and numerical method. We find a new shear due to variation of radial velocity along the vertical direction and show that this causes a rapid damping of the bending wave. Additional information is contained in the original extended abstract.
Derived from Text
Radial Velocity; Saturn Rings; Bending

20010044610 University of Western Ontario, Dept. of Geography, London, Ontario Canada
Voyager Images Revisited: New Views of the Satellites of Saturn and Uranus
Stooke, P. J., University of Western Ontario, Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New processing methods applied to Voyager images reveal new features on outer planet satellites, including features on Ariel illuminated by planetshine and many features in areas left blank on USGS maps. New maps of Enceladus demonstrate these improvements. Additional information is contained in the original extended abstract.
Derived from text
Planetary Mapping; Uranus Satellites; Saturn Satellites

20010044611 Baylor Univ., Center for Astrophysics, Space Physics and Engineering Research, Waco, TX USA
Further Investigations of Dust Grain Orbital Behavior Around Neptune
Nazzario, R., Baylor Univ., USA; Hyde, T. W., Baylor Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Dust grain orbital behavior around Neptune is investigated using a fifth order Runge-Kutta method. Additional information is contained in the original extended abstract.
Derived from Text
Dust; Neptune (Planet); Planetary Rings; Computerized Simulation; Orbits

20010044612 Lunar and Planetary Inst., Houston, TX USA

Meteoroid Ablation on the Outer Planets

Moses, J. I., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have calculated the ablation rate of interplanetary dust particles in the atmospheres of Jupiter, Saturn, Uranus, and Neptune. Implications for neutral and ionospheric chemistry and aerosol formation will be discussed. Additional information is contained in the original extended abstract.

Derived from Text

Ablation; Gas Giant Planets; Interplanetary Dust; Meteoroids

20010044613 Open Univ., Planetary and Space Sciences Research Inst., Milton Keynes, UK

Sonar Behaviour in Non-Terrestrial Ocean Exploration

Garry, J. R. C., Open Univ., UK; Towner, M. C., Open Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A goal for a future Europan payload is to determine the extent of the postulated sea, aspects of acoustic remote sensing are discussed with a view to operating a sonar in such a subsurface ocean. Additional information is contained in the original extended abstract.

Derived from Text

Europa; Oceans; Acoustic Sounding; Remote Sensing

20010044614 Brown Univ., Dept. of Geological Sciences, Providence, RI USA

A Composite Flow Law for Water Ice for Use in Modelling of Glaciers, Polar Caps, and Icy Planetary Interiors

Goldsby, D. L., Brown Univ., USA; Kohlstedt, D. L., Minnesota Univ., USA; Pappalardo, R., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The dynamical properties of glaciers, polar caps, and icy planetary interiors are controlled in large part by the grain-scale deformation of ice. A new composite flow law reveals the existence of four distinct creep regimes for ice. Additional information is contained in the original extended abstract.

Derived from Text

Ice; Deformation; Creep Properties; Rheology

20010044615 NASA Ames Research Center, Moffett Field, CA USA

Topographic and Morphologic Evidence for Flooding of Ganymede's Resurfaced Terrains by Low-Viscosity Water-Ice Lavas

McKinnon, W. B., Washington Univ., USA; Schenk, P. M., Lunar and Planetary Inst., USA; Moore, J. M., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Topographic mapping in at least three distinct regions of Ganymede reveals that smooth terrains are flat and are topographically depressed. This and embayment relationships are consistent with volcanic resurfacing. Additional information is contained in the original extended abstract.

Derived from Text

Ganymede; Topology; Morphology; Planetary Mapping; Satellite Surfaces

20010044616 Lancaster Univ., Planetary Sciences Research Group, UK

A Morphological Examination of Lugalmeslam Crater, Ganymede

Thomas, C., Lancaster Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Lugalmeslam is a crater on Ganymede with an unusual elliptical rim where it overlaps the bright terrain of Mashu Sulcus. An analysis of the crater's morphology is presented which provides new insights into the processes that have affected its shape. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Craters; Ganymede; Morphology

20010044617 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Scalloped Depressions on Ganymede from Galileo (G28) Very High Resolution Imaging
Spaun, N. A., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Pappalardo, R. T., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have analyzed new Galileo images of scalloped depressions, described as caldera-like features, on Ganymede to test for evidence of cryovolcanism. Additional information is contained in the original extended abstract.
Derived from Text
Ganymede; Imaging Techniques; Satellite Surfaces; Structural Basins; Volcanology

20010044618 Wheaton Coll., Norton, MA USA
A GIS Crater Database for Comparison of Crater Density on Ganymede Terrain Types and Features
Collins, G. C., Wheaton Coll., USA; Farrar, K. S., Wheaton Coll., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present global mapping of craters on Ganymede in an effort to have a database to generate the crater density of stratigraphic units within the grooved terrain. We also discuss GIS techniques for crater counting. Additional information is contained in the original extended abstract.
Derived from Text
Ganymede; Geographic Information Systems; Thematic Mapping; Satellite Surfaces

20010044619 Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Inst. of Space Sensor Technology and Planetary Exploration, Berlin, Germany
Topography of Ganymede's Arbela Sulcus
Giese, B., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Wagner, R., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Neukum, G., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Pappalardo, R., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Stereo images acquired during Galileo's 28th orbit are used to derive the topography in Ganymede's Arbela Sulcus. Implications for the formation of Arbela are given. Additional information is contained in the original extended abstract.
Derived from Text
Ganymede; Stereophotography; Photogrammetry; Terrain Analysis

20010044620 Brown Univ., Dept. of Geological Science, Providence, RI USA
Ganymede: Very High Resolution Data from G28 Reveal New Perspectives on Processes and History
Head, J. W., III, Brown Univ., USA; Pappalardo, Robert, Brown Univ., USA; Collins, Geoffrey, Brown Univ., USA; Spaun, Nicole, Brown Univ., USA; Nixon, Brian, Brown Univ., USA; Wagner, Roland, Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Giese, Bernd, Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Neukum, Gerhard, Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Recent G28 very high resolution image data provides new insight into five major problem areas and shows evidence for strike-slip faulting and processes perhaps like Europa band formation. Additional information is contained in the original extended abstract.
Derived from Text
Ganymede; Terrain Analysis; Satellite Surfaces; Craters

20010044621 Geological Survey, Flagstaff, AZ USA

Final Digital Global Maps of Ganymede, Europa, and Callisto

Becker, T., Geological Survey, USA; Archinal, B., Geological Survey, USA; Colvin, T., RAND Corp., USA; Davies, M., RAND Corp., USA; Gitlin, A., Geological Survey, USA; Kirk, R., Geological Survey, USA; Weller, L., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Completion of the digital global cartographic maps of Ganymede, Europa, and Callisto. The maps utilize image data acquired from Galileo SSI and Voyager 1 and 2 missions. Additional information is contained in the original extended abstract.

Derived from Text

Callisto; Europa; Ganymede; Planetary Mapping; Digital Data

20010044622 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Radar Observations of the Icy Galilean Satellites During 2000 Opposition

Harcke, L. J., Stanford Univ., USA; Zebker, H. A., Stanford Univ., USA; Jurgens, R. F., Jet Propulsion Lab., California Inst. of Tech., USA; Slade, M. A., Jet Propulsion Lab., California Inst. of Tech., USA; Butler, B. J., National Radio Astronomy Observatory, USA; Harmon, J. K., Arecibo Ionospheric Observatory, Puerto Rico; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report results of radar observation campaigns of Europa, Ganymede, and Callisto carried out during the November/December 2000 Jovian opposition using the Arecibo 12.6 cm, Goldstone 3.5 cm, and Goldstone/VLA 3.5 cm bistatic radars. Additional information is contained in the original extended abstract.

Derived from Text

Radar Imagery; Icy Satellites; Multistatic Radar

20010044623 Brown Univ., Dept. of Geological Sciences, Providence, RI USA

Comparisons of Volcanic Fields on Venus, Earth, and Mars

Kortz, Brian E., Brown Univ., USA; Head, James W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Analysis of volcanic fields on Venus, Earth, and Mars show that venusian shields are most similar to terrestrial low shields. Martian shields are also similar but differ in morphology due to atmospheric and gravity differences. Additional information is contained in the original extended abstract.

Derived from Text

Volcanology; Earth (Planet); Mars (Planet); Venus (Planet)

20010044624 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Arecibo to Goldstone Radar Interferometric Topography of Selected Regions of Venus

Slade, M. A., Jet Propulsion Lab., California Inst. of Tech., USA; Simons, M., California Inst. of Tech., USA; Pritchard, M. E., California Inst. of Tech., USA; Jurgens, R. F., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New high resolution digital elevation models (DEMs) of the equatorial region of Venus will be merged with Magellan imagery in order to investigate the relationship between the emplacement of the plains and the tesserae, and rifting in Phoebe Region. Additional information is contained in the original extended abstract.

Derived from Text

Geological Faults; Interferometry; Venus (Planet); Topography; Venus Surface

20010044625 Kharkov Astronomical Observatory, Kharkov, Ukraine

Volcanic Plains on Venus: Search for Correlation Between Dielectric Permittivity and Stratigraphic Position

Kreslavsky, M. A., Kharkov Astronomical Observatory, Ukraine; Raitala, J., Oulu Univ., Finland; Bondarenko, N. V., Academy of Sciences of the Ukraine, Ukraine; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Survey of microwave emissivity contrasts associated with volcanic units boundaries in Venus plains was carried out. Units with locally higher dielectric permittivity was found to be locally younger. This can be due to surface alteration or mantling. Additional information is contained in the original extended abstract.
Derived from Text
Emissivity; Permittivity; Stratigraphy; Venus (Planet); Volcanoes; Dielectrics

20010044626 Pittsburgh Univ., Dept. of Geology and Planetary Science, Pittsburgh, PA USA
Emplacement of Venusian Lava Flow Fields
Byrnes, Jeffrey M., Pittsburgh Univ., USA; Crown, David A., Pittsburgh Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This study constrains emplacement processes within lava flow fields on Venus through analysis of flow lobe morphologies and radar backscatter characteristics at Mylitta Fluctus, Zipaltonal Fluctus, and within Guinevere Planitia. Additional information is contained in the original extended abstract.
Derived from Text
Flow Distribution; Lava; Venus (Planet); Venus Surface; Radar Imagery

20010044627 Proxemy Research, Inc., Laytonsville, MD USA
Plains Resurfacing on Venus: Examples from Geographically Diverse Quadrangles
Stofan, E. R., Proxemy Research, Inc., USA; Guest, J. E., University Coll., UK; Brian, A. W., University Coll., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We describe plains resurfacing styles in the eight quadrangles we have been mapping under the Venus Geologic Mapping Program. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Mapping; Venus Surface; Plains

20010044628 Academy of Sciences (USSR), Vernadsky Inst. of Geochemistry and Analytical Chemistry, Moscow, USSR
Large Tesserae Flooding Experiment: Comparison with Small Tesserae
Ivanov, M. A., Academy of Sciences (USSR), USSR; Head, J. W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Flooding experiments of existing tessera on Venus produce similarities to tessera with patchy distribution suggesting that tessera underlines many areas of regional plains. Additional information is contained in the original extended abstract.
Derived from Text
Venus (Planet); Venus Surface; Floods

20010044629 Academy of Sciences (USSR), Vernadsky Inst., Moscow, USSR
Geologic Mapping in V-61 Quadrangle, Venus: Preliminary Results
Ivanov, M. A., Academy of Sciences (USSR), USSR; Head, J. W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Preliminary mapping of the V-61 Quadrangle, Venus, shows that the region is transitional between Lavinia Planitia and Lada Terra and is dominated by Quetzalpetlatl Corona. Additional information is contained in the original extended abstract.
Derived from Text
Venus (Planet); Venus Surface; Planetary Mapping

20010044630 Southern Methodist Univ., Dept. of Geological Sciences, Dallas, TX USA
Rusalka Complete: Geology of a Venusian Planitia
Young, D. A., Southern Methodist Univ., USA; Hansen, V. L., Southern Methodist Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We will present a detailed map of Rusalka Planitia, Venus, compiled from V25 and V37. A regional geological history will show the resurfacing and tectonic processes that have shaped the basin. Additional information is contained in the original extended abstract.
Derived from Text
Venus (Planet); Planetary Geology; Planetary Mapping

20010044631 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Stratigraphy and Observations of Nepthys Mons Quadrangle (V54), Venus
Bridges, N. T., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Initial mapping has begun in Venus' Nepthys Mons Quadrangle (V54, 300-330 deg. E, 25-50 deg. S). Major research areas addressed are how the styles of volcanism and tectonism have changed with time, the evolution of shield volcanoes, the evolution of coronae, the characteristics of plains volcanism, and what these observations tell us about the general geologic history of Venus. Reported here is a preliminary general stratigraphy and several intriguing findings. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Mapping; Stratigraphy; Venus Surface; Tectonics; Structural Properties (Geology); Venus (Planet); Plains; Paleontology; Volcanology

20010044632 Universidad Rey Juan Carlos, Escuela Superior de Ciencias Experimentales y Tecnologia, Madrid, Spain
Geology of the Helen Planitia Quadrangle (V52), Venus: Initial Results
Lopez, Ivan, Universidad Rey Juan Carlos, Spain; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

An initial study on the geology of the Helen Planitia Quadrangle (V52) has been carry out. This work describes the different volcanic and tectonic features present in the area, paying special attention to large tectovolcanic structures as coronae. Additional information is contained in the original extended abstract.
Derived from Text
Coronas; Tectonics; Volcanology; Planetary Geology; Volcanoes; Venus (Planet); Structural Properties (Geology)

20010044633 Southern Methodist Univ., Dept. of Geological Sciences, Dallas, TX USA
Geology of the Ovda Regio Quadrangle (V35), Venus
Bleamaster, L. F., III, Southern Methodist Univ., USA; Hansen, V. L., Southern Methodist Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The complex geology of the V35 quadrangle allows the investigation of crustal plateau evolution, chasmata formation, coronae development, and the interactions that occur between them. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Geology; Venus (Planet); Plateaus; Venus Surface; Planetary Crusts; Planetary Evolution; Coronas

20010044634 Southern Methodist Univ., Dept. of Geological Sciences, Dallas, TX USA
The Kuanja/Vir-Ava Chasmata: A Coherent Intrusive Complex on Venus
Bleamaster, L. F., III, Southern Methodist Univ., USA; Hansen, V. L., Southern Methodist Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A "coherent intrusive complex" model accounts for the presence of pit chains, troughs, normal faults, calderas, central volcanoes, lava channels, and lava flows at the Kuanja/Vir-Ava Chasmata. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Geology; Volcanoes; Venus (Planet); Structural Properties (Geology); Planetary Structure

20010044635 Northwestern Univ., Dept. of Geological Sciences, Evanston, IL USA

Orientation of Coronae and Relation to Chasmata on Venus

Jurdy, D. M., Northwestern Univ., USA; Stoddard, P. R., University of Northern Illinois, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

By specifically analyzing the orientation, eccentricity, and tilt of coronae, we seek an independent determination of deformation and uplift history relative to the surrounding regions, as well as the inter-relationship of coronae and chasmata. Additional information is contained in the original extended abstract.

Derived from Text

Coronas; Planetary Geology; Venus (Planet); Stratigraphy; Planetary Structure; Geological Faults

20010044636 Carleton Univ., Ottawa, Ontario Canada

Evidence for Radiating Dyke Swarms Fed from Multiple Magma Chambers Located Within the Central Regions of Volcanic/Magmatic Centres: Two Examples from Southern Sedna Planitia/Northern Western Eistla Regio, Venus

Harris, B. A., Carleton Univ., Canada; Ernst, R. E., Geological Survey of Canada, Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Superimposed radiating graben systems (interpreted to be underlain by dyke swarms) are used to locate multiple magma chambers within volcanic/magmatic centres. Additional information is contained in the original extended abstract.

Derived from Text

Geological Faults; Venus (Planet); Venus Surface; Volcanoes; Planetary Structure

20010044637 Geological Survey of Canada, Ottawa, Ontario Canada

Characterization of Radiating, Linear and Circumferential Graben Systems in Northern Guinevere Planitia/Beta Regio Region (264-312 deg E, 24-60 deg N), Venus

Ernst, R. E., Geological Survey of Canada, Canada; Desnoyers, D. W., Geological Survey of Canada, Canada; Head, J. W., Brown Univ., USA; Grosfils, E. B., Pomona Coll., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Detailed mapping of 1000s of individual narrow graben in an area (264-312 deg E 24-60 deg N) of Venus reveal 29 radiating system (15 having radii greater than 300 km and 7 having radii greater than 1000 km), and 13 linear systems greater than 1000 km long. Additional information is contained in the original extended abstract.

Derived from Text

Venus (Planet); Geological Faults; Venus Surface; Planetary Structure; Planetary Mapping; Volcanoes

20010044638 Imperial Coll. of Science, Technology and Medicine, T. H. Huxley School, London, UK

Continental-like Tectonics Revealed by the Structural History of Thetis Regio, Venus

Ghail, Richard, Imperial Coll. of Science, Technology and Medicine, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Structural mapping of Thetis Regio reveals discrete tectonic terrains, implying that it formed not by a single process of upwelling or downwelling but by multiple continental-like tectonic events, involving considerable horizontal transport. Additional information is contained in the original extended abstract.

Derived from Text

Planetary Mapping; Tectonics; Venus Surface; Planetary Structure; Geological Faults; Plateaus; Venus (Planet)

20010044639 Imperial Coll. of Science, Technology and Medicine, T. H. Huxley School, London, UK

The Complex Case of Beruth Corona

Ghail, Richard, Imperial Coll. of Science, Technology and Medicine, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Detailed stratigraphic mapping of Beruth Corona reveals the complex history of rifting and intrusion that formed this multiple corona in Parga Chasma. Modifications to the diapiric theory are required to explain the range of observed features. Additional information is contained in the original extended abstract.
Derived from Text
Coronas; Geological Faults; Planetary Mapping; Venus (Planet); Stratigraphy; Venus Surface; Planetary Geology; Rock Intrusions; Petrology

20010044640 Academy of Sciences (USSR), Vernadsky Inst. of Geochemistry and Analytical Chemistry, Moscow, USSR
Morphology of Selected Novae, Venus
Basilevsky, A. T., Academy of Sciences (USSR), USSR; Raitala, J., Oulu Univ., Finland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Analysis of five typical novae show if they are one- or multi-stage structures, whether they have associated volcanism, at what stage of nova evolution it occurred, and during which periods of the geologic history of Venus novae formed. Additional information is contained in the original extended abstract.
Derived from Text
Novae; Paleontology; Venus (Planet); Volcanology; Planetary Evolution; Venus Surface; Topography

20010044641 Oulu Univ., Dept. of Physical Sciences, Finland
Model for Nova Formation Within Corona Evolution
Aittola, M., Oulu Univ., Finland; Kostama, V.-P., Oulu Univ., Finland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Our model predicts that the established variations in morphology, topography and the age relations of corona annulus and nova radial features depend on the stage of corona evolution during the nova forming reactivation period or event. Additional information is contained in the original extended abstract.
Derived from Text
Coronas; Novae; Tectonics; Volcanoes; Astronomical Models; Geological Faults

20010044642 Academy of Sciences (USSR), Vernadsky Inst., Moscow, USSR
Novae on Venus: Distribution, Classification and Evolution
Krassilnikov, A. S., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Basing on analysis of topography and geology of 64 novae we suggest their classification and sequence of evolution. Our results are in agreement with published numerical, geological and tectonophysical models of the nova and corona formation. Additional information is contained in the original extended abstract.
Derived from Text
Classifications; Coronas; Novae; Structural Properties (Geology); Galactic Evolution; Star Formation; Planetary Structure; Venus (Planet)

20010044643 Academy of Sciences (USSR), Vernadsky Inst., Moscow, USSR
Formation of Novae and Coronae on Venus: Tectonophysical Modeling Using Gravity Models
Krassilnikov, A. S., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Novae and coronae formation was simulated using caoutchouc as a model of lower ductile part of lithosphere and dry flour as a model of upper brittle part of it. Distribution and character of the deformational structures is described. Additional information is contained in the original extended abstract.
Derived from Text
Coronas; Novae; Geological Faults; Astronomical Models; Venus Surface; Tectonics; Planetary Geology; Planetary Structure

20010044644 Oulu Univ., Dept. of Physical Sciences, Finland

The Global Distribution and Altimetry of Venusian Arachnoids, Novae and Coronae

Kostama, V.-P., Oulu Univ., Finland; Aittola, M., Oulu Univ., Finland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The study of the altimetry of coronae, arachnoids and novae shows that arachnoids and novae both have correlations to the altimetric distribution of coronae, while being in contrast to each others. The global distributions are distinct and different. Additional information is contained in the original extended abstract.

Derived from Text

Coronas; Novae; Venus (Planet); Planetary Geology; Satellite Altimetry; Astronomical Catalogs

20010044645 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

An Updated Database of Coronae on Venus

Stofan, E. R., Proxemy Research, Inc., USA; Baloga, S. M., Proxemy Research, Inc., USA; Glaze, L. S., Proxemy Research, Inc., USA; Smrekar, S. E., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present an updated database of coronae on Venus, increasing the number of features from 336 to 523. Additional information is contained in the original extended abstract.

Derived from Text

Venus (Planet); Data Bases; Coronas; Astronomical Catalogs

20010044646 Kansas Univ., Dept. of Geology, Lawrence, KS USA

The Deep Structure of Coronae on Venus: The Beta-Atla-Themis Region

Peterson, Kelly, Kansas Univ., USA; Kiefer, Walter S., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Gravity modeling indicates the presence of hot diapirs under some large coronae in the BAT region of Venus. Other coronae are located over regions of average mantle temperature, indicating a significant period of thermal cooling since those coronae formed. Additional information is contained in the original extended abstract.

Derived from Text

Coronas; Venus (Planet); Planetary Structure; Venus Surface; Astronomical Models; Planetary Geology

20010044647 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Implications of a Gravity Survey for the Formation Mechanisms and Stage of Evolution of Topographic (Stealth) Coronae

Smrekar, S. E., Jet Propulsion Lab., California Inst. of Tech., USA; Stofan, E. R., Proxemy Research, Inc., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Gravity/topography admittance spectra for 34 topographic (stealth) coronae show a range of bottom and top loading signatures. Here we interpret these loading signatures in the context of possible models of their formation. Additional information is contained in the original extended abstract.

Derived from Text

Coronas; Topography; Gravitation; Isostasy; Galactic Evolution; Planetary Structure

20010044648 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Topographic Corona Gravity Survey Results

Comstock, R. L., University of Central Washington, USA; Smrekar, S. E., Jet Propulsion Lab., California Inst. of Tech., USA; Anderson, F. S., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present estimates for elastic and crustal thickness obtained from a gravity survey of Venusian topographic coronae, and characterize advantages and disadvantages for generating spectral admittance. Additional information is contained in the original extended abstract.
Derived from Text
Coronas; Gravitation; Venus (Planet); Planetary Crusts; Planetary Structure; Structural Properties (Geology)

20010044649 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA
Finite Amplitude Relaxation of Crustal Plateaus on Venus
Nunes, D. C., Washington Univ., USA; Phillips, R. J., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Viscous relaxation of initially compensated crustal plateaus on Venus has finite amplitude, reducing initial topography by less than 25%, and is too limited to support the idea of a genetic link between crustal plateaus and arcuate tessera inliers. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Crusts; Inliers (Landforms); Plateaus; Topography; Venus (Planet); Venus Surface; Planetary Structure

20010044650 Tokyo Univ., Dept. of Earth and Planetary Science, Hongo, Japan
The Interior of Venus: Inferred from Long Wavelength Geoid and Topography Data
Nomura, T., Tokyo Univ., Japan; Abe, Y., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We constrain the flow pattern and upper-lower viscosity contrast in Venusian mantle from the observed long wavelength admittance (geoid height / topographic height) data using a dynamic support model. Additional information is contained in the original extended abstract.
Derived from Text
Geoids; Topography; Venus (Planet); Astronomical Models; Planetary Mantles; Planetary Structure; Planetary Geology; Geophysical Fluids; Geophysical Observatories

20010044651 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Global Admittance Estimates of Elastic and Crustal Thickness of Venus: Preliminary Results from Top and Bottom Loading Models
Anderson, F. S., Jet Propulsion Lab., California Inst. of Tech., USA; Smrekar, S. E., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Initial elastic and crustal thickness estimates (Te and Zc) for a global set of local admittance inversions with a one degree spacing for Venus provide a global map for interpreting subsurface structure. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Crusts; Venus (Planet); Venus Surface; Planetary Structure; Planetary Geology; Structural Properties (Geology)

20010044652 Tsukuba Space Center, Centrifuge Project Team, Japan
Melting Experiment on Ancient Mare Basalt Asuka 881757
Arai, T., Tsukuba Space Center, Japan; Takeda, H., Chiba Inst. of Tech., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Asuka (A) 881757 is an unbrecciated, coarse-grained mare basalt that crystallized at 3.94 Ga, with very low TiO2. Melting experiments on A881757 were performed to understand the cooling/crystallization history of this new type of basalt, focusing on spinel. Additional information is contained in the original extended abstract.
Derived from Text
Basalt; Crystallization; Planetary Geology; Melting; Mineralogy; Cooling Flows (Astrophysics); Petrogenesis

20010044653 Brown Univ., Dept. of Geological Sciences, Providence, RI USA

The Ilmenite Saturation Surface of High Ti Mare Basalts

Beck, A. R., Brown Univ., USA; Hess, P. C., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have calculated the ilmenite saturation surface for high Ti mare basaltic glasses and applied it to basalt petrogenesis. Additional information is contained in the original extended abstract.

Derived from Text

Basalt; Ilmenite; Petrogenesis; Mineralogy; Melting; Glass; Lunar Rocks; Lunar Composition; Lunar Geology; Solubility

20010044654 Massachusetts Inst. of Tech., Dept. of Earth, Atmospheric and Planetary Sciences, Cambridge, MA USA

Is the Sinking High-Ti Cumulate Hypothesis Sunk?

Tanton, L. T. Elkins, Massachusetts Inst. of Tech., USA; VanOrman, J. A., Carnegie Institution of Washington, USA; Grove, T. L., Massachusetts Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The physical and petrologic aspects of five high-Ti cumulate overturn models are examined, and only two are found to be possible. Wholesale sinking of late-stage high-Ti lunar cumulates is unlikely. Additional information is contained in the original extended abstract.

Derived from Text

Crystallization; Ilmenite; Magma; Lunar Crust; Lunar Rocks; Volcanoes; Petrology; Lunar Geology

20010044655 NASA Johnson Space Center, Houston, TX USA

Deciphering Ages of Impacted Basalts Using a Crystal Chemical-Ion Microprobe Approach: An Example Using the Apollo 17 Group D Basalt

Shearer, C. K., New Mexico Univ., USA; Borg, L., New Mexico Univ., USA; Ryder, G., Lunar and Planetary Inst., USA; Papike, J. J., New Mexico Univ., USA; Nyquist, L., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report on the major and trace element characteristics of a ”glass” component in a mare basalt (79001) and speculate on its role in defining the isotopic behavior of this sample. Additional information is contained in the original extended abstract.

Derived from Text

Trace Elements; Basalt; Minerals; Planetary Crusts; Glass; Ion Probes; Petrology; Chemical Analysis; Planetary Mantles; Planetary Geology

20010044656 New Mexico Univ., Inst. of Meteoritics, Albuquerque, NM USA

Trace Element Variability of the Apollo 14 High-Al Basalts: A Result of Igneous Processes or Sample Size?

Hagerty, J. J., New Mexico Univ., USA; Shearer, C. K., New Mexico Univ., USA; Papike, J. J., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Three fragments of aluminous basalt were analyzed via SIMS. Each fragment exhibited a range of bulk incompatible element concentrations. The data from these fragments show an interesting dichotomy in the incompatible-compatible element behavior. Additional information is contained in the original extended abstract.

Derived from Text

Basalt; Fragments; Trace Elements; Lunar Rocks; Petrogenesis; Igneous Rocks; Minerals; Regolith; Lunar Geology

20010044657 PIT, Toronto, Ontario Canada

Stratigraphy of the Schickard Crater Area: Investigations Using Statistical Crater Modeling

Antonenko, I., PIT, Canada; Prinos, J., PIT, Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Craters from previous work in the Schickard area are compared to a model crater population, and are found to be consistent with a stratigraphic model having two cryptomare layers. Statistically, very few craters are expected to tap deep mare laye Additional information is contained in the original extended abstract.rs.
Derived from Text
Lunar Craters; Statistical Analysis; Stratigraphy; Volcanoes; Lunar Rocks; Ejecta; Lunar Maria; Basalt

20010044658 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Extent of Basaltic Volcanism in South Pole-Aitken Basin
Pieters, C. M., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In addition to basaltic mare identified within SPA, several older basaltic deposits (cryptomare) are recognized. SPA basalts occur as localized deposits and there is no evidence for extensive volcanism similar to that in basins on the nearside. Additional information is contained in the original extended abstract.
Derived from Text
Basalt; Volcanology; Lunar Maria; Topography; Lunar Crust; Lunar Craters; Minerals; Lunar Surface

20010044659 Bates Coll., Geology Dept., Lewiston, ME USA
Analysis of the Oppenheimer Pyroclastic Deposits Using Clementine UVVIS Data
Petro, N. E., Bates Coll., USA; Gaddis, L. R., Geological Survey, USA; Staid, M. I., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Clementine data are used to examine the compositions of pyroclastic deposits in the lunar farside crater Oppenheimer. The compositions of these deposits are compared to those of other pyroclastic deposits in SPA basin and in Alphonsus. Additional information is contained in the original extended abstract.
Derived from Text
Lunar Craters; Volcanology; Lunar Surface; Lunar Maria; Composition (Property); Minerals; Volcanoes; Lunar Albedo

20010044660 Hawaii Univ., Hawaii Inst. of Geophysics and Planetology, Honolulu, HI USA
Geochemical Studies of the Moscoviense Basin Region
Hawke, B. Ray, Hawaii Univ., USA; Robinson, M. S., Northwestern Univ., USA; Craddock, R. A., National Air and Space Museum, USA; Blewett, D. T., Hawaii Univ., USA; Smith, G. A., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Clementine UVVIS images, iron maps, titanium maps, and maturity images were used to investigate the composition and origin of surface units in the Moscoviense basin regi Additional information is contained in the original extended abstract.on.
Derived from Text
Geochemistry; Lunar Surface; Composition (Property); Lunar Rocks; Lunar Craters; Iron Oxides; Titanium Oxides; Volcanoes

20010044661 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
New Age Determinations of Lunar Mare Basalts in Mare Cognitum, Mare Nubium, Oceanus Procellarum, and Other Nearside Mare
Hiesinger, H., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Wolf, U., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Neukum, G., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present crater size-frequency distribution measurements for spectrally homogeneous basalt units in Mare Cognitum, Mare Nubium, Oceanus Procellarum, and other nearside maria. We combine these data with volume estimates to study the flux of basalts. Lunar mare basalts cover about 17% of the lunar surface [1]. A significant portion of lunar mare basalts are exposed within Oceanus Procellarum for which absolute radiometric age data are still lacking. Here we present age data that are based on remote sensing techniques, that is, crater counts. We performed new crater size-frequency distribution measurements for spectrally homogeneous basalt units in Mare Cognitum, Mare Nubium, and Oceanus Procellarum. The investigated area was previously mapped by Whitford-Stark and Head [2] who, based on morphology and spectral characteristics, defined 21 distinctive basalt types in this part of the lunar nearside. Based on a high-resolution Clementine color ratio composite (e.g., 750-400/750+400

ratio as red, 750/990 ratio as green, and 400/750 ratio as blue), we remapped the distribution of distinctive basalts and found that their map well discriminates the major basalt types. However, based on the new high-resolution color data several of their units can be further subdivided into spectrally different basalt sub-types. The purpose of remapping the basalts in Oceanus Procellarum was to define spectrally homogeneous units for which we assume that they were formed within a short period of time with to a first order homogeneous mineralogy, such as a single eruptive phase. Definition of homogeneous units is one of the crucial prerequisites for reliable age determinations with crater size-frequency distribution measurements. Having defined such units with Clementine images, we transferred the unit boundaries to high- resolution Lunar Orbiter IV images in order to measure the crater size-frequency distribution. Clementine images are not well suited for crater counts because of their high sun angle. The technique of crater size-frequency distribution measurements on spectrally homogeneous regions has been previously applied to basalts in Mare Imbrium, Serenitatis, Tranquillitatis, Humorum, Humboldtianum, Australe and is described in detail by [3]. Additional information is contained in the original extended abstract.
Derived from Text
Lunar Craters; Lunar Maria; Mineralogy; Size Distribution; Lunar Surface; Basalt

20010044662 Tennessee Univ., Dept. of Geology, Chattanooga, TN USA
The Stratigraphy of Lava Flows in Northern Oceanus Procellarum, Moon
Boroughs, Lydia L., Tennessee Univ., USA; Spudis, Paul D., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Using Clementine image data, we have mapped the stratigraphy of lava flows in Northern Oceanus Procellarum. We find a variety of flows with varying compositions and ages, attesting to protracted volcanic eruption history. Additional information is contained in the original extended abstract.
Derived from Text
Fluid Flow; Lava; Lunar Maria; Stratigraphy; Volcanology; Lunar Surface; Lunar Craters; Basalt; Volcanoes

20010044663 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA
Thorium Content of Mare Basalts of the Western Procellarum Region
Jolliff, B. L., Washington Univ., USA; Gillis, J. J., Washington Univ., USA; Lawrence, D. J., Los Alamos National Lab., USA; Maurice, S., Observatoire de Midi-Pyrenees, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Maps of FeO, TiO2, and Th for a region of Western Procellarum are shown at half-degree resolution. Using compositional profiles and geological relationships, we show some of the basalts to be enriched in Th, similar to Apollo 11 high-K basalts. Additional information is contained in the original extended abstract.
Derived from text
Basalt; Iron Oxides; Lunar Maria; Thorium; Titanium Oxides; Lunar Geology; Lunar Surface; Minerals; Lunar Craters; Regolith; Volcanoes

20010044664 European Space Agency. European Space Research and Technology Center, ESTEC, Space Science Dept., Noordwijk, Netherlands
Volcanism on the Marius Hills Plateau
Heather, D. J., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Dunkin, S. K., Science Research Council, UK; Wilson, L., Lancaster Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Marius Hills region has been studied using Clementine data. A wide range of eruption styles have shaped the plateau. Pyroclastics appear on many scales as both localized glassy deposits and well developed cones. Modelling work is ongoing. Additional information is contained in the original extended abstract.
Derived from Text
Deposits; Plateaus; Volcanology; Lunar Topography; Lunar Surface; Basalt; Spectrum Analysis; Volcanoes; Lunar Maria

20010044665 Minnesota State Univ., Moorhead, MN USA

Mapping Activity Variations for Ru2O3 in Lunar Volcanic Green Glass Analogs Using Differential Pulse Voltammetry

Malum, K. M., Minnesota State Univ., USA; Colson, R. O., Minnesota State Univ., USA; Sawarynski, M., Minnesota State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-7366; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Using differential pulse voltammetry, we are mapping variations in activities for NiO and Ru2O3 as a function of compositional variation for compositions centered around an Apollo 15 green glass analog. Additional information is contained in the original extended abstract.

Derived from Text

Glass; Volcanoes; Composition (Property); Nickel Oxides; Ruthenium Compounds; Basalt; Volumetric Analysis; Lunar Surface

20010044666 Centre de Recherches Petrographiques et Geochimiques, Nancy, France

Nitrogen and Argon Isotopes in Single Particles from Luna-24 Regolith: Search for the Modern Solar Wind Component

Assonov, S. S., Academy of Sciences (USSR), USSR; Marty, B., Centre de Recherches Petrographiques et Geochimiques, France; Shukolyukov, Y. A., Academy of Sciences (USSR), USSR; Semenova, A. S., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Luna-24 breccia and agglutinate particles were analysed for N and Ar isotopes. Majority of particles has negative 15 N values as well as low 40 Ar/36 Ar. Trend seen for particles with low 40 Ar/36 Ar is suggestive modern solar wind to be lighter than sought before.

Derived from Text

Agglutination; Breccia; Nitrogen Isotopes; Solar Wind; Lunar Rocks; Argon Isotopes; Regolith; Lunar Surface; Isotope Ratios

20010044667 National Science Foundation, Tucson, AZ USA

Cosmic-Ray-Produced C-14 and Be-10 in Lunar Rock 74275

Jull, A. J. T., National Science Foundation, USA; McHargue, L. R., National Science Foundation, USA; Klandrud, S. E., National Science Foundation, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-4832; NSF EAR-97-30699; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The depth dependence of C-14 and Be-10 produced by the action of solar and galactic cosmic rays on lunar rock 74275 was studied. The results are compared to those of other lunar rocks where many radionuclides have been studied, such as 68815. Additional information is contained in the original extended abstract.

Derived from Text

Beryllium Isotopes; Carbon 14; Lunar Rocks; Radioactive Isotopes; Irradiation; Lunar Surface; Cosmic Rays

20010044668 Colorado Univ., Lab. for Atmospheric and Space Physics, Boulder, CO USA

Dust Particle Charging near Surfaces in Space

Sickafoose, A. A., Colorado Univ., USA; Colwell, J. E., Colorado Univ., USA; Horanyi, M., Colorado Univ., USA; Robertson, S., Colorado Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Dust dynamics, as observed on the lunar surface, are thought to be due to the interaction between charged dust and a photoelectron sheath above the surface. We perform experiments on the charging and dynamics of dust near a surface having a sheath Additional information is contained in the original extended abstract.

Derived from Text

Lunar Dust; Lunar Surface; Particle Charging; Photoelectrons; Sheaths; Particle Interactions

20010044669 Max-Planck-Inst. fuer Aeronomie, Katlenburg-Lindau, Germany

Electric Potential Distribution on the Nightside of the Moon

Mall, Urs A., Max-Planck-Inst. fuer Aeronomie, Germany; Borisov, N., Academy of Sciences (Russia), Russia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The electric potential distribution close to the lunar surface on the nightside of the Moon is investigated in an analytic form. Additional information is contained in the original extended abstract.
Derived from Text
Electric Potential; Lunar Surface; Distribution Functions; Photoelectric Emission; Solar Wind; Space Charge

20010044670 Massachusetts General Hospital, Northeast Proton Therapy Center, Boston, MA USA
Production of Na-22 and Other Radionuclides by Neutrons in Al, SiO2, Si, Ti, Fe and Ni Targets: Implications for Cosmic Ray Studies
Sisterson, J. M., Massachusetts General Hospital, USA; Jones, D. T. L., National Accelerator Centre, South Africa; Binns, P. J., National Accelerator Centre, South Africa; Langen, K., National Accelerator Centre, South Africa; Schroeder, I., National Accelerator Centre, South Africa; Buthelezi, Z., National Accelerator Centre, South Africa; Latti, E., National Accelerator Centre, South Africa; Brooks, F. D., Cape Town Univ., South Africa; Buffler, A., Cape Town Univ., South Africa; Allie, M. S., Cape Town Univ., South Africa; Herbert, M. S., Cape Town Univ., South Africa; Nchodu, M. R., Cape Town Univ., South Africa; Makupula, S., Cape Town Univ., South Africa; Ullmann, J., Los Alamos National Lab., USA; Reedy, R. C., Los Alamos National Lab., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): W-7405-eng-36; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Cross section measurements for neutron-induced reactions are summarized. Measured cross sections for 22 Na produced by neutrons in Al and Si are used to calculate the production rate for 22 Na in lunar rock 12002 by galactic cosmic ray particles. Additional information is contained in the original extended abstract.
Derived from Text
Lunar Rocks; Neutrons; Nuclear Reactions; Radioactive Isotopes; Sodium 22; Lunar Surface; Neutron Beams; Cosmic Rays; Irradiation

20010044671 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA
Petrology and Geochemistry of Lunar Regolith Particle 65903,16-7: Evidence for Extreme Reduction and Oxidation
Zeigler, R. A., Washington Univ., USA; Jolliff, B. L., Washington Univ., USA; Korotev, R. L., Washington Univ., USA; Kremser, D. T., Washington Univ., USA; Haskin, L. A., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-4172; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Apollo 16 particle 65903,16-7 is a magnesian, alkali-rich impact melt breccia. Low Fe/Mn and high phosphide/phosphate ratios are evidence of severe reduction during impact-melt cooling. Presence of carbonate and FeOOH is evidence for later oxidation. Additional information is contained in the original extended abstract.
Derived from Text
Geochemistry; Lunar Rocks; Breccia; Petrology; Regolith; Oxidation; Reduction (Chemistry); Magnesium; Chemical Analysis; Alkalies; Impact Melts; Lunar Composition; Mineralogy

20010044672 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Meteor Storm Evidence Against the Recent Formation of Lunar Crater Giordano Bruno
Withers, Paul, Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

It has been suggested that the formation of 22 km diameter lunar crater Giordano Bruno was witnessed in June 1178 AD. to date, this hypothesis has not been well tested. Such an impact on the Earth would be ”civilization threatening.” Previous studies have shown that the formation of Giordano Bruno would lead to the arrival of 10 million tonnes of ejecta in the Earth#s atmosphere in the following week. I calculate that this would cause a week-long meteor storm potentially comparable to the peak of the 1966 Leonids storm. The lack of any known historical records of such a storm is evidence against the recent formation of Giordano Bruno. Additional information is contained in the original extended abstract.
Derived from text
Lunar Craters; Meteoroids; Storms; Lunar Environment; Galactic Evolution

20010044673 Witwatersrand Univ., Impact Cratering Research Group, Johannesburg, South Africa

Granulitic Melt Breccias in the Vredefort Impact Structure, South Africa: A Terrestrial Analog for Lunar Granulites

Gibson, R. L., Witwatersrand Univ., South Africa; Reimold, W. U., Witwatersrand Univ., South Africa; Ashley, A. J., Witwatersrand Univ., South Africa; Koeberl, C., Wien Univ., Austria; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Feldspathic granulitic breccia veins in Archean gneiss of the core of the Vredefort Dome are thought to be products of impact-induced melting. These breccia veins have some features in common with lunar granulites, the origin of which is still enigmatic. Additional information is contained in the original extended abstract.

Derived from Text

Breccia; Melting; Minerals; Feldspars; Earth Crust; Mineralogy; Metamorphism (Geology); Petrology; Rocks

20010044674 Tennessee Univ., Planetary Geosciences Inst., Knoxville, TN USA

Bulk Chemistry and Oxygen Isotopic Compositions of Lunar Meteorites Dhofar 025 and Dhofar 026

Taylor, L. A., Tennessee Univ., USA; Nazarov, M. A., Academy of Sciences (USSR), USSR; Cohen, B. A., Tennessee Univ., USA; Warren, P. H., California Univ., USA; Barsukova, L. D., Academy of Sciences (USSR), USSR; Clayton, R. N., Chicago Univ., USA; Mayeda, T. K., Chicago Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The major- and trace-element composition of highlands meteorites Dh25 and Dh26 show that both are dominated by a FAN component. Incompatible element depletion and low Ti abundances suggest a farside origin. O-isotopes are typical for lunar meteorites. Additional information is contained in the original extended abstract.

Derived from text

Isotopic Labeling; Meteorites; Meteoritic Composition; Oxygen Isotopes; Trace Elements; Minerals; Lunar Rocks; Lunar Soil; Textures; Neutron Activation Analysis; Regolith

20010044675 Tennessee Univ., Planetary Geosciences Inst., Knoxville, TN USA

Mineralogy and Petrology of "New" Lunar Meteorite Dhofar 025

Cahill, J. T., Tennessee Univ., USA; Cohen, B. A., Tennessee Univ., USA; Taylor, L. A., Tennessee Univ., USA; Nazarov, M. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Dh25 is an anorthositic regolith breccia. The mineral chemistry of most rock and melt clasts have compositions intermediate between FAN and HMS fields, indicative of a non-Apollo, FAN-rich locale, possibly the lunar farside. Additional information is contained in the original extended abstract.

Derived from Text

Breccia; Meteorites; Mineralogy; Petrology; Regolith; Impact Melts; Lunar Rocks; Minerals; Meteoritic Composition; Chemical Analysis

20010044676 Tennessee Univ., Planetary Geosciences Inst., Knoxville, TN USA

Impact Melt Compositions in Lunar Meteorite Dhofar 025

Cohen, B. A., Tennessee Univ., USA; Taylor, L. A., Tennessee Univ., USA; Nazarov, M. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The chemistry of crystalline impact melt clasts within lunar highlands meteorite Dh25 indicate that they are derived from KREEP-poor, basalt-free areas, making them good targets for age dating to further constrain the bombardment history of the Moon. Additional information is contained in the original extended abstract.

Derived from Text

Basalt; Breccia; Impact Melts; Meteorites; Mineralogy; Regolith; Lunar Rocks; Lunar Surface; Meteoritic Composition

20010044677 Academy of Sciences (USSR), Vernadsky Inst. of Geochemistry and Analytical, Moscow, USSR

Noble Gases in Three Meteorites from Oman

Shukolyukov, Y. A., Academy of Sciences (USSR), USSR; Nazarov, M. A., Academy of Sciences (USSR), USSR; Paetsch, M., Max-Planck-Inst. fuer Chemie, Germany; Schultz, L., Max-Planck-Inst. fuer Chemie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Concentration and isotopic composition have been measured in three new lunar meteorites: Dhofar 025, Dhofar 026, and Dhofar 081. These meteorites are not paired. Additional information is contained in the original extended abstract.

Derived from Text

Meteorites; Rare Gases; Meteoritic Composition; Cosmic Gases; Gas Composition; Lunar Rocks; Lunar Soil; Meteoroids; Solar Wind

20010044678 Notre Dame Univ., Dept. of Civil Engineering and Geological Science, IN USA

The Siderophile Element Budget of the Moon: A Reevaluation, Part 2

Neal, C. R., Notre Dame Univ., USA; Ely, J. C., Notre Dame Univ., USA; Jain, J. C., Notre Dame Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New PGE data are presented that show distinctions between the high- and low-Ti mare basalts. Additional information is contained in the original extended abstract.

Derived from Text

Basalt; Lunar Maria; Magnesium Oxides; Olivine; Lunar Rocks; Platinum; Chondrites; Titanium

20010044679 Pavia Univ., Dept. di Scienze della Terra, Italy

Complex Cooling Histories of Lunar Troctolite 76535 and Stillwater Orthoyroxenite SC-936

Domeneghetti, M. Chiara, Pavia Univ., Italy; McCallum, I. S., Washington Univ., USA; Schwartz, J. M., Washington Univ., USA; Camara, F., Pavia Univ., Italy; Zema, M., Pavia Univ., Italy; McCammon, C., Bayreuth Univ., Germany; Ganguly, J., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-4540; NAGW-3638; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Fe-Mg site occupancy determinations of orthopyroxene from troctolite 76535 yield closure temperatures of ordering of 500-550 C and cooling rates of 1-10 C per year corresponding to shallow burial. 76535 was excavated from deep lunar crust before it had cooled to approx. 550 C. Additional information is contained in the original extended abstract.

Derived from Text

Cooling; Lunar Crust; Anorthosite; Lunar Maria; Microanalysis; Minerals; Recrystallization; Stratigraphy; Iron Compounds; Magnesium Compounds

20010044680 Kyushu Univ., Dept. of Earth and Planetary Sciences, Fukuoka, Japan

Structures Beneath Lunar Basins: Estimates of Moho and Elastic Thickness from Local Analysis of Gravity and Topography

Aoshima, Chiaki, Kyushu Univ., Japan; Namiki, Noriyuki, Kyushu Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We attempt localized spectral analysis of the Moon and then apply possible compensation mechanisms to explain the observed admittance. The Moho depth over the near side is estimated to be constantly 50-60 km. Additional information is contained in the original extended abstract.

Derived from Text

Basalt; Lunar Craters; Lunar Maria; Isostasy; Lunar Topography; Spectrum Analysis; Structural Basins; Lunar Crust

20010044681 California Inst. of Tech., Pasadena, CA USA

Origin and Implications of the Degree Two Lunar Gravity Field

Stevenson, David J., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

There are major problems with the long-favored idea that the lunar degree two gravity field is a fossil tidal and rotational bulge. Alternatives or additions to this include primordial heterogeneity and variation in elastic properties of the lithosphere. Additional information is contained in the original extended abstract.
Derived from Text
Gravitational Fields; Lunar Gravitation; Fossils; Lithosphere; Lunar Crust; Lunar Surface

20010044682 Copenhagen Univ., Dept. of Geophysics, Denmark
The Deep Lunar Velocity Structure Infered from Lunar Free Oscillations
Khan, A., Copenhagen Univ., Denmark; Mosegaard, K., Copenhagen Univ., Denmark; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have inverted a number of fundamental spheroidal oscillations to infer the deep lunar velocity structure. The results seem to corroborate the findings from our arrival time inversion. Additional information is contained in the original extended abstract.
Derived from Text
Free Vibration; Moonquakes; Seismic Waves; Lunar Geology; Lunar Surface; Hypervelocity Impact

20010044683 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Influence of a Fluid Lunar Core on the Moons Orientation
Williams, J. G., Jet Propulsion Lab., California Inst. of Tech., USA; Boggs, D. H., Jet Propulsion Lab., California Inst. of Tech., USA; Ratcliff, J. T., Jet Propulsion Lab., California Inst. of Tech., USA; Yoder, C. F., Jet Propulsion Lab., California Inst. of Tech., USA; Dickey, J. O., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Oblateness of and dissipation at the lunar liquid-core/solid-mantle boundary affects the precession of core and mantle. Analysis of Lunar Laser ranges gives a weak detection of oblateness and a strong determination of dissipation. Additional information is contained in the original extended abstract.
Derived from Text
Lunar Core; Lunar Mantle; Lunar Composition; Lunar Geology; Rotating Fluids; Attitude (Inclination)

20010044684 KenKnight (Charles E.), USA
The Radial Mass Distribution Due to Heating Events
KenKnight, Charles E., KenKnight (Charles E.), USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Heating events in the solar nebula were localized in 3D, on the order of the scale height for the gas. This idea, combined with a changing of the ”surface” of the nebula in response to the event, predicts the observed projected surface density. Additional information is contained in the original extended abstract.
Derived from Text
Heating; Planetary Nebulae; Radial Distribution; Mass Distribution; Nebulae

20010044685 Washington Univ., Dept. of Astronomy, Seattle, WA USA
Shock Chemistry in the Inner Solar Nebula: Implications for Meteorites and Protoplanetary Disks
Kress, M. E., Washington Univ., USA; Desch, S. J., Carnegie Institution of Washington, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We calculate the gas-phase chemical abundances behind chondrule-forming (7-8 km/sec) shocks. We discuss the consequences on the chemistry of the terrestrial-planet-forming regions of protoplanetary disks. Additional information is contained in the original extended abstract.
Derived from Text
Chondrule; Meteoritic Composition; Protoplanetary Disks; Terrestrial Planets; Interstellar Matter; Meteorites; Nebulae; Planetary Nebulae; Cosmochemistry

20010044686 Arizona Univ., Dept. of Planetary Science, Tucson, AZ USA

Modeling the Effects of Ion Radiation on Crystalline Water Ice

Mastrapa, R. M. E., Arizona Univ., USA; Brown, R. H., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We will present model results from the collision cascade program, MARLOWE. We will attempt to constrain timescales and depth of processing of icy surfaces by ion radiation, specifically the conversion of crystalline water ice to amorphous. Additional information is contained in the original extended abstract.

Derived from Text

Ice; Radiation Effects; Astronomical Models; Kuiper Belt; Ion Irradiation; Crystal Structure; Collisions; Radiation Damage; Regolith; Solids

20010044687 Eidgenoessische Technische Hochschule, Inst. for Isotope Geochemistry, Zurich, Switzerland

The Influence of Cosmic-Ray Production on Extinct Nuclide Systems: New Results from Improved Model Calculations

Leya, I., Eidgenoessische Technische Hochschule, Switzerland; Wieler, R., Eidgenoessische Technische Hochschule, Switzerland; Halliday, A. N., Eidgenoessische Technische Hochschule, Switzerland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present new results for the cosmogenic contributions to extinct nuclide systems. Additional information is contained in the original extended abstract.

Derived from Text

Cosmic Rays; Cosmology; Extinction; Irradiation; Radioactive Isotopes; Lunar Geology; Lunar Rocks; Regolith; Isotopic Labeling

20010044688 Baylor Univ., Center for Astrophysics, Waco, TX USA

Simulating Dust Lattice Waves in Plasma Crystals Using the Box_Tree Code

Qiao, K., Baylor Univ., USA; Hyde, T. W., Baylor Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Dust Acoustic Wave (DAW) and Dust Lattice Wave modes within a dust crystal are examined using the Box_Tree code. Additional information is contained in the original extended abstract.

Derived from Text

Plasmas (Physics); Sound Waves; Interplanetary Dust; Astronomical Models; Computer Programs; Crystals

20010044689 Baylor Univ., Center for Astrophysics, Space Physics and Engineering Research, Waco, TX USA

Dynamics of Interplanetary Planetesimal Rings

Lindsay, Bruce D., Baylor Univ., USA; Hyde, Truell W., Baylor Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Among the problems yet to be solved by current theories of solar system formation is the origin of the Jupiter-family comets. Several possibilities are examined using a fifth-order Runge-Kutta algorithm. Additional information is contained in the original extended abstract.

Derived from text

Algorithms; Comets; Planetary Evolution; Protoplanets; Runge-Kutta Method; Planetary Rings; Jupiter (Planet)

20010044690 Missouri Univ., Dept. of Nuclear Chemistry, Rolla, MO USA

The Suns Origin, Composition and Source of Energy

Manuel, O., Missouri Univ., USA; Bolon, C., Missouri Univ., USA; Zhong, M., Iowa State Univ. of Science and Technology, USA; Jangam, P., Missouri Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Sun and its planetary system formed out of the debris of a supernova. The Sun formed on the collapsed SN core, a neutron star, which generates SW-H and solar luminosity by emission of neutrons, n-capture or decay, H upward migration and fusion, and escape of SW-H. Additional information is contained in the original extended abstract.
Derived from Text
Gravitational Collapse; Sun; Supernovae; Galactic Evolution; Solar System; Neutron Stars; Cosmology

20010044691 Academy of Sciences (USSR), Inst. for Dynamics of Geospheres, Moscow, USSR
Numerical Modeling of Impact Cratering at Shallow Sea
Shuvalov, V. V., Academy of Sciences (USSR), USSR; Artemieva, N. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): RFBR-00-05-81152; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In this paper impacts into shallow water are studied by detailed numerical simulations. Additional information is contained in the original extended abstract.
Derived from Text
Cratering; Mathematical Models; Seas; Shallow Water; Simulation; Impactors; Point Impact; Craters

20010044692 NASA Ames Research Center, Moffett Field, CA USA
Oblique Impact Ejecta Flow Fields: An Application of Maxwells Z Model
Anderson, J. L. B., Brown Univ., USA; Schultz, P. H., Brown Univ., USA; Heineck, J. T., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-3877; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Oblique impact flow fields show an evolution from asymmetric to symmetric ejecta flow. This evolution can be put into the simple analytical description of the evolving flow field origin using the Maxwell Z Model. Additional information is contained in the original extended abstract.
Derived from Text
Ejecta; Flow Distribution; Cratering; Craters; Explosions; Ejection; Imaging Techniques; Impact Velocity; Particle Image Velocimetry; Mathematical Models

20010044693 Academy of Sciences (USSR), Ivanov Inst. for Dynamics of Geospheres, Moscow, USSR
Numerical Simulation of Oblique Impacts: Impact Melt and Transient Cavity Size
Artemieva, N. A., Academy of Sciences (USSR), USSR; Ivanov, B. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present 3D hydrocode numerical modeling for oblique impacts (i) to estimate the melt production and (ii) to trace the evolution of the transient cavity shape till the crater collapse. Additional information is contained in the original extended abstract.
Derived from Text
Craters; Impact Melts; Mathematical Models; Simulation; Projectiles; Cratering; Lithology; Planetary Geology

20010044694 Academy of Sciences (USSR), Inst. for Dynamics of Geospheres, Moscow, USSR
Transient Cavity Scaling for Oblique Impacts
Ivanov, B. A., Academy of Sciences (USSR), USSR; Artemieva, N. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

First results of our numerical investigation of scaling laws for the case of oblique high velocity impacts are presented. Additional information is contained in the original extended abstract.
Derived from Text
Scaling Laws; Mathematical Models; Craters; Impact Melts; Planetary Craters; Projectiles; Cratering; Planetary Crusts; Hypervelocity Impact

20010044695 Academy of Sciences (USSR), Inst. for Dynamics of Geospheres, Moscow, USSR
Modeling Impact Crater Collapse: Acoustic Fluidization Implemented into a Hydrocode
Ivanov, B. A., Academy of Sciences (USSR), USSR; Turtle, E. P., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We discuss how to scale the intensity and the decay time of oscillations in the acoustic fluidization model to produce realistic impact crater morphologies, from central peak craters (e.g., Bosumtwi) to multiple-ring craters (e.g., Chicxulub) with a numerical model. Additional information is contained in the original extended abstract.

Derived from Text

Acoustics; Craters; Mathematical Models; Impact Damage; Cratering; Rheology; Planetary Geology; Planets

20010044696 Imperial Coll. of Science, Technology and Medicine, London, UK
Hydrocode Simulations of Complex Crater Collapse
Collins, G. S., Imperial Coll. of Science, Technology and Medicine, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We use hydrocode modelling to investigate complex crater collapse. We have modelled the collapse of 20 craters with a range of crater diameters from 1-1000 km. We compare our results (qualitatively and quantitatively) with the morphology of lunar craters. Additional information is contained in the original extended abstract.

Derived from text

Collapse; Lunar Craters; Computerized Simulation; Impact Damage; Computer Programs; Lunar Crust; Rheology

20010044697 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Gravitational Modification of Ejecta Curtain Expansion
Melosh, H. J., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Deep Impact Mission to Comet P/Tempel 1 will image the expansion of an artificial impact crater. Images of the edge of the expanding ejecta curtain appear capable of determining the mass and density of the comet. Additional information is contained in the original extended abstract.

Derived from Text

Comets; Craters; Ejecta; Impactors; Impact Damage; Projectile Cratering; Imaging Techniques

20010044698 Hokkaido Univ., Inst. of Low Temperature Science, Sapporo, Japan
Velocity Distribution of Powdery Ejecta in Oblique Impacts
Yamamoto, S., Hokkaido Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

I have performed impact experiments onto soda-lime glass powders to investigate velocity distribution of powdery ejecta in oblique impacts. Our results suggest that the velocity distribution of powdery ejecta depends strongly on impact angle. Additional information is contained in the original extended abstract.

Derived from Text

Calcium Oxides; Ejecta; Glass; Powder (Particles); Velocity Distribution; Impact Velocity; Regolith; Craters

20010044699 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA
Does Crustal Thickness Assist the Transition from Central-Peak to Peak-Ring Crater?
McKinnon, William B., Washington Univ., USA; Fisher, Jesse L., Washington Univ., USA; Passer, Alison L., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The hypothesis that crustal thickness can affect (or even determine) the transition to the peak-ring form is examined for the Moon, Mars, and Venus. It is found wanting, but shock reflection at the Moho could affect the excavation flow in principle. Additional information is contained in the original extended abstract.
Derived from Text
Moon; Thickness; Venus (Planet); Mars (Planet); Planetary Craters; Lunar Craters; Lunar Crust; Planetary Crusts; Projectile Cratering; Impact Tolerances

20010044700 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Availability of Heat to Drive Hydrothermal Systems in Large Martian Impact Craters
Thorsos, I. E., New Mexico Univ., USA; Newsom, H. E., New Mexico Univ., USA; Davies, A. G., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The central uplift in large craters on Mars can provide a substantial source of heat, equivalent to heat produced by the impact melt sheet. The heat generated in large impacts could play a significant role in hydrothermal systems on Mars. Additional information is contained in the original extended abstract.
Derived from Text
Impact Melts; Mars (Planet); Mars Craters; Shock Heating; Planetary Crusts; Mars Surface; Hydrothermal Systems; Temperature Gradients

20010044701 Arizona Univ., Lunar and Planetary Inst., Tucson, AZ USA
Impact-Induced Hydrothermal Systems: Heat Sources and Lifetimes
Daubar, I. J., Arizona Univ., USA; Kring, D. A., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Lifetimes of impact-induced hydrothermal systems are investigated by modeling the thermal evolution of impact melt sheets and central uplifts for different crater sizes. Additional information is contained in the original extended abstract.
Derived from Text
Craters; Heat Sources; Hydrothermal Systems; Impact Melts; Volcanoes; Heating; Hypervelocity Impact; Planetary Crusts

20010044702 DePaul Univ., Dept. of Chemistry, Chicago, IL USA
A Preliminary Search for Evidence of Impact-Related Burning Near the Mjolnir Impact Structure, Barents Sea
Wolbach, Wendy S., DePaul Univ., USA; Widicus, Susanna, California Inst. of Tech., USA; Dypvik, Henning, Oslo Univ., Norway; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

To see if combustion of biomass, impactor, or carbon-bearing target rocks occurred during the Mjolnir impact, we looked for soot in samples from an ejecta-bearing core drilled 30 km from the crater. Appreciable soot was observed in and above the ejecta unit. Additional information is contained in the original extended abstract.
Derived from Text
Barents Sea; Impactors; Rocks; Craters; Impact Damage; Planetary Geology; Ejecta; Hypervelocity Impact

20010044703 Arizona Univ., Lunar and Planetary Inst., Tucson, AZ USA
Hydrocode Modeling of the Ries Impact Event
Pierazzo, E., Arizona Univ., USA; Spitale, J. N., Arizona Univ., USA; Kring, D. A., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This work presents preliminary results of a 3D hydrocode simulation of the Ries impact event. In particular, we estimate the volumes of various types of sediments that underwent melting and vaporization/degassing. Additional information is contained in the original extended abstract.
Derived from Text
Computerized Simulation; Mathematical Models; Impact; Cratering; Ejecta; Impact Melts; Lithology; Sediments; Craters; Surface Layers

20010044704 Tokyo Univ., Dept. of Earth and Planetary Science, Hongo, Japan

The Penalver Formation: Deep-Sea Tsunami Deposit at K/T Boundary in Western Cuba

Goto, K., Tokyo Univ., Japan; Tajika, E., Tokyo Univ., Japan; Tada, R., Tokyo Univ., Japan; Iturralde-Vinent, M. A., National Museum of Natural History, Cuba; Kiyokawa, S., National Science Museum, Japan; Nakano, Y., Tokyo Univ., Japan; Yamamoto, S., Tokyo Univ., Japan; Garcia, D., National Museum of Natural History, Cuba; Oji, T., Tokyo Univ., Japan; Rojas, R., National Museum of Natural History, Cuba; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Penalver Formation in western Cuba is one of the thickest K/T boundary deposit. The lower unit is local debris flow deposit whereas the upper unit is deep-sea tsunami deposit, which is affected the repetition of tsunamis. Additional information is contained in the original extended abstract.

Derived from Text

Cretaceous-Tertiary Boundary; Cuba; Tsunami Waves; Deposits; Lithology; Ocean Bottom; Asteroid Collisions

20010044705 Open Univ., Planetary and Space Science Research Inst., Milton Keynes, UK

The Detailed Characterization of Martian Impact Craters from the 1/16 Degree MOLA Global Topography Grid

Wallis, D. W., Open Univ., UK; McBride, N., Open Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We describe a new project to obtain a global characterisation of martian impact crater morphology from the 1/16 degree Mars Orbital laser Altimeter (MOLA) topography dataset. A new mathematical method applicable to both symmetric and asymmetric craters is used. Additional information is contained in the original extended abstract.

Derived from Text

Mars (Planet); Topography; Laser Altimeters; Mars Craters; Impact Damage

20010044706 Wesleyan Univ., Dept. of Earth and Environmental Sciences, Middletown, CT USA

Crater Counts of Noachian Surfaces at MOC Resolution

Gilmore, M. S., Wesleyan Univ., USA; Skinner, J. A., Geological Survey, USA; Tanaka, K. L., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Still open is the question of how accessible Noachian-aged rocks will be at the scale of the Mars Exploration Rovers (MER) landing ellipse. Crater counts using Mars Orbiting Camera (MOC) data preserve relative age relationships and thus potentially allow comparison one landing ellipse to another. Additional information is contained in the original extended abstract.

Derived from Text

Mars Surface; Rocks; Mars (Planet); Valleys; Extraterrestrial Life; Mars Craters

20010044707 Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Inst. of Space Sensor Technology and Planetary Exploration, Berlin, Germany

Crater Production Function for Mars

Neukum, G., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Ivanov, B. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The cratering chronology model is established which can be used as a safe basis for modeling the impact chronology of other terrestrial planets, especially Mars. Additional information is contained in the original extended abstract.

Derived from Text

Chronology; Cratering; Mars Craters; Impactors; Impact Damage; Projectiles

20010044708 University of Central Florida, Dept. of Physics, Orlando, FL USA

Searching for Isolated Crater Clusters on Mars

Barlow, N. G., University of Central Florida, USA; Osborne, P., Osceola High School, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We are conducting a survey of the locations and sizes of isolated crater clusters on Mars to test between the two major formation theories: (1) impact of rubble-pile asteroids/comets, or (2) breakup of material as it passed through a thicker past atmosphere. Additional information is contained in the original extended abstract.
Derived from Text
Asteroids; Mars Craters; Cometary Collisions; Planetary Geology; Mars Surface; Impact Damage

20010044709 University of Central Florida, Dept. of Physics, Orlando, FL USA
Redefining the Preservational Categories of Martian Impact Craters
Mackey, F., University of Central Florida, USA; Barlow, N. G., University of Central Florida, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have developed a 7-point scale to describe the preservational state of martian impact craters, with 0 denoting ”ghost” craters and 7 referring to pristine craters. We present results from statistical analysis of craters is quadrangles MC08, 09, 10, 11, and 12. Additional information is contained in the original extended abstract.
Derived from Text
Mars Craters; Mars (Planet); Mars Surface; Degradation; Deposits; Ejecta; Imagery

20010044710 Lunar and Planetary Inst., Houston, TX USA
The Shape and Appearance of Oblique Impact Craters on Mars
Herrick, R. R., Lunar and Planetary Inst., USA; Shanteau, R. L., Bowling Green State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Using Mars Orbiter Laser Altimeters (MOLA) data, we present an initial look at the variation in appearance and shape of martian craters with impact angle. Additional information is contained in the original extended abstract.
Derived from Text
Mars Craters; Mars Surface; Shapes; Hypervelocity Impact; Cratering; Planetary Crusts; Ejecta; Imagery

20010044711 Academy of Sciences (USSR), Inst. for Dynamics of Geospheres, Moscow, USSR
Dust Ejection Induced by Small Meteoroids Impacting Martian Surface
Shuvalov, Valery, Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NRA-98-0SS-08; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The objective of this study is numerical modeling of meteoroid impact on the martian surface and determination of the resulting dust cloud parameters. Additional information is contained in the original extended abstract.
Derived from Text
Meteorite Collisions; Mars Surface; Meteoroid Dust Clouds; Computerized Simulation

20010044712 Notre Dame Univ., Dept. of Civil Engineering and Geological Sciences, IN USA
Detailed Geochemistry of New Shergottite, Dhofar 019
Neal, C. R., Notre Dame Univ., USA; Taylor, L. A., Tennessee Univ., USA; Ely, J. C., Notre Dame Univ., USA; Jain, J. C., Notre Dame Univ., USA; Nazarov, M. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Detailed geochemical data are presented for new shergottite Dhofar 019. Additional information is contained in the original extended abstract.
Derived from Text
Geochemistry; Shergottites; Mineralogy; Chemical Composition

20010044713 New Mexico Univ., Dept. of Earth and Planetary Sciences, Albuquerque, NM USA
Trace Element Crystal Chemistry of Minerals in DHOFAR 019: Implications for the Petrogenesis of Martian Magmas
Shearer, C. K., New Mexico Univ., USA; Taylor, L. A., Tennessee Univ., USA; Nazarov, M. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report on the major and trace element characteristics of mineral phases in DHOFAR 019 to shed additional light on martian basaltic magmatism. Additional information is contained in the original extended abstract.
Derived from Text
Trace Elements; Physical Chemistry; Meteorites; Crystals; Mineralogy

20010044714 Academy of Sciences (USSR), Vernadsky Inst. of Geochemistry and Analytical Chemistry, Moscow, USSR
Shock Metamorphism in the Shergottite Meteorite Dhofar 019
Badjukov, Dmitry D., Academy of Sciences (USSR), USSR; Nazarov, Mikhail A., Academy of Sciences (USSR), USSR; Taylor, Lawrence A., Tennessee Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Similar to all SNC meteorites, Dhofar 019 contains evidence for substantial shock metamorphism. The shock pressure and temperature have been estimated for this meteorites, using a computed Hugoniot. Additional information is contained in the original extended abstract.
Derived from Text
Shergottites; Metamorphism (Geology); Temperature Measurement; Pressure Measurement

20010044715 Tennessee Univ., Dept. of Geological Sciences, Knoxville, TN USA
A Textural Consideration of Dhofar 019 with Comparisons to Other Basaltic Shergottites
Lentz, R. C. F., Tennessee Univ., USA; McSween, H. Y., Jr., Tennessee Univ., USA; Nazarov, M. A., Academy of Sciences (USSR), USSR; Taylor, L. A., Tennessee Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Qualitative and quantitative textural analyses of Dhofar 019 suggest a closer resemblance to Zagami than to EET 79001A or DaG 476, implying similar crystallization conditions dominated the formations of the pyroxene populations of Dhofar and Zagami. Additional information is contained in the original extended abstract.
Derived from text
Crystallization; Pyroxenes; Shergottites; Qualitative Analysis; Textures

20010044716 Tokyo Univ., Dept. of Earth and Planetary Science, Hongo, Japan
Dhofar 019 Shergottite: Mineralogy and Petrology of a New Member of the Basaltic Martian Meteorites
Mikouchi, T., Tokyo Univ., Japan; Miyamoto, M., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This abstract presents mineralogy and petrology of the Dhofar 019 shergottite and compare it with other known basaltic shergottites. Dhofar 019 is similar to EETA79001, Dar al Ganis, and Zagami, and may be a key sample to understand their relationship and origins. Additional information is contained in the original extended abstract.
Derived from Text
Mineralogy; Petrology; Shergottites; Chemical Composition; Planetary Geology

20010044717 Max-Planck-Inst. fuer Chemie, Mainz, Germany
Chromites in Basaltic Shergottite Sayh Al Uhaymir 005: Implications for Petrogenesis and Relationship to Lherzolitic Shergottites
Goodrich, Cyrena Anne, Max-Planck-Inst. fuer Chemie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Chromites in basaltic shergottite SaU 005 have texturally and compositionally distinct cores and rims. Various features suggest that either cores are xenolithic (derived from a lherzolitic shergottite-like source) or magma mixing occurred after formation of cores. Additional information is contained in the original extended abstract.
Derived from Text
Chromites; Shergottites; Petrogenesis; Planetary Cores; Planetary Geology

20010044718 NASA Johnson Space Center, Houston, TX USA

A Reappraisal of the Mineralogy and Crystallization Features of Los Angeles: A Basaltic Martian Meteorite

Xirouchakis, Dimitrios M., NASA Johnson Space Center, USA; Draper, David S., NASA Johnson Space Center, USA; Schwandt, C. S., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We examined the mineralogy, oxide-silicate phase relations, and the symplectites in Los Angeles meteorite. We also modeled the phase relations and T-fO2 in the Ca-Mg-Fe-Ti-Si-O system by performing calculations at 1000 bars (max), and in the range 1000 to 800 C. Additional information is contained in the original extended abstract.

Derived from Text

Crystallization; SNC Meteorites; Mineralogy; Pyroxenes

20010044719 Max-Planck-Inst. fuer Chemie, Mainz, Germany

Rare Earth Element Systematics of Trapped Melt Inclusions and Groundmass Phases in Sayh Al Uhaymir 005

Zipfel, Jutta, Max-Planck-Inst. fuer Chemie, Germany; Goodrich, Cyrena Anne, Max-Planck-Inst. fuer Chemie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Rare Earth elements (REEs) were analyzed in melt inclusions in olivine and chromite and in groundmass phases of SaU 005. Our results suggest formation of SaU in an open system rather than in a closed system. The nature of the components involved can be constrained. Additional information is contained in the original extended abstract.

Derived from text

Rare Earth Elements; Petrology; Inclusions; Shergottites

20010044720 NASA Johnson Space Center, Houston, TX USA

Systematics of Ni, Co, Cr and V in Olivine from Planetary Melt Systems: Martian Basalts

Herd, C. D. K., New Mexico Univ., USA; Jones, J. H., NASA Johnson Space Center, USA; Shearer, C. K., New Mexico Univ., USA; Papike, J. J., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NGT9-31; MRA-97-282; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Secondary Ion Mass Spectrometry (SIMS) data for Ni, Co, Cr, and V in olivine in martian basalts is compared to data from lunar and terrestrial basalts. We use experimentally-derived and published D values to calculate as-yet unsampled, olivine-bearing, non-cumulus melt compositions. Additional information is contained in the original extended abstract.

Derived from text

Olivine; Shergottites; Trace Elements

20010044721 Lunar and Planetary Inst., Houston, TX USA

A Parent Magma for the Nakhla Martian Meteorite: Reconciliation of Estimates from 1-Bar Experiments, Magmatic Inclusions in Olivine, and Magmatic Inclusions in Augite

Treiman, Allan H., Lunar and Planetary Inst., USA; Goodrich, Cyrena Anne, Max-Planck-Inst. fuer Chemie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-8270; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The composition of the parent magma for the Nakhla (martian) meteorite has been estimated from mineral-melt partitioning and from magmatic inclusions in olivine and in augite. These independent lines of evidence have converged on small range of likely compositions. Additional information is contained in the original extended abstract.

Derived from text

SNC Meteorites; Minerals; Inclusions; Chemical Composition; Petrology; Planetary Geology

20010044722 NASA Johnson Space Center, Houston, TX USA
The Magma Composition of EET79001A: The First Recount
Schwandt, C. S., Lockheed Martin Corp., USA; Jones, J. H., NASA Johnson Space Center, USA; Mittlefehldt, D. W., NASA Johnson Space Center, USA; Treiman, A. H., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Using new image processing software, we have re-estimated the groundmass composition of EET79001A. Additional information is contained in the original extended abstract.
Derived from Text
Estimating; Petrology; SNC Meteorites; Chemical Composition; Magma

20010044723 Tennessee Univ., Dept. of Geological Sciences, Knoxville, TN USA
Melt Inclusions in Nakhla as Monitors of Parental Melts on Mars
Stockstill, K. R., Tennessee Univ., USA; Bodnar, R. J., Virginia Polytechnic Inst. and State Univ., USA; McSween, H. Y., Jr., Tennessee Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Melt inclusions in Nakhla may provide valuable information regarding the petrogenesis not available from analyses of the bulk rock. We examine the composition of homogenized melt inclusions in order to constrain the composition of the magma from which Nakhla formed. Additional information is contained in the original extended abstract.
Derived from text
Inclusions; Petrogenesis; SNC Meteorites; Chemical Composition

20010044724 California Univ., San Diego, Dept. of Chemistry and Biochemistry, La Jolla, CA USA
Observation of Wavelength-sensitive Mass-independent Sulfur Isotope Effects During SO2 Photolysis: Implications for Sulfur Isotope Compositions of SNC Meteorites and Ancient Terrestrial Samples
Farquhar, J., California Univ., San Diego, USA; Savarino, J., California Univ., San Diego, USA; Airieau, S., California Univ., San Diego, USA; Thiemens, M. H., California Univ., San Diego, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present results of sulfur dioxide photolysis experiments with four light sources and investigate the implications for recent observation of mass-independent sulfur in SNC meteorites (Nakhla and ALH84001) and ancient terrestrial samples. Additional information is contained in the original extended abstract.
Derived from Text
Isotope Effect; Photolysis; SNC Meteorites; Sulfur Isotopes

20010044725 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
SNC Oxygen Fugacity as Recorded in Pyroxenes: An Experimental Study
McCanta, M. C., Brown Univ., USA; Rutherford, M. J., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

An experimental study of pyroxenes has shown that Fe valence state estimates, calculated from electron microprobe analyses, are not accurate. This calls into question all estimates of SNC source region oxygen fugacity based on pyroxene analyses. Additional information is contained in the original extended abstract.
Derived from Text
Pyroxenes; SNC Meteorites; Crystallization

20010044726 New Mexico Univ., Dept. of Earth and Planetary Sciences, Albuquerque, NM USA
Mobile Elements Determined by SIMS Analysis in Hydrous Alteration Materials in the Lafayette Martian Meteorite
Newsom, H. E., New Mexico Univ., USA; Shearer, C. K., New Mexico Univ., USA; Treiman, A. H., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New Secondary Ion Mass Spectrometry (SIMS) data for Li, Be, and Ba in the 'iddingsite' alteration material in the Lafayette meteorite argue for multiple low temperature fluids involved in the alteration, possibly carrying mobile elements from the surface. Additional information is contained in the original extended abstract.
Derived from text
SNC Meteorites; Chemical Composition; Trace Elements

20010044727 New Mexico Univ., Dept. of Earth and Planetary Sciences, Albuquerque, NM USA
Possible Causes for Late-Stage Reaction Textures Associated with Pyroxferroite and Metastable Pyroxenes in the Basaltic Martian Meteorites
Aramovich, C. J., New Mexico Univ., USA; Herd, C. D. K., New Mexico Univ., USA; Papike, J. J., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Fine-grained assemblages of fayalite SiO2 +/- hedenbergite are observed in Los Angeles, QUE 94201, and Shergotty. These textures are likely from the breakdown of metastable pyroxenes and/or pyroxferroite and modification by diffusional reequilibration. Additional information is contained in the original extended abstract.
Derived from Text
Pyroxenes; Meteoritic Composition; SNC Meteorites

20010044728 NASA Johnson Space Center, Houston, TX USA
Textures of Secondary Alteration Zones in Nakhla
McKay, D. S., NASA Johnson Space Center, USA; Wentworth, S. J., Lockheed Martin Corp., USA; Longazo, T. G., Lockheed Martin Corp., USA; Thomas-Keprta, K., Lockheed Martin Corp., USA; Gibson, E. K., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Textures of secondary minerals in cracks in Nakhla are described and illustrated with high resolution Scanning Electron Microscopy (SEM) and BSE. Some Nakhla textures resemble alteration textures of glass in seafloor basalts. Criteria for inorganic vs. biogenic alteration are discussed. Additional information is contained in the original extended abstract.
Derived from Text
Cracks; Minerals; SNC Meteorites; Textures

20010044729 National Museum of Natural History, Dept. of Mineral Sciences, Washington, DC USA
Chemical Imaging of Nakhlite Secondary Mineralization at the Sub-Micrometer Length Scale: A TOF-SIMS Study
Vicenzi, E. P., National Museum of Natural History, USA; Fahey, A. J., National Inst. of Standards and Technology, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This study represents a detailed in situ examination of Nakhlite alteration by way of high spatial resolution secondary ion mass spectroscopy. Full mass spectrum TOF-SIMS imaging results of hydrous veinlets from both Nakhla and Lafayette are compared. Additional information is contained in the original extended abstract.
Derived from Text
Nakhlites; Mass Spectra; Chemical Composition; Imaging Techniques

20010044730 Manchester Univ., Dept. of Earth Sciences, UK
Halogen Concentrations and Possible Chlorine Zoning in ALH84001 Measured by Time of Flight SIMS and Electron Microanalysis
Holland, G., Manchester Univ., UK; Lyon, I. C., Manchester Univ., UK; Cliff, B., Manchester Coll. of Science and Technology, UK; Lockyer, N. P., Manchester Coll. of Science and Technology, UK; Vickerman, J. C., Manchester Coll. of Science and Technology, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have undertaken analysis of ALH84001 by Time of Flight Secondary Ionisation Mass Spectrometry (TOF-SIMS) and EPMA. Samples studied using TOF-SIMS show evidence of iodine within chromite. TOF-SIMS and EPMA both suggest chlorine

concentrations increase from core to rim of carbonate rosettes. Additional information is contained in the original extended abstract.
Derived from Text
Halogens; Iodine; SNC Meteorites; Carbonates; Meteoritic Composition

20010044731 NASA Johnson Space Center, Houston, TX USA
Comparison of Carbonate Globules Formed Synthetically by Hydrothermal Precipitation with Martian Meteorite ALH84001 Carbonate Globules
Golden, D. C., Hernandez Engineering, Inc., USA; Ming, D. W., NASA Johnson Space Center, USA; Schwandt, C. S., Lockheed Martin Corp., USA; Lauer, H. V., Jr., Lockheed Martin Corp., USA; Morris, R. V., NASA Johnson Space Center, USA; Lofgren, G. E., NASA Johnson Space Center, USA; McKay, G. A., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Carbonate globules similar to those of ALH84001 martian meteorite were synthesized. The synthesis produced a four-layered globule and three subtypes similar to those observed in the meteorite. Additional information is contained in the original extended abstract.
Derived from Text
Carbonates; Globules; SNC Meteorites; Synthesis (Chemistry)

20010044732 Dayton Univ., Dept. of Geology, OH USA
Magnetite and Carbonate Textures in ALH84001: Experimental Insights
Koziol, Andrea M., Dayton Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-9808; NSF EAR-98-05873; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Synthetic siderite and synthetic siderite-magnesite carbonates were equilibrated with hematite, magnetite, and CO2 at elevated pressure and temperature. Comparisons are made to textures seen in the carbonate globules in ALH84001. Additional information is contained in the original extended abstract.
Derived from Text
Carbonates; Globules; Siderites; Textures; SNC Meteorites

20010044733 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Xenon and Krypton in Nakhla Mineral Separates
Bart, G. D., Arizona Univ., USA; Swindle, T. D., Arizona Univ., USA; Olson, E. K., Arizona Univ., USA; Treiman, A. H., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Xenon and krypton were analyzed in pyroxene, mesostasis, olivine, and olivine-with-iddingsite separates from Nakhla. The Nakhla separate richest in martian atmospheric Xe was the mesostasis. Additional information is contained in the original extended abstract.
Derived from Text
Xenon; Krypton; SNC Meteorites; Meteoritic Composition

20010044734 Tennessee Univ., Geological Science Dept., Knoxville, TN USA
Martian Atmospheric Xenon and Martian 'Interior' Xenon Components in Martian Meteorites
Ocker, K. D., Tennessee Univ., USA; Gilmour, J. D., Manchester Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We discuss possible relationships among martian xenon components and elemental fractionation during trapping of the martian atmosphere. Additional information is contained in the original extended abstract.
Derived from Text
SNC Meteorites; Trapping; Xenon; Meteoritic Composition

20010044735 New Mexico Univ., Inst. of Meteoritics, Albuquerque, NM USA

High-Si Glasses in Basaltic Shergottite DaG 476 and Their Implications for Geochronology

Edmunson, J., New Mexico Univ., USA; Borg, L. E., New Mexico Univ., USA; Shearer, C., New Mexico Univ., USA; Papike, J. J., New Mexico Univ., USA; Davidson, K., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Trace element analyses show that high-Si glasses found in Dar al Gani 476 have significant abundances of rare earth elements. The presence of these glasses in mineral fractions may explain irregularities in Sm-Nd isochrons. Additional information is contained in the original extended abstract.

Derived from Text

Glass; Rare Earth Elements; Shergottites; Trace Elements; Chronology

20010044736 NASA Johnson Space Center, Houston, TX USA

Alternative Views of Martian Pb and Os

Jones, J. H., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Previous Pb isotopic analyses of Shergotty may reflect mixing rather than in situ decay of U. A reevaluation of Os-Pb systematics in SNC's predicts a primitive Pb composition for Dar al Gani 476. Additional information is contained in the original extended abstract.

Derived from Text

Shergottites; Meteoritic Composition; Isotope Ratios; Lead Isotopes; Osmium Isotopes

20010044737 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Could In Situ Dating Work on Mars?

Swindle, T. D., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Martian meteorites are used to simulate the results of K-Ar and cosmic ray exposure dating of a martian surface. While a single analysis of a single sample might not be useful, multiple analyses should yield a vast improvement in martian chronology. Additional information is contained in the original extended abstract.

Derived from text

SNC Meteorites; Radioactive Age Determination; Mars Surface

20010044738 NASA Johnson Space Center, Houston, TX USA

The Formation of Igneous CAIs and Chondrules by Impacts?

Connolly, Harold C., Jr., California Inst. of Tech., USA; Love, Stanley G., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Numerous challenges exist with forming the igneous spheres found within chondrites via collision events in the early solar nebula. We explore these challenges and discuss potential methods to overcome them. Collision models should be received cautiously. Additional information is contained in the original extended abstract.

Derived from text

Meteoritic Composition; Spherules; Models; Chondrites; Chondrule

20010044739 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Chondrule Formation by Passage of a Shock Wave Through a Dust-Gas Suspension

Ciesla, F. J., Arizona Univ., USA; Hood, L. L., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We will present a model for the formation of chondrules by passage of a shock wave through a dust-gas suspension. Additional information is contained in the original extended abstract.

Derived from Text

Chondrule; Meteoritic Composition; Shock Waves; Planetary Geology

20010044740 Tohoku Univ., Faculty of Science, Japan

Crystallization of Cosmic Materials in Microgravity

Tsukamoto, K., Tohoku Univ., Japan; Kobatake, H., Tohoku Univ., Japan; Nagashima, K., Tohoku Univ., Japan; Satoh, H., Geological Survey of Japan, Japan; Yurimoto, H., Tokyo Inst. of Tech., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In-situ observation of cosmic materials was for the first time done in microgravity to investigate the origin of the thermal history. Very large supercooling, 600-100 C, was needed to reproduce similar texture as natural barred olivine chondrules. Additional information is contained in the original extended abstract.

Derived from Text

Crystallization; Microgravity; Cosmic Dust; Thermal Analysis; Planetary Temperature; Planetary Geology

20010044741 NASA Goddard Space Flight Center, Greenbelt, MD USA

Magnetic Effects on Bjurbole (L4) Chondrules Moving from Space to Terrestrial Environments

Kletetschka, G., NASA Goddard Space Flight Center, USA; Wasilewski, P. J., NASA Goddard Space Flight Center, USA; Berdichevsky, M., Eleanor High School, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Meteorites contain magnetic material capable of acquiring a wide range of magnetic remanence records by warming from space temperature and magnetic conditions to 300 K inside the terrestrial environment. Additional information is contained in the original extended abstract.

Derived from text

Magnetic Effects; Chondrule; Meteoritic Composition; Meteorites; Space Temperature; Planetary Geology

20010044742 NASA Johnson Space Center, Houston, TX USA

Partially-melted Aggregate Chondrules in LEW86134: Preliminary Analysis of Textural and Chemical Trends

Nettles, J. W., Tennessee Univ., USA; Lofgren, G. E., NASA Johnson Space Center, USA; McSween, H. Y., Jr., Tennessee Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The chemistry and texture of partially-melted aggregate chondrules are being studied so that a method to identify the least-melted aggregates can be developed. The least-melted aggregates would represent an inventory of chondrule precursor material. Additional information is contained in the original extended abstract.

Derived from Text

Chondrule; Meteoritic Composition; Planetary Geology; Textures; Melting

20010044743 NASA Johnson Space Center, Houston, TX USA

Transmission Electron Microscopy of the Matrix Minerals in the Tagish Lake Carbonaceous Chondrite

Mikouchi, T., Tokyo Univ., Japan; Kasama, T., Tokyo Univ., Japan; Zolensky, M. E., NASA Johnson Space Center, USA; Tachikawa, O., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We studied the Tagish Lake matrix minerals by TEM. The result shows similarities to CIs (and CRs) and differences from CMs, but its heterogeneity (e.g., carbonate abundance, saponite/serpentine ratio) suggests its complex history. Additional information is contained in the original extended abstract.

Derived from Text

Transmission Electron Microscopy; Minerals; Carbonaceous Chondrites; Mineralogy; Planetary Geology

20010044744 Geological Survey of Canada, Ottawa, Ontario Canada

Petrology of the Tagish Lake Carbonaceous Chondrite

Herd, R. K., Geological Survey of Canada, Canada; Hunt, P. A., Geological Survey of Canada, Canada; Venance, K., Geological Survey of Canada, Canada; Protheroe, W. J., Jr., Energy-Micro-Analytical Consultants, Inc., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Tagish Lake's petrology varies. Magnesian silicates and phosphates (chondrules and fragments, plus alterations), and lithic fragments, occur in at least two different fine-grained matrices. A petrogenetic sequence is suggested. Additional information is contained in the original extended abstract.
Derived from text
Meteoritic Composition; Chondrule; Petrology; Carbonaceous Chondrites; Planetary Geology

20010044745 Open Univ., Planetary and Space Sciences Research Inst., Milton Keynes, UK
Hydrogen Isotopic Composition of the Tagish Lake Meteorite: Comparison with Other Carbonaceous Chondrites
Pearson, V. K., Open Univ., UK; Sephton, M. A., Open Univ., UK; Gilmour, I., Open Univ., UK; Franchi, I. A., Open Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A study into the hydrogen isotopic characteristics of whole rock samples of carbonaceous chondrites and their comparison with a whole rock sample of the Tagish Lake meteorite. Additional information is contained in the original extended abstract.
Derived from Text
Carbonaceous Chondrites; Comparison; Hydrogen Isotopes; Planetary Geology; Rocks

20010044746 Open Univ., Planetary and Space Sciences Research Inst., Milton Keynes, UK
The Tagish Lake Chondrite and the Interstellar Parent Body Hypothesis
Gilmour, I., Open Univ., UK; Sephton, M. A., Open Univ., UK; Pearson, V. K., Open Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Investigation of the solvent extractable organic compounds in Tagish Lake. The results are used to test the interstellar parent body hypothesis for the origin of extraterrestrial organic matter. Additional information is contained in the original extended abstract.
Derived from Text
Organic Compounds; Chondrites; Solvents; Solvent Extraction; Planetary Geology

20010044747 NASA Johnson Space Center, Houston, TX USA
FTIR and Carbon-XANES Examination of Organic Carbon in Tagish Lake: Evidence for a Moderately Volatile Organic Component
Flynn, G. J., State Univ. of New York, USA; Keller, L. P., NASA Johnson Space Center, USA; Jacobsen, C., State Univ. of New York, USA; Wirick, S., State Univ. of New York, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Four distinct C-XANES spectra, carbonate, amorphous carbon and 2 organic phases, were identified. The 3 micron IR spectrum of Tagish Lake is similar to Orgueil and Murchison but Tagish Lake contains an organic lost on heating to 100 C for 1/2 hour. Additional information is contained in the original extended abstract.
Derived from text
Amorphous Materials; Carbon; Organic Materials; Carbonates; Planetary Geology; Carbonaceous Chondrites

20010044748 Hawaii Univ., Hawaii Inst. of Geophysics and Planetology, Honolulu, HI USA
Oxygen-Isotopic Compositions of Forsterite in an Accretionary Rim Around Ca, Al-rich Inclusion and in an Amoeboid Olivine Aggregate from the Reduced CV Chondrite Efremovka and Their Significance
Krot, A. N., Hawaii Univ., USA; McKeegan, K. D., California Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

O-16 rich nebular gas is inferred from O-isotopic composition of forsterites in an accretionary rim around compact Type A CAI and in an amoeboid olivine aggregate from the reduced CV chondrite Efremovka. Isotope exchange of melilite is also discussed. Additional information is contained in the original extended abstract.
Derived from Text
Mineralogy; Oxygen Isotopes; Chondrites; Meteoritic Composition; Forsterite; Planetary Geology

20010044749 Tokyo Univ., Dept. of Earth and Planetary Science, Japan

Heterogeneous O Isotopic Distributions in Melilite and Anorthite in a CAI from the Dar Al Gani 521 Meteorite (CV3)

Hirai, K., Tokyo Univ., Japan; Hiyagon, H., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Anorthite and melilite in a Calcium-Aluminium-rich Inclusions (CAI) in Dar al Gani 521 meteorite show two distinct O isotopic compositions: O-16 rich and O-16 poor. Both groups of anorthite grains show canonical 26 Al/27 Al initial ratios, suggesting a very early reheating event. Additional information is contained in the original extended abstract.

Derived from Text

Mineralogy; Calcium; Oxygen Isotopes; Meteorites; Inclusions; Planetary Geology

20010044750 Physical Research Lab., Ahmedabad, India

Isotopic Records in Murray and Murchison Hibonites: Implications for the Oxygen Isotopic Reservoirs in the Early Solar System

Goswami, J. N., Physical Research Lab., India; McKeegan, K. D., California Univ., USA; Marhas, K. K., Physical Research Lab., India; Sinha, N., Physical Research Lab., India; Davis, A. M., Chicago Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Oxygen isotope data for CM hibonites do not correlate with data for other isotopes. The reservoir of the exotic Ti-50 got depleted during the period of hibonite formation, which was not the case for exotic O-16. Plausible scenarios are proposed. Additional information is contained in the original extended abstract.

Derived from Text

Oxygen Isotopes; Planetary Geology; Murray Meteorite; Murchison Meteorite

20010044751 Hawaii Univ., Hawaii Inst. of Geophysics, Honolulu, HI USA

Forsterite-rich Accretionary Rims Around CAIs from the Reduced CV3 Chondrite Efremovka, 1, Mineralogy and Petrography

Krot, A. N., Hawaii Univ., USA; Ulyanov, A. A., Moscow State Univ., Russia; Meibom, A., Stanford Univ., USA; Keil, K., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Accretionary rims around Type A and B Calcium-Aluminum-rich Inclusions (CAIs) from the reduced CV3 chondrite Efremovka are aggregates of high-temperature nebular condensates composed of forsterite, Fe, Ni-metal and a refractory component composed of Al-diopside, anorthite, and spinel. Additional information is contained in the original extended abstract.

Derived from Text

Forsterite; Chondrites; Mineralogy; Petrography; Planetary Geology; Rims

20010044752 Monash Univ., Australian Crustal Research Centre, Clayton, Australia

Nebular Flash Heating Events and CAI Rim Formation

Wark, D. A., Monash Univ., Australia; Boynton, W. V., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Trace element, mineralogical and isotopic data all point to flash heating events which partly vaporized the outer layers of Calcium-Aluminum-rich Inclusions (CAIs), leaving a refractory residue there which was later metamorphosed to create the present Wark-Lovering rim layers. Additional information is contained in the original extended abstract.

Derived from Text

Heating; Inclusions; Mineralogy; Planetary Geology; Planetary Nebulae

20010044753 Academy of Sciences (USSR), Vernadsky Inst., Moscow, USSR

The First Known Occurrence of CaAl2O4 in a CAI from the CH Chondrite NWA 470

Ivanova, Marina A., Academy of Sciences (USSR), USSR; Petaev, Michail I., Harvard-Smithsonian Center for Astrophysics, USA; Nazarov, Michail A., Academy of Sciences (USSR), USSR; Taylor, Lawrence A., Tennessee Univ., USA; MacPherson, Glenn J., National Museum of Natural History, USA; Wood, John A., Harvard-Smithsonian Center for Astrophysics, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Calcium monoaluminate, CaAl2O4 has been identified in a calcium-aluminum-rich inclusion (CAI) from the new CH chondrite NWA 470. CaAl2O4 is not predicted to form during equilibrium condensation from a gas of solar composition. Additional information is contained in the original extended abstract.
Derived from Text
Inclusions; Chondrites; Planetary Geology; Calcium; Aluminum

20010044754 Centre de Recherches Petrographiques et Geochimiques, Nancy, France
Lithium and Boron Isotopic Compositions of Refractory Inclusions from Primitive Chondrites: A Record of Irradiation in the Early Solar System
Chaussidon, M., Centre de Recherches Petrographiques et Geochimiques, France; Robert, F., National Museum of Natural History, France; McKeegan, K. D., California Univ., USA; Krot, A. N., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The correlations between the Li-7/Li-6, B-11/B-10 ratios and the concentration of short lived Be-10 found in Calcium-Aluminum-rich Inclusions (CAIs) are used to constrain the time scale of irradiation in the early solar nebula. Additional information is contained in the original extended abstract.
Derived from Text
Isotopic Labeling; Composition (Property); Inclusions; Chondrites; Lithium Isotopes; Boron Isotopes; Planetary Nebulae; Beryllium Isotopes; Planetary Geology

20010044755 Consejo Nacional de Inverstigaciones Cientificas y Tecnicas, Dept. de Geologia, San Juan, Argentina
Glasses in the D'Orbigny Angrite
Varela, M. E., Consejo Nacional de Inverstigaciones Cientificas y Tecnicas, Argentina; Kurat, G., Naturhistorisches Museum, Austria; Brandstaetter, F., Naturhistorisches Museum, Austria; Bonnin-Mosbah, M., Commissariat a l'Energie Atomique, France; Metrich, N., Commissariat a l'Energie Atomique, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; Sponsored in part by LPS
Contract(s)/Grant(s): FWF Proj. P13975-GEO; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The D'Orbigny angrite contains abundant glasses, a phase which has not been previously reported from any other angrite. Glasses fill in part open druses and interstitial spaces between major silicates, or occur as glass inclusions in olivine. Additional information is contained in the original extended abstract.
Derived from Text
Meteoritic Composition; Planetary Geology; Glass

20010044756 Tokyo Univ., Dept. of Earth and Planet Science, Hongo, Japan
Mineralogy of Unique Calcium Silico-Phosphates in Angrites
Kaneda, K., Tokyo Univ., Japan; Mikouchi, T., Tokyo Univ., Japan; Saito, A., High Energy Accelerator Research Organization, Japan; Sugiyama, K., Tokyo Univ., Japan; Ohsumi, K., High Energy Accelerator Research Organization, Japan; Mukai, M., High Energy Accelerator Research Organization, Japan; Osaka, T., High Energy Accelerator Research Organization, Japan; Miyata, Y., High Energy Accelerator Research Organization, Japan; Nakai, M., Tokyo Univ., Japan; Kasama, T., Tokyo Univ., Japan; Chikami, J., Senshu Univ., Japan; Miyamoto, M., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Three angrites (Asuka 881371, Sahara 99555 and D'Orbigny) contain unknown silico-phosphates with two different Si/P ratios. One shows similar stoichiometry to merrillite, however, there is no matching mineral with the other one. Additional information is contained in the original extended abstract.
Derived from Text
Meteoritic Composition; Planetary Geology; Mineralogy; Calcium Phosphates

20010044757 National Inst. of Polar Research, Antarctic Meteorite Research Center, Tokyo, Japan
Mineralogical Study of a Highly Metamorphosed Eucrite, Northwest Africa 011
Yamaguchi, A., National Inst. of Polar Research, Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

NWA011 is a highly metamorphosed eucrite with anomalous FeO/MnO ratios of pyroxenes. I report mineralogy of NWA011 and compare with other eucrites. Additional information is contained in the original extended abstract.
Derived from Text
Metamorphism (Geology); Mineralogy; Planetary Geology; Metamorphic Rocks

20010044758 Michigan Univ., Dept. of Geological Sciences, Ann Arbor, MI USA
Self-Consistency for Each of XRD and Mossbauer Measurements of Fe-Mg Order-disorder in Orthopyroxene
Zhang, You-Xue, Michigan Univ., USA; Lawrence, Sam, Michigan Univ., USA; Moon, Namdoo, Michigan Univ., USA; Dong, Wei-Dong, Michigan Univ., USA; Dunham, William R., Michigan Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Fe-Mg order-disorder in Orthopyroxene (opx) determined from Mossbauer is different from that from X-Ray Diffraction (XRD), but each is internally consistent. The superior sensitivity of our Mossbauer spectrometer has great potential to investigate cooling rates of meteorites. Additional information is contained in the original extended abstract.
Derived from Text
Pyroxenes; X Ray Diffraction; Meteorites; Cooling; Planetary Geology; Consistency

20010044759 Tohoku Univ., Faculty of Science, Sendai, Japan
Evidence for Thermal Metamorphism of Asuka-882023 Mesosiderite
Tomaru, A., Tohoku Univ., Japan; Fujimaki, H., Tohoku Univ., Japan; Yanai, K., Iwate Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Asuka-882023 is mesosiderite, recovered from Antarctica. We report the petrological characteristics and chemical compositions to discuss its thermal history. Additional information is contained in the original extended abstract.
Derived from Text
Metamorphism (Geology); Chemical Composition; Petrology; Iron Meteorites; Thermal Analysis; Thermal Shock

20010044760 American Museum of Natural History, Dept. of Earth and Planetary Sciences, New York, NY USA
The Role of Roedderite in the Formation of Aubrites
Fogel, Robert A., American Museum of Natural History, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The presence of roedderite in aubrites signifies that their precursor melts were peralkaline. Peralkaline conditions may be the key to the formation of forsterite in aubrites and allows for a model that derives aubrites directly from E chondrites. Additional information is contained in the original extended abstract.
Derived from Text
Meteoritic Composition; Forsterite; Achondrites; Planetary Geology

20010044761 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA
Diopside-bearing EL6 EET 90102: Insights from Rare Earth Element Distributions
Floss, Christine, Washington Univ., USA; Fogel, Robert A., American Museum of Natural History, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report REE data for EET 90102, the first diopside-bearing EL6. The presence of Yb anomalies in diopside and Sm anomalies in relict chondrules suggest that EET 90102 may have a different history from other equilibrated enstatite chondrites. Additional information is contained in the original extended abstract.
Derived from Text
Rare Earth Elements; Meteoritic Composition; Chondrites; Chondrule; Planetary Geology

20010044762 Open Univ., Planetary Space and Space Research Inst., Milton Keynes, UK

An Integrated Mineralogical, Petrographic, Light Stable Isotope and Noble Gas Investigation of Sahara 99201 Ureilite

Smith, C. L., Open Univ., UK; Franchi, I. A., Open Univ., UK; Wright, I. P., Open Univ., UK; Verchovsky, A. B., Open Univ., UK; Grady, M. M., Museum of Natural History, UK; Pillinger, C., Open Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New ureilite Sahara 99201 has been investigated to determine mineralogy, petrography, light stable isotopes and noble gases. The sample is a typical olivine pigeonite ureilite (Fo78, Wo10, En72). C, N, O and Ar are consistent with other ureilites. Additional information is contained in the original extended abstract.

Derived from Text

Planetary Geology; Mineralogy; Petrography; Isotopes; Rare Gases; Ureilites

20010044763 Open Univ., Planetary and Space Sciences Research Inst., Milton Keynes, UK

New Data on Carbon Isotopic Compositions of Some Ureilites

Smith, C. L., Open Univ., UK; Franchi, I. A., Open Univ., UK; Wright, I. P., Open Univ., UK; Grady, M. M., Museum of Natural History, UK; Pillinger, C., Open Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have collected new C data from high resolution stepped combustion analyses of 5 ureilites to better constrain their relationships with O and mineralogical/petrographic groupings. This may help the future development of petrogenetic models. Additional information is contained in the original extended abstract.

Derived from Text

Isotopic Labeling; Carbon; Ureilites; Meteoritic Composition; Planetary Geology

20010044764 Iwate Univ., Lab. of Planetary Geo-Sciences, Morioka, Japan

Lodranites and Their Subgroups Related with Some Acapulcoites

Yanai, K., Iwate Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Six lodranites are studied and divided to three subgroups. Some meteorites in the subgroup of lodranites are very similar to those of acapulcoites of the primitive achondrites for their mineral assemblages robot Hunveyor. Additional information is contained in the original extended abstract.

Derived from Text

Meteoritic Composition; Achondrites; Planetary Geology; Stony-Iron Meteorites

20010044765 Cornell Univ., Dept. of Astronomy, Ithaca, NY USA

Testing Spectral Methods for Asteroid Surface Compositional Determination Using Spectroscopic and Compositional Data of Ordinary Chondrite Meteorites

Berthoud, M. G., Cornell Univ., USA; Bell, J. F., III, Cornell Univ., USA; Clark, B. E., Cornell Univ., USA; Gaffey, M. J., Rensselaer Polytechnic Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This work tests a method to determine the orthopyroxene versus olivine abundance ratio from Visible and Near-Infrared (VNIR) spectra. Abundances predicted from spectral measurements are compared to the abundances from laboratory examinations of meteorites. Additional information is contained in the original extended abstract.

Derived from Text

Spectral Methods; Composition (Property); Asteroids; Chondrites; Meteorites; Pyroxenes; Olivine; Abundance; Planetary Geology

20010044766 Arkansas Univ., Center for Space and Planetary Sciences, Fayetteville, AR USA

The Orbital Distribution of Meteorites Based on High Temperature Thermoluminescence, 2, Orbits of Meteoroids over the Last Million Years

Benoit, P. H., Arkansas Univ., USA; Akridge, J. M. C., Arkansas Univ., USA; Sears, D. W. G., Arkansas Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAGW-3479; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We use high temperature TL data to evaluate perihelia of Antarctic meteorites. Perihelion has been constant for the ordinary chondrites over the last 40,000-100,000 years. Additional information is contained in the original extended abstract.
Derived from Text

Meteorites; Thermoluminescence; Orbitals; Perihelions; Chondrites; Planetary Geology

20010044767 Pittsburgh Univ., Dept. of Geology and Planetary Science, Pittsburgh, PA USA

Progress in Theoretical Modeling of Space Weathering in Lunar and Asteroid Regoliths

Hapke, B., Pittsburgh Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Space weathering affects spectral slopes and band depths, but not band central wavelengths. Hence, band centers can be validly used to match meteorites and asteroid classes. Simple analytic models can successfully account for space weathering effects. Additional information is contained in the original extended abstract.
Derived from Text

Mathematical Models; Regolith; Weathering; Asteroids; Chondrites; Planetary Geology

20010044768 Tokyo Univ., Dept. of Earth and Planetary Science, Hongo, Japan

Mineralogical Examination of Yamato 75258 (LL6) Heated at Different Oxygen Fugacities

Komatsu, M., Tokyo Univ., Japan; Miyamoto, M., Tokyo Univ., Japan; Mikouchi, T., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report our initial examination of textural and compositional changes observed for the heated LL6 chondrite under different oxygen fugacities in order to identify the responsible phases(s) that affected the spectra. Additional information is contained in the original extended abstract.
Derived from Text

Mineralogy; Chondrites; Planetary Geology; Meteorites; Metamorphism (Geology); Asteroids

20010044769 NASA Johnson Space Center, Houston, TX USA

Discovery of the First D-Asteroid Spectral Counterpart: Tagish Lake Meteorite

Hiroi, T., Brown Univ., USA; Zolensky, M. E., NASA Johnson Space Center, USA; Pieters, Carle M., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAGW-53871; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have discovered the first meteorite, Tagish Lake, which shows a reflectance spectrum very similar to that of the D asteroids, especially 368 Haidea. D and P asteroids have been believed to be ”supercarbonaceous” unlike any meteorite. Additional information is contained in the original extended abstract.
Derived from Text

Planetary Geology; Spectral Reflectance; Asteroids; Carbonaceous Chondrites

20010044770 Tennessee Univ., Dept. of Geological Sciences, Knoxville, TN USA

Asteroid Bulk Density: Implications for the Structure of Asteroids

Britt, D. T., Tennessee Univ., USA; Consolmagno, G. J., Vatican Observatory, Vatican City State (Holy See); Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The increase in asteroid bulk density measurements provides insight on asteroid structure. The largest asteroids appear to have zero macroporosity while the remaining population is divided between fractured but coherent objects and rubble piles. Additional information is contained in the original extended abstract.
Derived from Text
Asteroids; Density Measurement; Structures; Planetary Geology

20010044771 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
The Porosity of 433 Eros
Britt, D. T., Tennessee Univ., USA; Yeomans, Donald K., Jet Propulsion Lab., California Inst. of Tech., USA; Consolmagno, G. J., Vatican Observatory, Vatican City State (Holy See); Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Data from the NEAR mission show the bulk density of 433 Eros is 2.67 g/cm 3 . Given an L or LL composition, the bulk porosity of Eros is in the range of 25-29% and the macroporosity is 14-18%. This is consistent with a fractured, but coherent asteroid. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Geology; Eros Asteroid; Porosity; Density Measurement

20010044772 NASA Goddard Space Flight Center, Greenbelt, MD USA
The Composition of 433 Eros: A Mineralogical-Chemical Synthesis
McCoy, T. J., Smithsonian Institution, USA; Gaffey, M., Rensselaer Polytechnic Inst., USA; Bell, J. F., III, Cornell Univ., USA; Boynton, W. V., Arizona Univ., USA; Burbine, T. H., Smithsonian Institution, USA; Chapman, C. R., Southwest Research Inst., USA; Cheng, A., Johns Hopkins Univ., USA; Clark, P. E., Cornell Univ., USA; Evans, L. G., NASA Goddard Space Flight Center, USA; Gorenstein, P., Smithsonian Astrophysical Observatory, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report on an effort with the Near-Infrared Spectrometer/Multi-Spectral Imager (NIS/MSI) and X-ray/Gamma-ray Spectrometer (XGRS) teams to synthesize our data sets to constrain the relationship between Eros and meteorites; the mineralogy, abundances and compositions of Eros; and the processes that formed Eros. Additional information is contained in the original extended abstract.
Derived from Text
Eros Asteroid; Composition (Property); Mineralogy; Synthesis (Chemistry); Meteorites; Planetary Geology

20010044773 NASA Goddard Space Flight Center, Greenbelt, MD USA
Preliminary Results of the NEAR Gamma-Ray Spectrometer
Evans, L. G., Computer Sciences Corp., USA; Trombka, J. I., NASA Goddard Space Flight Center, USA; Starr, R. D., Catholic Univ. of America, USA; Boynton, W. V., Arizona Univ., USA; Bruekner, J., Max-Planck-Inst. fuer Chemie, Germany; Reedy, R. C., Los Alamos National Lab., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Near Earth Asteroid Rendezvous (NEAR) spacecraft was put into a 35 km orbit on December 13, 2000. This is first opportunity for the Gamma-ray Spectrometer to collect good geochemical data from Eros. Preliminary measurements for a number of key elements are in good agreement with predictions. Additional information is contained in the original extended abstract.
Derived from Text
Gamma Ray Spectrometers; Eros Asteroid; Planetary Geology

20010044774 Catholic Univ. of America, Physics Dept., Washington, DC USA
Examination of the Apparent Sulfur and Other Element Depletions of 433 Eros Relative to Ordinary Chondrites
Clark, Pamela E., Catholic Univ. of America, USA; Killen, R. M., Southwest Research Inst., USA; Murphy, M. E., Catholic Univ. of America, USA; McCoy, Tim J., National Museum of Natural History, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Near Earth Asteroid Rendezvous (NEAR) XRS measurements of 433 Eros are most consistent with chondrites, but important compositional differences remain, particularly in regard to S abundance. S depletion appears explainable, in terms of impact volatilization processes. Additional information is contained in the original extended abstract.
Derived from Text
Depletion; Sulfur; Chondrites; Eros Asteroid; Planetary Geology

20010044775 Northwestern Univ., Evanston, IL USA
Mapping and Normalised Reflectance of Asteroid Eros
Bussey, D. Ben J., Northwestern Univ., USA; Robinson, M., Northwestern Univ., USA; Edwards, Kay, Q and D Programmers, USA; Thomas, Peter, Cornell Univ., USA; Joseph, Jonathan, Cornell Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Near Earth Asteroid Rendezvous (NEAR) Shoemaker spacecraft has returned images of the entire surface of Eros. A global shape model allows photometric corrections to be made to the data, permitting analysis of variations in I/F across the surface to be conducted. Hunveyor. Additional information is contained in the original extended abstract.
Derived from Text
Reflectance; Planetary Geology; Planetary Mapping; Eros Asteroid; Images

20010044776 Carnegie Institution of Washington, Dept. of Terrestrial Magnetism, Washington, DC USA
Potential for Long-Wavelength Folding on Mercury
Dombard, Andrew J., Carnegie Institution of Washington, USA; Hauck, Steven A., II, Washington Univ., USA; Solomon, Sean C., Carnegie Institution of Washington, USA; Phillips, Roger J., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We use a simple analytic model to determine that Mercury's near-surface may have been unstable against folding; the resultant long-wavelength, low-amplitude folds could accommodate significant contractional strain associated with planetary cooling. Additional information is contained in the original extended abstract.
Derived from Text
Mercury (Planet); Planetary Geology; Planetary Evolution; Planetary Surfaces; Folds (Geology)

20010044777 Northwestern Univ., Dept. of Geological Sciences, Evanston, IL USA
Topography of Mercurian Craters
Wilkison, S. L., Northwestern Univ., USA; Robinson, M., Northwestern Univ., USA; Cook, A. C., Northwestern Univ., USA; Watters, T. R., National Air and Space Museum, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present results of crater topography measurements from digital elevation models derived from Mariner 10 stereo imagery of the Discovery region on Mercury. Additional information is contained in the original extended abstract.
Derived from Text
Topography; Mercury (Planet); Imagery; Planetary Geology; Planetary Craters; Mercury Surface

20010044778 National Air and Space Museum, Center for Earth and Planetary Studies, Washington, DC USA
Topography of Large-Scale Lobate Scarps in the Southern Hemisphere of Mercury
Watters, T. R., National Air and Space Museum, USA; Robinson, M., Northwestern Univ., USA; Cook, A. C., National Air and Space Museum, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Digital elevation data are used to examine the topography of Adventure, Resolution, and Discovery Rupes. These three thrust fault structures may have been localized by mechanical discontinuities introduced by one or more ancient buried impact basins. Additional information is contained in the original extended abstract.
Derived from Text
Topography; Escarpments; Mercury (Planet); Geological Faults; Planetary Geology; Mercury Surface

20010044779 NASA Ames Research Center, Moffett Field, CA USA

Can Distributed Volunteers Accomplish Massive Data Analysis Tasks?

Kanefsky, B., NASA Ames Research Center, USA; Barlow, N. G., University of Central Florida, USA; Gulick, V. C., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We argue that many image analysis tasks can be performed by distributed amateurs. Our pilot study, with crater surveying and classification, has produced encouraging results in terms of both quantity (100,000 crater entries in 2 months) and quality. Additional information is contained in the original extended abstract.

Derived from Text

Image Analysis; Image Processing; Data Processing; Planetary Craters

20010044780 Harvard-Smithsonian Center for Astrophysics, Cambridge, MA USA

On-Line Literature Search and Full Articles in the NASA ADS

Eichhorn, G., Harvard-Smithsonian Center for Astrophysics, USA; Accomazzi, A., Harvard-Smithsonian Center for Astrophysics, USA; Grant, C. S., Harvard-Smithsonian Center for Astrophysics, USA; Kurtz, M. J., Harvard-Smithsonian Center for Astrophysics, USA; Murray, S. S., Harvard-Smithsonian Center for Astrophysics, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NCC5-189; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The ADS provides free world-wide on-line access to over 2.2 million abstracts and over 1 million scanned pages of the astronomical and planetary literature plus over 4 million links to other relevant on-line information at http://ads.harvard.edu. Additional information is contained in the original extended abstract.

Derived from Text

On-Line Systems; Astronomical Catalogs; Planetology

20010044781 Massachusetts Inst. of Tech., Dept. of Earth, Atmospheric and Planetary Sciences, Cambridge, MA USA

Announcing the Availability of the MIT SMASS and SMASSIR Data Sets

Binzel, R. P., Massachusetts Inst. of Tech., USA; Bus, S. J., Hawaii Univ., USA; Burbine, T. H., National Museum of Natural History, USA; Rivkin, A. S., Massachusetts Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAGW-1450; NAG5-3939; NSF AST-95-30282; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We announce the release of visible and near-infrared reflectance spectroscopy measurements for nearly 2000 asteroids obtained by the MIT Small Main-Belt Asteroid Spectroscopic Survey (SMASS) program. Data are being released via http://smass.mit.edu. Additional information is contained in the original extended abstract.

Derived from Text

Asteroids; Spectral Reflectance; Data Systems

20010044782 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

From Binary Notation to Gravitational Waves: Rocket Science Made Easy

Fisher, Diane K., Jet Propulsion Lab., California Inst. of Tech., USA; Leon, Nancy J., Jet Propulsion Lab., California Inst. of Tech., USA; Cooper, Larry, Ohio Aerospace Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Space Place is a NASA educational outreach program open to all NASA missions, studies, and instruments. It uses diverse media (web, print, displays, hands-on activities) to deliver high-quality products through a highly leveraged infrastructure. Additional information is contained in the original extended abstract.

Derived from Text

NASA Programs; Aerospace Sciences; Gravitational Waves; Binary Codes

20010044783 Geological Survey, Flagstaff, AZ USA

Creating Cartographic Image Maps on the Web Using PDS MAP-A-PLANET

Garcia, P. A., Geological Survey, USA; Eliason, E. M., Geological Survey, USA; Barrett, J. M., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Use the Planetary Data System (PDS) MAP-A-PLANET website to create cartographic image maps from Mosaicked Digital Image Model (MDIM) data for Venus, Mars, Earth's Moon, and Jupiter's Moon Callisto. Additional information is contained in the original extended abstract.

Derived from Text

Data Systems; Images; Planetary Mapping

20010044784 NASA Goddard Space Flight Center, Greenbelt, MD USA

GRIDVIEW: Recent Improvements in Research and Education Software for Exploring Mars Topography

Roark, J. H., Science Systems and Applications, Inc., USA; Frey, H. V., NASA Goddard Space Flight Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have developed an Interactive Data Language (IDL) scientific visualization software tool called GRIDVIEW that can be used in research and education to explore and study the most recent Mars Orbiter Laser Altimeter (MOLA) gridded topography of Mars (http://denali.gsfc.nasa.gov/mola_pub/gridview). Additional information is contained in the original extended abstract.

Derived from Text

Topography; Programming Languages; Scientific Visualization; Software Development Tools; Mars Surface; Education

20010044785 Arizona State Univ., Tempe, AZ USA

Involving Students in Active Planetary Research During the 2001 Mars Odyssey Mission: The THEMIS Student Imaging Project

Klug, S. L., Arizona State Univ., USA; Christensen, P. R., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Thermal Emission Imaging System instrument (THEMIS) Student Imaging Project is a research and inquiry-based project that will give students the opportunity to participate in the exploration of Mars by planning, acquiring, and analyzing real images of Mars. Additional information is contained in the original extended abstract.

Derived from Text

Imaging Techniques; Thermal Emission; Themis Project; Space Exploration

20010044786 European Space Agency. European Space Research and Technology Center, ESTEC, Space Science Dept., Noordwijk, Netherlands

Outreach and Education from ESA's SMART-1 Mission to the Moon

Heather, D. J., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Foing, B. H., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; vanSusante, P., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Almeida, M., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present some of the possible outreach and education activities that are being considered for use during ESA's SMART-1 mission to the Moon, including "adopt a crater", "illuminating poles" and others. Packages will be produced for all levels. Additional information is contained in the original extended abstract.

Derived from Text

Education; Moon; Space Missions

20010044787 Space Explorers, Inc., De Pere, WI USA

The Moonlink, NEARlink and Marslink Program Model: Bringing Space Missions into the Classroom

Theno, T. W., Space Explorers, Inc., USA; Yingst, R. A., Space Explorers, Inc., USA; Brunsell, E., Space Explorers, Inc., USA; Pietsch, J., Space Explorers, Inc., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Space Explorers, Inc. has created a set of standards-based Internet education programs that give students basic concepts, mission simulations and access to actual spacecraft data, via a spiffy 3D online lab. Additional information is contained in the original extended abstract.

Derived from Text

Education; Space Missions; Internets; Aerospace Sciences

20010044788 Arizona State Univ., Dept. of Geology, Tempe, AZ USA

Mars: An Electronic Field Trip from Mission Planning to Image Interpretation

Kadel, Steven D., Arizona State Univ., USA; Greeley, Ronald, Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Arizona State University Mars Electronic Field Trip (EFT) is a newly developed interactive educational exercise simulating an orbiter mission to Mars. It is available to students and educators via the world-wide web at http://europa.la.asu.edu/spl. Additional information is contained in the original extended abstract.

Derived from Text

Mars Missions; Mission Planning; Education; Imaging Techniques

20010044789 Space Science Inst., Boulder, CO USA

The MarsQuest Traveling Exhibition: The First Year and Beyond

Dusenbery, P. B., Space Science Inst., USA; Farrand, W. H., Space Science Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The MarsQuest traveling exhibition has completed its first year on the road. The exhibition and associated education programs is described. Additional information is contained in the original extended abstract.

Derived from Text

Education; Mars (Planet); Mars Exploration; Aerospace Sciences

20010044790 Hawaii Univ., School of Ocean Earth, Science and Technology, Honolulu, HI USA

X-treme Science! Exploring Oceans, Volcanoes and Outer Space: A New Exhibit at the Bishop Museum

Hicks, T. L., Hawaii Univ., USA; Johnson, K. T. M., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

”X-treme Science! Exploring Oceans, Volcanoes, and Outer Space,” is the largest exhibit ever developed in-house at the Bishop Museum. The purpose of this exhibit is to introduce some of the explorers in Hawaii who are doing innovative research. Additional information is contained in the original extended abstract.

Derived from Text

Oceans; Outer Space Treaty; Earth Sciences; Aerospace Sciences; Oceanography; Mars Volcanoes

20010044791 NASA Johnson Space Center, Houston, TX USA

An Astrobiology Microbes Exhibit and Education Module

Lindstrom, M. M., NASA Johnson Space Center, USA; Allen, J. S., Lockheed Martin Corp., USA; Mortillaro, C., NASA Johnson Space Center, USA; Ducceschi, C., NASA Johnson Space Center, USA; Rawlings, P., Science Applications International Corp., USA; Stocco, K., Pasadena Independent School District, USA; Tobola, K., Clear Creek Independent School District, USA; Olendzenski, L., Woods Hole Oceanographic Inst., USA; Angermiller, L., Exhibitech, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; Sponsored in part by National Astrobiology Institutes; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A JSC-SCH team has produced an astrobiology exhibit and education module to augment the ”Microbes!” traveling exhibit. The astrobiology section focuses on life in extreme environments and considers the possibility of extraterrestrial life. Additional information is contained in the original extended abstract.
Derived from Text
Education; Exobiology; Aerospace Environments

20010044792 Lunar and Planetary Inst., Houston, TX USA
The ALTA II Spectrometer: A Tool for Teaching About Light and Remote Sensing
Treiman, Allan H., Lunar and Planetary Inst., USA; Thompson, Pamela B., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Bright leaves on dark sky Beyond the brilliant rainbow Vision fades away. Additional information is contained in the original extended abstract.
Derived from Text
Education; Remote Sensing; Light (Visible Radiation); Imaging Spectrometers

20010044793 Berzsenyi Daniel Coll., Dept. of Technology, Szombathely, Hungary
Planetary Science Education Via Construction of the Hunveyor-3 Experimental Planetary Lander in Berzsenyi College, Szombathely, Hungary: Rock Radioactivity Measurements
Kovacs Z. I., Berzsenyi Daniel Coll., Hungary; Kovari, I. E., Berzsenyi Daniel Coll., Hungary; Balogh, R., Berzsenyi Daniel Coll., Hungary; Varga, V., Berzsenyi Daniel Coll., Hungary; Kovacs, T., Berzsenyi Daniel Coll., Hungary; Hegyi, S., Pecs Univ., Hungary; Berczi, S., Eotvos Univ., Hungary; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We built the Hunveyor-3 minimal experimental lander space probe of Surveyor type in the Berzsenyi College, Hungary. With a new instrument on Hunveyors for natural radioactivity we measured and compared different rock types with planetary importance. Additional information is contained in the original extended abstract.
Derived from Text
Radioactivity; Rocks; Space Probes; Planetary Geology; Aerospace Sciences

20010044794 FOELDIX, Budapest, Hungary
New Experiment Plans (Electrostatic, Lunar Dust Measuring, Bio-Filtering) to the Hunveyor Educational Landers of Universities and Colleges in Hungary
Foldi, T., FOELDIX, Hungary; Berczi, S., Eotvos Univ., Hungary; Koris, A., Szeged Univ., Hungary; Kovacs, B., Pecs Univ., Hungary; Hegyi, S., Pecs Univ., Hungary; Kovacs Z. I., Berzsenyi Daniel Coll., Hungary; Rosko, F., Eotvos Univ., Hungary; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Measurement on levitating dust-pillow layer above lunar surface (a), and life components (from cell to large-molecule) selecting (nanofilters) and measuring (fiber-opto-chemical sensors) instrument (b), were planned for educational robot Hunveyor. Additional information is contained in the original extended abstract.
Derived from Text
Lunar Dust; Electrostatics; Robots; Planetary Geology; Education

20010044795 Muenster Univ., Inst. fuer Planetologie, Germany
The Chemical Heterogeneity of CI Chondrites
Morlok, A., Muenster Univ., Germany; Bischoff, A., Muenster Univ., Germany; Henkel, T., Muenster Univ., Germany; Rost, D., Muenster Univ., Germany; Stephan, T., Muenster Univ., Germany; Jessberger, E. K., Muenster Univ., Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Silicate-rich fragments from CI chondrites were analyzed with electron microprobe and TOF-SIMS to investigate chemical heterogeneities in these meteorites. Considerable variations were found for most major elements, especially for S, K, Na. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Heterogeneity; Silicates; Fragments; Meteorites; Planetary Geology

20010044796 Lawrence Livermore National Lab., Livermore, CA USA
Aqueous Alteration of CM Carbonaceous Chondrites
Rosenberg, N. D., Lawrence Livermore National Lab., USA; Browning, L., Southwest Research Inst., USA; Bourcier, W. L., Lawrence Livermore National Lab., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Results from a geochemical modeling study suggest that the environment conditions under which CM asteroidal parent bodies were altered was strongly basic and reducing, and may have included large quantities of hydrogen and methane gases. Additional information is contained in the original extended abstract.
Derived from Text
Carbonaceous Chondrites; Asteroids; Aqueous Solutions; Geochemistry

20010044797 NASA Johnson Space Center, Houston, TX USA
Sayama CM2 Chondrite: Fresh but Heavily Altered
Takaoka, N., Kyushu Univ., Japan; Nakamura, T., Kyushu Univ., Japan; Noguchi, T., Ibaraki Univ., Japan; Tonui, E., NASA Johnson Space Center, USA; Gounelle, M., NASA Johnson Space Center, USA; Zolensky, M. E., NASA Johnson Space Center, USA; Ebisawa, N., Tokyo Univ., Japan; Osawa, T., Tokyo Univ., Japan; Okazaki, R., Tokyo Univ., Japan; Nagao, K., Tokyo Univ., Japan; Yoneda, S., National Science Museum, Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Noble gas composition and mineralogy of Sayama meteorite, that fell in Japan and recently identified as a CM2 chondrite, revealed many unique features, indicating that it experienced extensive aqueous alteration under highly oxidized condition compared with typical CMs. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Meteoritic Composition; Mineralogy; Gas Composition; Planetary Geology

20010044798 Tokyo Univ., Lab. for Earthquake Chemistry, Hongo, Japan
Spectroscopic Classification of Carbonaceous Chondrites from the Speciation of Hydrous Components
Osawa, T., Tokyo Univ., Japan; Kagi, H., Tokyo Univ., Japan; Nagao, K., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Fourier-transform infrared spectroscopy (FTIR) analyses have been carried out for Antarctic carbonaceous chondrites and Sayama meteorite which is a just-recognized Japanese carbonaceous chondrite. A good correlation between chemical and infrared spectroscopic classification was obtained. Additional information is contained in the original extended abstract.
Derived from Text
Classifications; Infrared Spectroscopy; Carbonaceous Chondrites; Chemical Analysis

20010044799 Carnegie Institution of Washington, Washington, DC USA
Solid State Nuclear Magnetic Resonance Studies of the Murchison Organic Macromolecule
Cody, G. D., III, Carnegie Institution of Washington, USA; Alexander, C. M. OD., Carnegie Institution of Washington, USA; Tera, F., Carnegie Institution of Washington, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have used high speed H-1 (DEPTH) and C-13 (VACP MAS-slow spinning) solid state NMR to determine the contributions of protonated vs non-protonated carbon in the Murchison Macromolecule. Additional information is contained in the original extended abstract.
Derived from Text
Nuclear Magnetic Resonance; Macromolecules; Murchison Meteorite; Molecular Structure; Solid State

20010044800 Woods Hole Oceanographic Inst., MA USA

Experimental Studies on the Formation of Meteorite Organics During Hydrothermal Alteration

McCollom, T. M., Woods Hole Oceanographic Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Formation of organic compounds was observed during decomposition of iron oxalate and siderite. The products closely resemble those observed in meteorites, suggesting that some meteorite organics may form in situ concurrent with mineral alteration. Additional information is contained in the original extended abstract.

Derived from Text

Organic Compounds; Carbonaceous Chondrites; Alternations

20010044801 California Univ., San Diego, Dept. of Chemistry and Biochemistry, La Jolla, CA USA

Oxygen Isotope Systematics of CI and CM Chondrite Sulfate: Implications for Evolution and Mobility of Water in Planetesimals

Airieau, S. A., California Univ., San Diego, USA; Farquhar, J., California Univ., San Diego, USA; Jackson, T. L., California Univ., San Diego, USA; Leshin, L. A., Arizona State Univ., USA; Thiemens, M. H., California Univ., San Diego, USA; Bao, H., California Univ., San Diego, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report oxygen isotope composition of sulfate from CM and CI chondrites that is consistent with the assertion that the sulfate analyzed in all CM chondrites extraterrestrial origin insufficient to demonstrate the same for CI chondrite sulfate. Additional information is contained in the original extended abstract.

Derived from Text

Oxygen Isotopes; Water; Mobility; Carbonaceous Chondrites; Sulfates

20010044802 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA

Isotopic and Petrographic Observations of the Fine-grained Rim Around a Vigarano Refractory Inclusion

Cosarinsky, M., Arizona State Univ., USA; Leshin, L. A., Arizona State Univ., USA; MacPherson, G. J., National Museum of Natural History, USA; Guan, Y., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report oxygen isotopic compositions of multiple phases from the fine-grained rim around a Vigarano CAI. The large isotopic heterogeneity observed appears to preclude extensive processing after rim formation. Additional information is contained in the original extended abstract.

Derived from Text

Isotopic Labeling; Petrography; Rims; Oxygen Isotopes; Planetary Geology; Mineralogy; Chondrule

20010044803 Washington Univ., Dept. of Physics, Saint Louis, MO USA

The I-Xe System in Magnetic Fractions from CV3 Meteorites

Pravdivtseva, O. V., Washington Univ., USA; Hohenberg, C. M., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-9442; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New I-Xe data obtained for magnetic separates from CV3 meteorites Kaba, Bali, Mokoia. Additional information is contained in the original extended abstract.

Derived from Text

Magnetite; Orgueil Meteorite; Fractions; Planetary Geology

20010044804 New Mexico Univ., Dept. of Earth and Planetary Sciences, Albuquerque, NM USA

Compositional Zoning and Mn-Cr Systematics in Carbonates from the Y791198 CM2 Carbonaceous Chondrite

Brearley, Adrian J., New Mexico Univ., USA; Hutcheon, Ian D., Lawrence Livermore National Lab., USA; Browning, Lauren, Southwest Research Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): W-7405-eng-48; NAG5-9798; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Cathodoluminescence and microprobe analyses show that carbonates in Y791198 exhibit complex zoning. Cr-Mn dating suggests formation of carbonates 10 Ma after CAI formation Additional information is contained in the original extended abstract..
Derived from Text
Carbonaceous Chondrites; Manganese Alloys; Chromium Alloys; Carbonates; Planetary Geology

20010044805 Arizona State Univ., Dept. of Chemistry and Biochemistry, Tempe, AZ USA
Thermal Analysis of Labile Trace Elements in CM and CV Carbonaceous Chondrites Using Inductively Coupled Plasma-Mass Spectrometry
Lauretta, D. S., Arizona State Univ., USA; Klaue, B., Michigan Univ., USA; Blum, J. D., Michigan Univ., USA; Buseck, P. R., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-4308; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document
We developed a technique to measure the thermal release profiles of a suite of labile elements (Zn, As, Se, Cd, In, Sn, Sb, Te, Pt, Hg, Au, Tl, Pb, Bi). Conclusions are reached about the behavior of each element during parent-body alteration. Additional information is contained in the original extended abstract.
Derived from Text
Thermal Analysis; Trace Elements; Carbonaceous Chondrites

20010044806 National Inst. for Fusion Science, Safety and Environmental Research Center, Toki, Japan
Detailed Abundances of Rare Earth Elements Among Carbonaceous Chondrites
Shinotsuka, K., National Inst. for Fusion Science, Japan; Ebihara, M., Tokyo Metropolitan Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document
Extensive analyses of bulk carbonaceous chondrites for REE are performed using Inductively Coupled Plasma Mass Spectrometry (ICP-MS). Though each group of carbonaceous chondrites have variable REE abundance patterns, CV chondrite show characteristic pattern similar to that of group II CAI. Additional information is contained in the original extended abstract.
Derived from Text
Carbonaceous Chondrites; Rare Earth Elements; Abundance; Planetary Geology

20010044807 Proxemy Research, Inc., Laytonsville, MD USA
Potential Mechanisms for the Formation of Lava Flow Auras on Io
Baloga, S. M., Proxemy Research, Inc., USA; Glaze, L. S., Proxemy Research, Inc., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document
We propose three hypotheses for the formation of bright conforming borders of lobate lava flows on Io, referred to as auras. We use the stochastic-ballistic model to test the hypotheses and explore temperature and compositional constraints. Additional information is contained in the original extended abstract.
Derived from Text
Lava; Planetary Geology; Hypotheses; Fluid Flow

20010044808 Lancaster Univ., Environmental Science Dept., UK
Modelling Eruption Conditions at the Pillan and Pele Volcanoes on Io
Cataldo, V., Lancaster Univ., UK; Wilson, L., Lancaster Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document
Modelling the dynamics and thermodynamics of explosive eruptions at the Pillan and Pele vents on Io allows us to estimate mass eruption rates, mean pyroclast sizes, and amounts of near-surface SO2 mixing with the magma. Additional information is contained in the original extended abstract.
Derived from Text
Volcanoes; Planetary Geology; Magma

20010044809 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Orogenic Tectonism on Io

Jaeger, W. L., Arizona Univ., USA; Turtle, E. P., Arizona Univ., USA; Keszthelyi, L., Arizona Univ., USA; McEwen, A., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We estimate Io's lithosphere to be is greater than 14 km thick. This suggests that mountain uplift on Io is dominantly driven by subsidence-related stresses, though thermal expansion plays a non-negligible role in orogenic tectonics. Additional information is contained in the original extended abstract.

Derived from Text

Orography; Tectonics; Lithosphere; Mountains; Planetary Geology

20010044810 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Io: Heat Flow and Surface Age

Matson, D. L., Jet Propulsion Lab., California Inst. of Tech., USA; Davies, A. G., Jet Propulsion Lab., California Inst. of Tech., USA; Veeder, G. J., Jet Propulsion Lab., California Inst. of Tech., USA; Blaney, D. L., Jet Propulsion Lab., California Inst. of Tech., USA; Johnson, T. V., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Assuming Io is completely resurfaced with volcanics, ages to surface units on Io can be assigned as a function of temperature. Additional information is contained in the original extended abstract.

Derived from Text

Heat Transmission; Volcanology; Planetary Geology

20010044811 Centre National de la Recherche Scientifique, Lab. de Planetologie, Grenoble, France

Tentative Identification of Local Deposits of Cl2SO2 at Io's Surface

Schmitt, B., Centre National de la Recherche Scientifique, France; Rodriguez, S., Centre National de la Recherche Scientifique, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We tentatively identify a band at 3.915 micron observed locally on Io in NIMS spectra with Cl2SO2 diluted in solid SO2. It is prefered over H2S from converging arguments considering their spectra, physical state, abundance, volatility and chemistry. Additional information is contained in the original extended abstract.

Derived from Text

Deposits; Planetary Geology; Chlorine Compounds; Sulfur Dioxides; Satellite Surfaces

20010044812 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Infrared Spectral Signatures for Io's Dark and Green Spots

Granahan, J. C., BAE Systems, USA; Fanale, F. P., Hawaii Univ., USA; Carlson, R., Jet Propulsion Lab., California Inst. of Tech., USA; Smythe, W. D., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This spectral study of Io identifies the infrared components of the visible spectral units (green and dark) as identified by Galileo. The green units possess sulfur dioxide and the dark units are associated with infrared thermal signatures. Additional information is contained in the original extended abstract.

Derived from Text

Infrared Signatures; Infrared Spectra; Infrared Radiation

20010044813 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Io's Diverse Styles of Volcanic Activity: Results from Galileo NIMS

Lopes, R. M. C., Jet Propulsion Lab., California Inst. of Tech., USA; Smythe, W. D., Jet Propulsion Lab., California Inst. of Tech., USA; Kamp, L. W., Jet Propulsion Lab., California Inst. of Tech., USA; Doute, S., Centre National de la Recherche Scientifique, France; Carlson, R., Jet Propulsion Lab., California Inst. of Tech., USA; McEwen, A., Arizona Univ., USA; Geissler, P., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire

conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Observations by Galileo's Near-Infrared Mapping Spectrometer were used to map the thermal structure of several of Io's hot spots, revealing different styles of volcanism Additional information is contained in the original extended abstract..
Derived from Text
Volcanology; Temperature Distribution; Volcanoes; Planetary Geology

20010044814 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Power Outputs and Volumetric Eruption Rates for Ionian Volcanoes from Galileo-NIMS Data
Davies, A. G., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): RTOP 624-02-00-18; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Volumetric eruption rates for a number of Io volcanoes are calculated as a function of volcanic thermal output. Thermal output is determined using 2-temperature fits to NIMS data. Typical eruption rates are larger than terrestrial eruptions of similar style. Additional information is contained in the original extended abstract.
Derived from Text
Volcanoes; Planetary Geology; Flux (Rate); Volumetric Analysis

20010044815 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA
Chemistry and Vent Pressure of Very High-Temperature Gases Emitted from Pele Volcano on Io
Zolotov, M. Y., Washington Univ., USA; Fegley, B., Jr., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-6366; NAG5-7696; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Galileo data for magma temperature at Pele and HST chemical data (SO2, S2, and SO) for Pele plumes were used to evaluate vent pressure (10 -4 -2 bar), the oxidation state (2-3 log fO2 units below Ni-NiO), and chemistry of volcanic gases. Additional information is contained in the original extended abstract.
Derived from Text
Vents; Gas Pressure; Volcanoes; High Temperature Gases; Magma; Temperature Measurement; Planetary Geology

20010044816 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Eruption Mechanisms for Loki, Io: Inferences Based on Galileo and Groundbased Data
Rathbun, J. A., Lowell Observatory, USA; Spencer, J. R., Lowell Observatory, USA; Davies, A. G., Jet Propulsion Lab., California Inst. of Tech., USA; Howell, R. R., Wyoming Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A wealth of data about Loki, the most powerful volcano on Io, has been collected and here, we try to begin synthesis of these data. These data suggest periodic lava lake overturn. Further, these eruptions may be truly periodic, and therefore predictable. Additional information is contained in the original extended abstract.
Derived from Text
Volcanoes; Planetary Geology; Data Processing

20010044817 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Dynamics and Evolution of SO2 Gas Condensation Around Prometheus-like Volcanic Plumes on Io as Seen by the Near Infrared Mapping Spectrometer
Doute, S., Centre National de la Recherche Scientifique, France; Lopes-Gautier, R., Jet Propulsion Lab., California Inst. of Tech., USA; Smythe, W. D., Jet Propulsion Lab., California Inst. of Tech., USA; Kamp, L. W., Jet Propulsion Lab., California Inst. of Tech., USA; Carlson, R., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Near Infrared Mapping Spectrometer data acquired during the I24, 25, and 27 Io's Fly-bys by Galileo are analyzed to map the SO2 frost abundance and granularity. This allows a better understanding of the dynamics and evolution of gas condensation around volcanic plumes. Additional information is contained in the original extended abstract.
Derived from Text
Gas Evolution; Gas Dynamics; Condensation; Sulfur Dioxides; Volcanoes; Planetary Geology

20010044818 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Are Prometheus-type Plumes on Io Produced by Lava-SO2 Interactions at the Flow Fronts?
Milazzo, M., Arizona Univ., USA; Keszthelyi, L., Arizona Univ., USA; McEwen, A., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have investigated whether Lava-SO2 interactions at the flow fronts can produce the Prometheus-type plumes on Io. Additional information is contained in the original extended abstract.
Derived from Text
Plumes; Lava; Sulfur Dioxides; Gas-Liquid Interactions; Planetary Geology

20010044819 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Paterae on Io: Galileo Images, Sizes, Distribution, and Ages
Radebaugh, Jani, Arizona Univ., USA; Keszthelyi, Laszlo, Arizona Univ., USA; McEwen, Alfred, Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Galileo images of Io from 1999 and 2000 reveal new information about its paterae. The mean of 417 paterae on Io (79% of the surface) is 41.0 km, with fewer and larger paterae poleward of +/-25 deg latitude. An age progression of paterae can be seen in high resolution images. Additional information is contained in the original extended abstract.
Derived from Text
Galileo Spacecraft; Images; Volcanoes; Size (Dimensions); Planetary Geology

20010044820 Arizona Univ., Dept. of Hydrology and Water Research, Tucson, AZ USA
Very Recent, Water-related Landforms on Mars
Baker, V. R., Arizona Univ., USA; Strom, R. G., Arizona Univ., USA; Kargel, J. S., Geological Survey, USA; Dohm, J. M., Arizona Univ., USA; Ferris, J. C., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Very recent glacial, fluvial, lacustrine, periglacial, and mass-movement hill slope landforms indicate a causative episode or episodes of relatively high atmospheric pressure and extensive movement of water through and precipitation from the atmosphere. Additional information is contained in the original extended abstract.
Derived from Text
Water; Landforms; Mars Surface; Mars (Planet); Planetary Geology

20010044821 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
A Comparison of MOC and MOLA Observations of Northern Plains "Contacts" with Coastal Landforms of the Bonneville Basin, Utah
Parker, T. J., Jet Propulsion Lab., California Inst. of Tech., USA; Grant, J. A., National Air and Space Museum, USA; Franklin, B. J., Jet Propulsion Lab., California Inst. of Tech., USA; Rice, J. W., Jr., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Mars Global Surveyor has now completed its nominal mission. Among its many science objectives, the question of whether or not lakes or oceans existed on Mars is arguably one of the most provocative. Additional information is contained in the original extended abstract.
Derived from Text
Plains; Lakes; Oceans; Mars (Planet); Planetary Geology; Mars Missions

20010044822 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Surface Drainage on Mars

Banerdt, W. B., Jet Propulsion Lab., California Inst. of Tech., USA; Vidal, A., California State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The role of water on Mars bears directly on investigations crossing a wide range of disciplines, including geomorphology, geochemistry, and biology. We have calculated the potential flow patterns of water using Mars Orbiter Laser Altimeter (MOLA) topographic data. Additional information is contained in the original extended abstract.

Derived from Text

Mars Surface; Drainage; Mars (Planet); Water Flow; Flow Distribution; Potential Flow; Planetary Geology; Hydrology

20010044823 Washington Univ., School of Oceanography, Seattle, WA USA

Wet Evidence for a Dry Mars

Parsons, J. D., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Recent mapping efforts of the oceanic seafloor and underlying stratigraphy illustrate the ubiquity of certain morphologic features. The processes responsible for these forms will be discussed along with their relevance martian surface morphology. Additional information is contained in the original extended abstract.

Derived from Text

Mars Surface; Planetary Geology; Mars (Planet); Ocean Bottom

20010044824 National Air and Space Museum, Center for Earth and Planetary Studies, Washington, DC USA

Martian Highland Drainage Basins: Basin Fill Characteristics from MOC

Maxwell, Ted A., National Air and Space Museum, USA; Craddock, Robert A., National Air and Space Museum, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mars Orbiting Camera (MOC) images of the highland plains of Mars indicate that sediments from the neighboring highlands were responsible for infilling several, but not all basins. Associations of features are used to determine the most likely origin of these materials. Additional information is contained in the original extended abstract.

Derived from Text

Mars (Planet); Drainage; Mars Surface; Planetary Geology; Structural Basins

20010044825 Pittsburgh Univ., Dept. of Geology and Planetary Science, Pittsburgh, PA USA

Highland Drainage Basins and Valley Networks in the Eastern Hellas Region of Mars

Mest, Scott C., Pittsburgh Univ., USA; Crown, David A., Pittsburgh Univ., USA; Harbert, William, Pittsburgh Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Geologic mapping of highland terrains east of the Hellas basin resulted in identification of twelve drainage basins. Morphometric analysis of the basins using ArcInfo and Mars Orbiter Laser Altimeter (MOLA) will provide a better understanding of the degradation of the highlands. Additional information is contained in the original extended abstract.

Derived from Text

Highlands; Drainage; Structural Basins; Planetary Geology; Mars (Planet); Mars Surface

20010044826 NASA Goddard Space Flight Center, Greenbelt, MD USA

Valley Network Morphology and Topographic Gradients on Mars

Aharonson, Oded, Massachusetts Inst. of Tech., USA; Zuber, Maria T., NASA Goddard Space Flight Center, USA; Rothman, Daniel H., Massachusetts Inst. of Tech., USA; Schorghofer, Norbert, Massachusetts Inst. of Tech., USA; Phillips, Roger J., Washington Univ., USA; Williams, Rebecca M. E., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Data returned from the Mars Orbiter Laser Altimeter allows construction of a high precision digital elevation model. Quantitative investigations into the geomorphic properties of drainage features, similar to ones carried out on Earth, are now possible Additional information is contained in the original extended abstract.
Derived from Text
Valleys; Planetary Geology; Morphology; Topography; Mars Surface; Mars (Planet); Gradients

20010044827 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Metastability of Liquid Water on Mars
Hecht, M. H., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This talk reviews reasonable spatial and temporal scales for melting and flowing of water on Mars, and relates them to plausible martian conditions. Additional information is contained in the original extended abstract.
Derived from Text
Mars Environment; Mars Surface; Metastable State; Water; Planetary Geology; Mars (Planet)

20010044828 Colorado Univ., Lab. for Atmospheric and Space Physics, Boulder, CO USA
Recent Gullies on Mars and the Source of Liquid Water
Mellon, M. T., Colorado Univ., USA; Phillips, R. J., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Reported observations of young gully-like features on Mars suggest that liquid water has recently flowed on the surface. Yet Mars is globally covered by permafrost. We present a mechanism for the occurrence of liquid water in the near-surface environment. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Geology; Mars Surface; Water; Mars (Planet); Water Flow

20010044829 NASA Ames Research Center, Moffett Field, CA USA
Some Ground Water Considerations Regarding the Formation of Small Martian Gullies
Gulick, V. C., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Discovery of young valleys on Mars has renewed interest in mechanisms capable of producing near-surface water under present climatic conditions. This abstract discusses modeling results of small martian hydrothermal systems. Additional information is contained in the original extended abstract.
Derived from Text
Ground Water; Mars Surface; Mars (Planet); Hydrothermal Systems; Planetary Geology

20010044830 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Ephemeral Dark Spots Associated with Martian Gullies
Bridges, N. T., Jet Propulsion Lab., California Inst. of Tech., USA; Herkenhoff, K. E., Geological Survey, USA; Titus, T. N., Geological Survey, USA; Kieffer, H. H., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Seasonal spots confined to the channels of the recently-discovered martian gullies are described and explanations offered for their origin. Additional information is contained in the original extended abstract.
Derived from Text
Mars (Planet); Planetary Geology; Ground Water; Mars Surface

20010044831 NASA Ames Research Center, Moffett Field, CA USA

Recent Aqueous Environments in Impact Craters and the Astrobiological Exploration of Mars

Cabrol, N. A., NASA Ames Research Center, USA; Wynn-Williams, D. D., British Antarctic Survey, UK; Crawford, D. A., Sandia National Labs., USA; Grin, E. A., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Three cases of recent aqueous environments are surveyed at Mars Orbiting Camera (MOC) high-resolution in the E-Gorgonum, Newton and Hale craters and their astrobiological implications assessed. Additional information is contained in the original extended abstract.

Derived from Text

Aqueous Solutions; Mars (Planet); Mars Craters; Planetary Geology; Exobiology

20010044832 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Liquid CO2 Breakout and the Formation of Recent Small Gullies on Mars

Musselwhite, D. S., Arizona Univ., USA; Swindle, T. D., Arizona Univ., USA; Lunine, J. I., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We show that a CO2 suspended flow could have produced the recent small gullies on Mars. The model involves the build-up of liquid-CO2 behind a dry-ice barrier a few meters into the cliff face and about a hundred meters below the top of the cliff. Additional information is contained in the original extended abstract.

Derived from Text

Carbon Dioxide; Planetary Geology; Valleys; Mars Surface; Mars (Planet)

20010044833 Eidgenoessische Technische Hochschule, Dept. of Earth Sciences, Zurich, Switzerland

Strontium Isotopes and the Paleocosmochemistry of the Inner Solar System

Halliday, A. N., Eidgenoessische Technische Hochschule, Switzerland; Porcelli, D., Eidgenoessische Technische Hochschule, Switzerland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Strontium isotope data indicate loss of alkalies during accretion of planetesimals and planets. Time-integrated Rb/SR ratios are consistent with substantial quantities (1% and 10%) of C and S in the present earth's core if retained during accretion. Additional information is contained in the original extended abstract.

Derived from Text

Strontium Isotopes; Solar System; Solar System Evolution; Planetary Geology

20010044834 Harvard Univ., Dept. of Earth and Planetary Sciences, Cambridge, MA USA

Nb-Zr and Hf-W Isotope Systematics: Applications to Early Solar System Chronology and Planetary Differentiation

Yin, Qing-Zhu, Harvard Univ., USA; Jacobsen, S. B., Harvard Univ., USA; Blichert-Toft, J., Ecole Normale Superieure, France; Telouk, P., Ecole Normale Superieure, France; Albarhde, F., Ecole Normale Superieure, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present new Zr isotope data that provide constraints on the planetary differentiation time scale. Additional information is contained in the original extended abstract.

Derived from Text

Solar System; Chronology; Niobium Isotopes; Zirconium Isotopes; Tungsten Isotopes; Hafnium Isotopes; Differentiation; Planetary Geology

20010044835 Harvard Univ., Dept. of Earth and Planetary Sciences, Cambridge, MA USA

Core-Formation Models and Extinct Nuclides

Jacobsen, S. B., Harvard Univ., USA; Yin, Q.-Z., Harvard Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Zr and W isotope data are consistent with the Earth's core forming in a single event subsequent to about 113 Ma after the formation of the solar system. With continuous models of core formation the process can start early. Additional information is contained in the original extended abstract.
Derived from Text
Solar System; Nuclides; Planetary Cores; Chondrites; Earth (Planet)

20010044836 Carnegie Institution of Washington, Dept. of Terrestrial Magnetism, Washington, DC USA
Accurate Lead Isochrons for Terrestrial Rocks: Modifying the Two-Stage Model to Accommodate the Many Reservoirs They Indicate
Tera, Fouad, Carnegie Institution of Washington, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Accurate dating of rocks indicates existence of multiple ancient reservoirs. This required modification of the standard two-stage evolution models. Intermediate position of the undifferentiated Earth indicates there may be no Pb paradox. Additional information is contained in the original extended abstract.
Derived from Text
Rocks; Reservoirs; Planetary Geology; Lead Isotopes

20010044837 NASA Johnson Space Center, Houston, TX USA
High Pressure Anhydrous Phase Relations of Homestead L5: An Analog for Martian Mantle
Wasserman, A. A., Arizona Univ., USA; Chabot, N. L., NASA Johnson Space Center, USA; Draper, D. S., NASA Johnson Space Center, USA; Agee, C. B., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Homestead L5 is a viable analog to martian mantle. High pressure phase relations help elucidate martian magmatic processes. Additional information is contained in the original extended abstract.
Derived from Text
Mars (Planet); Planetary Mantles; Planetary Structure; Chondrites; Phases; Planetary Geology

20010044838 New Mexico Univ., Dept. of Earth and Planetary Sciences, Albuquerque, NM USA
Chemistry of Olivine from Planetary Basalts: Earth-Moon Comparisons Emphasizing Mn/Fe and Co/Ni Systematics
Karner, J. M., New Mexico Univ., USA; Papike, J. J., New Mexico Univ., USA; Shearer, C. K., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Major and trace element trends of basaltic olivines from the Earth and Moon indicate planetary origins and settings. Additional information is contained in the original extended abstract.
Derived from Text
Trace Elements; Olivine; Moon; Basalt; Planetary Geology; Earth (Planet)

20010044839 Mount Holyoke Coll., Dept. of Earth and Environment, South Hadley, MA USA
Ferric Iron in Feldspar as an Indicator of Evolution of Planetary Oxygen Fugacity
Dyar, M. D., Mount Holyoke Coll., USA; Delaney, J. S., Rutgers Univ., USA; Tegner, C., Geological Survey of Norway, Norway; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Synchrotron micro-XANES analysis of felsic magma constituents allows us to constrain independently Fe3 and hence the oxygen fugacity of magmatic systems. We focus here on feldspar from anorthosites and intrusive complexes found on four different bodies. Additional information is contained in the original extended abstract.
Derived from Text
Iron; Feldspars; Magma; Planetary Geology

20010044840 Idaho State Univ., Dept. of Geology, Pocatello, ID USA

Mafic Volcanism on the Eastern Snake River Plain: Petrologic Evaluation of a Terrestrial Analogue for Planetary Bodies

Hughes, Scott S., Idaho State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Lava plains and flood basalts are the principal manifestations of magmatism associated with the evolution of planetary lithospheres. Geochemical analyses are used to evaluate time-space variations in Snake River Plain tholeiites. Additional information is contained in the original extended abstract.

Derived from Text

Terrestrial Planets; Volcanology; Petrology; Planetary Geology; Lava; Floods; Plains; Basalt; Planetary Evolution

20010044841 National Air and Space Museum, Center for Earth and Planetary Studies, Washington, DC USA

Field Studies and Radar Remote Sensing of Silicic Lava Flows

Bulmer, M. H., National Air and Space Museum, USA; Campbell, B. A., National Air and Space Museum, USA; Byrnes, J., Pittsburgh Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The eruption of large evolved (>60% SiO2) lava flows on Earth has never been witnessed, making careful data analyses combined with numerical (and possibly physical) modeling the only way to understand them. Additional information is contained in the original extended abstract.

Derived from Text

Remote Sensing; Lava; Fluid Flow; Silicon Dioxide; Planetary Geology; Volcanoes

20010044842 Utrecht Univ., Dept. of Sedimentology, Utrecht, Netherlands

Collapse Structures in the Early Earth and Possible Planetary Equivalents

Nijman, W., Utrecht Univ., Netherlands; deVries, S. T., Utrecht Univ., Netherlands; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Lower Archean, 100 km-scale, crustal collapse structures are assumed to host Earth's earliest sedimentary basins. Felsic volcanism and hydrothermal activity accompany collapse. The structures may be compared to coronas of Venus. Additional information is contained in the original extended abstract.

Derived from Text

Collapse; Earth (Planet); Volcanology; Planetary Geology

20010044843 Argonne National Lab., Materials Science Div., IL USA

Barium Isotopes in Single Presolar Grains

Pellin, M. J., Argonne National Lab., USA; Davis, A. M., Chicago Univ., USA; Savina, M. R., Argonne National Lab., USA; Kashiv, Y., Argonne National Lab., USA; Clayton, R. N., Chicago Univ., USA; Lewis, R. S., Chicago Univ., USA; Amari, S., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): W-31-109-eng-38; NAG5-3986; NAG5-4298; NAG5-4493; NAG5-9510; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Barium isotopic compositions of single presolar grains were measured by laser ablation laser resonant ionization mass spectrometry and the implications of the data for stellar processes are discussed. Additional information is contained in the original extended abstract.

Derived from Text

Barium Isotopes; Grains; Isotopic Labeling; Composition (Property); Trace Elements

20010044844 Max-Planck-Inst. fuer Chemie, Mainz, Germany

Silicon- and Calcium-Isotopic Compositions of Presolar Silicon Nitride Grains from the Indarch Enstatite Chondrite

Besmehn, A., Max-Planck-Inst. fuer Chemie, Germany; Hoppe, P., Max-Planck-Inst. fuer Chemie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Presolar Si3N4 grains have Ca44/Ca-40 ratios compatible with solar and there is no apparent evidence for the presence of now extinct Ti-44. One grain shows a clear excess in Ca-42. This, however, is not in conflict with the proposed SN origin. Additional information is contained in the original extended abstract.
Derived from Text
Calcium Isotopes; Isotopic Labeling; Silicon Isotopes; Composition (Property); Chondrites; Grains

20010044845 Washington Univ., Lab. for the Space Sciences, Saint Louis, MO USA
Presolar SiC from Parent Stars of Varying Metallicity and the Galactic Evolution of the Si Isotopes
Zinner, Ernst, Washington Univ., USA; Amari, Sachiko, Washington Univ., USA; Gallino, Roberto, Turin Univ., Italy; Lugaro, Maria, Monash Univ., Australia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Si isotopic ratios measured in mainstream, Y and Z type presolar Si grains from primitive meteorites indicate that the grains come from C-rich Asymptotic giant Branch (AGB) stars with a range of metallicities. Additional information is contained in the original extended abstract.
Derived from Text
Silicon Carbides; Silicon Isotopes; Galactic Evolution; Meteorites; Carbon Stars

20010044846 Clemson Univ., Dept. of Physics and Astronomy, SC USA
Abundances of Linear Carbon-Chain Molecules in Supernovae
Clayton, D. D., Clemson Univ., USA; Deneault, E., Clemson Univ., USA; Meyer, B. S., Clemson Univ., USA; The, L.-S., Clemson Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This paper evaluates the condensation of carbon solids in a gas of pure C and O atoms when these exist within the interior of an expanding young supernova. We calculate the abundances of large carbon molecules, which serve as nucleations for condensation of graphites. Additional information is contained in the original extended abstract.
Derived from Text
Supernovae; Abundance; Molecular Chains; Condensation Nuclei

20010044847 Carnegie Institution of Washington, Dept. of Terrestrial Magnetism, Washington, DC USA
The Search of Presolar Silicates and the Cr-54 Carrier
Alexander, C. M. OD., Carnegie Institution of Washington, USA; Nittler, L. R., Carnegie Institution of Washington, USA; Tera, F., Carnegie Institution of Washington, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We use a novel dissolution technique to search for presolar silicates and an anomalous chromium carrier. Additional information is contained in the original extended abstract.
Derived from Text
Chromium Isotopes; Silicates; Chondrites

20010044848 Max-Planck-Inst. fuer Chemie, Mainz, Germany
Recoil of Spallation Xenon: Hope for Dating Presolar SiC
Mohapatra, R., Max-Planck-Inst. fuer Chemie, Germany; Merchel, S., Max-Planck-Inst. fuer Chemie, Germany; Ott, U., Max-Planck-Inst. fuer Chemie, Germany; Herpers, U., Cologne Univ., Germany; Michel, R., Technische Hochschule, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The recoil range of spallation Xe-126 produced by irradiation with 1200 MeV protons in a Ba glas has been determined. With an inferred range in silicon carbide of 0.165 m, determining a Xe-based presolar exposure age for SiC grains seems feasible. Additional information is contained in the original extended abstract.
Derived from Text
Spallation; Xenon Isotopes; Silicon Carbides; Recoil Protons

20010044849 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA

Presolar Grains in CM2 Chondrites

Huss, G. R., Arizona State Univ., USA; Meshik, A. P., Washington Univ., USA; Hohenberg, C. M., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-8173; NAG5-4173; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New abundance determinations for presolar diamond, SiC, and graphite in CM2 chondrites are presented and used to infer initial abundances in primitive solar-system material. Modifications of initial abundances reflect early-solar-system processes. Additional information is contained in the original extended abstract.

Derived from Text

Solar System; Chondrites; Abundance

20010044850 Bern Univ., Physics Inst., Bern, Switzerland

Helium Isotopic Ratios in Carbonaceous Chondrites: Significant for the Early Solar Nebula and Circumstellar Diamonds?

Busemann, H., Bern Univ., Switzerland; Baur, H., Eidgenoessische Technische Hochschule, Switzerland; Wieler, R., Eidgenoessische Technische Hochschule, Switzerland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Stepwise etching of acid-resistant residues from carbonaceous chondrites yields a new, extraordinarily low He isotopic ratio for phase Q that might represent early solar nebula composition. A much lower ratio possibly characterizes He-P3 from circumstellar diamonds. Additional information is contained in the original extended abstract.

Derived from Text

Helium; Isotope Ratios; Carbonaceous Chondrites; Planetary Nebulae; Meteoritic Diamonds; Meteoritic Composition

20010044851 Washington Univ., Physics Dept., Saint Louis, MO USA

Selective Laser Extraction of Xe-H from Xe-HL in Meteoritic Nanodiamonds: Real Effect or Experimental Artifact?

Meshik, A. P., Washington Univ., USA; Pravdivtseva, O. V., Washington Univ., USA; Hohenberg, C. M., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-9442; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New, suggestive results of selective laser extraction of Xe-H were obtained for Indarch and Allende nanodiamonds. However, due to large experimental uncertainties we cannot make any certain conclusions on the separability of Xe-HL. Additional information is contained in the original extended abstract.

Derived from Text

Lasers; Extraction; Meteoritic Diamonds; Separation

20010044852 Open Univ., Planetary and Space Sciences Research Inst., Milton Keynes, UK

Separation of Q-Noble Gas Carrier from Bulk Carbon in Enstatite Chondrites by Stepped Combustion

Verchovsky, A. B., Open Univ., UK; Sephton, M. A., Open Univ., UK; Wright, I. P., Open Univ., UK; Pillinger, C., Open Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Detailed stepped combustion of HF-HCl residues from carbonaceous and enstatite chondrites suggest Q-noble gas carrier is different from bulk carbon in the meteorites. Additional information is contained in the original extended abstract.

Derived from Text

Rare Gases; Carbon; Enstatite; Carbonaceous Chondrites; Meteorites; Residues; Separation

20010044853 Max-Planck-Inst. fuer Chemie, Mainz, Germany

Large Nitrogen-15 Enrichments in Silicon Carbide and Carbon Grains from the Bencubbin Meteorite

Mostefaoui, S., Max-Planck-Inst. fuer Chemie, Germany; Hoppe, P., Max-Planck-Inst. fuer Chemie, Germany; Ott, U., Max-Planck-Inst. fuer Chemie, Germany; ElGoresy, A., Max-Planck-Inst. fuer Chemie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We searched for N-15-rich phases in acid resistant residues of the Bencubbin meteorite. Particularly interesting constituents in the residues are carbon, SiC, and Al2O3 grains. We encountered large N-15-excesses in SiC and carbon grains suggesting interstellar origins. Additional information is contained in the original extended abstract.

Derived from Text

Meteorites; Meteoritic Composition; Nitrogen 15

20010044854 NASA Ames Research Center, Moffett Field, CA USA

On an Interstellar Origin for N-15 Fractionation in Meteorites

Charnley, S. B., NASA Ames Research Center, USA; Rodgers, S. D., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have shown that interstellar chemistry could produce much larger N-15/N-14 fractionation in specific interstellar molecules than previously thought. Additional information is contained in the original extended abstract.

Derived from Text

Fractionation; Interstellar Chemistry; Nitrogen 15; Isotope Ratios

20010044855 Open Univ., Planetary and Space Sciences Research Inst., Milton Keynes, UK

Dual Isotopic Composition of Methane in Murchison Meteorite

Butterworth, A. L., Open Univ., UK; Sephton, M. A., Open Univ., UK; Gilmour, I., Open Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Dual isotopic composition (H and C) of methane extracted from a small sample of Murchison meteorite reveals a deuterium enrichment for this molecule, indicating the presence of interstellar hydrogen. Additional information is contained in the original extended abstract.

Derived from Text

Deuterium; Isotope Ratios; Methane; Murchison Meteorite; Meteoritic Composition

20010044856 NASA Johnson Space Center, Houston, TX USA

Near-Earth Asteroid Sample Return Missions

Sears, D. W. G., Arkansas Univ., USA; Allen, C. C., NASA Johnson Space Center, USA; Britt, D. T., Tennessee Univ., USA; Brownlee, D. E., Washington Univ., USA; Cheng, A., Johns Hopkins Univ., USA; Chapman, C. R., Southwest Research Inst., USA; Clark, B. C., Lockheed Martin Astronautics, USA; Drake, B. G., NASA Johnson Space Center, USA; Franchi, I. A., Open Univ., UK; Gorevan, S., Honeybee Robotics Ltd., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The rate of discovery of new Near Earth Asteroids (NEAs) and the success of D-S 1 and NEAR-Shoemaker, suggest that sample return from NEAs is now technically feasible. Here we present a summary of a recent workshop on the topic. Additional information is contained in the original extended abstract.

Derived from Text

Asteroid Missions; Sample Return Missions; Mission Planning

20010044857 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Radar Observations of Near-Earth Asteroids 2000 UG11 and 2000 UK11

Nolan, M. C., Arecibo Ionospheric Observatory, Puerto Rico; Margot, J.-L., Arecibo Ionospheric Observatory, Puerto Rico; Howell, E. S., Arecibo Ionospheric Observatory, Puerto Rico; Benner, L. A. M., Jet Propulsion Lab., California Inst. of Tech., USA; Ostro, S. J., Jet Propulsion Lab., California Inst. of Tech., USA; Jurgens, R. F., Jet Propulsion Lab., California Inst. of Tech., USA; Giorgini, J. D., Jet Propulsion Lab., California Inst. of Tech., USA; Campbell, D. B., Cornell Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Two small near-Earth asteroids, 2000 UG11 and 2000 UK11 were observed using the Arecibo and Goldstone radars a week after their discovery. 2000 UK11 is a rapidly rotating (3 min) approximately 30 m solid body. 2000 UG11 is two bodies separated by at least 300 m Additional information is contained in the original extended abstract..

Derived from Text

Asteroids; Radar Tracking; Orbit Determination

20010044858 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Radar Observations of Binary Asteroid 2000 DP107

Margot, J. L., National Astronomy and Ionosphere Center, Puerto Rico; Nolan, M. C., National Astronomy and Ionosphere Center, Puerto Rico; Benner, L. A. M., Jet Propulsion Lab., California Inst. of Tech., USA; Ostro, S. J., Jet Propulsion Lab., California Inst. of Tech., USA; Jurgens, R. F., Jet Propulsion Lab., California Inst. of Tech., USA; Giorgini, J. D., Jet Propulsion Lab., California Inst. of Tech., USA; Slade, M. A., Jet Propulsion Lab., California Inst. of Tech., USA; Campbell, D. B., Cornell Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present the discovery and characterization of DP107 with the Goldstone and Arecibo radars, including a detailed sequence of images showing the system's orbital motion. Additional information is contained in the original extended abstract.

Derived from Text

Asteroids; Orbits; Radar Tracking

20010044859 Rensselaer Polytechnic Inst., Planetary Sciences Lab., Troy, NY USA

Asteroids: Does Space Weathering Matter?

Gaffey, Michael J., Rensselaer Polytechnic Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAGW-3725; NAG5-8976; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The interpretive calibrations and methodologies used to extract mineralogy from asteroidal spectra appear to remain valid until the space weathering process is advanced to a degree which appears to be rare or absent on asteroid surfaces. Additional information is contained in the original extended abstract.

Derived from Text

Asteroids; Weathering

20010044860 Massachusetts Inst. of Tech., Cambridge, MA USA

Aqueous Alteration on S Asteroid 6 Hebe?

Rivkin, A. S., Massachusetts Inst. of Tech., USA; Davies, J. K., Joint Astronomy Centre, USA; Clark, B. E., Cornell Univ., USA; Trilling, D. E., Pennsylvania Univ., USA; Brown, R. H., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have observed 6 Hebe in the 1.9-3.6 micron region and found evidence for hydrated minerals on its surface, varying with rotational phase. We also find its continuum behavior unlike a mixture of OC and metal. Additional information is contained in the original extended abstract.

Derived from Text

Asteroids; Minerals; Spectra

20010044861 California Inst. of Tech., Lindhurst Lab. of Experimental Geophysics, Pasadena, CA USA
Impact on Comets and Asteroids
OKeefe, John D., California Inst. of Tech., USA; Stewart, Sarah T., California Inst. of Tech., USA; Ahrens, Thomas J., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-8915; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We characterized the impact physics in collisions on porous bodies by various density projectiles and defined different penetration modes (compression, spreading, or breakup) based on transitions between instability regimes. Additional information is contained in the original extended abstract.

Derived from text
Asteroids; Collisions; Comets; Computerized Simulation; Penetration

20010044862 Boeing Co., Seattle, WA USA
Ejecta from Impact Craters in Porous Materials
Housen, K. R., Boeing Co., USA; Voss, M. E., Boeing Co., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Centrifuge experiments are described that simulate the formation of craters and ejecta blankets from impacts on porous asteroids. Ejecta blankets diminish as target porosity increases, consistent with observations of large craters on Mathilde. Additional information is contained in the original extended abstract.

Derived from Text
Asteroids; Porosity; Ejecta; Craters; Experimentation

20010044863 Washington Univ., Dept. of Aeronautics and Astronautics, Seattle, WA USA
On Equilibrium Shapes of Solid Solar System Bodies
Holsapple, K. A., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Equilibrium configurations for a cohesionless elastic-plastic ellipsoidal solid body are derived using limit-load analyses. The classical results (Maclaurin spheroids, Jacobi ellipsoids, Roche limits) for fluids are included as special cases. Additional information is contained in the original extended abstract.

Derived from Text
Shapes; Loads (Forces); Celestial Bodies; Elastic Deformation

20010044864 Rensselaer Polytechnic Inst., Planetary Sciences Lab., Troy, NY USA
Unraveling the Thermal Structure of the Asteroid Belt from Meteoritic and Asteroidal Evidence
Hardersen, P. S., Rensselaer Polytechnic Inst., USA; Gaffey, M., Rensselaer Polytechnic Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The thermal structure of the main asteroid belt will be geothermally characterized by using the inferred thermal histories obtained from near infrared and radar data of main belt asteroids. The proposed heating mechanisms will then be tested with available asteroid data. Additional information is contained in the original extended abstract.

Derived from text
Temperature Distribution; Asteroid Belts; Asteroids; Heating

20010044865 Tennessee Univ., Dept. of Geological Sciences, Knoxville, TN USA
Thermal Consequences of the Multizone Accretion Code on the Structure of the Asteroid Belt
Ghosh, A., Tennessee Univ., USA; Weidenschilling, S. J., Planetary Science Inst., USA; McSween, H. Y., Jr., Tennessee Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Using Al-26 as the heat source, we attempt to reproduce the heliocentric thermal zoning of the asteroid belt from the output of the Multizone Accretion code. Additional information is contained in the original extended abstract.
Derived from Text
Aluminum Isotopes; Asteroid Belts; Heat Sources

20010044866 NASA Johnson Space Center, Houston, TX USA
New Visible-Region Spectral Observations of Vesta and Five Vestoids
Jarvis, K. S., Lockheed Martin Space Operations, USA; Vilas, F., NASA Johnson Space Center, USA; Cochran, A. L., Texas Univ., USA; Kelley, M. S., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New visible-region reflectance spectra were acquired of 4 Vesta and five Vestoids. An absorption feature near 0.5065 microns has been previously identified in spectra of Vesta and some Vestoids. These observations continue the search for this feature. Additional information is contained in the original extended abstract.
Derived from Text
Spectral Reflectance; Vesta Asteroid; Composition (Property)

20010044867 NASA Ames Research Center, Moffett Field, CA USA
Compositional Variability Associated with Stickney Crater on Phobos
Roush, T. L., NASA Ames Research Center, USA; Hogan, R. C., Symtec Corp., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Unsupervised clustering techniques identified four regions in and near Stickney crater on Phobos having unique spectral properties. These spectra are best matched by spectra of naturally occurring materials, e.g., lunar soils, meteorites, and rocks. Additional information is contained in the original extended abstract.
Derived from Text
Phobos; Spectra; Variability; Composition (Property); Craters

20010044868 Academy of Sciences (USSR), Vernadsky Inst., Moscow, USSR
Downslope Movement of Surface Material on Phobos
Shingareva, T. V., Academy of Sciences (USSR), USSR; Kuzmin, R. O., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Two types of surface material emplacement on Phobos are observed. The simulation of the large-scale landslide motion within Stickney and its triggering by sublimation-induced erosion are considered. Additional information is contained in the original extended abstract.
Derived from Text
Phobos; Surface Layers; Landslides; Computerized Simulation

20010044869 Universita degli Studi G. D'Annunzio, International Research School of Planetary Sciences, Pescara Italy
MOC Observation of Layered Deposits in Valles Marineris, Mars
Komatsu, G., Universita degli Studi G. D'Annunzio, Italy; Ori, G. G., Universita degli Studi G. D'Annunzio, Italy; diCamillo, M., Universita degli Studi G. D'Annunzio, Italy; Garzarella, A., Universita degli Studi G. D'Annunzio, Italy; Strom, R. G., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Numerous fine layers identified within layered deposits in Valles Marineris using Mars Orbiter Camera (MOC) images are extensive in horizontal directions and lack clear evidence of bedforms, observations best explained by depositions in quiescent aqueous environments. Additional information is contained in the original extended abstract.
Derived from text
Mars Surface; Planetary Geology; Deposits; Spatial Distribution; Stratigraphy

20010044870 NASA, Washington, DC USA

The Interior Layered Deposits of Valles Marineris: Layering, Erosional Processes, and Age Relationships

Weitz, C. M., NASA, USA; Parker, T., Jet Propulsion Lab., California Inst. of Tech., USA; Anderson, F. S., Jet Propulsion Lab., California Inst. of Tech., USA; Grant, J. A., National Air and Space Museum, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have used Viking and Mars Global Surveyor data to study the interior layered deposits in detail. We have identified features which may support fluvial activity within Valles Marineris. Stratigraphic relationships indicate the deposits are younger than the wallrock. Additional information is contained in the original extended abstract.

Derived from Text

Deposits; Mars Surface; Stratigraphy; Planetary Geology; Chronology

20010044871 Nevada Univ., Geomechanics-Rock Fracture Group, Reno, NV USA

Slope Stability and Lithology for Interior Layered Deposits and Wallrock in Valles Marineris

Caruso, Paul A., Nevada Univ., USA; Schultz, Richard A., Nevada Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We find that interior layered deposits are consistent in their strength properties with sandstone or siltstone. In contrast, wallrock slopes are consistent with layered igneous rock such as basalt with networks of columnar joints. Additional information is contained in the original extended abstract.

Derived from text

Lithology; Mars Surface; Deposits; Computerized Simulation; Slopes; Planetary Geology

20010044872 Geological Survey, Flagstaff, AZ USA

MOC Images Confirm Layered Deposits Formed Within Valles Marineris, Mars

Lucchitta, B. K., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mars Orbiter Camera (MOC) images confirm previous research based on Mariner and Viking images: the layered deposits were emplaced inside the Valles Marineris after the troughs opened; they do not weather out from the walls. Additional information is contained in the original extended abstract.

Derived from Text

Mars Surface; Deposits; Weathering; Planetary Geology

20010044873 University of Northern Illinois, Dept. of Geography, De Kalb, IL USA

Digital Elevation Model Resolution and Hypsometric Analysis: Implications for MOLA Gridded Topographic Data

Luo, W., University of Northern Illinois, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Results indicate that the hypsometric analysis is a promising technique in quantifying landform and inferring underlying processes based on fine resolution digital elevation models (DEMs) and should be used with other morphometry analysis techniques. Additional information is contained in the original extended abstract.

Derived from Text

Topography; Hypsography; Mars Surface; Planetary Geology

20010044874 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA

Mars: Are Negative Linear Gravity Anomalies Buried Fluvial Channels?

Phillips, R. J., Washington Univ., USA; Zuber, M. T., Massachusetts Inst. of Tech., USA; Hynek, B. M., Washington Univ., USA; Portle, K. B., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Negative linear gravity anomalies (with no surface topographic expression) emanating from observed outflow channels in Chryse Planitia may be due to buried channels and are unlikely to be tectonic features. We explore the fluvial hypothesis. Additional information is contained in the original extended abstract.
Derived from text
Gravity Anomalies; Mars Surface; Geological Faults; Planetary Geology

20010044875 Pittsburgh Univ., Dept. of Geology and Planetary Science, Pittsburgh, PA USA
Circum-Hellas Outflow Channels: New Views from Mars Global Surveyor
Crown, David A., Pittsburgh Univ., USA; Mest, Scott C., Pittsburgh Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Analyses of Mars Orbiter Camera (MOC) images and Mars Orbiter Laser Altimeter (MOLA) topographic profiles constrain fluvial and mass-wasting processes involved in outflow channel formation as well as related erosional and depositional events in surrounding plains. Additional information is contained in the original extended abstract.
Derived from text
Erosion; Mars Surface; Topography; Planetary Geology

20010044876 NASA Goddard Space Flight Center, Greenbelt, MD USA
Relationships Between the Medusae Fossae Formation (MFF), Fluvial Channels, and the Dichotomy Boundary Southeast of Nicholson Crater, Mars
Bradley, B. A., NASA Goddard Space Flight Center, USA; Sakimoto, S. E. H., NASA Goddard Space Flight Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We use Mars Global Surveyor's Mars Orbiter Laser Altimeter (MOLA) and Mars Orbiter Camera (MOC) data to investigate the Medusae Fossae Formation (MFF) and its relationship to fluvial channels southeast of Nicholson Crater. In this area the MFF shows small-scale layering and is draped over Labou Vallis. Additional information is contained in the original extended abstract.
Derived from text
Mars Surface; Planetary Geology; Formations; Topography

20010044877 Oxford Univ., School of Geography and the Environment, Oxford, UK
The Australian Paleoflood Model for Unconfined Fluvial Deposition on Mars
Bourke, M. C., Oxford Univ., UK; Zimbelman, J. R., Smithsonian Institution, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-8153; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Paleoflood deposits in central Australia represent a new model for possible fluvial deposits on Mars. The distinct Australian assemblage of landforms and sediments is used to identify potential unconfined paleoflood deposits in Mars Orbiter Camera (MOC) images of Mars. Additional information is contained in the original extended abstract.
Derived from Text
Landforms; Mars Surface; Planetary Geology; Analogs; Flood Plains

20010044878 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA
Wide-Scale Denudation of Western Arabia Terra
Hynek, B. M., Washington Univ., USA; Phillips, R. J., Washington Univ., USA; Nunes, D. C., Washington Univ., USA; Williams, R. M., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present evidence for widespread denudation throughout western Arabia Terra, Mars, including: (1) a degraded landscape hosting numerous inliers, (2) absence of valley networks, and (3) sedimentary deposits seen in high-resolution images. Additional information is contained in the original extended abstract.
Derived from Text
Topography; Mars Surface; Planetary Geology; Erosion

20010044879 Louisiana Univ., Dept. of Geosciences, Monroe, LA USA

Martian Sedimentary Provinces

DeHon, R. A., Louisiana Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Regional-scale, closed, topographic basins serve as sedimentary provinces in which gravity dominated process move weathered products to lower levels of the basin. The resulting accumulation of sediments on the basin floor provides a sedimentary record of the province. Additional information is contained in the original extended abstract.

Derived from Text

Gravitational Effects; Mars Surface; Planetary Geology; Sediment Transport

20010044880 Geological Survey, Flagstaff, AZ USA

Regional Emplacement History of the Utopia and Elysium Plains Deposits, Mars

Skinner, J. A., Jr., Geological Survey, USA; Tanaka, K. L., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We review a new stratigraphic framework and regional emplacement history of these channelized plains deposits based on a basin-analysis approach in a GIS environment. Additional information is contained in the original extended abstract.

Derived from text

Deposits; Mars Surface; Planetary Geology; Stratigraphy; Chronology

20010044881 Pomona Coll., Claremont, CA USA

The Keck "Mars 2000" Project: Using Mars Orbiter Laser Altimeter Data to Assess Geological Processes and Regional Stratigraphy Near Orcus Patera and Marte Vallis on Mars

Grosfils, E. B., Pomona Coll., USA; Sakimoto, S. E. H., Maryland Univ., USA; Mendelson, C. V., Beloit Coll., USA; Bleacher, J. E., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

During the Keck 'Mars 2000' summer project 10 undergraduates (rising juniors) used Mars Orbiter Laser Altimeter (MOLA) data to study a 19x14 degree region they identified as a potential Mars 2003 landing site. Here we introduce the project science and organization. Additional information is contained in the original extended abstract.

Derived from text

Mars Surface; Stratigraphy; Planetary Geology; Students

20010044882 NASA Johnson Space Center, Houston, TX USA

Petrology and Geochemistry of the New Angrite D'Orbigny

Mittlefehldt, David W., NASA Johnson Space Center, USA; Killgore, Marvin, Southwest Meteorite Lab., USA; Lee, Michael T., Hernandez Engineering, Inc., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Here we report preliminary petrologic study of one thin section, and geochemical study of a bulk sample of D'Orbigny, a new 16.6 kg angrite recently reported from Argentina. Additional information is contained in the original extended abstract.

Derived from Text

Meteorites; Meteoritic Composition; Petrology; Geochemistry

20010044883 NASA Johnson Space Center, Houston, TX USA

Mineralogical Investigation of D'Orbigny: A New Angrite Showing Close Affinities to Asuka 881371, Sahara 99555, and Lewis Cliff 87051

Mikouchi, T., Tokyo Univ., Japan; McKay, G., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A new angrite, D'Orbigny, shows a close petrogenetic relationship to previously known angrites (LEW 87051, Asuka 881371, Sahara 99555). Probably, all crystallized from the same magma with locally different abundances of entrained olivine xenocrysts. Additional information is contained in the original extended abstract.
Derived from text
Crystallization; Meteoritic Composition; Achondrites; Petrology

20010044884 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA
Trace Element Compositions and Petrogenesis of the D'Orbigny Angrite
Floss, Christine, Washington Univ., USA; Killgore, Marvin, Southwest Meteorite Lab., USA; Crozaz, Ghislaine, Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The new angrite, D'Orbigny, is texturally and mineralogically similar to other angrites with basaltic textures. Trace element data indicate a close relationship to Sahara 99555 and the Antarctic angrites LEW 87051 and Asuka 881371. Additional information is contained in the original extended abstract.
Derived from Text
Meteoritic Composition; Petrogenesis; Trace Elements; Achondrites

20010044885 Naturhistorisches Museum, Vienna, Austria
D'Orbigny: A New Window into Angrite Genesis
Kurat, G., Naturhistorisches Museum, Austria; Varela, M. E., Universidad Nacional del Sur, Argentina; Brandstaetter, F., Naturhistorisches Museum, Austria; Waesch, E., Museum fuer Naturkunde, Germany; Nazarov, M. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): FWF Proj. 13975-GEO; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This new angrite, D'Orbigny, is an unusual rock, consisting of dense and porous lithologies forming a mushroom-like body rich in open druses and closed hollow shells, abundant glass and some olivinites are also present. An igneous origin is unlikely. Additional information is contained in the original extended abstract.
Derived from Text
Meteoritic Composition; Achondrites; Shapes; Lithology

20010044886 Smithsonian Institution, Dept. of Mineral Sciences, Washington, DC USA
Spectra of Angrites and Possible Parent Bodies
Burbine, T. H., Smithsonian Institution, USA; McCoy, T. J., Smithsonian Institution, USA; Binzel, R. P., Massachusetts Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-387; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

One meteorite class where very little progress has been made in identifying possible parent bodies is the angrites. We have obtained spectra of two new angrites (D'Orbigny and Sahara 99555). Additional information is contained in the original extended abstract.
Derived from Text
Meteoritic Composition; Spectra; Achondrites

20010044887 Smithsonian Institution, Dept. of Mineral Sciences, Washington, DC USA
REE Patterns and Abundances from Sulfides in an Oldhamite-rich Lithology of the ALH 84008 Aubrite
McCoy, T. J., Smithsonian Institution, USA; Dickinson, T. L., Catholic Univ. of America, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Variable rare earth elements (REE) patterns and abundances from co-existing sulfides in an oldhamite-rich lithology from the ALH 84008 aubrite suggest that if they formed in a common magmatic system, they experienced slightly different histories within that system. Additional information is contained in the original extended abstract.
Derived from text
Achondrites; Lithology; Meteoritic Composition; Rare Earth Elements

20010044888 Arizona Univ., Lunar and Planetary Inst., Tucson, AZ USA

Another Weird Rock from Space: A Unique Enstatite Achondrite from the Saharan Desert

Patzer, A., Arizona Univ., USA; Hill, D. H., Arizona Univ., USA; Boynton, W. V., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A new meteorite recovered from the Saharan desert this year is described in terms of its mineralogy and chemical composition. It is an unusual metal-rich enstatite achondrite. Additional information is contained in the original extended abstract. Derived from text

Achondrites; Chemical Composition; Mineralogy; Enstatite

20010044889 Max-Planck-Inst. fuer Chemie, Mainz, Germany

Magmatic Inclusions in Frontier Mountain 90054 and Elephant Moraine 96328: Complex Petrogenesis of the Olivine-(Augite)-Orthopyroxene Ureilites

Goodrich, Cyrena Anne, Max-Planck-Inst. fuer Chemie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Compositions of melt inclusions in augite and opx in FRO 90054 support the model that FRO and Hughes 009 formed by admixture of an opx-saturated magma to an olivine-augite-liquid assemblage. Melt inclusions in opx oikocrysts in EET 96328 provide an example of such a liquid. Additional information is contained in the original extended abstract.
Derived from text

Admixtures; Inclusions; Petrogenesis; Ureilites

20010044890 Massachusetts Inst. of Tech., Dept. of Earth, Atmospheric, and Planetary Sciences, Cambridge, MA USA

Petrogenesis of Ureilite Meteorites: Evidence of Magmatic Processes from Mineral Chemistry and Modal Mineralogy

Singletary, S. J., Massachusetts Inst. of Tech., USA; Grove, T. L., Massachusetts Inst. of Tech., USA; Goodrich, Cyrena Anne, Max-Planck-Inst. fuer Chemie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

There is a variation in mineral composition and mode that is consistent with a smelting process for part of the ureilite group, but this process cannot explain all of the variability observed among the ureilites. Additional information is contained in the original extended abstract.
Derived from Text

Mineralogy; Petrogenesis; Ureilites; Meteoritic Composition

20010044891 NASA Johnson Space Center, Houston, TX USA

Formation of Mesosiderites: Fragmentation and Reaccretion of a Large Differentiated Asteroid

Scott, Edward R. D., Hawaii Univ., USA; Haack, Henning, Geological Museum, Denmark; Love, Stanley G., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We propose that these stony-iron meteorites formed when a 50-150 km diameter projectile disrupted a 200-400 km diameter asteroid with a molten core. Several mineralogical features of mesosiderites need reinterpreting if our model is correct. Additional information is contained in the original extended abstract.
Derived from Text

Stony-Iron Meteorites; Mineralogy; Fragmentation

20010044892 NASA Johnson Space Center, Houston, TX USA

Early Thermal History of Eucrites by Ar-39-Ar-40

Bogard, D. D., NASA Johnson Space Center, USA; Garrison, D. H., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Ar-39-Ar-40 ages for Piplia Kalan (3.58 +/- 0.02 Ga) and two other eucrites indicate later impact resetting. Older Ar-39-Ar-40 ages exist for the Moama cumulate eucrite (4.42 +/- 0.01 Ga) and the PCA82502 (4.506 +/- 0.009 Ga) and PCA91007 non-brecciated eucrites. Additional information is contained in the original extended abstract.
Derived from Text
Argon Isotopes; Isotope Ratios; Radioactive Age Determination; Achondrites

20010044893 California Univ., Inst. of Geophysics, Los Angeles, CA USA
Eucrite Bluewing 001: A Stannern-like Bulk Composition and Its Linkage with Other Unequilibrated HED Basalts
Warren, Paul H., California Univ., USA; Kallemeyn, Gregory W., California Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Bluewing 001 features a moderate-high Mg by eucrite standards, and yet relatively high concentrations of incompatible elements (e.g., Sm). These and literature data indicate a correlation between degree of thermal metamorphism and eucrite composition. Additional information is contained in the original extended abstract.
Derived from text
Metamorphism (Geology); Achondrites; Magnesium; Meteoritic Composition

20010044894 National Inst. of Polar Research, Antarctic Meteorite Research Center, Tokyo, Japan
Zircon in Eucrites: Occurence, Possible Origin, and U-Pb Isotopic Systematics
Misawa, K., National Inst. of Polar Research, Japan; Yamaguchi, A., National Inst. of Polar Research, Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We will present occurence and U-Pb age of zircon in eucrites, and discuss possible origin of these zircons. Additional information is contained in the original extended abstract.
Derived from Text
Minerals; Achondrites; Radioactive Age Determination

20010044895 NASA Goddard Space Flight Center, Greenbelt, MD USA
Simultaneous Production of Reduced Nitrogen Compounds and Hydrocarbons Using Amorphous Iron Silicate Smokes as a Catalyst
Nuth, Joseph A., III, NASA Goddard Space Flight Center, USA; Hill, Hugh G. M., NASA Goddard Space Flight Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Amorphous iron silicates efficiently catalyze formation of hydrocarbons and ammonia under conditions similar to that found in the solar nebula. Preliminary data and rates will be discussed, and much further experimentation is required. Additional information is contained in the original extended abstract.
Derived from Text
Nitrogen Compounds; Hydrocarbons; Solar System Evolution; Earth Atmosphere; Catalysts

20010044896 Puerto Rico Univ., Dept. of Physics and Chemistry, Arecibo, Puerto Rico
Planetary Habitable Zones: The Spatial Distribution of Life on Planetary Bodies
Mendez, A., Puerto Rico Univ., Puerto Rico; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In this work a model is presented to explain the spatial distribution of life on Earth and its potential distribution on other planetary bodies. Additional information is contained in the original extended abstract.
Derived from Text
Spatial Distribution; Biological Diversity; Computerized Simulation

20010044897 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Exchange of Meteoritic Material Between Stellar Systems
Melosh, H. J., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Can meteorites travel to nearby stellar systems? Monte Carlo simulations of ejection from the solar system and capture by a giant planet in the target system indicate that about a dozen meteorites from our solar system are captured by another stellar system every 100 Myr. Additional information is contained in the original extended abstract.
Derived from Text
Meteorites; Stellar Systems; Planetary Systems; Ejection

20010044898 NASA Johnson Space Center, Houston, TX USA
Investigations into the Contamination of Lunar Return Material, Part 1, Surface Analysis and Imaging Investigations
Steele, A., Portsmouth Univ., UK; Toporski, J. K. W., Portsmouth Univ., UK; Avci, R., Montana State Univ., USA; Agee, C. B., NASA Johnson Space Center, USA; McKay, D. S., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A suite of lunar soils has been investigated by imaging and in-situ spectroscopy techniques. A suite of contaminant plastics and potential microbes has been found. Additional information is contained in the original extended abstract.
Derived from Text
Contaminants; Contamination; Lunar Soil; Lunar Rocks

20010044899 NASA Johnson Space Center, Houston, TX USA
Truncated Hexa-Octahedral Magnetites: Biosignatures in Terrestrial Samples and Martian Meteorite ALH84001
Thomas-Keprta, Kathie L., Lockheed Martin Corp., USA; Clemett, Simon J., Lockheed Martin Corp., USA; Bazylinski, Dennis A., Iowa State Univ. of Science and Technology, USA; Kirschvink, Joseph L., California Inst. of Tech., USA; McKay, David S., NASA Johnson Space Center, USA; Wentworth, Susan J., Lockheed Martin Corp., USA; Vali, H., McGill Univ., Canada; Gibson, Everett K., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We suggest that the observation of truncated hexa-octahedral magnetites in ALH84001 are both consistent with, and in the absence of terrestrial inorganic analogs, likely formed by biogenic processes. Additional information is contained in the original extended abstract.
Derived from Text
SNC Meteorites; Extraterrestrial Life; Exobiology; Bacteria; Magnetite; Biological Effects

20010044900 NASA Ames Research Center, Moffett Field, CA USA
Chains of Magnetite Crystals in the Meteorite ALH84001: Evidence of Biological Origin
Friedmann, E. I., NASA Ames Research Center, USA; Wierzchos, J., Lleida Univ., Spain; Ascaso, C., Consejo Superior de Investigaciones Cientificas, Spain; Winklhofer, M., Ludwig-Maximilians-Univ., Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The presence of magnetite crystal chains, missing evidence for their biological origin, as well as five morphological characteristics incompatible with a nonbiological origin are demonstrated by high-power stereo backscattered scanning electron microscopy. Additional information is contained in the original extended abstract.
Derived from Text
Crystals; Magnetite; SNC Meteorites; Molecular Chains; Extraterrestrial Life; Exobiology

20010044901 Lunar and Planetary Inst., Houston, TX USA
A Hypothesis for the Abiotic and Non-Martian Origins of Putative Signs of Ancient Martian Life in ALH84001
Treiman, Allan H., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-8270; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Putative evidence of martian life in ALH84001 can be explained by abiotic and non-martian processes consistent with the meteorite's geological history. Additional information is contained in the original extended abstract.
Derived from Text
Mars (Planet); SNC Meteorites; Mars Surface; Planetary Geology

20010044902 Yale Univ., Dept. of Geology and Gelphysics, New Haven, CT USA

Development of the Sulfur Isotope Biomarker for Mars Sample Return: Results from Los Angeles, Nakhla, and ALH84001

Greenwood, J. P., Yale Univ., USA; Mojzsis, S. J., Colorado Univ., USA; Coath, C. D., California Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

S-32, S-33, and S-34 measurements of sulfides in the martian meteorites Los Angeles, Nakhla, and ALH84001 will be presented. Two pyrite grains in ALH84001 have S-33 anomalies. The data do not support evidence of biological activity. Additional information is contained in the original extended abstract.

Derived from Text

Mars Surface Samples; SNC Meteorites; Sulfides; Sulfur Isotopes; Geochemistry

20010044903 Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, Orsay, France

Ferrihydrite in Micrometeorites: A Potential Adsorbent of Amino Acids and Catalyst of Oligopeptide Formation

Matrajt, G., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Maurette, M., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Blanot, D., Centre National de la Recherche Scientifique, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Ferrihydrite, a very abundant phase in micrometeorites, is a potential adsorbent of amino acids, particularly the proteic ones, and a good catalyst allowing the formation of small peptides. Additional information is contained in the original extended abstract.

Derived from Text

Adsorbents; Amino Acids; Micrometeorites; Adsorption; Iron Compounds; Meteoritic Composition

20010044904 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA

Raman Spectroscopic Detection of Graphitic Carbon of Biogenic Parentage in an Ancient South African Chert

Wang, Alian, Washington Univ., USA; Haskin, Larry A., Washington Univ., USA; Kuebler, Karla E., Washington Univ., USA; Jolliff, Bradley L., Washington Univ., USA; Walsh, Maud M., Louisiana State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-7140; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The detection of reduced carbon in martian rocks and soils is important in the search for evidence of life. A Raman spectroscopic study of South Africa chert reveals that 50 ppm carbon or less can be determined by this technique. Additional information is contained in the original extended abstract.

Derived from Text

Carbon; Rocks; Raman Spectroscopy; Detection; Petrology; Activity (Biology); Biological Effects

20010044905 NASA Johnson Space Center, Houston, TX USA

The Combined Detection of Morphological and Molecular Biomarkers: Implications for Astrobiology

Toporski, J., Portsmouth Univ., UK; Steele, A., Portsmouth Univ., UK; Westall, F., Lunar and Planetary Inst., USA; Avci, R., Montana State Univ., USA; McKay, D. S., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have investigated known bacterial fossils using a combination of morphological and spectral techniques for the detection of biomarkers. This approach is considered crucial to unambiguous life detection strategies within Astrobiology. Additional information is contained in the original extended abstract.

Derived from Text

Bacteria; Exobiology; Fossils; Extraterrestrial Life; Life Detectors

20010044906 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

The Fe-Isotope System and Its Applicability as a Biosignature

Beard, Brian L., Wisconsin Univ., USA; Johnson, Clark M., Wisconsin Univ., USA; Skulan, Joseph, Wisconsin Univ., USA; Taylor, Lawerence A., Tennessee Univ., USA; Sun, Henry, Jet Propulsion Lab., California Inst. of Tech., USA; Cox, Lea, Jet Propulsion Lab., California Inst. of Tech., USA; Nealson, Kenneth H., Jet Propulsion Lab., California Inst. of Tech., USA; Sinha, Mahadeva P., Jet Propulsion Lab., California Inst. of Tech., USA; Gerdenich, Michael J., Michigan Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

High precision (0.05) Fe isotope analyses show that igneous rocks and loess are invariant but chemical sediments have variable compositions. The relative roles of abiologic and biologic fractionations that produced this range are discussed. Additional information is contained in the original extended abstract.

Derived from Text

Iron Isotopes; Activity (Biology); Chemical Fractionation; Exobiology

20010044907 Scripps Institution of Oceanography, La Jolla, CA USA

The Effect of Sterilizing Gamma Radiation on Amino Acids

Kminek, G., Scripps Institution of Oceanography, USA; Bada, J. L., Scripps Institution of Oceanography, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Our investigation shows that gamma radiation can be used to sterilize samples returned from Mars without destroying important information about organic molecules that might be in the sample. Additional information is contained in the original extended abstract.

Derived from Text

Amino Acids; Gamma Rays; Mars (Planet); Sterilization Effects

20010044908 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA

Global Context for Lunar Nonmare Rock Types: Sample and Remote-Sensing Perspectives

Jolliff, B. L., Washington Univ., USA; Korotev, R. L., Washington Univ., USA; McCallum, I. S., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-4172; NAG5-8905; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Nonmare rock types known from lunar sample studies are placed in a global context using results from recent remote-sensing missions and constraints based on sample studies, including thermobarometric, geochemical, and isotopic data. Additional information is contained in the original extended abstract.

Derived from Text

Lunar Geology; Lunar Rocks; Remote Sensing; Geochemistry

20010044909 Massachusetts Inst. of Tech., Dept. of Earth, Atmospheric and Planetary Sciences, Cambridge, MA USA

The Composition of the Lunar Crust: Constraints from Central Peaks and Crustal Thickness Modeling

Wieczorek, Mark A., Massachusetts Inst. of Tech., USA; Zuber, Maria T., Massachusetts Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We correlate lunar central peak compositions with a dual-layered crustal thickness model. The peak compositions are found to be consistent with the crust being stratified, and we constrain the composition of these crustal layers. Additional information is contained in the original extended abstract.

Derived from Text

Lunar Crust; Thickness; Lunar Composition; Lithology

20010044910 Los Alamos National Lab., NM USA

Iron Abundances on the Lunar Surface as Measured by the Lunar Prospector Gamma-Ray Spectrometer

Lawrence, D. J., Los Alamos National Lab., USA; Feldman, W. C., Los Alamos National Lab., USA; Blewett, D. T., Hawaii Univ., USA; Elphic, R. C., Los Alamos National Lab., USA; Lucey, P. G., Hawaii Univ., USA; Maurice, S., Observatoire de Midi-Pyrenees, France; Prettyman, T. H., Los Alamos National Lab., USA; Binder, A. B., Arizona Univ., USA; Lunar and

Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Here we present the first quantitative estimates of global iron abundances from Lunar Prospector Gamma-Ray Spectrometer (LP-GRS) data and make comparisons to iron abundances derived from Clementine Spectral Reflectance data. Additional information is contained in the original extended abstract.

Derived from Text

Gamma Ray Spectrometers; Lunar Prospector; Lunar Surface; Moon; Iron

20010044911 Los Alamos National Lab., NM USA

Distribution of Iron and Titanium on the Lunar Surface from Lunar Prospector Gamma-Ray Spectra

Prettyman, T. H., Los Alamos National Lab., USA; Feldman, W., Los Alamos National Lab., USA; Lawrence, D., Los Alamos National Lab., USA; Elphic, R. C., Los Alamos National Lab., USA; Gasnault, O., Los Alamos National Lab., USA; Maurice, S., Observatoire de Midi-Pyrenees, France; Moore, K. R., Los Alamos National Lab., USA; Binder, A. B., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Relative abundances of iron and titanium on the lunar surface have been measured using Lunar Prospector gamma-ray data. These are the first Lunar Prospector-Gamma Ray Spectrometer (LP-GRS) results presented with spectral deconvolved data. Additional information is contained in the original extended abstract.

Derived from Text

Gamma Ray Spectra; Iron; Lunar Prospector; Titanium; Lunar Surface

20010044912 Los Alamos National Lab., Space and Atmospheric Sciences, NM USA

Lunar Prospector Neutron Measurements and Lunar TiO2

Elphic, R. C., Los Alamos National Lab., USA; Lawrence, D. J., Los Alamos National Lab., USA; Maurice, S., Observatoire de Midi-Pyrenees, France; Feldman, W. C., Los Alamos National Lab., USA; Barraclough, B. L., Los Alamos National Lab., USA; Gasnault, O. M., Los Alamos National Lab., USA; Binder, A. B., Arizona Univ., USA; Lucey, P. G., Hawaii Univ., USA; Blewett, D. T., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Lunar Prospector neutron spectrometer data suggest lower TiO2 abundances than have previously been suggested. Additional information is contained in the original extended abstract.

Derived from Text

Lunar Prospector; Titanium Oxides; Thermal Neutrons

20010044913 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA

A Hybrid Method for Calculating TiO2 Concentrations Using Clementine UVVIS Data, and Verified with Lunar Prospector Neutron Spectrometer Data

Gillis, J. J., Washington Univ., USA; Jolliff, B. L., Washington Univ., USA; Elphic, R. C., Los Alamos National Lab., USA; Maurice, S., Observatoire de Midi-Pyrenees, France; Feldman, W. C., Los Alamos National Lab., USA; Lawrence, D. J., Los Alamos National Lab., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-8905; NAG5-4172; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present a new algorithm for extracting TiO2 concentrations from Clementine UVVIS data, which accounts for soil darkness and UV/VIS ratio. The accuracy of these TiO2 estimates are examined with Lunar Prospector thermal/epithermal neutron flux data. Additional information is contained in the original extended abstract.

Derived from text

Lunar Prospector; Neutron Spectrometers; Titanium Oxides; Clementine Spacecraft; Algorithms

20010044914 Observatoire de Midi-Pyrenees, Toulouse, France

A Maturity Parameter of the Lunar Regolith from Neutron Data

Maurice, S., Observatoire de Midi-Pyrenees, France; Feldman, W. C., Los Alamos National Lab., USA; Lawrence, D. J., Los Alamos National Lab., USA; Elphic, R. C., Los Alamos National Lab., USA; Johnson, J. R., Geological Survey, USA; Chevrel,

S., Observatoire de Midi-Pyrenees, France; Genetay, I., Observatoire de Midi-Pyrenees, France; Binder, A. B., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Here we introduce a new index of maturity at remote sensing scale from epithermal neutron measurements by the Lunar Prospector Neutron Spectrometer. Additional information is contained in the original extended abstract.

Derived from text

Regolith; Remote Sensing; Neutron Spectrometers; Lunar Prospector

20010044915 Centre National de la Recherche Scientifique, Paris, France

Systematic Spectral Relationships Linked to Maturity and Composition: Toward a New Iron Mapping Technique

LeMouilic, S., Centre National de la Recherche Scientifique, France; Langevin, Y., Centre National de la Recherche Scientifique, France; Lucey, P. G., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We use Clementine UVVIS and NIR data to investigate systematic relationships between spectral parameters around small fresh craters in Tycho area. Implications for a new iron mapping technique are discussed. Additional information is contained in the original extended abstract.

Derived from text

Iron; Spectrum Analysis; Mapping; Tycho Crater

20010044916 NASA Johnson Space Center, Houston, TX USA

Formation of Nanophase Iron in the Lunar Regolith

Keller, P., NASA Johnson Space Center, USA; Clemett, Simon J., Lockheed Martin Corp., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format Contract(s)/Grant(s): NSF-DMR-96-32667; RTOP 344-31-40-06; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We are using a Transmission Electron Microscopy (TEM) technique to measure Fe-metal/Fe-2 ratios in space weathered lunar soils to determine the efficiency of nanophase metal production in the lunar regolith. Additional information is contained in the original extended abstract.

Derived from Text

Iron; Regolith; Lunar Soil

20010044917 NASA Johnson Space Center, Houston, TX USA

Occurrence and Distribution of Fe-0 Globules in Lunar Agglutinates

Basu, Abhijit, Indiana Univ., USA; Wentworth, Susan J., Lockheed Martin Corp., USA; McKay, David S., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

High-resolution Backscattered Electron Imaging (BSE) of agglutinitic glass shows immiscible metallic Fe(o) globules (greater than 99% are less than 15 nm; greater than 50% are less than 50 nm) in agglutinitic melt defining flow-lines, occurring in clusters, and rimming clasts (approx. 5%). Additional information is contained in the original extended abstract.

Derived from Text

Agglutination; Iron; Lunar Soil; Glass

20010044918 Los Alamos National Lab., NM USA

Evidence for Water Ice Near the Lunar Poles

Feldman, W. C., Los Alamos National Lab., USA; Maurice, S., Observatoire de Midi-Pyrenees, France; Lawrence, D. J., Los Alamos National Lab., USA; Little, R. C., Los Alamos National Lab., USA; Lawson, S. L., Los Alamos National Lab., USA; Gasnault, O., Los Alamos National Lab., USA; Wiens, R. C., Los Alamos National Lab., USA; Barraclough, B. L., Los Alamos National Lab., USA; Elphic, R. C., Los Alamos National Lab., USA; Prettyman, T. H., Los Alamos National Lab., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A reanalysis of Lunar Prospector neutron data near both lunar poles shows that the enhanced [H] there is not consistent with a reduced diffusion rate. Instead, a reduced sublimation rate seems to be required, which then implies the presence of H2O. Additional information is contained in the original extended abstract.
Derived from Text
Water; Lunar Surface; Polar Regions

20010044919 NASA Goddard Space Flight Center, Greenbelt, MD USA
Space Weathering Effects on Lunar Cold Traps
Crider, D. H., NASA Goddard Space Flight Center, USA; Vondrak, R. R., NASA Goddard Space Flight Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We investigate the effects of space weathering on the stability of deposits of volatiles at the lunar cold traps. Additional information is contained in the original extended abstract.
Derived from Text
Lunar Surface; Surface Properties; Weathering; Cold Traps; Polar Caps

20010044920 Eoetvoes LORANd Univ., Dept. of G. Physics, Budapest, Hungary
Water and Bacteria Transport Via Electrostatic Coagulation and Their Accumulation at the Poles on a Dusty Planet
Berczi, Sz., Eoetvoes LORANd Univ., Hungary; Foeldi, T., FOELDIX, Hungary; Palasti, E., FOELDIX, Hungary; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Agglutination of electrostatically charged dust particles may produce grains which attract H2O molecules (or bacteria) on dusty planetary surfaces. These particles are dragged by the solar radiation pressure toward the poles where they accumulate. Additional information is contained in the original extended abstract.
Derived from Text
Electrostatics; Planetary Surfaces; Water; Bacteria; Polar Caps; Agglomeration

20010044921 New Mexico Univ., Inst. of Meteoritics, Albuquerque, NM USA
New Evidence for Impact-induced Hydrothermal Alteration at the Lunar Crater, India: Implications for the Effect of Small Craters on the Mineralogical and Chemical Composition of the Martian Regolith
Hagerty, J., New Mexico Univ., USA; Newsom, H. E., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-8804; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Lunar crater has several unique characteristics that make it a valid analogue for similar craters on Mars. We have characterized the secondary alteration assemblage at Lunar in order to make implications for martian alteration materials. Additional information is contained in the original extended abstract.
Derived from Text
Chemical Composition; Mars Craters; Mineralogy; Planetary Geology; Meteorite Craters; Clays

20010044922 New Mexico Univ., Inst. of Meteoritics, Albuquerque, NM USA
Central Remnant Craters on Mars - Localization of Hydrothermal Alteration at the Edge of Crater Floors?
Newsom, H. E., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-8804; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Localized erosion at the edge of crater floors may be caused by hydrothermal alteration due to focusing of fluid flow around an impact melt sheet following crater formation, coupled with hydrothermal self-sealing under the center of the crater. Additional information is contained in the original extended abstract.
Derived from Text
Mars Craters; Cratering; Fluid Flow; Impact Melts; Hydrothermal Systems

20010044923 University of Central Florida, Dept. of Physics, Orlando, FL USA

Ejecta Mobility Results for Impact Craters in the Northern Hemisphere of Mars

Barlow, N. G., University of Central Florida, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present results on how ejecta extent, measured by a parameter called ejecta mobility, varies with latitude, terrain, and ejecta morphology for impact craters with layered ejecta structures located in the northern hemisphere of Mars. Additional information is contained in the original extended abstract.

Derived from Text

Ejecta; Mobility; Northern Hemisphere; Meteorite Craters; Mars Craters

20010044924 Brown Univ., Providence, RI USA

Recent Ground Ice on Mars and Implications for Volatiles and Surface Processes

Mustard, J. F., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A terrain interpreted to be ice-cemented soil has been mapped. The formation and removal of this terrain has affected the distribution of volatiles (e.g. water) and contributed to the formation lineated valley fill and lobate debris aprons. Additional information is contained in the original extended abstract.

Derived from Text

Ice Mapping; Mars Surface; Land Ice; Geomorphology

20010044925 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Investigating Creep of Ground Ice as a Cause of Crater Relaxation in Martian High-Latitude Softened Terrain

Turtle, E. P., Arizona Univ., USA; Pathare, A. V., California Univ., USA; Hartmann, W. K., Planetary Science Inst., USA; Esquerdo, G., Planetary Science Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We incorporated recent rheologic data for ice/dust mixtures into finite-element models to investigate the conditions under which viscous creep of martian ground ice can occur to create the modified craters observed in the ”softened terrain” on Mars. Additional information is contained in the original extended abstract.

Derived from Text

Creep Properties; Mars Surface; Mathematical Models; Land Ice

20010044926 NASA Ames Research Center, Moffett Field, CA USA

Geothermal Heating, Convective Flow and Ice Thickness on Mars

Rosenberg, N. D., Lawrence Livermore National Lab., USA; Travis, B. J., Los Alamos National Lab., USA; Cuzzi, J., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Our 3D calculations suggest that hydrothermal circulation may occur in the martian regolith and may significantly thin the surface ice layer on Mars at some locations due to the upwelling of warm convecting fluids driven solely by background geothermal heating. Additional information is contained in the original extended abstract.

Derived from Text

Convective Flow; Mars Surface; Land Ice; Geothermal Anomalies; Surface Layers

20010044927 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Paleotopographic Reconstruction of the Tharsis Magmatic Complex Reveals Potential Ancient Drainage Basin/Aquifer System

Dohm, J. M., Arizona Univ., USA; Ferris, J., Arizona Univ., USA; Anderson, R. C., Jet Propulsion Lab., California Inst. of Tech., USA; Baker, V., Arizona Univ., USA; Hare, T., Geological Survey, USA; Barlow, N. G., University of Central Florida, USA; Strom, R. G., Arizona Univ., USA; Tanaka, K. L., Geological Survey, USA; Scott, D. H.; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Paleotopographic reconstructions reveal the potential existence of an enormous Noachian drainage basin in the eastern part of the Tharsis region of significant geologic and paleohydrologic implications. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Structural Basins; Aquifers; Magma; Volcanology

20010044928 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
The History of Water Discharge in the Margaritifer Sinus Region of Mars
Grant, J. A., Smithsonian Institution, USA; Parker, T., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Uzboi-Holden-Ladon-Margaritifer Valles and Samara and Parana-Loire Valles discharge into Margaritifer Basin during late-Noachian/early-Hesperian caused ponding, infiltration, and storage. Early-to-mid Hesperian release formed Margaritifer Chaos and Ares Valles. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Structural Basins; Hydrology; Drainage Patterns

20010044929 Hokkaido Univ., Graduate School of Earth Environment Research, Sapporo, Japan
Water Circulation on a Land-Planet: An Implication for Paleo-Mars
Numaguchi, A., Hokkaido Univ., Japan; Abe, Y., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Precipitation distribution on a Mars-like land planet are investigated using a general circulation model. The low latitude area is kept humid only when the planet has large spin-axis inclination and warm climate. Otherwise it is likely dried out. Additional information is contained in the original extended abstract.
Derived from Text
Atmospheric General Circulation Models; Water Circulation; Mars Surface; Hydrological Cycle

20010044930 Colorado Univ., Lab. for Atmospheric and Space Physics, Boulder, CO USA
Mars Volatile and Climate Evolution: Water the Real Constraints?
Jakosky, B. M., Colorado Univ., USA; Phillips, R. J., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Our goal is to examine all of the observations pertinent to martian climate, determine which are the key constraints, and understand what scenarios might be consistent with them. Additional information is contained in the original extended abstract.
Derived from Text
Mars Atmosphere; Mars (Planet); Climatology; Geology; Geophysics

20010044931 Academy of Sciences (USSR), Inst. for Dynamics of Geospheres, Moscow, USSR
Mars/Moon Cratering Rate Ratio Estimates
Ivanov, B. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

One of the possible ways is presented to transfer the lunar production function (the frequency of impacts with a given size of a formed crater) to Mars. The model time scale for Mars crater chronology is derived. Additional information is contained in the original extended abstract.
Derived from Text
Mars Craters; Asteroid Collisions; Mars Surface; Cratering

20010044932 Planetary Science Inst., Tucson, AZ USA
Martian Upland History: Inconsistencies and Constraints
Hartmann, W. K., Planetary Science Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

ALH 84001 and age distribution of Mars meteorites constrain geological character of martian uplands as loosely consolidated sediments. A reservoir of 4.5 Gy crust exists with near-surface exposures in some regions. A synthesis of Neukum/Hartmann age data is given. Additional information is contained in the original extended abstract.
Derived from Text
Mars (Planet); Mars Surface; SNC Meteorites; Planetary Geology; Geochronology

20010044933 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Counting Craters on MOC Images: Production Functions and Other Complications
Plaut, J. J., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New crater counts on MOC images and associated Viking Orbiter images are used to address the issue of the crater production function at Mars, and to infer aspects of resurfacing processes. Additional information is contained in the original extended abstract.
Derived from Text
Mars Photographs; Mars Craters; Mars Surface; Meteorite Craters

20010044934 Maryland Univ., Dept. of Geology, College Park, MD USA
Osmium Isotopic Compositions of Chondrites and Earth's Primitive Upper Mantle: Constraints on the Late Veneer
Walker, R. J., Maryland Univ., USA; Horan, M. F., Carnegie Institution of Washington, USA; Morgan, J. W., Maryland Univ., USA; Meisel, T., Leoben Univ. of Mining and Metallurgy, Austria; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAGW-3625; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The 187 Os/188 Os of carbonaceous chondrites averages approximately 2% lower than for enstatite and ordinary chondrites. The primitive upper mantle ratio for the Earth best matches that of ordinary and enstatite chondrites. Additional information is contained in the original extended abstract.
Derived from text
Carbonaceous Chondrites; Earth Mantle; Meteoritic Composition

20010044935 Carnegie Institution of Washington, Dept. of Terrestrial Magnetism, Washington, DC USA
Highly Siderophile Elements in Shocked and Unshocked Chondrites
Horan, M. F., Carnegie Institution of Washington, USA; Walker, R. J., Maryland Univ., USA; Rubin, A. E., California Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAGW-57634; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

High precision abundances of Re, Os, Pt, Ir, Ru, and Pd are combined with Re-Os isotopic data to demonstrate that HSE provide a distinctive fingerprint for each of the chondrite groups. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Siderites; Mass Spectroscopy; Meteoritic Composition

20010044936 Maryland Univ., Dept. of Geology, College Park, MD USA
Late Influx: Evidence from Siderophile Elements in Terrestrial Peridotites and Lunar Breccias
Morgan, J. W., Maryland Univ., USA; Brandon, A. D., Maryland Univ., USA; Walker, R. J., Maryland Univ., USA; Horan, M. F., Carnegie Institution of Washington, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-7634; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In terrestrial peridotites, Pd is sometimes enhanced relative to other PGE. This observation is taken to imply a "non-chondritic" HSE signature in the mantle. A similar pattern is seen in some Apollo 17 breccias suggesting it to be a primordial feature of late influx. Additional information is contained in the original extended abstract.
Derived from Text
Meteoritic Composition; Earth Surface; Lunar Surface; Breccia; Surface Properties

20010044937 Wisconsin Univ., Dept. of Nuclear Engineering, Madison, WI USA

Moon's Chondritic Mantle Suggests Delayed Core Formation in the Earth and Other Terrestrial Planets

Schmitt, H. H., Wisconsin Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Initially cool chondritic cores within the terrestrial planets would have delayed metallic core formation by delaying the downward migration of metallic liquid. Additional information is contained in the original extended abstract.

Derived from Text

Chondrites; Lunar Mantle; Lunar Core; Solar System Evolution

20010044938 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Experimentally Determined Solubilities of Pt up to 90 Kbars and 1850 C

Ertel, W., Arizona Univ., USA; Walter, M. J., Okayama Univ., Japan; Sylvester, P. J., Memorial Univ. of Newfoundland, Canada; Drake, M. J., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

PGEs are indicators of planetary differentiation processes based on their siderophility. Results of our HP experiments (5 to 90 kbar; 1400 to 1850 C) indicate that P does not influence the Pt partitioning, supporting the late veneer hypothesis. Additional information is contained in the original extended abstract.

Derived from Text

Platinum; Spectroscopic Analysis; High Temperature Tests; Melting Points; Earth Mantle

20010044939 NASA Johnson Space Center, Houston, TX USA

The Effect of Core-Mantle Differentiation on V, Cr, and Mn: Experimental Metal/Silicate Partitioning Results

Chabot, N. L., National Academy of Sciences - National Research Council, USA; Agee, C. B., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): RTOP 344-31-20-25; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The abundances of V, Cr, and Mn are similarly depleted in the Earth and Moon. We present metal/silicate partitioning results which examine if the depletions can be explained by a core formation event. Additional information is contained in the original extended abstract.

Derived from Text

Core-Mantle Boundary; Earth Core; Earth Mantle; Moon

20010044940 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Rhenium and Iridium Partitioning in Silicate and Magmatic Spinels: Implications for Planetary Magmatism and Mantles

Righter, K., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-9435; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Highly siderophile elements Re, Ru and Ir partition strongly into spinel structures with large octahedral sites. New experimental results for both magmatic and silicate spinels will be presented with a few planetary implications. Additional information is contained in the original extended abstract.

Derived from Text

Rhenium; Iridium; Silicates; Magma; Igneous Rocks; Spinel

20010044941 Maryland Univ., Dept. of Geology, College Park, MD USA

The Composition of the Earth's Core

McDonough, W. F., Maryland Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Overall, the Earth has a volatile depletion pattern similar to that seen in chondrites and an Fe/Al value of approx. 20. Additional information is contained in the original extended abstract.
Derived from Text
Earth Core; Depletion

20010044942 NASA Johnson Space Center, Houston, TX USA
Chondrites Under Stress: Physical Processes and Geochemical Signatures at Slow Experimental Strain Rates
Rushmer, T., Vermont Univ., USA; Gaetani, G., Rensselaer Polytechnic Inst., USA; Jones, J. H., NASA Johnson Space Center, USA; Sparks, J., Boston Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have experimentally investigated metal segregation at slow strain rates. Liquid metal pore pressure remains high during deformation and migration is by fracture. Within a crystalline mush silicate melt may migrate preferentially to metallic liquid. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Liquid Metals; Deformation; Migration; Strain Rate

20010044943 Carnegie Institution of Washington, Geophysical lab. for High Pressure Research, Washington, DC USA
Physical Properties of Liquid Fe Alloys at High Pressure and Their Bearings on the Nature of Metallic Planetary Cores: Implications for the Earth, Mars and the Galilean Satellites
Sanloup, C., Carnegie Institution of Washington, USA; Guyot, F., Institut de Physique du Globe, France; Gillet, P., Ecole Normale Superieure, France; Fei, Y., Carnegie Institution of Washington, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report new high pressure data on liquid Fe-17wt% Si and Fe-27wt%S alloys. X-ray diffraction data are interpreted in the light of density measurements of liquid Fe-S alloys at high pressure and of a recent investigation structural changes in liquid Fe at high pressures and high temperatures. The paper is organized as follows: first the experimental data are exposed, and are then used to discuss 1) the potential nature of the light elements in the terrestrial outer core, 2) the physical state, solid vs. liquid, of the Martian core with regard to its moment of inertia, and 3) internal models of small planetary bodies interiors such as the galilean satellites. Additional information is contained in the original extended abstract.
Derived from Text
High Pressure; High Temperature; Liquid Alloys; Iron Alloys

20010044944 Tokyo Univ., Dept. of Earth and Planet. Sci., Japan
Effect of Isobaric Core Size on Early Thermal History of Mars
Senshu, H., Tokyo Univ., Japan; Matsui, T., Tokyo Univ., Japan; Kuramoto, K., Hokkaido Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have developed numerical early thermal history model of accreting Mars. We will report parameter dependency of final structure of accreting Mars, especially on the size of isobaric core. We will also report the following evolution of the interior of Mars. Additional information is contained in the original extended abstract.
Derived from Text
Mars (Planet); Planetary Cores; Planetary Atmospheres

20010044945 University Coll., Dept. of Geological Sciences, London, UK
First Principles Simulations of Iron Sulphide (FeS) Polymorphs and the Martian Interior
Price, G. D., University Coll., UK; Martin, P., University Coll., UK; Vocadlo, L., University Coll., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NERC-GT0498ES185; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Ab initio calculations have been used to investigate the relative stabilities and equations of state of FeS polymorphs. Values for the bulk modulus and its first and second derivatives with respect to pressure have been obtained for each polymorph. Additional information is contained in the original extended abstract.
Derived from Text
Simulation; Iron; Sulfides

20010044946 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA
Ocean Karma: What GOES Around Comes Around on Europa (Or Does It?)
McKinnon, W. B., Washington Univ., USA; Shock, E. L., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Europa interchange of matter and energy are introduced, with particular emphasis on the mantle-ocean interface and the possibility of convection within the ice shell. Additional information is contained in the original extended abstract.
Derived from Text
Europa; Jupiter (Planet); Matter (Physics)

20010044947 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
The Thick-Shell Model of Europa's Geology: Implications for Crustal Processes
Head, J. W., III, Brown Univ., USA; Pappalardo, R., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The gamut of Europa's endogenic surface features can be accounted for by tidal deformation coupled with the buoyant rise and partial melting of warm ice within a relatively thick (nominally approx. 20 to 30 km) icy shell above a liquid water ocean. Additional information is contained in the original extended abstract.
Derived from Text
Europa; Jupiter (Planet); Planetary Crusts; Planetary Geology

20010044948 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Ocean-to-Surface Linkages Resurface Europa: An Invited Review
Hoppa, G. V., Arizona Univ., USA; Geissler, P., Arizona Univ., USA; OBrien, D. P., Arizona Univ., USA; Tufts, B. R., Arizona Univ., USA; Greenberg, R., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The processes that resurface Europa each include regular transport and/or frequent exposure of oceanic water through the crust to the surface, providing extensive surface-subsurface material interchange. Additional information is contained in the original extended abstract.
Derived from Text
Europa; Jupiter (Planet); Satellite Surfaces

20010044949 Westfaelische Wilhelms Univ., Inst. fuer Planetologie, Muenster, Germany
Estimates of Europa Surface Heat Flow from Tidal Dissipation and Interior Structure Models
Spohn, T., Westfaelische Wilhelms Univ., Germany; Husmann, H., Westfaelische Wilhelms Univ., Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Models of the interior structure and tidal dissipation will be compared and discussed with emphasis on their prediction of surface heat flow. Additional information is contained in the original extended abstract.
Derived from Text
Europa; Jupiter (Planet); Satellite Surfaces

20010044950 NASA Ames Research Center, Moffett Field, CA USA
Cratering Rates on Europa
Zahnle, K. J., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We use numerical simulations of the orbital evolution of ecliptic comets and the observed history of close encounters with Jupiter to estimate the rate comets crater Europa. Additional information is contained in the original extended abstract.
Derived from Text
Cratering; Craters; Cometary Collisions; Satellite Surfaces; Europa; Jupiter (Planet)

20010044951 Hawaii Univ., HIGP/SOEST, Honolulu, HI USA
Simulation of Exposure of Brines to Europa's Surface
McCord, T. B., Hawaii Univ., USA; Orlando, T. M., Georgia Inst. of Tech., USA; Teeter, G., Pacific Northwest National Lab., USA; Hansen, G. B., Hawaii Univ., USA; Hibbitts, C. A., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Flash-frozen brines created under simulated Europa surface conditions to simulate exposure of ocean water. These brines show spectral features most similar to Europa hydrated material. Additional information is contained in the original extended abstract.
Derived from Text
Exposure; Brines; Sea Water

20010044952 Search for Extraterrestrial Intelligence Inst., Center for the Study of Life in the Universe, Mountain View, CA USA
Impact Gardening Rates on Europa: Comparison with Sputtering
Phillips, C. B., Search for Extraterrestrial Intelligence Inst., USA; Chyba, C. F., Search for Extraterrestrial Intelligence Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Impact gardening and sputtering are competing processes in the creation, destruction, and preservation of interesting biogenic materials on Europa. We estimate a new gardening rate, and compare it to current estimates of gardening and sputtering. Additional information is contained in the original extended abstract.
Derived from Text
Sputtering; Europa; Jupiter (Planet); Satellite Surfaces

20010044953 Johns Hopkins Univ., Applied Physics Lab., Laurel, MD USA
Creation and Destruction of Lithosphere on Europa: From Bands to Folds
Prockter, L. M., Johns Hopkins Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The recent discovery of compressional features on Europa suggests a model of lithospheric cycling, in which band formation results in compression and folding. Subsequent isostatic relaxation of folds may cycle material back into Europa's interior Additional information is contained in the original extended abstract..
Derived from Text
Destruction; Lithosphere; Cycles; Planetary Mantles; Planetary Crusts

20010044954 Institute of Ocean Sciences, Sidney, British Columbia Canada
Evidence for a Weakly Stratified Europan Ocean Sustained by Seafloor Heat Flux
Thomson, R. E., Institute of Ocean Sciences, Canada; Delaney, J. R., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Chaos-type features on the surface of Europa are interpreted as melt-through structures formed by rotationally confined oceanic plumes that rise to the base of the ice shell from magmatically heated regions of the seafloor. Additional information is contained in the original extended abstract.
Derived from Text
Europa; Jupiter (Planet); Satellite Surfaces

20010044955 Stanford Univ., Dept. of Geological and Environmental Sciences, Stanford, CA USA

Surface-Subsurface Exchange and the Prospects for Life on Europa

Chyba, C. F., Stanford Univ., USA; Phillips, C. B., Search for Extraterrestrial Intelligence Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Sources of chemical energy for speculative ecologies on Jupiter's moon Europa are difficult to identify, but disequilibrium radiation chemistry in Europa's upper ice layer could power an oceanic ecosystem provided that the upper layer communicates with the ocean. Additional information is contained in the original extended abstract.

Derived from Text

Europa; Jupiter (Planet); Satellite Surfaces; Extraterrestrial Life; Exobiology

20010044956 Texas Univ., Inst. for Geophysics, Austin, TX USA

Subsurface Evaluation of Europan Ice-Ocean Interchange Processes, Using an Orbiting Ice Penetrating Radar

Blankenship, D. D., Texas Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Practical europan ice-ocean interchange models imply that mapping of the deepest radar interface and classification of volume scattering would well characterize any brittle ice layer and could be used to test directly these crustal formation hypotheses. Additional information is contained in the original extended abstract.

Derived from Text

Europa; Jupiter (Planet); Satellite Surfaces

20010044957 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Europa Orbiter Exploration Strategies

Johnson, T. V., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Europa Orbiter mission is planned as the next stage of Europa exploration. Its primary goals are to search for definitive evidence of a subsurface ocean, to characterize the ice crust and ice/water interface, and to prepare for future surface/sub-surface missions. Additional information is contained in the original extended abstract.

Derived from Text

Europa; Jupiter (Planet); Satellite Surfaces; Mission Planning

20010044958 California Inst. of Tech., Pasadena, CA USA

Transport of Brine to the Near Surface or Surface of Europa: Some General Considerations

Stevenson, D. J., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Fluids at or near the surface of Europa could arise from melting within the ice and need not require direct transport from an ocean to the surface. Thin ice is not necessary. Additional information is contained in the original extended abstract.

Derived from Text

Transport Theory; Brines; Sea Water; Surface Properties; Satellite Surfaces; Europa

20010044959 NASA, Washington, DC USA

Europa Surface-Subsurface Material Interchange: Astrobiology Implications of the Session

Meyer, M. A., NASA, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This paper will seek to identify key parameters, and critical measurements needed to determine exchange rates of surface-subsurface materials of Europa and to anticipate their implications for the astrobiological studies NASA will plan. Additional information is contained in the original extended abstract.

Derived from Text

Europa; Jupiter (Planet); Satellite Surfaces; Surface Properties

20010044960 Science Applications International Corp., Chantilly, VA USA
Distribution of Materials at Tycho Crater
Tompkins, S., Science Applications International Corp., USA; Hawke, B. R., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A variety of remote sensing data (Clementine, Lunar Prospector, Lunar Orbiter, and radar-derived elevation maps) are used to evaluate the composition of surface materials at Tycho Crater. Additional information is contained in the original extended abstract.

Derived from Text

Tycho Crater; Lunar Composition; Surface Properties

20010044961 Science Applications International Corp., Advanced Technology Applications Div., Chantilly, VA USA
Yet Another New Look at Copernicus: Projecting Telescopic Spectra onto Clementine Multispectral Images Through Spectral Mixture Analysis
Sunshine, J. M., Science Applications International Corp., USA; Tompkins, S., Science Applications International Corp., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Using 0.7-2.5 micron spectra calculated at 100 m resolution, we are able to produce true band depth and position maps and thus more accurately map the distribution of impact melt, mare basalt, ejecta, and olivine at Copernicus. Additional information is contained in the original extended abstract.

Derived from Text

OAO 3; Multispectral Photography; Imaging Techniques; Image Processing; Spectral Mixture Analysis

20010044962 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Improved Mapping of the Lunar Surface Using a Multiple Endmember Mixture Model
Li, Lin, Brown Univ., USA; Mustard, John F., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

An improved approach for lunar surface mapping is proposed and tested in Serenitatis/Tranquilitatis region, and the procedure results in the mapping of more endmembers with high accuracy than traditional spectral mixture modeling does. Additional information is contained in the original extended abstract.

Derived from Text

Lunar Maps; Lunar Surface; Surface Properties; Mapping

20010044963 Houston Univ., Dept. of Geosciences, TX USA
Distribution and Stratigraphy of Basaltic Units in Mare Tranquillitatis
Rajmon, D., Houston Univ., USA; Spudis, P., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mosaics of Clementine images and FeO and TiO2 were used to map different basalt units in M. Tranquillitatis. 4 to 5 units with different TiO2 content were identified. Additional information is contained in the original extended abstract.

Derived from Text

Stratigraphy; Basalt; Lunar Maria

20010044964 Lunar and Planetary Inst., Houston, TX USA
Mixing of the Mare Regolith: A Clementine Test
Spudis, P. D., Lunar and Planetary Inst., USA; Baloga, S. M., Proxemy Research, Inc., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have used Clementine images to estimate the amounts of highland contamination in mare regoliths on the Moon. These results will be compared to predictions of highland debris derived from Monte Carlo models of regolith growth. Additional information is contained in the original extended abstract.
Derived from Text
Maria; Regolith; Contamination; Debris; Moon

20010044965 Geological Survey, Astrogeology Program, Flagstaff, AZ USA
Compositions of Lunar Pyroclastic Deposits
Gaddis, L., Geological Survey, USA; Staid, M. I., Geological Survey, USA; Petro, N., Bates Coll., USA; Hawke, B. Ray, Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The 5-band Clementine UVVIS data were used to characterize the compositions of 75 large and small lunar pyroclastic deposits, and these were compared to compositions of major lunar maria and highland terrains. Additional information is contained in the original extended abstract.
Derived from Text
Composition (Property); Volcanology; Deposits

20010044966 Hawaii Univ., Hawaii Inst. of Geophysics and Planetology, Honolulu, HI USA
Remote Sensing Studies of Selected Spectral Anomalies on the Moon
Hawke, B. R., Hawaii Univ., USA; Blewett, D. T., Hawaii Univ., USA; Lucey, P. G., Hawaii Univ., USA; Smith, G. A., Hawaii Univ., USA; Taylor, G. J., Hawaii Univ., USA; Lawrence, D., Los Alamos National Lab., USA; Spudis, P. D., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

It has been suggested that lunar Red Spots were produced by highlands volcanism and that they may be composed of KREEP basalt or even more evolved highlands lithologies. We have remote sensing data to investigate the composition of selected Red Spots. Additional information is contained in the original extended abstract.
Derived from Text
Remote Sensing; Spectra; Anomalies; Moon

20010044967 Geological Survey, Astrogeology Program, Flagstaff, AZ USA
The Compositional Diversity of Farside Basalts from Clementine Multispectral Images
Staid, M. I., Geological Survey, USA; Pieters, C., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The composition of near and farside lunar basalts are compared using multispectral images obtained by the Clementine spacecraft. Uncontaminated basalts are identified within fourteen mare deposits to examine the distribution of compositional types. Additional information is contained in the original extended abstract.
Derived from Text
Deposits; Lunar Maria; Basalt

20010044968 Hawaii Univ., Planetary Geosciences, Honolulu, HI USA
Is the Interior of South Pole-Aitken Basin Spectrally Similar to Apollo 14?
Lucey, P. G., Hawaii Univ., USA; Blewett, D. T., Hawaii Univ., USA; Holtzmann, J., Hawaii Univ., USA; Hawke, B. R., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Both Fra Mauro (Apollo 14 region) and SPA (South Pole-Aitken) are examples of high-iron highlands, therefore the Apollo 14 samples may help to understand the composition of SPA. The Clementine UVVIS spectral properties of SPA show both similarities and differences with Fra Mauro. Additional information is contained in the original extended abstract.
Derived from Text
Lunar Geology; Lunar Maria; Mineralogy

20010044969 Brown Univ., Dept. of Geological Sciences, Providence, RI USA

The Character and Possible Origin of "Olivine Hill" in South Pole-Aitken Basin

Pieters, C., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Gaddis, L., Geological Survey, USA; Jolliff, B. L., Washington Univ., USA; Duke, M., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A hill with abundant olivine in central SPA may represent an exposure of upper mantle material. A new approach to mapping rock types allows spatial relations of diverse materials to be evaluated in geologic context. Additional information is contained in the original extended abstract.

Derived from Text

Olivine; Igneous Rocks; Lunar Geology

20010044970 Hawaii Univ., Hawaii Inst. of Geophysics and Planetology, Honolulu, HI USA

Mid-Infrared Multispectral Imaging of the Moon

Steutel, D., Hawaii Univ., USA; Lucey, P. G., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Using ground-based two-band mid-infrared multispectral imaging of the Moon, we have tentatively identified 3 cases (Aristarchus, Copernicus, and Bullialdus) where spectral anomalies are consistent with the presence of coarse-grained (>75 micron) olivine. Additional information is contained in the original extended abstract.

Derived from Text

Infrared Imagery; Imaging Techniques; Multispectral Photography; Moon

20010044971 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Scattering Properties of Candidate Planetary Regolith Materials

Nelson, R. M., Jet Propulsion Lab., California Inst. of Tech., USA; Smythe, W. D., Jet Propulsion Lab., California Inst. of Tech., USA; Hapke, B. W., Pittsburgh Univ., USA; Hale, A. S., Pittsburgh Univ., USA; Piatek, J. A.; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The laboratory investigation of the scattering properties of candidate planetary regolith materials is an important technique for understanding the physical properties of a planetary regolith. Additional information is contained in the original extended abstract.

Derived from Text

Scattering; Planetary Composition; Regolith

20010044972 Kharkov Astronomical Observatory, Kharkov, Ukraine

Lunar Opposition Spike Observed by Clementine NIR Camera: Preliminary Results

Kreslavsky, M. A., Kharkov Astronomical Observatory, Ukraine; Shkuratov, Y. G., Kharkov Astronomical Observatory, Ukraine; Kaydash, V. G., Kharkov Astronomical Observatory, Ukraine; Omelchenko, V. V., Kharkov Astronomical Observatory, Ukraine; Blewett, D. T., Hawaii Univ., USA; Lucey, P. G., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We processed Clementine near-infrared camera images of the zero-phase point to study the amplitude of the opposition spike at NIR wavelengths. The results are consistent with the coherent-backscatter mechanism. Additional information is contained in the original extended abstract.

Derived from Text

Lunar Geology; Planetary Geology

20010044973 Chicago Univ., Lab. for Astrophysics and Space Research, Chicago, IL USA

Chemistry of Mars Pathfinder Samples Determined by the APXS

Foley, C. N., Chicago Univ., USA; Economou, T., Chicago Univ., USA; Clayton, R. N., Chicago Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A flight duplicate has been used to further calibrate the APXS under martian conditions in order to quantify the Pathfinder abundances. We report new abundances for the Pathfinder samples and possible evidence for water in some samples. Additional information is contained in the original extended abstract.
Derived from Text
Environmental Chemistry; Mars Environment; Mars Pathfinder

20010044974 Max-Planck-Inst. fuer Chemie, Mainz, Germany
Revised Data of the Mars Pathfinder Alpha Proton X-Ray Spectrometer: Geochemical Behavior of Major and Minor Elements
Brueckner, J., Max-Planck-Inst. fuer Chemie, Germany; Dreibus, G., Max-Planck-Inst. fuer Chemie, Germany; Rieder, R., Max-Planck-Inst. fuer Chemie, Germany; Waenke, H., Max-Planck-Inst. fuer Chemie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The analysis of the Alpha Proton X-ray Spectrometer of the Mars Pathfinder Mission is revised by a more accurate recalibration. Compared to previous results the Fe concentration of all samples rose by about 25%, while the Si fell by about 10%. Additional information is contained in the original extended abstract.
Derived from Text
Mars Pathfinder; Mars Missions

20010044975 Geological Survey, USA
Compositional Variability of Martian Olivines Using Mars Global Surveyor Thermal Emission Spectra
Hoefen, T. M., Geological Survey, USA; Clark, R. N., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Data from the Mars Global Surveyor Thermal Emission Spectrometer have spectral features in the 16 to 50 micron wavelength region correlating to bands in olivines. Using laboratory spectra, outcrops of olivine were mapped in the TES data, on the basis of their FeO content. Additional information is contained in the original extended abstract.
Derived from Text
Variability; Planetary Composition; Mars (Planet); Olivine

20010044976 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA
Spectral Variations in MGS TES Data of Nili Fossae: A Possible Source Region for SNC Meteorites on Mars?
Hamilton, V. E., Arizona State Univ., USA; Christensen, P., Arizona State Univ., USA; McSween, H. Y., Jr., Tennessee Univ., USA; Clark, R. N., Geological Survey, USA; Hoefen, T. M., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

As part of ongoing studies of TES data and global searches for the source regions of SNC meteorites, we have identified a potential source region for the martian meteorites ALH77005 and Chassigny in the Nili Fossae region of northeastern Syrtis Major. Additional information is contained in the original extended abstract.
Derived from Text
Spectrum Analysis; Variations; Thermal Emission; Spectrometers; Mars Global Surveyor

20010044977 NASA Goddard Space Flight Center, Greenbelt, MD USA
Compositions of Low Albedo Intracrater Materials and Wind Streaks on Mars: Examination of MGS TES Data in Western Arabia Terra
Bandfield, J. L., NASA Goddard Space Flight Center, USA; Wyatt, M. B., Tennessee Univ., USA; Christensen, P., Arizona State Univ., USA; McSween, H. Y., Jr., Tennessee Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Basalt and andesite surface compositions are identified within individual low albedo intracrater features and adjacent dark wind streaks. High resolution mapping of compositional heterogeneities may help constrain origin hypotheses for these features. Additional information is contained in the original extended abstract.
Derived from Text
Composition (Property); Albedo; Planetary Radiation; Surface Properties; Andesite; Basalt; Igneous Rocks

20010044978 Brown Univ., Dept.of Geological Sciences, Providence, RI USA

TES Observations of the Global Distribution of Sulfate on Mars

Mustard, J. F., Brown Univ., USA; Cooper, C. D., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A global set of TES spectra was deconvolved using endmembers including a laboratory cemented sulfate soil. Good matches are found to the cemented sulfate and appear to represent detection of spatially-coherent regions of cemented sulfates on Mars. Additional information is contained in the original extended abstract.

Derived from Text

Sulfates; Concentration (Composition); Soil Sampling; Mars Surface Samples; Viking Lander Spacecraft; Mars Pathfinder; Planetary Geology

20010044979 Winnipeg Univ., Dept. of Geography, Manitoba Canada

Reflectance Spectra of Iron-bearing Sulphates: Implications for Mars

Cloutis, E. A., Winnipeg Univ., Canada; Krenn, K. M., Winnipeg Univ., Canada; Kollar, S., Winnipeg Univ., Canada; Strong, J., Winnipeg Univ., Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Reflectance spectra of a number of different iron-bearing sulphates show a diversity of spectral properties, most noticeably the lack of a 0.43 micron absorption feature in some cases. Consequently some of these minerals are spectrally consistent with martian surface spectra. Additional information is contained in the original extended abstract.

Derived from Text

Spectral Reflectance; Absorption Spectra; Spectrum Analysis; Sulfates

20010044980 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

The 4.5 micron Sulfate Absorption Feature on Mars and Its Relationship to Formation Environment

Blaney, D. L., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The 4.5 micron sulfate absorption feature on Mars is spatially variable. It is a sensitive composition and hydration state and can be used to identify different types of aqueous environments. Additional information is contained in the original extended abstract.

Derived from Text

Sulfates; Absorption Spectra; Mars Environment; Formations

20010044981 Lunar and Planetary Inst., Houston, TX USA

Determining TES Detection Limits for Minerals

Kirkland, L. E., Lunar and Planetary Inst., USA; Herr, K. C., Aerospace Corp., USA; Salisbury, J. W., Johns Hopkins Univ., USA; McAfee, J. M., Los Alamos National Lab., USA; Forney, P. B., Lockheed Martin Corp., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We will examine mineral detection limits for the Mars Global Surveyor TES, and what the results indicate for remote sensing studies of Mars. Additional information is contained in the original extended abstract.

Derived from Text

Remote Sensing; Spectral Bands; Emission Spectra; Infrared Absorption; Thermal Emission

20010044982 NASA, Washington, DC USA

Spectra of Martian Andesitic Materials

Minitti, M. E., Carnegie Institution of Washington, USA; Rutherford, M. J., Brown Univ., USA; Weitz, C. M., NASA, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Mars Pathfinder and Mars Global Surveyor missions both detected andesitic compositions on the martian surface. We have investigated the spectral properties of unoxidized and oxidized martian andesitic samples crystallized with and without water. Additional information is contained in the original extended abstract.
Derived from Text
Spectra; Andesite; Igneous Rocks; Mars Sample Return Missions; Mars Surface Samples; Planetary Composition

20010044983 NASA Johnson Space Center, Houston, TX USA
Thermal Infrared Spectroscopy of Experimentally Shocked Anorthosite and Pyroxenite
Johnson, J. R., Geological Survey, USA; Hoerz, F., NASA Johnson Space Center, USA; Christensen, P., Arizona State Univ., USA; Lucey, P. G., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We performed shock recovery experiments at JSC (17-63 GPa) on samples of Stillwater pyroxenite and anorthosite and acquired their thermal infrared spectra (3-50 micron) to investigate the degradation of spectral features at high pressures. Additional information is contained in the original extended abstract.
Derived from Text
Anorthosite; Soils; Pyroxenes; Feldspars

20010044984 NASA Johnson Space Center, Houston, TX USA
Crystallization of Oxide and Silicate Phases from Impact Melts with Average Martian Soil Composition
Morris, R., NASA Johnson Space Center, USA; Lofgren, G. E., NASA Johnson Space Center, USA; Le, L., Lockheed Martin Space Operations, USA; Shelfer, T. D., Lockheed Martin Space Operations, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Crystallization of melts formed from impact into martian soil in a CO2 atmosphere might contribute magnetite, pyroxene, and minor feldspar to the martian surface. The strongly magnetic nature of martian soil might be a manifestation of this process. Additional information is contained in the original extended abstract.
Derived from Text
Crystallization; Oxides; Silicates; Impact Melts

20010044985 NASA Ames Research Center, Moffett Field, CA USA
Aqueous Alteration of Mars-Analog Rocks Under an Acidic Atmosphere
Bullock, M. A., Southwest Research Inst., USA; Moore, J. M., NASA Ames Research Center, USA; Mellon, M. T., Colorado Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The wind-blown fines of Mars have high amounts of salts that are easily mobilized by water. We report on laboratory experiments that produce brines from the interaction of water with Mars-analog rocks and a simulated acidic Mars paleoatmosphere. Additional information is contained in the original extended abstract.
Derived from Text
Mars (Planet); Mars Atmosphere; Mars Surface; Planetary Geology

20010044986 Washington Univ., Lab. for Space Sciences, Saint Louis, MO USA
Hydrogen, Carbon, and Nitrogen Isotopic Imaging of Sub-Micron Components from Interplanetary Dust Particles
Stadermann, F. J., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The new Washington University NanoSIMS is used for the study of the internal H, C, and N isotopic compositions of 7 chondritic IDPs. The most interesting result is the discovery of a discrete, 400 nm sub-grain with a 15 N enrichment of 813%. Additional information is contained in the original extended abstract.
Derived from Text
Hydrogen; Carbon; Nitrogen; Isotopic Labeling; Imaging Techniques

20010044987 NASA Goddard Space Flight Center, Greenbelt, MD USA

Nano-Diamonds in Chondritic Interplanetary Dust Particles

Dai, Z. R., Georgia Inst. of Tech., USA; Joswiak, D. J., Washington Univ., USA; Bradley, J. P., Georgia Inst. of Tech., USA; Brownlee, D. E., Washington Univ., USA; Hill, H. G. M., NASA Goddard Space Flight Center, USA; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-7450; NAG5-9797; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In-situ acid etching of ultramicrotomed thin sections has lead to the identification of nano-diamonds in interplanetary dust particles. Additional information is contained in the original extended abstract.

Derived from Text

Nanocrystals; Diamonds; Single Crystals

20010044988 NASA Johnson Space Center, Houston, TX USA

Carbon-XANES and Oxygen-XANES Measurements on Interplanetary Dust Particles: A Preliminary Measurement of the C to O Ratio in the Organic Matter in a Cluster IDP

Flynn, G. J., State Univ. of New York, USA; Feser, M., State Univ. of New York, USA; Keller, L. P., NASA Johnson Space Center, USA; Jacobsen, C., State Univ. of New York, USA; Wirick, S., State Univ. of New York, USA; Avakians, S., State Univ. of New York, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

C-XANES and O-XANES measurements on L2011 B2, a cluster fragment, demonstrate that the carbon-rich phase contains oxygen that is double-bonded to carbon, confirming this material is organic, and we preliminarily estimate the C:O ratio as approximately 2:1. Additional information is contained in the original extended abstract.

Derived from Text

Carbon; Oxygen; Interplanetary Dust

20010044989 Washington Univ., Dept. of Astronomy, Seattle, WA USA

Carbonaceous Meteor Ash: A Significant Carrier of Carbon, Organic Material and Noble Gas to the Surfaces of Terrestrial Planets?

Brownlee, D. E., Washington Univ., USA; Joswiak, D. J., Washington Univ., USA; Bradley, J. P., Georgia Inst. of Tech., USA; Kress, M., Washington Univ., USA; Pepin, R., Minnesota Univ., USA; Schlutter, D., Minnesota Univ., USA; Palma, R., Sam Houston State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Meteor ash - a significant carrier of carbon, noble gas and organic matter to terrestrial planet surfaces. Additional information is contained in the original extended abstract.

Derived from Text

Carbonaceous Meteorites; Meteoritic Composition; Ashes

20010044990 Sam Houston State Univ., Dept. of Physics, Huntsville, TX USA

Helium and Neon in Carbon-rich Phases of Interplanetary Dust Particles

Palma, R., Sam Houston State Univ., USA; Schlutter, D., Minnesota Univ., USA; Pepin, R., Minnesota Univ., USA; Brownlee, D. E., Washington Univ., USA; Joswiak, D. O., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

IDPs showing evidence of atmospheric entry heating to high temperature nevertheless retained large amounts of He in highly refractory, probably carbonaceous sites. Carbon is also a major He and Ne carrier in a particle not strongly heated on entry. Additional information is contained in the original extended abstract.

Derived from Text

Helium; Neon; Carbon; Interplanetary Dust

20010044991 NASA Goddard Space Flight Center, Greenbelt, MD USA

Astro-Mineralogy: The Comparison of Infrared Spectra from Astrophysical Environments with those from Interplanetary Dust Particles (IDPs)

Nuth, J. A., III, NASA Goddard Space Flight Center, USA; Molster, F. J., Georgia Inst. of Tech., USA; Sitko, M. L., Cincinnati Univ., USA; Bradley, J. P., Georgia Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-7450; NAG5-9797; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The infrared spectral properties of interplanetary dust particles are directly compared with those of astronomical dust in several astrophysical environments as measured by the Infrared Space Observatory (ISO). Additional information is contained in the original extended abstract.

Derived from Text

Stellar Spectrophotometry; Infrared Space Observatory (ISO)

20010044992 Centre de Recherches Petrographiques et Geochimiques, Nancy, France

Conditions of Atmospheric Entry of Micrometeorites

Libourel, G., Centre de Recherches Petrographiques et Geochimiques, France; Toppani, A., Centre de Recherches Petrographiques et Geochimiques, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Owing to an experimental study designed to simulate the atmospheric entry of micrometeorites, it is possible to reproduce their main types and to better constrain their entry conditions, such as degree of heating, altitude of deceleration and entry angle. Additional information is contained in the original extended abstract.

Derived from Text

Conditions; Atmospheric Entry; Micrometeorites; Micrometeoroids

20010044993 Museum of Natural History, Dept. of Mineralogy, London, UK

The Petrology of Fine-grained Micrometeorites: Evidence for the Diversity of Primitive Asteroids

Genge, M. J., Museum of Natural History, UK; Bradley, J. P., MVA, Inc., USA; Engrand, C., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Gounelle, M., Museum of Natural History, UK; Harvey, R. P., Case Western Reserve Univ., USA; Grady, M. M., Museum of Natural History, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report the discovery by analytical TEM of serpentine and phases interpreted as dehydroxylates of serpentine in ultramicrotomed sections of a number of fine-grained Antarctic micrometeorites. Additional information is contained in the original extended abstract.

Derived from Text

Petrology; Micrometeorites; Cosmic Dust; Micrometeoroids

20010044994 Ibaraki Univ., Mito, Japan

Mineralogy of Phyllosilicate-rich Micrometeorites and Comparison with Tagish Lake CI and Sayama CM Chondrites

Noguchi, T., Ibaraki Univ., Japan; Nakamura, T., Kyushu Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We investigated CI-like and CM-like MMs, and compared them with Tagish Lake and Sayama. CI-like MMs were probably derived from parent bodies those have affinity with the parent body of Tagish Lake. There is no direct relationship between a CM-like MM and CM chondrite. Additional information is contained in the original extended abstract.

Derived from Text

Mineralogy; Micrometeorites; Cosmic Dust

20010044995 Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, Orsay, France

FTIR and STXM Detection of Organic Carbon in Scoriaceous-type Antarctic Micrometeorites

Matrajt, G., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Flynn, G. J., State Univ. of New York, USA; Bradley, J. P., MVA, Inc., USA; Maurette, M., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Lunar

and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Organic carbon has been detected in a scoriaceous-type Antarctic micrometeorite using FTIR and STXM analytical techniques. Additional information is contained in the original extended abstract.

Derived from Text

Carbon; Antarctic Regions; Micrometeorites

20010044996 NASA Johnson Space Center, Houston, TX USA

Atmospheric Entry Heating of Micrometeorites Revisited: Higher Temperatures and Potential Biases

Love, S., NASA Johnson Space Center, USA; Alexander, C. M. OD., Carnegie Institution of Washington, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The atmospheric entry heating model of Love and Brownlee appears to have overestimated evaporation rates by as much as two orders of magnitude. Here we revisit the issue of atmospheric entry heating, using a revised prescription for evaporation rates. Additional information is contained in the original extended abstract.

Derived from Text

Atmospheric Entry; Aerodynamic Heating; Heating; Micrometeorites

20010044997 Carnegie Institution of Washington, Dept. of Terrestrial Magnetism, Washington, DC USA

Mass-dependent Fractionation of Mg, Si, and Fe Isotopes in Five Stony Cosmic Spherules

Alexander, C. M. OD., Carnegie Institution of Washington, USA; Taylor, S., Army Cold Regions Research and Engineering Lab., USA; Delaney, J. S., Rutgers Univ., USA; Herzog, G. F., Rutgers Univ., USA; Ma, P., Rutgers Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We found mass dependent fractionation, and hence evidence of evaporation, in five stony cosmic spherules. We selected light colored, iron-poor spherules for analysis. Iron was fractionated in all five spherules, Si in three and Mg in one spherule. Additional information is contained in the original extended abstract.

Derived from Text

Fractionation; Evaporation; Spherules; Micrometeorites; Cosmic Dust

20010044998 NASA Johnson Space Center, Houston, TX USA

Synthesis and Characterization of Nanocomposite Analogs of Interstellar Amorphous Silicates

Al-Badri, Z., North Dakota State Univ., USA; Keller, L. P., NASA Johnson Space Center, USA; Grier, D. G., North Dakota State Univ., USA; McCarthy, G. J., North Dakota State Univ., USA; Chauhan, B. P. S., Catholic Univ. of America, USA; Boudjouk, P., North Dakota State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NCC5-399; RTOP 344-31-40-06; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Synthetic analog materials consisting of nanophase Fe metal in a silica glass matrix have been prepared. The infrared properties of the analog materials show remarkable similarities to amorphous interstellar silicates. Additional information is contained in the original extended abstract.

Derived from Text

Nanocomposites; Nanocrystals; Amorphous Materials; Silicates; Mineralogy

20010044999 Lecce Univ., Physics Dept., Italy

Spectral Emissivity as a Tool for the Interpretation of Martian Data: A Laboratory Approach

Fonti, S., Lecce Univ., Italy; Blanco, A., Lecce Univ., Italy; Blecka, M. I., Polish Academy of Sciences, Poland; DeCarlo, F., Lecce Univ., Italy; Orofino, V., Lecce Univ., Italy; Polimeno, N., Lecce Univ., Italy; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): KBN-2P03C00515; KBN-2P03C00217; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Lecce Astrophysics Group is involved in a systematic study of spectral emissivity performed with an especially developed setup, aimed to the analysis of analogs of martian materials. The goal is to better understand Mars's climatic evolution and life development possibility. Additional information is contained in the original extended abstract.
Derived from Text
Astrophysics; Spectral Emission; Mars (Planet); Mars Surface

20010045000 Winnipeg Univ., Dept. of Geography, Manitoba Canada
Spectral-Compositional Properties of Iron-bearing Clays: Remote Sensing Implications
Marcino, D., Winnipeg Univ., Canada; Cloutis, E. A., Winnipeg Univ., Canada; Asher, P., University of Southern Georgia, USA; Strong, J., Winnipeg Univ., Canada; Russell, B., Winnipeg Univ., Canada; Goltz, D., Winnipeg Univ., Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Reflectance spectra of iron-bearing clays exhibit a number of absorption features in the 0.3-1.2 micron region that are common to many of the clays but which vary from species to species. Additional information is contained in the original extended abstract.
Derived from Text
Spectral Reflectance; Spectrum Analysis; Iron; Clays

20010045001 Winnipeg Univ., Dept. of Geography, Manitoba Canada
Reflectance Spectra of Jarosite Minerals: Implications for Mars
Krenn, K. M., Winnipeg Univ., Canada; Cloutis, E. A., Winnipeg Univ., Canada; Russell, B., Winnipeg Univ., Canada; Kollar, S., Winnipeg Univ., Canada; Strong, J., Winnipeg Univ., Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Reflectance spectra of jarosites exhibit a large number of common, and in some cases unique, absorption features as well as small variations in band positions and band depths which may be related to slight structural variations. Additional information is contained in the original extended abstract.
Derived from Text
Spectral Reflectance; Spectrum Analysis; Minerals

20010045002 Winnipeg Univ., Dept. of Geography, Manitoba Canada
Spectral Reflectance Properties of Zeolite Group Minerals
Cloutis, E. A., Winnipeg Univ., Canada; Asher, P. M., Winnipeg Univ., Canada; Mertzman, S. A., Franklin and Marshall Coll., USA; Guertin, M., Winnipeg Univ., Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The reflectance spectra of zeolites exhibit a number of absorption features, most of which are associated with adsorbed water and hence cannot be used to discriminate different zeolites. However the wavelength position of the Christansen band is diagnostic of Al content. Additional information is contained in the original extended abstract.
Derived from Text
Spectral Reflectance; Spectrum Analysis; Absorption Spectra; Zeolites; Minerals

20010045003 Hawaii Univ., Hawaii Inst. of Geophysics and Planetology, Honolulu, HI USA
Remote Pulsed-Laser Raman Spectroscopy System for Mineral Analysis
Sharma, S. K., Hawaii Univ., USA; Angel, S. M., South Carolina Univ., USA; Ghosh, M., Hawaii Univ., USA; Hubble, H. W., Hawaii Univ., USA; Lucey, P. G., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-7139; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have measured Raman spectra of carbonate, silicate, and hydrous silicate and sulfate minerals, our new remote-pulsed Raman system, indicating that it can be used to analyze the minerals on planetary surfaces to a distance of 10 to 66 meters. Additional information is contained in the original extended abstract.
Derived from Text
Remote Control; Pulsed Lasers; Laser Spectroscopy; Spectrum Analysis; Raman Spectra; Minerals

20010045004 Hawaii Univ., Dept. of Chemistry, Honolulu, HI USA

Raman Spectroscopic Studies of the Laser-induced Heating in Alpha-Quartz of Various Grain Sizes

Chio, C. H., Hawaii Univ., USA; Sharma, S. K., Hawaii Univ., USA; Lucey, P. G., Hawaii Univ., USA; Muenow, D. W., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Raman spectroscopic studies of quartz of various grain size have shown the effects of laser-induced heating of the sample as grain size approaches the sub-micron range. Additional information is contained in the original extended abstract.

Derived from Text

Spectroscopic Analysis; Laser Heating; Quartz; Grain Size

20010045005 Brown Univ., Dept. of Geologic Sciences, Providence, RI USA

Unusual Spectral Properties Observed in Valles Marineris

Mustard, J. F., Brown Univ., USA; Murchie, S. L., Johns Hopkins Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Two regions of anomalous near-infrared spectral properties were identified in western Candor Chasma in Valles Marineris. They are best modeled as a cemented or lithified mixture of dust and altered mafic materials. Additional information is contained in the original extended abstract.

Derived from Text

Spectroscopic Analysis; Mars (Planet); Mars Surface; Mineralogy; Spectrum Analysis

20010045006 Aerospace Corp., El Segundo, CA USA

Terrestrial Airborne Hyperspectral Remote Sensing (SEBASS): Applications to Remote Sensing of Mars

Keim, E. R., Aerospace Corp., USA; Kirkland, L. E., Lunar and Planetary Inst., USA; Hackwell, J. A., Aerospace Corp., USA; Herr, K. C., Aerospace Corp., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We will show SEBASS terrestrial hyperspectral images, and discuss implications of the results to TES and THEMIS studies of Mars. Additional information is contained in the original extended abstract.

Derived from Text

Mars Exploration; Mars (Planet); Remote Sensing

20010045007 NASA Johnson Space Center, Houston, TX USA

Mapping Alteration Minerals Exposed on the Summit of Mauna Kea Volcano Using AVIRIS Data: Implications for Mapping Mars Mineralogy

Guinness, E. A., Washington Univ., USA; Arvidson, R. E., Washington Univ., USA; Jolliff, B. L., Washington Univ., USA; Morris, R., NASA Johnson Space Center, USA; Ming, D. W., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We mapped the distribution of hydrothermal minerals at the summit of Mauna Kea, Hawaii, using Airborne Visible Infrared Imaging Spectrometer data. Our results provide a test on the detectability of hydrothermal alteration products on Mars at visible and near-IR wavelengths. Additional information is contained in the original extended abstract.

Derived from Text

Planetary Mapping; Thermal Mapping; Mineral Deposits; Mineralogy; Planetary Geology; Mars Surface

20010045008 Winnipeg Univ., Dept. of Geography, Manitoba Canada

Spectral Properties of Carbonates in the 2.0-2.5 micrometer Region: Implications for Mars

Strong, J., Winnipeg Univ., Canada; Cloutis, E. A., Winnipeg Univ., Canada; Russell, B., Winnipeg Univ., Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The reflectance spectra of both hydrous and anhydrous carbonates exhibit a number of absorption bands in the 2.0-2.5 micron region. These bands are characteristic of the particular carbonates and become increasingly evident with decreasing water content. Additional information is contained in the original extended abstract.
Derived from Text
Spectral Reflectance; Spectrum Analysis; Absorption Spectra; Carbonates

20010045009 Search for Extraterrestrial Intelligence Inst., Moffett Field, CA USA
Photodecomposition of Carbonates on Mars
Quinn, R. C., Search for Extraterrestrial Intelligence Inst., USA; Zent, A. P., NASA Ames Research Center, USA; McKay, C. P., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report on experimental investigations of the photo-induced decomposition of calcium carbonate in both a simulated martian atmosphere and under high vacuum. Additional information is contained in the original extended abstract.
Derived from Text
Photodecomposition; Calcium Carbonates; Mars (Planet)

20010045010 NASA Johnson Space Center, Houston, TX USA
Weathering of Martian Evaporites
Wentworth, S. J., Lockheed Martin Corp., USA; Velbel, M. A., Michigan State Univ., USA; Thomas-Keprta, K. L., Lockheed Martin Corp., USA; Longazo, T. G., Lockheed Martin Corp., USA; McKay, D. S., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Evaporites in martian meteorites contain weathering or alteration features that may provide clues about the martian near-surface environment over time. Additional information is contained in the original extended abstract.
Derived from Text
Weathering; Mars (Planet); Mars Environment

20010045011 Virginia Polytechnic Inst. and State Univ., Fluids Research Lab., Dept. of Geological Sciences, Blacksburg, VA USA
PTX Phase Equilibria in the H2O-CO2-Salt System at Mars Near-Surface Conditions
Bodnar, R. J., Virginia Polytechnic Inst. and State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The P-T range over which liquid is stable in the system water-carbon dioxide-salt is considered relative to Mars near-surface conditions. The breakdown of carbon dioxide clathrate in the subsurface provides both the liquid and the energy to produce surface erosion. Additional information is contained in the original extended abstract.
Derived from Text
Water; Carbon Dioxide; Clathrates; Mars Environment

20010045012 Lamont-Doherty Geological Observatory, Palisades, NY USA
Clathrate and Ice Stability in a Porous Martian Regolith
Longhi, J., Lamont-Doherty Geological Observatory, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

CO2-clathrate becomes stable with respect to combinations of CO2-rich gas and water ice at depths is greater than = 7 m on Mars. However, if the gas in a porous regolith is in hydraulic contact with the atmosphere, both clathrate and ice will be unstable. Additional information is contained in the original extended abstract.
Derived from Text
Carbon Dioxide; Clathrates; Ice; Stability; Mars Surface; Regolith

20010045013 Search for Extraterrestrial Intelligence Inst., Moffett Field, CA USA

Iceland as a Model for Chemical Alteration on Mars

Bishop, J. L., Search for Extraterrestrial Intelligence Inst., USA; Schiffman, P., California Univ., USA; Murad, E., Bavarian Geological Survey, Germany; Southard, R., California Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; Reflectance spectra were measured at Relab, a multi-user, NASA-supported facility (NAG5-3871).; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Subglacial volcanic activity on Iceland has led to the formation of a variety of silicate and iron oxide-rich alteration products that may ressemble chemical alteration on Mars. The spectral and chemical properties of Icelandic samples are presented. Additional information is contained in the original extended abstract.

Derived from Text

Iceland; Chemical Effects; Chemical Properties; Mars Surface; Mars Surface Samples; Planetary Geology

20010045014 Nevada Univ., Authur Brant Lab. for Exploration Geophysics Geological Sciences, Reno, NV USA

Acid Sulfate Alteration of Basaltic Andesites: A Case Study near Reno, Nevada

Calvin, W. M., Nevada Univ., USA; Vaughan, R. G., Nevada Univ., USA; Taranik, J., Nevada Univ., USA; Smailbegovic, A., Nevada Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Recent observations show that much of the martian surface is andesitic in nature. Examination of acid sulfate alteration on basaltic-andesite volcanics near Reno, Nevada, can provide clues to the weathering of the martian northern lowlands. Additional information is contained in the original extended abstract.

Derived from Text

Sulfates; Basalt; Andesite; Volcanology; Nevada; Weathering

20010045015 Oklahoma State Univ., School of Geology, Stillwater, OK USA

A Survey of the Luminescence Dose Response of a Variety of Terrestrial Basalts and Andesites as Analogs of Mars Surface Materials

Abbott, N., Oklahoma State Univ., USA; Lepper, K., Oklahoma State Univ., USA; McKeever, S. W. S., Oklahoma State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report here the results of ongoing experiments with terrestrial analogs of martian surface materials to establish a broad materials knowledge base for development of in-situ luminescence dating procedures and equipment. Additional information is contained in the original extended abstract.

Derived from Text

Luminescence; Dosage; Basalt; Andesite; Mars Surface Samples; Analogs

20010045016 NASA Johnson Space Center, Houston, TX USA

Characterization of the Thermal Properties of Magnetite Using Differential Scanning Calorimetry

Lauer, H. V., Jr., Lockheed Martin Space Mission Systems and Services, USA; Ming, D. W., NASA Johnson Space Center, USA; Golden, D. C., Hernandez Engineering, Inc., USA; Lin I-C., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Because of its possible importance to Mars science we are reporting on the thermal and crystalline properties of magnetic particles synthesized over a wide range of temperatures in a controlled 1-bar reducing atmosphere furnace. Additional information is contained in the original extended abstract.

Derived from Text

Thermodynamic Properties; Magnetite

20010045017 NASA Goddard Space Flight Center, Greenbelt, MD USA

Multiple Emission Angle Surface-Atmosphere Separations of MGS Thermal Emission Spectrometer Data

Bandfield, J. L., NASA Goddard Space Flight Center, USA; Smith, M. D., NASA Goddard Space Flight Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Multiple emission angle observations taken by MGS-TES have been used to derive atmospheric opacities and surface temperatures and emissivities with increased accuracy and wavelength coverage. Martian high albedo region surface spectra have now been isolated. Additional information is contained in the original extended abstract.
Derived from Text
Mars Atmosphere; Thermal Emission; Spectrometers; Mars Surface; Emissivity

20010045018 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA
The Effect of Bulk Density on the Thermal Conductivity of Particulate Materials Under Martian Atmospheric Pressures
Presley, M. A., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Thermal conductivities of particulate samples under atmospheric pressures typical of the martian surface are measured with a line-heat source apparatus. Thermal conductivity exhibits linear dependence on the bulk density of the material. Additional information is contained in the original extended abstract.
Derived from Text
Thermal Conductivity; Particulates; Particle Size Distribution; Mars Surface; Mars Atmosphere; Atmospheric Pressure

20010045019 Tennessee Univ., Dept. of Geological Sciences, Knoxville, TN USA
Possible Effects of Zonation in Plagioclase on Thermal Emission Spectra: A Progress Report
Milam, K. A., Tennessee Univ., USA; McSween, H. Y., Jr., Tennessee Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This study examines the effects of plagioclase zoning in thermal emission spectra using a new technique of experimental analysis developed at the University of Tennessee and Arizona State University. Additional information is contained in the original extended abstract.
Derived from Text
Feldspars; Mars Surface Samples; Thermal Emission; Emission Spectra

20010045020 Tennessee Univ., Dept. of Geological Sciences, Knoxville, TN USA
Bulk Chemistry of Medicine Lake Lavas from Deconvolution of Thermal Emission Spectra
Cavendish, T. A., Tennessee Univ., USA; Wyatt, M. B., Tennessee Univ., USA; Hamilton, V. E., Arizona State Univ., USA; McSween, H. Y., Jr., Tennessee Univ., USA; Grove, T. L., Massachusetts Inst. of Tech., USA; Christensen, P., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Modeled bulk oxides of volcanic rocks are examined for their effectiveness in classifying different volcanic lithologies and interpreting petrologic processes. Results are applicable to the study of martian surface compositions. Additional information is contained in the original extended abstract.
Derived from Text
Igneous Rocks; Volcanoes; Lava; Oxides

20010045021 Arizona State Univ., Dept. of Geology, Tempe, AZ USA
Understanding Processes that have Influenced Surface Properties on Mars: Integrating TES-derived Thermal Inertia with High-Resolution MOC Images
Paarlberg, R. L., Arizona State Univ., USA; Christensen, P., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This study uses TES-derived thermal inertia information and high-resolution MOC images to determine the relationship between the physical properties of the upper surface material and meter-scale landforms and surface characteristics. Additional information is contained in the original extended abstract.
Derived from Text
Surface Properties; Mars Surface; Mars (Planet)

20010045022 Brown Univ., Dept. of Geological Sciences, Providence, RI USA

Type 2 Terrain: Compositional Constraints on the Martian Lowlands

Noble, S. K., Brown Univ., USA; Pieters, C., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The presence of glass and/or weathering products can alter the mid-IR spectral properties of a basaltic surface to mimic a more silicic composition. Additional information is contained in the original extended abstract.

Derived from Text

Glass; Weathering; Infrared Radiation; Revisions; Mars (Planet)

20010045023 NASA Ames Research Center, Moffett Field, CA USA

Sedimentary Hematite on Mars and Its Implications for the Early Martian Environment

Catling, D. C., Search for Extraterrestrial Intelligence Inst., USA; Moore, J. M., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Crystalline hematite deposits detected by Mars Global Surveyor are thought to have formed aqueously on early Mars. The formation of such deposits is discussed with regard to the overall redox implications for the early environment and early life. Additional information is contained in the original extended abstract.

Derived from Text

Hematite; Mars (Planet); Mars Environment; Mars Surface

20010045024 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA

Experimental Replication of the Surface of the Sinus Meridiani Hematite Region

Glotch, T. D., Arizona State Univ., USA; Holloway, J. R., Arizona State Univ., USA; Christensen, P., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Preliminary wet chemistry experiments have begun with the ultimate goal of reproducing the vibrational spectrum of the surface of Sinus Meridiani. Results and future work will be discussed. Additional information is contained in the original extended abstract.

Derived from Text

Mars Surface; Hematite; Basalt; Highlands; Planetary Geology

20010045025 Planetary Science Inst., Tucson, AZ USA

Update on Studies of the Martian Hematite-rich Areas

Lane, M. D., Planetary Science Inst., USA; Hartmann, W. K., Planetary Science Inst., USA; Berman, D. C., Planetary Science Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A synthesis of MGS TES and MOC data on the Sinus Meridiani hematite area yields two independent indications that this area has been exhumed: 1) spectral evidence shows the hematite is in a platy mode that may have been produced by burial, 2) crater ages suggest preservation. Additional information is contained in the original extended abstract.

Derived from Text

Hematite; Mars (Planet); Mars Surface; Craters

20010045026 Universita degli Studi G. D'Annunzio, Chieti, Italy

Diverse Origins for Hematite on Mars

Sammartino, P., Universita degli Studi G. D'Annunzio, Italy; Komatsu, G., International Research School of Planetary Sciences, Italy; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Crystalline hematite occurs in a wide variety of geological settings on the martian surface (identified by TES and Viking/Phobos II ISM), and origin of their mineralizations can be diverse. Additional information is contained in the original extended abstract.
Derived from Text
Hematite; Mars (Planet); Mars Surface

20010045027 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA
Laboratory Measurements of Radar Transmission Through Dust with Implications for Radar Imaging on Mars
Williams, K. K., Arizona State Univ., USA; Greeley, R., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; This work was supported in part by a NASA Graduate Student Researchers Program fellowship through JPL.; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Measurements of radar transmission through a Mars analog dust are used to calculate values of signal attenuation over a frequency range of 0.5-12 GHz. These values are discussed in the context of a Mars radar imaging mission. Additional information is contained in the original extended abstract.
Derived from Text
Radar Transmission; Mars Surface; Dust

20010045028 NASA Johnson Space Center, Houston, TX USA
Effects of Palagonitic Dust Coatings on Thermal Emission Spectra of Rocks and Minerals: Implications for Mineralogical Characterization of the Martian Surface by MGS-TES
Graff, T. G., Arizona State Univ., USA; Morris, R., NASA Johnson Space Center, USA; Christensen, P., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Thermal emission measurements on dust-coated rocks and minerals show that a 300 5m thick layer is required to mask emission from the substrate and that non-linear effects are present. Additional information is contained in the original extended abstract.
Derived from Text
Mineralogy; Minerals; Rocks; Planetary Geology; Dust

20010045029 NASA Johnson Space Center, Houston, TX USA
Determining the Composition of Martian Dust and Soils Using MGS TES: Midinfrared Emission Spectra of Variable-Composition Palagonites
Hamilton, V. E., Arizona State Univ., USA; Morris, R., NASA Johnson Space Center, USA; Christensen, P., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

To identify palagonitic components on the martian surface it is important to have spectra representative of the variability in palagonite chemistry. Our objective is to create a set of midinfrared spectra of palagonitic soils that exhibit such a range. Additional information is contained in the original extended abstract.
Derived from Text
Composition (Property); Planetary Geology; Dust; Soils; Mars Surface

20010045030 NASA Ames Research Center, Moffett Field, CA USA
Study of a Martian Aeolian Sand Analog with MECA Microscopy
Marshall, J., Search for Extraterrestrial Intelligence Inst., USA; Kuhlman, K., Jet Propulsion Lab., California Inst. of Tech., USA; Stevens, R., NASA Ames Research Center, USA; Meyyappan, M., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

MECA microscopy (built for Mars '01) is simulated to show the potential of in situ microscopic analyses of surface materials on Mars. In particular, the value of nanotechnology is demonstrated. Additional information is contained in the original extended abstract.
Derived from Text
Dust Storms; Mars Surface; Sands; Surface Properties; Wind Effects

20010045031 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Multi-Technique Study of a Martian Aeolian Sand Analog
Kuhlman, K., Jet Propulsion Lab., California Inst. of Tech., USA; Marshall, J., Search for Extraterrestrial Intelligence Inst., USA; Evans, N. D., Oak Ridge National Lab., USA; Luttge, A., Rice Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Potential scientific returns from technological advances in various forms of microscopy and benchmarking of currently available in-situ measurements using an aeolian red dune sand from the central Australian desert. Additional information is contained in the original extended abstract.
Derived from Text
Dust Storms; Sands; Dunes; Mars Surface

20010045032 NASA Johnson Space Center, Houston, TX USA
Spectral Differences Between Shape Classes of Rocks at the Mars Pathfinder Landing Site
Murchie, S., Johns Hopkins Univ., USA; Barnouin-Jha, O., Johns Hopkins Univ., USA; Johnson, J., Geological Survey, USA; Bell, J. F., III, Cornell Univ., USA; Morris, R., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Development of coatings on rocks at the Mars Pathfinder landing sites varies systematically between different shape classes of rocks is discussed. This variation may originate from differences in rocks' exposure ages, or it may reflect differences in primary lithologies. Additional information is contained in the original extended abstract.
Derived from Text
Lithology; Rocks; Landing Sites; Shapes

20010045033 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Extreme Rock Distributions on Mars
Golombek, M. P., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Extreme rock size-frequency distributions from rare boulder fields in MOC images are compared with the three landing sites. Results suggest that most of Mars where such boulders are absent is relatively free of such large potentially hazardous rocks. Additional information is contained in the original extended abstract.
Derived from Text
Rocks; Size Distribution; Planetary Geology; Mars Surface

20010045034 Academy of Sciences (USSR), Inst. of Geochemistry and Analytical Chemistry, Moscow, USSR
Color Ratios of the APXS Analyzed Rocks at the Mars Pathfinder Landing Site
Basilevsky, A. T., Academy of Sciences (USSR), USSR; Thomas, N., Max-Planck-Inst. fuer Aeronomie, Germany; Hviid, S. F., Max-Planck-Inst. fuer Aeronomie, Germany; Keller, H. U., Max-Planck-Inst. fuer Aeronomie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Analysis of red/blue color ratios for eight APXS-analyzed rocks and their close vicinities at the Mars Pathfinder site has been done. Implications of this study on character of the exogenic processes at the site are presented. Additional information is contained in the original extended abstract.
Derived from Text
Rocks; Planetary Geology; Landing Sites; Color

20010045035 New Mexico Museum of Natural History and Science, Albuquerque, NM USA

Vesicles in Surface Rocks: Detection, Analysis and Significance

Crumpler, L. S., New Mexico Museum of Natural History and Science, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Vesicle distributions in martian lavas are predicted to be distinct relative to terrestrial lavas. They may offer a means of determining initial vesicularity and gas content, details of lava emplacement, and early atmospheric pressure on Mars. Additional information is contained in the original extended abstract.

Derived from Text

Lava; Igneous Rocks; Magma; Bubbles; Volcanology

20010045036 Colgate Univ., Hamilton, NY USA

Terrestrial Rock Varnish: A Key to Understanding the Surface Composition of Mars

Ward, J. G., Colgate Univ., USA; Kirkland, L. E., Lunar and Planetary Inst., USA; Keller, D., Colgate Univ., USA; April, R., Colgate Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We examine whether thermal infrared spectra (5-25 micron) may be used to differentiate between different poorly ordered silicates (desert varnish, glassy silicate cooling rind, and glassy basalt), and what the results indicate for remote sensing of Mars. Additional information is contained in the original extended abstract.

Derived from Text

Mars (Planet); Rocks; Varnishes; Composition (Property); Surface Layers

20010045037 NASA Johnson Space Center, Houston, TX USA

Neutron-Capture Kr-80 and Ar-36 in the Martian Atmosphere and Regolith

Rao, M. N., Lockheed Martin Corp., USA; Bogard, D. D., NASA Johnson Space Center, USA; Nyquist, L., NASA Johnson Space Center, USA; McKay, D. S., NASA Johnson Space Center, USA; Masarik, J., Komensky Univ., Czechoslovakia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We calculate that approximately 10% of martian atmospheric Kr-80 formed by neutron capture on Mars in approx. 0.5 Ga. The regolith contains even larger amounts of n-capture Kr-80 and Ar-36, which may provide clues to the evolution of the martian regolith and atmosphere. Additional information is contained in the original extended abstract.

Derived from Text

Neutrons; Capture Effect; Argon Isotopes; Krypton Isotopes; Mars Atmosphere

20010045038 California Inst. of Tech., Pasadena, CA USA

North Polar Cloud Activity on Mars from Mid Summer to Late Fall

Wang, H., California Inst. of Tech., USA; Ingersoll, A. P., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We examine the martian cloud type and distribution in the north polar region using the Mars daily global maps from mid summer to late fall (Ls: 135 deg - 270 deg). Active cloud activity is seen throughout this period. Additional information is contained in the original extended abstract.

Derived from Text

Polar Regions; Clouds (Meteorology); Mars Atmosphere; Mars (Planet)

20010045039 La Trobe Univ., Victorian Inst. of Earth and Planetary Science, Melbourne, Australia

Habitable Zones for Terrestrial Planets in a CO2 Polar Condensation Scenario

Hoffman, N., La Trobe Univ., Australia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Simple models that include polar condensation of CO2 ice predict that Mars is well outside the Habitable Zone and should have been an iceworld for its entire history. Most atmospheric models neglect polar condensation and therefore overestimate the outer bound of the HZ. Additional information is contained in the original extended abstract.
Derived from Text
Habitability; Regions; Mars (Planet); Carbon Dioxide

20010045040 Tokyo Univ., Dept. of Earth and Planetary Science, Hongo, Japan
Multiple Solutions in the Martian Climate System Under the Seasonal Change Condition
Nakamura, T., Tokyo Univ., Japan; Tajika, E., Tokyo Univ., Japan; Abe, Y., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We introduce a one-dimensional energy balance climate model for Mars to discuss possibility of the existence of multiple solutions for the martian climate system, considering three major CO2 reservoirs and seasonal change of solar incident flux. Additional information is contained in the original extended abstract.
Derived from Text
Mathematical Models; Energy Budgets; Climate Models; Mars Environment; Mars (Planet); Mars Surface; Planetary Meteorology; Mars Atmosphere

20010045041 Hawaii Univ., Hawaii Inst. for Geophysics and Planetology, SOEST, Honolulu, HI USA
Empirical Optical Properties of Martian Dust
Hansen, G. B., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In an effort to improve our analysis of martian polar spectra, we have calculated an improved set of optical constants from 7 to 50 microns wavelength based on infrared spectra from the Mariner 9 mission. Additional information is contained in the original extended abstract.
Derived from Text
Optical Properties; Dust; Mars (Planet); Mars Surface

20010045042 NASA Goddard Space Flight Center, Greenbelt, MD USA
A Global Electric Circuit on Mars
Delory, G. T., California Univ., USA; Farrell, W. M., NASA Goddard Space Flight Center, USA; Desch, M. D., NASA Goddard Space Flight Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We describe conditions on the surface of Mars conducive to the formation of a martian global electric circuit, in a direct analogy to the terrestrial case where atmospheric currents and electric fields are generated worldwide through the charging in thunderstorms. Additional information is contained in the original extended abstract.
Derived from Text
Electric Current; Electric Fields; Mars (Planet); Mars Surface

20010045043 Nevada Univ., Dept. of Geology, Reno, NV USA
Recent Advances in Understanding Dust Devil Processes and Sediment Flux on Earth and Mars
Metzger, S., Nevada Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

There is a high frequency of dust devil events active over diverse arid surfaces on Earth and Mars that loft a surprisingly high dust load well into the atmosphere. This report presents numerous new findings on the subject. Additional information is contained in the original extended abstract.
Derived from Text
Particulates; Dust; Sediments; Planetary Geology

20010045044 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Using Scaled Visual Texture for Autonomous Rock Clustering

Anderson, R. C., Jet Propulsion Lab., California Inst. of Tech., USA; Castano, R., Jet Propulsion Lab., California Inst. of Tech., USA; Stough, T., Jet Propulsion Lab., California Inst. of Tech., USA; Gor, V., Jet Propulsion Lab., California Inst. of Tech., USA; Mjolsness, E., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

To maximize the return on future planetary missions, it will be critical that rovers have the capability to analyze information onboard and select and return data that is most likely to yield valuable scientific discoveries. Additional information is contained in the original extended abstract.

Derived from Text

Space Missions; Space Exploration; Rocks

20010045045 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

FIDO Prototype Mars Rover Field Trials, May 2000, Black Rock Summit, Nevada

Seelos, F. P., Washington Univ., USA; Arvidson, R. E., Washington Univ., USA; Squyres, S. W., Cornell Univ., USA; Baumgartner, E. T., Jet Propulsion Lab., California Inst. of Tech., USA; Schenker, P. S., Jet Propulsion Lab., California Inst. of Tech., USA; Jolliff, B. L., Washington Univ., USA; Niebur, C. S., Washington Univ., USA; Larsen, K. W., Washington Univ., USA; Snider, N. O., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Results of May 2000 field testing of the FIDO prototype Mars rover are summarized. Tests included remote science operations and simulated aspects of the Athena payload for 2003 MER (Mars Exploration Rovers). Additional information is contained in the original extended abstract.

Derived from Text

Field Tests; Environmental Tests; Performance Tests; Prototypes; Roving Vehicles

20010045046 Los Alamos National Lab., Space and Atmospheric Sciences, NM USA

Elemental Compositions at Stand-Off Distances from a Rover: Development and Testing of a Laser-induced Breakdown Spectroscopy (LIBS) Field Prototype Instrument

Wiens, R. C., Los Alamos National Lab., USA; Cremers, D., Los Alamos National Lab., USA; Ferris, M., Los Alamos National Lab., USA; Arvidson, R. E., Washington Univ., USA; Seelos, F. P., Washington Univ., USA; Blacic, J. D., Los Alamos National Lab., USA; Nordholt, J. E., Los Alamos National Lab., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

LIBS is a new technique for obtaining elemental compositions up to 20 m from the rover or lander. Under the MIDP Program an initial field prototype was built and integrated into the K9 rover for field tests in Nevada in May 2000. Results are reported here. Additional information is contained in the original extended abstract.

Derived from Text

Chemical Composition; Planetary Structure; Planetary Geology; Roving Vehicles

20010045047 Queensland Univ., Dept. of Mechanical Engineering, Brisbane, Australia

Progress Towards Mars Rover Simulations in the Australian Outback

Cairns, B., HOP Project, Australia; Fenton, A., Queensland Univ., Australia; Hoffman, N., La Trobe Univ., Australia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mars Society Australia plans to conduct field operations of a simulated pressurized rover in the Australian desert. Scientific objectives will be combined with construction and design techniques to assist with future manned missions. Additional information is contained in the original extended abstract.

Derived from Text

Roving Vehicles; Simulation; Australia; Deserts

20010045048 European Space Agency. European Space Research and Technology Center, ESTEC, Space Science Dept., Noordwijk, Netherlands

Status of the European Mars Express Mission

Chicarro, A. F., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The European Mars Express mission to be launched in 2003 consists of an orbiter and a lander focusing on surface mapping, subsurface water, atmospheric studies and detection of signs of past or present life. Additional information is contained in the original extended abstract.

Derived from Text

Mars Missions; Mars Exploration

20010045049 European Space Agency. European Space Research and Technology Center, ESTEC, Space Science Dept., Noordwijk, Netherlands

Science Objectives and Planning for the Mars Express Orbiter

Martin, P., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Chicarro, A. F., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Zender, J. J., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Hechler, M., European Space Agency. European Space Operations Center, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This paper gives the scientific objectives of the ESA Mars Express mission and describes the mission phases that are planned to achieve these goals. Finally, it presents the preliminary science planning for the Mars Express Orbiter payload. Additional information is contained in the original extended abstract.

Derived from Text

European Space Agency; Mars Missions; Mars Exploration; Mission Planning

20010045050 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

U.S. Participation in the Mars Express Mission

Morrison, A. D., Jet Propulsion Lab., California Inst. of Tech., USA; Thompson, T. W., Jet Propulsion Lab., California Inst. of Tech., USA; Acton, C. H., Jr., Jet Propulsion Lab., California Inst. of Tech., USA; Bourke, R. D., Jet Propulsion Lab., California Inst. of Tech., USA; Butman, S., Jet Propulsion Lab., California Inst. of Tech., USA; Campbell, J. K., Jet Propulsion Lab., California Inst. of Tech., USA; Jepsen, P. L., Jet Propulsion Lab., California Inst. of Tech., USA; Johnson, W. T. K., Jet Propulsion Lab., California Inst. of Tech., USA; Lavoie, S. K., Jet Propulsion Lab., California Inst. of Tech., USA; Metzger, R. M., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

NASA will provide the antenna and RF subsystem to the MARSIS radar sounder. There are 11 U.S. Co-Investigators for the science investigations, and navigation and data archiving support are also provided. ASPERA-3 receives NASA Discovery Program funding. Additional information is contained in the original extended abstract.

Derived from Text

Mars Missions; Mars Exploration; NASA Space Programs; European Space Agency; Italian Space Program; International Cooperation

20010045051 International Research School of Planetary Sciences, Pescara, Italy

Investigating the Subsurface Geology of Mars Using the MARSIS Radar Instrument of the Mars Express Mission

Marinangeli, L., International Research School of Planetary Sciences, Italy; Ormo, J., International Research School of Planetary Sciences, Italy; Ori, G. G., International Research School of Planetary Sciences, Italy; Baliva, A., International Research School of Planetary Sciences, Italy; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The MARSIS radar will show for the first time the characteristics of the subsurface of Mars. This work is based on the new MGS data and will provide models of the martian subsurface in different geological settings to simulate the radar response. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Geology; Mars (Planet); Mars Surface; Mars Missions; Mars Exploration

20010045052 Max-Planck-Inst. fuer Aeronomie, Katlenburg-Lindau, Germany
The Beagle2 Optical Microscope
Hviid, S. F., Max-Planck-Inst. fuer Aeronomie, Germany; Thomas, N., Max-Planck-Inst. fuer Aeronomie, Germany; Keller, H. U., Max-Planck-Inst. fuer Aeronomie, Germany; Markiewicz, W. J., Max-Planck-Inst. fuer Aeronomie, Germany; Bluemchen, T., Max-Planck-Inst. fuer Aeronomie, Germany; Smith, P., Arizona Univ., USA; Tanner, R., Arizona Univ., USA; Reynolds, R., Arizona Univ., USA; Oquest, C., Arizona Univ., USA; Josset, J., Swiss Center for Electronics and Microtechnology, Inc., Switzerland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This presentation is an introduction to the Beagle2 optical microscope. Additional information is contained in the original extended abstract.
Derived from Text
Optical Microscopes; Spacecraft Instruments; Exobiology; Mars Polar Lander

20010045053 Open Univ., Planetary and Space Science Research Inst., Milton Keynes, UK
Martian Dust Devil Detection with the Beagle 2 Wind Sensor
Ringrose, T. J., Open Univ., UK; Zarnecki, J. C., Open Univ., UK; Towner, M. C., Open Univ., UK; Kapartis, S., F. T. Technology, UK; Strachan, R., F. T. Technology, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Beagle 2 is a Mars lander expected to land on December 26, 2003. The Beagle 2 wind sensor utilizes an ultrasonic technique, which is unique to planetary landers, and with other sensors will identify, and characterize dust devils. Additional information is contained in the original extended abstract.
Derived from Text
Dust; Particulates; Mars Surface; Mars Atmosphere

20010045054 Museum of Natural History, Dept. of Mineralogy, London, UK
The Beagle 2 Landing Site in Isidis Planitia
Bridges, J. C., Museum of Natural History, UK; Seabrook, A. M., Open Univ., UK; Kim, J. R., University Coll., UK; Muller J-P., University Coll., UK; Rothery, D. A., Open Univ., UK; Pillinger, C., Open Univ., UK; Sims, M. R., Leicester Univ., UK; Wright, I. P., Open Univ., UK; Grady, M. M., Museum of Natural History, UK; Mitchell, K. L., University Coll., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Mars probe Beagle 2 will land in Isidis Planitia. This region satisfies the engineering constraints and has evidence for particularly volatile-rich subsoil. Isidis provides a suitable place for the lander to search for H2O and organic matter. Additional information is contained in the original extended abstract.
Derived from Text
Mars Probes; Landing Sites; Mars Surface; Topography

20010045055 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Arabia Terra, Mars: Evaluation of Potential Target Sites for the High-Resolution Stereo Camera (HRSC) On Board the MARS EXPRESS Mission
Hiesinger, H., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Russell, P., Brown Univ., USA; Thomson, B. J., Brown Univ., USA; Hauber, E., Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Germany; Neukum, G., Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Germany; Jaumann, R., Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Germany; Hoffmann, H., Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Geologic diversity, orbital constraints, illumination conditions, as well as the volume of data that can be returned to Earth, make it necessary to carefully evaluate imaging possibilities and strategies of the HRSC camera. Additional information is contained in the original extended abstract.
Derived from Text
Mars Missions; Mission Planning; European Space Agency

20010045056 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Preliminary Engineering Constraints and Potential Landing Sites for the Mars Exploration Rovers
Golombek, M. P., Jet Propulsion Lab., California Inst. of Tech., USA; Parker, T., Jet Propulsion Lab., California Inst. of Tech., USA; Schofield, T., Jet Propulsion Lab., California Inst. of Tech., USA; Kass, D., Jet Propulsion Lab., California Inst. of Tech., USA; Crisp, J., Jet Propulsion Lab., California Inst. of Tech., USA; Haldemann, A., Jet Propulsion Lab., California Inst. of Tech., USA; Knocke, P., Jet Propulsion Lab., California Inst. of Tech., USA; Roncoli, R., Jet Propulsion Lab., California Inst. of Tech., USA; Lee, W., Jet Propulsion Lab., California Inst. of Tech., USA; Adler, M., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Preliminary engineering constraints on Mars Exploration Rover landing sites are derived, mapped into remote sensing criteria, and used to identify potential landing sites. High-priority sites via an open request to the science community and future plans are described. Additional information is contained in the original extended abstract.
Derived from Text
Landing Sites; Mars Exploration; Roving Vehicles; Mars Surface

20010045057 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Using MOC and MOLA Data to Assess Landing Site Safety
Anderson, F. S., Jet Propulsion Lab., California Inst. of Tech., USA; Golombek, M. P., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Techniques for Using MOC and MOLA Data for Constraining Landing Site Safety are described. Additional information is contained in the original extended abstract.
Derived from Text
Landing Sites; Selection; Safety

20010045058 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
GSSR Mars Delay-Doppler Data Available for MER Landing Site Assessment
Jurgens, R. F., Jet Propulsion Lab., California Inst. of Tech., USA; Haldemann, A., Jet Propulsion Lab., California Inst. of Tech., USA; Slade, M. A., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Goldstone Solar System Radar (GSSR) observation of Mars made over the past 10 years are tabulated. Some of these are two station interferometric data that can now be processed using Mars Orbiter Laser Altimeter (MOLA) aided altimetry to provide North/South separation and higher resolution. New 2001 observations are targeted at Mars Exploration Rover (MER) sites. Additional information is contained in the original extended abstract.
Derived from text
Mars Landing Sites; Mars Exploration; Radar Tracking; Mars Surface

20010045059 Lunar and Planetary Inst., Houston, TX USA
Landing Site Selection Using Infrared Data Sets of Mars
Kirkland, L. E., Lunar and Planetary Inst., USA; Herr, K. C., Aerospace Corp., USA; Adams, P. M., Aerospace Corp., USA; Keim, E. R., Aerospace Corp., USA; Salisbury, J. W., Johns Hopkins Univ., USA; Hackwell, J. A., Aerospace Corp., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We will examine the effect of surface properties on mineral detection limits using thermal emission spectra, and what the results indicate for using Thermal Emission Spectrometer (TES) and THEMIS for Mars landing site selection. Additional information is contained in the original extended abstract.
Derived from Text
Site Selection; Mars Landing Sites; Surface Properties; Mineral Deposits

20010045060 New Mexico Museum of Natural History and Science, Albuquerque, NM USA
Mars Exploration Rover Target Sites in Southern Isidis
Crumpler, L. S., New Mexico Museum of Natural History and Science, USA; Tanaka, K. L., Geological Survey, USA; Hare, T., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have evaluated our geologic mapping to define the best sites for accomplishing Mars Exploration Rover (MER) science goals. Sites along the terminal sediment fans permit access to the geologic materials of interest outlined in previous targeting exercises. Additional information is contained in the original extended abstract.
Derived from text
Mars Surface; Planetary Mapping; Mars Landing Sites

20010045061 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
The Mars Microbeam Raman Spectrometer (MMRS)
Haskin, L. A., Washington Univ., USA; Wang, A., Washington Univ., USA; Jolliff, B. L., Washington Univ., USA; Wdowiak, T., Alabama Univ., USA; Agresti, D., Alabama Univ., USA; Lane, A., Jet Propulsion Lab., California Inst. of Tech., USA; Squyres, S. W., Cornell Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-7140; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Mars Microbeam Raman Spectrometer can identify minerals in situ, determine rock types and textures, provide some mineral chemistry, detect organic and biogenic materials, and identify bound water. Additional information is contained in the original extended abstract.
Derived from Text
In Situ Measurement; Raman Spectroscopy; Mars Surface; Spectrometers; Mineralogy

20010045062 Washington Univ., Dept. of Earth and Planetary Sciences, McDonnell Center for the Space Sciences, Saint Louis, MO USA
Can We Detect Carbonate and Sulfate Minerals on the Surface of Mars by Raman Spectroscopy?
Kuebler, K. E., Washington Univ., USA; Wang, A., Washington Univ., USA; Abbott, K., Washington Univ., USA; Haskin, L. A., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-7410; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Raman spectra of micrometer-sized grains of calcite, epsomite, quartz, and olivine show no peak shift relative to larger crystals and no peak broadening at least down to 2 micrometers, which bodes well for the Raman analysis of martian soils. Additional information is contained in the original extended abstract.
Derived from text
Mars Surface; Raman Spectroscopy; Sulfates; Carbonates; Minerals

20010045063 Winnipeg Univ., Dept. of Geography, Manitoba Canada
ME and Mini-ME: Two Mars Environmental Simulation Chambers for Reflectance Spectroscopy
Craig, M., Winnipeg Univ., Canada; Cloutis, E. A., Winnipeg Univ., Canada; Mueller, T., Winnipeg Univ., Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Two environment chambers have been constructed which are designed to simulate Mars surface conditions of atmospheric pressure and composition, temperature and ultraviolet light regime while allowing spectral measurements of samples across a wide wavelength range. Additional information is contained in the original extended abstract.
Derived from text
Environment Simulation; Mars Surface; Surface Properties; Mars Environment

20010045064 Moscow Junior High School, Moscow, ID USA

Critical Angle of Repose of Martian Dust

Moller, L. E., Moscow Junior High School, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This work describes an instrument in the Mars Environmental Compatibility Assessment (MECA) experiment bay of the canceled Mars Surveyor 2001 Lander Mission and related laboratory experiments. The Planetary Society and NASA-JPL selected this project in the Student Nano-Experiment Challenge. Additional information is contained in the original extended abstract.
Derived from text

Mars Environment; Mars Surface; Dust; Spacecraft Instruments

20010045065 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Geophysical Exploration of Asteroids: The Deep Interior Mission Concept

Asphaug, E., California Univ., USA; Belton, M., Belton Space Exploration Initiatives, USA; Kakuda, R. Y., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We describe a possible international multiple-rendezvous mission to probe the interiors representative near-Earth objects. Features include SEP, autonomous navigation, stereo imaging, radio tomography, anchored seismology stations and explosive signal sources. Additional information is contained in the original extended abstract.
Derived from text

Asteroids; Mission Planning; Rendezvous Spacecraft

20010045066 Tokyo Univ., Sagamihara, Japan

The XRS Instrument Onboard Muses-C Asteroid Mission

Okada, T., Tokyo Univ., Japan; Kato, M., Tokyo Univ., Japan; Shirai, K., Tokyo Univ., Japan; Yamamoto, Y., Tokyo Univ., Japan; Matsuda, T., Tokyo Univ., Japan; Tsunemi, H., Osaka Univ., Japan; Kitamoto, S., Osaka Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The x-ray fluorescence spectrometer (XRS) instrument onboard MUSES-C asteroid mission is designed as the flight model. We present its specifications and the observation plan. The XRS is designed mainly for elemental analysis but it also provides thermal properties of the asteroid. Additional information is contained in the original extended abstract.
Derived from text

X Ray Fluorescence; Spectrometers; Asteroids; Sample Return Missions

20010045067 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Triboelectric Charging, Heating, Crushing, Erosion: Experiments on Target Effects During Penetrator Emplacement

Lorenz, R. D., Arizona Univ., USA; Shandera, S. E., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; This work was supported by the DS-2 project.; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We've been measuring the weird stuff that happens when you hit the dirt at 80 miles an hour. As if impact penetration loads themselves weren't bad enough, many of these processes severely affect sensor performance. Additional information is contained in the original extended abstract.
Derived from Text

Impact Loads; Spacecraft Survivability; Impact Tests

20010045068 Los Alamos National Lab., NM USA

Results from a Prototype Multi-Element CdZnTe Gamma-Ray Detector for Planetary Missions

Moss, C. E., Los Alamos National Lab., USA; Browne, M. C., Los Alamos National Lab., USA; Ianakiev, K. D., Los Alamos National Lab., USA; Prettyman, T. H., Los Alamos National Lab., USA; Reedy, R. C., Los Alamos National Lab., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present high energy results for a 2 x 2 x 2 array of eight 10 mm x 10 mm x 5 mm coplanar grid CdZnTe detectors. We conclude that such an array can provide a room-temperature detector with good resolution and efficiency for planetary missions. Additional information is contained in the original extended abstract.
Derived from Text
Prototypes; Gamma Ray Spectrometers; Spacecraft Instruments

20010045069 Hawaii Univ., Hawaii Inst. of Geophysics and Planetology, Honolulu, HI USA
Performance of a CW-Laser Remote Raman System
Horton, K. A., Hawaii Univ., USA; Sharma, S. K., Hawaii Univ., USA; Domergue-Schmidt, N., Hawaii Univ., USA; Lucey, P. G., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Ability to perform Raman analysis remotely from a planetary lander increases a rover's range while decreasing risks. Calibration of the intensity of the remote Raman signal and derivation of the cross section of materials at distance is demonstrated. Additional information is contained in the original extended abstract.
Derived from Text
Raman Spectroscopy; Remote Control; Experimentation

20010045070 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Field Ion Microscopy and Atom Probe Tomography of Metamorphic Magnetite Crystals
Kuhlman, K., Jet Propulsion Lab., California Inst. of Tech., USA; Martens, R. L., Imago Scientific Instruments Corp., USA; Kelly, T. F., Wisconsin Univ., USA; Evans, N. D., Oak Ridge National Lab., USA; Miller, M. K., Oak Ridge National Lab., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; Research at JPL and SETI was sponsored by NASA. Research at the ORNL SHaRE User Facility was sponsored by U.S. DOE, under contract DE-AC05- 00OR22725 with UT-Battelle, LLC, and through the SHaRE Program under contract DE-AC05-76OR00033 with ORAU.
Contract(s)/Grant(s): DE-AC05-00OR22725; DE-AC05-76OR00033; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Magnetite has been analysed using Field Ion Microscopy (FIM) and Atom Probe Tomography (APT), highly attractive techniques for the nanoanalysis of geological materials despite the difficulties inherent in analyzing semiconducting and insulating materials. Additional information is contained in the original extended abstract.
Derived from text
Ion Microscopes; Tomography; Planetary Geology

20010045071 Rutgers Univ., Dept. of Geological Sciences, Piscataway, NJ USA
Quantifying X-Ray Pleochroism Effects in Synchrotron Micro-XANES Microanalyses of Elemental Oxidation States: Feldspar and Biotite
Delaney, J. S., Rutgers Univ., USA; Dyar, M. D., Mount Holyoke Coll., USA; Sutton, S. R., Chicago Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NSF EAR-99-09587; NSF EAR-98-06182; NSF EAR-99-09588; DE-FG02-93ER-14244; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

X-ray pleochroism is a predictable source of scatter in synchrotron microXANES analyses of elemental oxidation states. The magnitude of the effect is illustrated and a procedure to compensate for it has been implemented, reducing errors significantly. Additional information is contained in the original extended abstract.
Derived from text
Microanalysis; Spectroscopy; Planetary Geology

20010045072 Los Alamos National Lab., Space and Atmospheric Sciences, NM USA
Development of an Instrument for Isotopic and Elemental Composition Analysis at Stand-Off Distances on Airless Planetary Surfaces
Shappirio, M., Los Alamos National Lab., USA; Wiens, R. C., Los Alamos National Lab., USA; Nordholt, J. E., Los Alamos National Lab., USA; Cremers, D., Los Alamos National Lab., USA; Ferris, M., Los Alamos National Lab., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings

presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We are developing an instrument utilizing laser ablation and ion mass spectrometry to determine the isotopic and elemental composition of airless bodies for elements is less than 60 amu. We will present the preliminary results of laboratory testing. Additional information is contained in the original extended abstract.

Derived from Text

Laser Ablation; Mass Spectroscopy; Planetary Surfaces

20010045073 NASA, Washington, DC USA

Interpretation of Fe-XANES Pre-Edge Spectra: Predictions Based on Co and Fe Optical Spectra

Dyar, M. D., Mount Holyoke Coll., USA; Rossman, G. R., California Inst. of Tech., USA; Delaney, J. S., Rutgers Univ., USA; Sutton, S. R., Chicago Univ., USA; Newville, M., Chicago Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): De-Fg02-92er14244; NSF EAR-9909587; NSF EAR-9806182; NSF EAR-9909588; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Microanalysis of Fe-3+/Total(Fe) in extraterrestrial samples is important due to sample size constraints of sample return missions. We compare Fe XANES spectra with Co optical spectra that predict valence electron levels based on 'Z1' model. Additional information is contained in the original extended abstract.

Derived from text

Microanalysis; Iron; Extraterrestrial Matter; Spectra

20010045074 Winnipeg Univ., Dept. of Geography, Manitoba Canada

H2O/OH-Associated Absorption Band Depth Relationships in Mineral Reflectance Spectra

Cloutis, E. A., Winnipeg Univ., Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Reflectance spectra of various minerals exhibit complex relationships between water/OH-associated absorption bands. Strong bands in the 35-m region do not necessarily imply significant hydration or large water contents. Additional information is contained in the original extended abstract.

Derived from text

Absorption Spectra; Moisture Content; Spectral Reflectance

20010045075 Groupe de Recherches de Geodesie Spatiale, Toulouse, France

Influence of Linear Versus Non-Linear Mixture on Bidirectional Reflectance Spectra Using a Laboratory Wide Field Spectral Imaging Facility

Pinet, P. C., Groupe de Recherches de Geodesie Spatiale, France; Cord, A. M., Groupe de Recherches de Geodesie Spatiale, France; Daydou, Y., Groupe de Recherches de Geodesie Spatiale, France; Boubault, F. R., Groupe de Recherches de Geodesie Spatiale, France; Chevrel, S., Groupe de Recherches de Geodesie Spatiale, France; Lapeyrere, V., Groupe de Recherches de Geodesie Spatiale, France; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We conduct experimental studies to quantify the impact of intimate mixtures and physical properties of materials, and shade, in the deconvolution process of bidirectional reflectance spectra of heterogeneous macroscopic targets with varied mineralogies. Additional information is contained in the original extended abstract.

Derived from Text

Bidirectional Reflectance; Experimentation; Spectrophotometry; Planetary Surfaces

20010045076 Bloomsburg Univ., Dept. of Geography and Geoscience, Bloomsburg, PA USA

The Bloomsburg University Goniometer (B.U.G.) Laboratory: An Integrated Laboratory for Measuring Bidirectional Reflectance Functions

Shepard, M. K., Bloomsburg Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-7964; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have constructed a photometric goniometer for measuring the full bidirectional reflectance function of planetary analog materials. Additional information is contained in the original extended abstract.
Derived from Text
Bidirectional Reflectance; Goniometers; Photometry

20010045077 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Aerogel as a Sample Collector and Sample Mount for Transmission XRD Analysis
Bish, D. L., Los Alamos National Lab., USA; Vaniman, D. T., Los Alamos National Lab., USA; Chipera, S. J., Los Alamos National Lab., USA; Yen, A. S., Jet Propulsion Lab., California Inst. of Tech., USA; Jones, S. M., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Silica aerogel can be used for dust collection and in situ X-ray analysis. Aerogels can be less absorbing than Be, and it is feasible to obtain X-ray transmission factors is greater than 50% using typical aerogels together with a 100-micrometer Be backing foil. Additional information is contained in the original extended abstract.
Derived from Text
Aerogels; X Ray Analysis; Dust Collectors

20010045078 NASA Johnson Space Center, Houston, TX USA
Genesis Discovery Mission: Science Canister Processing at JSC
Stansbery, E. K., NASA Johnson Space Center, USA; Cyr, K. E., NASA Johnson Space Center, USA; Allton, J. H., Lockheed Martin Corp., USA; Schwarz, C. M., Lockheed Martin Corp., USA; Warren, J. L., Lockheed Martin Corp., USA; Schwandt, C., Certified Associates, USA; Hittle, J. D., Certified Associates, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This document includes a description of collector material installation and final cleaning of the Genesis Discovery Mission science canister at Johnson Space Center. Additional information is contained in the original extended abstract.
Derived from text
Cleaning; Installing; Preflight Operations; Samplers

20010045079 NASA Johnson Space Center, Houston, TX USA
JSC Curation and Future Sample Return Missions
Cyr, K. E., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Johnson Space Center is the NASA center charged with curation of extraterrestrial samples, and is currently participating on several missions. Our experience shows that curation efforts need to start early, during mission planning and mission design. Additional information is contained in the original extended abstract.
Derived from Text
Mission Planning; Sample Return Missions; Extraterrestrial Matter

20010045080 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Mapping of the Chaac-Camaxtli Region of Io
Williams, D. A., Arizona State Univ., USA; Radebaugh, J., Arizona Univ., USA; Keszthelyi, L., Arizona Univ., USA; Simonelli, D., Cornell Univ., USA; McEwen, A., Arizona Univ., USA; Lopes-Gautier, R., Jet Propulsion Lab., California Inst. of Tech., USA; Greeley, R., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This presentation discusses our initial observations about the Chaac-Camaxtli region of Jupiter's moon Io, using Galileo SSI and NIMS data from the February 2000 flyby (orbit I27) and planetary mapping. Additional information is contained in the original extended abstract.
Derived from Text
Io; Planetary Geology

20010045081 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Interpreting Low Spatial Resolution Thermal Data from Active Volcanoes on Io and the Earth

Keszthelyi, L., Arizona Univ., USA; Harris, A. J. L., Hawaii Univ., USA; Flynn, L., Hawaii Univ., USA; Davies, A. G., Jet Propulsion Lab., California Inst. of Tech., USA; McEwen, A., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The style of volcanism was successfully determined at a number of active volcanoes on Io and the Earth using the same techniques to interpret thermal remote sensing data. Additional information is contained in the original extended abstract.

Derived from Text

Io; Volcanoes; Volcanology

20010045082 Lancaster Univ., Environmental Science Dept., UK

Ascent and Eruption of Magmas on Io: Application to Pele

Cataldo, V., Lancaster Univ., UK; Wilson, L., Lancaster Univ., UK; Leone, G., Lancaster Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We model eruptions at the Pele vent on Io as being due to discrete buoyant dikes (volumes approx. 30 million cubic m) rising from a deep reservoir under crustal structural control and absorbing near-surface SO2 to feed short-lived (approx. one hour long) events. Additional information is contained in the original extended abstract.

Derived from Text

Ascent; Io; Magma; Volcanoes

20010045083 Geological Survey, Flagstaff, AZ USA

An Improved RAND-USGS Control Network and Size Determination for Io

Archinal, B. A., Geological Survey, USA; Davies, M. E., RAND Corp., USA; Colvin, T. R., RAND Corp., USA; Becker, T. L., Geological Survey, USA; Kirk, R. L., Geological Survey, USA; Gitlin, A. R., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A new photogrammetric control solution has been performed for Jupiter's moon Io, using only Galileo SSI image measurements, giving triaxial ellipsoid semi-axis estimates consistent with determinations via other methods. Additional information is contained in the original extended abstract.

Derived from Text

Size Determination; Photogrammetry; Io

20010045084 Lunar and Planetary Inst., Houston, TX USA

Topographic Mapping of Io from Voyager and Galileo Stereo Images: Mountains, Calderas, and Volcanoes, Oh My!

Wilson, R. R., Lunar and Planetary Inst., USA; Schenk, P. M., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Topographic mapping of Io, based on stereo images, has been completed, nominally covering up to 75% of the surface. Heights and surface slopes, are reported for ionian mountains, calderas, and volcanoes. Additional information is contained in the original extended abstract.

Derived from Text

Io; Mapping; Topography

20010045085 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Formation Models of Ionian Mountains

Turtle, E. P., Arizona Univ., USA; Jaeger, W. L., Arizona Univ., USA; Keszthelyi, L., Arizona Univ., USA; McEwen, A., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have conducted a series of numerical simulations to evaluate various mechanisms for the formation of mountains on Io, investigating the role played by Io's high global resurfacing rate and the relationship between tectonics and volcanism. Additional information is contained in the original extended abstract.
Derived from Text
Io; Mountains; Computerized Simulation

20010045086 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Does Io Rotate Non-Synchronously?
Milazzo, M., Arizona Univ., USA; Geissler, P. E., Arizona Univ., USA; Greenberg, R., Arizona Univ., USA; Keszthelyi, L. P., Arizona Univ., USA; McEwen, A. S., Arizona Univ., USA; Radebaugh, J., Arizona Univ., USA; Turtle, E. P., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present work on the investigation of whether Io rotates non-synchronously. Additional information is contained in the original extended abstract.
Derived from Text
Io; Rotation; Synchronism

20010045087 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Plume Models and Pyroclastic Flow on Io
Smythe, W. D., Jet Propulsion Lab., California Inst. of Tech., USA; Kieffer, S. W., S. W. Kieffer Science Consulting, Inc., Canada; Lopes-Gautier, R., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Models of Io's plumes have been run varying atmospheric pressure, vent size, and volatile content. These simulations suggest that eruptions with low volatile content can form pyroclastic flows on Io. Additional information is contained in the original extended abstract.
Derived from Text
Fluid Flow; Io; Plumes; Computerized Simulation

20010045088 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Cassini and Galileo Imaging Observations of Io
McEwen, A., Arizona Univ., USA; Geissler, P., Arizona Univ., USA; Milazzo, M., Arizona Univ., USA; Turtle, E. P., Arizona Univ., USA; Keszthelyi, L., Arizona Univ., USA; Porco, C., Arizona Univ., USA; Simonelli, D., Cornell Univ., USA; Belton, M., Belton Space Exploration Initiatives, LLC, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Galileo completed its 29th periapsis of Jupiter on 29 Dec. 2000, and the closest approach to Jupiter by Cassini occurred the next day. Both spacecraft cameras imaged Io, especially during eclipses to observe high-temperature hot spots and visible aurora. Additional information is contained in the original extended abstract.
Derived from Text
Imaging Techniques; Io; Plumes; Auroras

20010045089 Observatoire de Midi-Pyrenees, Toulouse, France
Is Io's Mantle Really Molten?
Monnereau, M., Observatoire de Midi-Pyrenees, France; Dubuffet, F., Minnesota Supercomputing Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Spherical models of mantle convection of Io including volcanism cooling effects show the possible existence of cold mantle compatible with the strong heat flux and the topographic relief observed on Io. Additional information is contained in the original extended abstract.
Derived from Text
Io; Topography; Volcanology; Convection

20010045090 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA

Geological Evidence for an Ocean on Callisto

Klemaszewski, J., Arizona State Univ., USA; Greeley, R., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Callisto's multiring structures may provide geological evidence consistent with the presence of an ocean. The presence of concentric and radial fractures at Asgard, Utgard, and Valhalla suggest the presence of an ocean at the times of their formation. Additional information is contained in the original extended abstract.

Derived from Text

Callisto; Planetary Geology; Oceans

20010045091 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Inst. of Space Sensor Technology and Planetary Exploration, Berlin, Germany

Fractures, Scarps, and Lineaments on Callisto and Their Correlation with Surface Degradation

Wagner, R., Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Germany; Neukum, G., Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Germany; Greeley, R., Arizona State Univ., USA; Klemaszewski, J., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Tectonic features on Callisto are found in multi-ring structures and in several areas in its dark, cratered plains units. In this paper, we will investigate tectonic features outside multi-ring basins and their correlation with surface degradation. Additional information is contained in the original extended abstract.

Derived from Text

Callisto; Degradation; Structural Properties (Geology); Tectonics

20010045092 California Univ., Dept. of Earth and Space Sciences, Los Angeles, CA USA

Thermal Constraints to Callisto's Internal Structure

Jensen, E. A., California Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Callisto's internal structure is tightly constrained by Galileo's magnetometer evidence of an ocean. of all the possible internal structures that Callisto may have, only those with a thin lithosphere had oceans. Additional information is contained in the original extended abstract.

Derived from text

Callisto; Oceans

20010045093 Idaho Univ., Dept. of Geological Sciences, Moscow, ID USA

Detailed Fracture History of the Bright Plains Region, Europa: Implications from Nonsynchronous Rotation Models

Kattenhorn, S. A., Idaho Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Fracture orientations in the Bright Plains imply clockwise rotation of principal stresses through time. This behavior is consistent with nonsynchronous rotation (NSR) models. At least 720 deg of NSR of Europa's crust is implied by the fracture sequence. Additional information is contained in the original extended abstract.

Derived from Text

Crusts; Fracturing; Callisto; Mapping

20010045094 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA

En Echelon Ridge and Trough Structures on Europa

Michalski, J., Arizona State Univ., USA; Greeley, R., Arizona State Univ., USA; Figueredo, P. H., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Some Europa en lineaments exhibit echelon ridge and trough structures. This study focuses on characterizing such structures and offers an explanation of how they form. Additional information is contained in the original extended abstract.
Derived from Text
Europa; Structural Properties (Geology); Troughs

20010045095 Instituto Nacional de Tecnica Aeroespacial, Centro de Astrobiologia, Torrejon de Ardoz, Spain
Specific Heat Capacity Data of Some Hydrated Salts at Low Temperature. Applications to Europa Satellite
Prieto, O., Instituto Nacional de Tecnica Aeroespacial, Spain; Kargel, J. S., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The surface and the crust of the satellite Europa are contaminated by materials that some authors have recognized as hydrated salts or as hydrated sulfuric acid. We present data about the heat capacity of powdered epsomite, mirabillite, and natron between 298 K and 173 K. Additional information is contained in the original extended abstract.
Derived from text
Contamination; Crusts; Europa; Specific Heat

20010045096 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Vapor and Melt Production During the Formation of Impact Craters on Europa
Turtle, E. P., Arizona Univ., USA; Pierazzo, E., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We use hydrocode simulations to determine the amount of vapor and melt produced by impacts into Europa for various projectile and target parameters including ice thickness. We find that a 1 km comet can completely melt through a 5 km thick ice layer Additional information is contained in the original extended abstract..
Derived from text
Comets; Europa; Ice; Computerized Simulation

20010045097 Southwest Research Inst., Boulder, CO USA
On the Clustering of Europa's Small Craters
Bierhaus, E. B., Southwest Research Inst., USA; Chapman, C. R., Southwest Research Inst., USA; Merline, W. J., Southwest Research Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-8896; NAG5-8090; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We analyze the spatial distribution of Europa's small craters and find that many are too tightly clustered to result from random, primary impacts. Additional information is contained in the original extended abstract.
Derived from text
Craters; Spatial Distribution; Europa; Satellite Surfaces

20010045098 Lunar and Planetary Inst., Houston, TX USA
Topographic Variability on Europa from Galileo Stereo Images
Schenk, P. M., Lunar and Planetary Inst., USA; McKinnon, W. B., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Digital elevation models (DEMs) of Europa based on Galileo stereo images reveal a diversity of topographic features. These topographic variations may place constraints on the formation of geologic features and the nature of the icy shell. Additional information is contained in the original extended abstract.
Derived from text
Europa; Variability; Topography; Satellite Surfaces

20010045099 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA
Europa's 'Mitten': Morphology, Topography and Surface Evolution
Figueredo, P. H., Arizona State Univ., USA; Chuang, F. C., Arizona State Univ., USA; Kirk, R. L., Geological Survey, USA; Greeley, R., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM

contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present morphological and topographic evidence for a cryovolcanic origin of Europa's mitten and discuss a multiple-stage surface evolution model. A E17 crustal dome is identified as representative of the mitten's early stages. Additional information is contained in the original extended abstract.

Derived from Text

Morphology; Topography; Europa; Satellite Surfaces

20010045100 Keele Univ., UK

Formation of Chaos Terrain on Europa: Constraints on the Development of Brittle Failure from Numerical Models

Tuckwell, G. W., Keele Univ., UK; Prockter, L., Johns Hopkins Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Models of brittle deformation in the lithosphere due to diapiric buoyancy produce realistic patterns of failure. Parameters controlling deformation are identified and constrained. Diapir buoyancy and lithosphere strength are most significant. Additional information is contained in the original extended abstract.

Derived from Text

Brittleness; Deformation; Lithosphere; Europa; Satellite Surfaces; Terrain Analysis

20010045101 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

A Melt-Through Model for Chaos Formation on Europa

OBrien, D. P., Arizona Univ., USA; Geissler, Paul, Arizona Univ., USA; Greenberg, Richard, Arizona Univ., USA; Tufts, B. Randall, Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Given uncertainties in the internal state of Europa, large internal heat production is plausible, and modest localized heat concentrations can form chaos regions by melt-through at a rate which exceeds the rate of flow of ice into a melting region. Additional information is contained in the original extended abstract.

Derived from Text

Europa; Satellite Surfaces; Terrain Analysis; Ice Reporting

20010045102 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Chronology: An Important (and Potentially Accessible) Parameter in Understanding Europa Surface-Subsurface Material Interchange, Burial, and Resurfacing Processes

Swindle, T. D., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-9198; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Time is an important parameter in understanding the interaction of the surface and subsurface of Europa. It should be possible to determine potassium-argon and cosmic ray exposure ages in situ on the surface of Europa. Additional information is contained in the original extended abstract.

Derived from Text

Cosmic Rays; Europa; Exposure; Chronology; Terrain Analysis

20010045103 Brown Univ., Dept. of Geological Sciences, Providence, RI USA

Characteristics of the Trailing Equatorial Quadrant of Europa from Galileo Imaging Data: Evidence for Shear Failure in Forming Lineae

Spaun, N. A., Brown Univ., USA; Pappalardo, R., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Sherman, N. D., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have mapped regions of Europa's trailing equatorial quadrant and found that lineae orientations are not consistent with an origin as tension cracks. Shear failure predictions are a better match for the observations. Additional information is contained in the original extended abstract.
Derived from text
Europa; Satellite Surfaces; Conformal Mapping; Terrain Analysis; Stress Measurement

20010045104 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA
Modeling Intrusive Processes in Europa's Ice Lithosphere
Fagents, S. A., Arizona State Univ., USA; Greeley, R., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Results of improved models support the hypothesis that dark surfaces associated with triple bands are the consequence of near surface emplacement of warm diapiric or intrusive bodies within Europa's ice lithosphere. Additional information is contained in the original extended abstract.
Derived from text
Ice; Lithosphere; Europa; Satellite Surfaces; Thermophysical Properties

20010045105 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Tidal Dissipation Around a Cylindrical Hole in the Europan Ice Shell
Ekholm, A. G., Arizona Univ., USA; Melosh, H. J., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have modeled the tidal dissipation (and heat flow) around a cylindrical hole in the Europan ice shell, and find that the enhanced dissipation is not enough to prevent an initially open hole from freezing shut. Additional information is contained in the original extended abstract.
Derived from text
Heat Transmission; Ice; Europa; Mathematical Models; Satellite Surfaces

20010045106 NASA Goddard Space Flight Center, Greenbelt, MD USA
Tidal and Librational Energetics of Europa
Bills, B. G., California Univ., USA; Ray, R. D., NASA Goddard Space Flight Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The energetics of Europa are usually considered only in the context of eccentricity driven tides. We note that the existence of differential librations, and of a finite obliquity, both contribute significantly to the energy budget. Additional information is contained in the original extended abstract.
Derived from Text
Eccentricity; Europa; Tides; Librational Motion

20010045107 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Silicate Volcanism on Europa
Geissler, P., Arizona Univ., USA; OBrien, D. P., Arizona Univ., USA; Greenberg, R., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Melting of Europa's silicate interior is possible if the heating rate from tidal dissipation exceeds the rate of heat loss by solid state convection. In that case, the solid ice shell of Europa might be no more than a few kilometers in thickness. Additional information is contained in the original extended abstract.
Derived from Text
Europa; Heating; Ice; Volcanology; Satellite Surfaces

20010045108 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA
A Hydrothermal Origin for the Sulfate-rich Ocean of Europa
Zolotov, M. Yu., Washington Univ., USA; Shock, E. L., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-7696; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Thermodynamic calculations show that formation of a sulfate-rich ocean on Europa might require high-temperature alkaline hydrothermal processes in the oxidized silicate mantle. The ocean on Europa could be thought of as a cooled hydrothermal fluid. Additional information is contained in the original extended abstract.
Derived from Text
Europa; Oceans; Thermodynamics; Mathematical Models

20010045109 Instituto Nacional de Tecnica Aeroespacial, Centro de Astrobiologia, Torrejon de Ardoz, Spain
Two Extreme Terrestrial Analogues for Modeling the Crustal and Oceanic Evolution of the Satellite Europa
Fernandez-Remolar, D. C., Instituto Nacional de Tecnica Aeroespacial, Spain; Prieto, O., Instituto Nacional de Tecnica Aeroespacial, Spain; Rodriguez, N., Instituto Nacional de Tecnica Aeroespacial, Spain; Kargel, J. S., Geological Survey, USA; Amils, R., Instituto Nacional de Tecnica Aeroespacial, Spain; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Two terrestrial scenarios involving extremes in pH--the Tinto River as an acidic extreme and La Mancha lakes as the alkaline one, are studied and compared to the mineral paragenesis of Europa. Additional information is contained in the original extended abstract.
Derived from Text
Analogs; Europa; pH; Satellite Surfaces

20010045110 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Compositional Diversity at Copernicus: Analysis of Integrated Data Using GIS
Cohen, J. L., Brown Univ., USA; Pieters, C., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Using a Geographic Information System (GIS) database, we have evaluated the distribution of olivine, anorthosite, and norite across Copernicus. High-Ca pyroxene appears to exist only in the pooled impact melt, while no pyroxene is present in the olivine-rich central peaks. Additional information is contained in the original extended abstract.
Derived from Text
Moon; Lunar Craters; Lunar Composition; Olivine; Pyroxenes; Anorthosite

20010045111 Brown Univ., Providence, RI USA
Statistical Analysis of Lunar Mare Soil Mineralogy, Chemistry, and Reflectance Spectra
Pieters, C., Brown Univ., USA; Stankevich, D. G., Kharkov Astronomical Observatory, Ukraine; Shkuratov, Yu. G., Kharkov Astronomical Observatory, Ukraine; Taylor, L. A., Tennessee Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The ability of visible-near IR spectroscopy to predict composition is assessed using statistical analysis of Lunar Soil Characterization Compsium (LSCC) data for mare soils. Links are made between measured elemental composition, mineralogy, and visible-near IR spectroscopy using Principal Component Analysis (PCA). Additional information is contained in the original extended abstract.
Derived from text
Lunar Maria; Chemical Composition; Mineralogy; Lunar Soil

20010045112 Hawaii Univ., Planetary Geosciences, Honolulu, HI USA
A Comparison of Clementine UVVIS Spectral Parameters with Telescopic NIR Band Parameters
Blewett, D. T., Hawaii Univ., USA; Lucey, P. G., Hawaii Univ., USA; Hawke, B. R., Hawaii Univ., USA; Giguere, T. A., Hawaii Univ., USA; Holtzmann, J., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

To evaluate the ability of low spectral resolution Clementine UVVIS data to characterize the shape of the 1 micron ferrous absorption band, we compare Clementine spectral parameters with band parameters derived from high spectral resolution telescopic near-IR observations. Additional information is contained in the original extended abstract.
Derived from text
Absorption Spectra; Shapes; Spectrum Analysis

20010045113 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA
Bimodal TiO2 Contents of Mare Basalts at Apollo and Luna Sites and Implications for TiO2 Derived from Clementine Spectral Reflectance
Gillis, J. J., Washington Univ., USA; Jolliff, B. L., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-8905; NAG5-4172; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A revised algorithm to estimate Ti contents of mare regions centered on Apollo and Luna sites shows a bimodal distribution, consistent with mare-basalt sample data. A global TiO2 map shows abundant intermediate TiO2 basalts in western Procellarum. Additional information is contained in the original extended abstract.
Derived from text
Algorithms; Basalt; Spectral Reflectance; Titanium Oxides

20010045114 Kharkov Astronomical Observatory, Kharkov, Ukraine
Anomalies of the Lunar Regolith Structure in the Vicinity of Apollo-15 Landing Site: Results from Photometric Analysis of Clementine UVVIS Images
Kreslavsky, M. A., Kharkov Astronomical Observatory, Ukraine; Shkuratov, Yu. G., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Analysis of a series of frames showed anomalies of the phase dependence of brightness. They are not related to albedo and are caused by anomalies in the small-scale regolith structure. They are associated with some fresh craters and the landing site. Additional information is contained in the original extended abstract.
Derived from text
Anomalies; Regolith; Lunar Surface; Brightness

20010045115 Northwestern Univ., Evanston, IL USA
Simulation of Illumination Conditions at the Lunar South Pole
Bussey, D. B. J., Northwestern Univ., USA; Robinson, M., Northwestern Univ., USA; Edwards, K., Q&D Programmers, USA; Cook, Anthony C., National Air and Space Museum, USA; Watters, T. R., National Air and Space Museum, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Illumination simulations corresponding to Lunar Orbiter and Clementine images indicate that the available topography data are good. Simulations permit the determination of seasonal lighting variations at the lunar poles. Additional information is contained in the original extended abstract.
Derived from text
Lunar Topography; Polar Regions; Computerized Simulation; Illuminating

20010045116 Geological Survey, Flagstaff, AZ USA
Lunar Shaded Relief Map Updated with Clementine Data
Rosiek, M. R., Geological Survey, USA; Aeschliman, R., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Lunar maps at 1:10,000,000 scale will show elevation in false color superimposed on the shaded relief airbrush base. This series will consist of three map sheets, each portraying two opposite hemispheres. Additional information is contained in the original extended abstract.
Derived from Text
Elevation; Lunar Maps; Relief Maps

20010045117 Geological Survey, Flagstaff, AZ USA

Cartographic Processing of Digital Lunar Orbiter Data

Gaddis, L., Geological Survey, USA; Sucharski, T., Geological Survey, USA; Becker, T., Geological Survey, USA; Gitlin, A., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have completed work for a pilot project demonstrating our capabilities for high-resolution digitization and cartographic processing of five full Lunar Orbiter (LO) IV frames. Additional information is contained in the original extended abstract.

Derived from Text

Digital Data; Digital Techniques; Lunar Maps

20010045118 Geological Survey, Flagstaff, AZ USA

Clementine: Reduced Resolution Digital Image Model of the Moon

Isbell, C. E., Geological Survey, USA; Eliason, E. M., Geological Survey, USA; Lee, E. M., Geological Survey, USA; McEwen, A., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A reduced resolution Digital Image Model (DIM) of the Moon is described. This DIM is derived from the existing Clementine UVVIS 5-band full resolution DIM. The new DIM is a global dataset presented at 0.5, 2.5, and 12.5 km/pixel resolutions. Additional information is contained in the original extended abstract.

Derived from text

Moon; Models; Digital Techniques

20010045119 Geological Survey, Flagstaff, AZ USA

Hydrogen Distribution from Lunar Prospector Epithermal Neutron Data: Correlations with Impact Craters and Landing Site Samples

Johnson, J. R., Geological Survey, USA; Maurice, S., Observatoire de Midi-Pyrenees, France; Feldman, W., Los Alamos National Lab., USA; Lawrence, D., Los Alamos National Lab., USA; Lucey, P. G., Hawaii Univ., USA; Swindle, T. D., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Lunar Prospector epithermal neutron counts correlate with maturity-normalized H contents of lunar soils and with Copernican crater ages. The latter suggests the youngest ejecta have the lowest [H] due to relative lack of exposure to the solar wind. Additional information is contained in the original extended abstract.

Derived from Text

Correlation; Lunar Craters; Hydrogen; Neutrons

20010045120 Observatoire de Midi-Pyrenees, Toulouse, France

Comparison Between Spectral Clementine and Gamma-Ray Lunar Prospector Iron Abundances on the Moon

Chevrel, S., Observatoire de Midi-Pyrenees, France; Pinet, P. C., Observatoire de Midi-Pyrenees, France; Daydou, Y., Observatoire de Midi-Pyrenees, France; Lawrence, D., Los Alamos National Lab., USA; Feldman, W., Los Alamos National Lab., USA; Maurice, S., Observatoire de Midi-Pyrenees, France; Lucey, P. G., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

An important result from this comparison is that Lunar Prospector shows lower iron abundances in the South Pole-Aitken region than Clementine, indicating that lower crust rather than mantle would have been excavated in the impact forming the basin. Additional information is contained in the original extended abstract.

Derived from Text

Lunar Crust; Lunar Craters; Lunar Mantle; Polar Regions

20010045121 FOELDIX, Budapest, Hungary

The Source of Water Molecules in the Vicinity of the Moon

Foldi, T., FOELDIX, Hungary; Birczi, Sz., Eoetvoes LORANd Univ., Hungary; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Two continuous sources of lunar water molecules were suggested: (1) terrestrial (solar) hydrogen, reaching Moon in periodical lunar crossings of the Earth's magnetic tail; and (2) solar wind protons, recombined to atomic H, reducing oxides of surface rocks. Additional information is contained in the original extended abstract.

Derived from Text

Hydrogen; Water; Moon

20010045122 Observatoire de Midi-Pyrenees, Toulouse, France

Lunar Prospector Integrated Neutrons Below 500keV

Genetay, I., Observatoire de Midi-Pyrenees, France; Maurice, S., Observatoire de Midi-Pyrenees, France; dUston, C., Observatoire de Midi-Pyrenees, France; Elphic, R. C., Los Alamos National Lab., USA; Feldman, W., Los Alamos National Lab., USA; Gasnault, O., Los Alamos National Lab., USA; Lawrence, D., Los Alamos National Lab., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Lunar Prospector integrated neutron flux below 500keV reinforces and complements the previous results obtained with thermal, epithermal, and fast data sets. Additional information is contained in the original extended abstract.

Derived from text

Flux (Rate); Neutrons; Lunar Soil

20010045123 Los Alamos National Lab., NM USA

The First Lunar Map of the Average Soil Atomic Mass

Gasnault, O., Los Alamos National Lab., USA; Feldman, W., Los Alamos National Lab., USA; Maurice, S., Observatoire de Midi-Pyrenees, France; Genetay, I., Observatoire de Midi-Pyrenees, France; dUston, C., Centre d'Etude Spatiale des Rayonnements, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Indexes of lunar surface composition were obtained using neutron spectrometers. We established a strong relationship between fast neutron fluxes and the average soil atomic mass <A

– We inverted this relation to produce the first lunar map of <A

– Additional information is contained in the original extended abstract.

Derived from text

Atomic Weights; Lunar Maps; Lunar Surface; Fast Neutrons; Soil Mapping

20010045124 Los Alamos National Lab., NM USA

The Lunar Neutron Leakage Flux and Its Measurement by Lunar Prospector Neutron Spectrometers

Elphic, R. C., Los Alamos National Lab., USA; Feldman, W., Los Alamos National Lab., USA; Lawrence, D., Los Alamos National Lab., USA; Gasnault, O., Los Alamos National Lab., USA; Maurice, S., Observatoire de Midi-Pyrenees, France; Little, R., Los Alamos National Lab., USA; Prettyman, T. H., Los Alamos National Lab., USA; Binder, A. B., Lunar Research Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We compare calculated neutron leakage flux from the lunar surface to measured values, via modeled instrument response. Additional information is contained in the original extended abstract.

Derived from Text

Leakage; Lunar Surface; Flux (Rate); Neutrons; Lunar Soil

20010045125 Los Alamos National Lab., NM USA

Stratified Composition Effects on Planetary Neutron Flux

Gasnault, O., Los Alamos National Lab., USA; Maurice, S., Observatoire de Midi-Pyrenees, France; dUston, C., Centre d'Etude Spatiale des Rayonnements, France; Feldman, W., Los Alamos National Lab., USA; Lunar and Planetary Science XXXII; 2001;

In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have demonstrated that a stratified composition in a planetary surface could change significantly the neutron leakage flux. In particular, the epithermal flux is enhanced when a layer of iron-poor materials is deposited above an iron-rich soil. Additional information is contained in the original extended abstract.

Derived from Text

Flux (Rate); Leakage; Planetary Surfaces; Neutrons; Stratification

20010045126 Los Alamos National Lab., NM USA

Combined Analysis of Thorium and Fast Neutron Data at the Lunar Surface

Gasnault, O., Los Alamos National Lab., USA; Feldman, W., Los Alamos National Lab., USA; dUston, C., Centre d'Etude Spatiale des Rayonnements, France; Lawrence, D., Los Alamos National Lab., USA; Maurice, S., Laboratoire d'Astrophysique de Toulouse, France; Chevrel, S., Dynamique Terrestre et Planetaire, France; Pinet, P. C., Dynamique Terrestre et Planetaire, France; Elphic, R. C., Los Alamos National Lab., USA; Genetay, I., Laboratoire d'Astrophysique de Toulouse, France; Moore, K. R., Los Alamos National Lab., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Correlated variations of thorium vs. fast neutrons are studied, in an attempt to provide a better understanding of the Th emplacement. Thorium rings around two major structures is also discussed, one of which may be a previously unrecognized impact basin. Additional information is contained in the original extended abstract.

Derived from Text

Fast Neutrons; Lunar Surface; Thorium

20010045127 European Space Agency. European Space Research and Technology Center, ESTEC, International Lunar Exploration Working Group, Noordwijk, Netherlands

Next Steps for International Lunar Exploration

Foing, B. H., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Duke, M., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Galimov, E., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Mizutani, H., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report activities and recommendations from the conferences organized by ILEWG (International Lunar Exploration Working Group). This covers science questions, technology, data exchange, resources utilization, the Moon as step to Mars, and solar system exploration. Additional information is contained in the original extended abstract.

Derived from Text

Lunar Exploration; Space Exploration; Technology Utilization

20010045128 European Space Agency. European Space Research and Technology Center, ESTEC, Noordwijk, Netherlands

ESA's SMART-1 Mission to the Moon

Foing, B. H., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Heather, D. J., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Almeida, M., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Racca, G., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Marini, A., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Grande, M., Rutherford Appleton Lab., UK; Keller, U., Max-Planck-Inst. fuer Aeronomie, Germany; Josset, J. L., Swiss Center for Electronics and Microtechnology, Inc., Switzerland; Iess, L., Rome I Univ., Italy; Schmidt, W., Finnish Meteorological Inst., Finland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The European Space Agency's (ESA's) SMART-1 technology mission is to be launched at the end of 2002, to reach the Moon with Solar Electric Propulsion. Its visible multicolor camera, near IR spectrometer, an X-ray spectrometer will address current key questions of lunar and planetary science. Additional information is contained in the original extended abstract.

Derived from Text

Moon; Space Exploration; Spacecraft Instruments

20010045129 Rutherford Appleton Lab., Space Science and Technology Dept., Oxford, UK

The D-CIXS X-Ray Spectrometer on ESA's SMART-1 Mission to the Moon

Dunkin, S. K., Rutherford Appleton Lab., UK; Grande, M., Rutherford Appleton Lab., UK; Browning, R., Rutherford Appleton Lab., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

D-CIXS is an X-ray spectrometer to fly on ESA's (European Space Agency's) SMART-1 mission to the Moon. It will complete the first global X-ray fluorescence survey of the Moon, detecting Mg, Si, Fe, and Al as well as other elements during solar flares. Additional information is contained in the original extended abstract.

Derived from Text

Moon; Space Exploration; X Ray Spectrometers

20010045130 National Space Development Agency, Ibaraki, Japan

Data Processing Flow and Products of LISM: Lunar Imager and Spectrometer

Demura, H., National Space Development Agency, Japan; Hirata, N., National Space Development Agency, Japan; Otake, H., National Space Development Agency, Japan; Ohtake, M., National Space Development Agency, Japan; Sugihara, T., National Space Development Agency, Japan; Higa, M., National Space Development Agency, Japan; Matsunaga, T., Tokyo Inst. of Tech., Japan; Haruyama, J., National Space Development Agency, Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

LISM/SELENE (Lunar Imager and Spectrometer/Selenological and Engineering Explorer) data processing flow and products are presented. Additional information is contained in the original extended abstract.

Derived from Text

Data Processing; Spectrometers

20010045131 National Space Development Agency, Ibaraki, Japan

LISM (Lunar Imager/Spectrometer) Hardware Development for the SELENE Project and the Analytical Procedure of the LISM Data

Ohtake, M., National Space Development Agency, Japan; Haruyama, J., National Space Development Agency, Japan; Matsunaga, T., Tokyo Inst. of Tech., Japan; Hirata, N., National Space Development Agency, Japan; Higa, M., National Space Development Agency, Japan; Sugihara, T., National Space Development Agency, Japan; Demura, H., National Space Development Agency, Japan; Otake, H., National Space Development Agency, Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We are developing LISM (Lunar Imager/Spectrometer for the Selene project) hardware along with the analytical procedure of the LISM data. Algorithm for the automatic identification of the lunar reflectance spectra are now in progress. Additional information is contained in the original extended abstract.

Derived from Text

Algorithms; Hardware; Spectrometers; Lunar Surface

20010045132 Tokyo Univ., Inst. of Space and Astronautical Science, Sagamihara, Japan

In Situ Lunar Heat Flow Experiment Using the LUNAR-A Penetrator

Tanaka, S., Tokyo Univ., Japan; Yoshida, S., Tokyo Univ., Japan; Hagermann, A., Tokyo Univ., Japan; Hayakawa, M., Tokyo Univ., Japan; Fujimura, A., Tokyo Univ., Japan; Mizutani, M., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

An in situ lunar heat flow measurement is planned using the Japanese Lunar-A penetrators. The temperature gradient of the regolith is expected to be obtained within 12% error. Additional information is contained in the original extended abstract.

Derived from Text

Flow Measurement; Heat Transmission; Regolith; Temperature Gradients; Moon

20010045133 Tokyo Univ., Inst. of Space and Astronautical Science, Sagamihara, Japan

Thermal in Situ Measurements in the Lunar Regolith Using the LUNAR-A Penetrators: An Outline of Data Reduction Methods

Hagermann, A., Tokyo Univ., Japan; Tanaka, S., Tokyo Univ., Japan; Yoshida, S., Tokyo Univ., Japan; Hayakawa, M., Tokyo Univ., Japan; Fujimura, A., Tokyo Univ., Japan; Mizutani, H., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

For determining the lunar heat flow two parameters need to be measured; (1) the thermal gradient and (2) the thermal conductivity of the regolith. Methods for inferring these quantities from in situ measurements using the LUNAR-A penetrators will be presented. Additional information is contained in the original extended abstract.

Derived from Text

Heat Transmission; Lunar Rocks; Regolith; Temperature Gradients; Thermal Conductivity

20010045134 Tokyo Univ., Inst. of Space and Astronautical Science, Sagamihara, Japan

Derivation of Globally Averaged Lunar Heat Flow from the Local Heat Flow Values and the Thorium Distribution at the Surface: Expected Improvement by the LUNAR-A Mission

Yoshida, S., Tokyo Univ., Japan; Tanaka, S., Tokyo Univ., Japan; Hagermann, A., Tokyo Univ., Japan; Hayakawa, M., Tokyo Univ., Japan; Fujimura, A., Tokyo Univ., Japan; Mizutani, H., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The relationship between the thorium abundance and the heat flow data of the Apollo sites and the LUNAR-A sites, where the thorium concentrations are in the wide range from 1 ppm to 6 ppm, will allow for a more precise estimation of the averaged heat flow value. Additional information is contained in the original extended abstract.

Derived from Text

Heat Transmission; Thorium; Lunar Temperature

20010045135 Rome Univ., Dept. of Chemistry, Rome, Italy

Ilmenite Reduction with H2 and CH4 in a Sound Assisted Fluidized Bed

DeMaria, G., Rome Univ., Italy; Brunetti, B., Rome Univ., Italy; Trionfetti, G., Rome Univ., Italy; Ferro, D., Rome Univ., Italy; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Reduction of ilmenite with CH4 has been investigated in the temperature range 1120-1250 K under different flow rates and pressure conditions, utilizing a gravimetric technique and a sound assisted fluidized bed. Results are comparatively discussed. Additional information is contained in the original extended abstract.

Derived from Text

Flow Velocity; Gravimetry; Lunar Soil; Oxygen

20010045136 Tokyo Univ., Dept. of Earth and Planetary Science, Japan

Observation of the Moon's Albedo with the Extreme Ultraviolet Scanner on the Mars Orbiter NOZOMI

Shiomi, K., Tokyo Univ., Japan; Yamazaki, A., Tokyo Univ., Japan; Yoshikawa, I., Tokyo Univ., Japan; Takizawa, Y., Institute of Physical and Chemical Research, Japan; Nakamura, M., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The albedo of the Moon at wavelengths around 30.4 nm, in extreme ultraviolet range, was observed by an Extreme Ultraviolet scanner on the Mars orbiter NOZOMI for the first time, when the spacecraft approached the Moon. Additional information is contained in the original extended abstract.

Derived from text

Ultraviolet Radiation; Lunar Albedo

20010045137 Army Cold Regions Research and Engineering Lab., Hanover, NH USA

A Second Collection of Micrometeorites from the South Pole Water Well

Taylor, S., Army Cold Regions Research and Engineering Lab., USA; Lever, J. H., Army Cold Regions Research and Engineering Lab., USA; Govoni, J., Army Cold Regions Research and Engineering Lab., USA; Lunar and Planetary Science XXXII; 2001;

In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In 2000, we suctioned all visible material, including about 0.4 g of extraterrestrial material, from the bottom of the South Pole water well. The micrometeorites appear unweathered and their depositional age is approximately 700-1100 AD. Additional information is contained in the original extended abstract.

Derived from Text

Micrometeorites; Melting; Weathering

20010045138 Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, Orsay, France

Search for Past and Future "Frozen" Leonid Showers in Antarctica and Greenland

Duprat, J., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Hammer, C., Niels Bohr Inst., Denmark; Maurette, M., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Engrand, C., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Matrajt, G., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Immel, G., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Gounelle, M., Niels Bohr Inst., Denmark; Kurat, G., Naturhistorisches Museum, Austria; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We recovered micrometeorites from the surface snow of Dome C (Central Antarctica). Their sporadic flux is estimated. This work is part of a long-term program to collect micrometeorites from Leonid showers in Greenland and Antarctica. Additional information is contained in the original extended abstract.

Derived from Text

Micrometeorites; Leonid Meteoroids; Collection

20010045139 Bemidji State Univ., MN USA

Are Cosmic Spherules Found in Glaciogenic Sediments? A New View of an Ongoing Investigation

Toft, B., Bemidji State Univ., USA; Chambers, J., Bemidji State Univ., USA; Hassing, R., Bemidji State Univ., USA; Godwin, A., Bemidji State Univ., USA; Schauer, R., Bemidji State Univ., USA; Ross, A., Bemidji State Univ., USA; DeBaer, J., Bemidji State Univ., USA; Melchior, R., Bemidji State Univ., USA; Annexstad, J., Bemidji State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Magnetic spherules that are possibly cosmic in origin are found in glaciogenic sediments that are outwash deposits. Additional information is contained in the original extended abstract.

Derived from text

Sediments; Spherules; Cosmic Dust

20010045140 Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, Orsay, France

Oxygen Isotopic Composition of Ancient Cosmic Spherules

Engrand, C., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Kettrup, D., Muenster Univ., Germany; Duprat, J., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Deutsch, A., Muenster Univ., Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The oxygen isotopic composition of cosmic spheres from a 1.4 Ga old sedimentary rock is compatible with that of modern cosmic spheres. Thus, either the Earth atmosphere was the same 1.4 Ga ago as it is now or these 'old' spheres are actually modern. Additional information is contained in the original extended abstract.

Derived from Text

Sedimentary Rocks; Spherules; Earth Atmosphere; Cosmic Dust

20010045141 Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, Orsay, France

Search for Possible Extraterrestrial Matter Among Shiny Small Iron Oxide Spherules

Duprat, J., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Engrand, C., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Gounelle, M., Museum of Natural History, UK; Maurette, M., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Matrajt, G., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Kurat, G., Naturhistorisches Museum, Austria; Brandstaetter, F., Naturhistorisches Museum,

Austria; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; This work was supported in France by PNP and IN2P3; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We performed oxygen isotopic analyses of 13 iron oxide spherules collected in Antarctica to find extraterrestrial spherules. One sample has a heavy oxygen isotopic composition suggesting an extraterrestrial origin. Other types may be from diesel engine fumes. Additional information is contained in the original extended abstract.

Derived from text

Extraterrestrial Matter; Iron Oxides; Oxygen Isotopes; Spherules

20010045142 NASA Johnson Space Center, Houston, TX USA

Synchrotron X-Ray Microprobe In-Situ Trace Element Analysis of "Swarm" Particles Collected in Aerogel on the MIR Space Station: Evidence for a CI-like Composition

Flynn, G. J., State Univ. of New York, USA; Sutton, S. R., Chicago Univ., USA; Horz, F., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In-situ X-ray fluorescence analysis of four particles from a 'swarm' of particles captured in aerogel on MIR shows they have approximately CI concentrations of Mn, Cr, Ga, Ge, and Se, but a low Zn content suggests thermal alteration during aerogel capture Additional information is contained in the original extended abstract..

Derived from Text

Aerogels; Microanalysis; Synchrotrons; X Ray Fluorescence

20010045143 Centre National de la Recherche Scientifique, Institut d'Astrophysique Spatiale, Orsay, France

Micro-Raman Survey of the Carbonaceous Matter Structure in Stratospheric IDPs and Carbonaceous Chondrites

Raynal, P. I., Centre National de la Recherche Scientifique, France; Quirico, E., Centre National de la Recherche Scientifique, France; Borg, J., Centre National de la Recherche Scientifique, France; dHendecourt, L., Centre National de la Recherche Scientifique, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The comparative study of the carbonaceous matter in ten interplanetary dust particles (IDPs) (L2021D7/C8/B4 and L2036G15/I29/A4/E25/D1/D3/D6) and various carbonaceous chondrites, using Raman microspectrometry, shows the distinctiveness of IDP carbon and of the Orgueil meteorite. Additional information is contained in the original extended abstract.

Derived from text

Carbonaceous Chondrites; Interplanetary Dust; Orgueil Meteorite; Carbon

20010045144 Muenster Univ., Institut fuer Planetologie, Germany

Comprehensive Consortium Study of Interplanetary Dust Particles from Collector U2071

Stephan, T., Muenster Univ., Germany; Arndt, P., Max-Planck-Inst. fuer Kernphysik, Germany; Jessberger, E. K., Muenster Univ., Germany; Kloeck, W., Institut fuer Geologische Wissenschaften, Germany; Nakamura, K., Kobe Univ., Japan; Maetz, M., Max-Planck-Inst. fuer Kernphysik, Germany; Rost, D., Muenster Univ., Germany; Thomas-Keprta, K. L., Lockheed Martin Corp., USA; Warren, J. L., Lockheed Martin Corp., USA; Weber, I., Muenster Univ., Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This is a status report on a comprehensive consortium study to investigate dust particles from collector U2071. The primary idea of this study was to apply a series of analytical techniques to an entire set of particles avoiding any preselection. Additional information is contained in the original extended abstract.

Derived from Text

Interplanetary Dust; Stratosphere; Evaluation

20010045145 State Univ. of New York, Dept. of Physics, Plattsburgh, NY USA

Comparison of Pyrrhotite from Interplanetary Dust and Meteorites: Evidence for Different Formation Environments

Flynn, G. J., State Univ. of New York, USA; Lanzirotti, A., Chicago Univ., USA; Sutton, S. R., Chicago Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Five pyrrhotite-dominated interplanetary dust particles (IDPs), examined by X-ray microprobe, have Se contents averaging approximately 1.6 W the Se content of pyrrhotite from the CI meteorite Orgueil, indicating IDP pyrrhotite formed in a different environment than Orgueil pyrrhotite. Additional information is contained in the original extended abstract.
Derived from Text
Interplanetary Dust; Meteorites; Microanalysis; Pyrrhotite; Chemical Composition

20010045146 NASA Goddard Space Flight Center, Greenbelt, MD USA
Serpentine by Hydrogenation of Fe-rich Ferromagnesiosilica PCs in Aggregate IDPs
Rietmeijer, F. J. M., New Mexico Univ., USA; Nuth, J. A., III, NASA Goddard Space Flight Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Condensed hydrogen-bearing magnesiosilica smokes support that hydrogenation at H2/H2O ratios may lead to the formation of rare Fe-rich serpentine plus metallic iron in ferromagnesiosilica PCs with appropriate (Mg,Fe)/Si ratios that were acquired during their formation. Additional information is contained in the original extended abstract.
Derived from text
Hydrogenation; Serpentine; Interplanetary Dust

20010045147 NASA Goddard Space Flight Center, Greenbelt, MD USA
Heat-Treatment of MgSiO Smokes of Astrophysical Interest: Possible Implications for Olivine-Pyroxene-Silica Assemblages in Chondritic Aggregate IDPs
Rietmeijer, F. J. M., New Mexico Univ., USA; Nuth, J. A., III, NASA Goddard Space Flight Center, USA; Hallenbeck, S. L., DuPont Central Research and Development, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Anhydrous silicates in coarse-grained ferromagnesiosilica principal components (PCs) formed during atmospheric entry flash-heating also constrain the astromineralogy of astrophysical dust. This is because of the unique closed-system behavior of these PCs in chondritic aggregate interplanetary dust particles (IDPs). Additional information is contained in the original extended abstract.
Derived from text
Aggregates; Interplanetary Dust; Chondrites; Heat Treatment

20010045148 Washington Univ., Dept. of Astronomy, Seattle, WA USA
Carbonate Mineralogy in Stratospheric IDPs: Compositions, Co-Existing Smectite and Comparison to CI Carbonaceous Chondrites
Joswiak, D. J., Washington Univ., USA; Brownlee, D. E., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Breunnerite carbonates were studied in six stratospheric interplanetary dust particles (IDPs) and show positive Fe/FeMg correlation with their host smectites. Differences in carbonate chemistry between IDPs and CI chondrites suggest different crystallization environments. Additional information is contained in the original extended abstract.
Derived from Text
Carbonaceous Chondrites; Interplanetary Dust; Mineralogy

20010045149 Open Univ., Planetary and Space Sciences Research Inst., Milton Keynes, UK
Laboratory Capture, Isolation and Analysis of Microparticles in Aerogel: Preparation for the Return of Stardust
Graham, G. A., Open Univ., UK; Butterworth, A. L., Open Univ., UK; Burchell, M. J., Kent Univ., UK; Kearsley, A. T., Oxford Brookes Univ., UK; Creighton, J. A., Kent Univ., UK; Mann, J., Kent Univ., UK; Bland, P. A., Open Univ., UK; Cressey, G., Museum of Natural History, UK; Jones, C. G., Museum of Natural History, UK; Grady, M. M., Museum of Natural History, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present observations from the laboratory capture of particles in aerogel. The paper focuses on a possible extraction technique and the bulk mineral characterization of the captured material using non-destructive analytical techniques. Additional information is contained in the original extended abstract.
Derived from Text
Aerogels; Extraction; Microparticles

20010045150 NASA Johnson Space Center, Houston, TX USA
Mapping the Inner Zodiacal Light with Clementine
Hahn, J. M., Lunar and Planetary Inst., USA; Zook, H. A., NASA Johnson Space Center, USA; Cooper, B., Oceaneering Space Systems, USA; Sunkara, B., Houston Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Images of the inner zodiacal light were acquired by the Clementine spacecraft while orbiting the Moon in 1994. An all-sky map of the inner zodiacal light is obtained, and the distribution of dust throughout the inner solar system will also be reported. Additional information is contained in the original extended abstract.
Derived from Text
Zodiacal Light; Dust; Spatial Distribution

20010045151 Tokyo Univ., Dept. of Earth Planetary Science, Japan
The Nearest Approach Distance of Interstellar Dust to the Sun for Different Sizes
Naoi, T., Tokyo Univ., Japan; Sasaki, S., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We calculate the changes of interstellar dust grain flowing into the solar system as a function of the heliocentric distance, and then decide the closest distance to the Sun that interstellar dust grain with radius range 10-0.01 mm can approach. Additional information is contained in the original extended abstract.
Derived from Text
Solar Position; Spatial Distribution; Cosmic Dust

20010045152 Tohoku Univ., Faculty of Science, Sendai, Japan
In Situ Investigation for the Origin of the Interplanetary Dust Particles Under Microgravity
Kobatake, H., Tohoku Univ., Japan; Tsukamoto, K., Tohoku Univ., Japan; Yokoyama, E., Yamaguchi Univ., Japan; Satoh, H., Geological Survey of Japan, Japan; Yurimoto, H., Tokyo Inst. of Tech., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Interplanetary dust particles (IDPs) have been synthesized under microgravity. The morphology and the chemical composition were studied by TEM, the result of which is similar to natural one. In situ measurement of temperature and the concentration around the melt was also employed. Additional information is contained in the original extended abstract.
Derived from Text
Chemical Composition; In Situ Measurement; Interplanetary Dust; Morphology; Temperature Measurement

20010045153 Oberlin Coll., Geology Dept., OH USA
New Evidence that a Spherule Layer in the Late Archean Jeerinah Formation of Western Australia was Produced by a Major Impact
Simonson, B. M., Oberlin Coll., USA; Cardiff, M., Oberlin Coll., USA; Schubel, K. A., Lafayette Coll., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A newly discovered crop of an impact spherule layer proves it persists for is greater than 50 km and has 200 mm of spherules. This confirms it is regionally extensive and produced by a large impact. It also contains rip-up clasts of sediment 0.5 meter long. Additional information is contained in the original extended abstract.
Derived from text
Spherules; Thickness; Surface Layers

20010045154 Rutgers Univ., Dept. of Chemistry, Piscataway, NJ USA

Be-10 in Muong Nong-Type Australasian Tektites: Constraints on the Location of the Source Crater

Ma, P., Rutgers Univ., USA; Tonzola, C., Rutgers Univ., USA; DeNicola, P., Rutgers Univ., USA; Herzog, G. F., Rutgers Univ., USA; Glass, B. P., Delaware Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In 18 Muong Nong-type tektites, concentrations of Be-10 and of mineral inclusions anticorrelate. Be-10 is lowest and the source crater probably lies within a region between the southern Laotian border and the southwestern tip of Hainan Island, China. Additional information is contained in the original extended abstract.

Derived from text

Beryllium Isotopes; Tektites; Craters; Position (Location)

20010045155 Muenster Univ., Inst. fuer Planetologie, Germany

SR, Nd Isotope Composition of Impact Melt Coated Gneissbombs and Tagamites, Popigai Crater, Russia

Kettrup, B., Muenster Univ., Germany; Deutsch, A., Muenster Univ., Germany; Masaitis, V. L., Karpinsky Geological Research Inst., USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): DFG-De-401/12; DFG-GRK-189/3; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Different types of melt coatings are thought to reflect compositional variations in the fireball. Chemical variations in the tagamite and suevite bodies probably reflect various contributions of different precursor lithologies to the melt sheet. Additional information is contained in the original extended abstract.

Derived from text

Meteorite Craters; Isotopes; Impact Melts

20010045156 Delaware Univ., Geology Dept., Newark, DE USA

Discovery of a Naturally-occurring, Shock-produced, High-Pressure Zircon Polymorph

Glass, B. P., Delaware Univ., USA; Liu, S., Delaware Univ., USA; Leavens, P. B., Delaware Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NSF EAR-99-03811; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Zircons that were converted to a high-pressure zircon polymorph with a scheelite structure have been discovered in an upper Eocene impact ejecta layer. This is the first time that this high-pressure phase has been found in nature. Additional information is contained in the original extended abstract.

Derived from text

High Pressure; Minerals; Ejecta

20010045157 Witwatersrand Univ., Dept. of Geology, Johannesburg, South Africa

TEM Analysis of Naturally Deformed Zircon from the Central Vredefort Dome

Reimold, W. U., Witwatersrand Univ., South Africa; Leroux, H., Universite des Sciences et Techniques de Lille, France; Gibson, R. L., Witwatersrand Univ., South Africa; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Naturally deformed zircon with optically visible planar microdeformation was examined by TEM, in order to investigate the nature of shock induced planar features in this refractory mineral. Additional information is contained in the original extended abstract.

Derived from Text

Deformation; Minerals; Dislocations (Materials); Annealing

20010045158 Russian Academy of Natural Sciences, Inst. for Dynamics of Geospheres, Moscow, Russia

Calcite Phase Diagram in Relation to Shock Decomposition

Ivanov, B. A., Russian Academy of Natural Sciences, Russia; Deutsch, A., Muenster Univ., Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): DE-401/15; 436-RUS-17/20/99; 436-RUS-17/34/00; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The phase diagram of calcite is updated using published experimental data and theoretical equation of state. Calcite decomposition seems to be strongly controlled by kinetic of CaO and CO2 separation depending of their phase state. Additional information is contained in the original extended abstract.
Derived from text
Calcite; Decomposition; Phase Diagrams

20010045159 Wien Univ., Inst. of Geochemistry, Austria
Carbon Isotopic Compositions of Shock-produced Diamonds
Maruoka, T., Wien Univ., Austria; Koeberl, C., Wien Univ., Austria; Matsuda, J., Osaka Univ., Japan; Syono, Y., Tohoku Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): Proj. Y58-GEO; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In order to study the pressure effect on the isotopic fractionation between diamond and graphite, we analyzed isotopic compositions of diamonds produced by shock experiments. Additional information is contained in the original extended abstract.
Derived from Text
Pressure Effects; Fractionation; Diamonds; Composition (Property)

20010045160 Yamaguchi Univ., Faculty of Science, Japan
Formation of Fe-Ni Particles by Impact Process
Miura, Y., Yamaguchi Univ., Japan; Uedo, Y., Yamaguchi Univ., Japan; Kedves, M., Yamaguchi Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Fe-Ni mixed minerals are found in natural impact crater and artificial impact experiments, where large Ni-rich particles can be formed by impact process. Additional information is contained in the original extended abstract.
Derived from Text
Craters; Iron; Nickel; Impact Tests

20010045161 Indian Inst. of Tech., Kanpur, India
Nano-sized Iron Phases at the K/T and P/T Boundaries Revealed by Mossbauer Spectroscopy
Verma, H. C., Indian Inst. of Tech., India; Upadhyay, C., Indian Inst. of Tech., India; Tripathi, R. P., Jai Narain Vyas Univ., India; Tripathi, A., Jai Narain Vyas Univ., India; Shukla, A. D., Physical Research Lab., India; Bhandari, N., Physical Research Lab., India; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Moessbauer spectroscopy reveals the presence of nano-particles of iron oxides/hydrooxide phases at the K/T and P/T mass extinction boundaries. Additional information is contained in the original extended abstract.
Derived from Text
Iron; Spectroscopy; Cretaceous-Tertiary Boundary; Paleontology; Mineralogy; Paleozoic Era; Mossbauer Effect

20010045162 University of Northern Colorado, Greeley, CO USA
Distribution and Characteristics of Multi-sourced Shock-metamorphosed Quartz Grains, Late Devonian Alamo Impact, Nevada
Morrow, J. R., University of Northern Colorado, USA; Sandberg, C. A., University of Northern Colorado, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; Supported in part by the Petroleum Research Fund, administered by the American Chemical Society.; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New stratigraphic/geographic distribution and petrographic data on multi-sourced, shock-altered quartz from the Late Devonian oceanic Alamo Impact, Nevada, help to further constrain the excavation depth, location, and magnitude of the impact. Additional information is contained in the original extended abstract.
Derived from Text
Geographic Distribution; Metamorphism (Geology); Petrography; Quartz; Stratigraphy; Metamorphic Rocks; Paleontology; Paleozoic Era; Geochronology

20010045163 University of Northern Colorado, Greeley, CO USA

New Evidence for Deeper Water Site of Late Devonian Alamo Impact, Nevada

Morrow, J. R., University of Northern Colorado, USA; Sandberg, C. A., Geological Survey, USA; Poole, F. G., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; Supported in part by the donors of The Petroleum Research Fund, administered by the American Chemical Society for Morrow's part of the study.; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Discontinuous, off-platform deposits of the Alamo Breccia have a different pattern and character from the semicircular pattern of shoreward-thinning, extremely coarse to fine carbonate-platform deposits, and suggest filling of a deeper water crater. Additional information is contained in the original extended abstract.

Derived from Text

Breccia; Meteorite Craters; Impact Damage; Ejecta; Cratering; Paleozoic Era

20010045164 Eoetvoes LORANd Univ., Dept. Physics, Budapest, Hungary

Mien-Ramso Island Impact Melt Rock and Breccia: Origin of Vesicular Sharp Pebbles from the Ramso Island

Berczi, Sz., Eoetvoes LORANd Univ., Hungary; Torok, K., Eoetvoes LORANd Univ., Hungary; Gal-Solymos, K., Eoetvoes LORANd Univ., Hungary; Jozsa, S., Eoetvoes LORANd Univ., Hungary; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We studied vesicular, "rhyolitic" sharp pebbles from the Ramso Island, Mien Lake, Blekinge County, Sweden. The Mien Crater has impact origin, the central peak is the Ramso Island and impact melt rocks from Ramso Island earlier were classified as rhyolites. In our samples we could see how impact melting transformed and preserved some parts of the original texture. Additional information is contained in the original extended abstract.

Derived from Text

Meteorite Craters; Impact Melts; Breccia; Meteoritic Composition

20010045165 Geological Survey, Woods Hole, MA USA

Chesapeake Coring Team Drilling to Basement Inside the Chesapeake Bay Crater

Poag, C. W., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; Collaborating parties: Hampton Roads Planning District Commission (partial funding); NASA-Langley Research Center (operational and logistical support); Virginia Department of Environmental Quality; Geology Department, College of William and Mary.; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In a new 635-m corehole to basement inside the Chesapeake Bay crater, the USGS documented an upward succession of crystalline basement, a disturbed decollement zone, slumped sedimentary megablocks, surgeback breccia, washback breccia, and a fallout layer. Additional information is contained in the original extended abstract.

Derived from Text

Chesapeake Bay (US); Drilling; Meteorite Craters; Core Sampling; Earth Crust; Boundary Layers; Petrology

20010045166 Geological Survey, Richmond, VA USA

Deep Corehole and Seismic Reflection Data Provide Insights into Crater-filling Processes and the Hydrogeology of the Outer Margin of the Chesapeake Bay Impact Structure, Eastern Virginia Coastal Plain, USA

Powars, D. S., Geological Survey, USA; Gohn, G. S., Geological Survey, USA; Catchings, R. D., Geological Survey, USA; McFarland, E. R., Geological Survey, USA; Bruce, T. S., Virginia Dept. of Environmental Quality, USA; Johnson, G. H., College of William and Mary, USA; Izett, G. A., College of William and Mary, USA; Emry, S. A., Hampton Roads Planning District Commission, USA; Edwards, L. E., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A 2,084-ft-deep corehole and 6.5-mi-long, high-resolution seismic reflection and refraction survey recently were completed as part of an ongoing investigation of the geology and hydrology of the Chesapeake Bay impact structure. Additional information is contained in the original extended abstract.

Derived from Text

Chesapeake Bay (US); Hydrogeology; Seismology; Meteorite Craters; Signal Reflection

20010045167 Witwatersrand Univ., Dept. of Geology, Johannesburg, South Africa

Lithic Clasts in the Vredefort Granophyre

Buchanan, P. C., Witwatersrand Univ., South Africa; Reimold, W. U., Witwatersrand Univ., South Africa; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Some lithic clasts in the Vredefort Granophyre contain quartz grains with multiple sets of PDFs. Some of these clasts contain melt pockets composed of microlites in a glassy groundmass. Analysis of these features confirms extreme amounts of mixing. Additional information is contained in the original extended abstract.

Derived from Text

Breccia; Petrology; Crystallography; Mineralogy

20010045168 Witwatersrand Univ., Dept. of Geology, Johannesburg, South Africa

Structural Analysis of the Core of the Central Uplift of the Vredefort Impact Structure, South Africa

Lana, C., Witwatersrand Univ., South Africa; Gibson, R. L., Witwatersrand Univ., South Africa; Kisters, A., Stellenbosch Univ., South Africa; Reimold, W. U., Witwatersrand Univ., South Africa; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Structural analysis of the Vredefort basement shows that all deformation, except the pseudotachylitic breccias, is of Archean age and that the deformation styles are continuous across the alleged OGG-ILG boundary - not supporting the existence of a Vredefort discontinuity. Additional information is contained in the original extended abstract.

Derived from Text

Breccia; Precambrian Period; Structural Analysis; Impact Damage; Meteorite Craters; Deformation

20010045169 Witwatersrand Univ., Impact Cratering Research Group, Johannesburg, South Africa

Pseudotachylites in Central Parts of Impact Craters - Orientation and Timing of Emplacement

Dressler, B. O., Witwatersrand Univ., South Africa; Reimold, W. U., Witwatersrand Univ., South Africa; Sharpton, V. L., Alaska Univ., USA; Gibson, R. L., Witwatersrand Univ., South Africa; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Results of detailed investigations of the provenance, distribution, and geometries of pseudotachylitic breccias in the Vredefort Dome and Slate Islands impact structures are discussed, with special reference to the formation processes of these breccias. Additional information is contained in the original extended abstract.

Derived from Text

Breccia; Meteorite Craters; Impact Damage; Petrology; Petrogenesis

20010045170 NASA Johnson Space Center, Houston, TX USA

Impact Cratering: A Role in the Formation of the First Felsic Continental Crust?

Therriault, A. M., Geological Survey of Canada, Canada; Grieve, R. A. F., Geological Survey of Canada, Canada; Cintala, M. J., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Large impacts on Earth have generated pools of melt rocks. These early impact melts were deep, cooled slowly, and may have produced felsic differentiates in a ”near-surface” environment, which may have played a role in the formation of continents. Additional information is contained in the original extended abstract.

Derived from Text

Earth Crust; Impact Melts; Meteorite Craters; Felsite; Growth; Geochronology

20010045171 Arizona State Univ., Dept of Geological Sciences, Tempe, AZ USA

Space Shuttle Radar Images: Connolly Basin Impact Site, Western Australia

McHone, J. F., Arizona State Univ., USA; Williams, K. K., Arizona State Univ., USA; Shoemaker, C. S., Geological Survey, USA; Roddy, D. J., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Connolly Basin is a well preserved 9 km dia impact structure in the Gibson Desert of Western Australia. Although its size and structure are subtle or invisible in the field, they appear distinct and prominent to spaceborne imaging radar. Additional information is contained in the original extended abstract.
Derived from Text
Australia; Shuttle Imaging Radar; Earth Observations (From Space); Meteorite Craters; Structural Basins

20010045172 Witwatersrand Univ., Dept. of Geology, Johannesburg, South Africa
A Possible Impact Structure in the Belinga Greenstone Belt of Northeast Gabon
Reimold, W. U., Witwatersrand Univ., South Africa; Ayres, N., De Beers GeoScience Center, South Africa; Hatton, C., De Beers GeoScience Center, South Africa; Thomas, R. J., Council for Geoscience, South Africa; Chevallier, L., Council for Geoscience, South Africa; Master, S., Witwatersrand Univ., South Africa; Antoine, L. A. G., Witwatersrand Univ., South Africa; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

An approx. 7-km-diameter, near-circular structure with indications of raised rim and disturbed central terrane has been identified on radar imagery in the Belinga Greenstone Belt of northeast Gabon. This structure should be further investigated as a possible impact structure. Additional information is contained in the original extended abstract.
Derived from Text
Gabon; Impact Damage; Meteorite Craters; Ejecta

20010045173 Academy of Sciences (USSR), Inst. for Dynamics of Geospheres, Moscow, Russia
Atmospheric Entry of Tunguska-like Meteoroids: 2D Numerical Model
Shuvalov, V. V., Academy of Sciences (USSR), Russia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

2D numerical model with radiation and ablation is used to study atmospheric entry of Tunguska-like meteoroids. Additional information is contained in the original extended abstract.
Derived from Text
Atmospheric Entry; Meteoroids; Two Dimensional Models; Mathematical Models; Ablation

20010045174 Academy of Sciences (USSR), Inst. for Dynamics of Geospheres, Moscow, Russia
Long-Term Disturbances of Ionosphere Caused by Tunguska-like Impacts
Shuvalov, V. V., Academy of Sciences (USSR), Russia; Artemieva, N. A., Academy of Sciences (USSR), Russia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

2D and 3D numerical models are used to study the long time evolution of large scale ionospheric disturbances induced by Tunguska-like impacts. Additional information is contained in the original extended abstract.
Derived from Text
Ionospheric Disturbances; Two Dimensional Models; Meteoroids; Atmospheric Entry; Plumes

20010045175 Academy of Sciences (USSR), Inst. for Dynamics of Geospheres, Moscow, Russia
Numerical Simulation of the Meteoroid Wake
Khazins, V. M., Academy of Sciences (USSR), Russia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A quasi-two-dimensional model for estimation of the wake dynamic parameters along a reasonably large segment of the meteoroid trajectory is proposed. Numerical simulation is demonstrated with an example of the Tunguska-like event. Additional information is contained in the original extended abstract.
Derived from Text
Meteoroids; Computerized Simulation; Trajectories; Two Dimensional Models; Wakes; Gas Dynamics

20010045176 Academy of Sciences (USSR), Inst. for Dynamics of Geospheres, Moscow, Russia

Meteoroid Impacts Detection from an Orbiter Around the Airless Cosmic Body

Kosarev, I. B., Academy of Sciences (USSR), Russia; Nemtchinov, I. V., Academy of Sciences (USSR), Russia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The efficiency of the initial kinetic energy transformation into radiation is sufficient for detection of impacts onto the lunar surface. Lunar orbiter may detect impacts of meteoroids with the size about 20 times smaller than observations from the Earth. Additional information is contained in the original extended abstract.

Derived from Text

Hypervelocity Impact; Lunar Orbiter; Lunar Surface; Meteorite Collisions

20010045177 Academy of Sciences (USSR), Inst. for Dynamics of Geospheres, Moscow, Russia

The Influence of Meteoroid Shape on the Movement of Destroyed Meteoroid

Azovskiy, A. N., Academy of Sciences (USSR), Russia; Shuvalov, V. V., Academy of Sciences (USSR), Russia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): RFBR 00-05-81152_Bel2000_a; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

When meteoroids penetrate into dense layers of atmosphere, in most cases they are broken on separated fragments, which form crater fields. and the shape of fragments can influence on their divergence very strongly. Additional information is contained in the original extended abstract.

Derived from Text

Meteoroids; Atmospheric Entry; Descent Trajectories

20010045178 Institute of Technical Physics, Chelyabinsk, Russia

Spherical Explosive Experiments with Iron Meteorites

Kozlov, E. A., Institute of Technical Physics, Russia; Teplov, V. A., Academy of Sciences, Russia; Kusina, M. S., Ural State Polytechnical University, Russia; Grokhovsky, V. I., Ural State Polytechnical University, Russia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): RFRF 98-05-64822; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The first results are presented with respect to the investigation of the spheres turned from the iron meteorites Chinga and Sikhote-Alin after their spherical explosive compression of different intensity. Additional information is contained in the original extended abstract.

Derived from Text

Iron Meteorites; Spheres; Atmospheric Entry; Experimentation; Explosions

20010045179 NASA Johnson Space Center, Houston, TX USA

Survivability of Meteorite Projectiles - Results from Impact Experiments

Bland, P. A., Open Univ., UK; Cintala, M. J., NASA Johnson Space Center, USA; Hoerz, F., NASA Johnson Space Center, USA; Cressey, G., Natural History Museum, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

An experimental impact study investigating the fragmentation of various projectiles, including meteorite, at speeds up to 1.8 km/s. The results have implications for the survivability of meteorites impacting planetary and asteroidal surfaces. Additional information is contained in the original extended abstract.

Derived from Text

Fragmentation; Meteorites; Impact; Survival

20010045180 NASA Ames Research Center, Moffett Field, CA USA

Airborne Geomagnetic Investigations at the Haughton Impact Structure, Devon Island, Nunavut, Canada

Glass, B. J., NASA Ames Research Center, USA; Lee, P., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; The Haughton-Mars Project is supported by The National Research Council (NRC), the Polar Continental Shelf Project (PCSP)

of Canada, the National Geographic Society and the Geological Survey of Canada.; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This investigation created a broad magnetic map of the 23 Ma Haughton impact structure, in order to characterize its geomagnetic signature. Additional information is contained in the original extended abstract.

Derived from Text

Geomagnetism; Meteorite Craters; Magnetic Anomalies; Canadian Shield; Geology

20010045181 NASA Langley Research Center, Hampton, VA USA

Integrated Geologic, Hydrologic, and Geophysical Investigations of the Chesapeake Bay Impact Structure, Virginia, USA: A Multi-Agency Program

Gohn, G. S., Geological Survey, USA; Bruce, T. S., Virginia Dept. of Environmental Quality, USA; Catchings, R. D., Geological Survey, USA; Emry, S. R., Hampton Roads Planning District Commission, USA; Johnson, G. H., College of William and Mary, USA; Levine, J. S., NASA Langley Research Center, USA; McFarland, E. R., Geological Survey, USA; Poag, C. W., Geological Survey, USA; Powars, D. S., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Chesapeake Bay impact structure is the focus of an ongoing federal-state-local research program. Recent core drilling and geophysical surveys address the formative processes and hydrogeologic properties of this major ”wet-target” impact. Additional information is contained in the original extended abstract.

Derived from Text

Chesapeake Bay (US); Geophysics; Surveys; Meteorite Craters; Meteoritic Damage; Projectile Cratering

20010045182 Geological Survey, Menlo Park, CA USA

Subsurface Images of the Annular Trough of the Chesapeake Bay Impact Structure, Virginia from Seismic Reflection/Refraction Data

Catchings, R. D., Geological Survey, USA; Powars, D. S., Geological Survey, USA; Gohn, G. S., Geological Survey, USA; Goldman, M. R., Geological Survey, USA; Gandhok, G., Geological Survey, USA; Johnson, G. H., College of William and Mary, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Seismic images of the Chesapeake Bay Impact Crater, York-James Peninsula, Virginia are shown with correlations from borehole logs along the seismic profiles. Additional information is contained in the original extended abstract.

Derived from Text

Chesapeake Bay (US); Meteorite Craters; Meteoritic Damage; Seismology

20010045183 Texas Univ., Inst. for Geophysics, Austin, TX USA

Deep Three-Dimensional Structure of the Chicxulub Impact Crater

Christeson, G. L., Texas Univ., USA; Morgan, J. V., Texas Univ., USA; Warner, M. R., Texas Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present the results of a wide-angle seismic survey conducted over the Chicxulub impact crater in 1996. Our three-dimensional modeling identifies stratigraphic uplift, Moho uplift, and regional basement structure. Additional information is contained in the original extended abstract.

Derived from Text

Stratigraphy; Three Dimensional Models; Meteorite Craters; Impact Damage; Projectile Cratering

20010045184 Instituto Mexicano de Petroleo, Mexico City, Mexico

Three-Dimensional Modeling of Aeromagnetic Anomalies over the Chicxulub Crater

Ortiz-Aleman, C., Instituto Mexicano de Petroleo, Mexico; Urrutia-Fucugauchi, J., Universidad Nacional Autonoma de Mexico, Mexico; Pilkington, M., Geological Survey of Canada, Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The analytic signal method in 3D is applied to the magnetic field data over the Chicxulub crater. In a second stage, source locations are used as a priori information in the construction of a prism-like magnetic configuration model. Additional information is contained in the original extended abstract.
Derived from Text
Aeromagnetism; Craters; Magnetic Anomalies; Three Dimensional Models

20010045185 New Mexico Univ., Dept. of Earth and Planetary Sciences, Albuquerque, NM USA
In Situ Observation of Carbonaceous Material in the Matrices of CV and CM Carbonaceous Chondrites: Preliminary Results from Energy Filtered Transmission Electron Microscopy
Brearley, A. J., New Mexico Univ., USA; Abreu, N. M., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-9798; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Energy filtered transmission electron microscopy shows that organic matter can be detected in situ in the matrices of carbonaceous chondrites at a spatial resolution of at least 1 nm. In CM chondrites, carbon is often associated with sulfide particles. Additional information is contained in the original extended abstract.
Derived from Text
Carbonaceous Chondrites; Carbonaceous Materials; In Situ Measurement; Transmission Electron Microscopy

20010045186 New Mexico Univ., Dept. of Earth and Planetary Sciences, Albuquerque, NM USA
Petrographic Studies of Fine-grained Rims in the Yamato 791198 cm Carbonaceous Chondrite and Comparison to Murchison and ALH81002
Chizmadia, L. J., New Mexico Univ., USA; Brearley, A. J., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-9798; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Fine-grained rims in Y791198 (CM2) have been studied in detail using SEM and EPMA techniques. In comparison with the more highly altered CM chondrite, ALH 81002, the rims are texturally and compositionally more heterogeneous. Additional information is contained in the original extended abstract.
Derived from Text
Carbonaceous Chondrites; Petrography; Meteoritic Composition; Scanning Electron Microscopy

20010045187 European Space Agency. European Space Research and Technology Center, ESTEC, Space Science Dept., Noordwijk, Netherlands
Micro-Magnetic Properties of Selected Mineral Grains in Primitive Meteorites
Romstedt, J., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Jackel, A., Bern Univ., Switzerland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Optically opaque phases from the CV Chondrite Vigarano were investigated by magnetic force microscopy. The detection limit of small magnetic grains is below 200 nm. Different signal strengths could be detected for various mineral groups. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Magnetic Properties; Minerals; Mineralogy; Petrology

20010045188 Morgan State Univ., Physics Dept., Baltimore, MD USA
Fe-rich Pentlandite in Allende Bulk Samples and Separates: Moessbauer Spectroscopic Analysis
Hoffman, E., Morgan State Univ., USA; Housley, R. M., California Inst. of Tech., USA; Bland, P. A., Museum of Natural History, UK; Oliver, F. W., Morgan State Univ., USA; Seifu, D., Morgan State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Allende separates contain pentlandite of unusually high Fe:Ni ratio. Moessbauer spectra show clear evidence of this phase. Additional information is contained in the original extended abstract.
Derived from Text
Allende Meteorite; Meteoritic Composition; Iron; Nitrogen

20010045189 NASA Johnson Space Center, Houston, TX USA

Fluid Inclusions in Carbonaceous Chondrites

Saylor, J., Case Western Reserve Univ., USA; Zolensky, M. E., NASA Johnson Space Center, USA; Bodnar, R. J., Virginia Polytechnic Inst. and State Univ., USA; Le L., Lockheed Engineering and Sciences Co., USA; Schwandt, C., Lockheed Engineering and Sciences Co., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Fluid inclusions are present in carbonaceous chondrites. of the chondrites studied (CI1, CM1 and 2, CV3) fluid inclusions were found only in CM2s and CI1s, and by extrapolation are most likely to be found there in the future. Additional information is contained in the original extended abstract.

Derived from Text

Carbonaceous Chondrites; Inclusions; Meteoritic Composition; Fluids

20010045190 California Univ., Scripps Inst. of Oceanography,, San Diego, CA USA

Classification of Carbonaceous Meteorites Through Amino Acid Signatures?

Botta, O., California Univ., USA; Glavin, D. P., California Univ., USA; Kminek, G., California Univ., USA; Bada, J. L., California Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

An overview of the amino acid composition of all carbonaceous chondrites analyzed in our lab will be presented, including the CMs Murchison, Murray, Nogoya, the CIs Orgueil and Ivuna, the CR Renazzo and the CV3 Allende. Additional information is contained in the original extended abstract. Additional information is contained in the original extended abstract.

Derived from Text

Amino Acids; Carbonaceous Meteorites; Meteoritic Composition; Signatures

20010045191 Harvard-Smithsonian Center for Astrophysics, Cambridge, MA USA

Al-rich Clinopyroxenes in the CH Chondrite NWA 470: Condensates from Fractionated Nebular Systems

Petaev, M., Harvard-Smithsonian Center for Astrophysics, USA; Ivanova, M., Academy of Sciences (USSR), USSR; Nazarov, M. A., Academy of Sciences (USSR), USSR; Wood, J. A., Harvard-Smithsonian Center for Astrophysics, USA; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Clinopyroxenes with very different Al2O3 contents coexist in two CAIs and a euhedral pyroxene grain of the CH chondrite NWA 470. These clinopyroxenes apparently formed by condensation from fractionated nebular systems.

Derived from Text

Chondrites; Condensates; Pyroxenes; Meteoritic Composition; Cosmochemistry

20010045192 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA

Si-Isotopic Fractionation in Silicate Minerals from Chondritic Meteorites: A Possible New Probe for Early Solar System Processes

Hua, X., Arizona State Univ., USA; Wang, J., Carnegie Institution of Washington, USA; Huss, G. R., Arizona State Univ., USA; Sharp, T. G., Arizona State Univ., USA; Buseck, P. R., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Large Si-isotopic variations were found in our SIMS measurements of individual silicates from chondritic meteorites. If these variations are real, SIMS measurements of Si isotopes will provide an important new probe into early solar system processes. Additional information is contained in the original extended abstract.

Derived from Text

Chondrites; Fractionation; Silicon Isotopes; Solar System; Solar System Evolution; Cosmochemistry; Meteoritic Composition

20010045193 Carnegie Institution of Washington, Dept. of Terrestrial Magnetism, Washington, DC USA

High Precision Iron Isotope Measurements by Multi-Collector ICP-MS

Kehm, K., Carnegie Institution of Washington, USA; Alexander, C. M. O'D., Carnegie Institution of Washington, USA; Hauri, E., Carnegie Institution of Washington, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We are developing a precise technique for iron isotope analysis that uses ”cool” plasma ICPMS. Four bulk samples of chondritic meteorites analyzed by this method give similar Fe-56/Fe-54 and Fe-58/Fe-54 ratios as iron measured in a terrestrial basalt. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Iron Isotopes; Isotope Ratios; Meteoritic Composition; Cosmochemistry

20010045194 Museum of Natural History, Dept. of Mineralogy, London, UK
Copper and Zinc Stable Isotope Compositions of Chondrules and CAIs: Method Development and Possible Implications for Early Solar System Processes
Mullane, E., Museum of Natural History, UK; Mason, T. F. D., Imperial Coll. of Science, Technology and Medicine, UK; Russell, S. S., Museum of Natural History, UK; Weiss, D., Imperial Coll. of Science, Technology and Medicine, UK; Hortswood, M., Natural Environmental Research Council, UK; Parrish, R. R., Natural Environmental Research Council, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Using MC-ICP-MS to measure Cu-Zn isotope fractionation, we aim to determine their chondrule and CAI systematics, to delineate early solar system processes. We introduce a new method using Ga, to monitor mass-bias, enabling concurrent Cu-Zn analyses. Additional information is contained in the original extended abstract.
Derived from Text
Chondrule; Copper Isotopes; Meteoritic Composition; Zinc Isotopes; Chondrites

20010045195 Montpellier-2 Univ., France
Cu and Zn Isotopic Variations in Meteorites
Luck, J. M., Montpellier-2 Univ., France; Ben Othman, D., Montpellier-2 Univ., France; Barrat, J. A., Angers Univ., France; Albarhde, F., Ecole Normale Superieure, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Cu and Zn isotopic variations, measured on Plasma 54, are reported for meteorites of various classes and groups. They are around the permil and relate to redox, temperature, volatility, parent-body alteration and/or metamorphic conditions. Additional information is contained in the original extended abstract.
Derived from Text
Meteorites; Copper Isotopes; Zinc Isotopes; Meteoritic Composition; Cosmochemistry

20010045196 Open Univ., Planetary and Space Sciences Research Inst., Milton Keynes, UK
Modal Mineralogy of Unequilibrated Chondrites by X-Ray Diffraction and Mossbauer Spectroscopy
Bland, P. A., Open Univ., UK; Cressey, G., Museum of Natural History, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We utilize an X-ray diffractometer with a fixed diffraction geometry to record an X-ray pattern from Allende, and standard mineral samples, stripping out peaks associated with known CV phases to quantify the complete modal mineralogy of the meteorite. Additional information is contained in the original extended abstract.
Derived from Text
Mineralogy; Allende Meteorite; Meteoritic Composition; Mossbauer Effect

20010045197 Max-Planck-Inst. fuer Chemie, Mainz, Germany
Noble Gas Investigations of New Meteorites from Africa
Patsch, M., Max-Planck-Inst. fuer Chemie, Germany; Weber, H. W., Max-Planck-Inst. fuer Chemie, Germany; Schultz, L., Max-Planck-Inst. fuer Chemie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Sixteen new meteorites from Africa were analyzed regarding the light noble gases: nine HEDs, one ureilite, three carbonaceous chondrites, two ordinary chondrites and one iron meteorite. Additional information is contained in the original extended abstract.
Derived from Text
Meteorites; Rare Gases; Argon Isotopes; Neon Isotopes; Helium Isotopes; Meteoritic Composition

20010045198 NASA Johnson Space Center, Houston, TX USA

A Prolific Meteorite Stranding Surface: The Allan Hills Revisited

Annexstad, J., NASA Johnson Space Center, USA; Probst, L.; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This document discusses Antarctic meteorite stranding surfaces and complex ice emergent mechanisms. Additional information is contained in the original extended abstract.

Derived from Text

Antarctic Regions; Meteorites; Glaciers

20010045199 NASA Johnson Space Center, Houston, TX USA

Mineralogy and Petrology of Yamato 86029: A New Type of Carbonaceous Chondrite

Tonui, E., NASA Johnson Space Center, USA; Zolensky, M. E., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Y-86029 resembles CI chondrites. Its matrix is very fine-grained. Olivine shows evidence of shock, which has rarely been observed in carbonaceous chondrites. Y-86029 experienced aqueous and thermal alteration during or after accretion in parent body. Additional information is contained in the original extended abstract.

Derived from Text

Carbonaceous Chondrites; Mineralogy; Petrology; Crystallography; Meteoritic Composition; Meteoritic Microstructures

20010045200 Angers Univ., Facult des Sciences, France

News from the Moon and Mars: Preliminary Examinations of Two New Saharan Finds

Barrat, J. A., Angers Univ., France; Gillet, P., Ecole Normale Superieure, France; Jambon, A., Paris VI Univ., France; Sautter, V., National Museum of Natural History, France; Javoy, M., Institut de Physique du Globe, France; Petit, E., Institut de Physique du Globe, France; Lesourd, M., SCIAM, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report on the discovery of two Saharan finds: a lunar basalt and a basaltic shergottite. The petrographical and geochemical features of these two stones will be presented. Additional information is contained in the original extended abstract.

Derived from Text

Achondrites; Meteoritic Composition; Cosmochemistry; Mineralogy; Petrology

20010045201 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Petrography, Mineralogy and Petrology of Two New HED Meteorites: Diogenite GRA98108 and Howardite GRA98030

Righter, K., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-9435; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Two new HED meteorites are described. GRA98108 is an olivine-bearing diogenite at the Mg-rich end of the diogenite clan. GRA98030 is a howardite with 30% eucritic and 70% diogenitic clasts, and contains an MgO-rich and CaO- and Al2O3-poor glassy spherule. Additional information is contained in the original extended abstract.

Derived from Text

Meteorites; Meteoritic Composition; Mineralogy; Petrography; Petrology

20010045202 Academy of Sciences (USSR), Vernadsky Inst., Moscow, USSR

NWA 470, a New CH Chondrite from the Moroccan Sahara

Ivanova, M., Academy of Sciences (USSR), USSR; Petaev, M., Harvard-Smithsonian Center for Astrophysics, USA; Clayton, R. N., Chicago Univ., USA; Mayeda, T., Chicago Univ., USA; Hutcheon, I. D., Lawrence Livermore National Lab., USA; Phinney, D., Lawrence Livermore National Lab., USA; Nazarov, M. A., Academy of Sciences (USSR), USSR; Taylor, L. A., Tennessee Univ., USA; Wood, J. A., Harvard-Smithsonian Center for Astrophysics, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

NWA 470, a new meteorite discovered in the desert of Morocco, is classified as a CH chondrite. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Meteoritic Composition; Petrology; Mineralogy

20010045203 National Science Museum, Tokyo, Japan
Sayama Meteorite: A New CM Chondrite Fall in Japan with Highly Aqueously Altered Textures
Yoneda, S., National Science Museum, Japan; Ebihara, M., Tokyo Metropolitan Univ., Japan; Oura, Y., Tokyo Metropolitan Univ., Japan; Okada, A., Institute of Physical and Chemical Research, Japan; Kusakabe, M., Okayama Univ., Japan; Nakamura, T., Kyushu Univ., Japan; Nagao, K., Tokyo Univ., Japan; Naraoka, H., Tokyo Metropolitan Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report a new CM chondrite fall in Japan. The Sayama meteorite, a 430 g stone, fell at Sayama-city on or about April 29, 1986. SEM studies show that Sayama experienced extensive aqueous alteration than a normal CM2. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Meteoritic Composition; Meteoritic Microstructures

20010045204 California Univ., Dept. of Chemistry and Biochemistry, San Diego, CA USA
A New IAB Iron Meteorite from China
Ponganis, K. V., California Univ., San Diego, USA; Lavielle, B., Bordeaux 1 Univ., France; Spettel, B., Max-Planck-Inst. fuer Chemie, Germany; Buchwald, V. F., Ingeborgvej, Denmark; Nishiizumi, K., California Univ., USA; Caffee, M. W., Lawrence Livermore National Lab., USA; Marti, K., California Univ., San Diego, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

An iron mass was found approx. 8 km NW of Zhongshan, China. Petrographic data and a preliminary N isotopic analysis classify the iron as a IAB/IIICD type. An exposure age of is greater than 440 Ma is inferred and measurements of radionuclides are in progress. Additional information is contained in the original extended abstract.
Derived from Text
Iron Meteorites; Petrography; Meteoritic Composition; Meteoritic Microstructures; Isotope Ratios

20010045205 National Museum of Natural History, Paris, France
Oxygen Isotopes in the Sahara 97096 EH3 Chondrite
Perron, C., National Museum of Natural History, France; Bourot-Denise, M., National Museum of Natural History, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

O isotopic composition has been measured with an ion microprobe in various components of the EH3 chondrite Sahara 97096 (reduced and oxidized pyroxene, olivine). One barred olivine chondrule plots in the carbonaceous chondrite domain. Additional information is contained in the original extended abstract.
Derived from Text
Carbonaceous Chondrites; Meteoritic Composition; Oxygen Isotopes

20010045206 Open Univ., Planetary and Space Sciences Research Inst., Milton Keynes, UK
An Fe-57 Moessbauer Study of the Olivine Solid Solution Series: Implications for Meteorite Classification and Deconvolution of Unequilibrated Chondrite Spectra
Menzies, O. N., Open Univ., UK; Bland, P. A., Open Univ., UK; Berry, F. J., Open Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The olivine solid solution series was investigated by Fe-57 Moessbauer spectroscopy. The study aims to improve interpretation of meteorite spectra and provide a rapid method of characterizing silicate chemistry and degree of equilibration in chondrites. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Olivine; Spectroscopy; Mossbauer Effect

20010045207 Max-Planck-Inst. fuer Chemie, Mainz, Germany

Noble Gases in Five Rumuruti Chondrites

Weber, H. W., Max-Planck-Inst. fuer Chemie, Germany; Schultz, L., Max-Planck-Inst. fuer Chemie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Concentration and isotopic composition have been measured in five new R-chondrites: Dar al Gani 417, Northwest Africa 053, Ouzina, Sahara 98248, and Sahara 99531. Two of these meteorites contain solar trapped gases, NWA 053 has an unusual short exposure age of 0.2 Ma. Additional information is contained in the original extended abstract.

Derived from Text

Chondrites; Isotopes; Rare Gases; Meteoritic Composition

20010045208 Purdue Univ., Dept. of Chemistry, West Lafayette, IN USA

How Do L/LL Chondrites Relate to L and LL Falls?

Friedrich, J. M., Purdue Univ., USA; Lipschutz, M. E., Purdue Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Provisionally our ICPMS results, when treated by cluster analysis, suggest L/LL chondrites constitute an individual group. We found it interesting that bulk REE contents in the L/LL chondrite suite seem enriched relative to the L and LL suites. Additional information is contained in the original extended abstract.

Derived from Text

Chondrites; Meteoritic Composition; Meteoroid Showers

20010045209 NASA Johnson Space Center, Houston, TX USA

Ar-39/Ar-40 and Space Exposure Ages of the Unique Portales Valley H-Chondrite

Garrison, D. H., NASA Johnson Space Center, USA; Bogard, D. D., Lockheed Martin Corp., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The space exposure age of the unique Portales Valley H-chondrite is approx. 40-45 Myr. The 39 Ar-40 Ar ages of two samples are 4.477 +/- 0.016 and 4.46 +/- 0.02 Ga and show no evidence of more recent disturbance, in contrast to previous radiometric determinations Additional information is contained in the original extended abstract..

Derived from Text

Argon Isotopes; Chondrites; Chronology; Isotope Ratios; Meteoritic Composition

20010045210 Royal Ontario Museum, Dept. of Earth Sciences, Toronto, Ontario Canada

Combined Initial SR, Sm-Nd, and U-Pb Systematics of Chondritic Phosphates: How Reliable are the Ages?

Rotenberg, E., Royal Ontario Museum, Canada; Amelin, Y., Royal Ontario Museum, Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report here combined initial SR, Sm-Nd, and U-Pb data from chondritic phosphates in order to evaluate the suitability of the initial SR method for determining the ages of these meteorites. Additional information is contained in the original extended abstract.

Derived from Text

Chondrites; Phosphates; Chronology; Strontium Isotopes; Meteoritic Composition; Isotope Ratios; Cosmochemistry

20010045211 Witwatersrand Univ., Dept. of Geology, Johannesburg, South Africa

Flow Differentiation in a Melt Vein in the L6 Chondrite PCA82528

Buchanan, P. C., Witwatersrand Univ., South Africa; Reimold, W. U., Witwatersrand Univ., South Africa; Kruger, F. J., Witwatersrand Univ., South Africa; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Flow differentiation of rock and mineral fragments in a relatively wide melt vein in the Antarctic L6 ordinary chondrite PCA82528 suggests that melt moved significant distances from the source area. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Flow Velocity; Rock Intrusions; Petrology

20010045212 NASA Johnson Space Center, Houston, TX USA
Experimentally Produced Shock Melts in Impact-comminuted Powders of an L6 Ordinary Chondrite
See, T. H., Lockheed Martin Corp., USA; Hoerz, F., NASA Johnson Space Center, USA; Cintala, M. J., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Shock-recovery experiments using L6 ordinary chondrite (ALH85017) were conducted to investigate the formation of impact melts as a function of shock pressure and to assess the significance of shock-melting as a regolith process on asteroids. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Impact Melts; Comminution; Experimentation; Pressure

20010045213 Academia Sinica, Guangzhou Inst. of Geochemistry, Guangzhou, China
A High-Pressure Phase of Ca3(PO4)2 in the Shock Melt Veins of the Suizhou Meteorite
Xie, X., Academia Sinica, China; Minitti, M. E., Carnegie Institution of Washington, USA; Chen, M., Academia Sinica, China; Wang, D., Academia Sinica, China; Mao, H. K., Carnegie Institution of Washington, USA; Shu, J., Carnegie Institution of Washington, USA; Fei, Y., Carnegie Institution of Washington, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NNSF-49672098; NNSF-49825106; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have discovered and experimentally confirmed the presence of a high-pressure polymorph of Ca3(PO4)2 in the Suizhou meteorite. The high-pressure Ca3(PO4)2 polymorph in Suizhou likely represents the first naturally occurring example of this phase. Additional information is contained in the original extended abstract.
Derived from Text
High Pressure; Chondrites; Impact Melts; Meteoritic Composition; Meteoritic Microstructures

20010045214 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA
High-Pressure Phases in Shock-induced Melt Veins from the Umbarger L6 Chondrite: Constraints on Shock Conditions
Xie, Z., Arizona State Univ., USA; Tomioka, N., Kobe Univ., Japan; Sharp, T. G., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Umbarger L6 chondrite contains previously unknown high-pressure phases: ringwoodite, akimotoite (MgSiO3-ilmenite), augite, and hollandite phase. Crystallization of akimotoite suggests supercooling of the melt vein during adiabatic decompression. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; High Pressure; Supercooling; Mineralogy; Solid Phases

20010045215 NASA Johnson Space Center, Houston, TX USA
A Henry's Law Test for Experimental Partitioning Studies of Iron Meteorites
Chabot, N. L., National Academy of Sciences - National Research Council, USA; Campbell, A. J., Chicago Univ., USA; Humayun, M., Chicago Univ., USA; Agee, C. B., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): RTOP 344-31-20-25; NAG5-9800; NAG5-9435; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Low-level doped solid metal/liquid metal experiments analyzed by laser ablation ICP-MS allow Henry's Law to be tested. The results indicate Henry's Law is obeyed and the experimental partition coefficients can be applied to iron meteorites. Additional information is contained in the original extended abstract.
Derived from Text
Iron Meteorites; Gas-Liquid Interactions; Meteoritic Composition; Crystallization

20010045216 Eidgenoessische Technische Hochschule, Zurich, Switzerland
Helium, Neon, and Argon in Canyon Diablo Spheroids
Leya, I., Eidgenoessische Technische Hochschule, Switzerland; Wieler, R., Eidgenoessische Technische Hochschule, Switzerland; Herzog, G. F., Rutgers Univ., USA; Schnabel, C., Eidgenoessische Technische Hochschule, Switzerland; Ma, P., Rutgers Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Despite having melted when they formed, many Canyon Diablo spheroids retain cosmogenic Ar-38. The concentrations imply that the spheroids' precursor material mostly came from a shell approx. 1 m thick centered at a depth of approx. 1.2 m in the impactor. Additional information is contained in the original extended abstract.
Derived from Text
Argon; Helium; Neon; Spheroids; Meteorites; Meteoritic Composition

20010045217 Yamaguchi Univ., Dept. of Earth Sciences, Japan
Iron Spherules and Melted Fragments Found at Rice-Field of Nio Meteorite Shower Site in Yamaguchi, Japan
Miura, Y., Yamaguchi Univ., Japan; Uedo, Y., Yamaguchi Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

From compositional and textural data, fragments of the Nio meteorite with fusion crust have been found at wet rice-field of deeper layer at Nio meteorite shower site in Japan Additional information is contained in the original extended abstract..
Derived from Text
Iron; Meteorites; Spherules; Micrometeorites

20010045218 Geological Survey of Czech Republic, Prague, Czech Republic
Crystal Structure of Schreibersite from the Meteoritic Iron Sikhote Alin
Skala, R., Geological Survey of Czech Republic, Czech Republic; Cisarova, I., Karlova Univ., Czechoslovakia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): GACR-205/98/0655; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The crystal structure refinement of a prismatic crystal of schreibersite from the meteorite Sikhote Alin is presented. Results indicate non-equal occupation of sites by Ni and Fe with nickel concentrated dominantly in a single atomic site. Additional information is contained in the original extended abstract.
Derived from Text
Crystal Structure; Schreibersite; Sikhote-Alin Meteorite; Meteoritic Composition; Meteoritic Microstructures; Crystals; Mineralogy

20010045219 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Pressure Distribution in Inflated Lava Flows
Anderson, S. W., Black Hills State Univ., USA; Stofan, E. R., Proxemy Research, Inc., USA; McColley, S., Black Hills State Univ., USA; Smrekar, S. E., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

There has been considerable debate regarding the role of inflation in terrestrial and planetary lava flow emplacement. We used a tumuli growth model to estimate the pressure within Hawaiian lava flows to better understand inflation processes. Additional information is contained in the original extended abstract.
Derived from Text
Fluid Flow; Lava; Pressure Distribution; Expansion

20010045220 NASA Johnson Space Center, Houston, TX USA

Terrestrial Aufeis Formation as a Martian Analog: Clues from Laboratory-produced C-13 Enriched Cryogenic Carbonate

Socki, R. A., Georgia Univ., USA; Romanek, C. S., Georgia Univ., USA; Gibson, E. K., Jr., NASA Johnson Space Center, USA; Golden, D. C., Hernandez Engineering, Inc., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Cryogenic calcite was produced to mimic aufeis and used as a martian analog. Presumably, aufeis could occur in V-shaped valleys on Mars, provided enough bicarbonate-rich liquid water exists or has existed in the past, most likely as frozen discharging groundwater springs. Additional information is contained in the original extended abstract.

Derived from Text

Aufeis (Ice); Carbon 13; Carbonates; Cryogenics; Mars (Planet); Mars Surface; Ground Water

20010045221 International Research School of Planetary Sciences, Pescara, Italy

Geological Evolution of the Lake Abhe Tectonic Basin Using Multitemporal Satellite Images

Rossi, A. P., International Research School of Planetary Sciences, Italy; Marinangeli, L., International Research School of Planetary Sciences, Italy; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

An analysis of multispectral and multitemporal images covering the Lake Abhe region (Djibouti) was performed. Both sedimentary and structural aspects were studied in order to reconstruct the recent geological evolution of the basin. Additional information is contained in the original extended abstract.

Derived from Text

Geology; Lakes; Satellite Imagery; Tectonics

20010045222 Carnegie Institution of Washington, Geophysical Lab., Washington, DC USA

Melting of a Model Orthopyroxene-rich Martian Mantle at 2.0 GPa

Gilpin, L. A., Carnegie Institution of Washington, USA; Bertka, C., Carnegie Institution of Washington, USA; Minitti, M., Carnegie Institution of Washington, USA; Fei, Y., Carnegie Institution of Washington, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We determined martian bulk compositions consisting of carbonaceous, ordinary and enstatite chondrite mixtures that satisfy martian geophysical constraints. Mineralogy and melting relations of the martian mantle compositions were also investigated. Additional information is contained in the original extended abstract.

Derived from Text

Carbonaceous Chondrites; Geophysics; Mars (Planet); Melting; Planetary Mantles

20010045223 Laboratoire de Planetologie et Geodynamique, Nantes, France

Early Transient Cooling of Mars

Choblet, G., Laboratoire de Planetologie et Geodynamique, France; Sotin, C., Laboratoire de Planetologie et Geodynamique, France; Grasset, O., Laboratoire de Planetologie et Geodynamique, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Thermal aspect of Mars early history is discussed. Convective cooling beneath a rigid lid presents an initial transient period. Estimates of the duration for this period for Mars vary from a few 100 Ma to several Ga, depending on initial thermal conditions. Additional information is contained in the original extended abstract.

Derived from Text

Convective Heat Transfer; Cooling; Mars (Planet); Planetary Geology; Planetary Evolution; Planetology

20010045224 New Mexico Univ., Dept. of Earth and Planetary Sciences, Albuquerque, NM USA

Hafnium and Tungsten Partitioning in Silicates. A Key to Understanding the Early Evolution of Both the Moon and Mars

Shearer, C. K., New Mexico Univ., USA; Righter, K., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present data on the behavior of both Hf and W in a variety of silicates and melt compositions and evaluate their role in generating W isotopic signatures. Additional information is contained in the original extended abstract.
Derived from Text
Hafnium; Moon; Silicates; Tungsten; Mars (Planet); Planetary Evolution; Lunar Evolution

20010045225 NASA Johnson Space Center, Houston, TX USA
Influence of Carbon and Sulfur on the Partitioning of Tungsten Between Solid and Liquid Metal
Lauer, H. V., Jr., Lockheed Martin Space Mission Systems and Services, USA; Jones, J. H., NASA Johnson Space Center, USA; Schwandt, C., Lockheed Martin Space Mission Systems and Services, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

To give some insight into C-bearing experiments, we performed a set of experiments investigating the partitioning of W between solid metal and liquid metal in Fe-Ni-C-S systems. Additional information is contained in the original extended abstract.
Derived from Text
Carbon; Liquid Metals; Sulfur; Tungsten

20010045226 NASA Johnson Space Center, Houston, TX USA
Partitioning of Nd, Tb, Lu, and Hf Between Garnet and Ordinary Chondrite Melt at 5 to 9 GPa: Applications to Martian Differentiation
Draper, D. S., NASA Johnson Space Center, USA; Chabot, N. L., NASA Johnson Space Center, USA; Xirouchakis, D., NASA Johnson Space Center, USA; Wasserman, A. A., Arizona Univ., USA; Agee, C. B., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

One explanation for Al and REE depletions in SNC meteorites is early majorite fractionation in a deep martian magma ocean. We report initial results from an experimental investigation of partitioning between majoritic garnet and ordinary chondrite liquid. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Mars (Planet); Garnets; Trace Elements

20010045227 Tohoku Univ., Inst. of Mineralogy, Petrology, and Economic Geology, Sendai, Japan
Distribution Coefficients of Transition Metal Elements Between Metallic Iron and Lower Mantle Minerals
Ohtani, E., Tohoku Univ., Japan; Satoh, J., Tohoku Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Transition metal element partitioning experiments between lower mantle minerals and metallic liquid were made in alumina containing system, and effect of alumina content in perovskite on distribution coefficients were clarified. Additional information is contained in the original extended abstract.
Derived from Text
Iron; Minerals; Transition Metals; Dispersing; Earth Mantle; Liquid Metals

20010045228 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Cataclysm + Cold Comets = Lots of Asteroid Impacts
Swindle, T. D., Arizona Univ., USA; Kring, D. A., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The existence of the lunar cataclysm, coupled with the observation of argon in Comet Hale-Bopp, has implications for the mechanism of the cataclysm, the source of Earth's water, and the type of objects causing the most impacts through Earth history. Additional information is contained in the original extended abstract.
Derived from Text
Asteroids; Comets; Cratering; Water; Earth (Planet); Planetary Evolution; Rare Gases

20010045229 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Tidal Amplitude for a Self-Gravitating, Compressible Sphere

Hurford, T. A., Arizona Univ., USA; Greenberg, R., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We derive Love numbers for a self-gravitating, compressible sphere. Additional information is contained in the original extended abstract.

Derived from Text

Spheres; Tides; Gravitation; Gravitational Fields; Compressibility; Computation

20010045230 Hokkaido Univ., Inst. of Low Temperature Science, Sapporo, Japan

Experiments on Evaporation Metamorphism of Interstellar Organic Materials

Nakano, H., Hokkaido Univ., Japan; Kouchi, A., Hokkaido Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We experimentally determined the distribution of interstellar organic materials in the protosolar nebula and discussed C,N-contents of carbonaceous chondrites. Additional information is contained in the original extended abstract.

Derived from Text

Evaporation; Organic Materials; Interstellar Matter; Heating; Experimentation

20010045231 Hokkaido Univ., Inst. of Low Temperature Science, Sapporo, Japan

Effect of Organic Matter on the Coagulation of Grains

Kudo, T., Hokkaido Univ., Japan; Kouchi, A., Hokkaido Univ., Japan; Arakawa, M., Hokkaido Univ., Japan; Watanabe, N., Hokkaido Univ., Japan; Maeno, N., Hokkaido Univ., Japan; Sirono, S., Nagoya Univ., Japan; Higa, M., National Space Development Agency, Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Results of collision experiments show that millimeter-sized organic grain aggregates stuck more effectively than silicate and ice to form larger aggregates even at the turbulent stage of the protosolar nebula. Additional information is contained in the original extended abstract.

Derived from Text

Aggregates; Coagulation; Nebulae; Organic Materials; Interstellar Matter; Protoplanetary Disks; Collisions

20010045232 Rutgers Univ., Piscataway, NJ USA

Electron- and Photon-stimulated Desorption of Alkali Atoms (Na, K) from Water Ice and Silicon Dioxide Surfaces

Yakshinskiy, B. V., Rutgers Univ., USA; Madey, T. E., Rutgers Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Based on laboratory studies, we conclude that photon-stimulated desorption of Na and K from surfaces by UV photons is a dominant source process for these alkalis in tenuous planetary atmospheres. Additional information is contained in the original extended abstract.

Derived from Text

Alkalies; Desorption; Ice; Photons; Silicon Dioxide; Electrons

20010045233 NASA, Washington, DC USA

Astrobiology Science and Technology: A Path to Future Discovery

Meyer, M. A., NASA, USA; Lavaery, D. B., NASA, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Astrobiology Program is described. However, science-driven robotic exploration of extreme environments is needed for a new era of planetary exploration requiring biologically relevant instrumentation and extensive, autonomous operations on planetary surfaces. Additional information is contained in the original extended abstract.

Derived from Text

Exobiology; Space Exploration; Extraterrestrial Life; NASA Programs

20010045234 New Mexico Univ., Dept. of Earth and Planetary Sciences, Albuquerque, NM USA

The Effect of Thermal Decarbonation on Stable Isotope Compositions of Carbonates

Sharp, Z. D., New Mexico Univ., USA; Durakiewicz, T., Marie Curie-Sklodowska Univ., Poland; Papike, J. J., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

C-O isotope ratios of CO2 evolved during thermal decarbonation of Cc and Dol are unfractionated. Large fractionations occur for Sid, due to auto-oxidation of Fe and CO generation. Decarbonation does not explain the isotope variability in ALH84001. Additional information is contained in the original extended abstract.

Derived from Text

Carbonates; Decarbonation; Isotope Ratios; SNC Meteorites

20010045235 NASA Johnson Space Center, Houston, TX USA

Organic Matter in SNC Meteorites: Is It Time to Re-Evaluate the Viking Biology Experimental Data?

Warmflash, D., NASA Johnson Space Center, USA; Clemett, S. J., Lockheed Martin Space Operations, USA; McKay, D. S., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New data from SNC meteorites suggests that organic material may be present in the martian upper crust. This adds to possibility that the Viking biology experiments may have plausible biological interpretations as well as inorganic chemical interpretations Additional information is contained in the original extended abstract..

Derived from Text

Extraterrestrial Life; Mars Surface; Organic Materials; SNC Meteorites; Viking Mars Program; Exobiology

20010045236 NASA Marshall Space Flight Center, Huntsville, AL USA

Biomorphes in Carbonaceous Chondrites

Rozanov, A. Yu., Academy of Sciences (USSR), USSR; Hoover, R., NASA Marshall Space Flight Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In the meteorites - Murchison, Efremovka, Murray, Nagoya etc. - was found biomorphic structures like cyanobacteria and other microorganisms. Additional information is contained in the original extended abstract.

Derived from Text

Carbonaceous Chondrites; Microorganisms; Extraterrestrial Life; Exobiology

20010045237 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Integrated Micro-Chip Amino Acid Chirality Detector for MOD

Glavin, D. P., California Univ., San Diego, USA; Bada, J. L., California Univ., San Diego, USA; Botta, O., California Univ., San Diego, USA; Kminek, G., California Univ., San Diego, USA; Grunthaner, F., Jet Propulsion Lab., California Inst. of Tech., USA; Mathies, R., California Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Integration of a micro-chip capillary electrophoresis analyzer with a sublimation-based extraction technique, as used in the Mars Organic Detector (MOD), for the in-situ detection of amino acids and their enantiomers on solar system bodies. Additional information is contained in the original extended abstract.

Derived from Text

Amino Acids; Chirality; Mars (Planet); Extraterrestrial Life; Exobiology; Life Detectors

20010045238 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Ultra High-Resolution Electrospray Ionization/Ion Mobility Spectrometer System for In-Situ Detection of Organic Compounds

Kanik, I., Jet Propulsion Lab., California Inst. of Tech., USA; Beegle, L. W., Jet Propulsion Lab., California Inst. of Tech., USA; Hill, H. H., Washington State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; This research is funded by NASA PIDDP and the JPL DRDF (Grand Challance).; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The potential of the high-resolution Electrospray Ionization/Ion Mobility Spectrometry (ESI/IMS) technique as analytical separation tool in analyzing bio-molecular mixtures in the search for the chemical signatures of life is demonstrated. Additional information is contained in the original extended abstract.
Derived from Text
Ion Mobility Spectroscopy; In Situ Measurement; Organic Compounds; Time of Flight Spectrometers

20010045239 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
A High-Pressure Hollow Cathode Ionization Source for In-Situ Detection of Organic Molecules
Beegle, L. W., Jet Propulsion Lab., California Inst. of Tech., USA; Kanik, I., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have designed, constructed and characterized a new high-pressure (1-5 Torr) hollow cathode discharge source (HCDS) that can be utilized as an ionizer in a wide variety of mass analyzers. Additional information is contained in the original extended abstract.
Derived from Text
High Pressure; Hollow Cathodes; Ionizers; Life Detectors; Extraterrestrial Life; Mars (Planet)

20010045240 NASA Johnson Space Center, Houston, TX USA
Mars Immunoassay Life Detection Instrument for Astrobiology (MILDI)
Steele, A., NASA Johnson Space Center, USA; McKay, D. S., NASA Johnson Space Center, USA; Allen, C. C., Lockheed Martin Space Operations, USA; Thomas-Keprta, K. L., Lockheed Martin Space Operations, USA; Warmflash, D., Lockheed Martin Space Operations, USA; Pincus, S., Montana State Univ., USA; Schweitzer, M., Montana State Univ., USA; Priscu, J., Montana State Univ., USA; Sears, J., Montana State Univ., USA; Hedgecock, J., Oceaneering Space Systems, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We outline the development of a new breed of robotic life detection instruments based on immunological reactions. Additional information is contained in the original extended abstract.
Derived from Text
Exobiology; Immunology; Robotics; Life Detectors; Extraterrestrial Life; Biochemistry

20010045241 NASA Johnson Space Center, Houston, TX USA
Astrobiology Investigations at a Martian Hematite Site
Allen, C. C., NASA Johnson Space Center, USA; Westall, F., Lunar and Planetary Inst., USA; Schelble, R., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Current lander instruments are well suited to analyze the aqueous and geologic history and macroscopic evidence of ancient life in a hematite deposit. Such a deposit, with indications of past life, would be a prime site for future sample return. Additional information is contained in the original extended abstract.
Derived from Text
Exobiology; Hematite; Mars (Planet); Extraterrestrial Life; Mars Exploration

20010045242 NASA Johnson Space Center, Houston, TX USA
Olivine Weathering: Abiotic Versus Biotic Processes as Possible Biosignatures
Longazo, T. G., Hernandez Engineering, Inc., USA; Wentworth, S. J., Lockheed Martin Corp., USA; McKay, D. S., NASA Johnson Space Center, USA; Southam, G., University of Northern Arizona, USA; Clemett, S. J., Lockheed Martin Corp., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A preliminary study to determine how abiotic versus biotic processes affect the weathering of olivine crystals. Perhaps the differences between these weathering processes could be used as biosignatures. Additional information is contained in the original extended abstract.
Derived from Text
Olivine; Weathering; Extraterrestrial Life; Exobiology; Life Detectors

20010045243 Houston Univ., Dept. of Geosciences, TX USA
Geometries and Facies Distributions in Yellowstone's Siliceous Hotsprings: Implications for Martian Exploration
Guidry, S. A., Houston Univ., USA; Chafetz, H. S., Houston Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; This research is supported by a NASA-JSC Astrobiology Grant (to HC), SEPM Foundation Robert J. Weimer Grant for Student Research (to SG), GSA Student Grant (#6239-98 to SG), and the Explorers Club-Rocky Mountain Chapter Grant for Student Research
Contract(s)/Grant(s): GSA-6239-98; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Synthesis of features from several siliceous hotsprings yields a relatively simple facies model. This model facilitates our ability to recognize these hotsprings in the terrestrial and probably extraterrestrial rock record. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Rocks; Shapes; Springs (Water); Yellowstone National Park (ID-MT-WY); Analogs; Geomorphology

20010045244 NASA Johnson Space Center, Houston, TX USA
Sulfur/Carbonate Springs and Life in Glacial Ice
Allen, C. C., NASA Johnson Space Center, USA; Grasby, S., Geological Survey of Canada, Canada; Longazo, T., Hernandez Engineering, Inc., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Glacial springs are useful analogs to channels and seeps issuing from frozen strata on Mars. Mineralized water can move through, and discharge from, solid ice. This water, even near freezing, can support microbial life and bring it to the surface. Additional information is contained in the original extended abstract.
Derived from Text
Carbonates; Ice; Microorganisms; Sulfur; Extraterrestrial Life; Analogs; Springs (Water)

20010045245 NASA Johnson Space Center, Houston, TX USA
Biogenic Structures from a Hypersaline Lake in the Bahamas
Byrne, M., Wellesley Coll., USA; Morris, P. A., Houston Univ., USA; Wentworth, S. J., Lockheed Martin Space Operations, USA; Thomas-Keprta, K. L., Lockheed Martin Space Operations, USA; Brigmon, R. L., Westinghouse Savannah River Co., USA; McKay, D. S., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A diversity of biogenic structures is described from Storr's Lake, Bahamas. Structures include four groups of coccoid structures, diatoms and probable cyanobacterial sheaths. Additional information is contained in the original extended abstract.
Derived from Text
Bahamas; Lakes; Salinity; Microorganisms; Microbiology

20010045246 NASA Johnson Space Center, Houston, TX USA
Probable Carbonate Fossilization Processes Within Dead Sea Microbial Remains
Morris, P. A., Houston Univ., USA; Wentworth, S. J., Lockheed Martin Corp., USA; Thomas-Keprta, K. L., Lockheed Martin Corp., USA; Allen, C. C., NASA Johnson Space Center, USA; McKay, D. S., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Microbial fossilization processes in the Dead Sea is primarily associated with the calcium cation. The putative fossilized microbes do not represent the reported living microbial population. Additional information is contained in the original extended abstract.
Derived from Text
Microorganisms; Fossils; Inland Waters; Carbonates

20010045247 Indiana State Univ., Dept. of Geosciences, Terre Haute, IN USA
Eukaryote-Dominated Microbial Communities That Build Iron-Stromatolites in Acid Mine Drainage, Western Indiana: An Analog for Proterozoic Banded Iron Formations and Oxygenation of the Early Atmosphere?
Hasiotis, S. T., Indiana State Univ., USA; Brake, S. S., Indiana State Univ., USA; Dannelly, H. K., Indiana State Univ., USA; Duncan, A., Indiana State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Eukaryote-dominated microbial communities build iron-rich stromatolites in acid mine drainage at several reclaimed coal mine sites in western Indiana, which can serve as an analog for Proterozoic iron-rich deposits and the oxygenation of the early atmosphere. Additional information is contained in the original extended abstract.
Derived from Text
Eukaryotes; Acidity; Primitive Earth Atmosphere; Oxygenation; Oxygen Production; Analogs

20010045248 New Mexico Univ., Dept. of Earth and Planetary Sciences, Albuquerque, NM USA
Carbonates of the Gunflint Banded Iron Formation as Analogs of Martian Carbonates
Pun, A., New Mexico Univ., USA; Papike, J. J., New Mexico Univ., USA; Shearer, C. K., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Terrestrial iron formations preserve remnants of life on Earth and may serve as analogs for identifying evidence of biologic activity in martian rocks. We report on the petrography, mineralogy and trace-element abundances of carbonates of the Gunflint banded iron formation. Additional information is contained in the original extended abstract.
Derived from Text
Carbonates; Iron; Mineralogy; Petrography; Trace Elements

20010045249 Tokyo Univ., Dept. of Earth and Planetary Science, Tokyo Japan
Physical and Geochemical Conditions Required for the Initiation of Snowball Earth
Tajika, E., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Condition for initiation of snowball Earth phenomena is studied by using a one-dimensional energy balance climate model and carbon geochemical cycle model. Critical condition for pCO2 to cause climate instability will be discussed. Additional information is contained in the original extended abstract.
Derived from Text
Geochemistry; Mathematical Models; Climate Models; Primitive Earth Atmosphere; Paleoclimatology; Carbon Dioxide; Precambrian Period

20010045250 British Antarctic Survey, Cambridge, UK
Ultraviolet Protection on a Snowball Earth
Cockell, C. S., British Antarctic Survey, UK; Wynn-Williams, D. D., British Antarctic Survey, UK; Horneck, G., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Habitats in the Antarctic provide an insight into habitats available on snowball earth. Physical UV protection on snowball earth would have been dominated by the manifestations of ice and snow in different habitats. The snowball period was a golden age of UV protection. Additional information is contained in the original extended abstract.
Derived from Text
Antarctic Regions; Ultraviolet Radiation; Radiation Protection; Paleobiology; Paleoclimatology; Microorganisms

20010045251 Academy of Sciences (Russia), Inst. of Cytology, Saint Petersburg, Russia

The Possible Sites for Exobiological Activity on Titan

Simakov, M. B., Academy of Sciences (Russia), Russia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

All conditions needed for exobiology - liquid water, complex organic chemistry and energy sources for support of biological processes are on Saturnian moon. There are several appropriate sites for biological and/or prebiological activity at present day on Titan. Additional information is contained in the original extended abstract.

Derived from Text

Exobiology; Titan; Extraterrestrial Life

20010045252 Kobe Univ., Dept. of Earth and Planetary Sciences, Japan

Laboratory Simulation of Space Weathering: A Transmission Electron Microscopic Study - Microstructures of the Laser Irradiated Samples

Nakamura, K., Kobe Univ., Japan; Sasaki, S., Tokyo Univ., Japan; Hamabe, Y., Tokyo Univ., Japan; Kurahashi, E., Tokyo Univ., Japan; Hiroi, T., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The microscopic characteristics in the simulation samples are linked to optical property change and formation of nanophase iron in the vapor deposited rim of grains. Additional information is contained in the original extended abstract.

Derived from Text

Irradiation; Simulation; Aerospace Environments; Weathering; Microstructure

20010045253 California Univ., Dept. of Earth Sciences, Santa Cruz, CA USA

Shaping Asteroids Via Small Impacts

Korycansky, D. G., California Univ., USA; Asphaug, E., California Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report preliminary results of an investigation into the effects of small impacts on the shapes and regolith distribution of small asteroids. The accumulated effects of a number of such impacts can potentially drive bodies to non-axisymmetry. Additional information is contained in the original extended abstract.

Derived from Text

Asteroids; Shapes; Impact; Impact Damage

20010045254 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA

Numerical Evaluation of the Yarkovsky Effect on Orbital Elements of Asteroids

Spitale, J. N., Arizona Univ., USA; Greenberg, R., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

To evaluate the Yarkovsky acceleration under a wide range of conditions, a three-dimensional finite-difference solution to the heat equation is applied to small spherical stony bodies of various diameters, with and without an insulating regolith. Additional information is contained in the original extended abstract.

Derived from Text

Asteroids; Orbital Elements; Computerized Simulation; Mathematical Models; Drag

20010045255 Valdosta State Univ., Dept. of Physics, Astronomy and Geosciences, Valdosta, GA USA

Low-Resolution Spectroscopy of Primitive Asteroids: Progress Report for SARA/VSU Survey

Leake, M. A., Valdosta State Univ., USA; Nogues, J. P., Yale Univ., USA; Gaines, J. K., Valdosta State Univ., USA; Looper, J. K., Valdosta State Univ., USA; Freitas, K. A., Pacific Lutheran Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; Supported in part by a Jove Augmentation Grant; and two Equipment, Technology and Construction Trust Fund grants from the University System of Georgia.

Contract(s)/Grant(s): NAG8-1264; NSF AST-96-19939; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Progress on a low-resolution survey of primitive C-class asteroids continues using new equipment (and its associated problems) to understand aqueous alteration in the solar system. Additional information is contained in the original extended abstract.
Derived from Text
Asteroids; Ice; Melting; Morphology

20010045256 NASA Johnson Space Center, Houston, TX USA
Aqueous Alteration in Low Albedo Asteroids
Howell, E. S., National Astronomy and Ionosphere Center, Puerto Rico; Rivkin, A. S., Massachusetts Inst. of Tech., USA; Vilas, F., NASA Johnson Space Center, USA; Soderberg, A. M., Cambridge Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We observe the 3 micron water/OH band and the 0.7 micron phyllosilicate band. We commonly find rotational variation and that the 0.7 micron band indicates hydrated silicates, but its absence does not imply a lack of hydrated silicates. Additional information is contained in the original extended abstract.
Derived from Text
Albedo; Asteroids; Water; Rotation; Hydration

20010045257 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
The Near-Earth Space Surveillance (NESS) Mission: Discovery, Tracking, and Characterization of Asteroids, Comets, and Artificial Satellites with a Microsatellite
Hildebrand, A. R., Calgary Univ., Canada; Carroll, K. A., Dynacon Enterprises Ltd., Canada; Balam, D. D., Victoria Univ., Canada; Cardinal, R. D., Victoria Univ., Canada; Matthews, J. M., British Columbia Univ., Canada; Kuschnig, R., British Columbia Univ., Canada; Walker, G. A. H., British Columbia Univ., Canada; Brown, P. G., Los Alamos National Lab., USA; Tedesco, E. F., TerraSystems, Inc., USA; Worden, S. P., Air Force Space Command, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Near-Earth Space Surveillance (NESS) Mission, a microsatellite dedicated to observing near-Earth (NEO) and interior-to-the-Earth (IEO)asteroids and comets plus artificial satellites, is currently being studied under contract to the Canadian Space Agency. Additional information is contained in the original extended abstract.
Derived from Text
Artificial Satellites; Microsatellites; Surveillance; Asteroid Detection; Spaceborne Telescopes; Astronomical Observatories

20010045258 Planetary Science Inst., Tucson, AZ USA
Origin of the Double Asteroid 90 Antiope: A Continuing Puzzle
Weidenschilling, S. J., Planetary Science Inst., USA; Marzari, F., Planetary Science Inst., USA; Davis, D. R., Planetary Science Inst., USA; Neese, C., Planetary Science Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Asteroid 90 Antiope is binary, with widely separated equal-mass components. Its high angular momentum may be due to a low-velocity impact among Themis family members, but the probability of such a collision is low, suggesting it is unique. Additional information is contained in the original extended abstract.
Derived from Text
Asteroids; Low Speed; Causes

20010045259 Arizona Univ., Lunar and Planetary Laboratory, Tucson, AZ USA
Near-Infrared Spectroscopy of Trojan Asteroids: Implications for the Evolution of the Solar System
Emery, J. P., Arizona Univ., USA; Brown, R. H., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We will present new near-infrared spectroscopic observations of Trojan asteroids. Additional information is contained in the original extended abstract.
Derived from Text
Trojan Asteroids; Solar System Evolution; Solar System; Protoplanetary Disks; Jupiter (Planet)

20010045260 NASA Johnson Space Center, Houston, TX USA

Modeling Coma Gas Jets in Comet Hale-Bopp

Lederer, S. M., NASA Johnson Space Center, USA; Campins, H., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present an analysis of OH, CN, and C2 jets observed in Comet Hale-Bopp. The relative contributions from and composition of the coma gas sources, and the parameters describing the active areas responsible for the gas jets will be discussed. Additional information is contained in the original extended abstract.

Derived from Text

Gas Composition; Hale-Bopp Comet; Gas Jets; Cometary Atmospheres; Composition (Property); Mathematical Models

20010045261 University of Western Ontario, Dept. of Geography, London, Ontario Canada

Gaspra: Revised Crater Counts

Stooke, P. J., University of Western Ontario, Canada; Ford, H. A., University of Western Ontario, Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Previous crater counts for Gaspra were made in restricted areas and did not incorporate low resolution images or large depressions. We present new counts using different assumptions and find an old surface saturated at diameters over 1 km. Additional information is contained in the original extended abstract.

Derived from Text

Counting; Craters; Gaspra Asteroid; Chronology

20010045262 Houston Univ., Dept. of Geosciences, TX USA

Microfabrics in Siliceous Hotsprings: Yellowstone National Park, Wyoming

Guidry, S. A., Houston Univ., USA; Chafetz, H. S., Houston Univ., USA; Westall, F., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; This research is supported by a NASA-JSC Astrobiology Grant (to HC), SEPM Foundation Robert J. Weimer Grant for Student Research (to SG), GSA Student Grant (#6239-98 to SG), and the Explorers Club-Rocky Mountain Chapter Grant for Student Research.

Contract(s)/Grant(s): GSA-6239-98; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Microfabrics shed light on the mechanisms governing siliceous sinter precipitation, the profound effects of microorganisms, as well as a conventional facies model for siliceous hotsprings. Additional information is contained in the original extended abstract.

Derived from Text

Microorganisms; Springs (Water); Extraterrestrial Life; Exobiology; Yellowstone National Park (ID-MT-WY); Analogs

20010045263 Universite de Bretagne Occidentale, IUEM, Brest, France

Metabolic Diversity and Physiological Adaptations of Deep-Sea Hydrothermal Vent Prokaryotes: Lesson for Astrobiology

Prieur, D. M., Universite de Bretagne Occidentale, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Among extreme environments on Earth, deep-sea hydrothermal vents represent models for the study of metabolic diversity of prokaryotes and some physio-chemical limits for life as well, and serve as references for search of life in and out the solar system. Additional information is contained in the original extended abstract.

Derived from Text

Exobiology; Ocean Bottom; Prokaryotes; Thermal Environments

20010045264 New Mexico Univ., Biology Dept., Albuquerque, NM USA

Cave Microbe-Mineral Suites: Best Model for Extraterrestrial Biosignatures!

Boston, P. J., New Mexico Univ., USA; Spilde, M. N., New Mexico Univ., USA; Northup, D. E., New Mexico Univ., USA; Melim, L. A., University of Western Illinois, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Microbial/mineral biosignature suites derived from cave microorganism and mineral associations provide an excellent model for developing extraterrestrial life search strategies. These suites combine macroscopic, microscopic, and chemical signatures. Additional information is contained in the original extended abstract.
Derived from Text
Caves; Extraterrestrial Life; Microorganisms; Underground Structures; Analogs; Exobiology

20010045265 New Mexico Univ., Inst. of Meteorities, Albuquerque, NM USA
Mn-Oxide Minerals from a Terrestrial Cave Environment: Biomarkers for the Search for Life on Mars?
Spilde, M. N., New Mexico Univ., USA; Brearley, A. J., New Mexico Univ., USA; Papike, J. J., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mn-oxides are promising biomarkers because microbes greatly accelerate Mn-oxide formation rates and produce distinctive oxidation states. Mn minerals in terrestrial caves form subaerially and could conceivably be present in the subsurface of Mars. Additional information is contained in the original extended abstract.
Derived from Text
Extraterrestrial Life; Microorganisms; Manganese Oxides; Exobiology

20010045266 NASA Ames Research Center, Moffett Field, CA USA
Microbial Mats in the Tswaing Impact Crater: Results of a South African Exobiology Expedition and Implications for the Search for Biological Molecules on Mars
Cockell, C. S., British Antarctic Survey, UK; Brandt, D., Witwatersrand Univ., South Africa; Hand, K., NASA Ames Research Center, USA; Lee, P. C., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We describe microbial mats from the Tswaing impact crater in South Africa. The mats provide insights into the unique biological characteristics of impact craters and can help strategies for the search for biomolecules on Mars. Additional information is contained in the original extended abstract.
Derived from Text
Exobiology; Microorganisms; Extraterrestrial Life; Meteorite Craters; Analogs; Mars (Planet)

20010045267 Texas Univ., Dept. of Geological Sciences, Austin, TX USA
Similarity of Nanometer-size Spheroids in Martian Meteorite Dhofar 019 and Enclosing Caliche Soil: South-Pole vs. Desert Forms
Folk, Robert L., Texas Univ., USA; Taylor, Lawrence A., Tennessee Univ., USA; Nazarov, Mikhail A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Similar to other martian meteorites found in hot deserts, nanometer-scale ovoids found within the caliche on the outside of Dhofar 019 appear to be identical in size and morphology to those in the meteorite proper. Nano forms are similar to those reported from ALH 84001. Additional information is contained in the original extended abstract.
Derived from Text
Analogies; SNC Meteorites; Exobiology; Extraterrestrial Life

20010045268 Louisiana State Univ., Inst. for Environmental Studies, Baton Rouge, LA USA
Identifying Potentially Badly Degraded Microfossils from Mars
Westall, Frances, Louisiana State Univ., USA; Walsh, Maud, Louisiana State Univ., USA; Schelble, Rachel, New Mexico Univ., USA; Toporski, Jan, Portsmouth Univ., UK; Steele, Andrew, Portsmouth Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The majority of the early terrestrial microfossils are badly degraded and to some extent some degradation is additional evidence of biogenicity. Potential martian microfossils are also likely to occur in degraded form and it is imperative that we be able to recognize them. Additional information is contained in the original extended abstract.
Derived from Text
Degradation; Fossils; Identifying; Mars (Planet); Microorganisms; Rocks

20010045269 NASA Johnson Space Center, Houston, TX USA

Hematite Mineralized Bacterial Remnants: Implications for Martian Hematite Deposits

Schelble, Rachel T., New Mexico Univ., USA; Westall, Frances, Lunar and Planetary Inst., USA; Allen, Carlton C., NASA Johnson Space Center, USA; Brearley, Adrian J., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Hematite mineralized bacterial remnants in the Gunflint Formation [early Proterozoic] can be used as an analog for potential microfossils in martian iron deposits. Additional information is contained in the original extended abstract.

Derived from Text

Bacteria; Fossils; Hematite; Mars Surface

20010045270 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA

Mineralogical, Microstructural and Chemical Biosignatures of Microfossils: An Electron Microscope Study

Moreau, J. W., Arizona State Univ., USA; Sharp, T. G., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mineral biosignatures were found in terrestrial microfossils at nanometer scales with transmission electron microscopy. These biosignatures exhibit characteristics consistent with nucleation of opaline silica on bacterial substrates during fossilization. Additional information is contained in the original extended abstract.

Derived from Text

Fossils; Microorganisms; Microstructure; Mineralogy

20010045271 Texas Univ., Dept. of Geological Sciences, Austin, TX USA

Endolithic Microbial Communities in Fractures: Insights Gleaned from Mineralized Filaments in Cretaceous-age Calcite Veins in Serpentinized Peridotites, Iberia Abyssal Plain

Milliken, K. L., Texas Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The occurrence of diverse mineralized microbial features in calcitized fractures in serpentinized peridotite, Iberia Abyssal Plain, suggests that mineralized fractures are of particular interest in the search for fossil or extant life on Mars. Additional information is contained in the original extended abstract.

Derived from Text

Calcite; Fossils; Microorganisms; Peridotite

20010045272 Texas Univ., Dept. of Geology, Arlington, TX USA

Finding Life on Mars: A Mudrock Geologist's Perspective

Schieber, J., Texas Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mudstones should be abundant in the martian rock record. On Earth, mudstones contain sedimentary pyrite grains with enclosed microbial remains. There is a potential to find evidence for life in sedimentary pyrite of martian mudstones. Additional information is contained in the original extended abstract.

Derived from Text

Mars Surface; Microorganisms; Pyrites; Mud; Extraterrestrial Life; Exobiology

20010045273 Oxford Univ., Dept. of Earth Sciences, Oxford, UK

A Geochronological Re-Evaluation of Claims for the Contemporaneity of Earliest Life with Major Impacts

Moorbath, Stephen, Oxford Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Re-evaluation of the ages of Greenland rocks containing the oldest isotopic evidence for life shows that they are is greater than 3.7 Ga, not is greater than 3.85 Ga, postdating heavy bombardment. Additional information is contained in the original extended abstract.
Derived from Text
Geochronology; Rocks; Petrology

20010045274 Arizona Univ., Lunar and Planetary Lab., Tucson, AZ USA
Life on Europa: How Tidal Processes Create Suitable Environments
Greenberg, R., Arizona Univ., USA; Tufts, B. R., Arizona Univ., USA; Geissler, P., Arizona Univ., USA; Hoppa, G. V., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Europa's crust may be one of the most likely and accessible places for us to find extra-terrestrial life, due to the character of diverse linkages between the ocean and the surface. Additional information is contained in the original extended abstract.
Derived from Text
Ocean Surface; Tides; Europa; Extraterrestrial Life; Exobiology; Ice

20010045275 Hawaii Univ., Hawaii Inst. of Geophysics and Planetology, Honolulu, HI USA
Northwest Africa 176: A Unique Iron Meteorite with Silicate Inclusions Related to Bocaiuva
Liu, Menghua, Hawaii Univ., USA; Scott, E. R. D., California Univ., USA; Keil, K., Hawaii Univ., USA; Wasson, J. T., California Univ., USA; Clayton, R. N., Chicago Univ., USA; Mayeda, T., Chicago Univ., USA; Eugster, O., Bern Univ., Switzerland; Crozaz, G., Washington Univ., USA; Floss, C., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

NWA 176 is a unique iron meteorite with 40 vol.% silicates of chondritic composition that is closely related to the Bocaiuva iron. Both irons contain rounded silicate clasts 1-10 mm in size and might be strongly metamorphosed, metal-rich chondrites. Additional information is contained in the original extended abstract.
Derived from Text
Iron; Iron Meteorites; Silicates; Mineralogy; Geochemistry; Petrography

20010045276 Chiba Inst. of Tech., Research Inst., Narashino, Japan
Mineralogy of Inclusions in the Campo Del Cielo and Mont Dieu Irons and Segregation of Partial Melts
Takeda, Hiroshi, Chiba Inst. of Tech., Japan; Ishii, T., Tokyo Univ., Japan; Otsuki, Mayumi, Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

To find partial melt segregation, we studied two new irons. Segregations of albite and chromite were found in Campo del Cielo and ameboidal FeS in Mont Dieu with the same shape as in IIE irons together with minor Cr diopside and Na,K-rich glass. Additional information is contained in the original extended abstract.
Derived from Text
Inclusions; Mineralogy; Petrology; Isolation

20010045277 California Inst. of Tech., Div. of Geological and Planetary Sciences, Pasadena, CA USA
The Possible Determination of Internal Isochrons for Iron Meteorites
Chen, J. H., California Inst. of Tech., USA; Papanastassiou, D. A., California Inst. of Tech., USA; Wasserburg, G. J., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-8251; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Re-Os on metal and schreibersite in iron meteorites provides the potential for the determination of internal isochrons for irons. This is applied to Wallapai (IID) and other samples. Additional information is contained in the original extended abstract.
Derived from Text
Iron Meteorites; Rhenium; Osmium; Petrology

20010045278 Jet Propulsion Lab., California Inst. of Tech., Earth and Space Sciences Div., Pasadena, CA USA

Chronology and Composition Puzzles in Portales Valley

Papanastassiou, D. A., Jet Propulsion Lab., California Inst. of Tech., USA; Chen, J. H., California Inst. of Tech., USA; Wasserburg, G. J., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-8251; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Rb-SR and Sm-Nd isotopic results on Portales Valley present a puzzle for the evolution of this unique breccia. Additional information is contained in the original extended abstract.

Derived from Text

Breccia; Chronology; Meteorites; Rubidium; Strontium; Samarium; Neodymium

20010045279 Max-Planck-Inst. fuer Chemie, Mainz, Germany

Mn-Cr Isotope Systematics in the Two Ordinary Chondrites Richardton (H5) and Ste. Marguerite (H4)

Polnau, E., Max-Planck-Inst. fuer Chemie, Germany; Lugmair, G. W., Max-Planck-Inst. fuer Chemie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mn-Cr isotopic systematics were determined in the two chondrites Richardton (H5) and Ste. Marguerite (H4) and the calculated Mn-Cr ages are 4556.3 +/- 1.6 Ma and 4565.0 +/- 0.7 Ma, respectively. These ages are compared to the Pb-Pb ages determined by Goepel et al. Additional information is contained in the original extended abstract.

Derived from Text

Chondrites; Geochronology; Magnesium Isotopes; Chromium Isotopes

20010045280 California Univ., San Diego, Scripps Inst. of Oceanography, La Jolla, CA USA

Cr Isotope Systematics in the Pallasite Eagle Station: Chronology and Evidence for a Genetic Link to Carbonaceous Chondrites

Shukolyukov, A., California Univ., San Diego, USA; Lugmair, G. W., California Univ., San Diego, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-4145; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The study of the Mn-53-Cr-53 system in the pallasite Eagle Station has shown that it formed 4557.5 +/- 0.6 Ma ago. The Cr isotopic signature is different from that of the main group pallasites and suggests a genetic link to CV3 chondrites. Additional information is contained in the original extended abstract.

Derived from Text

Carbonaceous Chondrites; Stony-Iron Meteorites; Geochronology; Chromium Isotopes

20010045281 Royal Ontario Museum, Dept. of Earth Sciences, Toronto, Ontario Canada

U-Pb Chronology of Chondritic Pyroxenes

Amelin, Y., Royal Ontario Museum, Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Pyroxenes from ordinary chondrites are found to contain highly radiogenic Pb, and are used to obtain precise pre-metamorphic ages. Additional information is contained in the original extended abstract.

Derived from Text

Chondrites; Chronology; Pyroxenes; Uranium; Mineralogy; Lead (Metal)

20010045282 Comision Nacional de Energia Atomica, Dept. de Fisica, Buenos Aires, Argentina

Cosmogenic Radionuclides in the Campo Del Cielo Iron Meteorite

Liberman, R. G., Comision Nacional de Energia Atomica, Argentina; FernandezNiello, J. O., Comision Nacional de Energia Atomica, Argentina; Reedy, R. C., Los Alamos National Lab., USA; Fifield, L. K., Australian National Univ., Australia; diTada, M. L., Australian National Univ., Australia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; Financial Sponsored in part by Fondo Para la Investigacion Cientifica y Tecnologica (FONCYT); No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Cosmogenic Be-10, Al-26, CL-36, Ca-41, and Ni-59 were measured in the Campo del Cielo iron meteorite. Our results led us to conclude that the pre-atmospheric radius might have been approximately 2 m. Comparisons with other big bodies are also presented. Additional information is contained in the original extended abstract.
Derived from Text
Iron Meteorites; Radioactive Isotopes; Size Determination; Meteoritic Composition

20010045283 California Univ., Space Sciences Lab., Berkeley, CA USA
A Complex Exposure History of the Gold Basin L4-Chondrite Shower from Cosmogenic Radionuclides and Noble Gases
Welten, K. C., California Univ., USA; Nishiizumi, K., California Univ., USA; Caffee, M. W., Lawrence Livermore National Lab., USA; Masarik, J., Komensky Univ., Czechoslovakia; Wieler, R., Eidgenoessische Technische Hochschule, Switzerland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): W-7405-eng-48; NAG5-4992; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Cosmogenic radionuclides and noble gases in samples of the Gold Basin L-chondrite shower indicate a complex exposure history, with a first stage exposure on the parent body, followed by a second stage of approx. 19 Myr in a meteoroid 3-4 m in radius. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Meteoritic Composition; Radioactive Isotopes; Size Determination; Cosmochemistry; Exposure

20010045284 California Univ., Space Sciences Lab., Berkeley, CA USA
The Search for Meteorites with Complex Exposure Histories Among Ordinary Chondrites with Low He-3/Ne-21 Ratios
Welten, K. C., California Univ., USA; Nishiizumi, K., California Univ., USA; Caffee, M. W., Lawrence Livermore National Lab., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): W-7405-eng-48; NAG5-4992; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present concentrations of cosmogenic radionuclides in 15 ordinary chondrites with low He-3/Ne-31 ratios. We identified only one or two meteorites with a complex exposure history, whereas the others are consistent with single-stage exposures. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Exposure; Radioactive Isotopes; Isotope Ratios; Meteoritic Composition; Cosmochemistry

20010045285 California Univ., Space Sciences Lab., Berkeley, CA USA
Exposure History of Shergottites Dar Al Gani 476/489/670/735 and Sayh Al Uhaymir 005
Nishiizumi, K., California Univ., USA; Caffee, M. W., Lawrence Livermore National Lab., USA; Jull, A. J. T., National Science Foundation, USA; Klandrud, S. E., National Science Foundation, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): W-7405-eng-48; NAG5-4992; NAG5-4832; NSF EAR-96-30699; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We measured cosmogenic nuclides, C-14, CL-36, Al-26, and Be-10 in Dar al Gani 476, 489, 670, and 735 and Sayh al Uhaymir 005 basaltic shergottites. The exposure ages and terrestrial ages of these martian meteorites were investigated. Additional information is contained in the original extended abstract.
Derived from Text
Exposure; Shergottites; SNC Meteorites; Cosmochemistry; Meteoritic Composition

20010045286 Rutgers Univ., Dept. of Chemistry, New Brunswick, NJ USA
Be-10, Al-26, and Mn-53 in Martian Meteorites
Schnabel, C., Rutgers Univ., USA; Ma, P., Rutgers Univ., USA; Herzog, G. F., Rutgers Univ., USA; Faestermann, T., Technische Univ. Munich, Germany; Knie, K., Technische Univ. Munich, Germany; Korschinek, G., Technische Univ. Munich, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mn-53 contents of 6 martian meteorites give exposure (CRE) ages similar to those obtained from He-3, Ne-21, and Be-10. CRE ages of lherzolites ALH 77005 and LEW 88516 exceed those of shergottites Zagami and QUE 94201, implying different ejection events. Additional information is contained in the original extended abstract.
Derived from Text
Aluminum Isotopes; Beryllium Isotopes; Ejection; Exposure; Manganese Isotopes; SNC Meteorites; Chronology

20010045287 Physical Research Lab., Ahmedabad, India
Parent Body Irradiation Records in the Fermo Brecciated (H) Chondrite
Murty, S. V. S., Physical Research Lab., India; Bhandari, N., Physical Research Lab., India; Bonino, G., Turin Univ., Italy; Castagnoli, G. Cini, Turin Univ., Italy; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Nuclear tracks and cosmogenic nuclides show that Fermo (H) chondrite meteoroid was a small body and had a simple one stage exposure. Presence of solar flare Ne and neutron effects at Kr-82 and Xe-128 clearly indicate irradiation records acquired on the parent body. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Exposure; Irradiation; Meteoritic Composition

20010045288 NASA Johnson Space Center, Houston, TX USA
Experimental Crystallization of the QUE94201 Basaltic Shergottite
Mikouchi, T., Tokyo Univ., Japan; Koizumi, E., Tokyo Univ., Japan; McKay, G., NASA Johnson Space Center, USA; Le, L., Lockheed Martin Corp., USA; Schwandt, C., Lockheed Martin Corp., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We report preliminary crystallization experiments using the synthetic analog of the QUE94201 basaltic shergottite. The results support that the bulk composition of QUE94201 is close to its parent magma composition. Additional information is contained in the original extended abstract.
Derived from Text
Basalt; Crystallization; Shergottites; Experimentation; Analogs; SNC Meteorites; Petrogenesis

20010045289 Field Museum of Natural History, Dept. of Geology, Chicago, IL USA
Trace Element Microdistributions in Los Angeles: A New Basaltic Shergottite Similar to, yet Distinct from, the Others
Wadhwa, M., Field Museum of Natural History, USA; Crozaz, G., Washington Univ., USA; Lentz, R. C. F., Tennessee Univ., USA; McSween, H. Y., Jr., Tennessee Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In this study we report on ion microprobe analyses of trace element concentrations in minerals of Los Angeles, a newly discovered basaltic martian meteorite. From these data, we make inferences regarding its petrogenesis and relationship to other known basaltic shergottites. Additional information is contained in the original extended abstract.
Derived from Text
Basalt; Petrogenesis; Shergottites; SNC Meteorites; Trace Elements; Meteoritic Composition

20010045290 Max-Planck-Inst. fuer Chemie, Mainz, Germany
Magmatic Inclusions in Olivine and Chromite in Basaltic Shergottite Sayh Al Uhaymir 005: Implications for Petrogenesis and Relationship to Lherzolitic Shergottites
Goodrich, C. A., Max-Planck-Inst. fuer Chemie, Germany; Zipfel, J., Max-Planck-Inst. fuer Chemie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

SaU 005 has an excess mafic component which may be cumulus, xenolithic, or an admixed (primitive) magma. Melt inclusions in olivine and chromite are consistent with any of these, and suggest a link to lherzolitic shergottites rather than EET 79001A. Additional information is contained in the original extended abstract.
Derived from Text
Basalt; Chromites; Inclusions; Olivine; Petrogenesis; Shergottites; Meteoritic Composition

20010045291 NASA Johnson Space Center, Houston, TX USA

REE and Strontium Partition Coefficients for Nakhla Pyroxenes

Oe, K., Tokyo Univ., Japan; McKay, G., NASA Johnson Space Center, USA; Le, L., Lockheed Martin Corp., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present new partition coefficients for REE and SR determined using a synthetic melt that crystallizes pyroxenes very similar in composition to Nakhla pyroxene cores. We believe these are the most appropriate partition coefficients to use in studying Nakhla Additional information is contained in the original extended abstract..

Derived from Text

Pyroxenes; Strontium; Rare Earth Elements; SNC Meteorites; Meteoritic Composition; Nakhlites

20010045292 Notre Dame Univ., Dept. of Civil Engineering and Geological Science, IN USA

New Platinum-Group Element (PGE) Data for Martian Meteorites: The Influence of Igneous Processing

Neal, C. R., Notre Dame Univ., USA; Ely, J. C., Notre Dame Univ., USA; Jain, J. C., Notre Dame Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New PGE data demonstrate the influence of igneous processing on the martian siderophile element budget. Additional information is contained in the original extended abstract.

Derived from Text

Platinum; SNC Meteorites; Meteoritic Composition; Iridium; Osmium; Palladium; Rhodium; Ruthenium

20010045293 New Mexico Univ., Dept. of Earth and Planetary Sciences, Albuquerque, NM USA

Controls on Oxygen Fugacity During Martian Basalt Petrogenesis: Clues from Geochemical Correlations

Herd, C. D. K., New Mexico Univ., USA; Borg, L. E., New Mexico Univ., USA; Papike, J. J., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The oxygen fugacity of Dar al Gani 476 has been re-evaluated, and is QFM-2.3. Oxygen fugacity correlates with geochemical parameters in the martian basalts, indicative of assimilation of oxidized crustal material by reduced, mantle-derived melts. Additional information is contained in the original extended abstract.

Derived from Text

Basalt; Geochemistry; Mars (Planet); Oxygen; Petrogenesis; Gaseous Diffusion

20010045294 California Univ., San Diego, Dept. of Chemistry and Biochemistry, La Jolla, CA USA

Implications of Recent Observations of Mass-Independent Sulfur and Oxygen Isotope Fractionations in Terrestrial Samples for Interpretations of SNC Meteorites

Farquhar, J., California Univ., San Diego, USA; Bao, H., California Univ., San Diego, USA; Thiemens, M. H., California Univ., San Diego, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Recent observation of mass-independent oxygen and sulfur isotope fractionations in terrestrial rocks provide a new context for evaluating natural mass-independent oxygen and sulfur isotope fractionations observed in SNC meteorites. Additional information is contained in the original extended abstract.

Derived from Text

Fractionation; Oxygen Isotopes; SNC Meteorites; Sulfur Isotopes; Meteoritic Composition; Geochemistry

20010045295 California Univ., San Diego, Dept. of Chemistry and Biochemistry, La Jolla, CA USA

Nitrogen and Noble Gas Signatures in Nakhla: Identification of Primitive and Evolved Components

Mathew, K. J., California Univ., San Diego, USA; Marti, K., California Univ., San Diego, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We identified a modern atmospheric Xe in Nakhla which requires a system opening, possibly 1.3 Ga ago. A solar-type, but modified by fission Xe, component is also identified. Ancient component is indicated by excess Xe-129. Additional information is contained in the original extended abstract.
Derived from Text
Nitrogen; Rare Gases; SNC Meteorites; Meteoritic Composition; Geochemistry

20010045296 Carnegie Institution of Washington, Geophysical Lab., Washington, DC USA
Hydrogen Isotope Studies of Water-bearing Post-Stishovite Silica Phase and Feldspathic Glass in the Martian Meteorites Shergotty and Zagami
Boctor, N. Z., Carnegie Institution of Washington, USA; Alexander, C. M. O. D., Carnegie Institution of Washington, USA; Wang, J., Carnegie Institution of Washington, USA; Hauri, E., Carnegie Institution of Washington, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We discuss hydrogen isotopes of post-stishovite silica and feldspathic glass and the source of water in these phases. Additional information is contained in the original extended abstract.
Derived from Text
Hydrogen Isotopes; Meteoritic Composition; Shergottites; Silica Glass; SNC Meteorites; Water

20010045297 NASA Johnson Space Center, Houston, TX USA
Age of EET79001B and Implications for Shergottite Origins
Nyquist, L. E., NASA Johnson Space Center, USA; Reese, Y., Lockheed Martin Space Mission Systems and Services, USA; Wiesmann, H., Lockheed Martin Space Mission Systems and Services, USA; Shih, C.-Y., Lockheed Martin Space Mission Systems and Services, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A precise Rb-SR age of 174+/-3 Ma was determined for EET79001B. A Sm-Nd age of 169+/-23 Ma also was determined, but the Nd isotopic systematics are disturbed. This disturbance is attributed to incomplete isotopic equilibration during petrogenesis. Additional information is contained in the original extended abstract.
Derived from Text
Shergottites; Geochronology; Isotope Ratios; SNC Meteorites; Igneous Rocks; Basalt; Meteoritic Composition

20010045298 Max-Planck-Inst. fuer Chemie, Mainz, Germany
New U-PB Isotope Data on SNC Meteorites
Jagoutz, E., Max-Planck-Inst. fuer Chemie, Germany; Jotter, R., Max-Planck-Inst. fuer Chemie, Germany; Dreibus, G., Max-Planck-Inst. fuer Chemie, Germany; Zartman, R., Max-Planck-Inst. fuer Chemie, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We analysed Nakhla and SaU as well as an optically pure hand-picked mineral separate of SaU Plagioclase for U-Pb isotopic systematics. This new experiment strongly suggests that Nakhla and SaU originated from the same isotopic reservoir. Additional information is contained in the original extended abstract.
Derived from Text
SNC Meteorites; Uranium Isotopes; Lead Isotopes; Geochronology; Isotope Ratios

20010045299 NASA Johnson Space Center, Houston, TX USA
The Age of Dhofar 019 and Its Relationship to the Other Martian Meteorites
Borg, L. E., New Mexico Univ., USA; Nyquist, L. E., NASA Johnson Space Center, USA; Reese, Y., Lockheed Martin Corp., USA; Wiesmann, H., Lockheed Martin Corp., USA; Shih, C.-Y., Lockheed Martin Corp., USA; Ivanova, M., Academy of Sciences (USSR), USSR; Nazarov, M. A., Academy of Sciences (USSR), USSR; Taylor, L. A., Tennessee Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Martian meteorite Dhofar 019 has a Sm-Nd age of 575+/-7 Ma and an initial Sigma Nd value of 34.8 +/- 0.4. A Rb-SR age of 525+/-56 Ma and an initial 87 SR/86 SR ratio of 0.70215 +/- 3 is derived from mineral fractions least altered by terrestrial weathering. Additional information is contained in the original extended abstract.
Derived from Text
SNC Meteorites; Geochronology; Isotope Ratios; Mineralogy; Petrology

20010045300 California Inst. of Tech., Div. of Geological and Planetary Sciences, Pasadena, CA USA
Records of an Ancient Martian Magnetic Field in ALH84001
Weiss, B. P., California Inst. of Tech., USA; Vali, H., McGill Univ., Canada; Baudenbacher, F. J., Vanderbilt Univ., USA; Stewart, S. T., California Inst. of Tech., USA; Kirschvink, J. L., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

SQUID microscope imaging and Ar/Ar dating demonstrate that some of the magnetization ALH84001 is at least 4 Gy old, the oldest ever detected in a planetary rock. This demonstrates that Mars had an active dynamo within 550 My of its formation. Additional information is contained in the original extended abstract.
Derived from Text
Mars (Planet); Planetary Magnetic Fields; Geochronology; SNC Meteorites; Geomagnetism; Paleomagnetism

20010045301 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Reflected Signal Analysis and Surface Albedo in the Mars Orbiter Laser Altimeter (MOLA) Investigation
Ivanov, Anton B., Jet Propulsion Lab., California Inst. of Tech., USA; Muhleman, Duane O., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-4437; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This work presents results from the analysis of the reflectivity data from the MOLA investigation. We will discuss calculation of the surface albedo using the MGS TES 9 micron opacity. We will also overview reflectivity data collected to date. Additional information is contained in the original extended abstract.
Derived from Text
Albedo; Reflectance; Signal Analysis; Mars Surface; Computation; Algorithms; Absorptivity; Surface Properties

20010045302 Centre National de la Recherche Scientifique, Midi-Pyrenees Observatory, Toulouse, France
Regional Photometry and Spectral Albedo of the Eastern Hemisphere of Mars in the 0.7-1. Micron Domain
Pinet, P. C., Centre National de la Recherche Scientifique, France; Rosemberg, C., Centre National de la Recherche Scientifique, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The regional photometry of Mars is explored as a function of wavelength and surface albedo. The relationship between the Minnaert's coefficient and the geometric albedo appears more complex than the first order linear case generally considered. Additional information is contained in the original extended abstract.
Derived from Text
Albedo; Eastern Hemisphere; Mars (Planet); Photometry; Mars Surface

20010045303 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA
The Thermophysical Properties of Ares Vallis from Thermal Emission Spectrometer Data
Nowicki, S. A., Arizona State Univ., USA; Christensen, P. R., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This investigation of the Ares Vallis region of Mars is a detailed analysis of TES data to constrain the thermophysical properties of the material exposed in the region, and interpret those as geologic surfaces. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Spectrometers; Thermal Emission; Thermophysical Properties; Mars (Planet); Meteorite Craters

20010045304 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Thermal Inertia of Rocks and Rock Populations

Golombek, M. P., Jet Propulsion Lab., California Inst. of Tech., USA; Jakosky, B. M., Colorado Univ., USA; Mellon, M. T., Colorado Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The effective thermal inertia of rock populations on Mars and Earth is derived from a model of effective inertia versus rock diameter. Results allow a parameterization of the effective rock inertia versus rock abundance and bulk and fine component inertia. Additional information is contained in the original extended abstract.

Derived from Text

Inertia; Rocks; Thermal Emission; Mars Surface; Mars (Planet); Topography

20010045305 Malin Space Science Systems, San Diego, CA USA

Geologic Aspects and Relations of Small Eolian Dunes and Large Ripples on Mars

Edgett, K. S., Malin Space Science Systems, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Small dune-like or large ripple-like eolian bedforms are common on Mars. Many are old, cratered, and mantled, others appear sharp and fresh. In either case, they are telling us something about recent geologic history of Mars. Additional information is contained in the original extended abstract.

Derived from Text

Dunes; Mars Surface; Mars (Planet); Terraforming; Topography

20010045306 California Inst. of Tech., Div. of Geological and Planetary Sciences, Pasadena, CA USA

Aeolian Erosional and Depositional Cycles on Mars: Initial Exploration of Surface Wind Stress for Varying Surface Pressures and Orbital Parameters with a GCM

Richardson, M. I., California Inst. of Tech., USA; McCleese, D. J., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present results from an atmospheric model which provide insight into how surface stresses vary with atmospheric mass and discuss implications for erosion and deposition Additional information is contained in the original extended abstract..

Derived from Text

Atmospheric Models; Ground Wind; Mars (Planet); Mars Atmosphere; Atmospheric Pressure; Planetary Meteorology; Wind Erosion; Wind Effects

20010045307 NASA Ames Research Center, Moffett Field, CA USA

Evidence of Strong Change in Seasonal Wind Pattern for Ultimi Lobe, Southern Polar Layered Deposits, Mars

Neakrase, Lynn D. V., Arizona State Univ., USA; Greeley, Ronald, Arizona State Univ., USA; Haberle, Robert M., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present a comparison of aeolian features with Mars Global Circulation Model for Southern Polar Layered Deposits using high-resolution MOC images. Additional information is contained in the original extended abstract.

Derived from Text

Atmospheric Circulation; Atmospheric Models; Dust Storms; Mars Surface; Wind (Meteorology); Mars (Planet); Mars Atmosphere; Polar Caps; Wind Effects

20010045308 NASA Ames Research Center, Moffett Field, CA USA

Topography and Aeolian Features: Dunes and Streaks Compared with Global and Meso Scale Wind Predictions

Greeley, R., Arizona State Univ., USA; Rafkin, S. C. R., San Jose State Univ., USA; Haberle, R. M., NASA Ames Research Center, USA; Kuzmin, R. O., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Aeolian features have been compared with global and meso-scale models of the atmospheric circulation which predict near-surface winds as a function of variables such as martian season and location on the planet. Additional information is contained in the original extended abstract.
Derived from Text
Atmospheric Circulation; Dunes; Mars (Planet); Topography; Wind (Meteorology); Wind Effects; Atmospheric Models

20010045309 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Composition and Color of Martian Soil from Oxidation of Meteoritic Material
Yen, A. S., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Aqueous weathering is not necessary for formation of the martian soils. The chemical composition and oxidation state of the surface fines can be attributed to meteoritic influx. Additional information is contained in the original extended abstract.
Derived from Text
Chemical Composition; Mars Surface; Oxidation; Weathering; Mars (Planet); Meteorites

20010045310 Space Science Inst., Boulder, CO USA
N-Dimensional Visualization and Spectral Mixture Analysis Applied to Imager for Mars Pathfinder Data: Detection and Mapping of Rocks and Soils
Farrand, W. H., Space Science Inst., USA; Johnson, J. R., Geological Survey, USA; Bell, J. F., III, Cornell Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-9774; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Sub-pixel analysis techniques applied to MPF IMP data indicate the presence of several rock and soil types. These techniques confirm the presence of a ”black” rock type and indicate a new soil type. Additional information is contained in the original extended abstract.
Derived from Text
Rocks; Soils; Mars Surface; Mars (Planet); Soil Mapping; Petrography

20010045311 Search for Extraterrestrial Intelligence Inst., Moffett Field, CA USA
A Study of Soil and Duricrust Models for Mars
Bishop, J. L., Search for Extraterrestrial Intelligence Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-3871; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

An analysis of soil and duricrust formation mechanisms on Mars is presented. Soil analog mixtures have been prepared, characterized and tested through wet/dry cycling experiments; results are compared with Mars Pathfinder soil data (spectral, chemical and magnetic). Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Soils; Mars (Planet); Planetary Crusts; Analogs

20010045312 NASA Ames Research Center, Moffett Field, CA USA
Get the Red Out: Removing Diffuse Sky Illumination from Mars Pathfinder Images
Stoker, Carol, NASA Ames Research Center, USA; Rages, Kathy, NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; Sponsored by the Mars Pathfinder Data Analysis Program; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Radiative transfer calculations are performed to remove the effect of diffuse illumination on the color of the martian surface. We describe the methods and apply them to a radiometric calibration target, and to a superpan cube of the rock Yogi. Additional information is contained in the original extended abstract.
Derived from Text
Calibrating; Color; Mars Surface; Radiative Transfer; Image Processing; Mars (Planet); Mars Atmosphere; Light Scattering

20010045313 Academy of Sciences (USSR), Vernadsky Inst. of Geochemistry and Analytical Chemistry, Moscow, USSR
Geologic Mapping of Vega 1 Landing Site Region
Abdrakhimov, A. M., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Geologic mapping of the Vega 1 landing site showed that the area is dominated by Wrinkle Ridged Plains (98%). Densely Fractured Plains (1%), Shield Plains (1%) and some others are subordinate. So the lander probably sampled the Wrinkle Ridged Plains. Additional information is contained in the original extended abstract.
Derived from Text
Geological Surveys; Landing Sites; Mapping; Venus (Planet); Venus Surface

20010045314 Academy of Sciences (USSR), Vernadsky Inst. of Geochemistry and Analytical Chemistry, Moscow, USSR
Geologic Mapping of Vega 2 Landing Site Region
Abdrakhimov, A. M., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Geologic mapping of the Vega 2 landing site showed that the area is dominated by Wrinkle Ridged Plains (99%). Less widespread are Lobate Plains (1%) and Fractured and Ridged Plains (is less than 0.1%). So the lander probably sampled the Wrinkle Ridged Plains. Additional information is contained in the original extended abstract.
Derived from Text
Geological Surveys; Landing Sites; Mapping; Venus (Planet); Venus Surface

20010045315 Academy of Sciences (USSR), Vernadsky Inst. of Geochemistry and Analytical Chemistry, Moscow, USSR
Geologic Mapping of Venera 8 Landing Site Region
Abdrakhimov, A. M., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Geologic mapping of the Venera 8 landing site showed that the area is dominated by Shield Plains (75%). Wrinkle Ridged Plains (15%), Lobate Plains (3%) and some others are subordinate. So the lander most probably sampled the Shield Plains. Additional information is contained in the original extended abstract.
Derived from Text
Geological Surveys; Landing Sites; Mapping; Venus (Planet); Venus Surface; Planetary Geology

20010045316 Academy of Sciences (USSR), Vernadsky Inst. of Geochemistry and Analytical Chemistry, Moscow, USSR
Geologic Mapping of Venera 9 Landing Site Region
Abdrakhimov, A. M., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Geologic mapping of the Venera 9 landing site showed the area is dominated by Wrinkle Ridged Plains (60%). Fractured and Ridged Plains (21%), Tessera Terrain (14%) and some others are subordinate. So the lander most probably sampled Shield Plains. Additional information is contained in the original extended abstract.
Derived from Text
Geological Surveys; Landing Sites; Mapping; Terrain; Venus (Planet); Venus Surface; Planetary Geology

20010045317 Academy of Sciences (USSR), Vernadsky Inst. of Geochemistry and Analytical Chemistry, Moscow, USSR
Geologic Mapping of Venera 10 Landing Site Region
Abdrakhimov, A. M., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Geologic mapping of the Venera 10 landing site showed that the area is dominated by Wrinkle Ridged Plains (60%). Lobate Plains (21%), Tessera Terrain (15%) and some others are subordinate. So the lander most probably sampled Shield Plains. Additional information is contained in the original extended abstract.
Derived from Text
Geological Surveys; Landing Sites; Mapping; Venus Surface; Venus (Planet); Terrain

20010045318 Academy of Sciences (USSR), Vernadsky Inst. of Geochemistry and Analytical Chemistry, Moscow, USSR
Geologic Mapping of Venera 13 Landing Site Region
Abdrakhimov, A. M., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Geologic mapping of the Venera 13 landing site showed that the area is dominated by Wrinkle Ridged Plains (90%). Lobate Plains (3%), Shield Plains (3%) and some others are subordinate. So the lander most probably sampled the Wrinkle Ridged Plains. Additional information is contained in the original extended abstract.
Derived from Text
Geological Surveys; Landing Sites; Mapping; Venus (Planet); Venus Surface

20010045319 Academy of Sciences (USSR), Vernadsky Inst. of Geochemistry and Analytical Chemistry, Moscow, USSR
Geologic Mapping of Venera 14 Landing Site Region
Abdrakhimov, A. M., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Geologic mapping of the Venera 14 landing site showed that the area is dominated by Lobate Plains (53%). Wrinkle Ridged Plains (27%), Rift Terrain (14%) and some others are subordinate. So the lander most probably sampled the Lobate Plains. Additional information is contained in the original extended abstract.
Derived from Text
Geological Surveys; Landing Sites; Mapping; Terrain; Venus (Planet); Venus Surface

20010045320 Muenster Univ., Inst. fuer Planetologie, Germany
Integrated Remote Sensing of the Spider Impact Structure, Australia - Potential Effects of the Morphostructural Setting on Cratering
Abels, A., Muenster Univ., Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Spider impact structure has been investigated by means of integrated remote sensing. It is concluded that cratering was influenced by the original morphostructural setting leading to the present, highly asymmetric properties of the deeply eroded site. Additional information is contained in the original extended abstract.
Derived from Text
Asymmetry; Meteorite Craters; Projectile Cratering; Meteoritic Damage; Geomorphology

20010045321 Oulu Univ., Dept. of Physical Sciences, Finland
Age Relations Between Coronae and Novae
Aittola, M., Oulu Univ., Finland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Majority of the novae, which are located in the inner part of the coronae, seem to postdate corona formation. These novae are usually located close to the corona annulus and display prominent topographic rise. Additional information is contained in the original extended abstract.
Derived from Text
Topography; Venus (Planet); Venus Surface; Planetary Craters; Planetary Geology; Geochronology

20010045322 Fernbank Science Center, Dept. of Space Sciences, Atlanta, GA USA
Igneous Dike Remnants and the Emplacement of Flood Lavas Within Martian Impact Basins
Albin, E. F., Fernbank Science Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A survey of high resolution Mars Observer Camera (MOC) images has revealed thin linear ridge-like features that are interpreted as the weathered remnants of igneous dikes within impact basins. Additional information is contained in the original extended abstract.
Derived from Text
Lava; Mars Craters; Mars Surface; Rock Intrusions; Structural Basins; Igneous Rocks

20010045323 Fernbank Science Center, Dept. of Space Sciences, Atlanta, GA USA
Origin of Dark Slope Streaks Within the Schiaparelli Impact Basin, Mars
Albin, E. F., Fernbank Science Center, USA; King, J. D., Georgia Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Schiaparelli basin is a prominent 470-km diameter impact feature situated in the equatorial cratered uplands of Mars. The nature and origin of dark slope streaks within the basin is discussed. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Slopes; Mars Craters; Mars (Planet)

20010045324 Academy of Sciences (USSR), Vernadsky Inst. of Geochemistry and Analytical Chemistry, Moscow, USSR
The Strange Features of the H5 Chondrites
Alexeev, V. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): RFFR-N98-05-64018; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

High fragmentation of H5 chondrites in the Earth atmosphere and significant losses of their cosmogenic and radiogenic gases may be caused by a feature of the catastrophic event on the H chondrite parent body about 200 Ma ago. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Fragmentation; Geochronology; Meteoritic Composition

20010045325 Academy of Sciences (USSR), Inst. of Geochemistry and Analytical Chemistry, Moscow, USSR
The Kunya-Urgench and Some Other Fresh-fallen Chondrites: Cosmogenic Radionuclides
Alexeev, V. A., Academy of Sciences (USSR), USSR; Gorin, V. D., Academy of Sciences (USSR), USSR; Ustinova, G. K., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): RFFR-N98-05-64018; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A set of radionuclide measurements in the fresh-fallen chondrites is carried out nondestructively, as a part of our research program to study the radiation history of the chondrites, as well as the radiation conditions in the contemporary heliosphere. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Radioactive Isotopes; Circumsolar Radiation; Extraterrestrial Radiation

20010045326 Academy of Sciences (USSR), Vernadsky Inst., Moscow, USSR
Ni-Co, Cu, and Zn Sulfides in the Melt Rocks of the Saaksjarvi Crater: Characteristics and Their Possible Origin
Badjukov, D. D., Academy of Sciences (USSR), USSR; Raitala, J., Oulu Univ., Finland; Petrova, T. L., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Pentlandite, Fe-Ni-Co monosulfide, millerite, chalkopyrite, and sphalerite were found in the Saaksjarvi melts. Morphology of some inclusions suggests a presence of sulfide liquids in the melts. Meteoritic origin for Ni-Co sulfides is proposed. Additional information is contained in the original extended abstract.
Derived from Text
Inclusions; Morphology; Rocks; Sulfides; Minerals; Impact Damage; Petrology

20010045327 Colorado Univ., APS Dept., Boulder, CO USA

Rise of Deep Melt into Ganymede's Ocean and Implications for Astrobiology

Barr, Amy C., Colorado Univ., USA; Pappalardo, Robert T., Brown Univ., USA; Stevenson, David J., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We investigate conditions under which magmatic events at Ganymede's rock/ice interface could generate pockets of water melt which rise through the ice mantle and carry nutrients to the ocean to help sustain a biota. Additional information is contained in the original extended abstract.

Derived from Text

Exobiology; Ice; Rocks; Water; Ganymede; Extraterrestrial Life; Planetary Environments

20010045328 Eoetvoes LORANd Univ., Dept. of Meteorology, Budapest, Hungary

Teaching High-School and Undergraduate Students to Download, Understand and Use Satellite Images

Bartholy, J., Eoetvoes LORANd Univ., Hungary; Pongracz, R., Eoetvoes LORANd Univ., Hungary; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This course is offered mainly for undergraduate students, however, the program can serve as a base in secondary schools or for self-education purposes. Our paper summarizes the course focusing on new ideas and features of satellite imagery. Additional information is contained in the original extended abstract.

Derived from Text

Education; Satellite Imagery; Schools; Students; Internets; World Wide Web

20010045329 Academy of Sciences (USSR), Vernadsky Inst., Moscow, USSR

Photogeologic Analysis of the 15 m/px Resolution Images of Callisto Taken at Orbit C21

Basilevsky, A. T., Academy of Sciences (USSR), USSR; Zabalueva, E. V., Academy of Sciences (USSR), USSR; Kotova, I. V., Moscow State Univ., Russia; Ivanov, M. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

15 m/px res Galileo images of Callisto show small (is less than 1-2 km) craters which degradation style is similar to that of lunar craters of the same size. This indicates that major factors of their degradation are impact regardening and mass wasting. Additional information is contained in the original extended abstract.

Derived from Text

Callisto; Craters; Photogeology; Geomorphology; Image Analysis

20010045330 NASA Johnson Space Center, Houston, TX USA

A Re-Assessment of Global Color Units on Mars from Hubble Space Telescope Visible to Near-IR Imaging and Spectroscopy

Bell, J. F., III, Cornell Univ., USA; Morris, R. V., NASA Johnson Space Center, USA; Farrand, W. H., Space Science Inst., USA; Wolff, M. J., Space Science Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-4333; OG-08152; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We are using new multispectral imaging and imaging spectroscopic measurements of Mars from the Hubble Space Telescope (HST) to identify and map Mars surface color and spectroscopic units globally at scales of approx. 20 to 50 km/pix. Additional information is contained in the original extended abstract.

Derived from Text

Imaging Techniques; Mars Surface; Planetary Mapping; Planetary Composition; Mars (Planet); Mineralogy

20010045331 Arkansas Univ., Center for Space and Planetary Sciences, Fayetteville, AR USA

The Orbital Distribution of Meteorites Based on High Temperature Thermoluminescence, 1, Theory and Modern Falls

Benoit, P. H., Arkansas Univ., USA; Sears, D. W. G., Arkansas Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Like 250 C Thermoluminescence (TL) data, 400 C TL levels of modern falls largely reflect solar heating, and thus perihelia. The 400 C data offers additional constraints on orbital information for ordinary chondrites. Additional information is contained in the original extended abstract.
Derived from Text
High Temperature; Meteorites; Thermoluminescence; Orbits; Perihelions; Insolation

20010045332 Eoetvoes LORANd Univ., Dept. of Physics, Budapest, Hungary
How We Used NASA Lunar Sample Set in Making an Educational Atlas Series of the Solar System Materials: (1), (2)
Berczi, Sz., Eoetvoes LORANd Univ., Hungary; Fabriczy, A., Eoetvoes LORANd Univ., Hungary; Hegyi, S., Pecs Univ., Hungary; KovacsZs. I., Berzsenyi Daniel Coll., Hungary; Keresztesi, M., Pecs Univ., Hungary; Cech, V., Eoetvoes LORANd Univ., Hungary; Diosy, T., Eoetvoes LORANd Univ., Hungary; Jozsa, S., Eoetvoes LORANd Univ., Hungary; Holba, A., Central Research Inst. for Physics, Hungary; Lukacs, B., Central Research Inst. for Physics, Hungary; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Our group compiled an Educational Atlas Series of the Solar System (Planetary and Material Maps). 1) Lunar and Asteroidal Evolution (lunar samples and meteorites), 2) Planetary Surface Studies by Surveyor and Experimental University Lander Hunveyor. Additional information is contained in the original extended abstract.
Derived from Text
Education; Lunar Geology; Solar System; Lunar Rocks; Planetary Systems; Planets; Maps

20010045333 NASA Ames Research Center, Moffett Field, CA USA
Proposed Wind Tunnel Studies of Ventifact Formation on Mars and Earth
Bridges, N. T., Jet Propulsion Lab., California Inst. of Tech., USA; Greeley, R., Arizona State Univ., USA; Kramer, G. M., NASA Ames Research Center, USA; Laity, J. E., California State Univ., USA; Phoreman, J., California Univ., USA; White, B. R., California Univ., USA; Wilson, G. R., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Upcoming experiments to produce ventifacts in the wind tunnel under terrestrial and martian conditions are discussed. Additional information is contained in the original extended abstract.
Derived from Text
Rocks; Wind Effects; Wind Tunnels; Petrography; Abrasion; Erosion

20010045334 Tennessee Univ., Dept. of Geological Sciences, Knoxville, TN USA
Portales Valley: The Bidirectional Reflectance Spectrum of a Unique H5 Breccia
Britt, D. T., Tennessee Univ., USA; Kring, D. A., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Portales Valley is an H5 ordinary chondrite with extensive crosscut metal rich veins. The bidirectional reflectance spectrum of its silicate portion is presented. Additional information is contained in the original extended abstract.
Derived from Text
Chondrites; Silicates; Breccia; Surface Properties; Meteoritic Composition

20010045335 Tennessee Univ., Dept. of Geological Sciences, Knoxville, TN USA
Ourique: Spectra and Petrology of an H4 Gas-rich Breccia
Britt, D. T., Tennessee Univ., USA; Kelsey, C. M., Arizona Univ., USA; Kring, D. A., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Ourique is a brecciated, gas-rich, H4 ordinary chondrite with a light-dark structure. The dark matrix shows lower reflectance and absorption features relative to the light clasts. The matrix is enhanced in the finest size fractions of metal. Additional information is contained in the original extended abstract.
Derived from Text
Breccia; Chondrites; Petrology; Regolith

20010045336 Academy of Sciences (USSR), Vernadsky Inst. of Geochemistry and Analytical Chemistry, Moscow, USSR
Topographic Feature Names on Venus: Progress in 2000, Review of 1997-2000 Development, Current State, and Prospective
Burba, G. A., Academy of Sciences (USSR), USSR; Blue, J., Geological Survey, USA; Campbell, D. B., Cornell Univ., USA; Dollfus, A., Pari-Meodon Observatory, France; Gaddis, L., Geological Survey, USA; Jurgens, R. F., Jet Propulsion Lab., California Inst. of Tech., USA; Marov, M. Ya., Academy of Sciences (USSR), USSR; Pettengill, G. H., Massachusetts Inst. of Tech., USA; Stofan, E. R., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

12 names assigned on Venus in 2000. The current list includes 1821 names of 21 feature types. 95% of names present 11 types of features. The main named types are craters - 872, and coronae - 267. These two types possess 62% of the names. Additional information is contained in the original extended abstract.
Derived from Text
Topography; Venus (Planet); Naming; Nomenclatures; Venus Surface; Landforms

20010045337 Moscow State Univ., Sternberh State Astronomical Inst., Russia
Oxidized and Hydrated Silicates on M- and S-Asteroids: Spectral Indications
Busarev, V. V., Moscow State Univ., Russia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

From our observational data we suppose that oxidized silicates may be widespread on the main-belt asteroids including differentiated bodies. Moreover, there is also a possibility of presence on the asteroids a small amount of hydrated silicates. Additional information is contained in the original extended abstract.
Derived from Text
Asteroids; Silicates; Hydration; Oxidation

20010045338 Malin Space Science Systems, San Diego, CA USA
Interannual Variability of the Martian Residual North Polar Cap
Cantor, B. A., Malin Space Science Systems, USA; James, P. B., Toledo Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Low-resolution MOC images of Mars during the 2000-1 northern summer season reveal a residual north polar cap that is smaller than that seen the previous martian year. Additional information is contained in the original extended abstract.
Derived from Text
Mars (Planet); Mars Surface; Polar Caps; Summer; Variability; Mars Environment; Planetary Cryospheres; Planetary Meteorology; Dust Storms

20010045339 Malin Space Science Systems, San Diego, CA USA
High-Resolution Imaging of Ceraunius Tholus, Mars
Caplinger, M. A., Malin Space Science Systems, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Features seen in new images of the small Tharsis volcano Ceraunius Tholus from the Mars Global Surveyor (MGS) Mars Orbiter Camera (MOC) are described. Additional information is contained in the original extended abstract.
Derived from Text
Imaging Techniques; Mars Volcanoes; Mars (Planet); Mars Craters

20010045340 Senshu Univ., Kawasaki, Japan
Mineralogical Study of GRA95209 Lodranite in Comparison with Acapulcoites and IAB Iron Meteorites
Chikami, J., Senshu Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

High ZnO content in both GRA95209 chromite and IAB iron meteorites and heterogenous metal distribution in GRA95209 and Caddo County IAB iron meteorite might suggest the common formation process between GRA95209 and IAB iron meteorites. Additional information is contained in the original extended abstract.
Derived from Text
Iron Meteorites; Meteoritic Composition; Mineralogy

20010045341 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA
Europa's 'Mitten': Estimate of Ice Thickness Using an Elastic Plate Model
Chuang, F. C., Arizona State Univ., USA; Figueredo, P. H., Arizona State Univ., USA; Kirk, R. L., Geological Survey, USA; Greeley, R., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Results of a 2-D elastic plate model used to estimate the thickness of ice below Europa's 'mitten' are presented. Using properties of polycrystalline water ice and inferred Europan "cryomagma", we calculate an elastic thickness of approx. 2.1-2.6 km. Additional information is contained in the original extended abstract.
Derived from Text
Ice; Thickness; Europa; Landforms

20010045342 NASA Johnson Space Center, Houston, TX USA
A Proposal for an Integrated Geophysical Strategy to "Follow the Water" on Mars
Clifford, S. M., Lunar and Planetary Inst., USA; George, J. A., NASA Johnson Space Center, USA; Stoker, C. R., NASA Ames Research Center, USA; Briggs, G., NASA Ames Research Center, USA; Beaty, D. W., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In this abstract we propose an integrated strategy for the geophysical exploration of Mars that we believe represents the fastest, most cost-effective, and technically capable approach to identifying the state and distribution of subsurface water. Additional information is contained in the original extended abstract.
Derived from Text
Geophysics; Identifying; Water; Mars (Planet); Mars Surface; Bioastronautics; Mars Environment

20010045343 Winnipeg Univ., Dept. of Geography, Manitoba Canada
Spectral Reflectance Properties of Calcium-Aluminum Inclusion Minerals, 2, Melilites
Cloutis, E. A., Winnipeg Univ., Canada; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The reflectance spectra of melilites exhibit absorption features attributable to both ferrous and ferric iron. This mineral does not appear to be a spectrally dominant component of calcium-aluminum inclusions (CAIs). Additional information is contained in the original extended abstract.
Derived from text
Spectral Reflectance; Mineralogy; Iron; Inclusions; Carbonaceous Chondrites

20010045344 Winnipeg Univ., Dept. of Geography, Manitoba Canada
Reflectance Spectra of Heated Palagonites
Cloutis, E. A., Winnipeg Univ., Canada; Bell, J. F., III, Cornell Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Heating of palagonites results in a number of spectral changes, mimicking those of naturally heated palagonites. These include reductions in H2O/OH band depths, increasing reflectance and a redder sloped spectrum. Additional information is contained in the original extended abstract.
Derived from Text
Spectral Reflectance; SNC Meteorites; Glass

20010045345 Winnipeg Univ., Dept. of Geography, Manitoba Canada

Spectral Reflectance Properties of Calcium-Aluminum Inclusion Minerals, 1, Perovskites

Cloutis, E. A., Winnipeg Univ., Canada; Gautason, B., Akureyri Univ., Iceland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The reflectance spectra of perovskites exhibit high overall reflectance and a number of absorption bands due to ferrous iron which may be diagnostic of composition. Additional information is contained in the original extended abstract.

Derived from Text

Spectral Reflectance; Perovskites; Iron; Carbonaceous Chondrites; Meteoritic Composition

20010045346 Moscow M. V. Lomonosov State Univ., Dept. of Geology, Moscow, Russia

Chemical Compositions of Rock-forming Minerals from Sahara 98044 (CV3) Refractory Inclusions and Findings of Rare Ge-rich Phases in Some Carbonaceous Chondrites

Demidova, S. I., Moscow M. V. Lomonosov State Univ., Russia; Ulyanov, A. A., Moscow M. V. Lomonosov State Univ., Russia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; Financial sponsored in part by Universities of Russia - Fundamental Investigations

Contract(s)/Grant(s): RFBR-99-05-6431; URFI-5305; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Calcium-aluminum inclusions (CAIs) from CV3 Sahara 98044 chondrite were studied and classified and detail mineralogical description of each type is given. Ge-rich phases were observed in one unique refractory inclusion from this chondrite and also in other carbonaceous chondrites. Additional information is contained in the original extended abstract.

Derived from Text

Carbonaceous Chondrites; Chemical Composition; Inclusions; Mineralogy; Meteoritic Composition

20010045347 Muenster Univ., Inst. fuer Planetologie, Germany

A Re-Examination of the Occurrence of Cosmic Spherules in the Mesoproterozoic Jotnian Sandstone

Deutsch, A., Muenster Univ., Germany; Kettrup, D., Muenster Univ., Germany; Pesonen, L. J., Helsinki Univ., Finland; Pihlaja, P., Geological Survey of Finland, Finland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; Financial sponsored in part by Academy of Finland Exchange Program and German Science Foundation

Contract(s)/Grant(s): GSF De 401/16; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Following an earlier description of the occurrence of cosmic spherules in the Satakunta sandstone, Finland, we sampled different outcrops. After two years of careful separation, it turned out that the samples from the Satakunta sandstone are barren. Additional information is contained in the original extended abstract.

Derived from Text

Outcrops; Spherules; Sandstones; Micrometeorites

20010045348 Main Astronomical Observatory, Kiev, Ukraine

Optical Characteristics of the Martian Dust

Dlugach, J. M., Main Astronomical Observatory, Ukraine; Morozhenko, A. V., Main Astronomical Observatory, Ukraine; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

It is shown that when variations in optical thickness of the martian atmosphere are ignored in the analysis of the data obtained from the martian surface, this may result in overestimating both the values of the intensity and optical thickness of the dust component. Additional information is contained in the original extended abstract.

Derived from text

Dust; Mars Atmosphere; Mars Surface; Optical Properties; Optical Thickness

20010045349 Southwest Research Inst., Space Studies Dept., Boulder, CO USA

Problematic Constraints on Collisional Evolution in the Edgeworth-Kuiper Belt: Difficulties in Exploiting the "Vesta Crust" Paradigm

Durda, D. D., Southwest Research Inst., USA; Stern, S. A., Southwest Research Inst., USA; Lunine, J. I., Arizona Univ., USA; Morbidelli, A., Observatoire de la Cote d'Azur, France; Lunar and Planetary Science XXXII; 2001; In English; See also

20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The existence of Pluto's volatile N2/CO/CH4 crust against 4.5 Gyr of Kuiper Belt bombardment is used to attempt to constrain the collisional history of the 30-50 AU zone and the timing of Pluto's crustal differentiation. Additional information is contained in the original extended abstract.

Derived from Text

Pluto (Planet); Planetary Crusts; Meteoritic Damage; Planetary Geology; Kuiper Belt

20010045350 Malin Space Science Systems, San Diego, CA USA

Rock Stratigraphy in Gale Crater, Mars

Edgett, K. S., Malin Space Science Systems, USA; Malin, M. C., Malin Space Science Systems, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A layered mound in Gale Crater is a remnant of a more extensive sequence that likely once filled the crater and represents a suite of layered materials on Mars interpreted as 'Noachian' sedimentary rock units. Additional information is contained in the original extended abstract.

Derived from Text

Mars Craters; Mars Surface; Planetary Geology; Stratigraphy

20010045351 Moscow M. V. Lomonosov State Univ., Geological Faculty, Moscow, Russia

Opacitization or Shock-Thermal Decomposition?

Feldman, V. I., Moscow M. V. Lomonosov State Univ., Russia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

During the action of shock wave on rock-forming minerals black opaque polymineral aggregate is formed. These aggregates are interpreted as a result of opacitization or shock-thermal decomposition. What is correct? Additional information is contained in the original extended abstract.

Derived from Text

Thermal Decomposition; Shock Waves; Opacity; Rocks; Mineralogy

20010045352 Academy of Sciences (USSR), Moscow, USSR

Estimation of Shock Pressure for Ureilites from the Contents of Ar and Xe in Diamonds

Fisenko, A. V., Academy of Sciences (USSR), USSR; Semjonova, L. F., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have estimated the shock pressure in Kenna and Novo Urei ureilites on the basis of Ar and Xe contents in diamonds and bulk samples. It's possible the ureilites of this type have experienced shock pressure equal to 65 plus or minus 16 GPa. Additional information is contained in the original extended abstract.

Derived from Text

Ureilites; Argon; Xenon; Pressure; Shock; Diamonds

20010045353 Academy of Sciences (USSR), Moscow, USSR

The Distribution of Ar and Xe Inside Diamond Grains from Efremovka

Fisenko, A. V., Academy of Sciences (USSR), USSR; Verchovsky, A. B., Open Univ., UK; Semjonova, L. F., Academy of Sciences (USSR), USSR; Pillinger, C., Open Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Analysis of the release pattern of Ar and Xe from grain size fractions of Efremovka presolar diamonds at stepped combustion and pyrolysis indicates that in both cases the gases release as a result of destruction of the diamond lattice. Additional information is contained in the original extended abstract.

Derived from Text

Argon; Xenon; Meteoritic Diamonds; Meteorites

20010045354 European Space Agency. European Space Research and Technology Center, ESTEC, Noordwijk, Netherlands
ICEUM4 Participants Results and Recommendations from the International Conference on the Exploration and Utilisation of the Moon 4 (ICEUM4)
Foing, B. H., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Heather, D. J., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Duke, M., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Racca, G., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Pieters, C., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Mizutani, H., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Galimov, E., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Dunkin, S. K., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; vanSusante, P., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Frischauf, N., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Almeida, M., European Space Agency. European Space Research and Technology Center, ESTEC, Netherlands; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present here highlights and recommendations from the International Lunar Exploration Working Group (ILEWG) organized International Conference on the Exploration and Utilisation of the Moon 4 (ICEUM4) meeting held in the Netherlands in July 2000. Additional information is contained in the original extended abstract.
Derived from Text
Conferences; Lunar Exploration; Moon

20010045355 Centre National de la Recherche Scientifique, Orsay, France
Near-Infrared Spectral Observations of Triton
Forni, O., Centre National de la Recherche Scientifique, France; LeMouelic, S., Centre National de la Recherche Scientifique, France; Quirico, E., Centre National de la Recherche Scientifique, France; deBergh, C., Observatoire de Paris-Meudon, France; Marchis, F., Centre National de la Recherche Scientifique, France; Schmitt, B., Grenoble Univ., France; Doute, S., Grenoble Univ., France; Prange, R., Centre National de la Recherche Scientifique, France; dHendecort, L., Centre National de la Recherche Scientifique, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Near-infrared spectral observations of Triton have been obtained with the ESO New Technology Telescope (NTT). Three unidentified bands previously observed are no longer detected, and the extended spectral range will be useful to bring new clues on the surface of Triton. Additional information is contained in the original extended abstract.
Derived from Text
Triton; Near Infrared Radiation; Spectrum Analysis; Telescopes

20010045356 Lancaster Univ., Environmental Science Dept., UK
Interpretation of Strain Measurements in Diana Chasma, Venus
Fowell, M., Lancaster Univ., UK; Wilson, L., Lancaster Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have used a new digital technique (usable as a general mapping tool) to explore the spatial variation of extensional tectonic strain within the Diana Chasma region of Venus. The results are consistent with the presence of micro-plates on Venus. Additional information is contained in the original extended abstract.
Derived from Text
Digital Techniques; Spatial Distribution; Strain Measurement; Tectonics; Venus (Planet); Venus Surface

20010045357 Institute for Space Devices, Moscow, USSR
TERMOSCAN Data-derived Thermal Inertia Mapping of Mars with Super High-Resolution
Gektin, Yu. M, Institute for Space Devices, USSR; Kuzmin, R. O., Academy of Sciences (USSR), USSR; Selivanov, A. S., Institute for Space Devices, USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The results of TERMOSCAN data-derived thermal inertia mapping of Mars with super high-resolution are presented. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Planetary Mapping; Mars (Planet); Thermal Emission; High Resolution

20010045358 Lancaster Univ., Environmental Science Dept., UK
Inferred Properties of Giant Radial Dikes Beneath Graben in Northern Tharsis, Mars
Gibbons, H. L., Lancaster Univ., UK; Scott, E. D., Lancaster Univ., UK; Wilson, L., Lancaster Univ., UK; Head, J. W., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We analyze graben in N Tharsis to deduce the geometries of underlying giant dikes. The shapes and sizes of associated pit craters are used to find how much dike magma was erupted in spatially localized but violently explosive eruptive events. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Rock Intrusions; Mars (Planet); Geological Faults; Mars Volcanoes; Planetary Structure

20010045359 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Inst. of Space Sensor Technology and Planetary Exploration, Berlin, Germany
The Topography of Bright/Dark Terrain on Ganymede
Giese, B., Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Germany; Wagner, R., Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Germany; Neukum, G., Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Germany; Pappalardo, R., Brown Univ., USA; Head, J. W., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Stereo images acquired during Galileo"s 28th orbit are used to derive the topography in a bright-dark terrain transition area on Ganymede. Implications for the origin of bright terrain are given. Additional information is contained in the original extended abstract.
Derived from Text
Ganymede; Terrain; Topography; Galileo Spacecraft; Imaging Techniques; Stereophotography

20010045360 Hawaii Univ., Honolulu, HI USA
Geochemical Studies of the Lomonosov-Fleming Region of the Lunar Farside
Giguere, T. A., Hawaii Univ., USA; Hawke, B. R., Hawaii Univ., USA; Blewett, D. T., Hawaii Univ., USA; Taylor, G. J., Hawaii Univ., USA; Lucey, P. G., Hawaii Univ., USA; Spudis, P. D., Lunar and Planetary Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Geochemical iron and titanium data is used to determine if the Lomonosov-Fleming basin is a cryptomare region. Additional information is contained in the original extended abstract.
Derived from Text
Geochemistry; Lunar Far Side; Structural Basins; Iron Oxides; Titanium Oxides

20010045361 Shemakha Astrophysical Observatory, Azerbaijan, USSR
Some Peculiarities of S-Asteroid Surface Materials Obtained by Modeling of Asteroid Reflectance Spectra
Golubeva, L. F., Shemakha Astrophysical Observatory, USSR; Shestopalov, D. I., Shemakha Astrophysical Observatory, USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Reflectance spectra of 38 asteroids from SI-SVII subtypes and probable reflectance spectra of optic active minerals on surface of these asteroids have been calculated. Spectral properties of asteroid pyroxenes and olivines are described. Additional information is contained in the original extended abstract.
Derived from Text
Asteroids; Minerals; Mathematical Models; Surface Properties; Spectral Reflectance

20010045362 Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, Orsay, France
Refractory Phases of Micrometeorites and the "Primitivity" of Cometary Nuclei
Gounelle, M., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Maurette, M., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Engrand, C., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Kurat, G., Naturhistorisches Museum, Austria; Shu, F., California Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; Financial sponsor in part by IN2P3 and INSU; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We used common characteristics of refractory phases in modern and early micrometeorites to both further constrain the scenarios proposed for the origin of the solar system and confirm that cometary nuclei are not as primitive as previously thought. Additional information is contained in the original extended abstract.
Derived from Text
Comet Nuclei; Micrometeorites; Refractories; Solar System

20010045363 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA
Volcanic Pseudocraters on Mars: Icelandic Analogs
Greeley, R., Arizona State Univ., USA; Fagents, S. A., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Pseudocraters are small conical structures which develop on some basaltic lava flows in Iceland as a result of the interaction of the active flow with water or marshy ground. These features have been studied in the field and compared with structures observed on Mars. Additional information is contained in the original extended abstract.
Derived from Text
Mars Craters; Iceland; Mars Surface; Mars Volcanoes; Mars (Planet)

20010045364 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA
Survivability of Aggregate Sands on Mars
Greeley, R., Arizona State Univ., USA; Kraft, M. D., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Sand-size particles are considered to exist on the surface of Mars, as indicated by the presence of numerous dunes and duneforms, as well as other evidence. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Aggregates; Sands; Mars (Planet)

20010045365 Arizona State Univ., Dept. of Geological Sciences, Tempe, AZ USA
Martian Dust Devils: Laboratory Simulations
Greeley, R., Arizona State Univ., USA; Iversen, J. D., Iowa State Univ. of Science and Technology, USA; Beardmore, G., Arizona State Univ., USA; Mickelson, B., Arizona State Univ., USA; Metzger, S., Nevada Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mars dust devils are effective in raising particles into the atmosphere. A laboratory apparatus has been installed in which particle threshold and flux experiments can be run under Mars and Earth conditions. Additional information is contained in the original extended abstract.
Derived from Text
Dust; Fabrication; Measuring Instruments; Simulation; Mars (Planet)

20010045366 Museum fuer Naturkunde, Berlin, Germany
Dhofar 125: A New Acapulcoite from Oman
Greshake, A., Museum fuer Naturkunde, Germany; Clayton, R. N., Chicago Univ., USA; Mayeda, T. K., Chicago Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

With a total mass of 2697 g Dhofar 125 is the largest acapulcoite ever found. It consists of olivine, augite, low-Ca pyroxene, plagioclase, Fe,Ni metal, troilite, chlorapatite, and chromite and displays a recrystallization texture with abundant 120 degree triple junctions. Additional information is contained in the original extended abstract.
Derived from text
Oman; Meteorites; Meteoritic Composition; Minerals; Mars Surface

20010045367 Eoetvoes LORANd Univ., Geography Dept., Budapest, Hungary
New Focuses on the Teaching of Planetology: Planetary Science at Middle Schools of Hungary
Hargitai, H., Eoetvoes LORANd Univ., Hungary; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The education of Solar System bodies many times follows the traditions, which does not include our new knowledge. Now its place should be in Geography instead of Physics. I give suggestions for a stronger emphasis on moons and Cartographic Atlases in education Additional information is contained in the original extended abstract..
Derived from Text
Solar System; Planetology; Education; Hungary; Geography

20010045368 Washington Univ., Dept. of Earth and Planetary Sciences and McDonnell Center for Space Sciences, Saint Louis, MO USA
On a Surface-Sample Collection Strategy for Mars, with Lessons from Lunar Sampling
Haskin, L. A., Washington Univ., USA; Korotev, R. L., Washington Univ., USA; Jolliff, B. L., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A reasonable sampling strategy for a Mars sample collection mission (assume total 0.5 kg) would be to obtain a few rocks not exceeding 5 g, at least half the mass as 1-5 mm rocklets, and a few 10-25-g samples of bulk regolith. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface Samples; Mars Surface; Mars (Planet); Lunar Rocks

20010045369 Washington Univ., Dept. of Earth and Planetary Sciences and McDonnell Center for Space Sciences, Saint Louis, MO USA
A Model for Properties of Basin Ejecta Deposits and Secondary Crater Densities
Haskin, L. A., Washington Univ., USA; McKinnon, W. B., Washington Univ., USA; Moss, B. E., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-4172; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Ejecta scaling relationships, ballistic sedimentation, and ejecta fragment size distributions are used to give estimates of thicknesses of basin ejecta deposits, proportions of primary ejecta, and secondary crater diameters and surface densities. Additional information is contained in the original extended abstract.
Derived from Text
Mathematical Models; Structural Basins; Ejecta; Craters; Mineral Deposits

20010045370 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Medusae Fossae Formation as Ancient Polar Deposits?: Tests and New Data on Stratigraphic Relationships
Head, J. W., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Analysis of the Medusae Fossae Formation shows that its properties are consistent with those in polar regions; the age of the deposit may be partly Hesperian. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Polar Regions; Stratigraphy; Mineral Deposits; Topography

20010045371 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
The Hesperian Period of Martian History: Key Trends in Volcanic and Tectonic Activity
Head, J. W., Brown Univ., USA; Basilevsky, A. T., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Volcanism in the Hesperian Period of Mars, together with global ridge and wrinkle-ridge formation, represent a major change in the evolution of the planet. Additional information is contained in the original extended abstract.
Derived from Text
Mars (Planet); Tectonics; Volcanoes; Stratigraphy; Geology

20010045372 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Beagle 2 Landing Site: Regional Characteristics of Isidis Planitia from MOLA Data
Head, J. W., Brown Univ., USA; Bridges, J. C., Museum of Natural History, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The geologic setting and regional topography of the Mars Express Beagle 2 landing site in Isidis Planitia are documented. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Topography; Mars Landing Sites; Structural Basins; Mars (Planet); Geology

20010045373 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Hesperian-aged Ice-rich Deposits near the South Pole: Evidence for Large-Scale Melting and Drainage in the Southern Noachis Terra Region of Mars
Ghatan, Gil J., Brown Univ., USA; Head, James W., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Analysis of the interior of a regional ice-rich deposit of Hesperian age near the south pole shows abundant evidence interior meltings and transport of water to the deposit margins and into surrounding lows. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Drainage; Ice; Polar Regions; Mars (Planet); Topography; Mineral Deposits

20010045374 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Origin of Sinuous Ridges in the Dorsa Argentea Formation: Additional Criteria for Tests of the Esker Hypothesis
Head, J. W., Brown Univ., USA; Hallet, B., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Principles of esker formation are reviewed from glacial physics and Earth field observations to test the origin of sinuous ridges on Mars. Additional information is contained in the original extended abstract.
Derived from Text
Stratigraphy; Polar Regions; Mars (Planet); Topography; Glacial Drift

20010045375 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Closed Chaos Basins on Mars: Evidence for Regional Groundwater Drawdown and Collapse
Head, J. W., Brown Univ., USA; Pratt, S., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A zone of isolated occurrences of chaotic terrain (closed chaos basins) is interpreted to represent drawdown of the regional groundwater table associated with the formation of Ma”Adim Valles, one of the largest valley networks on Mars. Additional information is contained in the original extended abstract.
Derived from Text
Ground Water; Mars Surface; Structural Basins; Terrain

20010045376 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Large Hesperian Lake in Schmidt Valley near the South Pole of Mars: Evidence for Water Input and Drainage
Head, J. W., Brown Univ., USA; Pratt, S., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Cavi and esker-like ridges suggest that water derived from melting of the Dorsa Argentea Formation ponded in the Schmidt valley to form a lake which was breached at its northern end and flowed down into the Argyre Basin. Additional information is contained in the original extended abstract.
Derived from Text
Drainage; Lakes; Valleys; Mars (Planet); Polar Regions

20010045377 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Malea Planum Hesperian Volcanic Province: Characterization Using MOLA Data
Head, J. W., Brown Univ., USA; Pratt, S., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New MOLA data permit characterization of highland paterae in Malea Planum and assessment of the adjacent Hesperian ridged plains. Additional information is contained in the original extended abstract.
Derived from Text
Calderas; Volcanoes; Plains; Highlands; Mars (Planet); Laser Altimeters

20010045378 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Mars: General Environments of Magma/H2O Interaction
Head, J. W., Brown Univ., USA; Wilson, L., Lancaster Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

General environments for the interaction of magma and water/ice on Mars are outlined. Additional information is contained in the original extended abstract.
Derived from Text
Magma; Mars Surface; Mars (Planet); Water; Planetary Cryospheres

20010045379 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Mars: Geologic Setting of Magma/H2O Interactions
Head, J. W., Brown Univ., USA; Wilson, L., Lancaster Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Specific environments of magma and water/ice interaction on Mars are described (plutons, dikes, sills). Additional information is contained in the original extended abstract.
Derived from Text
Magma; Mars Surface; Water; Mars (Planet); Planetary Geology

20010045380 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Oceans in the Northern Lowlands of Mars?: Further Tests Using MGS Data
Head, J. W., Brown Univ., USA; Ivanov, M. A., Academy of Sciences (USSR), USSR; Hiesinger, H., Brown Univ., USA; Kreslavsky, M. A., Kharkov Univ., Ukraine; Pratt, S., Brown Univ., USA; Thomson, B. J., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Continuing analyses of the northern lowlands oceans hypothesis find no support for the Amazonian, and ambiguous results for the Hesperian and Noachian. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Oceans; Mars Global Surveyor; Plains

20010045381 Eidgenoessische Technische Hochschule, Inst. for Isotope Geology and Mineral Resources, Zurich, Switzerland
High Resolution Solar He Record in Lunar Samples: Evidence for a Temporal Variation of the Solar Wind Composition with Time?
Heber, V. S., Eidgenoessische Technische Hochschule, Switzerland; Baur, H., Eidgenoessische Technische Hochschule, Switzerland; Wieler, R., Eidgenoessische Technische Hochschule, Switzerland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present high depth resolution He-3/He-4 ratios of solar wind implanted in lunar regolithic samples. These data show at face value a decreasing He-3/He-4 with increasing antiquity as might be expected from solar physics. However Ne isotopes suggest an alteration artefact. Additional information is contained in the original extended abstract.

Derived from Text

Lunar Rocks; Solar Wind; Helium Isotopes; Neon Isotopes; Temporal Distribution; Lunar Soil; Solar Physics; High Resolution

20010045382 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Capillary Effects on the Stability of Ice in Martian Crust
Hess, P. C., Brown Univ., USA; Longhi, J., Lamont-Doherty Geological Observatory, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Capillary effects can stabilize liquid water by as much as 40 C below the bulk melting temperature. Additional information is contained in the original extended abstract.

Derived from Text

Mars Surface; Planetary Crusts; Mars (Planet); Ice

20010045383 La Trobe Univ., Victorian Inst. of Earth and Planetary Science, Melbourne, Australia
CO2 Phase Changes and Flow Mechanisms for Non-Aqueous "Floods" on Mars
Hoffman, N., La Trobe Univ., Australia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Water is not required as the active medium for sediment transport and erosion in the outburst "floods". CO2 vapour-supported density flows are an ideal and far more probable mechanism. Explosive outbursts of subsurface liquid CO2 fuel the flows. Additional information is contained in the original extended abstract.

Derived from Text

Carbon Dioxide; Mars Surface; Mars (Planet); Liquid Phases; Liquid Flow

20010045384 La Trobe Univ., Victorian Inst. of Earth and Planetary Science, Melbourne, Australia
Explosive CO2-driven Source Mechanisms for an Energetic Outflow "Jet" at Aromatum Chaos, Mars
Hoffman, N., La Trobe Univ., Australia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New models of subsurface liquid CO2 escape show that giant gas-supported debris flows can be accelerated to speeds of 500 km/sec by the expansion pressure of CO2 vapour. Aromatum chaos is modelled as a low-pressure rocket motor, but operating at cryogenic temperatures. Additional information is contained in the original extended abstract.

Derived from Text

Carbon Dioxide; Mars (Planet); Mars Surface; Rocket Engines; Gas Flow

20010045385 La Trobe Univ., Victorian Inst. of Earth and Planetary Science, Melbourne, Australia
The Origin of Pervasive Layering on Early Mars Through Impact/Atmosphere Feedback Mechanisms
Hoffman, N., La Trobe Univ., Australia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Layering on Early Mars is not a localized feature of individual lake basins but a planetwide phenomenon tied to major impacts. Mass balance of ejecta and fill supports this. Major impacts would have caused wildly unstable atmospheres on early Mars. Additional information is contained in the original extended abstract.
Derived from Text
Mars (Planet); Layers; Mars Atmosphere; Mars Surface; Impact Damage

20010045386 La Trobe Univ., Victorian Inst. of Earth and Planetary Science, Melbourne, Australia
Isidis Basin - A Potential Focus of Cryovolcanic Activity on Mars
Hoffman, N., La Trobe Univ., Australia; Kargel, J. S., Geological Survey, USA; Tanaka, K. L., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mounds in Isidis Basin may well be the sites of explosive eruptions of CO2 from a subsurface liquid reservoir, rather than magmatic features. The surface chemistry and stratigraphy of Isidis may contain evidence of this cryovolcanism. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Structural Basins; Volcanology; Cryogenics

20010045387 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
Emplacement of a Debris Ocean on Mars by Regional-Scale Collapse and Flow at the Crustal Dichotomy
Hoffman, N., La Trobe Univ., Australia; Tanaka, K. L., Geological Survey, USA; Kargel, J. S., Geological Survey, USA; Banerdt, W. B., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Giant debris flows could have filled the northern lowlands with approx. 2 km of sediment in 10(exp 3) to 10(exp 5) years by catastrophic regional terrain collapse. The outburst floods and chaos zones are probably the waning stage of this process. Additional information is contained in the original extended abstract.
Derived from Text
Oceans; Mars (Planet); Mars Surface; Debris; Terrain

20010045388 Eoetvoes LORANd Univ., Dept. G. Physics, Budapest, Hungary
Probable Recent Biological Activity on Mars: Changing South Polar Dark Dune Spots
Horvath, A., Konkoly Observatory, Hungary; Ganti, T., Collegium Budapest, Hungary; Gesztesi, A., Budapest Planetarium, Hungary; Berczi, Sz., Eoetvoes LORANd Univ., Hungary; Szathmary, E., Collegium Budapest, Hungary; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We imply from MGS images" morphological analysis: Dark Dune Spots (DDSs) on sand polar reg. Mars: 1) DDSs do not fit to fine topography, 2) water flows out from DDSs, 3) sublimation recent biological activity explain their changes. Additional information is contained in the original extended abstract.
Derived from Text
Dunes; Activity (Biology); Polar Regions; Mars (Planet); Morphology

20010045389 Academy of Sciences (USSR), Moscow, USSR
Formation of Trans-Neptunian Objects
Ipatov, S. I., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; This work was supported by the Russian Federal Program "Astronomy" (project 1.9.4.1).; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

It may be possible that some large trans-Neptunian objects, asteroids, and planetesimals with diameter up to several hundreds kilometers were formed by compression of rarefied dust condensations, but not by accumulation of smaller planetesimals. Additional information is contained in the original extended abstract.
Derived from Text
Neptune (Planet); Protoplanets; Asteroids

20010045390 NASA Johnson Space Center, Houston, TX USA

The Kaidun Meteorite: A Large Albite Crystal - Fragment of an Alkaline Rock

Zolensky, M. E., NASA Johnson Space Center, USA; Stroganov, I. A., Academy of Sciences (USSR), USSR; Ivanov, A. V., Academy of Sciences (USSR), USSR; Migdisova, L. F., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A large albite crystal was found in a Kaidun thin section. The clast is the second alkaline rock found in meteorites. Additional information is contained in the original extended abstract.

Derived from Text

Meteorites; Rocks; Minerals; Crystals

20010045391 Academy of Sciences (USSR), Moscow, USSR

Morphology and Density of Impact Craters in Galileo Regio, Ganymede, and Asgard Basin, Callisto

Basilevsky, A. T., Academy of Sciences (USSR), USSR; Ivanov, M. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Impact craters on Callisto and Ganymede have different preservation state. The variety of the degradation states occurred during the early bombardment when intensive formation of craters was accompanied by their rapid degradation. Additional information is contained in the original extended abstract.

Derived from Text

Callisto; Craters; Ganymede; Morphology; Structural Basins; Density

20010045392 Academy of Sciences (USSR), Moscow, USSR

Density of Small Impact Craters at Asgard Basin, Callisto: Implications for the Relative Timing of the Asgard Event

Ivanov, M. A., Academy of Sciences (USSR), USSR; Kotova, I. V., Moscow State Univ., Russia; Basilevsky, A. T., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The statistics of craters less than 8 km suggests that the intensity of crater degradation was rather high early in the history of Callisto. This may be caused by the presence of temporary atmosphere at Callisto in the beginning of its geologic history. Additional information is contained in the original extended abstract.

Derived from Text

Callisto; Craters; Density; Structural Basins; Morphology; Degradation

20010045393 Academy of Sciences (USSR), Moscow, USSR

Refractory Inclusions from the New CH, NWA 470

Ivanova, M., Academy of Sciences (USSR), USSR; Petaev, M., Harvard-Smithsonian Center for Astrophysics, USA; Nazarov, M. A., Academy of Sciences (USSR), USSR; Taylor, L. A., Tennessee Univ., USA; Wood, J. A., Harvard-Smithsonian Center for Astrophysics, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

CAIs from NWA 470 are grossite-, hibonite-, melilite- and spinel-rich, with anorthite and Al-diopside. One CAI contains the first reported occurrence of calcium monoaluminate, CaAl2O4. These CAIs probably formed in the region depleted in Mg relative to Ca and Al. Additional information is contained in the original extended abstract.

Derived from Text

Chondrites; Inclusions; Refractories; Mineralogy; Aluminum; Calcium Compounds; Magnesium

20010045394 Geological Survey, Flagstaff, AZ USA

Field Spectroscopy of Modern and Ancient Calcareous Tufa Deposits

Johnson, J. R., Geological Survey, USA; Plescia, J. B., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Visible/near-infrared and thermal infrared field spectroscopy of calcareous tufa deposits at Mono and Searles Lakes was used to study potential differences in carbonate/evaporite mineralogy related to age differences between the deposits. Additional information is contained in the original extended abstract.
Derived from Text
Mineral Deposits; Mineralogy; Spectroscopy; Infrared Spectrometers; Thermal Radiation; Lakes

20010045395 Geological Survey, Flagstaff, AZ USA
Implementation of the Image for Mars Pathfinder Calibration Algorithms in Isis
Johnson, J. R., Geological Survey, USA; Sucharski, T., Geological Survey, USA; Reid, R. J., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Version 3 of the spectrophotometric calibration algorithms for Imager for Mars Pathfinder (IMP) stereo camera multispectral image data sets has been implemented in the USGS Integrated Software for Imagers and Spectrometers (ISIS) software package. Additional information is contained in the original extended abstract.
Derived from Text
Algorithms; Applications Programs (Computers); Calibrating; Mars Pathfinder; Spectrophotometry; Imaging Techniques

20010045396 Geological Survey, Flagstaff, AZ USA
The System Sulfuric Acid-Magnesium Sulfate-Water: Europa's Ocean Properties Related to Thermal State
Kargel, J. S., Geological Survey, USA; Head, J. W., Brown Univ., USA; Hogenboom, D. L., Lafayette Coll., USA; Khurana, K. K., California Univ., USA; Marion, G., Desert Research Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Europa"s aqueous evolution is modeled in the system H2O-H2SO4-MgSO4. For a thin ice crust, the ocean is thick, warm (approximately 267 K) and dominated by MgSO4; for a thick ice crust, the ocean layer is thin, cold (as low as 211 K), and dominated by H2SO4. Additional information is contained in the original extended abstract.
Derived from text
Magnesium Sulfates; Sulfuric Acid; Oceans; Models; Jupiter Satellites; Temperature Effects

20010045397 Academy of Sciences (USSR), Moscow, USSR
Track-Thermoluminescence and Microstructure Data of Single Silicate Crystals from Lunar Regolith: The Problem of GaS Bubbles Formation
Kashkarov, L. L., Academy of Sciences (USSR), USSR; Ivliev, A. I., Academy of Sciences (USSR), USSR; Assonov, S. S., Academy of Sciences (USSR), USSR; Kalinina, G. V., Academy of Sciences (USSR), USSR; Semenova, A. S., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): 98-05-64018; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Tracks, thermoluminescence, and SEM investigations were carried out for lunar regolith crystals. Report includes measured parameters, estimated shock pressure and heating temperatures and their possible relation to gas micro bubbles formation. Additional information is contained in the original extended abstract.
Derived from Text
Microstructure; Regolith; Silicates; Single Crystals; Thermoluminescence; Lunar Rocks; Bubbles

20010045398 Museum fuer Naturkunde, Inst. fuer Mineralogie, Berlin, Germany
Deformation Mechanisms During Impact Crater Modification Inferred from the Crooked Creek Impact Structure, Missouri, USA
Kenkmann, T., Museum fuer Naturkunde, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Microstructural investigations show that intergranular fracturing and brittle shear zone formation are dominant deformation modes during crater modification. Indications for plastic flow and granular flow were not found on the scale of observation. Additional information is contained in the original extended abstract.
Derived from Text
Deformation; Craters; Microstructure; Fracturing; Minerals

20010045399 California Univ., San Diego, Dept. of Chemistry and Biochemistry, La Jolla, CA USA

Solar Nitrogen Measurements and Records of Past Radiations

Kerridge, J. F., California Univ., San Diego, USA; Marti, K., California Univ., San Diego, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Several new nitrogen isotopic signatures have recently been found to possibly approximate those in the solar wind, but major discrepancies in these observations preclude a firm identification of this important datum. Additional information is contained in the original extended abstract.

Derived from Text

Nitrogen Isotopes; Solar Wind; Isotopic Labeling; Radioactive Isotopes; Cosmic Rays

20010045400 Ludwig-Maximilians-Univ., Munich, Germany

New Data for Chicxulub Target Lithologies and Ejecta Material

Kettrup, B., Ludwig-Maximilians-Univ., Germany; Deutsch, A., Ludwig-Maximilians-Univ., Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): DE401/13; GRK189/3; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Geochemical analysis of lithic clasts in impactites is a promising approach to constrain the target, and to determine contributions of precursor rocks to the melt. Investigation of material from different K/T sites may enlighten ejecta mechanisms. Additional information is contained in the original extended abstract.

Derived from Text

Geochemistry; Lithology; Ejecta; Rocks; Petrography

20010045401 Ludwig-Maximilians-Univ., Inst. fuer Planetologie, Munich, Germany

Micrometeorites in Sandstones: FRANKA - A Successful Separation Method?

Kettrup, D., Ludwig-Maximilians-Univ., Germany; Deutsch, A., Ludwig-Maximilians-Univ., Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): DE401/16-1; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

FRANKA and the results - unfortunately no new successful separation method to separate micrometeorites from solid rock samples. Similar to some welding and cutting techniques, the electrodynamical fragmentation produces spherical artifacts. Additional information is contained in the original extended abstract.

Derived from Text

Micrometeorites; Rocks; Sandstones; Fragmentation

20010045402 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA

On the Systematics of Lunar Regolith Compositions

Korotev, R. L., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAGW-8609; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Some systematics of lunar regolith composition are discussed in terms of chemical elements measurable from orbit. Additional information is contained in the original extended abstract.

Derived from Text

Lunar Rocks; Regolith; Mineralogy; Composition (Property); Chemical Elements

20010045403 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA

Trace-Element Concentrations in Northwest Africa 032

Korotev, R. L., Washington Univ., USA; Jolliff, B. L., Washington Univ., USA; Wang, A., Washington Univ., USA; Gillis, J. J., Washington Univ., USA; Haskin, L. A., Washington Univ., USA; Fagan, T. J., Hawaii Univ., USA; Taylor, G. J., Hawaii Univ., USA; Keil, K., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-4172; NAG5-8609; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Trace-element concentrations (INAA) are presented for four samples of the NWA 032 lunar meteorite. The mare basalt has a moderately high Th concentration (1.9 ppm) and a higher Th/REE ratio than any other known mare basalt. Additional information is contained in the original extended abstract.
Derived from Text
Meteorites; Lunar Surface; Concentration (Composition); Trace Elements

20010045404 Oulu Univ., Finland
Classification of Arachnoids on Cytherean Surface
Kostama V-P., Oulu Univ., Finland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Arachnoids are morphological lithospheric features unique to Venus. Their distribution probably reflects the qualities of the Venusian geological development. Different geological environments give us the variables to use in classifying arachnoids. Additional information is contained in the original extended abstract.
Derived from Text
Classifications; Lithosphere; Venus (Planet); Morphology; Planetary Geology

20010045405 Sternberg Astronomical Inst., Moscow, USSR
Compilation and Preliminary Analysis of a Catalogue of Craters of Mercury
Kozlova, E. A., Sternberg Astronomical Inst., USSR; Michael, G. G., Sternberg Astronomical Inst., USSR; Rodionova, J. F., Sternberg Astronomical Inst., USSR; Shevchenko, V. V., Sternberg Astronomical Inst., USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have used the data of the Mariner 10 spacecraft to create a new Morphological catalogue of craters of Mercury including 6334 craters of diameter 10 km and more. Additional information is contained in the original extended abstract.
Derived from Text
Mercury (Planet); Planetary Craters; Catalogs (Publications); Morphology; Planetary Geology

20010045406 Pomona Coll., Geology Dept., Claremont, CA USA
Analysis of Hellas Rim Geologic Units Using Mars Orbiter Laser Altimeter (MOLA) Data
Krause, M. O., Pomona Coll., USA; Grosfils, E. B., Pomona Coll., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We use MOLA data to assess whether elevation or point to point slope can be used to discriminate between different geologic units with a range of ages in a 10x10 degree region on the east side of the Hellas impact basin rim. Additional information is contained in the original extended abstract.
Derived from Text
Laser Altimeters; Mars Surface; Structural Basins; Mars (Planet); Planetary Geology

20010045407 Washington Univ., Dept. of Earth and Planetary Sciences; McDonnell Center for Space Sciences, Saint Louis, MO USA
Characterization of Mini-Core Samples Using Raman Point-Counting
Kuebler, K. E., Washington Univ., USA; Wang, A., Washington Univ., USA; Haskin, L. H., Washington Univ., USA; Jolliff, B. L., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Four cores were analyzed to determine how accurately the Mars Microbeam Raman Spectrometer can assess their mineral modes. We compare mineral estimates from traverses across smooth and rough surfaces (good focal conditions vs. poor). Additional information is contained in the original extended abstract.
Derived from Text
Raman Spectroscopy; Core Sampling; Mars (Planet); Minerals; Characterization

20010045408 Naturhistorisches Museum, Vienna, Austria

D'Orbigny: A New and Unusual Angrite

Kurat, G., Naturhistorisches Museum, Austria; Brandstatter, F., Naturhistorisches Museum, Austria; Clayton, R. N., Chicago Univ., USA; Nazarov, M. A., Academy of Sciences (USSR), USSR; Palme, H., Cologne Univ., Germany; Schultz, L., Max-Planck-Inst. fuer Chemie, Germany; Varela, M. E., Universidad Nacional del Sur, Argentina; Wasch, E., Museum fuer Naturkunde, Germany; Weber, H. W., Max-Planck-Inst. fuer Chemie, Germany; Weckwerth, G., Cologne Univ., Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): P-13975-GEO; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This is the sixth and largest angrite. Its chemical, mineralogical, O isotopic and rare gas compositions fit the range displayed by other angrites. It is porous in places, rich in druses and hollow spheres, a wonderful rock. Additional information is contained in the original extended abstract.

Derived from Text

Meteorites; Meteoritic Composition; Rocks; Mineralogy; Olivine; Isotopic Labeling

20010045409 Academy of Sciences (USSR), Moscow, USSR

Elemental Composition of Accessory Minerals from Adhi Kot EH4 Chondrite

Lavrentjeva, Z. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The results of elemental abundances in accessory minerals of enstatite chondrite Adhi Kot are reported. Additional information is contained in the original extended abstract.

Derived from Text

Chemical Composition; Chondrites; Minerals; Geochemistry

20010045410 Academy of Sciences (USSR), Moscow, USSR

Helium Isotopes in Solar System

Lavrukhina, A. K., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The differences in isotopic compositions of planetary He and solar He, which is produced by deuterium burning on the stage of the main sequence Sun, allow us to propose that accretion of protoplanetic nebula took place during earlier stages. Additional information is contained in the original extended abstract.

Derived from Text

Helium Isotopes; Isotopic Labeling; Solar System; Sun

20010045411 Centre National d'Etudes Spatiales, Institu d'Astrophysique Spatiale, Kourou, French Guiana

Estimation of the Bulk Iron Content of the Surface of Mercury from a Lunar Iron Mapping Technique

Langevin, Y., Centre National d'Etudes Spatiales, French Guiana; Le Mouelic, S., Centre National d'Etudes Spatiales, French Guiana; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We use an integrated telescopic spectrum of Mercury to discuss the composition of the surface in terms of iron content. Additional information is contained in the original extended abstract.

Derived from Text

Iron; Mapping; Mercury Surface; Lunar Maps

20010045412 Centre National de la Recherche Scientifique, Institut d'Astrophysique Spatiale, Orsay, France

Near Infrared Spectral Observations of the Asteroid 140 Siwa, Second Flyby Target of the Rosetta Mission

Forni, O., Centre National de la Recherche Scientifique, France; Quirico, E., Centre National de la Recherche Scientifique, France; Le Mouelic, S., Centre National de la Recherche Scientifique, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present the first spectral observation of the C Class asteroid 140 Siwa in the near infrared domain (0.95-2.5 micron). A flyby of 140 Siwa is planned in the baseline of the Rosetta mission in 2008. Additional information is contained in the original extended abstract.
Derived from Text
Asteroids; Near Infrared Radiation; Rosetta Mission; Infrared Astronomy; Infrared Spectra

20010045413 Eidgenoessische Technische Hochschule, Institute for Isotope Geochemistry, Zurich, Switzerland
Modelling the Cosmic-Ray Production Rates in Lunar Samples
Leya, I., Eidgenoessische Technische Hochschule, Switzerland; Wieler, R., Eidgenoessische Technische Hochschule, Switzerland; Neumann, S., Technische Univ., Germany; Michel, R., Technische Univ., Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present production rates of cosmogenic nuclides in lunar samples. Additional information is contained in the original extended abstract.
Derived from Text
Cosmic Rays; Lunar Geology; Lunar Rocks; Mathematical Models; Cosmology; Nuclides

20010045414 Universidad Rey Juan Carlos, Escuela Superior de Ciencias Experimentales y Tecnologia, Madrid, Spain
Plume-Lithosphere Interaction on Venus: Possible Scenarios for the Origin of Multiple and Asymmetric Coronae
Lopez, I., Universidad Rey Juan Carlos, Spain; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This work considered three possible scenarios involving plume-lithosphere interaction on Venus that can produce the lateral flow and ponding of a mantle diapir (channeling), process that could explain the occurrence of asymmetric and multiple coronae. Additional information is contained in the original extended abstract.
Derived from Text
Plumes; Lithosphere; Planetary Mantles; Venus (Planet); Tectonics

20010045415 Academy of Sciences (USSR), Moscow, USSR
Clast Population and Chemical Bulk Composition of the Dhofar 018 Howardite
Lorenz, C., Academy of Sciences (USSR), USSR; Nazarov, M. A., Academy of Sciences (USSR), USSR; Kurat, G., Naturhistorisches Museum, Austria; Brandstaetter, F., Naturhistorisches Museum, Austria; Ntaflos Th., Wien Univ., Austria; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Besides the usual clasts of HED achondrite and CM chondrite heritage, Dhofar 018 contains also clasts of an aubrite and a LL chondrite - the first of such kind found in a howardite. What do they tell us? Additional information is contained in the original extended abstract.
Derived from Text
Achondrites; Chemical Composition; Trace Elements; Carbonaceous Chondrites; Mineralogy

20010045416 Hawaii Univ., Honolulu, HI USA
Thermo-Reflectance Spectra: A New Tool for Compositional Analysis of Planetary Surfaces
Lucey, P. G., Hawaii Univ., USA; Hinrichs, J. L., Hawaii Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Thermo-reflectance spectroscopy, a new tool for remote sensing analysis of planetary surfaces, exploits the temperature dependent NIR spectra of mafic minerals. This technique is effective at detecting olivine in olivine-pyroxene mixtures. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Surfaces; Temperature Dependence; Mineralogy; Meteorites; Spectral Reflectance; Remote Sensing; Spectroscopy

20010045417 Academy of Sciences (USSR), Inst. of Geology and Geochemistry, Svierdlovsk, USSR
Mars' Planetary Evolution and the Problems of Earth Geodynamics
Malyshev, A. I., Academy of Sciences (USSR), USSR; Malysheva, L. K., Urals A. M. Gorky State Univ., Russia; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Degasification model of planetary evolution is considered. Schemes of planetary evolution for Earth and Mars are offered. Plate tectonics is only special case of planetary evolution. It is peculiar to modern stage of Earth evolution. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Evolution; Mars (Planet); Degassing

20010045418 Istituto Nazionale di Fisica Nucleare, Dept. of Physics, Padova, Italy
On the Origin of the 3:2 Almost Resonance Between the Two Earth-like Planets Orbiting Pulsar PSR 1257 + 12
Marzari, F., Istituto Nazionale di Fisica Nucleare, Italy; Vanzani, V., Istituto Nazionale di Fisica Nucleare, Italy; Tomasella, L., Osservatorio Astrofisico, Italy; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We suggest that the 3:2 near-resonance between the two more massive planets orbiting pulsar PSR1257 12 might be a consequence of two independent resonances (2:1 and 3:1) with a low-mass stellar companion, now completely evaporated. Additional information is contained in the original extended abstract.
Derived from Text
Pulsars; Earth (Planet); Planetary Orbits; Resonance

20010045419 Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, Orsay, France
Three New Tests to Validate EMMA and Confirm the Cometary Origin of Antarctic Micrometeorites
Matrajt, G., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Maurette, M., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Duprat, J., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Engrand, C., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Gounelle, M., Museum of Natural History, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We review all the evidences supporting the validity of a new scenario (EMMA) developed to account for various effects of the micrometeorite flux during the period of heavy bombardment, prior to 3.9 Ga ago. Additional information is contained in the original extended abstract.
Derived from Text
Antarctic Regions; Micrometeorites; Accretion Disks; Comets

20010045420 Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, Orsay, France
From the Earth to Early Planetary Systems with EMMA
Matrajt, G., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Maurette, M., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Engrand, C., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Gounelle, M., Museum of Natural History, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

EMMA (Early MicroMeteorite Accretion) defines the initial state of the early atmosphere of the terrestrial planets and allows to extrapolate the results obtained for the Earth"s hydrosphere to the other planets such as Mars. Additional information is contained in the original extended abstract.
Derived from Text
Micrometeorites; Planetary Systems; Earth (Planet); Terrestrial Planets; Accretion Disks

20010045421 Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, Orsay, France
A Diffuse Cosmic Volcanism "Erupting" from the Thermosphere on the Early Earth
Maurette, M., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Matrajt, G., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353;

CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The deceleration of the enormous flux of early micrometeorites in the thermosphere generated a new kind of ”cosmic volcanism” which has astonishing implications. Additional information is contained in the original extended abstract.
Derived from Text
Thermosphere; Volcanology; Earth (Planet); Micrometeorites; Carbonaceous Meteorites; Cosmology

20010045422 Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, Orsay, France
Search for Sites of Low Temperature Ion-Molecule Reactions in the Early Solar System
Maurette, M., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Leach, S., Observatoire de Paris-Meudon, France; Engrand, C., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Matrajt, G., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The D/H ratio of complex organic molecules in carbonaceous meteorites indicates that sites of low temperature ion-molecule reactions were existing in the early solar system. We investigated several processes to produce such sites. Additional information is contained in the original extended abstract.
Derived from Text
Low Temperature; Solar System; Ionic Reactions; Molecular Interactions

20010045423 Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, Orsay, France
EMMA and the Early Earth’s Hydrosphere
Maurette, M., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Matrajt, G., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Gounelle, M., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Engrand, C., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Duprat, J., Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, France; Kurat, G., Naturhistorisches Museum, Austria; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

EMMA (Early MicroMeteorite Accretion) is a scenario developed to account for various effects of large interplanetary dust particles in the inner solar system during the period of heavy bombardement. Additional information is contained in the original extended abstract.
Derived from Text
Earth Hydrosphere; Micrometeorites; Carbonaceous Meteorites; Solar System

20010045424 Clemson Univ., Dept. of Physics and Astronomy, SC USA
Calculating Chemical Evolution on the Web
Meyer, B. S., Clemson Univ., USA; Denny, J. E., Clemson Univ., USA; Clayton, D. D., Clemson Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-4703; AST98-19877; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have constructed an interactive web site that may be of interest to cosmochemists seeking to understand the evolution of isotopes in the Galaxy. The URL is http://photon.phys.clemson.edu/gce.html. Additional information is contained in the original extended abstract.
Derived from Text
Websites; Chemical Evolution; Cosmochemistry; Isotope Ratios; Galaxies

20010045425 University Coll., Dept. of Geomatic Engineering, London, UK
Explosive Volcanic Eruptions on Mars: An Improved Numerical Model
Mitchell, K. L., University Coll., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

In the light of new data, I present an outline of a improved numerical model for explosive volcanic eruptions on Mars. Additional information is contained in the original extended abstract.
Derived from Text
Mathematical Models; Mars (Planet); Mars Volcanoes

20010045426 Tokyo Univ., Space and Planetary Science, Hongo, Japan
Diffuse Reflectance Spectra of a Eucrite: Resistance to Heating at Different Oxygen Fugacities
Miyamoto, M., Tokyo Univ., Japan; Mikouchi, T., Tokyo Univ., Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have compared reflectance spectra of heated samples of the Millbillillie eucrite with those of several chondrites. Unlike chondrites, there has been little change in the spectra of the heated Millbillillie samples. Additional information is contained in the original extended abstract.
Derived from text
Spectral Reflectance; Chondrites; Thermal Resistance; Heating; Oxygen

20010045427 NASA Johnson Space Center, Houston, TX USA
Effects of Palagonitic Dust Coatings on Visible, Near-IR, and Mossbauer Spectra of Rocks and Minerals: Implication for Mineralogical Remote Sensing of Mars
Morris, R., NASA Johnson Space Center, USA; Graff, T. G., Arizona State Univ., USA; Shelfer, T. D., NASA Johnson Space Center, USA; Bell, J. F., III, Cornell Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Visible, near-IR, and Mossbauer measurements on dust coated rocks and minerals show that a 300 5m thick layer is required to obscure the substrate for VNIR measurements and that a greater than 2000-micron-thick layer is required to obscure the substrate for Mossbauer measurements. Additional information is contained in the original extended abstract.
Derived from Text
Near Infrared Radiation; Remote Sensing; Visible Spectrum; Mossbauer Effect; Rocks; Mineralogy; Mars Surface; Dust

20010045428 Academy of Sciences (USSR), Moscow, USSR
Phosphorian Sulfides from the ALH 84029, ALH 85013, EET 96029, and Y 82042 CM Carbonaceous Chondrites
Nazarov, M. A., Academy of Sciences (USSR), USSR; Kurat, G., Naturhistorisches Museum, Austria; Brandstaetter, F., Naturhistorisches Museum, Austria; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The listed CM chondrites, as all CM chondrites do, contain phosphorian Fe, Ni sulfides associated with schreibersite and/or barringerite which fit into the previously established compositional range. P-sulfides are a powerful taxonomy tool for CM chondrites. Additional information is contained in the original extended abstract.
Derived from Text
Carbonaceous Chondrites; Sulfides; Minerals; Schreibersite

20010045429 Lancaster Univ., Planetary Science Research Group, UK
Fractal Dimensions and the Emplacement of Lava Flows: Conclusions from Experimental Analysis
Norman, L. M., Lancaster Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Lava flow emplacement processes are studied and compared with the fractal dimension of the boundary of flows and the fractal dimension of the timing of new episodes of emplacement. Additional information is contained in the original extended abstract.
Derived from Text
Lava; Fractals; Viscous Flow

20010045430 Nevada Univ., Dept. of Geological Sciences, Reno, NV USA

Inverse Topographic Modeling: A Tool for Finding Subjacent Wrinkle Ridge Faults

Okubo, C. H., Nevada Univ., USA; Schultz, R. A., Nevada Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mechanical models of wrinkle ridges can predict subjacent fault geometries based on systematic variations in topography. Additional information is contained in the original extended abstract.

Derived from Text

Topography; Mathematical Models; Geological Faults; Ridges

20010045431 Ozima (M.), Tokyo, Japan

Origin of Terrestrial He-3 (1): Re-Estimation of ET- He-3 Flux

Ozima, M., Ozima (M.), Japan; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The origin of terrestrial He-3 appears to be different from heavy noble gases. We estimated ET-He-3 flux, one of possible sources for terrestrial He-3. This new estimation is less model-dependent, and the result is more easily tested statistically. Additional information is contained in the original extended abstract.

Derived from Text

Helium Isotopes; Flux Density; Earth (Planet)

20010045432 New Mexico Univ., Inst. of Meteoritics, Albuquerque, NM USA

Mn-Fe Systematics in Pyroxene from Planetary Basalts: An Indicator of Planetary Parentage

Papike, J. J., New Mexico Univ., USA; Karner, J. M., New Mexico Univ., USA; Shearer, C. K., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Pyroxene chemistries from the Earth, Moon, Mars, and 4 Vesta show indications of planetary parentage. Additional information is contained in the original extended abstract.

Derived from Text

Manganese; Iron; Pyroxenes; Basalt; Planetary Geology

20010045433 Brown Univ., Dept. of Geological Sciences, Providence, RI USA

Gravitational Differentiation of an Initially Unstable Chemical Stratification: Origin of Lunar Asymmetries

Parmentier, E. M., Brown Univ., USA; Zhong, S., Colorado Univ., USA; Zuber, M. T., Massachusetts Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Magmatic differentiation of the Moon creates an incompatible element-rich, dense residual mantle layer. to explain hemispheric crustal asymmetries, we examine conditions for diapirically instability of this layer at spherical harmonic degree one. Additional information is contained in the original extended abstract.

Derived from Text

Asymmetry; Lunar Crust; Moon; Lunar Gravitation

20010045434 Harvard-Smithsonian Center for Astrophysics, Cambridge, MA USA

Chromium Condensation in the Solar Nebula: Insights from the Upgraded CWPI Code

Petaev, M., Harvard-Smithsonian Center for Astrophysics, USA; Wood, J. A., Harvard-Smithsonian Center for Astrophysics, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Our new condensation model explicitly shows that the Cr depletions necessary to account for the chemical compositions of zoned metal grains in the CB chondrites could have resulted from the condensation of Cr in silicates. Additional information is contained in the original extended abstract.

Derived from Text

Chromium; Solar Corona; Condensation; Chondrites

20010045435 Harvard-Smithsonian Center for Astrophysics, Cambridge, MA USA

Silica-bearing Objects in the CH Chondrite NWA 470: Evidence for Their Formation in Fractionated Nebular Systems

Petaev, M., Harvard-Smithsonian Center for Astrophysics, USA; Ivanova, M., Academy of Sciences (USSR), USSR; Nazarov, M. A., Academy of Sciences (USSR), USSR; Wood, J. A., Harvard-Smithsonian Center for Astrophysics, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Several occurrences of silica in the NWA 470 chondrite are described. One of the SiO2-rich phases has chemical formula (K,Na,Ca)Mg2Al2Si9O24. Additional information is contained in the original extended abstract.

Derived from Text

Carbonaceous Chondrites; Silicon Dioxide; Mineralogy; Nebulae; Enstatite

20010045436 Harvard-Smithsonian Center for Astrophysics, Cambridge, MA USA

Zoned Metal Grains in the CH Chondrite NWA 470: More Constraints on the Cooling History of the CH Chondrite Nebular Source Region

Petaev, M., Harvard-Smithsonian Center for Astrophysics, USA; Ivanova, M., Academy of Sciences (USSR), USSR; Nazarov, M. A., Academy of Sciences (USSR), USSR; Wood, J. A., Harvard-Smithsonian Center for Astrophysics, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Zoned metal grains in the CH chondrite NWA 470 display varied zoning patterns indicative of different formation conditions. Additional information is contained in the original extended abstract.

Derived from Text

Chondrites; Cooling; Granular Materials; Metals; Nebulae

20010045437 Geological Survey, Flagstaff, AZ USA

Big Basin, Kansas: Gravity Investigation of a Proposed Impact Structure

Plescia, J. B., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Big Basin is a proposed multiple impact structure in Kansas. There are three depressions 600-1700 m in diameter. A gravity survey over the largest suggests the depressions are solution collapse structures rather than impact structures. Additional information is contained in the original extended abstract.

Derived from Text

Gravity Anomalies; Structural Basins; Surveys; Impact Damage; Kansas

20010045438 Geological Survey, Flagstaff, AZ USA

Elysium Region Tectonics

Plescia, J. B., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Tectonism in Elysium consists of graben and lineaments radial to Tharsis and graben and troughs concentric about the regional Elysium topographic high. Radial faulting associated with Elysium is not observed. Additional information is contained in the original extended abstract.

Derived from text

Mars Surface; Structural Properties (Geology); Tectonics; Geological Faults

20010045439 Geological Survey, Flagstaff, AZ USA

Geology of Tharsis Tholus, Mars

Plescia, J. B., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Tharsis Tholus exhibits two styles of faults: graben radial to Tharsis and normal faults which cut the entire edifice. The large normal faults may reflect whole deformation of the edifice due to sliding along a subsurface plastic layer. Additional information is contained in the original extended abstract.
Derived from Text
Planetary Geology; Mars Surface; Geological Faults; Volcanoes; Planetary Structure

20010045440 Geological Survey, Flagstaff, AZ USA
Hackberry Flat, Oklahoma: Gravity Survey of a Proposed Impact Structure
Plescia, J. B., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Hackberry Flat, Oklahoma has been proposed to be of impact origin. The feature is 6.9 km wide, 10-15 m deep. A gravity survey over the features indicates the complete absence of any anomaly suggesting the feature is purely erosional in origin. Additional information is contained in the original extended abstract.
Derived from Text
Oklahoma; Surveys; Impact Damage; Gravity Anomalies; Structural Properties (Geology)

20010045441 Geological Survey, Flagstaff, AZ USA
Visible-Near Infrared Spectroscopy of Hyperthermophile Organisms, Yellowstone National Park
Plescia, J. B., Geological Survey, USA; Johnson, J. R., Geological Survey, USA; Ferris, M., Montana State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

VNIR reflectance data of hyperthermophile organisms indicate they can be differentiated on the basis of spectral character. Additional information is contained in the original extended abstract.
Derived from Text
Near Infrared Radiation; Infrared Spectroscopy; Organisms; Thermophiles; Bacteria

20010045442 Geological Survey, Flagstaff, AZ USA
Connolly Basin, Western Australia: Total Magnetic Field Survey
Plescia, J. B., Geological Survey, USA; Shoemaker, C. S., Geological Survey, USA; Shoemaker, E. M., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Total magnetic field profiles across the Connolly Basin impact structure in Western Australia indicate the complete absence of any anomalies associated with the structure. Additional information is contained in the original extended abstract.
Derived from Text
Structural Basins; Magnetic Fields; Meteorite Craters; Magnetic Flux; Magnetic Signatures

20010045443 Florida Inst. of Tech., Indian Harbour Beach, FL USA
The Tarlton, Ohio Indian Effigy Cross Mound
Povenmire, H., Florida Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This astronomically significant, unique effigy mound is shown to be part of a much larger complex of earthworks connected by a 100 km length Indian Highway. Additional information is contained in the original extended abstract.
Derived from Text
Ohio; Structural Properties (Geology); Landforms

20010045444 Florida Inst. of Tech., Indian Harbour Beach, FL USA
The January 3, 2000 Lunar Occultation of Asteroid (4) Vesta
Povenmire, H., Florida Inst. of Tech., USA; Povenmire, K., Florida Inst. of Tech., USA; Bookamer, R.; Dunham, D.; Palermiti, M.; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Lunar occultations of bright asteroids can be observed by using small, portable equipment. Lunar occultations of asteroids provide the most theoretically precise astrometry possible. Additional information is contained in the original extended abstract.
Derived from Text
Lunar Occultation; Vesta Asteroid; Astrometry

20010045445 Academy of Sciences (USSR), Space Research Inst., Moscow, USSR
Determination of Hydrogen in Surface Layers of Planetary Bodies by Means of Forward Scattering Spectrometry
Prilutskyi, O., Academy of Sciences (USSR), USSR; Korchuganov, B., Academy of Sciences (USSR), USSR; Dolnikov, G., Academy of Sciences (USSR), USSR; Gerasimov, M., Academy of Sciences (USSR), USSR; Rieder, R., Max-Planck-Inst. fuer Chemie, Germany; Wanke, H., Max-Planck-Inst. fuer Chemie, Germany; Economou, T., Chicago Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Determination of hydrogen using elastic scattering of H and D by alpha-particles from a Cm-244 source. Hydrogen can be determined down to concentrations of less than 0.01 wt%; within a certain range it is even possible to determine the H/D ratio. Additional information is contained in the original extended abstract.
Derived from Text
Forward Scattering; Hydrogen; Spectrometers; Surface Layers; Alpha Particles; Curium 244

20010045446 Geological Survey of Canada, Ottawa, Ontario Canada
Cathodoluminescence Analysis of Nakhla 1401 Chloroapatites
Stirling, J. A. R., Geological Survey of Canada, Canada; Venance, K., Geological Survey of Canada, Canada; Protheroe, W. J., Jr.; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Analysis of Nakhla 1401-1 using cathodoluminescence (CL) spectroscopy has allowed greater detail of composition differences in chloroapatites. Additional information is contained in the original extended abstract.
Derived from Text
Cathodoluminescence; Spectroscopy; Calcium Phosphates; Minerals

20010045447 Geological Survey of Canada, Ottawa, Ontario Canada
Nakhla 1911-369 Chloroapatites
Venance, K., Geological Survey of Canada, Canada; Stirling, J. A. R., Geological Survey of Canada, Canada; Protheroe, W. J., Jr.; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Nakhla 1911-369 gives us a new insight into the complexity of chloroapatites. Additional information is contained in the original extended abstract.
Derived from Text
Calcium Phosphates; Minerals; Cathodoluminescence; Spectrum Analysis; Spectroscopy

20010045448 Los Alamos National Lab., NM USA
Neutron-Capture Gamma-Ray Data for Obtaining Elemental Abundances from Planetary Spectra
Frankle, S. C., Los Alamos National Lab., USA; Reedy, R. C., Los Alamos National Lab., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Newly compiled and evaluated energies and intensities of gamma rays made by the capture of thermal neutrons by elements from H to Zn plus Ge, Sm, and Gd are reported for use in determining elemental composition by planetary gamma-ray spectroscopy. Additional information is contained in the original extended abstract.
Derived from Text
Thermal Neutrons; Gamma Ray Spectrometers; Gamma Rays; Planetary Atmospheres; Capture Effect; Nuclides

20010045449 Arizona State Univ., Tempe, AZ USA
New MOC Observations of Dorsa Argentea Sinuous Ridges
Rice, J. W., Jr., Arizona State Univ., USA; Ruffr, S. W.; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New photogeologic analysis of the enigmatic sinuous ridges of the Dorsa Argentea region near the martian south pole have been conducted utilizing MOC data. These ridges have significant paleoclimatic implications whatever their origin. Additional information is contained in the original extended abstract.
Derived from Text
Photogeology; Mars (Planet); Mars Surface

20010045450 Brown Univ., Dept. of Geologic Sciences, Providence, RI USA
Identification of Mantled and Disaggregated Terrain Imaged by the Mars Orbital Camera
Rifkin, M. K., Brown Univ., USA; Cooper, C. D., Brown Univ., USA; Mustard, J. F., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mantled and disaggregated terrain on Mars is observed in MOC images. The distribution of these terrains is strongly dependent on latitude, which implies a relationship to climate. Diverse morphologies hint at variability in the process of dissection. Additional information is contained in the original extended abstract.
Derived from Text
Cameras; Mars Surface; Planetary Geology; Terrain

20010045451 Centre National de la Recherche Scientifique, Laboratoire de Mineralogie, Paris, France
Non Mass Dependent Oxygen Isotopic Fractionation: A Numerical Application to the Ozone Specific Rate Coefficients. Implication for Cosmochemistry
Robert, F., Centre National de la Recherche Scientifique, France; Camy-Peyret, C., Paris VI Univ., France; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A numerical application of a proposed theory for non-mass dependent effect is shown for isotopic reaction rates of ozone. Possible consequences for solid condensation in a high temperature gas. Numerical application to silicon isotopes. Additional information is contained in the original extended abstract.
Derived from Text
Cosmochemistry; Ozone; Oxygen Isotopes; Reaction Kinetics; Fractionation

20010045452 Northwestern Univ., Evanston, IL USA
Scattered Light in the Clementine UVVIS Camera
Robinson, M., Northwestern Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Limb images show that scattered light in the Clementine UVVIS camera can effect multispectral analyses of high contrast features. Residual signal in space (normalized to the limb) is 8-10% at 50 pixels and above 2% of the limb after 200 pixels. Additional information is contained in the original extended abstract.
Derived from Text
Clementine Spacecraft; Spacecraft Equipment; Cameras; Multispectral Photography; Light Scattering

20010045453 California Univ., Inst. of Geophysics and Planetary Physics, Los Angeles, CA USA
Gujba: A New Bencubbin-like Meteorite Fall from Nigeria
Rubin, A. E., California Univ., USA; Kallemeyn, G. W., California Univ., USA; Wasson, J. T., California Univ., USA; Clayton, R. N., Chicago Univ., USA; Mayeda, T., Chicago Univ., USA; Grady, M. M., Museum of Natural History, UK; Verchovsky, A. B., Open Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Gujba is a new Bencubbin-like meteorite fall enriched in N-15 and consisting (in vol.%) of 41% metal nodules, 20% large light-colored silicate nodules and 39% dark-colored, C- and silicate-rich matrix. Additional information is contained in the original extended abstract.
Derived from Text
Meteorites; Nigeria; Meteoritic Composition; Nitrogen 15

20010045454 Tokyo Univ., Dept. of Earth and Planetary Sciences, Hongo, Japan
A Successful Simulation of Space Weathering - Spectral Change and Nanophase Fe Particles on Olivine by Pulse-Laser Irradiation
Sasaki, S., Tokyo Univ., Japan; Nakamura, K., Kobe Univ., Japan; Hamabe, Y., Tokyo Univ., Japan; Kurahashi, E., Tokyo Univ., Japan; Hiroi, T., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Space weathering is simulated using nanosecond pulse laser. Laser-treated olivine pellets show reduction and reddening of reflectance, comparable to asteroid data. Nanophase Fe particles are found to have caused the optical property changes. Additional information is contained in the original extended abstract.
Derived from Text
Irradiation; Olivine; Pulsed Lasers; Iron; Weathering; Simulation

20010045455 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA
2001 Mars Odyssey: Geologic Questions for Global Geochemical and Mineralogical Mapping
Saunders, R. S., Jet Propulsion Lab., California Inst. of Tech., USA; Meyer, M. A., NASA, USA; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

2001 Mars Odyssey has three experiments. GRS will map the surface elemental composition. MARIE will characterize the Mars radiation environment for risk to humans. THEMIS will map the mineralogy and morphology with a camera and thermal IR imaging. Additional information is contained in the original extended abstract.
Derived from Text
Geochemistry; Mars Environment; Mineralogy; Thematic Mapping; Thermal Mapping; Planetary Mapping; Planetary Radiation

20010045456 Nevada Univ., Geomechanics-Rock Fracture Group, Reno, NV USA
How Big is Amenthes Rupes? An Inversion of MOLA Data Using Mechanics
Schultz, R. A., Nevada Univ., USA; Watters, T. R., Smithsonian Institution, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The structural topography of the Amenthes Rupes lobate thrust fault scarp, measured by MOLA, is modeled using mechanics. The best-fitting parameters indicate a deep fault, a specific dip angle, and spatially inhomogeneous contractional deformation. Additional information is contained in the original extended abstract.
Derived from Text
Geological Faults; Topography; Mars Surface; Structural Properties (Geology)

20010045457 Washington Univ., Dept. of Earth and Space Sciences, Seattle, WA USA
Evolution of the Basaltic Eucrite, Haraiya 6277
Schwartz, J. M., Washington Univ., USA; McCallum, I. S., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-4540; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Equilibrated eucrite, Haraiya, shows a range of textures with sharp boundaries between textural domains. However, calculations show a uniform cooling rate indicating a three-stage history of magmatic crystallization, brecciation, and thermal metamorphism. Additional information is contained in the original extended abstract.
Derived from Text
Basalt; Breccia; Metamorphism (Geology); Metamorphic Rocks; Crystallization

20010045458 Lancaster Univ., Environmental Science Dept., UK

The Stress State of the Lunar Lithosphere and the Volumes of Intruded and Erupted Magmas

Scott, R. S., Lancaster Univ., UK; Wilson, L., Lancaster Univ., UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Using a new model of dike rise from the upper mantle we find the ranges of magma densities, magma source depths and lithosphere tensile stresses that could deliver large volumes of magma to either erupt at, or to intrude close to, the lunar surface. Additional information is contained in the original extended abstract.

Derived from Text

Lithosphere; Lunar Surface; Tensile Stress; Tectonics; Core-Mantle Boundary

20010045459 New Mexico Univ., Inst. of Meteoritics, Albuquerque, NM USA

Chemistry of Olivine from Planetary Materials. Mn/Fe and Trace Element Systematics in an Unusual Achondrite: QUE 93148

Shearer, C. K., New Mexico Univ., USA; Papike, J. J., New Mexico Univ., USA; Karner, J. M., New Mexico Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Major and trace element characteristics of olivine in basalts from Earth, Moon, and Mars reflect conditions of crystallization and potentially fingerprint the planetary body. Here, we extend this study to the planetary body represented by QUE 93148. Additional information is contained in the original extended abstract.

Derived from Text

Trace Elements; Manganese; Iron; Achondrites; Olivine; Mars Environment; Moon; Earth (Planet)

20010045460 Sternberg Astronomical Inst., Moscow, USSR

Crater Chains on Mercury

Skobeleva, T. P., Sternberg Astronomical Inst., USSR; Shevchenko, V. V., Sternberg Astronomical Inst., USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): INTAS-ESA 99-00403; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A few crater chains on the surface of Mercury are identified as impact tracks of ”fragment trains” of the disrupted comets. Additional information is contained in the original extended abstract.

Derived from Text

Mercury Surface; Satellite Surfaces; Mercury (Planet); Planetary Craters; Comets

20010045461 Geological Survey, Flagstaff, AZ USA

Connolly Basin Impact Structure, Western Australia

Shoemaker, E. M., Geological Survey, USA; Shoemaker, C. S., Geological Survey, USA; Plescia, J. B., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Connolly Basin is a 9 km complex impact structure with a central uplift. The central uplift exhibits complex folding and faulting. Additional information is contained in the original extended abstract.

Derived from Text

Structural Basins; Australia; Structural Properties (Geology); Mapping; Topography

20010045462 Eoetvoes LORANd Univ., Dept. of Physical Geography, Budapest, Hungary

Comparative Study of Periglacial Mass Movements on Mars and Earth

Sik, A., Eoetvoes LORANd Univ., Hungary; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Based on MOC images and my own field work experience, the fretted debris aprons of Mars are analogous to rock glaciers. by finding the correlation between morphology, mechanisms and changing environment, they can be used as paleoclimatic indicators. Additional information is contained in the original extended abstract.
Derived from Text
Glaciers; Earth (Planet); Mars (Planet); Geomorphology

20010045463 Geological Survey, Flagstaff, AZ USA
Near-Infrared Reflectance Spectroscopy of Mars (1.4-2.6 micron) from the New Millennium Deep Space 1 Miniature Integrated Camera and Spectrometer (MICAS)
Soderblom, L. A., Geological Survey, USA; Yelle, R. V., University of Northern Arizona, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Presented is an analysis of MICAS near-infrared observations of Mars (1.4-2.6 microns) by detailed modeling and removing atmospheric components and extracting surface reflectance spectra. Additional information is contained in the original extended abstract.
Derived from Text
Mars (Planet); Near Infrared Radiation; Spectral Reflectance

20010045464 Brown Univ., Dept. of Geological Sciences, Providence, RI USA
Equatorial Distribution of Chaos and Lenticulae on Europa
Spaun, N. A., Brown Univ., USA; Head, J. W., III, Brown Univ., USA; Pappalardo, R. T., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We have performed an equatorial assessment of chaos and lenticulae on Europa. A dominant diameter of 9 km is found and other mapping issues are addressed. Additional information is contained in the original extended abstract.
Derived from Text
Equators; Mapping; Chaos; Lenticular Bodies; Europa

20010045465 Kharkov Univ., Kharkov, Ukraine
Seasonal Variations in the North-South Asymmetry of Polarized Light of Jupiter
Starodubtseva, O. M., Kharkov Univ., Ukraine; Akimov, L. A., Kharkov Univ., Ukraine; Korokhin, V. V., Kharkov Univ., Ukraine; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Seasonal changes in the north-south asymmetry of polarization at high latitudes of Jupiter are revealed from polarimetric observations in blue light made over a 18-yr period. They are seemingly caused by seasonal north-south asymmetry in Jupiter's atmosphere insolation. Additional information is contained in the original extended abstract.
Derived from Text
Annual Variations; Asymmetry; Polarized Light; Jupiter (Planet); Polarimetry

20010045466 Szeged Univ., Juhasz Gayula Coll., Szeged, Hungary
How Interactive Graphical Modeling Helps Space Science and Geometry Education in Hungary
Szilassi, L., Szeged Univ., Hungary; Karsai, J., Szeged Univ., Hungary; Pataki, T., MIMIKRISTUDIO, Hungary; Kabai, S., UNICONSTANT, Hungary; Birczi Sz., Eoetvoes LORANd Univ., Hungary; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We developed a space science/construction/geometry curriculum: lessons, graphical designs of space form construction/modeling, infolding/folding out objects which is attractive by visualizing graphical projections, movements outside/inside objects. Additional information is contained in the original extended abstract.
Derived from Text
Education; Geometry; Computer Graphics; Models; Aerospace Sciences

20010045467 Geological Survey, Flagstaff, AZ USA

The Stratigraphy of Mars: What We Know, Don't Know, and Need to Do

Tanaka, K. L., Geological Survey, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

To maintain its utility, the martian stratigraphic scheme must evolve to keep up with the state of knowledge. Geologic mapping and MGS data and careful application of stratigraphic techniques and principles can help refine the present scheme. Additional information is contained in the original extended abstract. Additional information is contained in the original extended abstract.
Derived from Text

Stratigraphy; Mars (Planet); Mapping; Planetary Geology; Geological Surveys

20010045468 NASA Johnson Space Center, Houston, TX USA

Mineralogical and Chemical Characterization of Lunar Highland Regolith: Lessons Learned from Mare Soils

Taylor, L. A., Tennessee Univ., USA; Cahill, J. T., Tennessee Univ., USA; Patchen, A., Tennessee Univ., USA; Pieters, C., Brown Univ., USA; Morris, R., NASA Johnson Space Center, USA; Keller, L. P., NASA Johnson Space Center, USA; McKay, D. S., NASA Johnson Space Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The Lunar Soil Characterization Consortium has begun study of the is less than 45 m fractions of ten representative highland soils, chosen for their contrasting maturities. Difficulties are addressed in the modal and chemical analyses of these highland soils. Additional information is contained in the original extended abstract.
Derived from Text

Chemical Analysis; Mineralogy; Regolith; Lunar Soil; Highlands

20010045469 Astrophysical Inst., Alma Ata, USSR

The Space-Time Asymmetry of Atmospheric Properties on Saturn

Tejfel, V. G., Astrophysical Inst., USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A comparison of observational data for the last three decades show significant differences in the reflectivity and methane absorption bands intensity on Saturn's disk Additional information is contained in the original extended abstract..
Derived from Text

Asymmetry; Saturn (Planet); Atmospheric Chemistry

20010045470 Lancaster Univ., Environmental Science Dept., UK

Using Elliptical Craters as Strain Markers in Marius Regio, Ganymede

Thomas, C., Lancaster Univ., UK; Ghail, R. C., Imperial Coll. of Science and Technology, UK; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The quantitative degree of strain from transtensional movement can be successfully recovered by restoring the circularity of elliptical craters. We also intend to apply this method to other types of deformed craters on Ganymede. Additional information is contained in the original extended abstract.
Derived from Text

Craters; Ganymede; Ellipticity

20010045471 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Shock Magnetic Field and Origin of the Earth

Tunyi, I., Slovak Academy of Sciences, Slovak Republic; Timko, M., Slovak Academy of Sciences, Slovak Republic; Roth, L. E., Jet Propulsion Lab., California Inst. of Tech., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

To the effects of impulse magnetic field in protoplanetary nebula (fast melting, cooling and magnetization of chondrules), there is added another possible effect - mechanism associated with the forces of attraction between magnetized planetesimals. Additional information is contained in the original extended abstract.
Derived from Text
Earth (Planet); Magnetic Fields; Planetary Evolution; Nebulae; Protoplanets

20010045472 Academy of Sciences (USSR), Inst. of Geochemistry and Analytical Chemistry, Moscow, USSR
Shock Wave Fractionated Krypton: 1. Effects of Energy Spectrum Rigidity
Ustinova, G. K., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): N 98-05-64018; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The effects of the Kr isotope fractionation due to the hardening of the energy spectrum of the incident particles accelerated by the strong shock waves in the early solar system, as well as in the contemporary heliosphere, are described. Additional information is contained in the original extended abstract.
Derived from Text
Krypton Isotopes; Shock Waves; Energy Spectra; Heliosphere; Fractionation

20010045473 Academy of Sciences (USSR), Inst. of Geochemistry and Analytical Chemistry, Moscow, USSR
Shock Wave Fractionated Krypton: 2. Effects of Ion Acceleration
Ustinova, G. K., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): N 98-05-6104; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The effects of the noble gas fractionation, conditioned by the different acceleration of ions during the passage of strong shock waves, are featured with the examples of the Kr isotopic system. Additional information is contained in the original extended abstract.
Derived from Text
Shock Waves; Krypton Isotopes; Ions; Particle Acceleration; Fractionation

20010045474 Baylor Univ., Center for Astrophysics, Waco, TX USA
Computer Modeling of Edge Effects in Plasma Crystals
Vasut, J. A., Baylor Univ., USA; Hyde, T. W., Baylor Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Dusty plasmas play an important role in astrophysical environments such as protostellar clouds and ring systems. A computer simulation of such plasmas will be presented. Additional information is contained in the original extended abstract.
Derived from Text
Computerized Simulation; Crystals; Plasmas (Physics); Astrophysics; Dust

20010045475 Eidgenoessische Technische Hochschule, Inst. for Isotope Geology and Mineral Resources, Zurich, Switzerland
Microdistribution of the Noble Gases Neon and Argon in Primitive Chondrites and Implications for Their Accretionary History
Vogel, N., Eidgenoessische Technische Hochschule, Switzerland; Baur, H., Eidgenoessische Technische Hochschule, Switzerland; Bischoff, A., Muenster Univ., Germany; Semenenko, V. P., Academy of Sciences of the Ukraine, Ukraine; Wieler, R., Eidgenoessische Technische Hochschule, Switzerland; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present laser-extraction noble gas data from Krymka and Leoville chondrules, rims and one dark inclusion. The chondrules contain very small but measurable amounts of primordial Ne and Ar, the dark inclusion displays extremely high Ne and Ar, with Ne being Q-dominated. Additional information is contained in the original extended abstract.
Derived from Text
Argon; Chondrites; Chondrule; Neon; Lasers

20010045476 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA

Preliminary Raman Spectroscopic Survey on a Martian Meteorite - Los Angeles

Wang, A., Washington Univ., USA; Kuebler, K. E., Washington Univ., USA; Freeman, J., Washington Univ., USA; Jollif, B. L., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-7140; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A Raman survey on a flat-sawn rock slab provides the major mineralogy of martian meteorite Los Angeles. Three unreported accessory minerals and seven terrestrial alteration products and contaminants (organic and inorganic) were also found. Additional information is contained in the original extended abstract.

Derived from Text

SNC Meteorites; Raman Spectroscopy; Mineralogy; Rocks

20010045477 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA

Raman Spectroscopy of Opaque Minerals and Applications to EETA79001 Martian Meteorite

Wang, A., Washington Univ., USA; Kuebler, K. E., Washington Univ., USA; Jollif, B. L., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-7140; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Martian meteorite EETA79001 contains abundant Fe-Ti oxides, which yield Raman spectra useful for the assignment of their structural and compositional features. Additional information is contained in the original extended abstract.

Derived from Text

Minerals; Raman Spectroscopy; SNC Meteorites; Raman Spectra; Iron Oxides; Titanium Oxides

20010045478 Melbourne Univ., Earth Sciences, Parkville, Australia

Metal Grains in CAIs, Rim Flash Heating and CAI Growth Zoning

Wark, D. A., Melbourne Univ., Australia; Boynton, W. V., Arizona Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Metal grains in six Ca-Al-rich inclusions (CAIs) were found to become more 'refractory' from core to rim of CAI, i.e., richer in refractory metals and poorer in Fe and Ni. This is due to primary metal zonation in the inner CAI and 'flash heating' at the rim. Additional information is contained in the original extended abstract.

Derived from Text

Refractory Metals; Granular Materials; Allende Meteorite

20010045479 California Univ., Inst. of Geophysics, Los Angeles, CA USA

Bluewing 001: A New Eucrite with Extremely Unequilibrated Pyroxene, Cognate (?) Eucritic Xenoliths, and Stannern-like Geochemistry

Warren, P. H., California Univ., USA; Gessler, P.; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

New eucrite Bluewing 001 features unequilibrated, extensively zoned pyroxenes. Bluewing pyroxenes show systematic Ti-enrichment vs. zoned pyroxenes in Pasamonte. Some pyroxenes nucleated around xenolithic enclaves with lower (yet moderately high) mg. Additional information is contained in the original extended abstract.

Derived from Text

Geochemistry; Igneous Rocks; Pyroxenes; Meteorites

20010045480 California Univ., Inst. of Geophysics, Los Angeles, CA USA

Bulk-Compositional Study of Three Dhofar Lunar Meteorites: Enigmatic Siderophile Element Results for Dhofar 026

Warren, P. H., California Univ., USA; Taylor, L. A., Tennessee Univ., USA; Kallemeyn, G. W., California Univ., USA; Cohen, B. A., Tennessee Univ., USA; Nazarov, M. A., Academy of Sciences (USSR), USSR; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The bulk chemistry of three new lunar meteorites is presented and placed within the context of each meteorite's petrographic texture. Unusual PGEs for D-26 is not explainable by contamination, but may reflect the presence of siderophile-rich nuggets. Additional information is contained in the original extended abstract.
Derived from Text
Meteorites; Petrography; Lunar Rocks; Meteoritic Composition

20010045481 California Univ., Los Angeles, CA USA
Compositions of Iron Meteorites in the IAB Complex; Six Groups Showing Similar Element-Au Trends
Wasson, J. T., California Univ., USA; Kallemeyn, G. W., California Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

On element-Au diagrams IAB irons form a main group and parallel clusters called subgroups (S). IIIC (S2) and IIID (S3) are resolved from each other. S1 is intermediate between main group and S2. These may have formed in impact events on an asteroid. Additional information is contained in the original extended abstract.
Derived from text
Subgroups; Iron Meteorites; Chemical Composition

20010045482 Smithsonian Institution, Center for Earth and Planetary Studies, Washington, DC USA
Studies of Martian Wrinkle Ridges Using MOLA Topographic Data: The Nature of Elevation Offsets
Watters, T. R., Smithsonian Institution, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mars Orbiter Laser Altimeter (MOLA) profiles across martian wrinkle ridges show the presence of elevation offsets. MOLA data has reveal that many wrinkle ridges do not exhibit elevation offsets and some may result from the ponding of lava flows or the accumulation of wind-blown material. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Planetary Geology; Geological Faults; Topography; Elevation

20010045483 Smithsonian Institution, Center for Earth and Planetary Studies, Washington, DC USA
The Topography of Lobate Scarps Along the Dichotomy Boundary from MOLA Data
Watters, T. R., Smithsonian Institution, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The topography of lobate scarps along the crustal dichotomy boundary is being studied using Mars Orbiter Laser Altimeter (MOLA) data. The presence of thrust faults and fractures along the dichotomy boundary suggests that a major tectonic event was associated with its formation. Additional information is contained in the original extended abstract.
Derived from text
Topography; Geological Faults; Escarpments; Boundaries; Mars Surface; Planetary Geology

20010045484 Lancaster Univ., Environmental Science Dept., UK
Heat Transfer and Melting in Subglacial Volcanic Eruptions: Implications for Volcanic Deposits and Meltwater Volumes
Wilson, L., Lancaster Univ., UK; Head, J. W., III, Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Principles of ascent and emplacement below ice caps and glaciers are developed and criteria for recognition are presented. Additional information is contained in the original extended abstract.
Derived from text
Volcanoes; Heat Transfer; Melting; Deposits

20010045485 Southwest Research Inst., Boulder, CO USA
Photometric Monitoring of Triton at Sommers-Bausch Observatory in 2000
Young, L. A., Southwest Research Inst., USA; Bullock, M. A., Southwest Research Inst., USA; Colwell, W. B., EarthWatch, Inc., USA; Durda, D. D., Southwest Research Inst., USA; Gleason, K., Colorado Univ., USA; Parker, J. W., Southwest Research Inst., USA; Stern, S. A., Southwest Research Inst., USA; Terrell, D., Southwest Research Inst., USA; Young, E. F., Southwest Research

Inst., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-9640; NAG5-4275; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We undertook pilot program to develop an observing and analysis strategy that can be used to measure Triton's B and V albedos with 0.05 magnitude accuracy at moderate-to-small telescopes, under moderate-to-poor seeing conditions. Additional information is contained in the original extended abstract.
Derived from Text
Albedo; Photometry; Triton

20010045486 NASA Ames Research Center, Moffett Field, CA USA
Use of SNC Meteorites to Constrain the Role of Oxidants in the Martian Regolith
Zent, A. P., NASA Ames Research Center, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Martian meteorites show evidence of oxidation, but putative Noachian organic materials should be accessible. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Planetary Geology; Regolith; SNC Meteorites; Oxidizers

20010045487 NASA Ames Research Center, Moffett Field, CA USA
Mars Atmospheric Oxidant Sensor (MAOS): An In-Situ Heterogeneous Chemistry Analysis
Zent, A. P., NASA Ames Research Center, USA; Quin, R., NASA Ames Research Center, USA; Grunthaner, F., Jet Propulsion Lab., California Inst. of Tech., USA; Hecht, M. H., Jet Propulsion Lab., California Inst. of Tech., USA; Buehler, M., Jet Propulsion Lab., California Inst. of Tech., USA; Ricco, A. J., ACLARA Biosciences, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

A new chemical sensor designed to detect oxidants in the martian environment has been developed. Additional information is contained in the original extended abstract.
Derived from Text
Mars Atmosphere; Oxidizers; In Situ Measurement; Chemical Analysis

20010045488 Washington Univ., Dept. of Earth and Planetary Sciences, Saint Louis, MO USA
Geochemical Constraints on the Oxidation States of the Europan Ocean and Mantle
Zolotov, M. Yu., Washington Univ., USA; Shock, E. L., Washington Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format
Contract(s)/Grant(s): NAG5-7696; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present observational, meteoritic, and physical-chemical arguments for an oxidized Fe-metal free mantle and an oxidized sulfate-carbonate rich ocean on Europa. The ocean should be out of equilibrium even with oxidized igneous rocks at the oceanic floor. Additional information is contained in the original extended abstract.
Derived from text
Europa; Geochemistry; Oceans; Oxidation; Chemical Composition

20010045489 NASA, Washington, DC USA
MOLA Topography of Small Volcanoes in Tempe Terra and Ceraunius Fossae, Mars: Implications for Eruptive Styles
Wong, M. P., California Univ., USA; Sakimoto, S. E. H., NASA Goddard Space Flight Center, USA; Garvin, J. B., NASA, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We use Mars Orbiter Laser Altimeter (MOLA) data to measure small volcanoes in the Tempe Terra and Ceraunius Fossae regions of Mars. We find that previous geometry estimates based on imagery alone are inaccurate, but MOLA data support image-based interpretations of eruptive style. Additional information is contained in the original extended abstract.
Derived from Text
Mars Surface; Mars Volcanoes; Topography; Image Analysis

20010045490 NASA Goddard Space Flight Center, Greenbelt, MD USA

Eruption Constraints for a Young Channelized Lava Flow, Marte Vallis, Mars

Therkelsen, J. P., Amherst Coll., USA; Santiago, S. S., Arizona State Univ., USA; Grosfils, E. B., Pomona Coll., USA; Sakimoto, S. E. H., NASA Goddard Space Flight Center, USA; Mendelson, C. V., Beloit Coll., USA; Bleacher, J. E., Arizona State Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

This study constrains flow rates for a specific channelized lava flow in Marte Vallis, Mars. We measured slope-gradient, channel width, and channel depth. Our results are similar to other recent studies which suggests similarities to long, terrestrial basaltic flow. Additional information is contained in the original extended abstract.

Derived from Text

Channel Flow; Lava; Mars Surface; Planetary Geology; Flow Velocity; Mars Volcanoes

20010045491 NASA Goddard Space Flight Center, Greenbelt, MD USA

Lava Tube Flow Models at Alba Patera, Mars: Topographic Constraints on Eruption Rates

Riedel, S. J., Franklin and Marshall Coll., USA; Sakimoto, S. E. H., NASA Goddard Space Flight Center, USA; Bradley, B. A., NASA Goddard Space Flight Center, USA; DeWet, A., Franklin and Marshall Coll., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format

Contract(s)/Grant(s): NAG5-8565; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Alba Patera has some of the longest lava tubes over some of the shallowest slopes on Mars. We use Mars Orbiter Laser Altimeter (MOLA) topography to model eruption rates for several Alba Patera lava tubes and compare them within Alba and with flows from other martian volcanic regions. Additional information is contained in the original extended abstract.

Derived from Text

Fluid Flow; Mars Surface; Planetary Geology; Topography; Computerized Simulation; Mars Volcanoes

20010045492 Buffalo Univ., Dept. of Geology, NY USA

Inferring Lava Flow-Field Emplacement Using MOLA: Topography of Tyrrhena Pateras Flow Field

Meyer, B. R., Buffalo Univ., USA; Gregg, T. K. P., Buffalo Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Using Mars Orbiter Laser Altimeter (MOLA) data to obtain accurate measurements of lava flow lobes within the Tyrrhena Patera flow field, we are able to constrain eruption and emplacement parameters. Additional information is contained in the original extended abstract.

Derived from Text

Flow Distribution; Lava; Topography; Mars Volcanoes

20010045493 Carroll Community Coll., Westminster, MD USA

Geomorphometric Analysis of an Ascraeus Mons Lava Flow: Implications for MGS Image Interpretation

Peitersen, M. N., Carroll Community Coll., USA; Foote, M., Carroll Community Coll., USA; Humphries, R., Carroll Community Coll., USA; MacInnis, C., Carroll Community Coll., USA; Mazie, I., Carroll Community Coll., USA; Trump, D., Carroll Community Coll., USA; Zimbelman, J. R., National Air and Space Museum, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

We present here the results of an undergraduate project, to study the morphology of an Ascraeus Mons lava flow. Forty-four widths and 11 thicknesses (from shadow measurements) were measured off a Mars Orbiter Camera (MOC) image. Geomorphometric analyses and Newtonian flow modeling were then applied. Additional information is contained in the original extended abstract.

Derived from Text

Fluid Flow; Lava; Mars Volcanoes; Morphology; Computerized Simulation

20010045494 Buffalo Univ., Dept. of Geology, NY USA

Textured Lava Flows on Earth, Mars, and Venus

Warner, N. H., Buffalo Univ., USA; Gregg, T. K. P., Buffalo Univ., USA; Bulmer, M. H., Smithsonian Institution, USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings

presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Textured lava flows at Sabancaya volcano, Peru reveal morphologies similar to textured lava flows on Mars and Venus. Analysis of the flows at Sabancaya may provide an understanding of the rheological properties of the extraterrestrial flows. Additional information is contained in the original extended abstract.

Derived from Text

Volcanoes; Rheology; Analogies; Morphology; Fluid Flow

20010045495 Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, German Aerospace Center, Berlin, Germany

Possible Volcanic Constructs in Aram Chaos Revealed by MOC and Their Impact on Outflow Channel Genesis

Lanz, J. K., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Juamann, R., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Mars Orbiter Camera (MOC)-Images of Aram Chaos show features resembling volcanic constructs or magmatic intrusions, hinting to the possibility that volcanic activity in the chaotic terrains themselves have played a key role in triggering the events that formed the Chryse outflow channels. Additional information is contained in the original extended abstract.

Derived from Text

Terrain; Mars Volcanoes; Mars Surface; Planetary Geology

20010045496 Brown Univ., Dept. of Geological Science, Providence, RI USA

Plains in Eastern Elysium Planitia, Mars: Topographic Evidence for Aqueous Channels and Lava Flows

Head, J. W. III, Brown Univ., USA; Kreslavsky, M. A., Kharkov Astronomical Observatory, Ukraine; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

The extremely flat and smooth Amazonian-age plains in eastern Elysium Planitia consist of an older unit (dendritic system of channels) and a younger unit (lava flows filling an outflow channel). Additional information is contained in the original extended abstract.

Derived from Text

Fluid Flow; Mars Surface; Topography; Plains; Planetary Geology

20010045497 Brown Univ., Dept. of Geology, Providence, RI USA

Amazonis Planitia: Detection of Pre-Aureole Olympus Mons Flows and the Origin of the Smoothest Plains on Mars

Head, J. W. III, Brown Univ., USA; Kreslavsky, M. A., Kharkov Astronomical Observatory, Ukraine; Pratt, S., Brown Univ., USA; Fuller, E. R., Brown Univ., USA; Lunar and Planetary Science XXXII; 2001; In English; See also 20010044353; CD-ROM contains the entire conference proceedings presented in PDF format; No Copyright; Abstract Only: Available from CASI only as part of the entire parent document

Analysis of Amazonis Planitia shows subdivisions in very smooth terrain and reveals evidence for Early Olympus Mons flows and fluvial and lava deposits. Additional information is contained in the original extended abstract.

Derived from text

Deposits; Lava; Mars Surface; Terrain; Planetary Geology; Stratigraphy

20010045823 NASA Goddard Space Flight Center, Greenbelt, MD USA

Mapping the Red Planet

Smith, David E., NASA Goddard Space Flight Center, USA; Smith, David E., NASA Goddard Space Flight Center, USA; [2001]; 1p; In English; Mars K-12 Educator's Workshop "Mapping the Red Planet: New Discoveries on Mars", 3 Mar. 2001, Tempe, AZ, USA; No Copyright; Avail: Issuing Activity; Abstract Only

Since September 1997 the Mars Global Surveyor spacecraft has been orbiting the planet Mars and acquiring new data about the red planet that is changing our view of its present state and past history. Except for a few weeks in October 1997 and a few months in the Spring/Summer of 1998 when special science operations were conducted the spacecraft spent the first 18 months if its time at Mars getting to the right orbital geometry for the mapping mission. But on March 1, 1999 the MGS spacecraft trained its instruments onto the planet to begin a full Mars year (684 Earth days) of continuous systematic mapping and observation of the planet. The camera began wide angle and high resolution mapping, the thermal emission spectrometer began sensing the atmosphere and the material properties of the surface, the magnetometer searched out regions of abnormally high magnetism, the

altimeter began determining the precise shape of the planet, and the radio science experiment began determining atmospheric pressures, temperatures and mapping the planet's gravity field. In a matter of a month more data was acquired about
Author
Planetary Mapping; Thermal Mapping; Mars (Planet)

20010046069 NASA Ames Research Center, Moffett Field, CA USA
Decoding the Domino: The Dark Side of Iapetus
Owen, Tobias C., Hawaii Univ., USA; Cruikshank, Dale P., NASA Ames Research Center, USA; DalleOre, C. M., NASA Ames Research Center, USA; Geballe, T. R., Gemini Telescope, USA; Roush, T. L., NASA Ames Research Center, USA; deBergh, C., Observatoire de Paris-Meudon, France; Meier, Roland, Hawaii Univ., USA; Pendleton, Yvonne J., NASA Ames Research Center, USA; Khare, Bishun N., NASA Ames Research Center, USA; [2001]; 50p; In English
Contract(s)/Grant(s): NAG5-6561; RTOP 344-32-20-01; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We present new spectra of the leading and trailing hemispheres of Iapetus from 2.4 to 3.8 micron. We have combined the leading hemisphere spectra with previous observations by others to construct a composite spectrum of the dark side (leading) hemisphere from 0.3 to 3.8 gm. We review attempts to deduce the composition of the dark material from previously available spectrophotometry. None of them (numbering more than 20 million!) leads to a synthetic spectrum that matches the new data. An intimate mixture of water ice, amorphous carbon and a nitrogen-rich organic compound (modeled here as Triton tholin) can fit the entire composite dark side spectrum. Observations in this spectral region have not revealed this mix of material on any other object observed thus far. We propose that this dark material may have originated on Titan, where atmospheric photochemistry has been producing nitrogen-rich organic compounds for 4.5 GY.
Author
Iapetus; Saturn (Planet); Titan

20010046975 Search for Extraterrestrial Intelligence Inst., Moffett Field, CA USA
Iceland as a Model for Chemical Alteration on Mars
Bishop, Janice L., Search for Extraterrestrial Intelligence Inst., USA; Schiffman, P., California Univ., USA; Murad, E., Barvarian Geological Survey, Germany; Southard, R., California Univ., USA; Jan. 18, 2001; 2p; In English; Lunar and Planetary Science Conference, 11-16 Mar. 2001, Houston, TX, USA
Contract(s)/Grant(s): NCC2-1100; NAG5-3871; RTOP 896-50-21-01; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Subglacial volcanic activity on Iceland has led to the formation of a variety of silicate and iron oxide-rich alteration products that may serve as a model for chemical alteration on Mars. Multiple palagonitic tuffs, altered pillow lavas, hydrothermal springs and alteration at glacial run-off streams were observed during a recent field trip in Iceland. Formation of alteration products and ferrihydrite in similar environments on Mars may have contributed to the ferric oxide-rich surface material there. The spectral and chemical properties of Icelandic alteration products and ferrihydrites are presented here.
Author
Chemical Effects; Planetary Geology; Glaciers; Mars Volcanoes; Silicates; Iceland

20010047497 Search for Extraterrestrial Intelligence Inst., Moffett Field, CA USA
A Study of Soil and Duricrust Models for Mars
Bishop, Janice L., Search for Extraterrestrial Intelligence Inst., USA; [2001]; 2p; In English; Lunar and Planetary Science Conference, 11-16 Mar. 2001, Houston, TX, USA
Contract(s)/Grant(s): NCC2-1100; NAG5-3871; RTOP 896-50-21-01; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

This project includes analysis of the Mars Pathfinder soil data (spectral, chemical and magnetic) together with analog materials and the products of laboratory alteration experiments in order to describe possible mechanisms for the formation of soil, duricrust and rock coatings on Mars. Soil analog mixtures have been prepared, characterized and tested through wet/dry cycling experiments for changes in binding and spectroscopic properties that are related to what could be expected for duricrusts on Mars. The smectite-based mixture exhibited significantly greater changes (1) in its binding properties throughout the wet/dry cycling experiments than did the palagonite-based mixture, and (2) in its spectral properties following grinding and resieving of the hardened material than did the palagonite-based mixture.
Author
Soils; Crusts; Soil Sampling; Mars Surface Samples; Mars (Planet)

20010047620 Colorado Univ., Dept. of Astrophysical and Planetary Science, Boulder, CO USA

The Radiative Effects of Martian Water Ice Clouds on the Local Atmospheric Temperature Profile

Colaprete, Anthony, Colorado Univ., USA; Toon, Owen B., Colorado Univ., USA; Icarus; [2000]; ISSN 0019-1035; Volume 145, pp. 524-532; In English

Contract(s)/Grant(s): NCC2-5300; NCC2-1052; NAG5-6900; Copyright; Avail: Issuing Activity

Mars Pathfinder made numerous discoveries, one of which was a deep temperature inversion that extended from about 15 km down to 8 km above the surface. It has been suggested by Haberle et al. (1999. J. Geophys. Res. 104, 8957-8974.) that radiative cooling by a water ice cloud may generate such an inversion. Clouds can strongly affect the local air temperature due to their ability to radiate efficiently in the infrared and due to the low air mass of the martian atmosphere, which allows the temperature to change during the relatively short lifetime of a cloud. We utilize a time-dependent microphysical aerosol model coupled to a radiative--convective model to explore the effects water ice clouds have on the local martian temperature profile. We constrain the dust and water vapor abundance using data from the Viking Missions and Mars Pathfinder. Water t ice clouds with visible optical depths of r is greater than 0.1 form readily in these simulations. These clouds alter the local air temperature directly, through infrared cooling, and indirectly, by redistributing atmospheric dust. With this model we are able to reproduce the temperature inversions observed by Mars Pathfinder and Mars Global t Surveyor 2000 Academic Press

Author

Ice Clouds; Atmospheric Temperature; Temperature Profiles; Aerosols; Mars Pathfinder; Temperature Inversions; Infrared Radiation

20010048001 NASA Goddard Space Flight Center, Greenbelt, MD USA

Non-detection at Venus of High-Frequency Radio Signals Characteristic of Terrestrial Lightning

Gurnett, D. A., Iowa Univ., USA; Zarka, P., Observatoire de Paris-Meudon, France; Manning, R., Observatoire de Paris-Meudon, France; Kurth, W. S., Iowa Univ., USA; Hospodarsky, G. B., Iowa Univ., USA; Averkamp, T. F., Iowa Univ., USA; Kaiser, M. L., NASA Goddard Space Flight Center, USA; Farrell, W. M., NASA Goddard Space Flight Center, USA; Nature; 20010118; Volume 409, pp. 313-315; In English; Copyright; Avail: Issuing Activity

The detection of impulsive low-frequency (10 to 80 kHz) radio signals, and separate very-low-frequency (approx. 100 Hz) radio 'whistler' signals provided the first evidence for lightning in the atmosphere of Venus. Later, a small number of impulsive high- frequency (100 kHz to 5.6 MHz) radio signals, possibly due to lightning, were also detected. The existence of lightning at Venus has, however, remained controversial. Here we report the results of a search for high-frequency (0.125 to 16 MHz) radio signals during two close fly-bys of Venus by the Cassini spacecraft. Such signals are characteristic of terrestrial lightning, and are commonly heard on AM (amplitude-modulated) radios during thunderstorms. Although the instrument easily detected signals from terrestrial lightning during a later fly-by of Earth (at a global flash rate estimated to be 70/s, which is consistent with the rate expected for terrestrial lightning), no similar signals were detected from Venus. If lightning exists in the venusian atmosphere, it is either extremely rare, or very different from terrestrial lightning.

Derived from text

Detection; High Frequencies; Lightning; Low Frequencies; Signal Detection; Venus Atmosphere

20010048008 California Univ., Inst. of Geophysics and Planetary Physics, Los Angeles, CA USA

A Global Magnetohydrodynamic Model of Jovian Magnetosphere *Final Report*

Walker, Raymond J., California Univ., USA; [2001]; 4p; In English

Contract(s)/Grant(s): NAG5-8055; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The goal of this project was to develop a new global magnetohydrodynamic model of the interaction of the Jovian magnetosphere with the solar wind. Observations from 28 orbits of Jupiter by Galileo along with those from previous spacecraft at Jupiter, Pioneer 10 and 11, Voyager I and 2 and Ulysses, have revealed that the Jovian magnetosphere is a vast, complicated system. The Jovian aurora also has been monitored for several years. Like auroral observations at Earth, these measurements provide us with a global picture of magnetospheric dynamics. Despite this wide range of observations, we have limited quantitative understanding of the Jovian magnetosphere and how it interacts with the solar wind. For the past several years we have been working toward a quantitative understanding of the Jovian magnetosphere and its interaction with the solar wind by employing global magnetohydrodynamic simulations to model the magnetosphere. Our model has been an explicit MHD code (previously used to model the Earth's magnetosphere) to study Jupiter's magnetosphere. We continue to obtain important insights with this code, but it suffers from some severe limitations. In particular with this code we are limited to considering the region outside of 15RJ, with cell sizes of about 1.5R(sub J). The problem arises because of the presence of widely separated time scales throughout the magnetosphere. The numerical stability criterion for explicit MHD codes is the CFL limit and is given by C(sub max)(Delta)t/(Delta)x less than 1 where C(sub max) is the maximum group velocity in a given cell, (Delta)x is the grid spacing

and (Delta)t is the time step. If the maximum wave velocity is C(sub w) and the flow speed is C(sub f), C(sub max) = C(sub w) + C(sub f). Near Jupiter the Alfven wave speed becomes very large (it approaches the speed of light at one Jovian radius). Operating with this time step makes the calculation essentially intractable. Therefore under this funding we have been designing a new MHD model that will be able to compute solutions in the wide parameter regime of the Jovian magnetosphere.
Author
Magnetohydrodynamics; Models; Earth Magnetosphere; Group Velocity; Solar Wind; Numerical Stability

20010048427 Michigan Univ., Dept. of Atmospheric, Oceanic and Space Sciences, Ann Arbor, MI USA
An Auroral Flare at Jupiter
Walte, J. H., Jr., Michigan Univ., USA; Gladstone, G. R., Southwest Research Inst., USA; Lewis, W. S., Southwest Research Inst., USA; Goldstein, R., Southwest Research Inst., USA; McComas, D. J., Southwest Research Inst., USA; Riley, P., Science Applications International Corp., USA; Walker, R. J., California Univ., USA; Robertson, P., Southwest Research Inst., USA; Desal, S., Desal (S.), USA; Clarke, J. T., Michigan Univ., USA; Young, D. T., Michigan Univ., USA; Nature; Apr. 12, 2001; Volume 410, pp. 787-789; In English; Original contains color illustrations; Copyright; Avail: Issuing Activity

Jupiter's aurora is the most powerful in the Solar System. It is e powered largely by energy extracted from planetary rotation, although there seems also to be a contribution from the solar wind. This contrasts with Earths aurora, which is generated through the interaction of the solar wind with the magnetosphere. The major features of Jupiter's aurora (based on far-ultraviolet, near-infrared and visible-wavelength observations) include a main oval that generally corotates with the planet and a region of patchy, diffuse emission inside the oval on Jupiters dusk side. Here we report the discovery of a rapidly evolving, very bright and localized emission poleward of the northern main oval, in a region a connected magnetically to Jupiter's outer magnetosphere. The intensity of the emission increased by a factor of 30 within 70 s, and then decreased on a similar timescale, all captured during a single four-minute exposure. This type of Raring emission has not previously been reported for Jupiter (similar, but smaller, transient events have been observed at Earth), and it may be related directly to changes in the solar wind.
Author
Auroras; Twilight Glow; Solar Flares; Jupiter (Planet)

20010048660 NASA Ames Research Center, Moffett Field, CA USA
Saturn's Spectacular Ring System
Lissauer, Jack J., NASA Ames Research Center, USA; [2001]; 1p; In English, 10-23 Mar. 2001, Tel Aviv, Israel
Contract(s)/Grant(s): RTOP 344-30-50-01; Copyright; Avail: Issuing Activity; Abstract Only

Saturn's beautiful rings have fascinated astronomers since they were first observed by Galileo in 1610. The main rings consist of solid particles mostly in the 1 cm - 10 m range, composed primarily of water ice. The ring disk is exceptionally thin - the typical local thickness of the bright rings is tens of meters, whereas the diameter of the main rings is 250,000 km! The main rings exhibit substantial radial variations "ringlets", many of which are actively maintained via gravitational perturbations from Saturn's moons. Exterior to the main rings lie tenuous dust rings, which have little mass but occupy a very large volume of space. This seminar will emphasize the physics of ring-moon interactions, recent advances in our understanding of various aspects of the rings obtained from observations taken during 1995 when the rings appeared edge-on to the Earth and then to the Sun, and observations in subsequent years from HST.
Author
Saturn Rings; Galileo Spacecraft; Dust; Ice; Moon; Perturbation

20010048670 California Univ., Dept. of Earth and Space Science, Los Angeles, CA USA
Magnetohydrodynamic Simulations of the Effects of the Solar Wind on the Jovian Magnetosphere
Walker, Raymond J., California Univ., USA; Ogino, Tatsuki, Nagoya Univ., Japan; Kivelson, Margaret G., California Univ., USA; Planetary and Space Science; 2001; ISSN 0032-0633; Volume 49, pp. 237-245; In English; Original contains color illustrations
Contract(s)/Grant(s): JPL-958694; NAG5-8055; Copyright; Avail: Issuing Activity

We have used a three-dimensional magnetohydrodynamic simulation of the interaction between the solar wind and a rapidly rotating magnetosphere to study the effects of the solar wind dynamic pressure and the interplanetary magnetic field IMF on the configuration of the Jovian magnetosphere. Both the solar wind dynamic pressure and the IMF can cause substantial changes in the magnetosphere. On the dayside when the pressure increases the bow shock and magnetopause move toward Jupiter and the equatorial magnetic field in the middle magnetosphere becomes more dipole-like. When the pressure decreases the boundaries move farther from Jupiter and the dayside magnetic field becomes stretched out into a more tail-like configuration. For northward IMF the boundaries move toward Jupiter but the field becomes more tail-like. Finally, for southward IMF the boundaries move away and the field becomes more dipole-like. These changes are qualitatively consistent with those observed on spacecraft passing

through the dayside magnetosphere. However, we were not always able to get quantitative agreement. In particular the model does not reproduce the extremely tail-like magnetic field observed during the Pioneer 10 and Ulysses inbound passes. The solar wind and IMF also influence the configuration of the middle magnetosphere in the magnetotail. Tailward flows were found in the nightside equatorial plasma sheet for most IMF orientations. Both inertial effects and the IMF influence reconnection in the tail. The only time the tailward flow in the magnetotail stopped was during prolonged intervals with southward IMF. Then reconnection in the polar cusp caused the flow to move out of the equatorial plane.
Author
Interplanetary Magnetic Fields; Magnetopause; Planetary Magnetic Fields; Magnetohydrodynamics; Simulation; Solar Wind

20010048882 NASA Ames Research Center, Moffett Field, CA USA
Exobiological Exploration of Mars
DeVincenzi, Donald L., NASA Ames Research Center, USA; [1994]; 1p; In English; NSCORT Symposium, ACS Spring 1994 Meeting, 21 Mar. 1994, San Diego, CA, USA; Sponsored by American Chemical Society, USA
Contract(s)/Grant(s): RTOP 185-52-92-03; No Copyright; Avail: Issuing Activity; Abstract Only

Of all the other planets in the solar system, Mars remains the most promising for studying concepts about chemical evolution and the origin of life. Strategies were developed to pursue three exobiological objectives for Mars: determine abundance and distribution of biogenic elements and organic compounds, detect evidence of an ancient biota, and determine if organisms exist anywhere on the planet. The three strategies share the same sequence of phases. In the first phase, each requires global reconnaissance and remote sensing by orbiters to select sites of interest for detailed in situ analyses. In the second phase, lander missions are conducted to characterize the chemical and physical properties of the selected sites. The third phase involves conducting ”critical” experiments at sites whose properties make them particularly attractive for exobiology. These critical experiments would include, for example, identification of organics, detection of fossils, and detection of extant life. The fourth phase is the detailed analysis of samples returned from these sites in Earth-based laboratories to confirm and extend previous discoveries. Finally, in the fifth phase, human exploration is needed to establish the geological context or to discover and explore sites that are not accessible to robotic spacecraft.
Author
Biological Evolution; Chemical Evolution; Organic Compounds; Organisms; Mars (Planet)

92
SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots. For related information see 93 Space Radiation.

20010043989 California Inst. of Tech., Norman Bridge Lab. for Physics, Pasadena, CA USA
Precision Solar Disk Photometry - A Tool for Understanding Changes in the Sun’s Luminosity ***Final Report, 1 Jun. 1997 - 31 May 2000***
[2000]; 3p; In English
Contract(s)/Grant(s): NAG5-6173; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The principal scientific aim of this project is to better understand the observed long-term temporal variations in the Sun’s luminosity. Satellite observations have revealed that the flux of solar radiation striking the Earth is modulated by the solar magnetic cycle, being approximately 0.1 percent larger during solar maximum. The impact of this irradiance modulation on terrestrial climate is difficult to model. However, the correlation between the Maunder minimum (a period of low solar magnetic activity in the late 1600s) and the ’Little Ice Age’ in Europe during the same period does suggest that small changes in the solar luminosity can profoundly affect the Earth’s climate.
Derived from text
Photometry; Solar Activity Effects; Temporal Distribution; Solar Radiation; Luminosity

20010044268 Boston Univ., Dept. of Astronomy, Boston, MA USA
Multipoint Energetic Neutral Atom Studies with Polar, Geotail, and Tiros ***Final Report, 15 Jan. 1999 - 14 Jan. 2001***
Spence, Harlan E., Boston Univ., USA; [2001]; 3p; In English; Original contains color illustrations
Contract(s)/Grant(s): NAG5-8039; BU-20-325-3894-5; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

This final report describes the efforts accomplished during the grant’s period of performance, covering the period of 15 January 1999 to 14 January 2001, of a NASA ISTP/SolarMax Extended Science Program grant. We have completed many of the goals set forth in the proposed research objectives and our efforts in this research area continue in a related grant from NASA.

Studies have been published and papers are being written, and numerous invited and contributed presentations of these studies have been presented at national and international meetings during the performance period.
Author
Neutral Atoms; Energetic Particles

20010046968 NASA Marshall Space Flight Center, Huntsville, AL USA
Shock Formation of Slow Magnetosonic Waves in Coronal Plumes
Cuntz, Manfred, Texas Univ., USA; Suess, Steven T., NASA Marshall Space Flight Center, USA; [2001]; 2p; In English; No Copyright; Avail: Issuing Activity; Abstract Only

We investigate the height of shock formation in coroner plumes for slow magnetosonic waves. The models take into account plume geometric spreading, heat conduction and radiative damping. The wave parameters as well as the spreading functions of the plumes and the base magnetic field strengths are given by empirical constraints mostly from Solar and Heliospheric Observatory/Ultraviolet Coronagraph Spectrometer (SOHO/UVCS). Our models show that shock formation occurs at low coronal heights, i.e., within 1.3 solar radius, depending on the model parameters. The shock formation is calculated using the well-established wave breaking condition given by the intersection of C+ characteristics in the space-time plane. Our models show that shock heating by slow magnetosonic waves is expected to be relevant at most heights in solar coronal plumes, although slow magnetosonic waves are most likely not a solely operating energy supply mechanism.
Author
Shock Heating; Solar Corona; Magnetohydrodynamic Waves

20010046973 Minnesota Univ., School of Physics and Astronomy, Minneapolis, MN USA
Ion Isotropy and Ion Resonant Waves in the Solar Wind: Cassini Observations
Kellogg, Paul J., Minnesota Univ., USA; Gurnett, Donald A., Iowa Univ., USA; Hospodarsky, George B., Iowa Univ., USA; Kurth, William S., Iowa Univ., USA; Geophysical Research Letters; Jan. 01, 2001; ISSN 0094-8276; Volume 28, No. 1, pp. 87-90; In English
Contract(s)/Grant(s): JPL-961152
Report No.(s): Paper-2000GL012100; Copyright; Avail: Issuing Activity

Electric fields in the solar wind, in the range of one Hertz, are reported for the first time from a 3-axis stabilized spacecraft. The measurements are made with the Radio and Plasma Wave System (RPWS) experiment on the Cassini spacecraft. Kellogg suggested that such waves could be important in maintaining the near-isotropy of solar wind ions and the validity of MHD for the description of the solar wind. The amplitudes found are larger than those estimated by Kellogg from other measurements, and are due to quasi-electrostatic waves. These amplitudes are quite sufficient to maintain isotropy of the solar wind ions.
Author
Electric Fields; Solar Wind; Electrostatic Waves; Ions; Space Probes; Electromagnetic Surface Waves

20010046993 Colorado Univ., Boulder, CO USA
[Characteristics of Waves Generated Beneath the Solar Convection Zone by Penetrative Overshoot] ***Final Report, Jun. 1999 - Nov. 2000***
Julien, Keith, Colorado Univ., USA; [2000]; 8p; In English
Contract(s)/Grant(s): NAG5-4918; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The goal of this project was to theoretically and numerically characterize the waves generated beneath the solar convection zone by penetrative overshoot. Three dimensional model simulations were designed to isolate the effects of rotation and shear. In order to overcome the numerically imposed limitations of finite Reynolds numbers (Re) below solar values, series of simulations were designed to elucidate the Reynolds-number dependence (hoped to exhibit mathematically simple scaling on Re) so that one could cautiously extrapolate to solar values.
Author
Three Dimensional Models; Solar Convection (Astronomy); Boundary Conditions

20010046999 NASA Ames Research Center, Moffett Field, CA USA
Large Solar Wind Disturbances During Late May and Early June, 1991
Mihalov, J. D., NASA Ames Research Center, USA; [1994]; 1p; In English
Contract(s)/Grant(s): RTOP 370-24-48; No Copyright; Avail: Issuing Activity; Abstract Only

Solar wind data from the Ames experiment aboard the Pioneer Venus Orbiter, associated with a period of high solar activity that began at the end of May, 1991, are summarized and discussed. Some particularly large, strong shocks and solar ejecta were

observed. The solar longitude of Venus, relative to associated flares. varies over a wide range, for a series of flares that produced X-rays that saturated the GOES X-ray counters.
Author
Solar Wind; Wind Measurement; X Rays; Solar Activity

20010047411 NASA, USA
Solar-Terrestrial Physics in the 1990s: Key Science Objectives for the IACG Mission Set
April 1991; 76p; In English; IACG-ISTP Workshop, 5-7 Feb. 1991, San Antonio, TX, USA; Sponsored by NASA, USA; Original contains color illustrations; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The International Solar-Terrestrial Physics (ISTP) program is an internationally coordinated multi-spacecraft mission that will study the production of the supersonic magnetized solar wind, its interaction with the Earth's magnetosphere, and the resulting transport of plasma, momentum and energy through the magnetosphere and into the ionosphere and upper atmosphere. The mission will involve l4spacecraft to be launched between 1992 and 1996, along with complementary ground-based observations and theoretical programs. A list of the spacecraft, their nominal orbits, and responsible agencies is shown.
Author
Earth Magnetosphere; Plasma Heating; Solar Terrestrial Interactions; Solar Wind

20010047692 NASA Goddard Space Flight Center, Greenbelt, MD USA
Taking Solar Images to the "IMAX" (Trademark)
Maran, Stephen P., NASA Goddard Space Flight Center, USA; [2000]; 2p; In English; Copyright; Avail: Issuing Activity

The most dramatic motion pictures ever made of the Sun and the aurora may be coming soon to a giant screen near you. They are highlights of the IMAX (registered) film, SolarMax, which follows humanity's reaction to the Sun from ancient times to the Space Age. The interaction of Sun and Earth is a major topic in the film, which opens with an impressive view of our planet surmounted by an auroral crown. Terrestrial scenes are featured too; they range from ancient ruins where the Sun was watched millennia ago to the most modern mountaintop observatories. The movie crew spent three weeks in Norway to get one great sequence of the midnight Sun, and claim they visited sites on five continents while making the film.
Derived from text
Motion Pictures; Sun; Solar Activity

20010048761 NASA Marshall Space Flight Center, Huntsville, AL USA
Plasma Beta Above a Solar Active Region: Rethinking the Paradigm
Gary, G. Allen, NASA Marshall Space Flight Center, USA; [2001]; 1p; In English; No Copyright; Avail: Issuing Activity; Abstract Only

In this paper, we present a model of the plasma beta above an active region and discuss its consequences in terms of coronal magnetic field modeling. The beta-plasma model is representative and derived from a collection of sources. The resulting beta variation with height is used to emphasize the assumption that the magnetic pressure dominates over the plasma pressure must be carefully considered depending on what part of the solar atmosphere is being considered. This paper points out (1) that the paradigm that the coronal magnetic field can be constructed from a force-free magnetic field must be used in the correct context, since the forcefree region is sandwiched between two regions which have beta greater than 1, (2) that the chromospheric MgIICIV magnetic measurements occur near the beta-minimum, and (3) that, moving from the photosphere upwards, beta can return to 1 at relatively low coronal heights, e.g. R approximately 1.2R(sub)s.
Author
Plasmas (Physics); Solar Atmosphere; Force-Free Magnetic Fields

93
SPACE RADIATION

Includes cosmic radiation; and inner and outer Earth radiation belts. For biological effects of radiation on plants and animals see 52 Aerospace Medicine. For theory see 73 Nuclear Physics.

20010045825 Colorado Univ., Boulder, CO USA
X-ray Emission from Pre-Main-Sequence Stars - Testing the Solar Analogy ***Final Report, 15 May 1995 - 31 Dec. 2000***
Skinner, Stephen L., Colorado Univ., USA; [2000]; 6p
Contract(s)/Grant(s): NAG5-3224; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This LTSA award funded my research on the origin of stellar X-ray emission and the validity of the solar-stellar analogy. This research broadly addresses the relevance of our current understanding of solar X-ray physics to the interpretation of X-ray emission from stars in general. During the past five years the emphasis has been on space-based X-ray observations of very young stars in star-forming regions (T Tauri stars and protostars), cool solar-like G stars, and evolved high-mass Wolf-Rayet (WR) stars. These observations were carried out primarily with the ASCA and ROSAT space-based observatories (and most recently with Chandra), supplemented by ground-based observations. This research has focused on the identification of physical processes that are responsible for the high levels of X-ray emission seen in pre-main-sequence (PMS) stars, active cool stars, and WR stars. A related issue is how the X-ray emission of such stars changes over time, both on short timescales of days to years and on evolutionary timescales of millions of years. In the case of the Sun it is known that magnetic fields play a key role in the production of X-rays by confining the coronal plasma in loop-like structures where it is heated to temperatures of several million K. The extent to which the magnetically-confined corona interpretation can be applied to other X-ray emitting stars is the key issue that drives the research summarized here.

Author

X Ray Astronomy; X Ray Stars; Analogies; Solar X-Rays

20010046958 NASA Marshall Space Flight Center, Huntsville, AL USA

NUCLEON-mission: A New Approach to Cosmic Rays Investigation

Adams, J., Naval Research Lab., USA; Bashindzhagyan, G., Moscow State Univ., Russia; Chilingarian, A., Academy of Sciences of the Armenian SSR, Armenia; Drury, L., Dublin Inst. for Advanced Studies, Ireland; Egorov, N., Research Inst. for Material Science and Technology, Russia; Golubkov, S., Research Inst. for Material Science and Technology, Russia; Grebenyuk, V., Joint Inst. for Nuclear Research, USSR; Korotkova, N., Moscow State Univ., Russia; Mashkantcev, A., KB Arsenal Co., Russia; Nanjo, H., Waseda Univ., Japan; [2001]; 1p; In English; International Cosmic Ray Conference, 7-15 Aug. 2001, Hamburg, Germany; No Copyright; Avail: Issuing Activity; Abstract Only

A new approach to Cosmic Rays Investigation is proposed. The main idea is to combine two experimental methods (KLEM and UHIS) for the NUCLEON Project. The KLEM (Kinematic Lightweight Energy Meter) method is used for the study of chemical composition and elemental energy spectra of galactic CRs in extremely wide energy range 10(exp 11)-10(exp 15) eV. The UHIS (Ultra Heavy Isotope Spectrometer) method is used for the ultra heavy CR nuclei fluxes registration nuclei beyond the iron peak. Combination of the two techniques will lead not to simple mechanical unification of two instruments in one block, but lead to the creation of a unique instrument, with a number of advantages.

Author

Cosmic Rays; Heavy Nuclei; Nucleons

20010048763 NASA Marshall Space Flight Center, Huntsville, AL USA

The First Flight of ATIC : Preliminary Results on CNO Nuclei

Fazely, A., Southern Univ., USA; Gunasingha, R., Southern Univ., USA; [2001]; 1p; In English; International Cosmic Ray Conference, 7-15 Aug. 2001, Hamburg, Germany; Financial sponsord in part by LA Board of Regents; No Copyright; Avail: Issuing Activity; Abstract Only

We present preliminary results on the spectra of CNO nuclei in the cosmic radiation as measured in the first flight of the Advanced Thin Ionization Calorimeter Balloon Experiment (ATIC) which lasted for 16 days, starting in December, 2000 with a launch from McMurdo, Antarctica. ATIC is a multiple, long duration balloon flight,investigation for the study of cosmic ray spectra from below 50 GeV to near 100 TeV total energy, using a fully active Bismuth Germanate (BGO) calorimeter. It is equipped with the first large area mosaic of small fully depleted silicon detector pads capable of charge identification in cosmic rays from H to Fe. As a redundancy check for the charge identification and a coarse particle tracking system, three projective layers of x-y scintillator hodoscopes were employed, above, in the center and below a Carbon interaction'target'.

Author

Germanates; Bismuth; Calorimeters; Cosmic Rays; Balloon Flight; Ionization; Nuclei (Nuclear Physics)

99
GENERAL

Includes aeronautical, astronautical, and space science related histories, biographies, and pertinent reports too broad for categorization; histories or broad overviews of NASA programs such as Apollo, Gemini, and Mercury spacecraft, Earth Resources Technology Satellite (ERTS), and Skylab; NASA appropriations hearings.

20010045676 NASA Langley Research Center, Hampton, VA USA
NASA Video Catalog
April 2001; 438p; In English
Report No.(s): NASA/SP-2001-7109/SUPPL08; NAS 1.21:7109/SUPPL08; No Copyright; Avail: CASI; A19, Hardcopy; A04, Microfiche

This report lists 1663 video productions from the NASA STI Database.

Author
Catalogs (Publications); Data Bases; NASA Programs; Video Tapes

20010047669 NASA, Washington, DC USA
NASA FY 2000 Accountability Report
2000; 143p; In English; Original contains color illustrations; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

This Accountability Report consolidates reports required by various statutes and summarizes NASA's program accomplishments and its stewardship over budget and financial resources. It is a culmination of NASA's management process, which begins with mission definition and program planning, continues with the formulation and justification of budgets for the President and Congress, and ends with scientific and engineering program accomplishments. The report covers activities from October 1, 1999, through September 30, 2000. Achievements are highlighted in the Statement of the Administrator and summarized in the Report.

Author
Project Planning; NASA Programs; Management Systems; Financial Management

Subject Term Index

A

A STARS, 105
ABLATION, 327, 455
ABRASION, 491
ABSORBERS (MATERIALS), 196, 232
ABSORPTION SPECTRA, 125, 265, 289, 410, 415, 417, 432, 441
ABSORPTIVITY, 236, 484
ABUNDANCE, 361, 371, 380, 381
ACCELERATED LIFE TESTS, 63, 69, 84
ACCELERATION (PHYSICS), 9, 117
ACCELEROMETERS, 24, 199
ACCESS CONTROL, 253
ACCIDENT INVESTIGATION, 12, 109
ACCIDENT PREVENTION, 7, 10, 11, 12
ACCRETION DISKS, 262, 263, 283, 510
ACCURACY, 8, 38, 111, 230
ACHONDRITES, 306, 360, 361, 389, 390, 391, 461, 509, 519
ACIDITY, 472
ACOUSTIC EMISSION, 115, 228
ACOUSTIC MEASUREMENT, 26, 225
ACOUSTIC PROPAGATION, 79, 227
ACOUSTIC PROPERTIES, 26, 225
ACOUSTIC RESONANCE, 224
ACOUSTIC SCATTERING, 224, 226, 229
ACOUSTIC SIMULATION, 97
ACOUSTIC SOUNDING, 327
ACOUSTICS, 51, 192, 226, 227, 346
ACOUSTO-OPTICS, 87
ACQUIRED IMMUNODEFICIENCY SYNDROME, 180
ACQUISITION, 256
ACTINIDE SERIES, 233
ACTIVE CONTROL, 2, 29, 30
ACTIVITY (BIOLOGY), 171, 393, 394, 503
ACTUATION, 110
ACTUATORS, 56, 85
ADAPTATION, 188
ADAPTIVE CONTROL, 214
ADDITIVES, 239
ADENOSINE TRIPHOSPHATE, 172, 178
ADHESIVE BONDING, 17
ADHESIVES, 67
ADIABATIC CONDITIONS, 90
ADMIXTURES, 390
ADSORBENTS, 393
ADSORPTION, 59, 393
AERIAL PHOTOGRAPHY, 124
AEROACOUSTICS, 97, 119, 229, 230
AEROBES, 73
AERODYNAMIC CHARACTERISTICS, 1, 2, 4, 5, 26, 28, 33, 100, 228
AERODYNAMIC CONFIGURATIONS, 2, 3, 4, 5, 26, 94, 226
AERODYNAMIC FORCES, 92
AERODYNAMIC HEAT TRANSFER, 98
AERODYNAMIC HEATING, 414
AERODYNAMIC LOADS, 1, 211
AERODYNAMIC NOISE, 229, 230
AERODYNAMIC STALLING, 102
AERODYNAMICS, 3, 15
AEROELASTICITY, 1, 3, 6, 29, 30, 117, 220
AEROGELS, 433, 448, 450
AEROMAGNETISM, 458
AERONAUTICAL ENGINEERING, 75, 91
AERONAUTICS, 82, 192
AERONOMY, 149
AEROSERVOELASTICITY, 220
AEROSHELLS, 2
AEROSOLS, 49, 109, 133, 136, 142, 143, 145, 149, 173, 293, 529
AEROSPACE ENGINEERING, 27
AEROSPACE ENVIRONMENTS, 44, 150, 368, 473
AEROSPACE INDUSTRY, 66, 67, 217
AEROSPACE MEDICINE, 213
AEROSPACE SCIENCES, 244, 365, 367, 368, 520
AEROSPACE SYSTEMS, 8, 16
AEROSPIKE ENGINES, 103
AEROTHERMODYNAMICS, 16, 92, 98
AFRICA, 137
AFTERBODIES, 90
AGGLOMERATION, 397
AGGLUTINATION, 339, 396
AGGREGATES, 449, 468, 498
AGING (MATERIALS), 45
AH-64 HELICOPTER, 31
AIR BREATHING ENGINES, 47
AIR DEFENSE, 32
AIR FLOW, 3
AIR LAND INTERACTIONS, 135, 150
AIR LOCKS, 39, 40
AIR MASSES, 145
AIR POLLUTION, 132, 133, 134, 138, 139, 140, 173
AIR QUALITY, 130, 132, 134, 139
AIR SAMPLING, 133, 143
AIR TO AIR REFUELING, 18, 19, 83
AIR TRAFFIC, 10, 14, 207
AIR TRAFFIC CONTROL, 31, 32, 82, 201
AIR TRAFFIC CONTROLLERS (PERSONNEL), 8, 14, 248
AIR WATER INTERACTIONS, 100
AIRCRAFT ACCIDENTS, 10, 11
AIRCRAFT COMPARTMENTS, 7, 9
AIRCRAFT CONFIGURATIONS, 202
AIRCRAFT CONSTRUCTION MATERIALS, 67
AIRCRAFT DESIGN, 5, 25, 31, 94
AIRCRAFT ENGINES, 25
AIRCRAFT FUEL SYSTEMS, 18
AIRCRAFT HAZARDS, 10
AIRCRAFT ICING, 7, 9, 112
AIRCRAFT INDUSTRY, 93
AIRCRAFT MAINTENANCE, 11, 188
AIRCRAFT MANEUVERS, 19
AIRCRAFT MODELS, 32
AIRCRAFT PERFORMANCE, 94, 210
AIRCRAFT PILOTS, 191, 193, 217
AIRCRAFT RELIABILITY, 27, 188
AIRCRAFT SAFETY, 7, 9, 13, 25, 29
AIRCRAFT STRUCTURES, 15, 115
AIRFOILS, 102
AIRFRAMES, 16, 53, 227
AIRLINE OPERATIONS, 14
AIRPORTS, 32
ALBEDO, 121, 271, 307, 409, 474, 484, 525
ALDOSTERONE, 183
ALERTNESS, 181
ALGORITHMS, 23, 28, 82, 120, 157, 206, 207, 208, 214, 215, 218, 219, 220, 236, 280, 344, 395, 441, 445, 484, 505
ALKALIES, 340, 468
ALKYL COMPOUNDS, 58, 62
ALLENDE METEORITE, 278, 458, 460, 523
ALPHA PARTICLES, 516
ALTERNATIONS, 370
ALTERNATIVES, 62
ALUMINUM, 302, 359, 504
ALUMINUM 26, 287, 303

ALUMINUM ALLOYS, 92
ALUMINUM ISOTOPES, 303, 385, 481
ALUMINUM SILICATES, 67
AMAZON REGION (SOUTH AMERICA), 128, 141
AMBIENCE, 132, 290
AMINO ACIDS, 178, 393, 394, 459, 469
AMMONIA, 311
AMORPHOUS MATERIALS, 60, 357, 414
AMPLIFICATION, 69
ANALOG TO DIGITAL CONVERTERS, 86
ANALOGIES, 282, 316, 476, 527, 534
ANALOGS, 306, 387, 418, 440, 471, 472, 475, 476, 481, 486
ANALYSIS (MATHEMATICS), 206
ANDESITE, 409, 411, 418
ANESTHESIA, 170
ANGLE OF ATTACK, 20
ANGLES (GEOMETRY), 226
ANGULAR DISTRIBUTION, 148
ANHYDRIDES, 68
ANISOTROPY, 219
ANNEALING, 451
ANNUAL VARIATIONS, 106, 319, 520
ANNULAR FLOW, 27
ANOMALIES, 89, 263, 271, 407, 441
ANORTHOSITE, 288, 342, 411, 440
ANTARCTIC REGIONS, 414, 461, 472, 510
ANTENNA ARRAYS, 85
ANTENNA COMPONENTS, 82, 85
ANTENNA DESIGN, 17, 84
ANTIBODIES, 172, 180
ANTICYCLONES, 131
ANTIEMETICS AND ANTINAUSEANTS, 163
ANTIFREEZES, 7
ANTIREFLECTION COATINGS, 68
APERTURES, 175
APPLICATIONS PROGRAMS (COMPUTERS), 209, 505
APPROXIMATION, 219
AQUEOUS SOLUTIONS, 139, 369, 377
AQUICULTURE, 157
AQUIFERS, 399
ARC WELDING, 111
ARCHITECTURE (COMPUTERS), 22, 87, 198, 205, 215, 252, 253
AREA, 189
ARGON, 465, 495, 522
ARGON ISOTOPES, 300, 339, 391, 423, 460, 463
ARMED FORCES (UNITED STATES), 81, 125, 209, 257, 258
AROMATIC COMPOUNDS, 156
ARSENIC, 241
ARSENIC COMPOUNDS, 239
ARTIFICIAL INTELLIGENCE, 24, 76, 112, 258
ARTIFICIAL SATELLITES, 150, 474
ASCENT, 270, 434
ASHES, 412
ASSAYING, 140, 161
ASSESSMENTS, 140, 248
ASTEROID BELTS, 384, 385
ASTEROID COLLISIONS, 348, 399
ASTEROID DETECTION, 474
ASTEROID MISSIONS, 382
ASTEROIDS, 275, 306, 349, 361, 362, 363, 365, 369, 383, 384, 430, 467, 473, 474, 492, 497, 503, 509
ASTROMETRY, 516
ASTRONAUT PERFORMANCE, 41
ASTRONOMICAL CATALOGS, 334, 365
ASTRONOMICAL MODELS, 333, 334, 335, 344
ASTRONOMICAL OBSERVATORIES, 474
ASTRONOMY, 261
ASTROPHYSICS, 260, 266, 415, 522
ASYMMETRY, 488, 513, 520, 521
ASYMPTOTIC SERIES, 216
ASYNCHRONOUS TRANSFER MODE, 44
ATLANTIS (ORBITER), 39, 41, 43
ATMOSPHERIC CHEMISTRY, 143, 147, 265, 266, 521
ATMOSPHERIC CIRCULATION, 136, 149, 485, 486
ATMOSPHERIC COMPOSITION, 136, 137, 318
ATMOSPHERIC EFFECTS, 125
ATMOSPHERIC ENTRY, 117, 413, 414, 455, 456
ATMOSPHERIC GENERAL CIRCULATION MODELS, 126, 132, 135, 146, 152, 399
ATMOSPHERIC HEATING, 293
ATMOSPHERIC MODELS, 100, 485, 486
ATMOSPHERIC PRESSURE, 59, 419, 485
ATMOSPHERIC RADIATION, 142, 154
ATMOSPHERIC TEMPERATURE, 78, 153, 529
ATOMIC WEIGHTS, 443
ATTACK AIRCRAFT, 195
ATTITUDE (INCLINATION), 45, 343
ATTITUDE CONTROL, 36, 45
AUDITORY DEFECTS, 226
AUDITORY TASKS, 226
AUFEIS (ICE), 466
AUGMENTATION, 20, 98, 274
AURORAL ZONES, 146
AURORAS, 147, 435, 530
AUSTRALIA, 425, 455, 519
AUTOMATIC CONTROL, 51, 195, 251, 254
AUTOMOBILES, 11, 109, 214
AVALANCHES, 317
AVIONICS, 17, 249
AXIAL STRAIN, 6
AZIDES (INORGANIC), 178
AZIDES (ORGANIC), 178

B

BACKSCATTERING, 69, 143, 153, 226, 229
BACKWARD FACING STEPS, 92
BACTERIA, 65, 73, 161, 178, 392, 393, 397, 477, 515
BAHAMAS, 471
BALANCING, 113
BALLOON FLIGHT, 106, 107, 534
BANDSTOP FILTERS, 85
BANDWIDTH, 83, 85, 125
BARENTS SEA, 347
BARIUM ISOTOPES, 379
BAROTROPIC FLOW, 126
BASALT, 269, 270, 273, 289, 297, 320, 335, 336, 337, 338, 339, 341, 342, 378, 379, 406, 407, 409, 418, 420, 441, 481, 482, 483, 513, 518
BEAMS (SUPPORTS), 52, 117
BEHAVIOR, 187
BENDING, 118, 119, 326
BERYLLIUM, 233
BERYLLIUM 7, 267
BERYLLIUM ISOTOPES, 303, 339, 359, 451, 481
BETA FACTOR, 83
BEVERAGES, 164
BIDIRECTIONAL REFLECTANCE, 432, 433
BIMETALS, 92
BINARY CODES, 365
BINOCULAR VISION, 214
BIOASTRONAUTICS, 493
BIOCHEMISTRY, 168, 172, 177, 267, 470
BIODEGRADABILITY, 68
BIODEGRADATION, 144, 156
BIODYNAMICS, 184
BIOENGINEERING, 171
BIOGEOCHEMISTRY, 128, 138, 141, 156

BIOLOGICAL DIVERSITY, 391
BIOLOGICAL EFFECTS, 50, 159, 166, 392, 393
BIOLOGICAL EVOLUTION, 120, 531
BIOLOGY, 265, 266
BIOMIMETICS, 171
BIOREACTORS, 175
BIOTECHNOLOGY, 173
BIPOLAR TRANSISTORS, 84
BIRTH, 175, 187
BISMUTH, 534
BLENDED-WING-BODY CONFIGURATIONS, 227
BLOOD, 161, 183
BLOOD VESSELS, 166
BLOWOUTS, 109
BLUNT BODIES, 3, 16
BODY FLUIDS, 188
BODY TEMPERATURE, 174
BODY WEIGHT, 175
BODY-WING CONFIGURATIONS, 6
BOEING 707 AIRCRAFT, 18
BOEING 737 AIRCRAFT, 15
BOILING, 37
BOLTED JOINTS, 75
BOLTZMANN TRANSPORT EQUATION, 90
BOMBS (ORDNANCE), 5
BONDED JOINTS, 17, 56
BONE MINERAL CONTENT, 179, 180
BONES, 182, 188
BOOSTER ROCKET ENGINES, 45
BORON, 233, 237
BORON ISOTOPES, 303, 359
BORON-EPOXY COMPOSITES, 56
BOUNDARIES, 524
BOUNDARY CONDITIONS, 91, 92, 217, 230, 532
BOUNDARY ELEMENT METHOD, 51
BOUNDARY LAYER SEPARATION, 92
BOUNDARY LAYERS, 5, 90, 105, 150, 453
BRAIN, 168, 185, 191
BRAYTON CYCLE, 74
BRAZING, 60
BREATHING APPARATUS, 195
BRECCIA, 288, 309, 310, 339, 340, 341, 400, 453, 454, 479, 491, 518
BRIDGMAN METHOD, 242
BRIGHTNESS, 441
BRINES, 404, 405
BRITTLENESS, 438
BROADBAND, 82, 224
BUBBLES, 423, 505
BUFFETING, 1
BULGARIA, 139
BURNING RATE, 60
BUSHINGS, 146

C

C++ (PROGRAMMING LANGUAGE), 75
C-135 AIRCRAFT, 19
CABLES (ROPES), 16, 17
CADMIUM COMPOUNDS, 239
CADMIUM TELLURIDES, 241, 243
CALCIFEROL, 162, 179
CALCIFICATION, 166
CALCITE, 452, 477
CALCIUM, 166, 180, 358, 359
CALCIUM CARBONATES, 417
CALCIUM COMPOUNDS, 504
CALCIUM ISOTOPES, 303, 380
CALCIUM OXIDES, 346
CALCIUM PHOSPHATES, 359, 516
CALCULI, 196
CALCULUS, 196
CALDERAS, 312, 321, 501
CALIBRATING, 32, 107, 112, 114, 145, 236, 486, 505
CALLISTO, 283, 329, 436, 490, 504
CALORIMETERS, 72, 106, 107, 108, 233, 534
CAMERAS, 192, 214, 322, 517
CANADIAN SHIELD, 457
CANARD CONFIGURATIONS, 211
CANCER, 161, 162, 163, 164, 165, 167, 168, 169, 170, 171, 172, 177, 179, 187, 197, 216
CANS, 104
CANYONS, 156
CAPTURE EFFECT, 423, 516
CARBON, 120, 239, 240, 266, 357, 361, 381, 393, 411, 412, 414, 448, 467
CARBON 13, 136, 466
CARBON 14, 339
CARBON COMPOUNDS, 86
CARBON CYCLE, 135
CARBON DIOXIDE, 136, 137, 283, 318, 377, 417, 424, 472, 502
CARBON DIOXIDE CONCENTRATION, 136
CARBON FIBER REINFORCED PLASTICS, 52
CARBON FIBERS, 49
CARBON STARS, 380
CARBONACEOUS CHONDRITES, 285, 286, 287, 295, 356, 357, 362, 369, 370, 371, 381, 400, 448, 449, 458, 459, 461, 462, 466, 469, 479, 493, 494, 509, 512, 514
CARBONACEOUS MATERIALS, 458
CARBONACEOUS METEORITES, 267, 287, 412, 459, 511
CARBONATES, 294, 298, 354, 357, 371, 417, 429, 466, 469, 471, 472
CARCINOGENS, 170
CARDIOVASCULAR SYSTEM, 172
CARPATHIAN MOUNTAINS (EUROPE), 316
CARRIER SENSE MULTIPLE ACCESS, 82
CASCADE FLOW, 27
CASTING, 54
CASUALTIES, 201
CATALOGS (PUBLICATIONS), 155, 507, 535
CATALYSIS, 58, 172
CATALYSTS, 58, 391
CATALYTIC ACTIVITY, 62
CATECHOLAMINE, 183
CATHODOLUMINESCENCE, 516
CATIONS, 233
CAUSES, 474
CAVES, 476
CCD CAMERAS, 236
CELESTIAL BODIES, 37, 384
CELL DIVISION, 170
CELLS (BIOLOGY), 159, 160, 161, 163, 164, 165, 168, 169, 170, 171, 177, 184, 231
CENTRIFUGAL FORCE, 54
CENTRIFUGES, 178
CENTRIFUGING, 174
CERAMIC MATRIX COMPOSITES, 55
CERAMICS, 16, 50, 58, 71
CERTIFICATION, 27, 253
CESSNA AIRCRAFT, 1
CH-46 HELICOPTER, 82
CHANNEL FLOW, 526
CHANNELS (DATA TRANSMISSION), 249
CHAOS, 520
CHARACTERIZATION, 63, 218, 240, 242, 507
CHARGE EXCHANGE, 232
CHEMICAL ANALYSIS, 59, 292, 336, 340, 341, 369, 521, 525
CHEMICAL COMPOSITION, 58, 68, 268, 285, 286, 287, 288, 289, 302, 306, 349, 350, 351, 352, 353, 360, 390, 397, 425, 440, 449, 450, 486, 494, 508, 509, 524, 525
CHEMICAL DEFENSE, 185, 195
CHEMICAL EFFECTS, 418, 528
CHEMICAL ELEMENTS, 506
CHEMICAL ENGINEERING, 69
CHEMICAL EVOLUTION, 511, 531

CHEMICAL FRACTIONATION, 277, 394
CHEMICAL LASERS, 108
CHEMICAL PROPERTIES, 418
CHEMICAL REACTIONS, 172
CHEMICAL WARFARE, 58, 133
CHEMOTHERAPY, 163, 168
CHESAPEAKE BAY (US), 453, 457
CHIRALITY, 469
CHLORIDES, 51
CHLORINE, 234
CHLORINE COMPOUNDS, 372
CHLOROPHYLLS, 125
CHOLESTEROL, 159, 160
CHONDRITES, 277, 290, 291, 292, 302, 303, 342, 355, 357, 358, 359, 360, 361, 362, 364, 369, 378, 380, 381, 400, 401, 402, 449, 458, 459, 460, 462, 463, 464, 467, 479, 480, 481, 489, 491, 504, 508, 512, 513, 514, 522
CHONDRULE, 276, 277, 278, 291, 303, 343, 355, 356, 357, 360, 370, 460, 522
CHROMITES, 350, 481
CHROMIUM, 513
CHROMIUM ALLOYS, 371
CHROMIUM ISOTOPES, 380, 479
CHROMOSOMES, 179
CHRONOLOGY, 141, 299, 300, 305, 320, 325, 348, 355, 377, 386, 388, 438, 463, 475, 479, 481
CIRCUMSOLAR RADIATION, 489
CIRRUS CLOUDS, 151, 152, 153, 154
CITIES, 134
CLASSIFICATIONS, 208, 333, 369, 507
CLATHRATES, 417
CLAYS, 397, 415
CLEANING, 433
CLEMENTINE SPACECRAFT, 395, 517
CLIMATE, 132, 320
CLIMATE CHANGE, 131, 138, 139, 143, 150, 293
CLIMATE MODELS, 140, 424, 472
CLIMATOLOGY, 100, 131, 136, 137, 143, 146, 282, 399
CLIMBING FLIGHT, 31
CLINICAL MEDICINE, 83, 166, 168, 169, 170, 180, 182, 200, 216
CLOTHING, 193
CLOUD COVER, 154, 155
CLOUD PHYSICS, 151, 154
CLOUDS (METEOROLOGY), 109, 131, 146, 423
CLUSTER ANALYSIS, 79
COAGULATION, 274, 468
COASTS, 155
COATINGS, 50
CODERS, 80
COEFFICIENTS, 232
COENZYMES, 160
COGNITION, 191
COGNITIVE PSYCHOLOGY, 13
COLD FRONTS, 150
COLD PLASMAS, 238
COLD TRAPS, 397
COLLAPSE, 346, 379
COLLECTION, 447
COLLISIONLESS PLASMAS, 78
COLLISIONS, 274, 275, 344, 384, 468
COLOR, 261, 307, 422, 486
COLUMNS (SUPPORTS), 52
COMBAT, 32, 251
COMBINATORIAL ANALYSIS, 220
COMBUSTION, 60, 62, 72
COMET NUCLEI, 498
COMETARY ATMOSPHERES, 475
COMETARY COLLISIONS, 349, 404
COMETS, 120, 262, 344, 346, 384, 437, 467, 510, 519
COMMAND AND CONTROL, 203, 249, 251, 252
COMMAND GUIDANCE, 209
COMMERCE, 259
COMMERCIAL AIRCRAFT, 11
COMMERCIAL OFF-THE-SHELF PRODUCTS, 198, 223, 256
COMMERCIALIZATION, 36, 259
COMMINUTION, 464
COMMODITIES, 199
COMMUNICATION EQUIPMENT, 17
COMMUNICATION NETWORKS, 7, 43, 79, 210, 253
COMMUNICATION SATELLITES, 43
COMPARISON, 208, 357
COMPETITION, 199
COMPILERS, 204
COMPLEMENT (BIOLOGY), 163
COMPLEX SYSTEMS, 25, 191
COMPOSITE MATERIALS, 50, 51, 52, 53, 56, 67, 110, 116
COMPOSITE STRUCTURES, 51, 53, 57
COMPOSITION (PROPERTY), 269, 320, 337, 339, 359, 361, 363, 379, 380, 385, 407, 409, 421, 423, 452, 475, 506
COMPRESSIBILITY, 468
COMPRESSOR ROTORS, 25
COMPUTATION, 62, 103, 206, 211, 230, 308, 468, 484
COMPUTATIONAL CHEMISTRY, 244
COMPUTATIONAL ELECTROMAGNETICS, 217
COMPUTATIONAL FLUID DYNAMICS, 4, 5, 29, 36, 42, 74, 91, 93, 94, 95, 96, 97, 100, 111
COMPUTATIONAL GRIDS, 91, 100, 216, 217, 223
COMPUTER AIDED DESIGN, 213
COMPUTER AIDED MAPPING, 123, 128
COMPUTER ASSISTED INSTRUCTION, 206
COMPUTER GRAPHICS, 520
COMPUTER INFORMATION SECURITY, 211, 212, 253
COMPUTER NETWORKS, 79, 161, 222, 255, 256
COMPUTER PROGRAMMING, 10, 198, 201, 209, 253
COMPUTER PROGRAMS, 3, 14, 24, 29, 76, 81, 100, 112, 123, 184, 194, 198, 203, 204, 205, 207, 209, 221, 252, 344, 346
COMPUTER SYSTEMS DESIGN, 93, 197, 247, 252, 253
COMPUTER SYSTEMS PERFORMANCE, 41
COMPUTER SYSTEMS PROGRAMS, 6, 82
COMPUTER TECHNIQUES, 222, 245
COMPUTER VIRUSES, 161
COMPUTERIZED SIMULATION, 5, 20, 29, 59, 96, 97, 100, 113, 116, 146, 195, 200, 201, 204, 208, 269, 275, 276, 293, 326, 346, 347, 349, 384, 385, 386, 391, 435, 437, 441, 455, 473, 522, 526
COMPUTERS, 128
CONCENTRATION (COMPOSITION), 410, 507
CONCRETE STRUCTURES, 116
CONCRETES, 116
CONDENSATES, 300, 459
CONDENSATION, 374, 513
CONDENSATION NUCLEI, 380
CONDENSING, 290
CONDITIONS, 413
CONDUCTIVE HEAT TRANSFER, 89, 92
CONFERENCES, 10, 36, 130, 143, 186, 249, 269, 496
CONFIGURATION MANAGEMENT, 2
CONFINEMENT, 262
CONFORMAL MAPPING, 439
CONGRESSIONAL REPORTS, 130, 211, 255
CONSERVATION LAWS, 101, 229, 230
CONSISTENCY, 360
CONSTRUCTION, 31, 33, 69, 134
CONTACTORS, 45
CONTAMINANTS, 62, 156, 392

CONTAMINATION, 51, 112, 123, 130, 140, 246, 298, 392, 407, 437
CONTINENTAL SHELVES, 156
CONTINUUMS, 260, 263
CONTRACT INCENTIVES, 247
CONTRACTORS, 247
CONTRAILS, 154
CONTRAST, 174
CONTROL EQUIPMENT, 87
CONTROL STABILITY, 117
CONTROL SURFACES, 17
CONTROL SYSTEMS DESIGN, 28, 79
CONTROLLERS, 45, 75
CONVECTION, 89, 154, 155, 296, 435
CONVECTIVE FLOW, 93, 398
CONVECTIVE HEAT TRANSFER, 283, 466
CONVENTIONS, 143
COOLERS, 37, 73, 74
COOLING, 174, 278, 290, 300, 342, 360, 466, 514
COOLING FLOWS (ASTROPHYSICS), 335
COOLING SYSTEMS, 72
COPOLYMERS, 68
COPPER ISOTOPES, 460
CORE SAMPLING, 453, 507
CORE-MANTLE BOUNDARY, 401, 519
CORES, 275
CORONAS, 331, 332, 333, 334, 335
CORRECTION, 236
CORRELATION, 63, 115, 149, 153, 442
CORROSION, 65, 290
CORROSION RESISTANCE, 63
CORROSION TESTS, 63
COSMIC DUST, 267, 268, 356, 413, 414, 447, 450
COSMIC GASES, 342
COSMIC RAYS, 339, 340, 344, 438, 506, 509, 534
COSMOCHEMISTRY, 343, 459, 460, 461, 463, 480, 511, 517
COSMOLOGY, 344, 345, 509, 511
COST ANALYSIS, 38, 113, 129
COST EFFECTIVENESS, 38, 113, 130, 246
COST REDUCTION, 38
COSTS, 15, 246
COUNTERMEASURES, 12
COUNTING, 475
COUPLING, 145
COVARIANCE, 219
COVERINGS, 228
CRACK INITIATION, 52
CRACK PROPAGATION, 52, 66, 67, 118
CRACKING (FRACTURING), 64, 65
CRACKS, 353
CRATERING, 308, 311, 345, 346, 347, 348, 349, 397, 399, 404, 453, 467
CRATERS, 270, 279, 306, 309, 310, 311, 315, 321, 328, 345, 346, 347, 384, 385, 404, 420, 437, 451, 452, 458, 475, 490, 499, 504, 505, 521
CREEP PROPERTIES, 64, 327, 398
CRETACEOUS-TERTIARY BOUNDARY, 348, 452
CREW PROCEDURES (INFLIGHT), 39, 40, 41, 42, 43
CREW PROCEDURES (PREFLIGHT), 39
CROSS FLOW, 96
CROSS SECTIONS, 182
CRUDE OIL, 143, 156
CRUISE MISSILES, 17
CRUSTS, 283, 303, 304, 311, 436, 437, 528
CRYOGENIC COOLING, 37, 74, 75
CRYOGENIC EQUIPMENT, 37
CRYOGENIC FLUIDS, 37
CRYOGENICS, 466, 503
CRYSTAL GROWTH, 242, 243
CRYSTAL STRUCTURE, 65, 70, 241, 344, 465
CRYSTALLIZATION, 65, 288, 292, 301, 335, 336, 350, 351, 352, 356, 389, 411, 465, 481, 518
CRYSTALLOGRAPHY, 238, 454, 461
CRYSTALS, 154, 166, 242, 344, 350, 392, 465, 504, 522
CUBA, 348
CULTURE TECHNIQUES, 171
CUMULUS CLOUDS, 154
CURING, 53
CURIUM 244, 516
CURRENT DENSITY, 84
CURVED PANELS, 51
CYCLES, 404
CYCLIC AMP, 168
CYCLOGENESIS, 155
CYCLONES, 131, 152
CYSTS, 162

D

DAMAGE, 89
DAMAGE ASSESSMENT, 17, 64
DARKENING, 292
DATA ACQUISITION, 22, 152, 195, 199, 308, 312, 319
DATA BASE MANAGEMENT SYSTEMS, 250, 255
DATA BASES, 100, 127, 185, 249, 250, 255, 322, 323, 334, 535
DATA CORRELATION, 34
DATA INTEGRATION, 4
DATA LINKS, 212
DATA MANAGEMENT, 22, 124, 250, 255, 318
DATA MINING, 79, 250
DATA PROCESSING, 80, 107, 212, 249, 250, 254, 313, 317, 365, 373, 445
DATA PROCESSING EQUIPMENT, 139
DATA RECORDERS, 20
DATA REDUCTION, 184, 199
DATA STORAGE, 247
DATA STRUCTURES, 205
DATA SYSTEMS, 82, 249, 250, 365, 366
DATA TRANSFER (COMPUTERS), 222, 252
DATA TRANSMISSION, 80, 87, 253
DEBONDING (MATERIALS), 53, 115
DEBRIS, 42, 112, 281, 282, 312, 317, 407, 503
DECARBONATION, 469
DECISION MAKING, 87, 192, 194, 209, 218, 221, 247, 249
DECISION SUPPORT SYSTEMS, 157, 222, 246
DECOMPOSITION, 294, 452
DEEP WATER, 129
DEFECTS, 57, 113, 115, 172
DEFENSE PROGRAM, 15, 185, 200, 212, 248
DEFORESTATION, 135, 141
DEFORMATION, 55, 64, 89, 150, 228, 279, 304, 309, 327, 402, 438, 451, 454, 505
DEGASSING, 510
DEGRADATION, 69, 73, 115, 144, 349, 436, 476, 504
DEGREES OF FREEDOM, 31
DEHYDRATION, 155, 183
DEICERS, 7
DEICING, 7, 144
DELAMINATING, 115
DEMAGNETIZATION, 90
DENSITY, 504
DENSITY (MASS/VOLUME), 234, 237
DENSITY (NUMBER/VOLUME), 166
DENSITY DISTRIBUTION, 220
DENSITY MEASUREMENT, 121, 182, 363
DEOXYRIBONUCLEIC ACID, 163, 166, 177
DEPLETION, 364, 402
DEPLOYMENT, 129
DEPOSITION, 9, 234, 237, 242
DEPOSITS, 282, 299, 317, 319, 338, 348, 349, 372, 385, 386, 388, 407, 524, 527

DESCENT TRAJECTORIES, 456
DESENSITIZING, 181
DESERTS, 425
DESIGN ANALYSIS, 4, 27, 45, 46, 54, 72, 85, 102, 106, 111, 213, 245, 252
DESIGN OPTIMIZATION, 46, 111, 207
DESORPTION, 468
DESTRUCTION, 404
DETACHMENT, 242
DETECTION, 31, 123, 155, 158, 225, 288, 393, 529
DETONATION, 47
DEUTERIUM, 263, 382
DIAGNOSIS, 21, 23, 32, 82, 175, 200, 236
DIAMETERS, 116
DIAMONDS, 412, 452, 495
DIELECTRICS, 330
DIETS, 165
DIFFERENTIAL EQUATIONS, 97, 217
DIFFERENTIATION, 377
DIFFERENTIATION (BIOLOGY), 160
DIFFRACTIVE OPTICS, 236
DIFFUSION, 290, 301, 312
DIFFUSION COEFFICIENT, 235, 301
DIGITAL DATA, 125, 313, 329, 442
DIGITAL SYSTEMS, 214
DIGITAL TECHNIQUES, 201, 251, 442, 496
DILUTION, 73
DIMENSIONAL ANALYSIS, 112, 308, 311
DIPOLE MOMENTS, 234
DIRECT CURRENT, 53
DIRECTIONAL CONTROL, 75
DISABILITIES, 174
DISASTERS, 126
DISCONTINUITY, 2
DISCRETIZATION (MATHEMATICS), 216
DISEASES, 165
DISLOCATIONS (MATERIALS), 451
DISORDERS, 182
DISPERSING, 467
DISPLACEMENT, 6, 293
DISPLAY DEVICES, 87, 147, 193, 197, 203
DISRUPTING, 272
DISSIPATION, 96
DISTORTION, 206
DISTRIBUTED INTERACTIVE SIMULATION, 201
DISTRIBUTED MEMORY, 205
DISTRIBUTED PROCESSING, 209
DISTRIBUTION FUNCTIONS, 114, 243, 340
DISTURBANCES, 149
DIURNAL VARIATIONS, 78, 131, 132, 135
DOMAINS, 217, 246
DOPED CRYSTALS, 240
DOPES, 69
DOSAGE, 418
DRAG, 473
DRAINAGE, 314, 315, 318, 375, 500, 501
DRAINAGE PATTERNS, 399
DRILLING, 453
DRINKING, 183
DROP TESTS, 116
DROPS (LIQUIDS), 154
DROUGHT, 123
DRUGS, 167
DUCTILITY, 118
DUCTS, 150
DUNES, 282, 422, 485, 486, 503
DUST, 105, 142, 264, 300, 317, 326, 421, 424, 427, 430, 450, 494, 498, 512, 522, 530
DUST COLLECTORS, 433
DUST STORMS, 245, 422, 485, 492
DYES, 69
DYNAMIC CHARACTERISTICS, 15
DYNAMIC LOADS, 120
DYNAMIC RESPONSE, 27, 95, 227
DYNAMIC STRUCTURAL ANALYSIS, 6, 23, 119
DYNAMICAL SYSTEMS, 81

E

EAR PROTECTORS, 83
EARDRUMS, 226
EARTH (PLANET), 107, 329, 378, 379, 467, 510, 511, 513, 519, 520, 522
EARTH ATMOSPHERE, 136, 261, 391, 447
EARTH CORE, 401, 402
EARTH CRUST, 341, 453, 454
EARTH HYDROSPHERE, 511
EARTH MAGNETOSPHERE, 530, 533
EARTH MANTLE, 400, 401, 467
EARTH OBSERVATIONS (FROM SPACE), 455
EARTH OBSERVING SYSTEM (EOS), 106, 126
EARTH RADIATION BUDGET, 126
EARTH RADIATION BUDGET EXPERIMENT, 135
EARTH SCIENCES, 122, 134, 367
EARTH SURFACE, 106, 400
EASTERN HEMISPHERE, 484
EATING, 182, 184
ECCENTRICITY, 439
ECHO SOUNDING, 229
ECONOMIC ANALYSIS, 130
ECONOMICS, 8, 36
ECOSYSTEMS, 135, 143
EDDY CURRENTS, 114
EDGE DETECTION, 214
EDUCATION, 8, 101, 181, 187, 191, 200, 201, 209, 213, 244, 245, 248, 255, 257, 261, 366, 367, 368, 490, 491, 499, 520
EGRESS, 9
EJECTA, 292, 293, 295, 299, 312, 337, 345, 346, 347, 349, 384, 398, 451, 453, 455, 499, 506
EJECTION, 345, 392, 481
EJECTORS, 4
EL NINO, 141
ELASTIC DEFORMATION, 54, 384
ELASTIC PROPERTIES, 55, 208
ELECTRIC BATTERIES, 186
ELECTRIC CONTACTS, 75
ELECTRIC CURRENT, 80, 424
ELECTRIC EQUIPMENT TESTS, 86
ELECTRIC FIELDS, 70, 147, 424, 532
ELECTRIC MOTORS, 86
ELECTRIC POTENTIAL, 340
ELECTRIC PROPULSION, 48
ELECTRICAL PROPERTIES, 241
ELECTRICITY, 80
ELECTRO-OPTICS, 106, 254
ELECTROCHEMISTRY, 63
ELECTRODYNAMICS, 44
ELECTROLUMINESCENCE, 240
ELECTROLYTE METABOLISM, 183
ELECTROMAGNETIC ABSORPTION, 196
ELECTROMAGNETIC ENVIRONMENT EXPERIMENT, 210
ELECTROMAGNETIC FIELDS, 183
ELECTROMAGNETIC RADIATION, 150
ELECTROMAGNETIC SHIELDING, 196
ELECTROMAGNETIC SPECTRA, 261
ELECTROMAGNETIC SURFACE WAVES, 532
ELECTROMAGNETIC WAVE FILTERS, 96
ELECTROMAGNETS, 48
ELECTRON BEAMS, 177
ELECTRON DENSITY (CONCENTRATION), 238
ELECTRON STATES, 233
ELECTRONIC COMMERCE, 256
ELECTRONIC CONTROL, 31, 33
ELECTRONIC STRUCTURE, 212

ELECTRONS, 468
ELECTROSTATIC WAVES, 532
ELECTROSTATICS, 274, 368, 397
ELEVATION, 305, 323, 441, 524
ELLIPTICAL GALAXIES, 260, 265
ELLIPTICITY, 521
EMERGENCIES, 122
EMISSION, 139, 146
EMISSION SPECTRA, 307, 410, 419
EMISSIVITY, 330, 419
EMPLOYEE RELATIONS, 258
EMPLOYMENT, 8
ENCAPSULATING, 215
ENERGETIC PARTICLES, 148, 532
ENERGY BUDGETS, 135, 424
ENERGY CONSUMPTION, 72
ENERGY DISSIPATION, 228, 232
ENERGY METHODS, 241
ENERGY SOURCES, 129
ENERGY SPECTRA, 108, 522
ENERGY TECHNOLOGY, 138
ENERGY TRANSFER, 84, 108, 235
ENGINE AIRFRAME INTEGRATION, 26
ENGINE DESIGN, 66
ENGINE NOISE, 226, 227
ENGINE TESTS, 86
ENSTATITE, 381, 390, 514
ENTROPY, 96, 217, 230, 283
ENUMERATION, 220
ENVIRONMENT EFFECTS, 58, 62, 138, 154
ENVIRONMENT MANAGEMENT, 130, 131, 134
ENVIRONMENT MODELS, 130, 132, 139
ENVIRONMENT POLLUTION, 59
ENVIRONMENT PROTECTION, 51, 124, 130, 138, 139, 143
ENVIRONMENT SIMULATION, 429
ENVIRONMENTAL CHEMISTRY, 409
ENVIRONMENTAL CLEANUP, 246
ENVIRONMENTAL ENGINEERING, 123
ENVIRONMENTAL LABORATORIES, 131
ENVIRONMENTAL MONITORING, 110, 130, 132, 140, 246
ENVIRONMENTAL QUALITY, 131, 140
ENVIRONMENTAL SURVEYS, 133, 134
ENVIRONMENTAL TESTS, 48, 425
ENZYME ACTIVITY, 178
EPIDEMIOLOGY, 161, 165
EPITAXY, 241
EPITHELIUM, 160, 165, 169, 170
EPOXY MATRIX COMPOSITES, 57
EPOXY RESINS, 53, 56
EQUATORS, 520
EQUILIBRIUM, 208
EROS ASTEROID, 307, 308, 309, 363, 364
EROSION, 122, 271, 272, 387, 491
ERROR ANALYSIS, 199, 207, 218
ERRORS, 10, 11
ESCARPMENTS, 364, 524
ESCHERICHIA, 161
ESTIMATES, 121, 124, 312, 316
ESTIMATING, 120, 121, 272, 352
ESTROGENS, 50, 83, 162
ETCHING, 237
ETHYL ALCOHOL, 62
ETIOLOGY, 182
EUKARYOTES, 472
EULER EQUATIONS OF MOTION, 228
EUROPA, 284, 327, 329, 403, 404, 405, 437, 438, 439, 440, 478, 493, 520, 525
EUROPEAN SPACE AGENCY, 426, 428
EUTECTICS, 67, 284
EVACUATING (TRANSPORTATION), 9
EVALUATION, 199, 448
EVAPORATION, 150, 263, 277, 278, 290, 300, 301, 414, 468
EVOLUTION (DEVELOPMENT), 283, 315
EXCITATION, 3, 232, 233
EXHAUST NOZZLES, 26, 72
EXOBIOLOGY, 265, 368, 377, 392, 393, 394, 405, 427, 468, 469, 470, 471, 473, 475, 476, 477, 478, 490
EXPANSION, 465
EXPERIMENT DESIGN, 19, 46
EXPERIMENTATION, 218, 261, 269, 278, 287, 301, 384, 431, 432, 456, 464, 468, 481
EXPERT SYSTEMS, 112, 202
EXPLORATION, 245
EXPLORER 1 SATELLITE, 146
EXPLOSIONS, 71, 345, 456
EXPLOSIVES, 59, 270
EXPOSURE, 63, 108, 140, 159, 183, 298, 404, 438, 480, 481
EXTERNAL STORE SEPARATION, 97
EXTERNAL TANKS, 39, 40
EXTINCTION, 344
EXTRACTION, 381, 450
EXTRATERRESTRIAL LIFE, 348, 392, 393, 405, 468, 469, 470, 471, 473, 475, 476, 477, 478, 490
EXTRATERRESTRIAL MATTER, 432, 433, 448
EXTRATERRESTRIAL RADIATION, 489
EXTRAVEHICULAR ACTIVITY, 39, 40, 42
EYE (ANATOMY), 108, 109, 195

F

F-18 AIRCRAFT, 16, 17, 18, 20
FABRICATION, 1, 51, 56, 58, 63, 72, 84, 102, 110, 236, 498
FAILURE, 23, 24, 47, 89, 115, 119
FAILURE ANALYSIS, 54, 55, 79, 103
FAILURE MODES, 64
FAN BLADES, 229
FARM CROPS, 164
FAST NEUTRONS, 443, 444
FATIGUE (MATERIALS), 20
FATIGUE LIFE, 22, 53
FATIGUE TESTS, 53
FAULT DETECTION, 23, 82, 112, 114
FAULT TOLERANCE, 79
FAYALITE, 290
FEASIBILITY, 68, 82, 199, 208
FEED SYSTEMS, 178
FEEDBACK, 106, 193
FELDSPARS, 310, 341, 378, 411, 419
FELSITE, 454
FEMALES, 184, 187
FERROELECTRICITY, 82
FETUSES, 174
FIBER OPTICS, 87, 221, 235
FIBERS, 54, 199
FIBROSIS, 184
FIELD EFFECT TRANSISTORS, 239
FIELD OF VIEW, 185, 222
FIELD TESTS, 425
FIGHTER AIRCRAFT, 17, 20, 83
FILM COOLING, 26
FILTRATION, 138
FINANCIAL MANAGEMENT, 130, 248, 535
FINITE DIFFERENCE THEORY, 230
FINITE ELEMENT METHOD, 22, 51, 53, 54, 57, 115, 117
FINITE VOLUME METHOD, 230
FINNED BODIES, 5
FINS, 1
FIRES, 48, 293
FIRING (IGNITING), 48
FISHES, 157
FIXED WINGS, 211
FLAME RETARDANTS, 70
FLAMMABILITY, 7
FLANGES, 53
FLIGHT CHARACTERISTICS, 38, 210

FLIGHT CONTROL, 17, 29
FLIGHT CREWS, 192
FLIGHT FATIGUE, 20
FLIGHT MANAGEMENT SYSTEMS, 13
FLIGHT OPERATIONS, 181
FLIGHT SAFETY, 7, 10, 12, 13, 24, 108
FLIGHT SIMULATION, 16, 31
FLIGHT TESTS, 4, 16, 18, 19, 20, 31, 69, 83
FLIR DETECTORS, 17
FLOOD CONTROL, 134
FLOOD DAMAGE, 134
FLOOD PLAINS, 387
FLOODS, 330, 379
FLOW CHARACTERISTICS, 88, 100, 312, 318
FLOW DISTRIBUTION, 2, 4, 33, 74, 100, 102, 206, 330, 345, 375, 526
FLOW EQUATIONS, 101
FLOW MEASUREMENT, 445
FLOW VELOCITY, 34, 446, 464, 526
FLOW VISUALIZATION, 3, 26, 34, 74, 90, 97, 99
FLUENCE, 124
FLUID DYNAMICS, 95
FLUID FLOW, 338, 371, 379, 397, 435, 465, 526, 527
FLUIDICS, 95
FLUIDS, 459
FLUORESCENCE, 173, 233
FLUTTER ANALYSIS, 3
FLUX (RATE), 237, 373, 443, 444
FLUX DENSITY, 513
FLUX DIFFERENCE SPLITTING, 97
FLYWHEELS, 54
FOAMS, 67
FOILS, 91
FOLDS (GEOLOGY), 364
FOOD INTAKE, 184
FORCE-FREE MAGNETIC FIELDS, 533
FORECASTING, 8, 155
FOREST FIRES, 122
FOREST MANAGEMENT, 120, 138, 139
FORESTS, 120, 121, 135, 141
FORMATIONS, 275, 319, 387, 410
FORSTERITE, 290, 357, 358, 360
FORTRAN, 198
FORWARD SCATTERING, 516
FOSSILS, 343, 393, 472, 476, 477
FOUR-WAVE MIXING, 61
FOVEA, 214
FRACTALS, 278, 512
FRACTIONATION, 301, 382, 414, 452, 459, 482, 517, 522
FRACTIONS, 370
FRACTURE MECHANICS, 54, 118, 280
FRACTURE STRENGTH, 52, 66
FRACTURES (MATERIALS), 280
FRACTURING, 52, 115, 436, 505
FRAGMENTATION, 390, 456, 489, 506
FRAGMENTS, 336, 369
FREE JETS, 4
FREE VIBRATION, 117, 343
FREEZING, 154
FREQUENCY DISTRIBUTION, 143
FREQUENCY MEASUREMENT, 260
FRESNEL LENSES, 236
FROST, 319
FUEL SYSTEMS, 62
FUEL TANKS, 9
FUELS, 62
FULL SCALE TESTS, 48
FULLERENES, 295
FUNCTIONAL DESIGN SPECIFICATIONS, 128
FUSES (ORDNANCE), 18
FUZZY SYSTEMS, 115, 249

G

GABON, 455
GADOLINIUM-GALLIUM GARNET, 90
GALACTIC CLUSTERS, 263
GALACTIC EVOLUTION, 333, 334, 340, 345, 380
GALAXIES, 511
GALILEAN SATELLITES, 284
GALILEO SPACECRAFT, 374, 497, 530
GALLIUM NITRIDES, 240
GAMMA RAY BURSTS, 107
GAMMA RAY SPECTRA, 395
GAMMA RAY SPECTROMETERS, 123, 124, 363, 395, 431, 516
GAMMA RAY TELESCOPES, 107
GAMMA RAYS, 107, 394, 516
GANYMEDE, 283, 327, 328, 329, 490, 497, 504, 521
GARNETS, 467
GAS COMPOSITION, 243, 342, 369, 475
GAS DENSITY, 90, 105
GAS DETECTORS, 235
GAS DYNAMICS, 36, 374, 455
GAS EVOLUTION, 374
GAS FLOW, 102, 502
GAS GIANT PLANETS, 275, 327
GAS HEATING, 42
GAS JETS, 475
GAS PRESSURE, 373
GAS TURBINE ENGINES, 25
GAS-LIQUID INTERACTIONS, 374, 465
GASEOUS DIFFUSION, 482
GASES, 129
GASPRA ASTEROID, 475
GENE EXPRESSION, 160, 166
GENERAL AVIATION AIRCRAFT, 1
GENERATORS, 228
GENES, 159, 160, 165, 167, 177, 179
GENETIC ALGORITHMS, 250
GENETICS, 165, 172
GEOCHEMISTRY, 286, 294, 337, 340, 349, 369, 388, 393, 394, 472, 478, 482, 483, 497, 506, 508, 518, 523, 525
GEOCHRONOLOGY, 400, 452, 454, 478, 479, 483, 484, 488, 489
GEODESY, 152
GEODETIC ACCURACY, 323
GEODETIC SURVEYS, 152
GEOGRAPHIC DISTRIBUTION, 452
GEOGRAPHIC INFORMATION SYSTEMS, 123, 252, 255, 322, 328
GEOGRAPHY, 499
GEOIDS, 335
GEOLOGICAL FAULTS, 279, 304, 305, 329, 332, 333, 364, 387, 497, 513, 514, 515, 518, 524
GEOLOGICAL SURVEYS, 122, 136, 314, 487, 488, 521
GEOLOGY, 123, 128, 308, 314, 399, 457, 466, 500
GEOMAGNETISM, 145, 148, 457, 484
GEOMETRY, 4, 520
GEOMORPHOLOGY, 314, 317, 324, 325, 398, 471, 488, 490, 520
GEOPHYSICAL FLUIDS, 335
GEOPHYSICAL OBSERVATORIES, 335
GEOPHYSICS, 123, 128, 224, 399, 457, 466, 493
GEOTHERMAL ANOMALIES, 398
GERMANATES, 534
GERMANIUM COMPOUNDS, 86, 239, 242
GLACIAL DRIFT, 319, 500
GLACIERS, 281, 321, 461, 520, 528
GLASS, 69, 289, 336, 339, 346, 355, 359, 396, 420, 493
GLASS TRANSITION TEMPERATURE, 69
GLOBAL POSITIONING SYSTEM, 13, 14
GLOBULAR CLUSTERS, 265
GLOBULES, 354
GLOVES, 193

GLUONS, 234
GLUTAMATES, 176
GLYCOLS, 7
GOALS, 246
GOES SATELLITES, 151
GONIOMETERS, 433
GOVERNMENTS, 255
GRADIENTS, 376
GRAIN BOUNDARIES, 64
GRAIN SIZE, 416
GRAINS, 379, 380
GRANULAR MATERIALS, 288, 289, 290, 514, 523
GRAPHITE-EPOXY COMPOSITES, 119
GRASSLANDS, 128
GRATINGS, 87
GRAVIMETRY, 446
GRAVITATION, 187, 296, 334, 335, 468
GRAVITATIONAL COLLAPSE, 345
GRAVITATIONAL EFFECTS, 100, 274, 388
GRAVITATIONAL FIELDS, 89, 343, 468
GRAVITATIONAL WAVES, 365
GRAVITY ANOMALIES, 296, 387, 514, 515
GRAVITY WAVES, 149
GREENHOUSE EFFECT, 139, 140
GRID GENERATION (MATHEMATICS), 97, 217, 223
GROOVES, 299
GROUND BASED CONTROL, 14
GROUND STATE, 239
GROUND TESTS, 18
GROUND WATER, 130, 140, 246, 272, 314, 315, 376, 466, 500
GROUND WIND, 485
GROUP VELOCITY, 530
GROUT, 69
GROWTH, 172, 275, 276, 454
GUSTS, 27
GYROSCOPES, 45

H

H-60 HELICOPTER, 190
HABITABILITY, 424
HAFNIUM, 467
HAFNIUM ISOTOPES, 377
HALE-BOPP COMET, 475
HALL THRUSTERS, 48
HALOGENS, 354
HANDBOOKS, 66, 67, 181
HARDWARE, 21, 445
HARDWARE DESCRIPTION LANGUAGES, 204
HAZARDOUS MATERIALS, 61
HAZARDS, 48, 140, 157
HEALTH, 134, 157, 183, 255
HEARING, 77, 226
HEART RATE, 170
HEAT ACCLIMATIZATION, 188
HEAT AFFECTED ZONE, 111
HEAT BALANCE, 185
HEAT FLUX, 100
HEAT OF SOLUTION, 66
HEAT SHIELDING, 92
HEAT SOURCES, 347, 385
HEAT TOLERANCE, 185
HEAT TRANSFER, 26, 49, 89, 93, 524
HEAT TRANSMISSION, 372, 439, 445, 446
HEAT TREATMENT, 66, 449
HEATING, 343, 347, 358, 384, 414, 439, 468, 512
HEAVY NUCLEI, 534
HELICOPTER DESIGN, 25
HELICOPTER PROPELLER DRIVE, 21
HELICOPTERS, 15, 21, 24, 117, 199
HELIOSPHERE, 522
HELIUM, 74, 381, 412, 465
HELIUM ATOMS, 239
HELIUM IONS, 148
HELIUM ISOTOPES, 73, 460, 502, 508, 513
HELMET MOUNTED DISPLAYS, 190, 214
HEMATITE, 325, 420, 421, 470, 477
HEMODYNAMIC RESPONSES, 183
HEMODYNAMICS, 183
HETEROCYCLIC COMPOUNDS, 156
HETEROGENEITY, 369
HIGH ENERGY ELECTRONS, 107
HIGH FREQUENCIES, 529
HIGH GRAVITY ENVIRONMENTS, 35, 174, 175
HIGH POLYMERS, 69
HIGH PRESSURE, 58, 284, 402, 451, 464, 470
HIGH RESOLUTION, 127, 497, 502
HIGH REYNOLDS NUMBER, 94
HIGH SPEED, 3, 102
HIGH STRENGTH ALLOYS, 66
HIGH STRENGTH STEELS, 64
HIGH TEMPERATURE, 45, 52, 64, 402, 491
HIGH TEMPERATURE GASES, 373
HIGH TEMPERATURE PLASMAS, 150
HIGH TEMPERATURE TESTS, 401
HIGHLANDS, 375, 420, 501, 521
HISTOCHEMICAL ANALYSIS, 176
HISTOLOGY, 176
HODOSCOPES, 106, 107
HOLLOW CATHODES, 45, 470
HOLOGRAPHY, 103
HOMOGENEOUS TURBULENCE, 99
HONEYCOMB STRUCTURES, 51
HORIZONTAL TAIL SURFACES, 1
HORMONES, 162
HUMAN BEHAVIOR, 189, 190, 194
HUMAN BEINGS, 71, 171
HUMAN BODY, 188
HUMAN FACTORS ENGINEERING, 9, 29, 77, 186, 190, 193, 194, 195, 213, 228
HUMAN PERFORMANCE, 10, 11, 181, 191, 247
HUMAN TOLERANCES, 186
HUMAN-COMPUTER INTERFACE, 29, 87, 192, 194, 195
HUNGARY, 138, 499
HURRICANES, 122
HYBRID COMPOSITES, 56, 63
HYDRATION, 474, 492
HYDRAULIC EQUIPMENT, 110
HYDROCARBONS, 391
HYDROCHLORIC ACID, 108
HYDROELECTRICITY, 72
HYDROGEN, 60, 64, 65, 111, 232, 235, 411, 442, 443, 516
HYDROGEN IONS, 148
HYDROGEN ISOTOPES, 357, 483
HYDROGEN SULFIDE, 61
HYDROGENATION, 449
HYDROGEOLOGY, 316, 453
HYDROGRAPHY, 156
HYDROLOGICAL CYCLE, 100, 135, 152, 399
HYDROLOGY, 106, 156, 375, 399
HYDROPHONES, 224
HYDROTHERMAL SYSTEMS, 315, 347, 376, 397
HYPERBOLIC COORDINATES, 223
HYPERSONIC AIRCRAFT, 97
HYPERSONIC FLOW, 90
HYPERSONIC NOZZLES, 90
HYPERSONIC SPEED, 26
HYPERTEXT, 210
HYPERVELOCITY IMPACT, 120, 299, 311, 343, 345, 347, 349, 456
HYPOTHESES, 371
HYPSOGRAPHY, 386

I

IAPETUS, 528

ICE, 9, 154, 268, 282, 311, 319, 327, 344, 417, 437, 439, 468, 471, 474, 478, 490, 493, 500, 502, 530
ICE CLOUDS, 151, 529
ICE FORMATION, 31, 33
ICE MAPPING, 398
ICE PREVENTION, 7
ICE REPORTING, 438
ICELAND, 418, 498, 528
ICY SATELLITES, 283, 284, 329
IDENTIFYING, 222, 266, 476, 493
IFF SYSTEMS (IDENTIFICATION), 17, 254
IGNEOUS ROCKS, 321, 336, 401, 408, 409, 411, 419, 423, 483, 489, 523
IGNITERS, 62
IGNITION, 62
IGNITION SYSTEMS, 62
ILLUMINATING, 441
ILMENITE, 336
IMAGE ANALYSIS, 219, 271, 273, 317, 319, 321, 326, 365, 490, 525
IMAGE PROCESSING, 77, 104, 211, 214, 322, 365, 406, 486
IMAGE RESOLUTION, 322
IMAGERY, 201, 211, 323, 349, 364
IMAGES, 364, 366, 374
IMAGING SPECTROMETERS, 106, 142, 368
IMAGING TECHNIQUES, 3, 50, 69, 106, 127, 175, 184, 191, 231, 233, 235, 302, 328, 345, 346, 353, 366, 367, 406, 408, 411, 435, 490, 492, 497, 505
IMMUNE SYSTEMS, 167, 180
IMMUNOLOGY, 470
IMPACT, 133, 269, 275, 300, 308, 311, 347, 456, 473
IMPACT DAMAGE, 119, 346, 347, 348, 349, 453, 454, 455, 457, 473, 489, 503, 514, 515
IMPACT LOADS, 430
IMPACT MELTS, 269, 298, 299, 300, 309, 310, 312, 315, 340, 341, 345, 347, 397, 411, 451, 453, 454, 464
IMPACT TESTS, 9, 57, 117, 430, 452
IMPACT TOLERANCES, 347
IMPACT VELOCITY, 42, 345, 346
IMPACTORS, 345, 346, 347, 348
IMPROVEMENT, 222
IN SITU MEASUREMENT, 127, 429, 450, 458, 470, 525
IN VIVO METHODS AND TESTS, 164
IN-FLIGHT MONITORING, 210
INCLUSIONS, 301, 302, 303, 351, 352, 358, 359, 390, 459, 478, 481, 489, 493, 494, 504
INCOMPRESSIBLE BOUNDARY LAYER, 92
INCOMPRESSIBLE FLOW, 91, 93
INDUSTRIAL MANAGEMENT, 133
INEQUALITIES, 217
INERTIA, 485
INFORMATION, 254
INFORMATION DISSEMINATION, 255
INFORMATION FLOW, 221, 250, 255
INFORMATION MANAGEMENT, 209, 221, 255
INFORMATION RETRIEVAL, 258
INFORMATION SYSTEMS, 194, 196, 203, 204, 209, 210, 211, 212, 213, 215, 222, 223, 249, 251, 254, 256
INFORMATION TRANSFER, 250, 255
INFRARED ABSORPTION, 410
INFRARED ASTRONOMY, 509
INFRARED IMAGERY, 284, 408
INFRARED RADIATION, 232, 372, 420, 529
INFRARED REFLECTION, 264
INFRARED SIGNATURES, 237, 372
INFRARED SPACE OBSERVATORY (ISO), 413
INFRARED SPECTRA, 289, 372, 509
INFRARED SPECTROMETERS, 505
INFRARED SPECTROSCOPY, 265, 266, 369, 515
INFRASONIC FREQUENCIES, 226
INHIBITORS, 162, 163, 169, 170
INJECTION, 203, 273
INLAND WATERS, 472
INLIERS (LANDFORMS), 335
INSECTS, 159, 160
INSOLATION, 491
INSPECTION, 114
INSTALLING, 433
INSULATION, 71
INTEGRATED CIRCUITS, 234
INTELLIGENCE, 210
INTELLIGIBILITY, 77
INTERFEROMETERS, 235
INTERFEROMETRY, 102, 329
INTERGRANULAR CORROSION, 63
INTERMETALLICS, 71
INTERNAL ENERGY, 3
INTERNAL WAVES, 157
INTERNATIONAL COOPERATION, 256, 426
INTERNATIONAL SPACE STATION, 39, 40, 41, 42, 43, 161
INTERNATIONAL TRADE, 72
INTERNETS, 210, 212, 249, 252, 367, 490
INTERPLANETARY DUST, 263, 267, 327, 344, 412, 448, 449, 450
INTERPLANETARY MAGNETIC FIELDS, 531
INTERSTELLAR CHEMISTRY, 382
INTERSTELLAR MATTER, 264, 265, 266, 267, 268, 343, 468
INTESTINES, 176
INVESTIGATION, 85
INVISCID FLOW, 2, 150
IO, 433, 434, 435
IODINE, 108, 354
ION CURRENTS, 53, 78
ION DISTRIBUTION, 231
ION ENGINES, 48
ION IRRADIATION, 344
ION MICROSCOPES, 431
ION MOBILITY SPECTROSCOPY, 470
ION PROBES, 336
ION PROPULSION, 48
IONIC REACTIONS, 511
IONIZATION, 107, 108, 534
IONIZED GASES, 3
IONIZERS, 470
IONOSPHERIC DISTURBANCES, 455
IONS, 59, 231, 243, 522, 532
IRIDIUM, 401, 482
IRON, 378, 395, 396, 403, 415, 432, 452, 458, 465, 467, 472, 478, 493, 494, 508, 513, 518, 519
IRON ALLOYS, 402
IRON COMPOUNDS, 342, 393
IRON ISOTOPES, 394, 460
IRON METEORITES, 360, 456, 462, 465, 478, 480, 493, 524
IRON OXIDES, 298, 337, 338, 448, 497, 523
IRRADIATION, 135, 339, 340, 344, 473, 481, 518
ISOLATION, 478
ISOSTASY, 334, 342
ISOTOPE EFFECT, 352
ISOTOPE RATIOS, 277, 278, 286, 287, 294, 300, 301, 302, 303, 339, 355, 381, 382, 391, 460, 462, 463, 469, 480, 483, 484, 511
ISOTOPES, 268, 269, 287, 294, 361, 451, 463
ISOTOPIC LABELING, 269, 285, 300, 341, 344, 359, 361, 370, 379, 380, 411, 506, 508
ISOTROPY, 63
ITALIAN SPACE PROGRAM, 426

J

JAMMING, 215

JET AIRCRAFT NOISE, 88
JET ENGINES, 72
JOINTS (JUNCTIONS), 17
JUPITER (PLANET), 44, 275, 344, 403, 404, 405, 474, 520, 530
JUPITER RINGS, 326
JUPITER SATELLITES, 505

K

K-EPSILON TURBULENCE MODEL, 88
K-OMEGA TURBULENCE MODEL, 95
KALMAN FILTERS, 103
KANSAS, 514
KINEMATICS, 283, 304
KINETIC EQUATIONS, 90
KINETICS, 108, 290, 301
KREEP, 300
KRYPTON, 354
KRYPTON ISOTOPES, 423, 522
KUIPER BELT, 262, 344, 495

L

LABOR, 258
LABORATORIES, 255, 257, 258
LAKES, 142, 150, 281, 285, 374, 466, 471, 501, 505
LAMINATES, 52, 56, 117
LAND ICE, 398
LANDFORMS, 272, 281, 282, 314, 321, 374, 387, 492, 493, 515
LANDING SITES, 292, 324, 422, 427, 428, 487, 488
LANDSLIDES, 385
LARGE EDDY SIMULATION, 98, 99
LASER ABLATION, 432
LASER ALTIMETERS, 322, 348, 501, 507
LASER APPLICATIONS, 104
LASER BEAMS, 49, 261
LASER HEATING, 416
LASER INDUCED FLUORESCENCE, 49, 158
LASER OUTPUTS, 64
LASER SPECTROSCOPY, 415
LASERS, 108, 381, 522
LATTICE PARAMETERS, 241
LAUNCH VEHICLES, 97
LAUNCHERS, 38
LAVA, 270, 272, 273, 313, 330, 338, 371, 374, 379, 419, 423, 465, 489, 512, 526, 527
LAW (JURISPRUDENCE), 258
LAYERS, 503
LEAD (METAL), 479
LEAD ISOTOPES, 355, 378, 483
LEADING EDGES, 3, 98
LEAKAGE, 123, 443, 444
LEGENDRE FUNCTIONS, 219
LENTICULAR BODIES, 520
LEONID METEOROIDS, 447
LIBRATIONAL MOTION, 439
LIFE (DURABILITY), 45, 69
LIFE DETECTORS, 393, 469, 470, 471
LIFE SCIENCES, 161
LIGHT (VISIBLE RADIATION), 105, 368
LIGHT EMISSION, 240
LIGHT GAS GUNS, 36, 42
LIGHT SCATTERING, 105, 486, 517
LIGHT TRANSMISSION, 240
LIGHTNING, 80, 529
LINEAR ARRAYS, 85
LINEAR EQUATIONS, 228
LINEAR POLARIZATION, 278
LIQUID ALLOYS, 402
LIQUID CHROMATOGRAPHY, 59
LIQUID CRYSTALS, 238
LIQUID FLOW, 100, 102, 502
LIQUID METALS, 402, 467
LIQUID NITROGEN, 92
LIQUID PHASES, 235, 502
LIQUID ROCKET PROPELLANTS, 47
LIQUID-GAS MIXTURES, 100
LIQUIDS, 321
LITHIUM, 233
LITHIUM ISOTOPES, 359
LITHOLOGY, 285, 345, 347, 348, 386, 389, 394, 422, 506
LITHOSPHERE, 295, 296, 303, 313, 343, 372, 404, 438, 439, 507, 509, 519
LIVER, 159
LOADING OPERATIONS, 40
LOADS (FORCES), 211, 384
LOG PERIODIC ANTENNAS, 84
LOGIC PROGRAMMING, 202, 223
LOGISTICS, 157, 251, 257
LOGISTICS MANAGEMENT, 251
LOW COST, 13, 17
LOW EARTH ORBITS, 48
LOW FREQUENCIES, 529
LOW PRESSURE, 234, 237
LOW SPEED, 116, 474
LOW TEMPERATURE, 62, 511
LUBRICANTS, 68
LUMINESCENCE, 418
LUMINOSITY, 263, 531
LUNAR ALBEDO, 337, 446
LUNAR COMPOSITION, 288, 336, 340, 343, 394, 406, 440
LUNAR CORE, 343, 401
LUNAR CRATERS, 269, 311, 337, 338, 340, 342, 346, 347, 440, 442
LUNAR CRUST, 269, 288, 299, 336, 337, 342, 343, 346, 347, 394, 442, 513
LUNAR DUST, 339, 368
LUNAR ENVIRONMENT, 340
LUNAR EVOLUTION, 300, 467
LUNAR EXPLORATION, 444, 496
LUNAR FAR SIDE, 497
LUNAR GEOLOGY, 336, 338, 343, 344, 394, 407, 408, 491, 509
LUNAR GRAVITATION, 343, 513
LUNAR MAGNETIC FIELDS, 299
LUNAR MANTLE, 289, 343, 401, 442
LUNAR MAPS, 406, 441, 442, 443, 508
LUNAR MARIA, 269, 270, 299, 337, 338, 342, 406, 407, 440
LUNAR OCCULTATION, 516
LUNAR ORBITER, 456
LUNAR PROSPECTOR, 395, 396
LUNAR ROCKS, 288, 289, 298, 299, 311, 336, 337, 339, 340, 341, 342, 344, 392, 394, 446, 491, 499, 502, 505, 506, 509, 524
LUNAR SOIL, 300, 341, 342, 392, 396, 440, 443, 446, 502, 521
LUNAR SURFACE, 288, 299, 300, 337, 338, 339, 340, 341, 343, 395, 397, 400, 406, 441, 443, 444, 445, 456, 507, 519
LUNAR TEMPERATURE, 446
LUNAR TOPOGRAPHY, 338, 342, 441
LYMPHOCYTES, 167, 170

M

MACH NUMBER, 230
MACHINE LEARNING, 209
MACROMOLECULES, 369
MAGMA, 270, 288, 297, 312, 321, 336, 352, 371, 373, 378, 399, 401, 423, 434, 501
MAGNESIUM, 289, 302, 340, 391, 504
MAGNESIUM COMPOUNDS, 342
MAGNESIUM ISOTOPES, 278, 301, 479
MAGNESIUM OXIDES, 342
MAGNESIUM SULFATES, 505
MAGNETIC ANOMALIES, 297, 304, 315, 457, 458
MAGNETIC COOLING, 90
MAGNETIC EFFECTS, 303, 356
MAGNETIC FIELD CONFIGURATIONS, 238, 262
MAGNETIC FIELDS, 80, 304, 515, 522
MAGNETIC FLUX, 515

MAGNETIC POLES, 297
MAGNETIC PROPERTIES, 299, 304, 458
MAGNETIC RESONANCE, 184, 231
MAGNETIC SIGNATURES, 515
MAGNETIC STORMS, 148, 150
MAGNETITE, 370, 392, 418
MAGNETOHYDRODYNAMIC GENERATORS, 27
MAGNETOHYDRODYNAMIC WAVES, 532
MAGNETOHYDRODYNAMICS, 27, 217, 530, 531
MAGNETOPAUSE, 531
MAGNETOSPHERE-IONOSPHERE COUPLING, 145
MAGNETOSPHERES, 238
MAGNETOSPHERIC INSTABILITY, 148
MAINTAINABILITY, 32
MAINTENANCE, 87, 251
MALES, 179, 183, 188
MAMMARY GLANDS, 50, 83, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 172, 175, 177, 179, 187, 197, 216, 231
MAN MACHINE SYSTEMS, 14, 197, 213
MANAGEMENT, 190
MANAGEMENT INFORMATION SYSTEMS, 194, 211, 248
MANAGEMENT SYSTEMS, 10, 11, 12, 254, 535
MANEUVERABILITY, 20
MANGANESE, 513, 519
MANGANESE ALLOYS, 371
MANGANESE ISOTOPES, 481
MANGANESE OXIDES, 476
MANIFOLDS (MATHEMATICS), 6
MANIPULATORS, 225
MANPOWER, 15
MANUALS, 181
MANUFACTURING, 84, 234
MANY BODY PROBLEM, 206
MAPPING, 262, 284, 314, 317, 396, 406, 434, 436, 487, 488, 508, 519, 520, 521
MAPS, 125, 491
MARIA, 270, 407
MARINE ENVIRONMENTS, 133, 156, 158, 215
MARINE METEOROLOGY, 150
MARINE TECHNOLOGY, 215
MARKET RESEARCH, 35
MARKOV CHAINS, 219
MARKOV PROCESSES, 161, 218
MARS (PLANET), 44, 280, 281, 282, 297, 304, 305, 312, 313, 316, 317, 320, 321, 322, 329, 347, 348, 349, 367, 374, 375, 376, 377, 378, 392, 394, 399, 400, 402, 409, 411, 415, 416, 417, 419, 420, 421, 423, 424, 427, 466, 467, 469, 470, 476, 482, 484, 485, 486, 489, 490, 492, 493, 497, 498, 499, 500, 501, 502, 503, 507, 510, 512, 517, 520, 521, 528, 531
MARS ATMOSPHERE, 44, 47, 245, 318, 324, 399, 411, 419, 423, 424, 427, 485, 486, 494, 503, 525
MARS CRATERS, 311, 321, 322, 347, 348, 349, 377, 397, 398, 399, 400, 489, 492, 495, 498
MARS ENVIRONMENT, 320, 376, 409, 410, 417, 420, 424, 429, 430, 492, 493, 518, 519
MARS EXPLORATION, 367, 416, 426, 427, 428, 470
MARS GLOBAL SURVEYOR, 323, 409, 501
MARS LANDING SITES, 428, 429, 500
MARS MISSIONS, 295, 367, 374, 409, 426, 427, 428
MARS PATHFINDER, 268, 324, 409, 410, 505, 529
MARS PHOTOGRAPHS, 323, 400
MARS POLAR LANDER, 427
MARS PROBES, 427
MARS SAMPLE RETURN MISSIONS, 117, 411
MARS SURFACE, 268, 270, 271, 272, 273, 280, 281, 282, 295, 296, 297, 303, 304, 305, 306, 312, 313, 314, 315, 317, 318, 319, 320, 321, 323, 324, 325, 326, 347, 348, 349, 355, 366, 374, 375, 376, 377, 385, 386, 387, 388, 392, 398, 399, 400, 411, 415, 416, 417, 418, 419, 420, 421, 422, 424, 427, 428, 429, 430, 466, 469, 471, 477, 484, 485, 486, 489, 490, 492, 493, 494, 495, 497, 498, 499, 500, 501, 502, 503, 507, 512, 514, 515, 517, 518, 524, 525, 526, 527
MARS SURFACE SAMPLES, 393, 410, 411, 418, 419, 499, 528
MARS VOLCANOES, 270, 272, 273, 320, 367, 492, 497, 498, 512, 525, 526, 527, 528
MASKING, 237
MASS, 103
MASS DISTRIBUTION, 182, 343
MASS SPECTRA, 264, 353
MASS SPECTROSCOPY, 58, 59, 161, 400, 432
MASSIVE STARS, 263
MASSIVELY PARALLEL PROCESSORS, 202
MATHEMATICAL LOGIC, 202
MATHEMATICAL MODELS, 5, 10, 36, 54, 56, 60, 67, 72, 78, 91, 95, 96, 98, 116, 117, 126, 130, 161, 185, 195, 218, 219, 270, 272, 312, 315, 317, 345, 346, 347, 362, 398, 424, 439, 440, 455, 472, 473, 475, 497, 499, 509, 512, 513
MATHEMATICAL PROGRAMMING, 220
MATRIX MATERIALS, 53, 286
MATTER (PHYSICS), 403
MAXIMUM ENTROPY METHOD, 283
MAXIMUM LIKELIHOOD ESTIMATES, 207
MAXWELL EQUATION, 217
MEASURING INSTRUMENTS, 143, 205, 498
MECHANICAL PROPERTIES, 68, 118
MEDICAL EQUIPMENT, 183
MEDICAL SCIENCE, 163, 173, 185
MEDICAL SERVICES, 173, 187
MELTING, 154, 276, 277, 284, 335, 336, 341, 356, 447, 466, 474, 524
MELTING POINTS, 401
MELTS (CRYSTAL GROWTH), 292
MEMBRANES, 175
MEMORY (COMPUTERS), 199
MENTAL PERFORMANCE, 191
MERCURY (PLANET), 78, 276, 364, 507, 519
MERCURY CADMIUM TELLURIDES, 241
MERCURY SURFACE, 364, 508, 519
MESOSPHERE, 78, 149
MESSAGES, 205
METABOLISM, 35, 165, 231
METAL FATIGUE, 64
METAL MATRIX COMPOSITES, 54
METAL SURFACES, 59
METALS, 58, 514
METAMORPHIC ROCKS, 360, 452, 518
METAMORPHISM (GEOLOGY), 289, 292, 310, 341, 350, 360, 362, 391, 452, 518
METASTABLE STATE, 284, 376
METEORITE COLLISIONS, 349, 456
METEORITE CRATERS, 292, 293, 294, 308, 310, 397, 398, 400, 451, 453, 454, 455, 457, 476, 484, 488, 515
METEORITES, 266, 269, 277, 286, 287, 292, 298, 302, 306, 341, 342, 343, 350, 356, 358, 360, 361, 362, 363, 369, 380, 381, 382, 388, 392, 449, 456, 460, 461, 465, 479, 486, 491, 495, 499, 504, 507, 508, 509, 518, 523, 524
METEORITIC COMPOSITION, 263, 267, 269, 276, 277, 285, 291, 302, 303, 341, 342, 343, 353, 354, 355,

356, 357, 359, 360, 361, 369, 381, 382, 388, 389, 390, 391, 393, 400, 412, 453, 458, 459, 460, 461, 462, 463, 464, 465, 480, 481, 482, 483, 489, 491, 493, 494, 499, 508, 518, 524
METEORITIC DAMAGE, 293, 457, 488, 495
METEORITIC DIAMONDS, 381, 495
METEORITIC MICROSTRUCTURES, 461, 462, 464, 465
METEOROID DUST CLOUDS, 349
METEOROID SHOWERS, 154, 463
METEOROIDS, 327, 340, 342, 455, 456
METEOROLOGICAL RADAR, 153
METEOROLOGICAL SATELLITES, 155
METEOROLOGY, 131, 137, 156
METHANE, 382
METHYL ALCOHOL, 62
METHYLENE, 51
MEXICO, 140
MICE, 176
MICROANALYSIS, 342, 431, 432, 448, 449
MICROBIOLOGY, 471
MICROELECTROMECHANICAL SYSTEMS, 85
MICROGRAVITY, 102, 356
MICROMECHANICS, 67, 118
MICROMETEORITES, 393, 413, 414, 447, 465, 494, 498, 506, 510, 511
MICROMETEOROIDS, 154, 413
MICROORGANISMS, 141, 175, 176, 469, 471, 472, 475, 476, 477
MICROPARTICLES, 450
MICROROCKET ENGINES, 95
MICROSATELLITES, 474
MICROSCOPES, 118
MICROSCOPY, 50
MICROSTRIP ANTENNAS, 82
MICROSTRIP TRANSMISSION LINES, 85
MICROSTRUCTURE, 57, 67, 71, 473, 477, 505
MICROTHRUST, 95
MICROWAVE IMAGERY, 151, 155
MICROWAVE RADIOMETERS, 105
MIGRATION, 402
MILITARY AIRCRAFT, 15, 29
MILITARY OPERATIONS, 19, 81, 203, 222, 249, 251
MILITARY TECHNOLOGY, 68, 83, 190, 215, 228
MILK, 175
MILLIMETER WAVES, 264
MINERAL DEPOSITS, 416, 429, 499, 500, 505
MINERALOGY, 265, 271, 282, 285, 287, 289, 291, 292, 298, 300, 301, 302, 307, 335, 336, 338, 340, 341, 349, 350, 351, 356, 357, 358, 359, 360, 361, 362, 363, 369, 370, 390, 397, 407, 413, 414, 416, 421, 429, 440, 449, 452, 454, 458, 460, 461, 462, 464, 465, 472, 477, 478, 479, 484, 490, 493, 494, 495, 504, 505, 506, 508, 509, 512, 514, 518, 521, 523
MINERALS, 142, 289, 310, 336, 337, 338, 341, 342, 351, 353, 356, 383, 391, 415, 421, 429, 451, 458, 467, 489, 497, 499, 504, 505, 507, 508, 512, 516, 523
MINIATURIZATION, 95
MISSILE DEFENSE, 17
MISSILES, 5
MISSION PLANNING, 261, 367, 382, 405, 426, 428, 430, 433
MITOSIS, 164, 169
MOBILITY, 370, 398
MODELS, 28, 61, 181, 200, 201, 226, 251, 271, 272, 312, 320, 355, 442, 505, 520, 530
MODULATION TRANSFER FUNCTION, 104, 157
MODULATORS, 106
MODULES, 21
MOISTURE, 106
MOISTURE CONTENT, 432
MOLECULAR BIOLOGY, 170
MOLECULAR CHAINS, 380, 392
MOLECULAR CLOUDS, 264
MOLECULAR CLUSTERS, 243, 244
MOLECULAR DYNAMICS, 59, 65, 208
MOLECULAR ELECTRONICS, 50
MOLECULAR GASES, 265
MOLECULAR INTERACTIONS, 511
MOLECULAR IONS, 59
MOLECULAR SPECTROSCOPY, 234
MOLECULAR STRUCTURE, 172, 369
MOLECULES, 147, 212, 238
MOLYBDENUM, 61
MONITORS, 21
MONKEYS, 179
MONTE CARLO METHOD, 59, 92, 177
MOON, 270, 288, 311, 347, 366, 378, 395, 401, 407, 408, 440, 442, 443, 444, 445, 467, 496, 513, 519, 530
MOONQUAKES, 343
MORPHOLOGY, 70, 241, 304, 313, 314, 316, 320, 321, 327, 328, 376, 438, 450, 474, 489, 503, 504, 507, 526, 527
MORTALITY, 187
MOSAICS, 323
MOSSBAUER EFFECT, 452, 460, 462, 512
MOTION PERCEPTION, 189
MOTION PICTURES, 533
MOTION SICKNESS, 181, 192
MOTION SIMULATION, 36
MOUNTAINS, 372, 435
MSM (SEMICONDUCTORS), 239
MUD, 477
MULTILAYER INSULATION, 45
MULTIPATH TRANSMISSION, 79
MULTISENSOR FUSION, 80, 222, 249, 254
MULTISPECTRAL PHOTOGRAPHY, 406, 408, 517
MULTISTATIC RADAR, 329
MURCHISON METEORITE, 358, 369, 382
MURRAY METEORITE, 358
MUSCLES, 186
MUSCULAR STRENGTH, 186
MUTATIONS, 165

N

N-TYPE SEMICONDUCTORS, 239
NAKHLITES, 353, 482
NAMING, 492
NANOCOMPOSITES, 58, 414
NANOCRYSTALS, 412, 414
NANOSTRUCTURES (DEVICES), 50
NANOTECHNOLOGY, 240
NANOTUBES, 239, 240
NARROWBAND, 80, 105
NASA PROGRAMS, 13, 59, 97, 248, 365, 468, 535
NASA SPACE PROGRAMS, 46, 426
NASTRAN, 115
NATIONAL AIRSPACE SYSTEM, 13, 194
NATURAL LANGUAGE (COMPUTERS), 196, 223
NATURAL SATELLITES, 262
NAUSEA, 163
NAUTICAL CHARTS, 128
NAVIER-STOKES EQUATION, 2, 88, 91, 93
NAVIGATION, 110, 124
NAVIGATION INSTRUMENTS, 110
NAVY, 10, 104
NEAR EARTH ASTEROID RENDEZVOUS MISSION, 306
NEAR INFRARED RADIATION, 307, 496, 509, 512, 515, 520
NEBULAE, 264, 276, 343, 468, 514, 522
NEODYMIUM, 294, 479
NEODYMIUM ISOTOPES, 269
NEON, 412, 465, 522
NEON ISOTOPES, 460, 502

NEOPLASMS, 162
NEPTUNE (PLANET), 326, 503
NERVES, 171, 174
NETWORK CONTROL, 28
NETWORKS, 220
NEURAL NETS, 28, 214
NEUROLOGY, 168, 184, 189
NEUROPHYSIOLOGY, 176
NEUROPSYCHIATRY, 189
NEUTRAL ATOMS, 231, 532
NEUTRON ACTIVATION ANALYSIS, 341
NEUTRON BEAMS, 340
NEUTRON SPECTROMETERS, 395, 396
NEUTRON STARS, 265, 345
NEUTRONS, 237, 340, 423, 442, 443, 444
NEVADA, 418
NICKEL, 452
NICKEL OXIDES, 339
NIGERIA, 518
NIGHT VISION, 189, 190
NIOBIUM, 66
NIOBIUM ISOTOPES, 377
NITINOL ALLOYS, 63
NITRAMINE PROPELLANTS, 72
NITRIC ACID, 132
NITROGEN, 232, 234, 235, 411, 458, 483
NITROGEN 15, 382, 518
NITROGEN COMPOUNDS, 391
NITROGEN ISOTOPES, 339, 506
NITROGEN OXIDES, 58, 132, 243
NITROGEN TETROXIDE, 47
NOISE (SOUND), 130, 226, 229
NOISE MEASUREMENT, 227
NOISE POLLUTION, 130
NOISE PREDICTION, 88
NOISE PREDICTION (AIRCRAFT), 226
NOISE REDUCTION, 88, 206, 228, 229
NOMENCLATURES, 492
NONDESTRUCTIVE TESTS, 17, 50, 54, 57
NONEQUILIBRIUM FLOW, 95, 98
NONLINEAR EQUATIONS, 224
NONLINEAR OPTICS, 239
NONLINEAR SYSTEMS, 91
NONLINEARITY, 30, 56
NORMAL DENSITY FUNCTIONS, 114
NORTH ATLANTIC TREATY ORGANIZATION (NATO), 215, 246
NORTHERN HEMISPHERE, 140, 149, 398
NOSE (ANATOMY), 176
NOTCH TESTS, 52
NOVAE, 333, 334
NOZZLE DESIGN, 26
NOZZLE EFFICIENCY, 206
NOZZLE FLOW, 4, 90
NOZZLES, 49
NUCLEAR FUSION, 237
NUCLEAR MAGNETIC RESONANCE, 369
NUCLEAR PHYSICS, 267
NUCLEAR REACTIONS, 340
NUCLEAR REACTORS, 234
NUCLEI (NUCLEAR PHYSICS), 233, 534
NUCLEONS, 234, 534
NUCLEOTIDES, 165
NUCLIDES, 287, 378, 509, 516
NUMERICAL ANALYSIS, 55, 67, 96, 97, 130, 218, 227, 230
NUMERICAL INTEGRATION, 261
NUMERICAL STABILITY, 530

O

OAO 3, 406
OBJECT-ORIENTED PROGRAMMING, 81, 201, 215
OBSERVATION, 319
OBSERVATORIES, 149
OCCULTATION, 107
OCEAN BOTTOM, 158, 225, 348, 375, 475
OCEAN SURFACE, 478
OCEANOGRAPHY, 156, 215, 367
OCEANS, 221, 283, 327, 367, 374, 436, 440, 501, 503, 505, 525
OH-58 HELICOPTER, 19
OHIO, 515
OIL RECOVERY, 129
OILS, 129
OKLAHOMA, 515
OLIVINE, 287, 291, 302, 307, 342, 351, 361, 378, 408, 409, 440, 462, 471, 481, 508, 518, 519
OMAN, 499
ON-LINE SYSTEMS, 365
OPACITY, 495
OPEN CLUSTERS, 232
OPERATING COSTS, 38
OPERATING SYSTEMS (COMPUTERS), 197
OPERATIONS RESEARCH, 80, 220
OPTICAL EQUIPMENT, 221
OPTICAL MATERIALS, 239
OPTICAL MEASUREMENT, 127
OPTICAL MEASURING INSTRUMENTS, 235
OPTICAL MICROSCOPES, 427
OPTICAL PROPERTIES, 32, 70, 126, 127, 153, 236, 424, 494
OPTICAL RADAR, 104, 149, 153
OPTICAL SCANNERS, 104
OPTICAL SWITCHING, 87
OPTICAL THICKNESS, 136, 494
OPTICAL TRACKING, 191
OPTIMIZATION, 66, 81, 204
OPTOELECTRONIC DEVICES, 86
ORBIT DETERMINATION, 383
ORBITAL ELEMENTS, 473
ORBITAL RENDEZVOUS, 39
ORBITALS, 362
ORBITS, 326, 383, 491
ORGANIC CHEMISTRY, 267
ORGANIC COMPOUNDS, 263, 265, 266, 357, 370, 470, 531
ORGANIC MATERIALS, 50, 106, 141, 265, 266, 286, 357, 468, 469
ORGANISMS, 515, 531
ORGANIZATIONS, 252
ORGUEIL METEORITE, 370, 448
OROGRAPHY, 372
OSCILLATING FLOW, 188
OSCILLATIONS, 268
OSMIUM, 478, 482
OSMIUM ISOTOPES, 355
OSTEOPOROSIS, 180
OUTCROPS, 494
OUTER SPACE TREATY, 367
OXIDATION, 61, 340, 486, 492, 525
OXIDATION-REDUCTION REACTIONS, 58
OXIDES, 411, 419
OXIDIZERS, 47, 525
OXIMETRY, 183
OXYGEN, 412, 446, 482, 512
OXYGEN 18, 294
OXYGEN IONS, 148
OXYGEN ISOTOPES, 286, 287, 302, 341, 357, 358, 370, 448, 462, 482, 517
OXYGEN MASKS, 195
OXYGEN PRODUCTION, 8, 472
OXYGENATION, 472
OZONE, 130, 137, 140, 142, 145, 517
OZONE DEPLETION, 140

P

P-TYPE SEMICONDUCTORS, 239
PAINT REMOVAL, 51
PAINTS, 50
PALEOBIOLOGY, 472
PALEOCLIMATOLOGY, 472
PALEOMAGNETISM, 297, 484

PALEONTOLOGY, 312, 331, 333, 452
PALEOZOIC ERA, 452, 453
PALLADIUM, 238, 482
PANELS, 30, 115
PARALLEL COMPUTERS, 120
PARALLEL PROCESSING (COMPUTERS), 199, 202, 206
PARAMETERIZATION, 154
PARKINSON DISEASE, 176
PARTIAL DIFFERENTIAL EQUATIONS, 224
PARTICLE ACCELERATION, 522
PARTICLE CHARGING, 339
PARTICLE IMAGE VELOCIMETRY, 2, 95, 99, 345
PARTICLE INTERACTIONS, 339
PARTICLE SIZE DISTRIBUTION, 419
PARTICLES, 112
PARTICULATES, 70, 419, 424, 427
PATCH ANTENNAS, 85
PATHOLOGY, 213
PAYLOAD CONTROL, 29
PENETRATION, 116, 225, 384
PENETROMETERS, 116
PEPTIDES, 175
PERCEPTUAL ERRORS, 34, 189
PERFORMANCE TESTS, 17, 47, 72, 86, 425
PERIDOTITE, 477
PERIHELIONS, 362, 491
PERIODIC VARIATIONS, 106
PERIODICALS, 128
PERISCOPES, 192
PERMITTIVITY, 330
PEROVSKITES, 494
PERSONAL COMPUTERS, 221
PERSONNEL, 191
PERSONNEL DEVELOPMENT, 213
PERSONNEL MANAGEMENT, 213, 258
PERSONNEL SELECTION, 8
PERTURBATION, 136, 530
PERTURBATION THEORY, 232
PETROGENESIS, 335, 336, 350, 352, 389, 390, 454, 481, 482
PETROGRAPHY, 285, 295, 301, 310, 358, 361, 370, 452, 458, 461, 462, 472, 478, 486, 491, 506, 524
PETROLEUM PRODUCTS, 143
PETROLOGY, 298, 302, 333, 336, 340, 341, 350, 351, 352, 357, 360, 379, 388, 389, 393, 413, 453, 454, 458, 461, 462, 464, 478, 484, 489, 491
PH, 440
PHASE CHANGE MATERIALS, 60
PHASE DIAGRAMS, 452
PHASE LOCKED SYSTEMS, 102
PHASE TRANSFORMATIONS, 60, 65, 284
PHASED ARRAYS, 82, 85
PHASES, 378
PHENOLOGY, 141
PHENOLS, 164
PHOBOS, 385
PHOSPHATES, 463
PHOSPHORUS, 128, 141
PHOSPHORYLATION, 164, 169
PHOTOCHEMICAL REACTIONS, 61
PHOTODECOMPOSITION, 417
PHOTOELECTRIC EMISSION, 340
PHOTOELECTRONS, 339
PHOTOGEOLOGY, 490, 517
PHOTOGRAMMETRY, 328, 434
PHOTOLYSIS, 352
PHOTOMETERS, 142, 238
PHOTOMETRY, 105, 326, 433, 484, 525, 531
PHOTONICS, 87
PHOTONS, 263, 468
PHOTORECEPTORS, 181
PHOTOVOLTAIC CONVERSION, 129
PHOTOVOLTAIC EFFECT, 129
PHTHALOCYANIN, 70
PHYSICAL CHEMISTRY, 235, 350
PHYSICAL EXERCISE, 180
PHYSICAL FITNESS, 186, 187
PHYSIOLOGICAL EFFECTS, 130
PHYSIOLOGICAL RESPONSES, 185
PHYSIOLOGY, 35, 170, 183
PIEZOELECTRIC ACTUATORS, 110
PILOT PERFORMANCE, 31
PILOT SELECTION, 193
PILOT TRAINING, 31
PILOTLESS AIRCRAFT, 29
PIPES (TUBES), 102, 110
PISTON ENGINES, 46
PLAINS, 330, 331, 374, 379, 501, 527
PLANAR STRUCTURES, 101
PLANETARY ATMOSPHERES, 136, 402, 516
PLANETARY BOUNDARY LAYER, 317
PLANETARY COMPOSITION, 408, 409, 411, 490
PLANETARY CORES, 262, 350, 378, 402
PLANETARY CRATERS, 269, 316, 328, 345, 347, 364, 365, 488, 507, 519
PLANETARY CRUSTS, 296, 297, 331, 335, 336, 345, 347, 349, 403, 404, 486, 495, 502
PLANETARY CRYOSPHERES, 272, 492, 501
PLANETARY ENVIRONMENTS, 490
PLANETARY EVOLUTION, 274, 275, 331, 333, 344, 364, 379, 466, 467, 510, 522
PLANETARY GEOLOGY, 269, 279, 280, 281, 282, 304, 305, 306, 313, 315, 324, 325, 331, 332, 333, 334, 335, 336, 345, 346, 347, 349, 350, 351, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 385, 386, 387, 388, 392, 397, 400, 403, 408, 410, 411, 416, 418, 420, 421, 422, 424, 425, 427, 431, 433, 436, 466, 487, 488, 495, 501, 507, 513, 515, 517, 521, 524, 525, 526, 527, 528
PLANETARY IONOSPHERES, 145
PLANETARY MAGNETIC FIELDS, 484, 531
PLANETARY MANTLES, 296, 297, 312, 317, 335, 336, 378, 404, 466, 509
PLANETARY MAPPING, 278, 280, 281, 295, 304, 323, 324, 325, 326, 327, 329, 330, 331, 332, 333, 364, 366, 416, 429, 490, 497, 518, 528
PLANETARY MASS, 274, 275
PLANETARY METEOROLOGY, 424, 485, 492
PLANETARY NEBULAE, 265, 266, 273, 343, 358, 359, 381
PLANETARY ORBITS, 510
PLANETARY RADIATION, 409, 518
PLANETARY RINGS, 326, 344
PLANETARY STRUCTURE, 331, 332, 333, 334, 335, 378, 425, 497, 515
PLANETARY SURFACES, 364, 397, 432, 444, 509
PLANETARY SYSTEMS, 274, 392, 491, 510
PLANETARY TEMPERATURE, 356
PLANETOLOGY, 365, 466, 499
PLANETS, 346, 491
PLANNING, 218, 221, 246
PLASMA DYNAMICS, 3
PLASMA HEATING, 533
PLASMA LAYERS, 147
PLASMA PROPULSION, 238
PLASMA RADIATION, 237
PLASMA SHEATHS, 78, 237
PLASMA WAVES, 78
PLASMAS (PHYSICS), 45, 234, 237, 344, 522, 533
PLASTIC COATINGS, 67
PLASTIC PROPERTIES, 120, 284
PLATEAUS, 279, 331, 332, 335, 338

PLATINUM, 288, 342, 401, 482
PLUMES, 58, 103, 270, 312, 374, 435, 455, 509
PLUTO (PLANET), 495
POINT IMPACT, 345
POINT SOURCES, 218
POINT SPREAD FUNCTIONS, 104
POLAR CAPS, 146, 280, 281, 282, 319, 397, 485, 492
POLAR COORDINATES, 101
POLAR REGIONS, 297, 319, 326, 397, 423, 441, 442, 499, 500, 501, 503
POLARIMETRY, 520
POLARIZED LIGHT, 520
POLICIES, 12
POLLUTION, 61
POLLUTION CONTROL, 123, 130, 134, 138, 139, 246
POLLUTION MONITORING, 132, 133, 134, 139
POLONIUM 210, 288
POLYCYCLIC AROMATIC HYDROCARBONS, 158
POLYETHYLENES, 208
POLYGONIZATION, 243
POLYMER MATRIX COMPOSITES, 55
POLYMERS, 7, 69, 70
POLYTETRAFLUOROETHYLENE, 212
POROSITY, 308, 309, 363, 384
POSITION (LOCATION), 268, 451
POSTFLIGHT ANALYSIS, 14
POSTMISSION ANALYSIS (SPACECRAFT), 306
POTENTIAL ENERGY, 239, 241
POTENTIAL FLOW, 375
POWDER (PARTICLES), 346
POWER CONVERTERS, 46
POYNTING THEOREM, 147
PRECAMBRIAN PERIOD, 454, 472
PRECESSION, 262
PRECIPITATES, 138
PRECIPITATION (METEOROLOGY), 131
PREDICATE LOGIC, 196, 223
PREDICTION ANALYSIS TECHNIQUES, 81, 117, 185
PREDICTIONS, 71, 147
PREFLIGHT OPERATIONS, 433
PREGNANCY, 174, 175, 187
PRELAUNCH SUMMARIES, 39, 40
PRESSURE, 464, 495
PRESSURE BREATHING, 195
PRESSURE DEPENDENCE, 284
PRESSURE DISTRIBUTION, 310, 465
PRESSURE EFFECTS, 452
PRESSURE MEASUREMENT, 1, 350
PRESSURE SENSORS, 268
PRESSURE VESSEL DESIGN, 74
PREVENTION, 12, 23, 65
PRIMITIVE EARTH ATMOSPHERE, 472
PROBABILITY DISTRIBUTION FUNCTIONS, 220
PROBABILITY THEORY, 10, 53, 219
PROBLEM SOLVING, 76, 189, 206, 220, 245
PROCEDURES, 29, 209, 247, 259
PROCUREMENT, 209
PRODUCT DEVELOPMENT, 58, 97, 194, 238
PROGENY, 187
PROGRAM VERIFICATION (COMPUTERS), 203
PROGRAMMING LANGUAGES, 366
PROJECT MANAGEMENT, 124, 248, 255, 257, 258
PROJECT PLANNING, 115, 535
PROJECTILE CRATERING, 346, 347, 457, 488
PROJECTILES, 3, 311, 345, 348
PROKARYOTES, 475
PROLONGATION, 123
PROPELLANTS, 60
PROPULSION SYSTEM CONFIGURATIONS, 27, 47
PROPULSION SYSTEM PERFORMANCE, 27, 204
PROSTAGLANDINS, 167
PROSTATE GLAND, 171
PROTECTION, 77, 208
PROTECTIVE COATINGS, 16, 63, 70
PROTEINS, 83, 159, 162, 163, 164, 168, 172
PROTOCOL (COMPUTERS), 44, 212
PROTON BEAMS, 237
PROTONS, 172, 232
PROTOPLANETARY DISKS, 343, 468, 474
PROTOPLANETS, 273, 344, 503, 522
PROTOSTARS, 264
PROTOTYPES, 74, 175, 204, 425, 431
PROVING, 74
PSYCHOACOUSTICS, 192
PSYCHOLOGICAL EFFECTS, 191
PUBLIC RELATIONS, 245
PULSARS, 510
PULSE DETONATION ENGINES, 47
PULSED LASERS, 415, 518
PUMPS, 110, 172
PYRITES, 477
PYROLYSIS, 92
PYROXENES, 294, 350, 351, 352, 353, 360, 361, 411, 440, 459, 479, 482, 513, 523
PYRRHOTITE, 449

Q

QUALIFICATIONS, 69
QUALITATIVE ANALYSIS, 350
QUALITY CONTROL, 44, 114
QUANTITATIVE ANALYSIS, 159
QUANTUM CHROMODYNAMICS, 234
QUANTUM COMPUTATION, 198
QUANTUM COMPUTERS, 198
QUANTUM MECHANICS, 198
QUARTZ, 70, 416, 452

R

RACES (ANTHROPOLOGY), 165
RADAR IMAGERY, 279, 329, 330
RADAR SCATTERING, 278
RADAR TRACKING, 17, 278, 383, 428
RADAR TRANSMISSION, 421
RADIAL DISTRIBUTION, 343
RADIAL VELOCITY, 326
RADIANCE, 138, 143
RADIATION COUNTERS, 181
RADIATION DAMAGE, 163, 344
RADIATION EFFECTS, 126, 276, 344
RADIATION PROTECTION, 472
RADIATION SHIELDING, 196, 232
RADIATION THERAPY, 167, 171, 177
RADIATION TOLERANCE, 163
RADIATIVE TRANSFER, 273, 486
RADIO COMMUNICATION, 13, 31
RADIO FREQUENCIES, 78, 79
RADIO SIGNALS, 77
RADIO WAVES, 78
RADIOACTIVE AGE DETERMINATION, 355, 391
RADIOACTIVE CONTAMINANTS, 142
RADIOACTIVE ISOTOPES, 273, 303, 339, 340, 344, 480, 489, 506
RADIOACTIVE WASTES, 233
RADIOACTIVITY, 267, 273, 296, 368
RADIOMETERS, 142
RAIL TRANSPORTATION, 11
RAILGUN ACCELERATORS, 38
RAIN, 121, 135, 151
RAIN FORESTS, 141
RAM ACCELERATORS, 42
RAMAN SPECTRA, 415, 523
RAMAN SPECTROSCOPY, 393, 429, 431, 507, 523

RANDOM SAMPLING, 190
RARE EARTH ELEMENTS, 48, 351, 355, 360, 371, 389, 482
RARE GASES, 8, 285, 295, 342, 361, 381, 460, 463, 467, 483
RAREFIED GAS DYNAMICS, 92
RATES (PER TIME), 187
RATS, 174, 175, 176, 187
RAYLEIGH SCATTERING, 105
REACTION KINETICS, 84, 108, 517
REACTION PRODUCTS, 290
REACTOR MATERIALS, 196
REAL TIME OPERATION, 28, 82, 103, 184, 207, 211
REAL VARIABLES, 207
RECEIVERS, 13
RECEPTORS (PHYSIOLOGY), 50, 83, 176
RECOIL PROTONS, 380
RECONNAISSANCE, 17
RECORDS MANAGEMENT, 255
RECREATION, 133
RECRYSTALLIZATION, 342
REDUCTION (CHEMISTRY), 293, 340
REED-SOLOMON CODES, 215
REFLECTANCE, 145, 307, 364, 484
REFRACTION, 150
REFRACTIVITY, 236
REFRACTORIES, 71, 498, 504
REFRACTORY COATINGS, 55
REFRACTORY METALS, 523
REFRIGERATORS, 90
REGIONS, 424
REGOLITH, 307, 308, 336, 338, 339, 340, 341, 344, 346, 362, 396, 407, 408, 417, 441, 445, 446, 491, 505, 506, 521, 525
REGULATIONS, 248, 255
REINFORCEMENT (STRUCTURES), 116
REINFORCING MATERIALS, 67
RELATIONAL DATA BASES, 209
RELAXATION METHOD (MATHEMATICS), 98
RELIABILITY, 38, 84, 219
RELIEF MAPS, 441
RELOCATION, 144
REMOTE CONTROL, 415, 431
REMOTE SENSING, 79, 124, 127, 128, 136, 151, 153, 327, 368, 379, 394, 396, 407, 410, 416, 509, 512
REMOTE SENSORS, 125
REMOTELY PILOTED VEHICLES, 29, 215
RENDEZVOUS SPACECRAFT, 430
RENEWABLE ENERGY, 129
REPLACING, 33, 87
REQUIREMENTS, 104
RESEARCH, 211, 271
RESEARCH AND DEVELOPMENT, 24, 28, 75, 83, 124, 134, 173, 221, 248, 254, 255, 256, 257, 258, 259
RESEARCH FACILITIES, 31, 34, 35, 87
RESERVOIRS, 378
RESIDUAL GAS, 243
RESIDUAL STRESS, 119
RESIDUES, 381
RESIN MATRIX COMPOSITES, 53
RESONANCE, 510
RESONANCE SCATTERING, 224
RESONANT FREQUENCIES, 225
RESOURCES MANAGEMENT, 31, 124, 138
RESPIRATORS, 195
RESPONSE BIAS, 45
RETENTION (PSYCHOLOGY), 217
RETINA, 181, 183
RETIREMENT FOR CAUSE, 114
REUSABLE LAUNCH VEHICLES, 35, 36, 38
REUSABLE SPACECRAFT, 38
REVISIONS, 315, 420
REYNOLDS AVERAGING, 2
RHENIUM, 401, 478
RHENIUM ISOTOPES, 300
RHEOLOGY, 112, 296, 311, 327, 346, 527
RHODIUM, 482
RIDGES, 513
RIGID ROTORS, 113
RIMS, 358, 370
RING CURRENTS, 148, 232
RIO GRANDE (NORTH AMERICA), 123
RISK, 143, 157, 165, 187
ROBOT ARMS, 41, 42, 225
ROBOTICS, 225, 470
ROBOTS, 368
ROCK INTRUSIONS, 333, 464, 489, 497
ROCKET ENGINES, 47, 502
ROCKET NOZZLES, 95
ROCKS, 310, 341, 347, 348, 357, 368, 378, 393, 421, 422, 423, 425, 471, 476, 478, 485, 486, 489, 490, 491, 495, 504, 506, 508, 512, 523
ROSETTA MISSION, 509
ROTARY WINGS, 6
ROTATING BODIES, 99
ROTATING DISKS, 54
ROTATING FLUIDS, 343
ROTATING GENERATORS, 238
ROTATION, 35, 435, 474
ROTOR BLADES (TURBOMACHINERY), 26, 113
ROTOR DYNAMICS, 6
ROTORS, 2, 75, 117, 211, 228
ROVING VEHICLES, 425, 428
RUBIDIUM, 479
RUBIDIUM ISOTOPES, 269
RUGGEDNESS, 197
RUNGE-KUTTA METHOD, 344
RUNWAYS, 32, 34
RUSSIAN FEDERATION, 138
RUTHENIUM, 482
RUTHENIUM COMPOUNDS, 339

S

S WAVES, 293
S-3 AIRCRAFT, 16
SABOT PROJECTILES, 38
SAFETY, 11, 27, 32, 38, 76, 109, 253, 428
SAFETY FACTORS, 194
SAFETY MANAGEMENT, 10, 11, 12, 61
SALINITY, 471
SALTS, 122
SAMARIUM, 479
SAMARIUM ISOTOPES, 269
SAMPLE RETURN MISSIONS, 382, 430, 433
SAMPLERS, 133, 433
SAMPLING, 86, 131, 132, 158
SANDS, 422, 498
SANDSTONES, 494, 506
SATELLITE ALTIMETRY, 334
SATELLITE COMMUNICATION, 13, 43, 81
SATELLITE IMAGERY, 466, 490
SATELLITE OBSERVATION, 131, 141, 151, 155
SATELLITE ORBITS, 261
SATELLITE SURFACES, 283, 284, 289, 327, 328, 372, 403, 404, 405, 437, 438, 439, 440, 519
SATURN (PLANET), 521, 528
SATURN RINGS, 326, 530
SATURN SATELLITES, 326
SCALE MODELS, 28, 152, 268
SCALING LAWS, 29, 345
SCANNING ELECTRON MICROSCOPY, 458
SCATTER PROPAGATION, 226
SCATTERING, 408
SCATTERING FUNCTIONS, 157
SCHEDULING, 218
SCHOOLS, 490
SCHOTTKY DIODES, 239

SCHREIBERSITE, 465, 512
SCIENTIFIC VISUALIZATION, 366
SCIENTISTS, 189
SCINTILLATION COUNTERS, 106
SEA SURFACE TEMPERATURE, 135
SEA WATER, 404, 405
SEAS, 345
SECURITY, 80
SEDIMENT TRANSPORT, 388
SEDIMENTARY ROCKS, 294, 309, 447
SEDIMENTS, 89, 156, 225, 294, 347, 424, 447
SEEPAGE, 282, 314
SEISMIC WAVES, 343
SEISMOLOGY, 293, 453, 457
SELECTION, 190, 248, 428
SELECTIVE DISSEMINATION OF INFORMATION, 250
SELENIUM, 240
SEMANTICS, 196, 223
SEMICONDUCTOR DEVICES, 239
SEMICONDUCTOR JUNCTIONS, 239
SEMICONDUCTORS (MATERIALS), 75
SENSITIVITY, 53, 150, 235
SENSITIVITY ANALYSIS, 152, 226, 229, 261
SEPARATED FLOW, 3, 94
SEPARATION, 96, 381
SERPENTINE, 449
SERVICE LIFE, 16, 17, 22, 104
SHADOWGRAPH PHOTOGRAPHY, 103
SHALLOW WATER, 228, 345
SHAPE MEMORY ALLOYS, 56, 63
SHAPE OPTIMIZATION, 46
SHAPES, 9, 311, 320, 349, 384, 389, 422, 441, 471, 473
SHEAR FLOW, 101
SHEAR LAYERS, 92, 101
SHEATHS, 339
SHERGOTTITES, 349, 350, 351, 355, 480, 481, 483
SHIP HULLS, 88
SHOCK, 495
SHOCK ABSORBERS, 112
SHOCK HEATING, 310, 347, 532
SHOCK LAYERS, 294
SHOCK RESISTANCE, 88
SHOCK TESTS, 88, 197
SHOCK WAVE PROPAGATION, 88, 224
SHOCK WAVES, 3, 71, 88, 224, 276, 310, 355, 495, 522
SHORELINES, 316
SHUTTLE IMAGING RADAR, 455
SIDERITES, 298, 354, 400
SIGNAL ANALYSIS, 484
SIGNAL DETECTION, 529
SIGNAL GENERATORS, 14
SIGNAL PROCESSING, 24, 82, 192
SIGNAL REFLECTION, 453
SIGNATURES, 459
SIGNS AND SYMPTOMS, 176
SIKHOTE-ALIN METEORITE, 465
SILICA GLASS, 483
SILICATES, 265, 276, 289, 369, 380, 401, 411, 414, 467, 478, 491, 492, 505, 528
SILICON, 107
SILICON CARBIDES, 55, 380
SILICON COMPOUNDS, 86, 242
SILICON DIOXIDE, 243, 379, 468, 514
SILICON ISOTOPES, 380, 459
SIMULATION, 4, 35, 65, 82, 107, 150, 152, 154, 175, 203, 208, 251, 268, 273, 274, 345, 403, 425, 473, 498, 518, 531
SIMULATORS, 80
SINGLE CRYSTALS, 412, 505
SITE SELECTION, 292, 429
SIZE (DIMENSIONS), 374
SIZE DETERMINATION, 434, 480
SIZE DISTRIBUTION, 142, 143, 309, 338, 422
SLABS, 116
SLENDER BODIES, 5
SLOPES, 317, 320, 386, 489
SLURRIES, 54
SMART MATERIALS, 22
SMART STRUCTURES, 22
SNC METEORITES, 351, 352, 353, 354, 355, 392, 393, 400, 469, 476, 480, 481, 482, 483, 484, 493, 523, 525
SNOW, 106, 121
SNOW COVER, 121
SODIUM, 61, 153
SODIUM 22, 340
SODIUM CHLORIDES, 138
SOFTWARE DEVELOPMENT TOOLS, 194, 197, 198, 205, 221, 252, 253, 366
SOFTWARE ENGINEERING, 81, 194, 197, 198, 201, 209, 252
SOFTWARE RELIABILITY, 194, 203
SOIL MAPPING, 443, 486
SOIL MOISTURE, 106
SOIL POLLUTION, 123
SOIL SAMPLING, 123, 410, 528
SOILS, 116, 128, 142, 143, 144, 411, 421, 486, 528
SOLAR ACTIVITY, 148, 533
SOLAR ACTIVITY EFFECTS, 148, 531
SOLAR ATMOSPHERE, 267, 533
SOLAR CELLS, 129
SOLAR CONVECTION (ASTRONOMY), 532
SOLAR CORONA, 273, 513, 532
SOLAR CYCLES, 140
SOLAR FLARES, 530
SOLAR PHYSICS, 502
SOLAR POSITION, 450
SOLAR RADIATION, 135, 531
SOLAR SPECTROMETERS, 105
SOLAR SYSTEM, 262, 267, 268, 274, 345, 377, 378, 381, 459, 474, 491, 498, 499, 508, 511
SOLAR SYSTEM EVOLUTION, 377, 391, 401, 459, 474
SOLAR TERRESTRIAL INTERACTIONS, 533
SOLAR WIND, 339, 340, 342, 502, 506, 530, 531, 532, 533
SOLAR X-RAYS, 534
SOLID PHASES, 464
SOLID PROPELLANT ROCKET ENGINES, 45, 48, 49
SOLID SOLUTIONS, 240
SOLID STATE, 369
SOLIDIFICATION, 89, 243
SOLIDS, 274, 344
SOLIDUS, 297
SOLUBILITY, 336
SOLVENT EXTRACTION, 357
SOLVENTS, 357
SONAR, 225, 228
SOUND FIELDS, 227
SOUND PRESSURE, 226, 230
SOUND TRANSMISSION, 79
SOUND WAVES, 192, 227, 230, 344
SOUNDING ROCKETS, 5
SOYUZ SPACECRAFT, 39
SPACE CHARGE, 340
SPACE EXPLORATION, 366, 425, 444, 445, 468
SPACE FLIGHT, 174, 187
SPACE MISSIONS, 45, 78, 232, 276, 366, 367, 425
SPACE PROBES, 368, 532
SPACE PROGRAMS, 245
SPACE SHUTTLE ORBITERS, 42
SPACE SHUTTLES, 14
SPACE STATION MODULES, 40, 41
SPACE TEMPERATURE, 356
SPACE TRANSPORTATION, 35, 38
SPACE TRANSPORTATION SYSTEM, 14, 38
SPACE TRANSPORTATION SYSTEM FLIGHTS, 14
SPACE WEATHER, 150

SPACEBORNE EXPERIMENTS, 179
SPACEBORNE TELESCOPES, 474
SPACECRAFT CHARGING, 150
SPACECRAFT CONTROL, 45
SPACECRAFT DESIGN, 14
SPACECRAFT DOCKING, 39, 40, 41, 43
SPACECRAFT EQUIPMENT, 517
SPACECRAFT INSTRUMENTS, 427, 430, 431, 444
SPACECRAFT LANDING, 42, 43
SPACECRAFT LAUNCHING, 42
SPACECRAFT SURVIVABILITY, 430
SPACECREWS, 39
SPACELAB, 103
SPALLATION, 380
SPATIAL DISTRIBUTION, 65, 231, 293, 385, 391, 437, 450, 496
SPATIAL RESOLUTION, 127
SPECIFIC HEAT, 437
SPECIFIC IMPULSE, 46
SPECIFICATIONS, 42
SPECKLE PATTERNS, 64
SPECTRA, 113, 149, 233, 263, 383, 385, 389, 407, 411, 432
SPECTRAL BANDS, 410
SPECTRAL EMISSION, 237, 415
SPECTRAL METHODS, 361
SPECTRAL MIXTURE ANALYSIS, 282, 406
SPECTRAL REFLECTANCE, 264, 362, 365, 385, 410, 415, 417, 432, 441, 493, 494, 497, 509, 512, 520
SPECTRAL RESOLUTION, 127
SPECTROMETERS, 87, 128, 409, 419, 429, 430, 445, 484, 516
SPECTROPHOTOMETRY, 432, 505
SPECTRORADIOMETERS, 106
SPECTROSCOPIC ANALYSIS, 401, 416
SPECTROSCOPY, 158, 159, 231, 288, 431, 452, 462, 505, 509, 516
SPECTRUM ANALYSIS, 49, 138, 184, 234, 237, 292, 307, 338, 342, 396, 409, 410, 415, 416, 417, 441, 496, 516
SPEECH, 77, 218
SPEECH RECOGNITION, 201
SPHERES, 456, 468
SPHERICAL COORDINATES, 101
SPHERICAL HARMONICS, 206
SPHEROIDS, 465
SPHERULES, 294, 295, 298, 355, 414, 447, 448, 450, 465, 494
SPINEL, 301, 401
SPREAD SPECTRUM TRANSMISSION, 79, 201
SPREADING, 157, 228, 283
SPRINGS (WATER), 471, 475
SPUTTERING, 241, 242, 404
STABILITY, 230, 280, 284, 417
STABILITY AUGMENTATION, 117
STABILIZATION, 241
STAINING, 176
STANDARDIZATION, 67, 250
STAR FORMATION, 333
STATISTICAL ANALYSIS, 59, 337
STATISTICAL DISTRIBUTIONS, 114
STATISTICAL TESTS, 114
STEADY STATE, 34, 145
STEEL STRUCTURES, 64
STEELS, 67
STELLAR MASS, 262, 264
STELLAR SPECTRA, 234
STELLAR SPECTROPHOTOMETRY, 413
STELLAR SYSTEMS, 392
STENCIL PROCESSES, 216
STEREOPHOTOGRAPHY, 328, 497
STERILIZATION EFFECTS, 394
STIRLING CYCLE, 46
STIRLING ENGINES, 46
STOCKPILING, 157
STONY-IRON METEORITES, 361, 390, 479
STORAGE TANKS, 102
STORMS, 150, 340
STRAIN MEASUREMENT, 293, 496
STRAIN RATE, 52, 402
STRATEGY, 259
STRATIFICATION, 444
STRATIGRAPHY, 269, 279, 280, 292, 299, 325, 330, 331, 332, 333, 337, 338, 342, 385, 386, 388, 406, 452, 457, 495, 499, 500, 521, 527
STRATOSPHERE, 62, 136, 145, 149, 155, 448
STRESS ANALYSIS, 54, 119
STRESS CORROSION CRACKING, 63
STRESS DISTRIBUTION, 54
STRESS MEASUREMENT, 188, 439
STRESS RELAXATION, 187
STRONTIUM, 294, 479, 482
STRONTIUM ISOTOPES, 269, 377, 463
STRUCTURAL ANALYSIS, 53, 54, 115, 117, 305, 454
STRUCTURAL BASINS, 123, 128, 281, 306, 318, 325, 328, 342, 375, 399, 455, 489, 497, 499, 500, 503, 504, 507, 514, 515, 519
STRUCTURAL DESIGN, 52
STRUCTURAL ENGINEERING, 22
STRUCTURAL MEMBERS, 71
STRUCTURAL PROPERTIES (GEOLOGY), 280, 331, 333, 335, 436, 437, 514, 515, 518, 519
STRUCTURAL VIBRATION, 15
STRUCTURED GRIDS (MATHEMATICS), 216, 223
STRUCTURES, 363
STUDENTS, 257, 388, 490
SUBGROUPS, 524
SUBMILLIMETER WAVES, 264
SUBSONIC FLOW, 33
SUBSONIC FLUTTER, 29
SUBSONIC SPEED, 4
SUBSONIC WIND TUNNELS, 33
SULFATES, 293, 370, 410, 418, 429
SULFIDES, 393, 403, 489, 512
SULFUR, 364, 467, 471
SULFUR DIOXIDES, 372, 374
SULFUR ISOTOPES, 352, 393, 482
SULFURIC ACID, 61, 62, 505
SUMMER, 257, 258, 492
SUN, 345, 508, 533
SUNYAEV-ZELDOVICH EFFECT, 263
SUPERCOMPUTERS, 198, 199, 202
SUPERCONDUCTING MAGNETS, 90
SUPERCOOLING, 464
SUPERFLUIDITY, 73
SUPERHIGH FREQUENCIES, 13
SUPERNOVAE, 345, 380
SUPERSONIC COMBUSTION RAMJET ENGINES, 26, 27
SUPERSONIC FLOW, 96
SUPERSONIC TURBINES, 26, 46, 111
SUPERSONICS, 3
SUPPORT SYSTEMS, 126, 144, 209, 213, 254
SUPPRESSORS, 179
SURFACE DEFECTS, 64
SURFACE LAYERS, 281, 307, 347, 385, 398, 423, 450, 516
SURFACE PROPERTIES, 118, 278, 307, 397, 400, 405, 406, 409, 419, 422, 429, 484, 491, 497
SURFACE ROUGHNESS, 9, 309
SURFACE TEMPERATURE, 126
SURGERY, 170
SURVEILLANCE, 221, 474
SURVEYS, 102, 190, 264, 274, 457, 514, 515
SURVIVAL, 456
SYMMETRY, 117
SYNCHRONISM, 435
SYNCHROTRONS, 448
SYNOPTIC METEOROLOGY, 137
SYNTHESIS (CHEMISTRY), 58, 71, 167, 354, 363

SYSTEMS ANALYSIS, 21, 24, 186, 207, 220
SYSTEMS ENGINEERING, 8, 18, 21, 32, 204
SYSTEMS HEALTH MONITORING, 21, 22, 23, 24, 25, 76, 113, 114, 188, 223
SYSTEMS MANAGEMENT, 251

T

TABS (CONTROL SURFACES), 4
TACTILE DISCRIMINATION, 87
TANKER AIRCRAFT, 19
TANKS (CONTAINERS), 37
TANTALUM, 66
TARGET ACQUISITION, 214
TARGETS, 81
TAXONOMY, 256
TEAMS, 252
TECHNOLOGICAL FORECASTING, 43
TECHNOLOGY ASSESSMENT, 8, 43, 139
TECHNOLOGY TRANSFER, 259
TECHNOLOGY UTILIZATION, 75, 259, 444
TECTONICS, 280, 283, 296, 305, 331, 332, 333, 372, 436, 466, 496, 500, 509, 514, 519
TEKTITES, 293, 294, 451
TELECOMMUNICATION, 77, 79, 80, 201, 203
TELEMEDICINE, 213
TELESCOPES, 261, 496
TEMPERATURE, 89
TEMPERATURE DEPENDENCE, 289, 509
TEMPERATURE DISTRIBUTION, 373, 384
TEMPERATURE EFFECTS, 505
TEMPERATURE GRADIENTS, 55, 75, 100, 347, 445, 446
TEMPERATURE INVERSIONS, 529
TEMPERATURE MEASUREMENT, 105, 153, 350, 373, 450
TEMPERATURE PROFILES, 529
TEMPORAL DISTRIBUTION, 502, 531
TEMPORAL RESOLUTION, 231
TENSILE STRESS, 519
TERRACES (LANDFORMS), 280
TERRAFORMING, 485
TERRAIN, 87, 283, 314, 326, 487, 488, 497, 500, 503, 517, 527
TERRAIN ANALYSIS, 328, 438, 439
TERRESTRIAL PLANETS, 343, 379, 510
TEST CHAMBERS, 34
TEST FACILITIES, 86
TETHERING, 44
TETHERLINES, 16, 17
TEXTURES, 34, 294, 341, 350, 353, 354, 356
THEMATIC MAPPING, 328, 518
THEMIS PROJECT, 366
THEOREMS, 232
THERAPY, 174, 177
THERMAL ANALYSIS, 7, 49, 111, 356, 360, 371
THERMAL BOUNDARY LAYER, 89
THERMAL CONDUCTIVITY, 55, 71, 92, 419, 446
THERMAL CONTROL COATINGS, 58
THERMAL DECOMPOSITION, 7, 70, 495
THERMAL EMISSION, 260, 271, 366, 409, 410, 419, 484, 485, 497
THERMAL ENVIRONMENTS, 475
THERMAL FATIGUE, 66
THERMAL INSULATION, 45
THERMAL MAPPING, 416, 518, 528
THERMAL NEUTRONS, 395, 516
THERMAL PROTECTION, 16
THERMAL RADIATION, 505
THERMAL RESISTANCE, 75, 512
THERMAL SHOCK, 360
THERMOCOUPLES, 84
THERMODYNAMIC PROPERTIES, 48, 418
THERMODYNAMICS, 56, 60, 273, 290, 291, 292, 440
THERMOELASTICITY, 56, 119
THERMOELECTRIC GENERATORS, 37
THERMOGRAPHY, 57
THERMOLUMINESCENCE, 362, 491, 505
THERMOMECHANICAL TREATMENT, 66
THERMOPHILES, 515
THERMOPHYSICAL PROPERTIES, 439, 484
THERMOPILES, 84
THERMOPLASTICITY, 56
THERMOREGULATION, 185
THERMOSPHERE, 78, 511
THICKNESS, 295, 296, 299, 303, 347, 394, 450, 493
THIN FILMS, 70, 84, 241, 242
THORIUM, 338, 444, 446
THREE DIMENSIONAL BODIES, 201
THREE DIMENSIONAL FLOW, 228
THREE DIMENSIONAL MODELS, 71, 87, 192, 207, 293, 305, 457, 458, 532
THRUST MEASUREMENT, 238
THULIUM, 240
THYRISTORS, 87
TIDES, 439, 468, 478
TILES, 216
TILT ROTOR AIRCRAFT, 117
TIMBER INVENTORY, 121
TIME DEPENDENCE, 74
TIME MEASUREMENT, 325
TIME OF FLIGHT SPECTROMETERS, 470
TIME SERIES ANALYSIS, 140
TIRES, 109
TISSUES (BIOLOGY), 184
TITAN, 473, 528
TITANIUM, 342, 395
TITANIUM ALLOYS, 25
TITANIUM OXIDES, 337, 338, 395, 441, 497, 523
TOLERANCES (MECHANICS), 113
TOMOGRAPHY, 431
TOPOGRAPHY, 271, 280, 281, 295, 296, 303, 305, 312, 314, 316, 317, 319, 321, 323, 324, 329, 333, 334, 335, 337, 348, 364, 366, 376, 386, 387, 427, 434, 435, 437, 438, 485, 486, 488, 492, 497, 499, 500, 513, 518, 519, 524, 525, 526, 527
TOPOLOGY, 327
TORNADOES, 122
TOTAL OZONE MAPPING SPECTROMETER, 145
TOUCH, 193
TOUCHDOWN, 34
TOXIC HAZARDS, 61
TOXICITY, 140
TOXICOLOGY, 61
TRACE CONTAMINANTS, 243
TRACE ELEMENTS, 145, 291, 336, 341, 350, 351, 353, 355, 371, 378, 379, 389, 467, 472, 481, 507, 509, 519
TRACKING (POSITION), 81
TRAILING EDGES, 206
TRAINING ANALYSIS, 244
TRAINING DEVICES, 204
TRAINING EVALUATION, 31
TRAINING SIMULATORS, 31
TRAJECTORIES, 455
TRANSFORMATIONS (MATHEMATICS), 206
TRANSFORMERS, 146
TRANSIENT RESPONSE, 197
TRANSITION FLOW, 100
TRANSITION METALS, 467
TRANSMISSION, 19

TRANSMISSION ELECTRON MICROSCOPY, 356, 458
TRANSMISSION LOSS, 228
TRANSMISSIONS (MACHINE ELEMENTS), 23
TRANSMITTERS, 153
TRANSONIC SPEED, 4
TRANSONIC WIND TUNNELS, 32
TRANSPORT AIRCRAFT, 19
TRANSPORT PROPERTIES, 145, 239, 242
TRANSPORT THEORY, 405
TRANSPORTATION, 218
TRAPPING, 64, 65, 111, 354
TREES (PLANTS), 120, 121
TRINITROTOLUENE, 73
TRITON, 496, 525
TRMM SATELLITE, 131, 132
TROILITE, 291
TROJAN ASTEROIDS, 265, 474
TROPICAL METEOROLOGY, 152
TROPICAL REGIONS, 141
TROPICAL STORMS, 152
TROPOSPHERE, 61, 62, 145, 146, 151, 155
TROPOSPHERIC WAVES, 149
TROUGHS, 437
TSUNAMI WAVES, 316, 348
TUMORS, 83, 166, 172, 175
TUNABLE FILTERS, 87
TUNGSTEN, 292, 467
TUNGSTEN ISOTOPES, 377
TURBINE BLADES, 26
TURBINE ENGINES, 4, 28
TURBINES, 27
TURBOFAN ENGINES, 27
TURBOMACHINE BLADES, 3, 27
TURBOPROP ENGINES, 19
TURBULENCE, 99, 111
TURBULENCE MODELS, 16, 29, 94, 95, 96
TURBULENT FLOW, 92, 93, 94, 95, 99, 100, 101
TURBULENT HEAT TRANSFER, 92, 98, 155
TWILIGHT GLOW, 530
TWO DIMENSIONAL MODELS, 87, 95, 455
TWO PHASE FLOW, 100, 102
TYCHO CRATER, 396, 406

U

UH-60A HELICOPTER, 25
ULTRAHIGH FREQUENCIES, 85, 86
ULTRAVIOLET IMAGERY, 147
ULTRAVIOLET LASERS, 49
ULTRAVIOLET RADIATION, 446, 472
ULTRAVIOLET SPECTRA, 173
UMBILICAL CONNECTORS, 16, 17
UNDERGROUND STORAGE, 102
UNDERGROUND STRUCTURES, 102, 476
UNDERWATER ACOUSTICS, 79, 225, 227, 228
UNDERWATER TESTS, 88
UNDERWATER VEHICLES, 215
UNITED STATES, 211, 316
UNIVERSITY PROGRAM, 248
UNSTEADY AERODYNAMICS, 27, 228
UNSTEADY FLOW, 74, 97, 102, 228
UNSTRUCTURED GRIDS (MATHEMATICS), 97, 98, 217
UPPER STAGE ROCKET ENGINES, 74
UPWIND SCHEMES (MATHEMATICS), 93
URANIUM, 479
URANIUM ISOTOPES, 483
URANUS SATELLITES, 326
UREILITES, 361, 390, 495
USER MANUALS (COMPUTER PROGRAMS), 123

V

VACCINES, 177, 180
VALLEYS, 314, 348, 376, 377, 501
VALVES, 110
VAPOR DEPOSITION, 70
VAPOR PHASE EPITAXY, 241
VAPOR PRESSURE, 277
VAPORS, 243
VARIABILITY, 170, 385, 409, 437, 492
VARIABLE STARS, 260
VARIATIONS, 296, 307, 409
VARNISHES, 423
VEGETATION, 120, 122, 125, 144
VELOCITY DISTRIBUTION, 346
VELOCITY MEASUREMENT, 1, 105
VENTS, 373
VENUS (PLANET), 279, 280, 329, 330, 331, 332, 333, 334, 335, 347, 487, 488, 492, 496, 507, 509
VENUS ATMOSPHERE, 529
VENUS SURFACE, 278, 279, 280, 329, 330, 331, 332, 333, 334, 335, 487, 488, 492, 496
VERTICAL DISTRIBUTION, 109
VERTICAL FLIGHT, 13
VERTICAL MOTION SIMULATORS, 31
VESTA ASTEROID, 385, 516
VIBRATION, 1, 19, 21, 23, 114, 232
VIBRATION DAMPING, 112
VIBRATIONAL STRESS, 51
VIDEO DATA, 122
VIDEO TAPES, 535
VIEWING, 214
VIKING LANDER SPACECRAFT, 410
VIKING MARS PROGRAM, 469
VIKING ORBITER SPACECRAFT, 323
VIRTUAL MEMORY SYSTEMS, 197
VIRTUAL REALITY, 87, 192, 201, 203, 204, 205
VISCOSITY, 53
VISCOUS FLOW, 96, 97, 100, 512
VISIBILITY, 105
VISIBLE SPECTRUM, 240, 512
VISION, 185
VISUAL AIDS, 194
VISUAL FIELDS, 185
VISUAL PERCEPTION, 189
VISUAL STIMULI, 185, 209
VOICE COMMUNICATION, 77, 83
VOICE DATA PROCESSING, 80
VOLATILE ORGANIC COMPOUNDS, 319
VOLCANOES, 136, 143, 271, 272, 279, 305, 312, 321, 330, 331, 332, 333, 336, 337, 338, 339, 347, 371, 373, 374, 379, 419, 434, 500, 501, 515, 524, 527
VOLCANOLOGY, 140, 272, 279, 313, 317, 328, 329, 331, 333, 337, 338, 372, 373, 379, 399, 407, 418, 423, 434, 435, 439, 503, 511
VOLUMETRIC ANALYSIS, 339, 373
VOMITING, 163
VORTEX RINGS, 101
VORTICES, 2, 5, 96, 99, 101, 149

W

WAKEFULNESS, 181
WAKES, 2, 99, 455
WARFARE, 19
WARNING SYSTEMS, 17, 253
WARPAGE, 262
WATER, 121, 175, 280, 286, 311, 315, 370, 374, 376, 397, 417, 443, 467, 474, 483, 490, 493, 501
WATER CIRCULATION, 399
WATER FLOW, 126, 313, 375, 376
WATER MANAGEMENT, 122
WATER POLLUTION, 123, 133, 138, 139, 140, 246
WATER QUALITY, 139
WATER RESOURCES, 123
WATER TREATMENT, 246
WATER TUNNEL TESTS, 34

WATER VAPOR, 149
WATER WAVES, 124
WATERSHEDS, 121, 122
WAVE FRONTS, 103
WAVE FUNCTIONS, 232
WAVE PROPAGATION, 150, 157
WAVELET ANALYSIS, 220
WEAPON SYSTEMS, 19
WEAR, 112
WEAR TESTS, 115
WEATHER, 7, 122, 137
WEATHER FORECASTING, 100, 137
WEATHERING, 362, 383, 386, 397, 417, 418, 420, 447, 471, 473, 486, 518
WEBSITES, 511
WEIGHT REDUCTION, 110
WEIGHTLESSNESS, 35
WELDING, 60
WIDE AREA NETWORKS, 44
WIND (METEOROLOGY), 78, 151, 485, 486
WIND EFFECTS, 422, 485, 486, 491
WIND EROSION, 485
WIND MEASUREMENT, 153, 533
WIND PROFILES, 151
WIND TUNNEL MODELS, 28, 268
WIND TUNNEL TESTS, 3, 4, 20, 26, 28, 32, 33, 268
WIND TUNNELS, 3, 31, 33, 112, 491
WING PROFILES, 4
WINGS, 30, 119, 226
WINTER, 140
WIRELESS COMMUNICATION, 83
WORKLOADS (PSYCHOPHYSIOLOGY), 191
WORLD WIDE WEB, 252, 490

X

X RAY ANALYSIS, 433
X RAY ASTRONOMY, 260, 265, 534
X RAY BINARIES, 262, 265
X RAY DIFFRACTION, 360
X RAY FLUORESCENCE, 430, 448
X RAY SPECTROMETERS, 445
X RAY STARS, 534
X RAY TIMING EXPLORER, 260
X RAYS, 103, 238, 265, 533
X-43 VEHICLE, 26
XENON, 354, 495
XENON ISOTOPES, 380

Y

YELLOWSTONE NATIONAL PARK (ID-MT-WY), 471, 475
YTTRIA-STABILIZED ZIRCONIA, 58

Z

ZEOLITES, 415
ZINC ISOTOPES, 460
ZINC OXIDES, 241, 242
ZINC TELLURIDES, 240
ZIRCONIUM ISOTOPES, 377
ZODIACAL LIGHT, 450
ZONE MELTING, 291

Personal Author Index

A

Abbas, Richat, 176
Abbott, K., 429
Abbott, N., 418
Abdeldayem, H., 106
Abdeldayem, H. A., 70
Abdrakhimov, A. M., 487, 488
Abdul-Aziz, Ali, 53
Abe, Y., 335, 399, 424
Abels, A., 488
Abgrall, Remi, 216
Abreu, N. M., 458
Accomazzi, A., 365
Ackerman, Andrew, 154
Acquaviva, Cynthia S., 119
Acton, C. H., Jr., 426
Acuna, M. H., 298
Adams, Brian S., 228
Adams, J., 534
Adams, J. H., 107
Adams, J. H., Jr., 107
Adams, James H., Jr., 195
Adams, P. M., 428
Adler, M., 428
Adrian, M. L., 237
Adrian, Neal R., 175
Aeschliman, R., 441
Aftosmis, M. J., 211
Agee, C. B., 378, 392, 401, 464, 467
Agnor, C., 275
Agresti, D., 429
Aharonson, Oded, 375
Ahlstrom, Vicki, 194
Ahn, H. S., 107
Ahne, Rebecca, 20
Ahrens, Thomas J., 292, 384
Airieau, S., 352
Airieau, S. A., 370
Aittola, M., 333, 334, 488
Akimov, L. A., 520
Akiyemi, Agnes N., 133
Akridge, J. M. C., 362
Al-Badri, Z., 414
Albarhde, F., 377, 460
Albin, E. F., 317, 488, 489
Alexander, C. M. O, 459
Alexander, C. M. O. D., 483
Alexander, C. M. OD., 369, 380, 414
Alexander, M., 44
Alexeev, V. A., 489
Allamandola, L. J., 267
Allamandola, Louis, 265
Allamandola, Louis J., 233, 266
Allemand, P., 311, 323
Allen, C. C., 382, 470, 471
Allen, Carlton C., 477
Allen, J. S., 367
Allen, R. L., 274
Allie, M. S., 340
Allton, J. H., 433
Almeida, M., 366, 444, 496
AlZoubi, N. R., 54
Amari, S., 379
Amari, Sachiko, 380
Ambrosone, Christine, 165
Ambur, Damodar R., 51
Amelin, Y., 463, 479
Ameri, Ali A., 95
Amils, R., 440
Amoroso, P. J., 187
Amos, Denys, 188
Anantram, M., 239
Andersen, Paul, 72
Anderson, F. S., 334, 335, 386, 428
Anderson, H. W., 121
Anderson, J., 321
Anderson, J. A., 322
Anderson, J. L. B., 345
Anderson, John G., 312
Anderson, M. O., 16
Anderson, R. C., 305, 398, 425
Anderson, S. W., 465
Anderson, Todd, 144
Anderson, William R., 60
Andracchio, Charles R., 31
Andre, P., 264
Andrews, Earl H., Jr., 26
Angel, S. M., 415
Angelini, Lorella, 265
Angermiller, L., 367
Annexstad, J., 316, 447, 461
Anthony, C. R., 173
Antoine, L. A. G., 455
Antonenko, I., 336
Aoshima, Chiaki, 342
April, R., 423
Arai, T., 335
Arakawa, M., 468
Aramovich, C. J., 353
Arb, Harold A., 218
Archinal, B., 329
Archinal, B. A., 323, 434
Ardizzone, Joe, 100
Arkani-Hamed, J., 297
Arnaud, S. B., 179
Arndt, P., 448
Arnold, J. R., 306
Arnold, S. M., 54
Arnone, R., 127
Arrowsmith, J. R., 314
Arsenault, J. E., 184
Artemieva, N. A., 293, 345, 455
Arvidson, R. E., 322, 325, 416, 425
Ascaso, C., 392
Ash, R. D., 278
Asher, P., 415
Asher, P. M., 415
Ashley, A. J., 310, 341
Asner, Gregory P., 128, 135, 141
Asphaug, E., 275, 308, 430, 473
Assonov, S. S., 339, 505
Atkinson, Peter, 128
Atlas, Robert M., 100
August, R. A., 267
Augustin, M., 222
Aurel, Serb, 78
Austinson, Todd A., 31
Avakians, S., 412
Avci, R., 392, 393
Avdjushin, S. I., 138
Averkamp, T. F., 529
Avila, Joao, 244
Ayala Filho, A. L., 234
Ayers, J. Kirk, 153
Ayres, N., 455
Azovskiy, A. N., 456

B

Baaklini, George, 53
Baaklini, George Y., 118
Backeberg, Pamela Dawn, 191
Bada, J. L., 394, 459, 469
Badjukov, D. D., 489
Badjukov, Dmitry D., 350
Badler, Norman, 200
Baer, Lisa A., 174
Bailey, Delbert B., 7
Bailey, P., 123
Baillot, Yohan, 222
Baines, K., 284

Baker, A. A., 22
Baker, D. N., 148
Baker, L., 286
Baker, V., 305, 398
Baker, V. R., 374
Bakker, N. H., 213
Balakotaiah, Vemuri, 99
Balam, D. D., 474
Baliva, A., 426
Balme, M. R., 280
Baloga, S. M., 270, 334, 371, 406
Balogh, R., 368
Bamieh, Bassam, 118
Banda, Michael J., 162
Bandfield, J. L., 320, 409, 418
Bandiwala, S. I., 140
Banerdt, B., 315
Banerdt, W. B., 375, 503
Bank, T. E., 87
Banks, C., 106
Banks, C. E., 70
Bao, H., 370, 482
Baratoux, D., 311, 323
Barbero, E. J., 52
Bareket, Z., 109
Barlow, N. G., 348, 349, 365, 398
Barlow, Nadine G., 245
Barnard, A. H., 127
Barnouin-Jha, O., 307, 309, 422
Barnouin-Jha, O. S., 308
Barr, Amy C., 490
Barraclough, B. L., 395, 396
Barrat, J. A., 460, 461
Barrett, J. M., 322, 366
Barrington, David W., 70
Barrowman, James S., 5
Barsukova, L. D., 341
Bart, G. D., 354
Barth, Timothy, 216
Bartholy, J., 490
Bashindzhagyan, G., 534
Basilevsky, A. T., 333, 422, 490, 500, 504
Basilevsky, Alexander T., 279
Basu, Abhijit, 396
Baudenbacher, F. J., 484
Baumgartner, E. T., 425
Baumgartner, Neal, 186
Baur, H., 381, 502, 522
Bauschlicher, Charles W., Jr., 232, 233
Bayer, N., 219
Bazylinski, Dennis A., 392
Beachum, Norman L., 113
Beard, Brian L., 394
Beardmore, G., 498
Beaty, D. W., 493
Becerra-Fernandez, Irma, 256
Beck, A. R., 336
Becker, Andrew, 23
Becker, Jeff, 199
Becker, K., 324
Becker, K. J., 322
Becker, Luann, 120, 295
Becker, T., 329, 442
Becker, T. L., 321, 322, 434
Beckett, J. R., 277
Beegle, L. W., 469, 470
Beer, Jeremy, 185
Begault, Durand R., 192
Begelman, Mitchell C., 262
Behrendt, A., 153
Belian, R. D., 287
Beljin, M. S., 123
Bell, J. F., III, 281, 306, 307, 361, 363, 422, 486, 490, 493, 512
Bell, Jeffrey F., 309
Bell, N. S., 187
Bell, Terry L., 212
Bellingham, J. G., 215
Bellucci, G., 284
Belshaw, N. S., 278
Belton, M., 430, 435
Ben Othman, D., 460
Benjamin, Henderson, 215
Benjey, W. G., 139
Benner, L. A. M., 383
Bennett, John, 204
Bennett, Kelly W., 86
Bennett, V. C., 300
Benoit, P. H., 362, 490
Benson, David K., 235
Berczi, S., 368
Berczi, Sz., 397, 453, 491, 503
Berdichevsky, M., 356
Bergh, Christopher, 14
Bergmann, T., 127
Bergstrom, R., 143
Bergstrom, R. W., 142
Berman, D. C., 313, 420
Berman, Daniel C., 320
Berne, A., 131
Bernhard, Jennifer T., 82
Berni, Alessandro, 79, 80
Bernstein, G. M., 274
Bernstein, Max P., 263
Berry, F. J., 462
Berthoud, M. G., 361
Bertka, C., 297, 466
Bertrand, William T., 31
Besmehn, A., 379
Bessemer, David W., 200
Best, Scot, 83
Beutter, B. R., 189
Beyerlein, Steve, 62
Beyerlein, Steven, 62
Beyl, Caula, 139
Bhandari, N., 452, 481
Bhartia, P. K., 145
Bhat, I., 241
Bhattacharya, Pallab, 83
Bhattacharyya, Abhijit, 326
Bibring, J.-P., 284
Bieber, Pierre, 253
Bierhaus, E. B., 437
Billings, Lora, 161
Billings, Marcus D., 117
Bills, B. G., 439
Binder, A. B., 287, 298, 394, 395, 396, 443
Binienda, Wieslaw K., 56
Binns, P. J., 340
Binzel, R. P., 365, 389
Birczi Sz., 316, 520
Birczi, Sz., 443
Birenzvige, Amnon, 133
Birkhahn, R., 240
Bischoff, A., 368, 522
Bish, D. L., 433
Bishop, J. L., 418, 486
Bishop, Janice L., 528
Bismayer, U., 57
Blacic, J. D., 425
Blackketter, Donald, 62
Blain, Cheryl A., 126
Blake, J. B., 150, 231
Blakemore, Colin, 185
Blanche, James, 45
Blanco, A., 414
Bland, P. A., 286, 449, 456, 458, 460, 462
Blaney, D. L., 372, 410
Blankenship, D. D., 405
Blanot, D., 393
Blaser, Tammy M., 204
Bleacher, J. E., 313, 320, 325, 388, 526
Bleacher, Jacob E., 312
Bleamaster, L. F., III, 331
Blecka, M. I., 414
Bles, W., 181
Blewett, D. T., 288, 337, 394, 395, 407, 408, 440, 497
Blichert-Toft, J., 377
Blower, D. F., 109
Blue, J., 492
Bluemchen, T., 427
Blum, J. D., 371
Blundell, S., 321

Blunt, David, 20, 23
Boctor, N. Z., 483
Bodnar, R. J., 352, 417, 459
Boehm, P., 129
Bogard, D. D., 390, 423, 463
Bogdanoff, David W., 27, 42
Boggs, D. H., 343
Bolon, C., 344
Bondarenko, N. V., 329
Bonino, G., 481
Bonnin-Mosbah, M., 359
Bontemps, S., 264
Bookamer, R., 515
Borg, J., 448
Borg, L., 336
Borg, L. E., 355, 482, 483
Borisov, N., 339
Borja-Aburto, V. H., 140
Boroughs, Lydia L., 338
Bos, J. E., 181
Bose, D., 234
Bose, Deepak, 78, 237
Boss, A. P., 273
Boston, P. J., 475
Botha, Gavin J., 3
Bots, M. J., 244
Botta, O., 459, 469
Bottke, William, 320
Boubault, F. R., 432
Boucherie, R. J., 219
Boudjouk, P., 414
Bourcier, W. L., 369
Bourke, M. C., 315, 387
Bourke, R. D., 426
Bourot-Denise, M., 462
Bovik, Alan C., 76
Bowden, E., 310
Bowen, James, 173
Boyall, N. M., 242
Boyle, Michael R., 220
Boynton, W. V., 306, 358, 363, 390, 523
Bradley, B. A., 271, 387, 526
Bradley, J. P., 412, 413
Bradshaw, Peter, 94
Brake, S. S., 472
Brandon, A. D., 400
Brandstaetter, F., 359, 389, 447, 509, 512
Brandstatter, F., 508
Brandt, D., 476
Branson, Mark D., 125
Braswell, Bobby H., 141
Braun, Scott A., 154
Brearley, A. J., 458, 476
Brearley, Adrian J., 277, 370, 477
Bregman, J., 264
Bregman, Jesse, 265, 266
Breizman, B. N., 236
Brennan, Peter J., 14
Brenner, Marty, 219
Brian, A. W., 330
Bridges, J. C., 427, 500
Bridges, N. T., 331, 376, 491
Briggs, G., 493
Brigmon, R. L., 471
Britt, D. T., 362, 363, 382, 491
Broda, James E., 158
Brooks, F. D., 340
Brooks, S. M., 326
Broomfield, Clarence A., 171
Brown, Daniel, 226
Brown, Dennis, 222
Brown, Martha C., 26
Brown, P. G., 474
Brown, Philip, 151
Brown, R., 284
Brown, R. H., 344, 383, 474
Brown, Ross, 116
Brown, Travis A., 18
Browne, M. C., 430
Browning, L., 369
Browning, Lauren, 370
Browning, R., 445
Brownlee, D. E., 382, 412, 449
Bruce, T. S., 453, 457
Brueckner, J., 306, 409
Bruekner, J., 363
Bruggeman, Ben, 250
Brundick, Frederick S., 201
Brunetti, B., 446
Brunsell, E., 367
Buchanan, P. C., 454, 463
Buchwald, V. F., 462
Buehler, M., 525
Buehrle, Ralph D., 51, 115
Buffler, A., 340
Bull, B., 12
Bull, Jeff, 15
Bullock, M. A., 411, 524
Bulmer, M. H., 379, 526
Bunch, T. E., 120
Buratti, B., 284
Burba, G. A., 492
Burbine, T. H., 306, 363, 365, 389
Burch, J., 237
Burchell, M. J., 311, 449
Burival, Zdenek, 251
Burki-Cohen, Judith, 31
Burnett, D. S., 301
Burr, D. M., 313
Burton, Dennis T., 139
Bus, S. J., 365
Busarev, V. V., 492
Buseck, P. R., 291, 371, 459
Buseck, Peter R., 290
Busemann, H., 381
Bush, Harold G., 119
Bussey, Ben, 306
Bussey, D. B. J., 307, 308, 441
Bussey, D. Ben J., 364
Bustamante, Mercedes M. C., 128, 135, 141
Buthelezi, Z., 340
Butler, B. J., 329
Butman, S., 426
Butterfield, Ansel J., 15
Butterworth, A. L., 382, 449
Byeon, C. C., 60
Byerly, William, 145
Byrne, M., 471
Byrnes, J., 379
Byrnes, Jeffrey M., 330
Byun, Chansup, 6

C

Cabrol, N. A., 315, 377
Caddy, B., 316
Caffee, M. W., 298, 462, 480
Cahill, J. T., 341, 521
Cai, L., 242
Cairns, B., 425
Caldwell, William F., 35
Calvin, W. M., 418
Camanho, Pedro P., 115
Camara, F., 342
Cambier, Jean-Luc, 42
Cambon, Claude, 99
Cameron, A. G. W., 273
Campbell, A. J., 291, 464
Campbell, B. A., 379
Campbell, Bruce A., 278
Campbell, D. B., 383, 492
Campbell, Donald B., 278
Campbell, J. K., 426
Campbell, James R., 109
Campins, H., 475
Camy-Peyret, C., 517
Canacci, Victor A., 33
Candler, Graham V., 3
Canfield, Dennis V., 61
Cano, Robert J., 63
Cano, Roberto J., 51
Cantor, B. A., 492
Canup, R., 275
Canup, R. M., 275

Cao, Wei, 204
Capaccioni, F., 284
Caplinger, M. A., 492
Caputo, Daniel F., 233
Cardiff, M., 450
Cardinal, R. D., 474
Carlson, R., 372, 373
Carlstrom, J. E., 263
Carr, L. W., 102
Carrico, C. M., 142
Carroll, K. A., 474
Carter, B. L., 316
Carter, Lynn M., 278
Carter, Susan, 127
Caruso, Paul A., 386
Cash, Michael D., 264
Cassell, Alan, 239
Castagnoli, G. Cini, 481
Castano, R., 425
Castellano, Timothy P., 105
Cataldo, V., 371, 434
Catalina, Adrian V., 66
Catallo, W. J., 156
Catchings, R. D., 453, 457
Catling, D. C., 420
Catrambone, Richard, 206, 245
Cattell, C. A., 147
Caudle, D., 129
Cavendish, T. A., 419
Cecchine, Gary, 173
Cech, V., 491
Celarier, Edward A., 145
Cerroni, P., 284
Cha, Soyoung Stephen, 236
Chabot, N. L., 378, 401, 464, 467
Chadwick, B., 295
Chafetz, H. S., 471, 475
Chakrabarti, S.andip K., 326
Chalkley, Peter, 56
Chamberlain, Sam, 82
Chambers, J., 447
Chan, William M., 100
Chandrasekhara, M. S., 102
Chang, C. C. Y., 159
Chang, D.-E., 155
Chang, J., 107
Chang, Ma M., 177
Chang, S., 267
Chang, S. C., 227
Chang, Sin-Chung, 229
Chang, T. Y., 159
Chapman, C. R., 363, 382, 437
Chapman, M. G., 271
Charnley, S. B., 382
Chasnov, Jeffrey R., 99
Chattot, JJ, 223
Chaturvedi, Arvind K., 61
Chauhan, B. P. S., 414
Chaussidon, M., 303, 359
Chell, G. G., 25
Chen, Chonglin, 84
Chen, J. H., 300, 478, 479
Chen, James, 258
Chen, M., 310, 464
Chen, R. F., 158
Cheng, A., 308, 363, 382
Cheng, A. F., 308, 309
Cheskis, Leland M., 84
Chevallier, L., 455
Chevrel, S., 395, 432, 442, 444
Chicarro, A. F., 426
Chikami, J., 359, 492
Chilingarian, A., 534
Chillier, Xavier D. F., 233
Chin, M., 141
Chio, C. H., 416
Chipera, S. J., 433
Chipot, C., 175
Chiu, W. K., 22
Chizmadia, L. J., 458
Choblet, G., 466
Choenni, Sunil, 250
Choi B.-G., 302
Choi. Michael K., 45
Chou, Shu-Hsien, 100
Choy, Yuen Ching, 87
Christensen, P., 320, 409, 411, 419, 420, 421
Christensen, P. R., 366, 484
Christeson, G. L., 457
Chuang, F. C., 437, 493
Chun, Donghoon, 85
Chyba, C. F., 404, 405
Ciesla, F. J., 276, 355
Cintala, M. J., 454, 456, 464
Cisarova, I., 465
Ciszak, Ewa, 238
Claeys, P., 295
Clark, B. C., 382
Clark, B. E., 307, 361, 383
Clark, Beth, 306
Clark, Lorenzo R., 226
Clark, P. E., 363
Clark, Pamela E., 363
Clark, R., 284
Clark, R. N., 289, 409
Clark, Robert L., Jr., 30
Clarke, Eric, 62
Clarke, J. T., 530
Clayton, D. D., 380, 511
Clayton, J. Louie, 49
Clayton, R. N., 287, 341, 379, 408, 461, 478, 498, 508, 517
Cleek, Tammy M., 182
Clemett, S. J., 469, 470
Clemett, Simon J., 392, 396
Clenet, Michel, 85
Cleveland, Cory C., 141
Cliff, B., 353
Clifford, S. M., 493
Cline, A. D., 184
Cloutis, E. A., 410, 415, 416, 429, 432, 493, 494
Co, Elizabeth L., 180
Coath, C. D., 393
Coats, Joel R., 144
Cobb, S. D., 241
Cobrinik, David, 164
Cocchiaro, J. E., 47
Cochran, A. L., 385
Cochran, R. Anita, 194, 195
Cochrane, C. G., 278
Cockell, C. S., 472, 476
Cockell, Charles S., 282
Cody, G. D., III, 369
Cohen, B. A., 298, 341, 523
Cohen, Daniel M., 18
Cohen, J. L., 440
Cohen, Jack S., 231
Colantonio, Ron, 7
Colaprete, Anthony, 529
Coleman, D. J., 50
Coleman, M. L., 47
Collins, G. C., 282, 328
Collins, G. S., 346
Collins, Geoffrey, 328
Colombo, J., 170
Colomy, John, 12
Colson, R. O., 339
Colvin, T., 329
Colvin, T. R., 323, 434
Colwell, J. E., 339
Colwell, W. B., 524
Comstock, R. L., 334
Connell, John W., 68
Connolly, B. J., 63
Connolly, H. C., Jr., 276, 301
Connolly, Harold C., Jr., 355
Considine, David B., 137
Consolmagno, G. J., 362, 363
Conti, Diane, 213
Cook, A. C., 364
Cook, Anthony C., 314, 441
Cook, D., 324
Cook, D. A., 322

Cooper, B., 450
Cooper, C. D., 410, 517
Cooper, Keith D., 204
Cooper, Larry, 365
Cooper, Michael K., 176
Copnstable, Stephen, 186
Coquilla, Rachael V., 268
Coradini, A., 284
Corbett, E. S., 122
Cord, A. M., 432
Corso, Lawrence M., 116
Cosarinsky, M., 370
Costard, F., 282, 312
Cotton, R., 152
Courteney, Hazel, 10
Cousins, Liz, 259
Cowen, M. B., 87
Cox, Lea, 394
Craddock, R. A., 337
Craddock, Robert A., 314, 375
Craig, M., 429
Craven, P., 237
Cravens, J., 237
Crawford, D. A., 377
Crawford, Kevin, 249
Crawford, Ronald, 72
Creech, Stephen D., 36
Creighton, J. A., 449
Cremers, D., 425, 431
Cressey, G., 449, 456, 460
Crider, D. H., 397
Crisp, J., 428
Crowder, James P., 3
Crowley, M., 127
Crown, D. A., 271
Crown, David A., 317, 330, 375, 387
Crozaz, G., 478, 481
Crozaz, Ghislaine, 298, 389
Cruden, B., 234
Cruikshank, Dale P., 264, 528
Crumpler, L. S., 423, 429
Cudney, Harley H., 110
Cuntz, Manfred, 532
Curchin, J. M., 289
Curran, Gordon, 210
Curreri, Peter A., 66
Curry, William B., 158
Curtin, Amy, 21
Cutter, Gary, 173
Cuzzi, J., 274, 283, 398
Cyr, K. E., 433

D

Daanen, H. A. M., 193
DAgostino, Mark, 103
Dahl, J. M., 293
Dahleh, Mohammed, 118
Dahmani, Rachid, 86
Dai, Jie, 171
Dai, Z. R., 412
Dali, Hans J., 17
DalleOre, C. M., 528
DalleOre, Cristina M., 264
Dalrymple, G. B., 299
Dalton, J. B., III, 289
Daly, M. E., 284
Danieshafsky, S., 167
Dannelly, H. K., 472
Dasappa, Srini, 59
Daubar, I. J., 347
Dauro, Vincent A., Sr., 260
Davidson, K., 355
Davies, A. G., 347, 372, 373, 434
Davies, I., 254
Davies, J. K., 383
Davies, M., 329
Davies, M. E., 323, 434
Davila, Carlos G., 115
Davis, A. M., 301, 358, 379
Davis, Curtiss O., 127
Davis, D. R., 275, 474
Davis, Sanford, 101
Davis, Thomas J., 14
Daydou, Y., 432, 442
De Wald, Daryll B., 170
Dean, Thomas, 218
Dearing, M. G., 33
Deb, Somnath, 24, 81, 199, 207
DeBaer, J., 447
deBergh, C., 496, 528
deBergh, Catherine, 264
DeCarli, P. S., 310
DeCarlo, F., 414
deGraaf, B., 77
deGroh, Henry C., III, 54
DeHon, R. A., 388
deJong, A. L., 161
deJong, C. A. F., 217, 227
Delacourt, C., 311, 323
Delaney, J. R., 404
Delaney, J. S., 378, 414, 431, 432
DeLay, Tom K., 74
Delest, M., 209
DelFrate, John H., 34
DelGenio, Anthony D., 136
Dellmyer, Dan, 32
Delory, G. T., 424
Delzeit, Lance, 239
DeMaio, Joe, 189
DeMaria, G., 446
Demidova, S. I., 494
DeMott, P. J., 152
deMoura, Marcelo F., 115
Demoz, Belay, 151
Demura, H., 445
Deneault, E., 380
DeNicola, P., 451
Denn, Fredrick M., 125
Denninghoff, Kurt, 182
Denny, J. E., 511
deRuiter, M. M., 209
Desal, S., 530
Desch, M. D., 424
Desch, S. J., 276, 343
Desnoyers, D. W., 279, 332
Deutsch, A., 447, 451, 494, 506
Deutschmann, Julie, 45
DeVincenzi, Donald L., 531
DeVivo, Adrian, 207
deVries, M. P., 122
deVries, S. C., 192
deVries, S. T., 379
DeWet, A., 526
Dexter, H. Benson, 51
dHendecort, L., 496
dHendecourt, L., 448
diCamillo, M., 385
Dickey, J. O., 343
Dickinson, T. L., 389
Dietz, Brian J., 68
Dikov, Yu. P., 269
Dilks, Lillian, 84
Diller, Thomas E., 25
Diosy, T., 491
DiSimone, S., 318
diTada, M. L., 479
Djomehri, M. J., 96
Dlugach, J. M., 494
Doelling, David R., 153
Dohm, J. M., 305, 374, 398
Doi, Noriyoshi, 113
Dolezalova, Hana, 161
Dollfus, A., 492
Dolnikov, G., 516
Domagala, Chuck, 24
Dombard, Andrew J., 364
Domeneghetti, M. Chiara, 342
Domergue-Schmidt, N., 431
Domingue, Dominque, 306
Domonkos, Matthew T., 48
Dones, L., 275

Dong, Wei-Dong, 360
Donovan, Joseph, 177
Doolan, Con, 36
Dorairaj, Mahendra B., 53
Dorney, Daniel J., 46
Dorris, G., 130
Dorris, James R., III, 278
Dotsenko, R., 179
Douglass, Anne R., 137
Doute, S., 372, 373, 496
Dowek, Gilles, 207
Dowell, Earl H., 30
Doyle, Laurance, 105
Drabkin, Harry, 179
Drake, B. G., 382
Drake, M. J., 401
Draper, D. S., 378, 467
Draper, David S., 351
Dreibus, G., 409, 483
Dressler, B. O., 309, 454
Driesenaar, Freek N., 249
Drullman, R., 225
Drury, L., 534
Druyan, Leonard M., 137
Duan, Chun-Gang, 65
Dube, Michael J., 68
Dubovik, O., 141
Dubovik, Oleg, 149
Dubrovinsky, L., 310
Dubuffet, F., 435
Ducati, M. B. Gay, 234
Ducceschi, C., 367
Dudley, Kenneth L., 210
Dudley, M., 242
Duffy, P. D., 121
Duke, M., 408, 444, 496
Dunand, D. C., 284
Duncan, A., 472
Duncan, M. J., 275
Duncan, R. A., 299
Dunham, D., 515
Dunham, William R., 360
Dunkin, S. K., 338, 445, 496
Dunn, J. M., 60
Dunn, Richard S., 194
Duprat, J., 287, 447, 510, 511
Durakiewicz, T., 469
Durda, D. D., 293, 494, 524
Durose, K., 242
Dusenbery, P. B., 367
dUston, C., 443, 444
Dutton, Scott A., 76
Duxbury, T. C., 323
Dworkin, Jason P., 263
Dyar, M. D., 378, 431, 432
Dypvik, Henning, 347

E

Ebel, D. S., 300
Ebihara, M., 371, 462
Ebisawa, N., 369
Eck, Stephen, 166
Economou, T., 408, 516
Edgett, K. S., 319, 485, 495
Edmunson, J., 355
Edwards, Cliff, 11
Edwards, K., 441
Edwards, Kay, 364
Edwards, L. E., 453
Egorov, N., 534
Eichenberg, Dennis J., 85
Eichhorn, G., 365
Eischeid, Todd M., 183
Ekholm, A. G., 439
Ekimov, E., 57
ElGoresy, A., 310, 382
Eliason, E. M., 321, 322, 366, 442
Eliaz, N., 60
Eliezer, D., 60
ElkinsTanton, L. T., 289
Elphic, R. C., 394, 395, 396, 443, 444
Ely, J. C., 288, 342, 349, 482
Emery, J. P., 474
Emry, S. A., 453
Emry, S. R., 457
England, Anthony W., 105
Engrand, C., 287, 413, 447, 498, 510, 511
Ennico, Kimberly, 261, 265, 266
Enright, M. P., 25
Envia, Edmane, 229
Erlebacher, G., 88
Ernst, R. E., 279, 332
Ernst, Thomas M., 167
Ertel, W., 401
Espinosa, Horacio D., 52
Esposito, L. W., 326
Esquerdo, G., 398
Essin, A. M., 62
Estrada, P. R., 283
Eugster, O., 299, 478
Euripides, P., 237
Evans, JuliAnn, 34
Evans, K. Franklin, 151
Evans, L. G., 306, 363
Evans, N. D., 422, 431

F

Fabriczy, A., 491
Faestermann, T., 480
Fagan, T. J., 506
Fagents, S. A., 439, 498
Fahey, A. J., 353
Fahey, Frederic, 175
Falgarone, E., 262
Fanale, F. P., 372
Farmer, J. D., 313
Farmer, W. L., 190
Farquhar, J., 287, 352, 370, 482
Farrand, W. H., 282, 321, 367, 486, 490
Farrar, K. S., 328
Farrell, W. M., 424, 529
Fasanella, Edwin L., 116, 117
Fazely, A., 534
Feary, Michael, 13
Fegley, B., Jr., 373
Fei, Y., 297, 402, 464, 466
Feldman, M. P., 259
Feldman, V. I., 495
Feldman, W., 395, 442, 443, 444
Feldman, W. C., 287, 394, 395, 396
Feng, N. S., 113
Fennell, J. F., 148, 150, 231
Fenton, A., 425
Fernandez-Remolar, D. C., 440
FernandezNiello, J. O., 479
Ferrare, Richard A., 149
Ferrier, Brad S., 154
Ferris, J., 305, 398
Ferris, J. C., 374
Ferris, M., 425, 431, 515
Ferro, D., 446
Feser, M., 412
Feth, S., 240
Field, Robert L., 157
Fifield, L. K., 479
Figueredo, P. H., 436, 437, 493
Fincke, E. M., 289
Fink, Bruce K., 53
Finnegan, D., 315
Fischer, C., 25
Fisenko, A. V., 495
Fishbaugh, Kathryn E., 318
Fisher, Bruce D., 4
Fisher, David F., 4
Fisher, Diane K., 365
Fisher, Jeffrey W., 143, 176
Fisher, Jesse L., 346
FitzCoy, Norman, 110
Floss, C., 478
Floss, Christine, 298, 360, 389

Flynn, Connor J., 109
Flynn, G. J., 285, 357, 412, 413, 448
Flynn, L., 434
Foeldi, T., 397
Fogel, Robert A., 360
Foing, B. H., 366, 444, 496
Foldi, T., 368, 443
Foley, C. N., 408
Folk, Robert L., 476
Follen, Gregory J., 204
Fonti, S., 314, 414
Foote, M., 526
Ford, H. A., 475
Forget, F., 282
Forney, P. B., 410
Forni, O., 496, 508
Forrester, David, 23
Forsyth, Graham F., 76, 187
Fossen, Haakon, 305
Fowell, M., 496
Fowler, Laura D., 125, 131, 132, 135, 146, 152
Fox, Peter, 185
Fox, W., 224
Franchi, I. A., 286, 357, 361, 382
Frank, L. A., 148
Franke, Richard, 219
Frankle, S. C., 516
Franklin, B. J., 374
Frantz, Brian D., 43
Franz, Geoffrey A., 314
Frasier, M., 122
Frawley, J. J., 271
Frazier, D., 106
Frazier, D. O., 70
Freeman, J., 523
Freitas, K. A., 473
French, B. M., 309
French, D., 129
Frey, E. L., 305
Frey, H., 316
Frey, H. V., 305, 366
Frey, S., 298
Friedmann, E. I., 392
Friedmann, Peretz P., 29
Friedrich, J. M., 463
Frischauf, N., 496
Frith, Peter, 27
Fritts, David C., 149
Frumkin, Michael, 216
Fujimaki, H., 360
Fujimura, A., 445, 446
Fulakeza, Matthew, 137
Fuller, E. R., 527

G

Gabb, T. P., 64
Gaddis, L., 407, 408, 442, 492
Gaddis, L. R., 321, 337
Gaetani, G., 402
Gaffey, M., 307, 363, 384
Gaffey, M. J., 307, 309, 361
Gaffey, Michael J., 383
Gaillard, A. W. K., 190
Gaines, J. K., 473
Gal-Solymos, K., 453
Galea, S. C., 22
Galimov, E., 444, 496
Gallagher, D., 237
Gallagher, D. L., 44
Gallagher, Michael, 12
Gallino, Roberto, 380
Gallo, Steven M., 210
Galy, A., 278
Gander, Philippa H., 180
Gandhok, G., 457
Ganguly, J., 342
Ganti, T., 503
Ganushkina, N., 148
Garbe, G. P., 44
Garcia, D., 348
Garcia, P. A., 366
Garcia, Roberto, 97
Gardner, Henry S., 139
Garg, Vijay K., 95
Garofalo, D., 124
Garrison, D. H., 390, 463
Garry, J. R. C., 327
Garter, M., 240
Garton, Stephen, 139
Garvin, J. B., 271, 308, 309, 525
Gary, G. Allen, 533
Garzarella, A., 385
Gasnault, O., 395, 396, 443, 444
Gasnault, O. M., 395
Gatski, T. B., 94
Gautason, B., 494
Gayda, John, 65
Geballe, T. R., 528
Geballe, Thomas R., 264
Geelen, Ghislaine, 183
Geiss, Kevin T., 158
Geissler, P., 372, 403, 435, 439, 478
Geissler, P. E., 435
Geissler, Paul, 438
Gektin, Yu. M, 496
Geller, Marvin A., 77
Gendaszek, Andrew S., 312
Genetay, I., 396, 443, 444
Genge, M. J., 413
Gentry, Bruce M., 151
George, J. A., 493
George, Jacob, 157
Gerasimov, M., 516
Gerasimov, M. V., 269
Gerdenich, Michael J., 394
Gerhold, Carl H., 226
Geser, Alfons, 207
Gessler, P., 523
Gesztesi, A., 503
Getoor, Lise C., 76
Ghail, R. C., 279, 521
Ghail, Richard, 283, 332
Ghatan, G. J., 321
Ghatan, Gil J., 500
Ghosh, A., 384
Ghosh, M., 415
Gibb, Allan, 82
Gibbons, H. L., 497
Gibson, C., 251
Gibson, E. K., 353
Gibson, E. K., Jr., 466
Gibson, Everett K., 392
Gibson, Gary G., 125
Gibson, R. L., 309, 310, 341, 451, 454
Gibson, Walter, 238
Gierens, Klaus, 153
Gierlotka, S., 57
Giese, B., 282, 328, 497
Giese, Bernd, 328
Giguere, J. S., 17
Giguere, T. A., 440, 497
Gillespie, John W., Jr., 53
Gillet, P., 402, 461
Gillet, Ph., 310
Gillis, J. J., 338, 395, 441, 506
Gilmore, M. S., 348
Gilmour, I., 286, 357, 382
Gilmour, J. D., 354
Gilpin, L. A., 466
Ginoux, Paul, 141
Giorgini, J. D., 383
Gitlin, A., 329, 442
Gitlin, A. R., 434
Gladstone, G. R., 530
Glasgow, J. K., 59
Glass, B. J., 456
Glass, B. P., 294, 451
Glavin, D. P., 459, 469
Glaze, L. S., 270, 334, 371
Gleason, K., 524
Glotch, T. D., 420
Gochberg, Lawrence A., 98
Godwin, A., 447

Goetzl, Edward J., 161
Gohn, G. S., 453, 457
Goldberg, Robert K., 55
Golden, D. C., 354, 418, 466
Golden, D. M., 62
Goldman, M. R., 457
Goldsby, D. L., 284, 327
Goldsmith, John E. M., 149
Goldstein, J. I., 291
Goldstein, R., 530
Golomb, Beatrice, 173
Golombek, M. P., 304, 305, 422, 428, 485
Goltz, D., 415
Golubeva, L. F., 497
Golubkov, S., 534
Gomes, Carla P., 198
Gomez, Rebecca L., 190
Gomez, Susan, 13
Gonsalez, Jose C., 33
Gonzalez, Richard R., 185
Goodburn, D. P. J., 208
Goodrich, C. A., 481
Goodrich, Cyrena Anne, 350, 351, 390
Goodwin, S., 112
Gor, V., 425
Gordaninejad, Fararmarz, 112
Gordon, Dan, 62
Gorenstein, P., 306, 363
Gorevan, S., 382
Gorguze, D. S., 170
Gorin, V. D., 489
Gorla, R. S. R., 26
Goswami, J. N., 303, 358
Goto, K., 348
Goudy, C. L., 313
Gounelle, M., 285, 287, 369, 413, 447, 498, 510, 511
Gouthro, Linda D., 182
Govindan, T. R., 78, 237
Govoni, J., 446
Gowda, Chandrakanth H., 64
Goyal, Vijay K., 117
Grabau, John H., 158
Grady, M. M., 361, 413, 427, 449, 517
Grady, Monica M., 286
Graf, Hans-F., 149
Graff, T. G., 421, 512
Graham, G. A., 449
Graham, J. Bart, 35
Granahan, J. C., 372
Grande, M., 444, 445
Grant, C. S., 365
Grant, J. A., 315, 374, 386, 399
Grasby, S., 471
Grasset, O., 284, 466
Grasza, K., 242
Graup, G., 310
Gray, G. M., 60
Grebenyuk, V., 534
Greeley, R., 313, 314, 421, 433, 436, 437, 439, 485, 491, 493, 498
Greeley, Ronald, 367, 485
Green, L. R., 122
Greenberg, R., 403, 435, 439, 468, 473, 478
Greenberg, Richard, 438
Greene, Thomas, 265, 266
Greenlaw, P. D., 131
Greenleaf, J. E., 183
Greenwood, J. P., 393
Gregg, T. K. P., 271, 313, 526
Grego, L., 263
Gregory, Kevin B., 180
Greshake, A., 498
Grey, I. D. S., 311
Grier, D. G., 414
Grier, Jennifer, 320
Grieve, R. A. F., 454
Griffin, Lisa, 97
Griffin, Lisa W., 46
Griffith, Jon B., 178
Griffiths, Jim, 72
Grimm, R. E., 315
Grin, E. A., 315, 377
Grokhovsky, V. I., 456
Grosfils, E. B., 279, 313, 320, 321, 325, 332, 388, 507, 526
Grosfils, Eric B., 312
Grossman, Bernard, 202
Grossman, Jeffrey N., 277
Grossman, L., 285, 300
Grosveld, Ferdinand W., 51
Groutage, Dale, 219
Grove, T. L., 289, 336, 390, 419
Gruden, James M., 80
Grugel, Richard N., 232
Grunthaner, F., 469, 525
Grzanka, E., 57
Gu, C., 138
Gu, Zu-Han, 69
Guan, Y., 287, 370
Gubarev, Mikhail, 238
Guertin, M., 415
Guest, J. E., 330
Guewa, John R., 210
Guidry, S. A., 471, 475
Guinness, E. A., 322, 416
Guisado, Raul, 173
Guleyupoglu, Suleyman, 203
Gulick, V. C., 365, 376
Gulick, Virginia C., 245
Gunasingha, R., 534
Gunderson, J. L., 157
Gundo, Daniel P., 34, 178
Gupta, Neelam, 86
Gurnett, D. A., 529
Gurnett, Donald A., 532
Gursul, Ismet, 1
Guruswamy, Guru P., 6
Guyot, F., 402
Gyekenyesi, Andrew L., 118

H

Haack, H., 292
Haack, Henning, 390
Haas, Brian L., 92, 98
Haberle, R. M., 485
Haberle, Robert M., 485
Hackwell, J. A., 416, 428
Hafez, M. M., 223
Haftka, Raphael, 206
Haftka, Raphael T., 110
Hagermann, A., 445, 446
Hagerty, J., 289, 397
Hagerty, J. J., 336
Hahn, E. J., 113
Hahn, J. M., 450
Haldemann, A., 428
Hale, A. S., 408
Halekas, J. S., 298
Hall, M. C., 8
Hallenbeck, S. L., 449
Hallet, B., 500
Hallet, Bernard, 319
Halliday, A. N., 344, 377
Halliday, D., 242
Hallock, Zachariah R., 157
Haltrin, Vladimir I., 157, 235
Halverson, H. G., 121
Hamabe, Y., 473, 518
Hamid, S., 251
Hamilton, V. E., 271, 409, 419, 421
Hammer, C., 447
Hamza, Rida, 23
Han, Jie, 239
Hand, K., 476
Hansel, R., 105
Hansen, G. B., 283, 404, 424
Hansen, V. L., 279, 330, 331
Hapke, B., 362
Hapke, B. W., 408
Harbert, William, 375
Harcke, L. J., 329
Hardersen, P. S., 307, 384

Hardman, William, 20
Hardy, J. R., 65
Hare, T., 305, 398, 429
Hare, T. M., 322, 324
Hargitai, H., 316, 499
Hariharasarma, M., 60
Harker, D., 264
Harmon, B., 107
Harmon, J. K., 329
Harper, Jeffrey, 168
Harper, Jennifer, 34
Harris, A. J. L., 434
Harris, B. A., 332
Harrison, K. P., 315
Harrison, S. A., 221
Harrison, William M., 256
Hartley, S., 142
Hartmann, W. K., 313, 398, 399, 420
Hartmann, William K., 264, 320
Haruyama, J., 445
Harvey, R. P., 292, 413
Hash, D., 234
Hasiotis, S. T., 472
Haskin, L. A., 298, 340, 429, 499, 506
Haskin, L. H., 507
Haskin, Larry A., 299, 393
Hasler, A. F., 122
Hassenpflug, F., 12
Hassing, R., 447
Hastings, L. J., 37
Hatton, C., 455
Hauber, E., 427
Hauck, Steven A., II, 364
Hauri, E., 459, 483
Hausman, Scott A., 152
Hawke, B. R., 288, 406, 407, 440, 497
Hawke, B. Ray, 337, 407
Hayakawa, M., 445, 446
Hazeltine, Richard D., 236
Head, J. N., 311
Head, J. W., 279, 332, 497, 499, 500, 501, 505
Head, J. W. III, 527
Head, J. W., III, 269, 270, 272, 281, 282, 295, 306, 312, 319, 321, 325, 328, 330, 337, 403, 408, 427, 438, 520, 524
Head, James W., 500
Head, James W., III, 272, 279, 318, 329
Head, Joseph W., III, 305
Healing, Richard F., 75
Heather, A., 222
Heather, D. J., 338, 366, 444, 496
Heaven, Michael C., 108
Heber, V. S., 502
Hebert, James R., 186
Hechler, M., 426
Hecht, M. H., 376, 525
Hedgecock, J., 470
Hegyi, S., 368, 491
Heidrick, J., 58
Heikenfeld, J., 240
Heil, M. C., 8, 190
Heil, Michael C., 248
Heil, S. K. R., 190
Heilman, Lorraine A., 149
Heineck, J. T., 345
Heineck, James T., 2
Heller, Don, 199
Heltsley, Fred, 31
Henderson, M. G., 147, 231
Henkel, T., 368
Herbert, M. S., 340
Herd, C. D. K., 351, 353, 482
Herd, R. K., 356
Hergert, D., 32
Herkenhoff, K. E., 280, 376
Herman, I., 209
Herman, Jay R., 145
Herpers, U., 380
Herr, K. C., 410, 416, 428
Herrick, R. R., 311, 349
Herzog, G. F., 414, 451, 465, 480
Hess, Andrew, 20
Hess, M., 153
Hess, P. C., 297, 336, 502
Hesthaven, J. S., 217
Hewins, R. H., 290
Heymsfield, Andrew, 151
Hibbitts, C. A., 283, 404
Hicks, T. L., 367
Hiesinger, H., 269, 321, 325, 337, 427, 501
Higa, M., 445, 468
Hildebrand, A. R., 474
Hill, D. H., 390
Hill, H. G. M., 412
Hill, H. H., 469
Hill, Hugh G. M., 391
Hill, Steven C., 49, 173
Hillier, Andrew C., 240
Himansu, A., 227
Hindson, William, 24
Hinrichs, J. L., 307, 509
Hirai, K., 358
Hirata, N., 445
Hiroi, T., 362, 473, 518
Hittle, J. D., 433
Hiyagon, H., 358
Hlavka, Dennis L., 109
Ho, Yu-Chi, 80
Hobbs, P. V., 142
Hochstein, Lawrence I., 178
Hoder, Douglas J., 13
Hodges, Dewey H., 5
Hoefen, T. M., 409
Hoeflaak, M., 63
Hoerz, F., 411, 456, 464
Hoffman, E., 458
Hoffman, N., 272, 313, 318, 423, 425, 502, 503
Hoffmann, H., 427
Hofmann, Hans W., 251
Hofmann, Marko, 251
Hogan, R. C., 385
Hogenboom, D. L., 284, 505
Hohenberg, C. M., 370, 381
Holba, A., 491
Holben, B., 141, 142
Holden, Ronald D., 195
Holder, G. P., 263
Holland, G., 353
Hollenbach, David, 263
Holler, Stephen, 173
Holloway, C., 112
Holloway, J. R., 420
Holman, Mathew J., 262
Holsapple, K. A., 384
Holtzmann, J., 407, 440
Holzapfel, W. L., 263
Hood, L. L., 276, 297, 298, 355
Hooker, Stanford B., 137
Hooks, Daniel E., 240
Hoover, R., 469
Hoppa, G. V., 403, 478
Hoppe, P., 379, 382
Horak, Jaroslav, 252
Horan, M. F., 400
Horanyi, M., 339
Horneck, G., 472
Horton, K. A., 431
Hortswood, M., 460
Horvath, A., 503
Horwath, John C., 80
Horz, F., 448
Hosman, R. J. A. W., 181
Hospodarsky, G. B., 529
Hospodarsky, George B., 532
Housen, K. R., 384
Housley, R. M., 458
Houtsma, Maurice A. W., 221
Houyoux, M. R., 139
Howard, A. D., 315
Howard, Alan D., 314
Howard, P. L., 112

Howard, Paul L., 114
Howell, E. S., 383, 474
Howell, R. R., 373
Howington-Kraus, E., 323, 324
Hoyniak, Daniel, 3
Hua, X., 459
Hua, Xin, 276
Huang, Tian-Sen, 144
Huard, J. J., 299
Hubble, H. W., 415
Huber, Frank W., 4
Hudgins, Douglas, 265, 266
Hudgins, M., 32
Hudson, Joel B., 248
Huebner, Lawrence D., 26
Hueter, Uwe, 37
Huff, Edward M., 19
Hughes, Scott S., 379
Hulcher, A. B., 55
Hulst, A. G., 58, 161
Humayun, M., 291, 464
Hummels, Donald M., 86
Humphries, R., 526
Hunt, P. A., 356
Huo, Winifred M., 234
Hurford, T. A., 468
Husmann, H., 403
Huss, G. R., 302, 303, 381, 459
Hussaini, M. Y., 88
Hutcheon, I. D., 303, 461
Hutcheon, Ian D., 370
Huth, J., 269
Hvidberg, C. S., 281
Hviid, S. F., 422, 427
Hwang, H., 234
Hwang, I. H., 109
Hyde, T. W., 326, 344, 522
Hyde, Truell W., 344
Hynek, B. M., 325, 386, 387

I

Ianakiev, K. D., 430
Ianni, John D., 213
Ide, Robert F., 111
Iess, L., 444
Ilinets, Boris V., 87
Imagawa, Walter, 168, 169
Imai, H., 302
Imamura, F., 316
Immel, G., 447
Inaba, H., 289
Inaba, S., 274
Inaba, Satoshi, 275
Inan, S., 20
Ingersoll, A. P., 423
Ipatov, S. I., 503
Iraci, L. T., 62
Irons, Fred, 86
Iruela-Arispe, Luisa, 171
Irvine, Thomas B., 33
Irwin, R. P., III, 315
Isbell, C. E., 442
Isbert, J., 106
Ishii, T., 478
Israel, Y. A., 138
Ito, M., 301
Itoh, S., 301
Iturralde-Vinent, M. A., 348
Ivancic, William D., 43, 212
Ivanov, A. V., 504
Ivanov, Anton B., 484
Ivanov, B. A., 345, 346, 348, 399, 451
Ivanov, M. A., 330, 490, 501, 504
Ivanova, M., 459, 461, 483, 504, 514
Ivanova, Marina A., 358
Iversen, J. D., 498
Ivliev, A. I., 505
Izenberg, N., 307
Izenberg, Noam, 306
Izett, G. A., 453

J

Jackel, A., 458
Jackson, Jana, 66, 67
Jackson, T. L., 287, 370
Jacob, Matt, 199
Jacobs, Christopher R., 188
Jacobsen, C., 357, 412
Jacobsen, S. B., 377
Jaeger, W. L., 372, 434
Jaffe, R. L., 208, 212
Jagoutz, E., 483
Jahn, Susan, 16
Jain, J. C., 288, 342, 349, 482
Jakosky, B. M., 399, 485
Jambon, A., 461
James, Kevin D., 3
James, P. B., 492
Jangam, P., 344
Jansen, Kenneth, 98
Jansen, Mark J., 68
Jarvis, K. S., 385
Jaumann, R., 427
Javoy, M., 461
Jeffries, Martin O., 150
Jegley, Dawn C., 119
Jenniskens, Peter, 154
Jensen, E., 152
Jensen, E. A., 436
Jensen, Eric, 154
Jepsen, P. L., 426
Jessberger, E. K., 368, 448
Ji, Qiang, 105
Jimmerson, Gary T., 17
Jindra, Vaclav, 252
Joblin, Christine, 233
Joco, Fidel, 72
Joens H.-P., 318
Johnson, Brian E., 11
Johnson, Clark M., 394
Johnson, David, 173
Johnson, E., 311
Johnson, G. H., 453, 457
Johnson, J., 422
Johnson, J. R., 395, 411, 442, 486, 504, 505, 515
Johnson, K. T. M., 367
Johnson, M., 147
Johnson, Martin, 249
Johnson, Stephanie D., 50
Johnson, T. V., 372, 405
Johnson, W. T. K., 426
Johnson, Walter W., 30
Johnsson, S. L., 205
Johnston, Norman J., 51
Jollif, B. L., 523
Jolliff, B. L., 288, 298, 338, 340, 394, 395, 408, 416, 425, 429, 441, 499, 506, 507
Jolliff, Bradley L., 393
Jones, A. P., 310
Jones, C. G., 449
Jones, D. T. L., 340
Jones, Hollis H., 204
Jones, Hugh W., 129
Jones, J. H., 351, 352, 355, 402, 467
Jones, R. H., 277
Jones, S. M., 433
Jones, William Henry, 214
Jones, William R., Jr., 68
Jones, Yvonne, 116
Jorgensen, A. M., 147, 231
Jorgensen, C. C., 28
Jorgenson, P. C., 227
Jorgenson, Philip C. E., 229
Joseph, J., 308
Joseph, Jonathan, 306, 364
Joslin, Ronald D., 2
Josset, J., 427
Josset, J. L., 444
Joswiak, D. J., 412, 449
Joswiak, D. O., 412
Jotter, R., 483

Jovic, S., 92
Joy, M. K., 263
Joy, Marshall, 238
Jozsa, S., 453, 491
Juamann, R., 527
Judge, Jasmeet, 105
Julien, Keith, 532
Julier, Simon, 222
Jull, A. J. T., 339, 480
Jurdy, D. M., 332
Jurena, D. J., 309
Jurgens, R. F., 329, 383, 428, 492

K

Kabai, S., 520
Kachmar, Brian A., 212
Kadel, Steven D., 367
Kagi, H., 369
Kaiser, M. K., 33
Kaiser, M. L., 529
Kaiser, N., 241
Kakuda, R. Y., 430
Kale, R., 160
Kalinina, G. V., 505
Kallemeyn, G. W., 291, 517, 523, 524
Kallemeyn, Gregory W., 391
Kallianpur, K., 320
Kamotani, Yasuhiro, 99
Kamp, L. W., 372, 373
Kan, Han-Pin, 53
Kaneda, K., 359
Kanefsky, B., 365
Kanefsky, Bob, 245
Kanik, I., 469, 470
Kanki, Barbara G., 31
Kapania, Rakesh K., 117
Kapartis, S., 427
Kargel, J. S., 272, 281, 284, 374, 437, 440, 503, 505
Karner, J. M., 378, 513, 519
Karp, Alan H., 199
Karsai, J., 520
Karvounis, George, 27
Kasama, T., 356, 359
Kashiv, Y., 379
Kashkarov, L. L., 505
Kass, D., 428
Kassinos, S. C., 94
Katehi, Linda P. B., 85
Kato, Hideyuki, 52
Kato, M., 430
Katsuhara, Takeshi, 134
Kattenhorn, S. A., 436
Kaufman, Y., 142
Kaydash, V. G., 408
Kearsley, A. T., 449
Kedves, M., 452
Kedves, Miklos, 309
Keener, Earl R., 90
Keese, David, 15
Kehm, K., 459
Keil, K., 301, 358, 478, 506
Keil, Klaus, 290
Keil, L. C., 183
Keiling, A., 147
Keim, E. R., 416, 428
Keith, Amy, 59
Kellas, Sotiris, 116
Keller, D., 423
Keller, H. U., 422, 427
Keller, L. P., 285, 357, 412, 414, 521
Keller, P., 396
Keller, U., 444
Kelley, M. R., 259
Kelley, M. S., 307, 385
Kelley, Michael C., 148
Kellogg, Paul J., 532
Kelly, T. F., 431
Kelsey, C. M., 491
Kendra, Andrew J., 31
Kenkmann, T., 505
KenKnight, Charles E., 343
Kepko, L., 147
Kerczewski, Robert J., 13
Keresztesi, M., 491
Kereszturi, A., 314
Kerridge, J. F., 506
Keszthelyi, L., 273, 372, 374, 433, 434, 435
Keszthelyi, L. P., 435
Keszthelyi, Laszlo, 374
Kettrup, B., 451, 506
Kettrup, D., 447, 494, 506
Kevdzija, Susan L., 33
Khan, A., 343
Khare, Bishun N., 528
Khashman, A., 214
Khazins, V. M., 455
Khurana, K. K., 505
Kiefer, Walter S., 296, 334
Kieffer, H. H., 376
Kieffer, S. W., 435
Killen, R. M., 363
Killgore, Marvin, 388, 389
Kim, Chan M., 204
Kim, D., 1
Kim, Edward J., 105
Kim, J. R., 322, 427
King, J. D., 317, 489
King, J. P., 122
King, P. J., 308
King, S. E., 267
Kinnunen, R. E., 157
Kinzie, Kevin W., 26, 206
Kiris, Cetin, 91, 92
Kirk, R., 323, 324, 329
Kirk, R. L., 280, 321, 324, 434, 437, 493
Kirkland, L. E., 410, 416, 423, 428
Kirschvink, J. L., 484
Kirschvink, Joseph L., 392
Kirubarajan, Thiagalingam, 207
Kirven-Brooks, M., 160
Kistemaker, J. A., 181
Kisters, A., 454
Kitamoto, S., 430
Kittel, P., 37
Kittel, Peter, 74
Kittle, Peter, 91
Kivelson, Margaret G., 530
Kiyokawa, S., 348
Klandrud, S. E., 339, 480
Klaue, B., 371
Kleidman, R., 142
Klemaszewski, J., 283, 436
Kletetschka, G., 356
Kletzing, C. A., 147
Kloeck, W., 448
Klug, S. L., 366
Kmak, Frank J., 32
Kminek, G., 394, 459, 469
Knie, K., 480
Knight, Chris, 256
Knight, Norman F., Jr., 116
Knocke, P., 428
Kobatake, H., 356, 450
Koeberl, C., 310, 341, 452
Koeberl, Christian, 294
Koh, Y. L., 22
Kohlstedt, D. L., 327
Kohn, W., 201
Koizumi, E., 481
Kojima, T., 291
Kolacz, John S., 85
Kolb, E. J., 325
Kollar, S., 410, 415
Kolodzey, James, 86
Komatsu, G., 272, 318, 385, 420
Komatsu, M., 362
Konak, M., 22
Kondoz, Ahmet, 79
Koons, H. C., 150
Koppen, Sandra V., 210
Korchuganov, B., 516

Korf, Bruce, 184
Koris, A., 368
Kornet, K., 274
Korokhin, V. V., 520
Koros, Anton, 194
Korotev, R. L., 288, 298, 340, 394, 499, 506
Korotkova, N., 534
Korschinek, G., 480
Kortenkamp, Stephen J., 275
Kortz, Brian E., 272, 329
Korycansky, D. G., 473
Kosarev, I. B., 456
Koslovskeya, I., 179
Kosslyn, Stephen M., 191
Kostama V-P., 507
Kostama, V.-P., 333, 334
Kotova, I. V., 490, 504
Kotschenreuther, M. T., 236
Kouchi, A., 468
Kovacs Z. I., 368
Kovacs, B., 368
Kovacs, T., 368
KovacsZs. I., 491
Kovari, I. E., 368
Koyama, Tomoyuki, 113
Koziol, Andrea M., 354
Kozlov, E. A., 456
Kozlova, E. A., 507
Kraft, M. D., 498
Kramer, G. M., 491
Kramer, Williams T. C., 202
Kramers, J., 299
Krassilnikov, A. S., 333
Krause, M. O., 507
Kremser, D. T., 298, 340
Krenn, K. M., 410, 415
Kreslavsky, M. A., 306, 329, 408, 441, 501, 527
Kreslavsky, Mikhail A., 305
Kress, M., 412
Kress, M. E., 343
Kring, D. A., 293, 347, 467, 491
Krivanek, Thomas M., 31
Krot, A. N., 290, 301, 303, 357, 358, 359
Krueger, Arlin J., 145
Krueger, Ronald, 52
Kruger, Charles H., 237
Kruger, F. J., 463
Kruger, F. Johan, 294
Krul, A. J., 193
Krusche, Stefan, 250
Krutar, Rudolph A., 198
Krzeczowski, Ken J., 14
Kucinskas, A. B., 295
Kudo, T., 468
Kuebler, K. E., 429, 507, 523
Kuebler, Karla E., 393
Kuhlman, Jeffery A., 16
Kuhlman, K., 421, 422, 431
Kulikauskas, V. S., 267
Kumar, Ajay, 94
Kundel, Harold, 196
Kunihiro, T., 302
Kunoo, Kazuo, 52
Kurahashi, E., 473, 518
Kuramoto, K., 402
Kurat, G., 359, 389, 447, 498, 508, 509, 511, 512
Kurkov, A. P., 26
Kurowski, M., 7
Kurth, W. S., 78, 529
Kurth, William S., 532
Kurtz, M. J., 365
Kusakabe, M., 462
Kuschnig, R., 474
Kusina, M. S., 456
Kutler, Paul, 93
Kuzhevskii, B. M., 267
Kuzmin, R. O., 385, 485, 496
Kvaternik, Raymond G., 116
Kwak, Dochan, 91, 92
Kyriakides, Stelios, 67

L

Lacewell, R., 122
Lach, Cynthia L., 63
Laity, J. E., 491
Lamar, John E., 2, 4
Lamb, David, 236
Lana, C., 454
Lanagan, P. D., 325
Landau, A., 64
Landis, Jeffrey A., 194, 195
Lane, A., 429
Lane, David A., 74, 90
Lane, John W., 158
Lane, Ken, 213
Lane, M. D., 420
Langan, Kevin J., 20
Langen, K., 340
Langevin, Y., 396, 508
Langhoff, Stephen R., 232, 233
Langlais, B., 304
Langston, Chester W., 116
Lanser, Wendy R., 3
Lansky, Amy L., 76, 245
Lanyi, Janos K., 172
Lanz, J. K., 527
Lanzagorta, Marco, 222
Lanzirotti, A., 448
Lao, Lixing, 163
Lapeyrere, V., 432
Lare, Andrew, 151
Lark, A., 313
LaRoque, S., 263
Larsen, K. W., 425
Laski, Mark, 72
Last, Julie A., 240
Latendresse, John R., 158, 176
Latti, E., 340
Lau, W. K.-M., 134
Lauer, H. V., Jr., 354, 418, 467
Lauretta, D. S., 291, 371
Lauretta, Dante S., 290
Laux, C. O., 237
Lavaery, D. B., 468
Lavielle, B., 462
Lavoie, S. K., 426
Lavrentjeva, Z. A., 508
Lavrukhina, A. K., 508
Lawrence, D., 395, 407, 442, 443, 444
Lawrence, D. J., 287, 338, 394, 395, 396
Lawrence, Sam, 360
Lawson, C. M., 60
Lawson, S. L., 287, 396
Lazauski, Colin J., 225
Le L., 459
Le Mouelic, S., 508
Le, Diana, 247
Le, L., 411, 481, 482
Le-Sager, Philippe, 144
Leach, S., 511
Leake, M. A., 473
Leamy, Kevin, 72
Leavens, P. B., 451
Lebacqz, Victor J., 180
Lederer, S. M., 475
Lee, Alfred T., 31
Lee, Chul Bom, 167
Lee, D. S., 240
Lee, E. M., 323, 324, 442
Lee, Kang N., 55
Lee, Michael T., 388
Lee, P., 456
Lee, P. C., 476
Lee, Pascal, 282
Lee, Timothy, 243
Lee, Timothy J., 147, 232, 243
Lee, W., 428
Lee, Young C., 103
Lee, Yu-Tai, 91
Lefer, Margaret E., 141

Lehman, Christopher J., 9
Lehoczky, S. L., 240, 241, 242
Leinhardt, Z. M., 274
Lele, Sanjiva K., 97
Lellock, K. L., 259
Lemmen, R. L. C., 227
LeMouelic, S., 496
LeMouilic, S., 396
Lensing, C., 64
Lentz, R. C. F., 350, 481
Leo, Donald J., 110
Leon, Nancy J., 365
Leone, G., 314, 434
Lepper, K., 418
Leroux, H., 451
Leshin, L. A., 287, 370
Leslie, Fred W., 236
Lesourd, M., 461
Leung, Kent, 212
Lever, J. H., 446
Leverant, G. R., 25
Levey, Alan I., 176
Levin, E. M., 234
Levin, Eugene, 239
Levine, J. S., 457
Levinson, Richard, 189
Levison, H. F., 275
Levy, R., 142
Lewicki, David G., 114
Lewinski, Daniel F., 7
Lewis, R. S., 379
Lewis, W. S., 530
Leya, I., 344, 465, 509
Li Han, 306
Li, Lin, 406
Liberman, R. G., 479
Libourel, G., 413
Lieber, Lysbeth, 226
Liechti, Kenneth M., 67
Lin I-C., 418
Lin, J. M. S., 120
Lin, R . F., 152
Lin, R. P., 298
Lin, Xin, 132, 135
Lindsay, Bruce D., 344
Lindstrom, D. J., 287
Lindstrom, M. M., 367
Link, L. S., 325
Liotti, Marlo, 185
Lipschutz, M. E., 463
Lipscomb, John C., 176
Lissauer, Jack J., 530
Little, Brenda, 65
Little, D. A., 63
Little, R., 443
Little, R. C., 396
Litz, Marc S., 84
Liu, Fang, 89
Liu, Jian-Jun, 65
Liu, Ke, 129
Liu, Menghua, 478
Liu, S., 451
Liu, Shaobin, 294
Liu, Stephen, 111
Liu, Xianyou, 204
Livingston, J., 142
Livingston, J. M., 142, 143
Lockyer, N. P., 353
Loewenstein, Michael, 265
Lofgren, G. E., 276, 354, 356, 411
Loh, Ching Y., 229
Loh, Cling Y., 230
Lojkowski, W., 57
Lonergan, Patrick, 137
Longazo, T., 471
Longazo, T. G., 353, 417, 470
Longhi, J., 417, 502
Longhi, John, 288
Loomis, D. P., 140
Looper, J. K., 473
Lopes, R. M. C., 372
Lopes-Gautier, R., 373, 433, 435
Lopez, I., 509
Lopez, Isaac, 204
Lopez, Ivan, 331
Lorenz, C., 509
Lorenz, R. D., 283, 430
Love, S., 414
Love, Stanley G., 355, 390
Lovik, A., 224
Lowry, Heard S., 31
Lu, C., 112
Lu, X., 159
Lucchitta, B. K., 317, 386
Lucey, P. G., 288, 307, 394, 395, 396, 407, 408, 411, 415, 416, 431, 440, 442, 497, 509
Luck, J. M., 460
Luey, K. T., 50
Lugaro, Maria, 380
Lugmair, G. W., 479
Lukacs, B., 491
Luna, Bernadette, 173
Lunine, J. I., 377, 494
Luo, Li-Shi, 90
Luo, W., 386
Luttge, A., 422
Ly, Canh, 208
Lyon, I. C., 353
Lysak, R. L., 147
Lyytinen, Esko, 154

M

Ma, P., 414, 451, 465, 480
Maas, Hans L. M. M., 221
MacAdam, C., 109
Mace, Jay, 151
MacInnis, C., 526
Mackenzie, S. Ben, 56
Mackey, F., 349
MacLeod, Donald I. A., 181
Macone, Dan, 32
MacPherson, G. J., 303, 370
MacPherson, Glenn J., 358
Madey, T. E., 468
Maeda, Taro, 309
Maeno, N., 468
Maetz, M., 448
Maguer, A., 224
Mah, R. W., 28
Mahtani, H., 159
Mahtani, H. K., 159
Maisonobe, Luc, 36
Makupula, S., 340
Malak, H., 159
Malamud, B. D., 295
Malepati, Venkat, 207
Malhotra, R., 274
Malin, M. C., 319, 495
Mall, Urs A., 339
Maloney, Philip R., 262
Malum, K. M., 339
Malyshev, A. I., 510
Malysheva, L. K., 510
Mandea, M., 304
Mangold, N., 282, 312
Mann, J., 449
Manning, C. A., 8
Manning, Carol A., 248
Manning, R., 529
Mansour, Nagi N., 99
Manuel, O., 344
Mao, H. K., 464
Maran, Stephen P., 533
Marchello, J. M., 55
Marchis, F., 496
Marciniak, M., 1
Marcino, D., 415
Marcum, David L., 97
Marek, V. W., 201
Margot, J. L., 383
Margot, J.-L., 383
Margot, Jean-Luc, 278

Marhas, K. K., 358
Marinangeli, L., 272, 426, 466
Marini, A., 444
Marinova, Margarita M., 282
Marion, G., 505
Marit, Gary B., 176
Markgraf, M., 12
Markiewicz, W. J., 427
Markowich, Brian, 18
Maroef, I. S., 64, 65
Maroef, Iman, 111
Marov, M. Ya., 492
Marquardt, Kaiser, 46
Marschall, Jochen, 70
Marshall, J., 274, 421, 422
Marshall, J. S., 98
Martens, R. L., 431
Marti, K., 462, 482, 506
Martin, P., 402, 426
Martin, Richard W., 114
Marty, B., 339
Maruoka, T., 452
Marvel, Lisa M., 201
Marzari, F., 474, 510
Masaitis, V. L., 451
Masarik, J., 423, 480
Mashkantcev, A., 534
Mason, D., 316
Mason, T. F. D., 460
Mason, William H., 202
Master, S., 455
Mastrapa, R. M. E., 344
Matchett, Robert A., 27
Mathe, Nathalie, 258
Mathew, K. J., 482
Mathies, R., 469
Matrajt, G., 393, 413, 447, 510, 511
Matson, D. L., 372
Matsuda, J., 452
Matsuda, T., 430
Matsufuji, Yasunori, 113
Matsui, T., 316, 402
Matsumoto, Toru, 134
Matsunaga, T., 445
Matsushita, Muneo, 111
Matsuyama, Hisayoshi, 103
Matthews, J. M., 474
Mattie, David R., 143
Matzke, Sarah Monique, 203
Maurette, M., 393, 413, 447, 498, 510, 511
Maurice, S., 287, 338, 394, 395, 396, 442, 443, 444
Maxwell, Ted A., 375
Mayeda, T., 461, 478, 517
Mayeda, T. K., 287, 341, 498
Maynard, Nancy G., 134
Mazie, I., 526
McAfee, J. M., 410
McAlister, Kenneth W., 2
McBride, N., 348
McBride, Walton E., III, 104, 157
McCallum, I. S., 342, 394, 518
McCammon, C., 342
McCann, Karen M., 207
McCanta, M. C., 352
McCarthy, G. J., 414
McCarthy, Geraldine, 165
McCleese, D. J., 485
McClenny, W. A., 132
McClung, R. C., 25
McColley, S., 465
McCollom, T. M., 370
McComas, D. J., 530
McCord, T. B., 283, 284, 404
McCoy, T. J., 306, 308, 363, 389
McCoy, Tim J., 363
McDonough, W. F., 401
McElroy, Bill, 59
McEwen, A., 325, 372, 374, 433, 434, 435, 442
McEwen, A. S., 273, 435
McEwen, Alfred, 374
McFadden, L., 307
McFarland, E. R., 453, 457
McGee, T. J., 153
McGovern, Patrick J., 295
McGuire, Robert, 9
McHargue, L. R., 339
McHone, J. F., 454
McIllroy, David, 62
McIlroy, David, 62
McIntosh, D. M., 142
McIntosh, Dawn, 105
McKay, C. P., 417
McKay, Christopher P., 282
McKay, D. S., 353, 392, 393, 417, 423, 469, 470, 471, 521
McKay, David S., 392, 396
McKay, G., 388, 481, 482
McKay, G. A., 354
McKeegan, K. D., 301, 303, 357, 358, 359
McKeever, S. W. S., 418
McKenzie, I., 22
McKerns, M. M., 60
McKinnon, W. B., 327, 403, 437, 499
McKinnon, William B., 346
McLean, G. A., 9
McLennan, Scott M., 297
McLeskey, Sandra, 166
McPeters, Richard D., 145
McQuaid, Michael, 71
McQueen, Steve, 203
McQuillen, John, 101
McRoberts, Sam, 23
McSween, H. Y., Jr., 350, 352, 356, 384, 409, 419, 481
Meakin, Robert L., 100
Mehta, Unmeel B., 27
Mehta, V., 134
Meibom, A., 292, 301, 358
Meibom, Anders, 290
Meier, Roland, 528
Meinhart, Carl D., 95
Meisel, T., 400
Melancon, G., 209
Melchior, R., 316, 447
Melim, L. A., 475
Mellon, M. T., 376, 411, 485
Melosh, H. J., 293, 346, 391, 439
Mendelson, C. V., 313, 320, 325, 388, 526
Mendelson, Carl V., 312
Mendez, A., 391
Menietti, J. D., 145
Menon, Sunil, 23
Menzies, O. N., 462
Merchel, S., 380
Mercier, D., 282
Merline, W. J., 437
Merrifield, M. R., 308
Mertzman, S. A., 415
Meshik, A. P., 381
Mesick, Hillary, 127
Messenger, S., 285
Mest, Scott C., 375, 387
Metrich, N., 359
Metzger, R. M., 426
Metzger, S., 424, 498
Metzger, S. M., 320
Mevel, L., 284
Meyer, B. R., 526
Meyer, B. S., 380, 511
Meyer, M. A., 405, 468, 518
Meyyappan, M., 78, 234, 237, 239, 421
Michael, G. G., 507
Michalski, J., 436
Michel, R., 380, 509
Mickelson, B., 498
Migdisova, L. F., 504
Mihalov, J. D., 532
Mikouchi, T., 285, 350, 356, 359, 362, 388, 481, 512
Milam, K. A., 419
Milazzo, M., 374, 435

Milkovich, S., 319
Milkovich, S. M., 319
Miller, D. H., 121
Miller, Donna L., 180
Miller, Greg, 16
Miller, K. M., 124
Miller, M. K., 431
Miller, Martin S., 60
Miller, Robert A., 55
Miller, Ron L., 140
Miller, Ted, 87
Milliken, K. L., 477
Mills, Nicole A., 174
Milne, A., 308
Milos, Frank S., 92
Ming, D. W., 354, 416, 418
Minguet, Pierre J., 52
Minitti, M., 466
Minitti, M. E., 410, 464
Minnis, Patrick, 153
Miranda, Felix A., 84
Mirkovic, Dragan, 205
Misawa, K., 391
Mitchel, J., 58
Mitchell, D. L., 298
Mitchell, K. L., 270, 322, 427, 511
Mitchell, Ken R., 129
Mittlefehldt, D. W., 352
Mittlefehldt, David W., 388
Miura, Y., 452, 465
Miura, Yasunori, 309
Miyamoto, M., 350, 359, 362, 512
Miyata, Y., 359
Mizutani, H., 444, 446, 496
Mizutani, M., 445
Mjolsness, E., 425
Moeller, Karl J., 210
Moghaddam, Abdollah P., 176
Mohapatra, R., 380
Mojzsis, S. J., 393
Molent, L., 20
Moline, M. A., 127
Moller, L. E., 430
Moller, S. C., 313
Molster, F. J., 413
Monnereau, M., 435
Montenbruck, O., 12
Montesi, Laurent G. J., 304
Montgomery, R. W., 108
Moon, Namdoo, 360
Moorbath, Stephen, 477
Moore, Gary, 255, 256, 257, 258
Moore, J., 44
Moore, J. M., 281, 327, 411, 420
Moore, K. R., 231, 287, 395, 444
Morbidelli, A., 494
Moreau, J. W., 477
Moreels, P., 280
Moreira, Romero da Costa, 125
Morel, Andre, 137
Morgan, J. V., 457
Morgan, J. W., 400
Morgan, Thomas R., 195
Morin, Gilbert, 85
Morioka, M., 301
Morley, J. G., 322
Morlok, A., 368
Morozhenko, A. V., 494
Morris, P. A., 471
Morris, R., 411, 416, 421, 422, 512, 521
Morris, R. V., 354, 490
Morrison, A. D., 426
Morrison, Carlos R., 75
Morrow, J. R., 452, 453
Mortillaro, C., 367
Morton, Andrew, 62
Morton, Andron, 62
Mosegaard, K., 343
Moser, Robert D., 101
Moses, J. I., 327
Mosher, Marianne, 19, 114
Mosqueira, I., 283
Moss, B. E., 499
Moss, C. E., 430
Moss, S., 22
Mostefaoui, S., 382
Motakef, S., 241
Motil, Brian, 101
Motil, Brian J., 99
Motte, F., 264
Mouginis-Mark, P. J., 271, 273, 320
Mount, T. D., 130
Mousis, O., 284
Mowbray, Keith, 113
Mozer, F. S., 147
Mozzone, Lorenzo, 79
Mueller, B., 96, 228, 230
Mueller, K. J., 304
Mueller, T., 429
Muenow, D. W., 416
Muhleman, Duane O., 484
Mukai, M., 359
Mulenburg, Gerald M., 34, 35, 178
Mulhearn, P. J., 226, 229
Mullane, E., 460
Muller J.-P., 322
Muller J-P., 427
Mulligan, J. B., 189
Mulligan, Jeffrey B., 181
Mumaw, Randall, 13
Munoz, Cesar, 207
Murad, E., 418, 528
Murchie, S., 307, 308, 309, 422
Murchie, S. L., 308, 416
Murchie, Scott, 306
Murman, Scott M., 19, 95
Murphy, M. E., 363
Murray, Ronald, 173
Murray, S. S., 365
Murty, S. V. S., 481
Muscat, Richard, 56
Mushotzky, Richard F., 265
Musselwhite, D. S., 377
Mustard, J. F., 311, 317, 398, 410, 416, 517
Mustard, John F., 406
Myers, William E., 200

N

Nachman, Paul, 49
Nagahara, H., 289, 290
Nagahara, Hiroko, 277
Nagao, K., 369, 462
Nagasawa, H., 301
Nagashima, K., 302, 356
Nagayasu, Tadashi, 52
Nakagawara, Van B., 108
Nakai, M., 359
Nakamura, G. J., 160
Nakamura, K., 448, 473, 518
Nakamura, M., 446
Nakamura, T., 285, 369, 413, 424, 462
Nakano, H., 468
Nakano, Y., 348
Nakayama, Hirofumi, 134
Namiki, Noriyuki, 342
Nanjo, H., 534
Naoi, T., 450
Naraoka, H., 462
Navidi, M., 179
Nazarov, M. A., 298, 341, 342, 349, 350, 389, 459, 461, 483, 504, 508, 509, 512, 514, 523
Nazarov, Michail A., 358
Nazarov, Mikhail A., 350, 476
Nazzario, R., 326
Nchodu, M. R., 340
Neakrase, Lynn D. V., 485
Neal, C. R., 288, 342, 349, 482
Neal, Jeannette G., 210
Nealson, Kenneth H., 394
Neely, J., 67
Neese, C., 474
Nelkin, Eric, 100

Nelson, D. M., 313
Nelson, R. M., 408
Nemtchinov, I. V., 456
Nerode, A., 201
Nesrsta, Ladislav, 252
Nettles, J. W., 356
Neukum, G., 269, 328, 337, 348, 427, 436, 497
Neukum, Gerhard, 328
Neumann, G., 308
Neumann, G. A., 309
Neumann, Gregory A., 295
Neumann, S., 509
Newman, Richard, 194
Newsom, H. E., 347, 352, 397
Newville, M., 432
Ng, Henry, 203
Ngo, H. H., 294
Nie, Walter Z., 56
Niebur, C. S., 425
Nielsen, Paul H., 102
Nijman, W., 379
Niles, Stanley, 49, 173
Nimmo, F., 296, 318
Nishiizumi, K., 298, 462, 480
Nishioka, Kouki, 88, 89
Nittler, L. R., 306, 380
Nixon, B., 282
Nixon, Brian, 328
Nixon, Mark W., 116
Noble, S. K., 420
NoeDobrea, E. Z., 281
Noguchi, T., 285, 369, 413
Nogues, J. P., 473
Nolan, M. C., 383
Nolin, A. W., 282
Nomura, T., 335
Nordholt, J. E., 425, 431
Norman, L. M., 512
Norman, M. D., 300
Northup, D. E., 475
Nowicki, S. A., 484
Ntaflos Th., 509
Numaguchi, A., 399
Nunes, D. C., 335, 387
Nuth, J. A., III, 413, 449
Nuth, Joseph A., III, 391
Nymmik, R. A., 267
Nyquist, L., 269, 336, 423
Nyquist, L. E., 483

O

O, 151
Obara, Clifford J., 4
OBrien, D. P., 403, 438, 439
OBrien, T. Kevin, 52
Ocker, K. D., 354
Oe, K., 482
Oesterreich, Mark H., 197
Ogawa, Angela M., 180
Ogino, Tatsuki, 530
Ogren, John A., 149
Oh, Soon Hwan, 175
Ohsumi, K., 359
Ohtake, M., 445
Ohtani, E., 467
Oji, T., 348
Okada, A., 462
Okada, T., 430
Okazaki, R., 369
OKeefe, John D., 292, 384
Okubo, C. H., 513
Okubo, Chris H., 305
Oldenburg, John R., 111
Olendzenski, L., 367
Oleson, Steven R., 48
Oliver, Carey, 164
Oliver, F. W., 458
Olsen, Richard G., 183
Olson, Carl T., 185
Olson, D. L., 60, 64, 65
Olson, David L., 111, 235
Olson, E. K., 354
Omelchenko, V. V., 408
Ono, Kousei, 52
Oquest, C., 427
Orasanu, Judith, 191
Ori, G. G., 272, 385, 426
Orlando, T. M., 404
Ormo, J., 272, 318, 426
Orofino, V., 314, 414
Ortiz-Aleman, C., 457
Osada, Y., 278
Osaka, T., 359
Osawa, T., 369
Osborne, P., 348
Osinski, G. R., 294
Ossowski, M. M., 65
Ostro, S. J., 383
Otake, H., 445
Otsuki, Mayumi, 478
Ott, U., 380, 382
Oura, Y., 462
Oving, A. B., 192
Owen, Tobias C., 264, 528
Ozawa, K., 289, 290
Ozawa, Kazuhito, 277
Ozcelik, Hilmi, 165
Ozima, M., 513

P

Paarlberg, R. L., 419
Paetsch, M., 342
Palasti, E., 397
Palaz, Hasan, 79
Palermiti, M., 515
Palikonda, Rabindra, 153
Palma, R., 412
Palme, H., 508
Palmer, Barbara, 186
Palmer, Everett, 13
Palosz, B., 57
Palosz, W., 57, 242, 243
Pan, Yong-Le, 173
Panasyuk, M. I., 267
Panda, J., 104
Pandurang, P., 200
Pandya, S. A., 211, 223
Pannell, Bill, 37
Panontin, Tina L., 118
Pantazidou, Marina, 129
Pao, S. Paul, 206
Papanastassiou, D. A., 294, 300, 302, 478, 479
Papike, J. J., 289, 336, 351, 353, 355, 378, 469, 472, 476, 482, 513, 519
Papila, Melih, 110
Papila, Nilay, 46, 110
Pappalardo, R., 283, 327, 328, 403, 438, 497
Pappalardo, R. T., 282, 328, 520
Pappalardo, Robert, 328
Pappalardo, Robert T., 490
Paris, Isabelle L., 52
Park, Chul, 27
Park, Y. D., 64
Parker, Bradford H., 204
Parker, J. W., 524
Parker, T., 386, 399, 428
Parker, T. J., 374
Parmentier, E. M., 296, 297, 513
Parrish, R. R., 460
Parsons, J. D., 375
Partridge, Harry, 232, 233, 239
Passer, Alison L., 346
Pataki, T., 520
Patchen, A., 521
Pathare, A. V., 398
Patriciu, Victor-Valeriu, 253
Patsch, M., 460
Patterson, Mark J., 188
Patterson, Michael J., 48

Patterson-Hine, Ann, 24
Pattison, T. R., 208
Patzer, A., 390
Paulus, R. A., 149
Pavlik, William R., 204
Pearson, V. K., 286, 357
Pegan, W. Scott, 127
Peitersen, M. N., 526
Pellegrino, Richard, 173
Pellin, M. J., 379
Pendleton, Yvonne J., 528
Peng, G. D., 69
Peng, Melinda S., 150
Peng, Z., 112
Penn, B., 106
Penn, B. G., 70
Pennings, J. M., 77
Pepin, R., 412
Perlwitz, Judith, 149
Perrin, Phillippe, 22
Perron, C., 462
Perry, Walter, 173
Personick, Stewart D., 87
Pesonen, L. J., 494
Petaev, M., 291, 459, 461, 504, 513, 514
Petaev, Michail I., 290, 358
Peterson, C. A., 288
Peterson, Kelly, 334
Peterson, W., 147
Petit, E., 461
Petro, N., 407
Petro, N. E., 337
Petrov, Yuri V., 144
Petrova, T. L., 489
Pettengill, G. H., 492
Pettengill, O., 160
Pety, J., 262
Peulvast, J. P., 282, 312
Pfister, Leonhard, 155
Pfister, M., 201
Phillips, C. B., 404, 405
Phillips, G. W., 267
Phillips, R. J., 325, 335, 376, 386, 387, 399
Phillips, Roger J., 295, 364, 375
Phillips, T. G., 262
Phillips, Todd, 144
Philpott, Michael, 59
Phinney, D., 461
Phoreman, J., 491
Piatak, David J., 116
Piatek, J. A., 408
Picard, Mary, 18
Pierazzo, E., 293, 347, 437
Pierce, Timothy L., 317
Pierce, William G., 124
Pieters, C., 407, 408, 420, 440, 496, 521
Pieters, C. M., 337
Pieters, Carle M., 362
Pietsch, J., 367
Pihlaja, P., 494
Pilewskie, P., 105
Pilkington, M., 457
Pillinger, C., 361, 381, 427, 495
Pillinger, C. T., 286
Pincus, S., 470
Pinet, P. C., 432, 442, 444, 484
Pinnick, Ronald G., 49, 173
Pirzadeh, Shahyar Z., 5
Pizzarello, S., 287
Pizzarello, Sandra, 286
Plachta, D., 37
Platteborze, Peter L., 171
Plaut, J. J., 400
Plaut, Karen, 174
Plescia, J. B., 504, 514, 515, 519
Plon, Sharon, 163
Poag, C. W., 294, 453, 457
Poellot, Michael, 151
Pohorille, Andrew, 172, 175
Polifke, W., 228
Polimeno, N., 414
Pollack, Steven K., 238
Polnau, E., 299, 479
Polson, Peter, 13
Ponganis, K. V., 462
Pongracz, R., 490
Ponomarev, Igor, 238
Poole, F. G., 453
Pope, Robert, 65
Porcelli, D., 377
Porco, C., 435
Poreda, Robert J., 295
Portle, K. B., 386
Potsdam, Mark A., 100
Poulter, K. E., 313
Povenmire, H., 515
Povenmire, K., 515
Powars, D. S., 453, 457
Powell, J. W., 259
Powell, John, 150
Powers, R., 67
Powlesland, I. G., 22
Prabhu, Ramadas K., 2
Pramono, Eddy, 119
Prange, R., 496
Prasad, Paras N., 50
Pratt, S., 319, 500, 501, 527
Pratt, Stephen, 272, 305
Pravdivtseva, O. V., 370, 381
Predmore, Roamer E., 68
Presley, M. A., 419
Preston, Kendall, 213
Pretschner, Alexander, 253
Prettyman, T. H., 394, 395, 396, 430, 443
Previc, Fred H., 185
Price, G. D., 310, 402
Prieto, O., 437, 440
Prieur, D. M., 475
Prilutskyi, O., 516
Prinos, J., 336
Priscu, J., 470
Pritchard, M. E., 329
Probst, L., 461
Prockter, L., 308, 438
Prockter, L. M., 308, 404
Prospero, J., 141
Protheroe, W. J., Jr., 356, 516
Pryor, Anna H., 114
Pueschel, R. F., 143
Pulaski, Beth, 177
Pulkkinen, T. I., 148
Pun, A., 472
Purucker, M. E., 304

Q

Qiao, K., 344
Quach, Cuong C., 210
Quattrochi, Dale A., 128
Quin, R., 525
Quinn, P. K., 142
Quinn, R. C., 417
Quirico, E., 448, 496, 508

R

Racca, G., 444, 496
Racette, Russell A., III, 109
Radebaugh, J., 433, 435
Radebaugh, Jani, 374
Rafkin, S. C. R., 485
Rages, Kathy, 486
Raghothamachar, B., 242
Raitala, J., 329, 333, 489
Rajic, N., 22
Rajmon, D., 406
Rakonczai, J., 316
Ramachandran, Narayanan, 236
Ramirez, M. L., 6
Ramirez, Michael L., 70
Ramos, R. A., 8, 248
Rampino, Michael R., 309

Randall, David A., 125, 131, 132, 135, 146, 152
Randall, Gia M., 158
Randall, R. B., 113
Rank, D., 264
Rao, M. N., 423
Rao, M. V. V. S., 234
Rapchun, David A., 204
Raphael, Roy A., 224
Rasch, Kevin H., 217
Rashidnia, Nasser, 235
Raskin, Lutgarde, 175
Rasky, Dan, 15
Ratcliff, J. T., 343
Rathbun, J. A., 373
Raval, A., 129
Rawlings, P., 367
Ray, R. D., 439
Ray, Richard, 65
Raymond, C. A., 303
Raynal, P. I., 448
Rebender, G., 10
Reddy, D. R., 26
Reddy, T. S. R., 26
Redemann, J., 142
Reedy, R. C., 306, 340, 363, 430, 479, 516
Reese, E. D., 263
Reese, Y., 269, 483
Reeves, G. D., 147, 231
Reginatto, M., 123
Reha, Jaroslav, 251
Reich, Richard F., Jr., 59
Reichardt, Jens, 153
Reichardt, S., 153
Reid, Eleanor, 156
Reid, Gary B., 190
Reid, R. J., 505
Reimer, Dennis J., 248
Reimold, W. U., 309, 310, 341, 451, 454, 455, 463
Reinhardt, Wolfgang, 252
Reintjes, J., 112
Reintjes, John, 114
Reisener, R. J., 291
Remier, L., 142
Remmel, J. B., 201
Revilock, Duane M., 56
Reynolds, Christopher S., 260
Reynolds, R., 427
Reynolds, Thomas L., 7
Reynolds, W. C., 94
Rhea, W. Joseph, 127
Rhijnsburger, M. P. M., 71
Ricco, A. J., 525
Rice, J. A., 79
Rice, J. W., Jr., 374, 517
Rice, James W., Jr., 282
Rice, Patricia, 144
Rice, Richard, 66, 67
Rice, Sean, 190
Richardson, D. C., 274
Richardson, M. I., 485
Richmond, R., 160
Richmond, R. C., 159
Richter, F. M., 301
Rider, Andrew, 56
Riedel, S. J., 526
Rieder, R., 409, 516
Riemersma, J. B. J., 244
Rietmeijer, F. J. M., 449
Rifkin, M. K., 317, 517
Righter, K., 401, 461, 466
Riley, P., 530
Rind, David, 140
Ringrose, T. J., 427
Rivell, Tomas, 268
Rivkin, A. S., 365, 383, 474
Rizk, Yehia M., 19
Roach, Pat R., 73
Roark, J., 316
Roark, J. H., 305, 366
Roark, S., 58
Robert, F., 303, 359, 517
Roberts, Gary D., 56
Robertson, P., 530
Robertson, S., 339
Robinson, Daryl C., 82
Robinson, Jay H., 51
Robinson, M., 307, 308, 364, 441, 517
Robinson, M. S., 307, 308, 309, 337
Robinson, Mark, 306
Rock, Kenneth E., 26
Roddy, D. J., 454
Rodgers, S. D., 382
Rodionova, J. F., 507
Rodriguez, N., 440
Rodriguez, S., 372
Roeder, J. L., 150
Roelof, E. C., 231
Rogala, James T., 124
Rogers, D., 320
Rogers, Stuart, 91, 92
Rojas, R., 348
Romanek, C. S., 466
Romstedt, J., 458
Ronca, April E., 174, 187
Roncoli, R., 428
Roseburg, Conrad M., 7
Rosekind, Mark R., 180
Rosemberg, C., 484
Rosenberg, N. D., 369, 398
Rosenbert, S. O., 177
Rosenblum, Lawrence, 222
Rosenfield, Joan E., 137
Rosenshein, E. B., 314
Rosenstein, Barry, 167
Rosiek, M. R., 323, 441
Rosko, F., 368
Ross, A., 447
Ross, J., 28
Ross, R. R., 123
Rossi, A. P., 318, 466
Rossi, Adrian, 203
Rossman, G. R., 432
Rost, D., 368, 448
Rotenberg, E., 463
Roth, Don J., 204
Roth, L. E., 521
Rothery, D. A., 427
Rothman, Daniel H., 375
Roush, T. L., 385, 528
Roush, Ted L., 264
Rozanov, A. Yu., 469
Rozyczka, M., 274
Rubin, A. E., 291, 301, 400, 517
Rubinstein, R., 93
Rudnick, S. M., 158
Ruf, Edward G., 26
Ruff, S. W., 271
Ruffr, S. W., 517
Ruiz, Marilyn O., 254
Rumsey, C. L., 93
Rushmer, T., 402
Russell, B., 415, 416
Russell, P., 142, 427
Russell, P. B., 142, 143
Russell, P. S., 272
Russell, Roberta L., 195
Russell, S. S., 301, 460
Russell, Samuel S., 57
Rutherford, M. J., 352, 410
Ruzicka, Gene C., 5
Ryder, G., 289, 299, 300, 310, 336

S

Sabath, Daniel E., 161
Saenz, Eileen M., 84
Sagues, A., 67
Saini, Subhash, 197
Saito, A., 359
Sakimoto, Philip, 244
Sakimoto, S. E. H., 271, 305, 313, 316, 320, 321, 325, 387, 388, 525, 526

Sakimoto, Susan E. H., 312
Salama, Farid, 233
Salas, M. D., 93
Saleeb, A. F., 54
Salerno, Louis J., 37, 91
Salisbury, J. W., 410, 428
Salomonson, Vincent V., 106
Saloum, Mahaman, 137
Salute, Joan, 15
Sammartino, P., 420
Sammells, A. F., 58
Sammonds, P. R., 280
Samuels, Jeff, 20
Sandberg, C. A., 452, 453
Sanderfer, Dwight, 24
Sandford, Scott A., 263, 265, 266
Sanford, Robert A., 175
Sankovic, John M., 48
Sanloup, C., 402
Sanner, Robert M., 45
Santiago, S. S., 526
SarverVerhey, Timothy R., 48
Sasaki, S., 450, 473, 518
Sassen, K., 152
Sassen, Kenneth, 151
Satoh, H., 356, 450
Satoh, J., 467
Satterthwait, Arnold C., 179
Saunders, R. S., 518
Sausen, Tania Maria, 244
Sautter, V., 461
Savarino, J., 352
Savina, M. R., 379
Sawarynski, M., 339
Saylor, J., 459
Scerbo, Mark W., 183
Schauer, R., 447
Schehl, Norm D., 114
Schein, David B., 26
Schelble, R., 470
Schelble, Rachel, 476
Schelble, Rachel T., 477
Scheller, N. M., 160
Schenk, P. M., 327, 434, 437
Schenker, P. S., 425
Schibler, William, 210
Schieber, J., 477
Schiffman, P., 418, 528
Schilk, A. J., 277
Schlutter, D., 412
Schmerr, N. C., 297
Schmid, B., 142
Schmidt, Gavin A., 140
Schmidt, W., 444
Schmidt, W. K. H., 107
Schmitt, B., 372, 496
Schmitt, H. H., 300, 401
Schmorrow, Dylan D., 203
Schnabel, C., 465, 480
Schneider, Brandt, 170
Schneider, Frank, 221
Schneider, Todd A., 44
Schofield, O., 127
Schofield, T., 428
Schorghofer, Norbert, 375
Schraagen, J. M. C., 246
Schreiber, Jeffrey G., 46
Schreuder, H. T., 120
Schroeder, I., 340
Schroeder, J. A., 33
Schroeder, Jeffrey A., 30
Schroeder, W. W., 156
Schubel, K. A., 450
Schuh, C., 284
Schultz, A. V., 112
Schultz, L., 342, 460, 463, 508
Schultz, P. H., 292, 293, 299, 311, 345
Schultz, R. A., 513, 518
Schultz, Richard A., 304, 305, 312, 386
Schumann, Ulrich, 153
Schvaneveldt, Roger W., 190
Schwandt, C., 269, 433, 459, 467, 481
Schwandt, C. S., 351, 352, 354
Schwartz, Ira B., 161
Schwartz, J. M., 342, 518
Schwarz, C. M., 433
Schweickart, Daniel L., 80
Schweitzer, M., 470
Schweizer, M., 241
Schwid, Steven W., 173
Scott, D. H., 398
Scott, E. D., 497
Scott, E. R. D., 478
Scott, Edward R. D., 390
Scott, John C., 157
Scott, R. S., 519
Scott, Steve, 236
Scott, V. Stanley, III, 109
Scudder, J. D., 147
Scully, J. R., 63
Scuseria, Gustavo E., 243
Seabrook, A. M., 427
Sears, D. W. G., 362, 382, 490
Sears, J., 470
Seasholtz, Richard G., 104
Sebok, T., 112
See, T. H., 464
Seelos, F. P., 325, 425
Seftor, Colin J., 145
Segre, Philip N., 89
Seiff, Alvin, 268
Seifu, D., 458
Seiner, J. M., 88
Selivanov, A. S., 496
Selkirk, Henry B., 145
Semenenko, V. P., 522
Semenova, A. S., 339, 505
Semjonova, L. F., 495
Sen, Subhayu, 66
Senier, L., 187
Senshu, H., 402
Sephton, M. A., 286, 357, 381, 382
Serb, Aurel, 253
Serfaty, Daniel, 252
Sethuraman, Jayaram, 219
Shandera, S. E., 430
Shankar, Dinesh, 87
Shanteau, R. L., 349
Shappirio, M., 431
Share, G. H., 267
Shariff, Karim, 100
Sharma, A., 70, 106
Sharma, Rajeev K., 68
Sharma, S. K., 415, 416, 431
Sharma, S. P., 234
Sharp, T. G., 292, 310, 459, 464, 477
Sharp, Thomas G., 276
Sharp, Z. D., 469
Sharpton, V. L., 454
Shcherbakov, R., 295
She, Chiao-Yao, 153
Shearer, C., 355
Shearer, C. K., 277, 289, 336, 349, 351, 352, 378, 466, 472, 513, 519
Shearer, Michael, 223
Shebell, P., 123
Shedd, Tommy R., 139
Sheldon, David W., 31, 33
Shelfer, T. D., 411, 512
Shell, Dan, 212
Shen, Zongbin, 88, 89
Shenolikar, Shirish, 164
Shepard, M. K., 432
Shepard, Michael K., 278
Sheppard, Sheri D., 118
Sherman, N. D., 438
Sherry, Lance, 13
Shestopalov, D. I., 497
Shevchenko, V. V., 507, 519
Shi, Hongyuan, 87
Shie, Chung-Lin, 100
Shih C.-Y., 269
Shih, C.-Y., 483
Shimizu, Masakata, 88, 89
Shin, Y. S., 197

Shindell, Drew T., 140
Shingareva, T. V., 385
Shinotsuka, K., 371
Shiomi, K., 446
Shirai, K., 430
Shkuratov, Y. G., 408
Shkuratov, Yu. G., 440, 441
Shock, E. L., 403, 440, 525
Shockey, K. M., 305
Shoemaker, C. S., 454, 515, 519
Shoemaker, E. M., 515, 519
Shoemaker, J. Todd, 104
Shoemaker, W., 170
Showalter, M. R., 326
Shu, F., 498
Shu, J., 464
Shukla, A. D., 452
Shukolyukov, Y. A., 339
Shukolyukov, A., 479
Shukolyukov, Y. A., 342
Shuvalov, V. V., 345, 455, 456
Shuvalov, Valery, 349
Shy, C. M., 140
Shyy, Wei, 46, 110
Sickafoose, A. A., 339
Sigwarth, J. B., 147
Sik, A., 519
Sikic, Branimir I., 169
Silbert, Mark, 210
Silver, Matthew H., 312
Silverman, Hanan, 23
Simakov, M. B., 473
Simon, Horst, 119, 199
Simon, Horst D., 197, 202
Simon, S. B., 285
Simonelli, D., 433, 435
Simons, M., 329
Simons, Mark, 295
Simons, Rainee N., 85
Simons, Todd A., 3
Simonson, B. M., 295, 450
Simpson, James, 13
Simpson, Roger, 94
Sims, M. R., 427
Sinclair, Daryl W., 31
Singletary, S. J., 390
Singleton, Jeffrey D., 116
Sinha, Mahadeva P., 394
Sinha, N., 358
Siron, Pierre, 253
Sirono, S., 468
Sisk, R. C., 84
Sisterson, J. M., 340
Sistla, G., 130
Sitko, M. L., 413
Sjoegreen, B., 91, 96
Skala, R., 294, 465
Skinner, J. A., 323, 348
Skinner, J. A., Jr., 388
Skinner, Stephen L., 533
Skipper, David J., 81
Skobeleva, T. P., 519
Skulan, Joseph, 394
Skundberg, Thomas L., 34
Slade, M. A., 329, 383, 428
Slavney, S., 322
Slotosch, Oscar, 253
Slough, J., 237
Smailbegovic, A., 418
Small, Justin, 157
Smallman, H. S., 87
Smeele, P. M. T., 77
Smith, Brian R., 29
Smith, C. L., 361
Smith, D., 308
Smith, D. E., 309
Smith, David E., 295, 527
Smith, Dudley R., 61
Smith, G. A., 337, 407
Smith, Grant D., 208, 212
Smith, J. L., 121
Smith, J. W., 64
Smith, M. D., 418
Smith, Mike S., 31
Smith, P., 427
Smith, Rodney D., II, 235
Smith, Roy M., 180
Smith, Steven J., 146
Smrekar, S. E., 280, 303, 334, 335, 465
Smythe, W. D., 372, 373, 408, 435
Snajder, Milan, 252
Snider, N. O., 425
Socki, R. A., 466
Soderberg, A. M., 474
Soderblom, L. A., 321, 322, 520
Soest, Jennifer, 186
Solomon, Sean C., 276, 295, 364
Solomon, W. David, Jr., 26
Sorensen, Morten Heine, 221
Soriano, J. Francisco, 268
Sotin, C., 284, 466
Southam, G., 470
Southard, R., 418, 528
Spaid, Frank W., 90
Sparks, J., 402
Sparrow, Victor W., 115
Spaun, N. A., 328, 438, 520
Spaun, Nicole, 328
Spears, William M., 161
Spence, H. E., 147, 231
Spence, Harlan E., 531
Spencer, J. R., 373
Spera, David A., 31, 33
Spettel, B., 462
Spilde, M. N., 475, 476
Spinhirne, James D., 109
Spitale, J. N., 347, 473
Spivak, Alan L., 91
Spohn, T., 403
Spray, J. G., 292, 294
Springer, R. J., 322
Spudis, P., 406
Spudis, P. D., 288, 406, 407, 497
Spudis, Paul D., 338
Squires, D. D., 102
Squires, Kyle D., 99
Squyres, S. W., 283, 306, 425, 429
St.John, M., 87
Staats, Dee Ann, 143
Stadermann, F. J., 411
Staid, M. I., 337, 407
Stallcop, James R., 239
Stankevich, D. G., 440
Stansbery, E. K., 433
Starke, Edgar A., Jr., 66
Starling, Michael, 11
Starnes, James H., Jr., 51
Starodubtseva, O. M., 520
Starr, D., 152
Starr, R. D., 306, 363
Stauner, Thomas, 253
Steciak, Judi, 62
Stecki, A. J., 240
Steele, A., 392, 393, 470
Steele, Andrew, 476
Steeneken, H. J. M., 214, 228
Stelmakh, S., 57
Stepanova, Lilia J., 168
Stephan, T., 368, 448
Stepinski, T. F., 274
Stern, S. A., 494, 524
Steutel, D., 408
Stevens, David, 154
Stevens, R., 421
Stevenson, D. J., 405
Stevenson, David J., 342, 490
Stewart, David H., 212
Stewart, Helen, 256
Stewart, Richard W., 61
Stewart, S. T., 318, 484
Stewart, Sarah T., 292, 384
Stirling, J. A. R., 516
Stocco, K., 367
Stocks, Jodie M., 188
Stockstill, K. R., 352

Stoddard, P. R., 332
Stofan, E. R., 330, 334, 465, 492
Stoker, C. R., 493
Stoker, Carol, 486
Stolper, E. M., 277
Stone, Bradley M., 233
Stooke, P. J., 326, 475
Stothers, Richard B., 136
Stouffer, Virginia, 209
Stough, T., 425
Stoyanovski, Ivan, 56
Strachan, R., 427
Strecker, Donald, 265, 266
Street, Kenneth W., 68
Stringer, Matt S., 210
Stroganov, I. A., 504
Strom, R. G., 374, 385, 398
Strong, J., 410, 415, 416
Stroscher, Christoph, 221
Stubbs, David A., 114
Su, C., 242
Su, Ching-Hua, 240, 241
Subramanyam, Guru, 84
Sucharski, T., 442, 505
Sucharski, T. L., 322
Sud, Y. C., 134
Suess, Steven T., 532
Sugihara, T., 445
Sugiura, N., 303
Sugiyama, K., 359
Sullivan, R., 317
Sun, Henry, 394
Sun, M., 98
Sun, W., 60
Sunkara, B., 450
Sunshine, J. M., 406
Supulver, K. D., 319
Susick, J. W., 139
Sutton, S. R., 431, 432, 448
Sweet, B. T., 33
Swift, M. R., 308
Swift, Walter L., 73
Swindle, T. D., 354, 355, 377, 438, 442, 467
Sylvester, P. J., 401
Syono, Y., 452
Szathmary, E., 503
Szilassi, L., 520
Szofran, F. R., 241

T

Tachibana, S., 289, 290
Tachikawa, O., 356
Tada, R., 348
Tajika, E., 316, 348, 424, 472
Takagi, M., 324
Takamiya, I., 316
Takaoka, N., 285, 369
Takeda, H., 335
Takeda, Hiroshi, 478
Takeda, Kazuhiro, 103
Takizawa, Y., 446
Talley, C., 44
Tanaka, K. L., 272, 322, 323, 325, 348, 388, 398, 429, 503, 521
Tanaka, S., 445, 446
Tankersley, L. L., 112
Tanner, R., 427
Tans, Pieter P., 135
Tanton, L. T. Elkins, 336
Tao, Wei-Kuo, 154
Taranik, J., 418
Tate, A., 304
Tavernelli, Paul F., 85
Taylor, G. J., 288, 407, 497, 506
Taylor, L. A., 298, 341, 349, 350, 440, 461, 483, 504, 521, 523
Taylor, Lawerence A., 394
Taylor, Lawrence A., 350, 358, 476
Taylor, Nigel A., 188
Taylor, S., 414, 446
Tedesco, E. F., 474
Teeter, G., 404
Tegner, C., 378
Tejada-Martinez, Andrew, 98
Tejfel, V. G., 521
Telegadas, H. K., 110
Telouk, P., 377
Temerin, M., 147
Temi, P., 264
Teplov, V. A., 456
Teply, J., 120
Tera, F., 369, 380
Tera, Fouad, 378
Termeer, M. K., 217, 227
Ternet, G. K., 50
Terrell, D., 524
Terribilini, D., 299
Tesei, A., 224
Tesny, Neal, 84
Thadhani, Naresh N., 71
The, L.-S., 380
Theno, T. W., 270, 367
Therkelsen, J. P., 526
Therriault, A. M., 454
Thiemens, M. H., 287, 352, 370, 482
Thomas, C., 327, 521
Thomas, Constantine, 283
Thomas, J. L., 93
Thomas, N., 422, 427
Thomas, P. C., 307, 308, 309
Thomas, Pete, 306
Thomas, Peter, 364
Thomas, R. J., 455
Thomas, Russell H., 206
Thomas-Keprta, K., 353
Thomas-Keprta, K. L., 417, 448, 470, 471
Thomas-Keprta, Kathie L., 392
Thompson, K. T., 322, 324
Thompson, Mike, 11
Thompson, Pamela B., 368
Thompson, R. C., 190
Thompson, T. W., 426
Thomson, B. J., 281, 427, 501
Thomson, R. E., 404
Thorsos, I. E., 347
Throop, H. B., 326
Tielens, A. G. G. M., 264
Timko, M., 521
Timmer, A., 244
Titus, T. N., 376
Tiwari, S. N., 55
Tobola, K., 367
Todd, Kevin B., 56
Toft, B., 447
Tolk, Andreas, 250
Tomaru, A., 360
Tomasella, L., 510
Tomioka, N., 292, 464
Tomlinson, Stephen, 163
Tomlinson, W., 237
Tompkins, S., 406
Tompkins, Stephanie, 268
Tonui, E., 285, 369, 461
Tonzola, C., 451
Tooman, Tim P., 149
Toon, Owen B., 529
Toporski, J., 393
Toporski, J. K. W., 392
Toporski, Jan, 476
Toppani, A., 413
Torczon, Linda, 204
Torok, K., 453
Torres, O., 141
Towner, M. C., 327, 427
Townsend, Alan R., 128, 135, 141
Tozzi, S., 127
Trammel, Charles, 21
Trangeled, Alex, 80
Travis, B. J., 398
Treiman, A. H., 352, 354
Treiman, Allan H., 351, 368, 392
Tribbett, K. L., 320

Trilling, D. E., 383
Trilling, David E., 275
Trionfetti, G., 446
Tripathi, A., 452
Tripathi, R. P., 452
Trivikrama Rao, S., 130
Trombka, J. I., 306, 363
Trudell, Jeffrey, 53
Trump, D., 526
Tsay, Si-Chee, 105
Tsuchiyama, A., 278
Tsuge, Yoshifumi, 103
Tsukamoto, K., 356, 450
Tsunemi, H., 430
Tucker, J. E., 112
Tucker, John, 35
Tuckwell, G. W., 279, 438
Tufts, B. R., 403, 478
Tufts, B. Randall, 438
Tumer, Irem Y., 19
Tung, Chee, 2
Tunyi, I., 521
Turcotte, D. L., 295
Turner, David D., 109, 149
Turner, Janelle, 259
Turner, N. E., 148
Turner, P., 12
Turner, Travis L., 56, 63
Turtle, E. P., 346, 372, 398, 434, 435, 437
Turton, D., 129
Tylka, A. J., 267

U

Uda, Nobuhide, 52
Uedo, Y., 452, 465
Uedo, Yuki, 309
Ullmann, J., 340
Ulyanov, A. A., 358, 494
Umbanhower, Paul, 89
Upadhyay, C., 452
Urquhart-Kelly, M., 307
Urrutia-Fucugauchi, J., 457
Ustinova, G. K., 489, 522

V

Valentian, D., 37
Valeriu, Patriciu Victor, 78
Vali, H., 392, 484
vanAanhold, J. E., 88
vanBaar, B. L. M., 58, 161
vanBeek, P. J. G., 217
vanBreda, L., 28
VanDam, J. W., 236
vanderBogert, C. H., 292
vanderHeide, E., 68
Vanderhoff, John A., 71
vanderKolk, D. A., 320
VanderVelden, S., 22
VanderWijngaart, Rob F., 205, 216
vanderWulp, C. J. M., 102
vanDoormaal, J. C. A. M., 115, 116
VanDyk, Steven G., 68
vanEijck, D. J. N., 196, 223
vanErp, J. B. F., 28, 192, 213
vanH ees, W. W. S., 121
Vanhala, H. A. T., 273
VanHooser, Katherine, 89
Vaniman, D. T., 433
VanKeuls, Fred W., 84
VanOrman, J. A., 336
vanSusante, P., 366, 496
vanVeen, H. A. H. C., 28, 192
vanVliet, A. J., 190, 193
vanVoorde, M. J., 104
vanWijngaarden, S. J., 77
vanWinsum, W., 213
Vanzani, V., 510
Varela, M. E., 359, 389, 508
Varga, Margaret, 203
Varga, V., 368
Vasques, Marilyn F., 178
Vasut, J. A., 522
Vaughan, R. G., 418
Vaughn, Jason A., 44
Veeder, G. J., 372
Veeramony, Jayaram, 126
Velbel, M. A., 417
Veldhuis, G. J., 244
Venable, Timothy B., 247
Venance, K., 356, 516
Verchovsky, A. B., 286, 361, 381, 495, 517
Verdon, Joseph M., 227
Verhave, J. A., 214, 228
Verma, H. C., 452
Vermeulen, R. C. N., 227
Vernik, R. J., 208
Veverka, J., 307, 308
Veverka, Joseph, 306, 309
Viall, Kenneth E., 81
Vicenzi, E. P., 353
Vickerman, J. C., 353
Vidal, A., 375
Videen, Gordon, 49
Vieux, B. E., 123
Viken, Sally A., 2
Vikram, Chandra S., 103
Vilas, F., 307, 385, 474
Vink, Frederik H., 80
Vinokur, M., 96
Virgin, Lawrence N., 30
Vita-Finzi, C., 280
Voas, Jeffrey, 202
Vocadlo, L., 402
Voevodine, Valeri G., 238
Vogel, N., 522
Vogt, Gregory L., 261
Volz, M. P., 241
Vondrak, R. R., 397
Vos, J., 225
Voss, M. E., 384
Vrionides, Polis, 21
Vujisic, L., 241

W

Wade, Charles E., 174
Wadhwa, M., 481
Waenke, H., 409
Waesch, E., 389
Wagner, Michael, 19
Wagner, R., 282, 328, 436, 497
Wagner, Roland, 328
Wainwright, Rodney C., 21
Walker, G. A. H., 474
Walker, G. K., 134
Walker, James L., 57
Walker, R. J., 400, 530
Walker, Raymond J., 529, 530
Walko, Lawrence C., 80
Wallace, Margaret, 172
Wallis, D. W., 348
Walsh, Marie K., 170
Walsh, Maud, 476
Walsh, Maud M., 393
Walte, J. H., Jr., 530
Walter, M. J., 401
Waluschka, Eugene, 261
Wang, A., 298, 429, 506, 507, 523
Wang, Alian, 393
Wang, D., 464
Wang, H., 423
Wang, J., 459, 483
Wang, Ling Jun, 240
Wang, Tee-See, 97
Wang, Ten-See, 103
Wang, X. Y., 227
Wang, Xiao Y., 229
Wang, Xiao-Fan, 83
Wang, Yong-Dong, 166
Wanke, H., 516

Warburton, T., 217
Ward, F. A., 122
Ward, J. G., 423
Ward, Michael D., 240
Ward-Thompson, D., 264
Wark, D. A., 358, 523
Warmflash, D., 469, 470
Warner, M. R., 457
Warner, N. H., 526
Warren, J. L., 433, 448
Warren, P. H., 341, 523
Warren, Paul H., 391
Wasch, E., 508
Wasilewski, P. J., 356
Wasserburg, G. J., 294, 300, 302, 478, 479
Wasserman, A. A., 293, 378, 467
Wasson, J. T., 291, 301, 478, 517, 524
Watanabe, N., 468
Watson, Kent A., 68
Watson, Layne T., 202
Watson, Michael D., 236
Watters, T. R., 364, 441, 518, 524
Watters, Thomas R., 305
Wdowiak, T., 429
Webb, Benjamin M., 272
Webb, Chuck, 19
Webb, Gary L., 80
Webbon, Bruce W., 173
Weber, H. W., 460, 463, 508
Weber, I., 448
Weckwerth, G., 508
Wegman, D. H., 187
Weidemann, Alan D., 104, 127, 157
Weidenschilling, S. J., 275, 384, 474
Weimer, Bart C., 170
Weinman, J. A., 155
Weisberg, M. K., 291, 301
Weiss, B. P., 484
Weiss, D., 460
Weiss, L. A., 122
Weitz, C. M., 386, 410
Weitz, David A., 89
Welch, Michael J., 50
Weldon, Keri J., 180
Wellemeyer, Charles G., 145
Weller, L., 329
Wellnitz, D., 307
Wells, Robert L., 162
Welten, K. C., 480
Welton, Ellsworth J., 109
Wen, Fang, 24, 81, 199
Wentworth, S. J., 353, 417, 470, 471
Wentworth, Susan J., 392, 396
Werking, William E., 16
Westall, F., 393, 470, 475
Westall, Frances, 476, 477
Wetherill, G. W., 274
Wetherill, George W., 275
Whalen, Robert T., 182
Whitaker, G. D., 253
White, B. R., 491
White, I., 251
White, J., 58
White, James W. C., 136
White, Michael A., 169
White, Raymond L., 164
White, William E., 172
Whitley, Scott, 18
Whitworth, T. M., 138
Widicus, Susanna, 347
Wieczorek, Mark A., 280, 299, 394
Wieler, R., 344, 381, 465, 480, 502, 509, 522
Wielicki, Bruce A., 125
Wiens, R. C., 396, 425, 431
Wierzchos, J., 392
Wiesmann, H., 269, 483
Wilcoski, James, 146
Wildeman, Thomas R., 235
Wilder, M. C., 102
Wilhelms, D. E., 281
Wilkins, Scott J., 304, 312
Wilkison, S. L., 308, 364
Willett, Peter, 24, 81, 199
Williams, D. A., 433
Williams, J. G., 343
Williams, K. K., 421, 454
Williams, R. M., 387
Williams, R. T., 150
Williams, Rebecca M. E., 375
Wils, E. R. J., 58, 161
Wilson, G. R., 491
Wilson, Gregory R., 268
Wilson, L., 270, 271, 312, 314, 338, 371, 434, 496, 497, 501, 519, 524
Wilson, M., 175
Wilson, Marcia A., 225
Wilson, R. R., 434
Winglee, R. M., 237
Winklhofer, M., 392
Wirick, S., 357, 412
Witherow, William K., 103
Withers, Paul, 340
Witte, David W., 26
Wlotzka, F., 269
Wolbach, Wendy S., 347
Wolf, U., 269, 337
Wolfe, Marilyn J., 139
Wolff, M. J., 490
Wong, A. K., 24
Wong, George Y., 215
Wong, H. V., 236
Wong, M., 271
Wong, M. P., 525
Woo, C., 170
Wood, C. F., 156
Wood, J. A., 459, 461, 504, 513, 514
Wood, John A., 290, 358
Woodall, Roger L., 224
Woodruff, S. L., 88
Woodward, Kelly H., 187
Woosley, Raymond, 231
Worden, S. P., 474
Worrall, D. M., 260
Wright, I. P., 286, 361, 381, 427
Wronski, T. J., 179
Wunder, M., 250
Wyatt, M. B., 409, 419
Wygant, J. R., 147
Wylie, Donald P., 131
Wynia, Sikke Jan, 221
Wynn-Williams, D. D., 315, 377, 472

X

Xie, X., 464
Xie, Z., 292, 464
Xiong, Y. -L., 290
Xiong, Zhongmin, 97
Xirouchakis, D., 467
Xirouchakis, Dimitrios M., 351

Y

Yakovlev, O. I., 269
Yakshinskiy, B. V., 468
Yamada, Toshishige, 239
Yamagata, Kenichi, 103
Yamaguchi, A., 359, 391
Yamamoto, S., 346, 348
Yamamoto, T., 121
Yamamoto, Y., 430
Yamazaki, A., 446
Yanai, K., 360, 361
Yarrow, Maurice, 207
Yazzie, R., 325
Yee, Albert F., 69
Yee, H. C., 91, 96, 228, 230
Yelle, R. V., 520
Yelleswarapu, C., 106
Yen, A. S., 433, 486
Yeomans, D., 308
Yeomans, Donald K., 363
Yin, Q.-Z., 377

Yin, Qing-Zhu, 377
Ying, Jie, 207
Yingling, Jonathan, 83
Yingst, R. A., 270, 367
Yoburn, J. B., 325
Yoder, C. F., 343
Yokoyama, E., 450
Yoneda, S., 369, 462
Yoon, D. Y., 208, 212
Yoshida, S., 445, 446
Yoshikawa, I., 446
Young, D. A., 280, 330
Young, D. T., 530
Young, E. D., 278
Young, E. F., 524
Young, L. A., 524
Young, R., 122
Yudin, Valery A., 77
Yurimoto, H., 301, 302, 356, 450

Z

Zabalueva, E. V., 490
Zaglaniczny, K., 170
Zahnle, K. J., 403
Zak, K., 294
Zakharian, A., 297
Zakrajsek, Robert J., 13
Zaman, K. B. M. Q., 4
Zaneveld, J. Ronald V., 127
Zarka, P., 529
Zarnecki, J. C., 427
Zaromb, Solomon, 133
Zartman, R., 483
Zatsepin, V. I., 233
Zebker, H. A., 329
Zega, Thomas J., 290
Zeigler, R. A., 298, 340
Zema, M., 342
Zender, J. J., 426
Zent, A. P., 417, 525
Zhang, R., 241
Zhang, Tingjun, 150
Zhang, You-Xue, 360
Zheng, Desheng, 204
Zhong, M., 344
Zhong, S., 296, 513
Zhu, Dongming, 55
Zhu, S., 70, 242
Zhu, Shen, 240, 241
Zhuravlev, D. A., 267
Zielinski, Alexander E., 38
Ziemba, T., 237
Zimbelman, J. R., 315, 324, 387, 526
Zimmerman, Randy, 156
Zinner, Ernst, 380
Zipfel, J., 301, 481
Zipfel, Jutta, 351
Zolensky, M. E., 285, 287, 356, 362, 369, 459, 461, 504
Zolotov, M. Y., 373
Zolotov, M. Yu., 440, 525
Zook, H. A., 450
Zuber, M., 308
Zuber, M. T., 296, 309, 386, 513
Zuber, Maria T., 280, 295, 299, 304, 375, 394