

NASA SP-7011 (437)
April 21, 1997

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES



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.

Specialized services that help round out 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, you can:

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

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

Phone the NASA Access Help Desk at (301) 621-0390

Write to: NASA Access Help Desk
NASA Center for AeroSpace Information
800 Elkridge Landing Road
Linthicum Heights, MD 21090-2934

This publication was prepared by the NASA Center for AeroSpace Information,
800 Elkridge Landing Road, Linthicum Heights, MD 21090-2934

Introduction

This issue of *Aerospace Medicine and Biology, A Continuing Bibliography with Indexes* (NASA SP-7011) lists reports, articles, and other documents recently announced in the NASA STI Database. In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which humans are subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. Applied research receives the most emphasis, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the publication consists of a standard bibliographic citation accompanied, in most cases, by an abstract.

The NASA CASI price code table, addresses of organizations, and document availability information are included before the abstract section.

Two indexes—subject and author are included after the abstract section.

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.

**Timely
Flexible
Complete
FREE!**

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 in the message area formatted as follows:

Subscribe <desired list> <Your name>

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

Phone: (301) 621-0390

Fax: (301) 621-0134

Write: NASA Access Help Desk
NASA Center for AeroSpace Information
800 Elkridge Landing Road
Linthicum Heights, MD 21090-2934

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** in the message area of your e-mail to listserv@sti.nasa.gov.



Table of Contents

Records are arranged in categories 51 through 55, the Life Sciences division of *STAR*. Selecting a category will link you to the collection of records cited in this issue pertaining to that category.

51	Life Sciences (General)	1
52	Aerospace Medicine Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.	4
53	Behavioral Sciences Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.	6
54	Man/System Technology and Life Support Includes human engineering; biotechnology; and space suits and protective clothing.	9
55	Space Biology Includes exobiology; planetary biology; and extraterrestrial life.	N.A.

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 view the indexes provided, for searching on *NASA Thesaurus* subject terms and author names.

Subject Term Index	ST-1
Author Index	PA-1

Selecting an index above will link you to that comprehensive listing.

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.

The New NASA Video Catalog is Here

Free!

To order your copy,
call the NASA Access Help Desk at

(301) 621-0390,

fax to

(301) 621-0134,

e-mail to

help@sti.nasa.gov,

or visit the NASA STI program

homepage at

<http://www.sti.nasa.gov/STI-homepage.html>

(Select STI Program Bibliographic Announcements)

Explore the Universe!

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
800 Elkridge Landing Road
Linthicum Heights, MD 21090-2934

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 and patent applications 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.

NASA patent application specifications are sold in both paper copy and microfiche by the NASA Center for AeroSpace Information (CASI). The document ID number should be used in ordering either paper copy or microfiche from CASI.

The patents and patent applications announced in the STI Database are owned by NASA and are available for royalty-free 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 (INIS) 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
800 Elkridge Landing Road
Linthicum Heights, MD 21090–2934

(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 Code Table

(Effective July 1, 1996)

CASI PRICE CODE	NORTH AMERICAN PRICE	FOREIGN PRICE
A01	\$ 6.50	\$ 13.00
A02	10.00	20.00
A03	19.50	39.00
A04-A05	21.50	43.00
A06	25.00	50.00
A07	28.00	56.00
A08	31.00	62.00
A09	35.00	70.00
A10	38.00	76.00
A11	41.00	82.00
A12	44.00	88.00
A13	47.00	94.00
A14-A17	49.00	98.00
A18-A21	57.00	114.00
A22-A25	67.00	134.00
A99	Call For Price	Call For Price

Important Notice

The \$1.50 domestic and \$9.00 foreign shipping and handling fee currently being charged will remain the same. Foreign airmail is \$27.00 for the first 1-3 items, \$9.00 for each additional item. Additionally, a new processing fee of \$2.00 per each video ordered will be assessed.

For users registered at the NASA CASI, document orders may be invoiced at the end of the month, charged against a deposit account, or paid by check or credit card. NASA CASI accepts American Express, Diners' Club, MasterCard, and VISA credit cards. There are no shipping and handling charges. To register at the NASA CASI, please request a registration form through the NASA Access Help Desk at the numbers or addresses below.

Return Policy

The NASA Center for Aerospace Information will gladly replace or make full refund on items you have requested if we have made an error in your order, if the item is defective, or if it was received in damaged condition and you contact us within 30 days of your original request. Just contact our NASA Access Help Desk at the numbers or addresses listed below.

NASA Center for Aerospace Information
800 Elkridge Landing Road
Linthicum Heights, MD 21090-2934

E-mail: help@sti.nasa.gov
Fax: (301) 621-0134
Phone: (301) 621-0390

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
800 Elkridge Landing Road
Linthicum Heights, MD 21090-2934.

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. Miller 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

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 437)

APRIL 21, 1997

51

LIFE SCIENCES (GENERAL)

19970011371 National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA USA

On the Visual Input Driving Human Smooth-Pursuit Eye Movements

Stone, Leland S., National Aeronautics and Space Administration. Ames Research Center, USA; Beutter, Brent R., National Aeronautics and Space Administration. Ames Research Center, USA; Lorenceau, Jean, National Aeronautics and Space Administration. Ames Research Center, USA; Dec. 1996; 14p; In English

Contract(s)/Grant(s): RTOP 199-16-12-37

Report No.(s): NASA-TM-110424; NAS 1.15:110424; A-962859; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Current computational models of smooth-pursuit eye movements assume that the primary visual input is local retinal-image motion (often referred to as retinal slip). However, we show that humans can pursue object motion with considerable accuracy, even in the presence of conflicting local image motion. This finding indicates that the visual cortical area(s) controlling pursuit must be able to perform a spatio-temporal integration of local image motion into a signal related to object motion. We also provide evidence that the object-motion signal that drives pursuit is related to the signal that supports perception. We conclude that current models of pursuit should be modified to include a visual input that encodes perceived object motion and not merely retinal image motion. Finally, our findings suggest that the measurement of eye movements can be used to monitor visual perception, with particular value in applied settings as this non-intrusive approach would not require interrupting ongoing work or training.

Author

Eye Movements; Visual Perception; Motion Perception; Image Motion Compensation; Retinal Images; Eye (Anatomy); Retina

19970011484 Nebraska Univ., Board of Regents, Lincoln, NE USA

Photo-Signal Transduction in Motile Cilia Blepharisma Final Report, 30 Sep. 1992 - 31 Dec. 1995

Song, Pill-Soon, Nebraska Univ., USA; Feb. 01, 1996; 4p; In English

Contract(s)/Grant(s): DAAL03-92-G0356

Report No.(s): AD-A308371; LWF/05-139-10402; ARO-29597.4-LS-EPS; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Blepharisma-japonicum and Stentor coeruleus, single cell protozoan ciliates, possess both light intensity- and wavelength-sensitivity. Their light sensor molecules, blepharismen and stentorin, respectively, contain hypericin-derived structures as unique photoreceptor chromophores. Under this grant, we recently elucidated the chemical structures of both blepharismen and stentorin. How these light sensor molecules mediate the intensity- and wavelength-sensitive light-sensory responses in these single cell organisms is still under investigation in this laboratory, results so far strongly suggest that both blepharismen and stentorin initiate their primary photoprocesses via electron transfer.

DTIC

Photographic Processing; Cells (Biology); Luminous Intensity; Microorganisms; Photoreceptors; Protozoa

19970011522 National Renewable Energy Lab., Golden, CO USA

Biological and chemical technologies research: FY 1995 annual summary report

Mar. 1996; 138p; In English

Contract(s)/Grant(s): DE-AC36-83CH-10093

Report No.(s): NREL/TP-430-20916; DE96-007936; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The annual summary report presents the Fiscal Year (FY) 1995 research activities and accomplishments for the USA Department of Energy (DOE) Biological and Chemical Technologies Research (BCTR) Program. This BCTR program resides within

the Office of Industrial Technologies (OIT) of the Office of Energy Efficiency and Renewable Energy (EE). The annual summary report for 1995 (ASR 95) contains the following: program description (including BCTR program mission statement, historical background, relevance, goals and objectives); program structure and organization, selected technical and programmatic highlights for 1995; detailed descriptions of individual projects; a listing of program output, including a bibliography of published work; patents; and awards arising from work supported by the BCTR.

DOE

Catalysts; Enzymes; Hydrocarbons; Research and Development

19970011649 Carolinas Medical Center, Dept. of General Surgery Research, Charlotte, NC USA

Immune Alterations in Male and Female Mice after 2-Deoxy-D-Glucose Administration

Dreau, Didier, Carolinas Medical Center, USA; Morton, Darla S., Carolinas Medical Center, USA; Foster, Mareva, Carolinas Medical Center, USA; Swiggett, Jeanene P., Carolinas Medical Center, USA; Sonnenfeld, Gerald, Carolinas Medical Center, USA; 1995; 28p; In English

Contract(s)/Grant(s): NAG2-933; NAG9-728

Report No.(s): NASA-CR-203876; NAS 1.26:203876; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Administration of 2-deoxy-D-glucose (2-DG), an analog of glucose which inhibits glycolysis by competitive antagonism for phosphohexose isomerase, results in acute periods of intracellular glucoprivation and hyperglycemia resulting in hyperphagia. In addition to these changes in the carbohydrate metabolism, injection of 2-DG results in alterations of both the endocrine and neurological systems as suggested by modifications in oxytocin and glucocorticoid levels and norepinephrine production. Moreover, alterations of the immune response, such as a decrease in the in vitro proliferation of splenocytes after mitogen-stimulation, were observed in mice injected with 2-DG. Sex, genotype and environment are among the factors that may modulate effects of catecholamines and hypothalamo-pituitary-adrenal axis on these immune changes. Sexual dimorphism in immune function resulting from the effects of sex hormones on immune effector cells has been shown in both animals and humans. These observations have important implications, especially with regard to higher incidence of many autoimmune diseases in females. Evidence exists that reproductive hormones influence the immune system and increase the risk of immunologically related disorders in both animals and humans. Indeed, immunological responses in stressful situations may also be confounded by fluctuations of sex hormones especially in females. Lymphocyte distribution, cytokine production, and the ability of lymphocyte to proliferate in vitro were analyzed in male and female mice to determine if sex influenced 2-DG immunomodulation. In addition, the influence of hormones, especially sex hormones, on these changes were evaluated.

Author

Immunology; Mice; Glucose; Glycolysis; Alterations; Immunity

19970011936 Madigan Army Medical Center, Takoma, WA USA

Magnetic Resonance Mammography (MRM): A Promising Application for Fat Suppression by Phase Unwrapping in the 3-Point-Dixon Method Final Report, 5 Dec. 1994 - 30 Jun. 1996

Ho, Vincent B., Madigan Army Medical Center, USA; Jul. 1996; 16p; In English

Contract(s)/Grant(s): MIPR-95MM5554

Report No.(s): AD-A315946; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Purpose: This study was undertaken (1) to further develop Phase Unwrapping in the 3-Point- Dixon Method (PU3PD) for Magnetic Resonance Mammography (MRM) on a V. 5.4 GE Signa 1.5 T MRI scanner, (2) to compare the PU3PD technique to conventional methods for fat signal elimination (subtraction 3D SPGR and FATSAT) in MRM. Subjects and Methods: 17 female patients (32-74 years; mean 48.76 years) with 18 mammographically suspicious lesions were enrolled. 18 sets of unilateral 3D SPGR and PU3PD images and 11 sets of bilateral FATS AT and PU3PD images were obtained following i.v. gadolinium contrast media administration. Results: PU3PD was preferred 89% over subtraction 3D SPGR and 73% over FATSAT images for fat elimination and 89% and 55% for lesion characterization. Pathologic confirmation was available for 15/18 lesions. PU3PD afforded improved lesion characterization than 3D SPGR as PU3PD images were not plagued by subtraction artifact. Bilateral FATSAT and PU3PD, performed at the end of each study both afforded suboptimal lesion/region characterization. Conclusion: PU3PD can provide better fat signal elimination than subtraction 3D SPGR and FATS AT. Lesion morphology on PU3PD images can be superior to subtraction 3D SPGR. PU3PD was developed for a v. 5.4 GE Signa 1.5 T MRI scanner.

DTIC

Magnetic Resonance; Morphology; Gadolinium; Lesions

19970011937 Miami Univ., FL USA

Role of CD44 and Variants in Membrane-Cytoskeleton Interactions, Adhesion, Metastasis and Human Breast Cancers
Annual Report, 1 Aug. 1995 - 31 Jul. 1996

Bourguignon, Lilly, Miami Univ., USA; Aug. 1996; 49p; In English

Contract(s)/Grant(s): DAMD17-94-J-4121

Report No.(s): AD-A315951; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

CD44 is the major hyaluronan cell surface receptor, and functions as an adhesion molecule in many different cell types including human breast epithelial cells. The coexpression of certain CD44 variants (CD44v), such as CD44v (v10/ex14), with CD44s (standard form) appears to be closely associated with human breast tumor metastasis. In this study we have established a stable transfection of CD44v (v10/ex14) cDNA into normal human breast epithelial cells (HBL100) which contain endogenous CD44s. Our results indicate that coexpression of both CD44v (v10/ex14) and CD44s alters the following important biological properties of these cells: (1) there is a significant reduction in hyaluronic acid (HA)-mediated cell adhesion; (2) there is an increased migration capability in collagen-matrix gel; and (3) these cells constitutively produce certain angiogenic factors which effectively promote tumorigenesis in athymic nude mice. These findings suggest that coexpression of CD44v (v10/ex14) and CD44s may trigger the onset of cell transformation required for breast cancer development.

DTIC

Mammary Glands; Cancer; Cells (Biology); Membranes; Epithelium

19970011973 Texas Univ., Medical Branch, Dept. of Physiology and Biophysics, Galveston, TX USA

GABA Transport: The Analysis of Mammalian and Bacterial Models *Final Report*

King, Steven C., Texas Univ., USA; Feb. 26, 1996; 58p; In English

Contract(s)/Grant(s): DAAH04-94-G-0014

Report No.(s): AD-A308319; ARO-32879.7-LS-YIP; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Convulsive seizures are a major symptom of central nervous system toxicity resulting from exposure to organophosphorous cholinesterase inhibitors such as Soman. Pharmacological management of these seizures has tended to focus on anticonvulsants that act postsynaptically on central receptors (muscarinic, NMDA, GABA). In contrast, a new generation of anticonvulsants act presynaptically to inhibit the GABA uptake protein. Since GABA uptake inhibitors augment inhibitory tone while preserving endogenous patterns of neuronal firing, anticonvulsants such as Tiagabin (NO-328) stand to exhibit a unique spectrum of actions and side-effects that are more efficacious and less limiting to physical performance than certain other pharmacological countermeasures used to protect against the central effects of organophosphorous anticholinesterase poisoning. In order to learn more about presynaptic anticonvulsants, we have cloned and characterized GABA transport systems from human and *E. coli*. The *E. coli* transporter is an attractive model system that mimics GABAergic ligand recognition in the central nervous system.

DTIC

Mammals; Bacteria; Biological Models (Mathematics); Central Nervous System

19970011976 Wake Forest Univ., Bowman Gray School of Medicine, Winston-Salem, NC USA

Role of a Novel Antioncogene that Prevents Metastatic Spread of Disease *Annual Report, 1 Jul. 1995 - 30 Jun. 1996*

Kute, Timothy E., Wake Forest Univ., USA; Jul. 1996; 46p; In English

Contract(s)/Grant(s): DAMD17-94-J-4342

Report No.(s): AD-A315955; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The purpose of this grant is to determine a mechanism of action for a novel antioncogene (i.e. nm23) which prevents the metastatic spread of disease. Our data would indicate that there is no relationship of nm23 expression with proteolytic factors such as cathepsin D, urokinase plasminogen activator, its receptor and its inhibitor. High levels of these factors have been shown to predict metastatic disease in breast cancer patients. Both western blot and ELISA analyses and also by immunohistochemistry were used to prove this lack of correlation. We did show that nm23 expression was related to metastatic potential using cell lines and xenografts. We also performed a clinical trial to determine if nm23 could predict prognosis in node negative breast cancer patients. Our results indicate that nm23 is not an independent prognostic indicator. Our results do indicate that when MDA-MB-23 1 cells are transfected with nm23 gene, they have a lower motility and become less metastatic in the nude mouse model system.

DTIC

Mammary Glands; Cancer; Diseases; Prognosis; Inhibitors

19970011978 Iowa Univ., Iowa City, IA USA

Role of SHPTP2 in Mitogenic Signaling *Annual Report, 30 Sep. 1995 - 29 Sep 1996*

Pessin, Jeffrey E., Iowa Univ., USA; Oct. 1996; 15p; In English

Contract(s)/Grant(s): DAMD17-95-J-4483

Report No.(s): AD-A315958; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The initial objectives were to determine the role of SHPTP2 in the growth factor (insulin and epidermal growth factor) activation of Ras. During the past funding period, these studies have lead us to identify a novel pathway directly involved in the down-regulation or inactivation of Ras following growth factor stimulation. We have been able to demonstrate that the inactivation of Ras occurs due to either an uncoupling of SOS from Grb2 (via insulin) or an uncoupling of hc from Grb2-SOS (via EGF) due to a feedback serine/threonine phosphorylation of OS. We have also recently demonstrated that these events occurs by a MEK- dependent but ERK-independent kinase. In order to further examine this critical regulatory pathway in the control of Ras activation/inactivation, we will identify the functional insulin and EGF stimulated SOS phosphorylation sites by deletion analysis and by site-directed mutagenesis. In parallel, we will perform PLC analysis to characterize and hopefully clone the specific kinase responsible or the functional phosphorylation of SOS. Finally, we will determine whether his phosphorylation is sufficient to account for the inactivation of Ras by performing in vitro dissociation studies and by expressing dominant-interfering mutants of the isolated SOS kinase.

DTIC

Phosphorylation; Cancer; Amino Acids; Mutations; Insulin

52

AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

19970011379 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA

Predictors of Atrial Arrhythmias for Patients Undergoing Coronary Artery Bypass Grafting

De Jong, Marla J., Maryland Univ., USA; Apr. 30, 1996; 75p; In English

Report No.(s): AD-A309071; AFIT/CI-96-025; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Coronary artery bypass grafting (CABG) is a commonly used and effective procedure to treat coronary artery disease. Atrial arrhythmias are common after CABG. The purpose of this descriptive study was to identify demographic, preoperative, intraoperative, and postoperative factors that predict atrial arrhythmias for post-CABG patients. The convenience sample consisted of 162 CABG patients who were in sinus rhythm preoperatively. Patients were observed postoperatively for the development of atrial arrhythmias. Data were collected using a prospective chart review. Fifty-two patients (32.1%) developed postoperative atrial arrhythmias. of patients who developed these arrhythmias, the arrhythmia occurred on the second or third postoperative day. Univariate predictors of postoperative atrial arrhythmias included age (p is less than .001) and presence of right coronary artery disease (p .004). Multivariate predictors of postoperative atrial arrhythmias included age (odds ratio by decade 1.93, 95% confidence interval 1.86-2.00, p .0007) and right coronary artery disease (odds ratio 2.67, 95% confidence interval 1.14-6.23, p .02). This model was 69.8% accurate in predicting postoperative atrial arrhythmias. The results of this study indicate that age and right coronary artery disease can be used to identify patients at increased risk for atrial arrhythmias after CABG.

DTIC

Coronary Artery Disease; Arteries; Arrhythmia; Bypasses; Heart

19970011380 Pennsylvania State Univ., Dept. of Chemistry, University Park, PA USA

Electrochemistry In and At Single Nerve Cells *Final Report*

Ewing, Andrew G., Pennsylvania State Univ., USA; Jun. 01, 1996; 9p; In English

Contract(s)/Grant(s): N00014-90-J-1161/P00005

Report No.(s): AD-A309787; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This report contains publications, patents, presentations, honors, and students reports. The following topics are discussed: Multiple Classes of Catecholamine Vesicles Observed During Exocytosis from the Planorbis Cell Body, Observation and Quantitation of Exocytosis from the Cell Body of a Fully Developed Neuron in Planorbis corneus, The Latency of Exocytosis Varies with the Mechanism of Stimulated Release in PC12 Cells, Electrochemical Monitoring of Individual Exocytosis Events from the Varicosities of Differentiated PC12 Cells, Characterization of the Effects of varying the pH and Monomer Concentration on Poly(oxyphenylene) Insulating Films on Carbon Fiber Electrodes, Picoliter Beakers for Capillary Electrophoresis and Voltammetry, Voltammetry of Adenosine After Electrochemical Treatment of Carbon Fiber Electrodes, Laser Activation of Microdisk Elec-

trodes Examined by Fast Scan Rate Voltammetry and Digital Simulation, Amperometric Monitoring of Stimulated Catecholamine Release from Rat Pheochromocytoma (PC12) Cells at Zeptomole Level, and Amphetamine Redistributes Dopamine from Synaptic Vesicles to the Cytosol and Promotes Reverse Transport

DTIC

Electrochemistry; Cells (Biology); Nervous System

19970011403 Institute of Space Medico, Beijing, China

Space Medicine and Medical Engineering, Volume 9

Wei, Jinhe, Editor, Institute of Space Medico, China; Yang, Tiande, Editor, Institute of Space Medico, China; Fan, Jianfeng, Editor, Institute of Space Medico, China; Huang, Duansheng, Editor, Institute of Space Medico, China; Xu, Zheng, Editor, Institute of Space Medico, China; Oct. 1996; ISSN 1002-0837; 60p; In English; In Chinese

Report No.(s): CN 11-2774/R; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Topics considered include: Changes in endothelial cell count and morphology after inhalation of low oxygen mixture; mechanism of circulatory and respiratory failure caused by large amounts of air in the circulatory system; design and experiments on a pulsatile centrifugal impeller blood pump; wavelet analysis and its application to compressing and reconstructing physiological signals; effect of hypoxia on pilot's cerebral oxygen saturation and blood volume; changes in cerebral blood flow under lower body negative pressure; and some problems in constructing human body impact dynamic model.

Derived from text

Hypoxia; Blood Flow; Cells (Biology); Blood Pumps; Blood Circulation; Physiological Effects; Blood Volume; Lower Body Negative Pressure; Human Body; Dynamic Models; Cardiovascular System

19970011686 Institute for Human Factors TNO, Soesterberg, Netherlands

Development of An Earplug Equipped with Active Noise Reduction Final Report Ontwikkeling van een Oordrp met Active Geluidreductie

Steeneken, H. J. M., Institute for Human Factors TNO, Netherlands; Verhave, J. A., Institute for Human Factors TNO, Netherlands; Goverts, S. T., Institute for Human Factors TNO, Netherlands; Dec. 18, 1995; 32p; In German

Report No.(s): AD-A307480; TNO-TM-1995-A-77; TD-95-1497; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In cooperation with Philips Asset and Groeneveld Etcea an earplug was developed equipped with an active noise reduction system. The goal, to achieve a extra active attenuation of 20 dB, is almost reached. An attenuation of 18 dB was obtained for frequencies below 500 Hz. Reduction of the loop-gain results in an extension of the frequency range with a tower attenuation. The system uses a specific telephone with an improved frequency response with respect to the standard walkman telephones. The casts of both telephone types are equivalent. The special designed telephone, however, has a low impedance which requires a complex adaptation to the electronic control unit. The use of a personal moulded earplug as connection between the ear canal and the electro-acoustic part of the system gives some leakage. Application of a standard earplug gives better results and is general applicable, however, the fixation with the ear canal is not as robust as with a personal moulded plug.

DTIC

Active Control; Noise Reduction; Frequency Response; Hearing; Plugs; Telephones

19970011756 Department of the Navy, Washington, DC USA

Apparatus for Diagnosing Sleep Breathing Disorders

Katz, Richard A., Inventor, Department of the Navy, USA; Lawee, Michael S., Inventor, Department of the Navy, USA; Newman, A. K., Inventor, Department of the Navy, USA; Jul. 10, 1996; 26p; In English

Patent Info.: Filed 10 Jul. 1996; US-Patent-Appl-SN-687098

Report No.(s): AD-D018199; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

This invention is generally related to methods and apparatus for performing medical diagnoses and particularly to a method and apparatus for diagnosing individuals with sleep breathing disorders or other physiological respiratory functions. Sleep breathing disorders and other physiological respiratory dysfunctions in humans constitute an area requiring diagnosis. One such area is called obstructive sleep apnea or sleep disorder breathing. Within the pediatric, infant and newborn population the incidence of apparent life threatening events, sudden infant death syndrome and sleep disorder breathing have all been well documented. Sleep apnea also affects over 25% of apparently healthy adults age 55 and older. Sleep apnea contributes to daytime fatigue, increased work place accidents and a number of cardiovascular disorders. The need for a relatively easily implemented procedure exists to provide efficient methods and procedures for diagnosing these various physiological respiratory dysfunctions.

DTIC

Patent Applications; Order-Disorder Transformations; Respiratory System; Sleep Deprivation; Cardiovascular System

19970011939 Maryland Univ., College Park, MD USA

Role of eIF-2a-Specific Protein Kinase (PKR) in the Proliferation of Breast Carcinoma Cells *Final Report, 1 Jul. 1994 - 30 Jun. 1996*

Jagus, Rosemary, Maryland Univ., USA; Jul. 1996; 14p; In English

Contract(s)/Grant(s): DAMD17-94-J-4324

Report No.(s): AD-A315959; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The eIF2a-specific protein kinase, PkR, has been implicated as a tumor suppressor gene because of its growth suppressive and translational inhibitory properties, as well as the ability of nonfunctional mutants of PKR to transform cells. We have sought to investigate the possibility that the aberrant regulation of cellular protein synthesis underlies the loss of growth control in breast carcinoma cells through dysfunction of the dsRNA activated, eIF2a-specific protein kinase, PKR. We have compared the expression and regulation of activity of PKR in normal breast and breast carcinoma cell lines and found unusually high levels of PKR, as well as evidence of an inhibitor of PkR activity in breast carcinoma cells. This PKR inhibitor could be involved in the establishment of the transformed state of breast carcinoma cells and could also be responsible for the resistance of breast carcinoma cells to interferon treatment. These data represent the first documentation of a defect in PKR associated with a human malignancy.

DTIC

Mammary Glands; Cancer; Cells (Biology); Protein Synthesis; Tumors

53

BEHAVIORAL SCIENCES

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

19970011274 Armstrong Lab., Wright-Patterson AFB, OH USA

Self-Reported Aviation Concerns of Male and Female U.S. Air Force and Army Rated Aircrew *Interim Report, Jan. 1993 - Feb. 1996*

Voge, Victoria M., Armstrong Lab., USA; King, Raymond E., Armstrong Lab., USA; Feb. 1996; 43p; In English

Contract(s)/Grant(s): AF Proj.7755

Report No.(s): AD-A308312; AL/AO-TR-1996-0039; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

An anonymous survey of all US Army and Air Force rated female aircrew and age/duty-matched men covered demographics; aircraft fit and safety; interpersonal relationships, waste disposal, menstruation, personal equipment, prisoner of war (POW), and women-in-combat concerns. of 1,134 questionnaires mailed, 44-66% were returned (depending on job, service, time in service, and gender). Male and female aircrew were similar in many respects (as delineated in the report), probably indicating self-selection into aviation. Women, however, were medically grounded for prolonged periods twice as often as men, not completely due to pregnancy. Despite safety concerns, women and men were generally happy with their aircraft. Women, and some men, used dehydration/fasting to cope with inadequate aircraft waste collection systems. Small women and large men had problems with personal flight equipment, although equipment fit most aircrew of both genders. Women felt they have to work harder, but admit to having received special help in learning to fly. Many men were upset with 'affirmative action' but were reticent to complain. Women had problems with their (male) peers' wives. Many aircrew believed they have inadequate POW training; women fear rape. Men were not convinced women should fly in combat; women overwhelmingly asserted they should. Both genders believed there should be no quotas; combat slots should be allotted on merit. Men thought they might be expected to protect a female POW. Women, although denying menstrual concerns and refusing to take themselves off the flight schedule, admitted to taking over-the-counter and prescription medications to alleviate menstrual symptoms.

DTIC

Flight Crews; Females; Males; Signs and Symptoms

19970011388 Armstrong Lab., Crew Systems Directorate, Wright-Patterson AFB, OH USA

Quantifying Human Performance of a Dynamic Military Target Detection Task: An Application of the Theory of Signal Detection *Interim Report, Nov. 1994 - Jun. 1995*

Turner, Stuart L., Armstrong Lab., USA; Jun. 1995; 102p; In English

Contract(s)/Grant(s): AF Proj. 7184

Report No.(s): AD-A308392; AL/CF-TR-1995-0130; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

As crew aiding technologies are developed to assist military aviators in performing complex target detection tasks, evaluation metrics must be developed which are common to both human operators and Automatic Target Recognition (ATR) systems so that performance comparisons can be efficiently conducted. The dynamic nature of the multiple target detection task introduces sever-

al unique problems in quantifying detection performance. Classical methods of implementing the Theory of Signal Detection (TSD) to quantify performance have proven to be insufficient, and ATR evaluators have developed unique metrics which have not been applicable to evaluating human performance. This research introduced a novel application of TSD to the dynamic, multiple target detection scenario, and a new method of evaluating human performance was developed by adapting an established ATR evaluation method to human subject performance. A linear relationship was discovered between the TSD metric d' and the new evaluation metric, validating the new evaluation method. The new method provided a common metric for evaluating both human and ATR performance of multiple target detection tasks.

DTIC

Target Acquisition; Performance Tests; Evaluation

19970011606 University of Southern California, Information Sciences Inst., Marina del Rey, CA USA

Efficient Incremental Induction of Decision Lists. Can Incremental Learning Outperform Non-Incremental Learning?
Topical Report

Shen, Wei-Min, University of Southern California, USA; Jan. 1996; 19p; In English

Contract(s)/Grant(s): F30602-94-C-0210; MDA972-94-2-0010; C94-0031

Report No.(s): AD-A308441; ISI/RR-96-433; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Although incremental learning has many advantages in theory, it is not in practice as widely used as non-incremental learning for real-world applications. One major reason for this situation is the lack of incremental algorithms that can perform as fast as non-incremental algorithms in general. In this paper, we present an effective yet very efficient incremental algorithm CDM for learning decision lists whose complexity is $O(dn(\exp 2))$, where d is the number of attributes and n the number of training instances. On the experiments we have conducted, CDLA's performance is as fast and accurate as the best non-incremental learning algorithms for batch tasks, and is much faster than the best-known incremental and non-incremental learning algorithms for serial tasks. We also show that efficient incremental algorithms can provide new research opportunities for learners to actively select training instances for better accuracy and higher speed, and that incremental learning may eventually outperform non-incremental learning in many aspects.

DTIC

Learning Theory; Decision Making; Algorithms; Induction

19970011852 Decision Systems Research, Inc., Herndon, VA USA

Questionnaire Measuring the Utility of Knowledge-Based Systems *Final Report, Nov. 1993 - Feb. 1995*

Riedel, Sharon L., Army Research Inst., USA; Trent, Ann P., Kansas Univ., USA; Adelman, Leonard, Decision Systems Research, Inc., USA; Gualtieri, James, Decision Systems Research, Inc., USA; Jan. 1996; 77p; In English

Contract(s)/Grant(s): DAAL03-91-C-0034; DA Proj. D730

Report No.(s): AD-A309015; ARI-TR-1036; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This paper describes the development and validation of an off-the-shelf questionnaire designed to be tailored, as needed, to obtain the opinions of potential users of knowledge based systems. Development began with a literature review to identify criteria used by different researchers to assess system utility and usability. The identified criteria then were organized into a multi-attributed hierarchy with the top three dimensions being Effect on Task Performance, System Usability, and System Fit. The bottom-level attributes were used to develop the questions for assessing system utility. In May 1994, the questionnaire was successfully tailored and used by the Army's Battle Command Battle Laboratory to evaluate 11 decision aiding prototypes. The questionnaire distinguished between those prototypes the soldiers liked and those that they did not. Psychometric analyses indicated the questionnaire passed required tests for reliability and validity.

DTIC

Knowledge Based Systems; Psychometrics; Surveys

19970011880 Army Research Lab., Adelphi, MD USA

FERET (Face Recognition Technology) Recognition Algorithm Development and Test Results *Final Report, Sep. 1993 - Aug. 1996*

Phillips, P. Jonathon, Army Research Lab., USA; Rauss, Patrick J., Army Research Lab., USA; Der, Sandor Z., Army Research Lab., USA; Oct. 1996; 72p; In English

Report No.(s): AD-A315841; ARL-TR-995; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

As part of the Face Recognition Technology (FERET) program, the U.S. Army Research Laboratory (ARL) conducted supervised government tests and evaluations of automatic face recognition algorithms. The goal of the tests was to provide an independent method of evaluating algorithms and assessing the state of the art in automatic face recognition. This report describes the

design and presents the results of the August 1994 and March 1995 FERET tests. Results for FERET tests administered by ARL between August 1994 and August 1996 are reported.

DTIC

Evaluation; Performance Tests; Personnel Management; Algorithms

19970011913 Federal Aviation Administration, Civil Aeromedical Inst., Oklahoma City, OK USA

Shift Work, Age, and Performance: Investigation of the 2-2-1 Shift Schedule Used in Air Traffic Control Facilities., Laboratory Performance Measures Final Report

Rocco, Pamela S. Della, Federal Aviation Administration, USA; Cruz, Crystal E., Federal Aviation Administration, USA; Sep. 1996; 60p; In English

Report No.(s): AD-A315493; DOT/FAA/AM-96/23; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Many Air Traffic Control Specialists (ATCSs) work a counterclockwise rotating shift schedule, called the '2-2-1', or some variation of the schedule. The 2-2-1 involves rotating from two afternoon shifts to two mornings, and finally, to a midnight shift over the course of one work week. The purpose of the present study was to investigate the effects in two different age groups of working the 2-2-1 schedule, as compared to a straight day schedule on measures of complex task performance in a laboratory-based synthetic work environment. It was hypothesized that the counterclockwise rotations would result in performance decrements over the course of the 2-2-1 week. Four groups of five male subjects between the ages of 30 to 35 (n = 10) and 50 to 55 (n = 10) participated in the four-week study. Subjects were screened on medical and cognitive criteria. The Multiple Task Performance Battery (MTPB) was utilized to provide a motivating synthetic work environment. Subjects worked three 2-hour sessions on the MTPB per eight-hour day for three weeks of a four-week protocol. During the second and fourth weeks, subjects worked day shifts (0800-1630). During the third week, subjects worked the 2-2-1 schedule. Performance measures were analyzed for each of the five tasks in the MTPB. Composite scores were also computed. Significant performance decrements were observed primarily on the night shift for both age groups. The older group demonstrated decrements in accuracy of recall on the code lock task following both rapid rotations during the 2-2-1 schedule. This study was part of a research program designed to develop fatigue countermeasures for Air Traffic Control Specialists. The hypothesis that the rapid, counterclockwise rotations would result in performance decrements was partially supported.

DTIC

Air Traffic Controllers (Personnel); Human Performance; Air Traffic Control; Workloads (Psychophysiology)

19970011914 Institute for Human Factors TNO, Soesterberg, Netherlands

Continuous Haptic Information and Platform Stabilization in Target Tracking Final Report

Korteling, J. E., Institute for Human Factors TNO, Netherlands; vanEmmerick, M., Institute for Human Factors TNO, Netherlands; Aug. 28, 1996; 29p; In English

Report No.(s): AD-A315563; TNO-TM-96-B012; TDCK-RP-96-0174; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The present study was conducted to gain insight in the effects of different forms of continuous haptic information (CHI) to operator performance of an unmanned platform equipped with a camera-monitor system. In a simulator experiment, subjects had to track a moving target keeping a simulated disturbed platform as well as possible straight above a moving target. While performing this tracking task, haptic information was provided concerning translations of the platform (and thereby of camera). Two independent control variables were manipulated between-subjects (four control conditions). These factors were: presence or absence of CHI and of (automated) stabilization of the platform. Each of the four groups consisted of 14 subjects. Three other factors were varied within-subjects, i.e., image degradation by four different image update rates, motor taskload through the amount of target motion, and visual taskload by the presence or absence of an extra visual attention-task. During the experiment subjects were seated in front of a monitor in a closed room. This screen was used for visual information presentation. The supplementary haptic information was generated by movements of a so-called active joystick which at the same time was used for steering the camera by 'force control'. Analysis of the tracking errors shows that CHI as well as automated platform stabilization substantially reduced tracking error. These effects were not additive as the combined effects of CHI and stabilization were not larger than the separate effects. Whereas the effect of stabilization diminished (but remained significant) with increasing update rate, the effects of CHI and update rate were additive. With increasing motor or visual taskload, as a consequence of an extra visual task or increased target motion, the stabilization effect increased.

DTIC

Visual Perception; Visual Tasks; Cameras

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing. For related information see also 16 Space Transportation.

19970011592 Veda, Inc., Dayton, OH USA

Integrated Mission Precision Attack Cockpit Technology (IMPACT), Phase 2, Cueing Benefits of Large Tactical Situation Displays, Helmet-Mounted Displays and Directional Audio *Final Report, 1 May 1994 - 31 Dec. 1995*

Boucek, G. Scott, Veda, Inc., USA; Orr, Horace A., Veda, Inc., USA; Williams, Robert D., Veda, Inc., USA; Montecalvo, Anthony J., Veda, Inc., USA; Redden, Mark C., Veda, Inc., USA; Rolek, Evan P., Veda, Inc., USA; Cone, Scott M., Veda, Inc., USA; Barba-to, Gregory J., Wright Lab., USA; Apr. 1996; 162p; In English

Contract(s)/Grant(s): F33615-93-D-3800; AF Proj. 2403

Report No.(s): AD-A309072; WL-TR-96-3076; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

The Wright Laboratory has initiated a program called the Integrated Mission/Precision Attack Cockpit Technology (IMPACT) program, whose purpose is to determine cockpit and Pilot-Vehicle Interface (PVI) requirements for a single-seat, multi-role fighter aircraft performing at night and in adverse weather. A structured systems engineering process is being utilized to focus on the conceptual phase of cockpit development. In support of this, Veda has employed a building block approach consisting of a literature review, design work, mission/human factors analysis, and pilot-in-the-loop simulation. The focus of this evaluation was on the integration of Helmet-Mounted Displays (HMD), Large Tactical Situation Displays (TSD), and Directional Audio to aid the pilot in threat and target acquisition (functions that are currently supported by a second crewmember). In order to understand the effects of integrating such technologies in a fighter aircraft cockpit, the F-15E weapon system was used as a baseline for comparison. A portion of a full mission simulation was developed and executed, and required a single pilot to fly an air interdiction mission using both the baseline cockpit and the advanced IMPACT cockpit. Results indicated a significant improvement in threat acquisition time and threat acquisition success rate, and a slight improvement in target acquisition, with the IMPACT cockpit.

DTIC

Helmet Mounted Displays; Cockpits; Fighter Aircraft; Human Factors Engineering; Man Machine Systems; Threat Evaluation; Flight Tests; Pilot Performance

19970011650 Institute for Human Factors TNO, Soesterberg, Netherlands

Shared Mental Models and Team Decision Making *Final Report*

Schraagen, J. M. C., Institute for Human Factors TNO, Netherlands; Rasker, P. C., Institute for Human Factors TNO, Netherlands; Dec. 22, 1995; 45p; In Dutch

Contract(s)/Grant(s): 894-011

Report No.(s): AD-A309449; TNO-TM-1995-B-17; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The goal of the experiment described in this report was to assess possible effects of the possession of a shared mental model on team decision making. Cross-training in each other's tasks was chosen in the experiment as the means to induce a shared mental model. The effects of cross-training were studied in a two-person team task. In this task, one of the team members acted as observer who had to detect and report fires in a city to the other team member who acted as decision maker by sending fire engines to the fires. Team members communicated via standard computer messages. Dependent variables were performance measures (number of victims, efficiency of allocated resources) and communication measures (number and type of messages sent). The results showed some effects of cross-training but not the predicted effect of sending more unrequested information to the other team member. This was probably due to the observer being not dependent enough of the decision maker for performing his task. Some suggestions are made to improve the paradigm and obtain more mutual dependence with the team members.

DTIC

Decision Making; Teams; Mental Performance; Dependent Variables

19970011945 Department of the Navy, Washington, DC USA

Workplace Layout Method Using Convex Polygon Envelope

O'Brien, Francis J., Inventor, Department of the Navy, USA; Aug. 27, 1996; 18p; In English

Patent Info.: Filed 27 Aug. 1996; US-Patent-Appl-SN-708008

Report No.(s): AD-D018210; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

An improved method for laying out a workspace using the prior art crowding index, PDI, where the average interpoint distance between the personnel and/or equipment to be laid out, actican be determined. The improvement lies in using the convex

hull area, A_{poi} , of the distribution of points being laid out within the workplace space to calculate the actual crowding index for the workspace. The convex hull area is that area having a boundary line connecting pairs of points being laid out such that no line connecting any pair of points crosses the boundary line. The calculation of the convex hull area is illustrated using Pick's theorem with additional methods using the Surveyor's Area formula and Hero's formula also being described for calculating A_{poi} . The improved crowding index is termed PDI_{poi} to distinguish it from the prior art crowding index, PDI_{act} .

DTIC

Layouts; Hulls (Structures); Connectors

Subject Term Index

A

ACTIVE CONTROL, 5
AIR TRAFFIC CONTROL, 8
AIR TRAFFIC CONTROLLERS (PERSONNEL), 8
ALGORITHMS, 7, 8
ALTERNATIONS, 2
AMINO ACIDS, 4
ARRHYTHMIA, 4
ARTERIES, 4

B

BACTERIA, 3
BIOLOGICAL MODELS (MATHEMATICS), 3
BLOOD CIRCULATION, 5
BLOOD FLOW, 5
BLOOD PUMPS, 5
BLOOD VOLUME, 5
BYPASSES, 4

C

CAMERAS, 8
CANCER, 3, 4, 6
CARDIOVASCULAR SYSTEM, 5
CATALYSTS, 2
CELLS (BIOLOGY), 1, 3, 5, 6
CENTRAL NERVOUS SYSTEM, 3
COCKPITS, 9
CONNECTORS, 10
CORONARY ARTERY DISEASE, 4

D

DECISION MAKING, 7, 9
DEPENDENT VARIABLES, 9
DISEASES, 3
DYNAMIC MODELS, 5

E

ELECTROCHEMISTRY, 5
ENZYMES, 2
EPITHELIUM, 3
EVALUATION, 7, 8
EYE (ANATOMY), 1

EYE MOVEMENTS, 1

F

FEMALES, 6
FIGHTER AIRCRAFT, 9
FLIGHT CREWS, 6
FLIGHT TESTS, 9
FREQUENCY RESPONSE, 5

G

GADOLINIUM, 2
GLUCOSE, 2
GLYCOLYSIS, 2

H

HEARING, 5
HEART, 4
HELMET MOUNTED DISPLAYS, 9
HULLS (STRUCTURES), 10
HUMAN BODY, 5
HUMAN FACTORS ENGINEERING, 9
HUMAN PERFORMANCE, 8
HYDROCARBONS, 2
HYPOXIA, 5

I

IMAGE MOTION COMPENSATION, 1
IMMUNITY, 2
IMMUNOLOGY, 2
INDUCTION, 7
INHIBITORS, 3
INSULIN, 4

K

KNOWLEDGE BASED SYSTEMS, 7

L

LAYOUTS, 10
LEARNING THEORY, 7
LESIONS, 2
LOWER BODY NEGATIVE PRESSURE, 5

LUMINOUS INTENSITY, 1

M

MAGNETIC RESONANCE, 2
MALES, 6
MAMMALS, 3
MAMMARY GLANDS, 3, 6
MAN MACHINE SYSTEMS, 9
MEMBRANES, 3
MENTAL PERFORMANCE, 9
MICE, 2
MICROORGANISMS, 1
MORPHOLOGY, 2
MOTION PERCEPTION, 1
MUTATIONS, 4

N

NERVOUS SYSTEM, 5
NOISE REDUCTION, 5

O

ORDER-DISORDER TRANSFORMATIONS, 5

P

PATENT APPLICATIONS, 5
PERFORMANCE TESTS, 7, 8
PERSONNEL MANAGEMENT, 8
PHOSPHORYLATION, 4
PHOTOGRAPHIC PROCESSING, 1
PHOTORECEPTORS, 1
PHYSIOLOGICAL EFFECTS, 5
PILOT PERFORMANCE, 9
PLUGS, 5
PROGNOSIS, 3
PROTEIN SYNTHESIS, 6
PROTOZOA, 1
PSYCHOMETRICS, 7

R

RESEARCH AND DEVELOPMENT, 2
RESPIRATORY SYSTEM, 5
RETINA, 1

RETINAL IMAGES, 1

S

SIGNS AND SYMPTOMS, 6

SLEEP DEPRIVATION, 5

SURVEYS, 7

T

TARGET ACQUISITION, 7

TEAMS, 9

TELEPHONES, 5

THREAT EVALUATION, 9

TUMORS, 6

V

VISUAL PERCEPTION, 1, 8

VISUAL TASKS, 8

W

WORKLOADS (PSYCHOPHYSIOLOGY), 8

Personal Author Index

A

Adelman, Leonard, 7

B

Barbato, Gregory J., 9
Beutter, Brent R., 1
Boucek, G. Scott, 9
Bourguignon, Lilly, 3

C

Cone, Scott M., 9
Cruz, Crystal E., 8

D

De Jong, Marla J., 4
Der, Sandor Z., 7
Dreau, Didier, 2

E

Ewing, Andrew G., 4

F

Fan, Jianfeng, 5
Foster, Mareva, 2

G

Goverts, S. T., 5
Gualtieri, James, 7

H

Ho, Vincent B., 2
Huang, Duansheng, 5

J

Jagus, Rosemary, 6

K

Katz, Richard A., 5
King, Raymond E., 6
King, Steven C., 3
Korteling, J. E., 8
Kute, Timothy E., 3

L

Lawee, Michael S., 5
Lorenceau, Jean, 1

M

Montecalvo, Anthony J., 9
Morton, Darla S., 2

N

Newman, A. K., 5

O

O, 9
Orr, Horace A., 9

P

Pessin, Jeffrey E., 4
Phillips, P. Jonathon, 7

R

Rasker, P. C., 9
Rauss, Patrick J., 7
Redden, Mark C., 9
Riedel, Sharon L., 7
Rocco, Pamela S. Della, 8
Rolek, Evan P., 9

S

Schraagen, J. M. C., 9
Shen, Wei-Min, 7
Song, Pill-Soon, 1
Sonnenfeld, Gerald, 2
Steeneken, H. J. M., 5
Stone, Leland S., 1
Swiggett, Jeanene P., 2

T

Trent, Ann P., 7
Turner, Stuart L., 6

V

vanEmmerick, M., 8
Verhave, J. A., 5
Voge, Victoria M., 6

W

Wei, Jinhe, 5
Williams, Robert D., 9

X

Xu, Zheng, 5

Y

Yang, Tiande, 5

Report Documentation Page

1. Report No. NASA SP-7011 (437)	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Aerospace Medicine and Biology A Continuing Bibliography (Supplement 437)		5. Report Date April 21, 1997	6. Performing Organization Code
		8. Performing Organization Report No.	
7. Author(s)	10. Work Unit No.		
9. Performing Organization Name and Address NASA Scientific and Technical Information Program Office		11. Contract or Grant No.	
		13. Type of Report and Period Covered Special Publication	
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Langley Research Center Hampton, VA 23681		14. Sponsoring Agency Code	
		15. Supplementary Notes	
16. Abstract This report lists reports, articles and other documents recently announced in the NASA STI Database.			
17. Key Words (Suggested by Author(s)) Aerospace Medicine Bibliographies Biological Effects		18. Distribution Statement Unclassified – Unlimited Subject Category – 52	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 26	22. Price A03/HC