NASA SP-7011 (410)
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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

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Introduction

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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.

Two indexes—subject and author are included.

The NASA CASI price code table, addresses of organizations, and document availability information are located at the back of this issue.

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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.

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

Appendix

Select **Appendix** for important information about NASA Scientific and Technical Information (STI) 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.

Typical Report Citation and Abstract

ON MICROFICHE

ACCESSION NUMBER → **N96-10751#** Sandia National Labs., Albuquerque, NM. **← CORPORATE SOURCE**

TITLE → **Minimizing phylogenetic number to find good evolutionary trees**

AUTHORS → Goldberg, Leslie Ann; Goldberg, Paul W.; Phillips, Cynthia A.; Sweedyk, Elizabeth (California Univ., Berkeley, CA.); and Warnow, Tandy (Pennsylvania Univ., Philadelphia, PA.) **← AUTHORS' AFFILIATION**

PUBLICATION DATE → 1995 26 p Presented at the 1995 Symposium on Combinatorial Pattern Matching, Helsinki, Finland, 4-7 Jul. 1995 Sponsored by California Legislative Grant

CONTRACTS/GRANTS → Contract(s)/Grant(s): (DE-AC04-94AL-85000; NSF CCR-94-57800)

REPORT NO.(S) → Report No.(s): (DE95-011893; SAND-95-0831C; CONF-9507123-1) Avail: CASI HC A03/MF A01 **← AVAILABILITY AND PRICE CODE**

ABSTRACT → Inferring phylogenetic trees is a fundamental problem in computational-biology. We present a new objective criterion, the phylogenetic number, for evaluating evolutionary trees for species defined by biomolecular sequences or other qualitative characters. The phylogenetic number of a tree T is the maximum number of times that any given character state arises in T. By contrast, the classical parsimony criterion measures the total number of times that different character states arise in T. We consider the following related problems: finding the tree with minimum phylogenetic number, and computing the phylogenetic number of a given topology in which only the leaves are labeled by species. When the number of states is bounded (as is the case for biomolecular sequence characters), we can solve the second problem in polynomial time. We can also compute a fixed-topology 2-phylogeny (when one exists) for an arbitrary number of states. This algorithm can be used to further distinguish trees that are equal under parsimony. We also consider a number of other related problems. DOE

SUBJECT TERMS → *Algorithms; Biological Evolution; Chemical Evolution; Genetics; Molecular Biology*

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 410)

JANUARY 1996

51 LIFE SCIENCES (GENERAL)

N96-10322# California Univ., Los Angeles, CA.
CO2 exchange, environmental productivity indices, and productivity of Agaves and Cacti under current and elevated atmospheric CO2 concentrations Terminal Report, 20 Sep. 1991 - 19 Sep. 1994
1995 9 p
Contract(s)/Grant(s): (DE-FG03-91ER-61252)
Report No.(s): (DE95-013304; DOE/ER-61252/T2) Avail: CASI HC A02/MF A01

The research described in the proposal investigated net CO2 uptake and biomass accumulation for an extremely productive CAM plant, the prickly pear cactus Opuntia ficus-indica, under conditions of elevated CO2 concentrations for relatively long periods. The influences of soil water status, air temperature, and the photosynthetic photon flux (PPF) on net CO2 uptake over 24-h periods were evaluated to enable predictions to be made based on an Environmental Productivity Index (EPI). Specifically, EPI predicts the fraction of maximal daily net CO2 uptake based on prevailing environmental conditions. It is the product of indices for temperature, soil water, and intercepted PPF, each of which range from 0.00 when that index factor completely inhibits net CO2 uptake to 1.00 when no limitation occurs. For instance, the Water Index is 1.00 under wet conditions and decreases to 0.00 during prolonged drought. Although the major emphasis of the research was on net CO2 uptake and the resulting biomass production for O. ficus-indica, effects of elevated CO2 concentrations on root: shoot ratios and on the activities of the two carboxylating enzymes were also investigated. Moreover, experiments were also done on other CAM plants, including Agave deserti, Agave salmiana, and Hylocereus undatus, and Stenocereus queretaroensis. DOE
Atmospheric Composition; Biomass; Carbon Dioxide; Carbon Dioxide Concentration; Gas Exchange; Photosynthesis; Plants (botany);

N96-10560# University of Southern California, Los Angeles, CA.
Workshop in computational molecular biology
Tavare, S.; 12 Apr. 1995 16 p Presented at the Interface 1991: Computing Science and Statistics; Workshop in Statistical Issues in Molecular Biology; Joint (ASA), Institute of Mathematics Statistics and Biometric Society Conference, Seattle, WA, 15 Apr. 1991 - 14 Apr. 1994
Contract(s)/Grant(s): (DE-FG03-91ER-61165)
Report No.(s): (DE95-012915; CONF-9104300-ABSTS; CONF-9308268-ABSTS; CONF-9308107) Avail: CASI HC A03/MF A01

Funds from this award were used to support two workshops and a special session at a conference: Workshop in Computational Molecular Biology, '91 Symposium on the Interface: Computing Science and Statistics; Workshop in Statistical Issues in Molecular Biology; and the Session on Population Genetics, a part of the 56th Annual Meeting, Institute of Mathematical Statistics. Abstracts of papers from these workshops are presented. DOE
Biological Evolution; Computational Chemistry; Conferences; Genetics; Molecular Biology; Statistical Analysis;

N96-10582# Arizona State Univ., Tempe, AZ.
The center for the study of early events in photosynthesis Final Report, 1 Sep. 1988 - 31 Aug. 1994
Orr, L. A.; 1994 108 p
Contract(s)/Grant(s): (DE-FG02-88ER-13969)
Report No.(s): (DE95-013801; DOE/ER-13969/3) Avail: CASI HC A06/MF A02

The ASU Center for the Study of Early Events in Photosynthesis was established in 1988 with funding through a five-year grant from the USDA/DOE/NSF Plant Science Center program and a grant from the NSF Biological Facilities program. Its scientific objective is to elucidate the basic principles that govern photosynthetic energy collection and storage. Understanding these principles is vital to mankind, as photosynthesis provides most of our food, fiber and energy needs. The Center attempts to fulfill this objective through research of the highest standard, coupled inextricably with quality education at the undergraduate, graduate and postdoctoral levels. These goals are met via a network of collaborative, interdisciplinary research groups comprising 100 personnel within the Department of Chemistry and

Biochemistry, the Department of Botany, and the Department of Physics and Astronomy. The work of these research groups is facilitated by the Center through a variety of important infrastructural functions. DOE
Biochemistry; Botany; Education; Energy Storage; Photosynthesis;

N96-10751# Sandia National Labs., Albuquerque, NM.
Minimizing phylogenetic number to find good evolutionary trees
Goldberg, Leslie Ann; Goldberg, Paul W.; Phillips, Cynthia A.; Sweedyk, Elizabeth; (California Univ., Berkeley, CA.); and Warnow, Tandy; (Pennsylvania Univ., Philadelphia, PA.) 1995 26 p Presented at the 1995 Symposium on Combinatorial Pattern Matching, Helsinki, Finland, 4-7 Jul. 1995 Sponsored by California Legislative Grant
Contract(s)/Grant(s): (DE-AC04-94AL-85000; NSF CCR-94-57800)
Report No.(s): (DE95-011893; SAND-95-0831C; CONF-9507123-1) Avail: CASI HC A03/MF A01

Inferring phylogenetic trees is a fundamental problem in computational-biology. We present a new objective criterion, the phylogenetic number, for evaluating evolutionary trees for species defined by biomolecular sequences or other qualitative characters. The phylogenetic number of a tree T is the maximum number of times that any given character state arises in T. By contrast, the classical parsimony criterion measures the total number of times that different character states arise in T. We consider the following related problems: finding the tree with minimum phylogenetic number, and computing the phylogenetic number of a given topology in which only the leaves are labeled by species. When the number of states is bounded (as is the case for biomolecular sequence characters), we can solve the second problem in polynomial time. We can also compute a fixed-topology 2-phylogeny (when one exists) for an arbitrary number of states. This algorithm can be used to further distinguish trees that are equal under parsimony. We also consider a number of other related problems. DOE
Algorithms; Biological Evolution; Chemical Evolution; Genetics; Molecular Biology;

N96-10766# Oklahoma Univ., Norman, OK.
Energetics and kinetics of anaerobic aromatic and fatty acid degradation Progress Report, Nov. 1993 - Nov. 1994
Mcinerney, M. J.; Dec. 1994 6 p
Contract(s)/Grant(s): (DE-FG05-89ER-14003)
Report No.(s): (DE95-013068; DOE/ER-14003/6) Avail: CASI HC A02/MF A01

Factors influencing the rate and extent of benzoate degradation by the anaerobic syntrophic consortia were studied. Nonlinear regression analysis showed that the cause of the benzoate threshold was not a diminished benzoate degradation capacity. Analysis of cocultures with hydrogen users that differed in their hydrogen utilization capacities showed that the threshold did not depend on the kinetic properties of the syntrophic partner. These data support a thermodynamic explanation for the threshold, and exclude the possibility that a change in the affinity of the enzyme system due to acetate inhibition caused the threshold. Modeling studies showed that the threshold value could be predicted from the concentrations of the end products, assuming a critical Gibb's free energy value. This work shows that interspecies acetate transfer is important in controlling the extent of metabolism by syntrophic organisms. DOE
Benzoic Acid; Degradation; Enzymes; Esters; Fatty Acids; Hydrogen; Kinetics; Nonlinearity; Regression Analysis; Thermodynamics;

N96-10867*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, FL.
Monitoring ethylene emissions from plants cultured for a controlled ecological life support system Final Report
Corey, Kenneth A.; 29 Sep. 1995 3 p
Contract(s)/Grant(s): (NAG10-91)
Report No.(s): (NASA-CR-199437; NAS 1.26:199437) Avail: CASI HC A01/MF A01

Emission of hydrocarbons and other volatile compounds by materials and organisms in closed environments will be a major concern in the design and management of advanced life support systems with a bioregenerative component. Ethylene, a simple hydrocarbon synthesized by plants, is involved in the elicitation of a wide range of physiological responses. In closed environments, ethylene may build up to levels which become physiologically active. In several growouts of 'Yecora Rojo' wheat in Kennedy Space Center's Biomass Production Chamber (BPC), it was observed that leaf flecking and rolling occurred in the sealed environment and was virtually eliminated when potassium permanganate was used to scrub the atmospheric environment. It was suggested that ethylene, which accumulated to about 60 ppb in the chamber and which was effectively absorbed by potassium permanganate, was responsible for the symptoms. The objectives of this work were to: (1) determine rates of ethylene evolution from lettuce (Lactuca sativa cultivar Waldemann's Green) and wheat (Triticum aestivum cultivar Yecora Rojo) plants during growth and development; (2) determine the effects of exposure of whole, vegetative stage plants to exogenous ethylene concentrations in the range of what would develop in closed environment growth chambers; and (3) develop predictive functions for changes in ethylene concentration that would develop under different cropping and closed environment configurations. Results will lead to the development of management strategies for ethylene in bioregenerative life support systems.
Derived from text
Biomass; Closed Ecological Systems; Ecosystems; Ethylene; Farm Crops; Vegetables;

N96-11120# Pennsylvania State Univ., University Park, PA. Dept. of Chemistry.

Contemporary problems in biology: Cell constituent analysis

Nowak, Robert J.; Beyer, Paula J.; Gilmar, S. D.; Lee, Roxane A.; Wood, Mark R.; Winograd, N.; and Ewing, A. G.; 30 Aug. 1994 36 p Submitted for publication in Nanofabrication and Biosystems: Integrating Materials Science Engineering and Biology

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

Report No.(s): (AD-A294356; TR-023) Avail: CASI HC A03/MF A01

The adaptation of methodologies from one scientific field to another is not uncommon. Technological advances in one field can often lead to great insight toward solving the problems of another. One very successful overlap can be observed between biochemistry and analytical chemistry. In particular, methods developed in analytical chemistry have been quite beneficial to the field of neurochemistry. This interaction between the two disciplines has resulted from the miniaturization of existing analytical techniques and the development of new methods able to analyze minute environments. These miniaturized techniques can be applied to the study of cellular environments. Several of these cellular environments are heterogeneous where each cell has its own function. Thus, the role of each cell must be determined individually. Once the specific function of each cell is understood, then its relation to other cells and to the entire organism can be determined. Only in this way can a true understanding of the chemistry of an entire organism be realized. The considerable interest in studying single cell chemistry has resulted in the development of a number of analytical techniques. These include enzyme activity measurements, immunoassay, microgel electrophoresis, fluorescence imaging techniques, microscale ion-selective electrodes voltammetric microelectrodes, microcolumn separation techniques optical and electron microscope techniques and secondary ion mass spectrometry. Although these methods have provided valuable information, they have important limitations. Most suffer from either inadequate sensitivity, poor quantitative capabilities or an inability to monitor chemical dynamics on a time scale similar to the neurotransmission process. DTIC

Analytical Chemistry; Biochemistry; Electrophoresis; Enzyme Activity; Fluorescence; Heterogeneity; Imaging Techniques; Immunoassay; Miniaturization; Neurology;

N96-11258# Georgia Univ., Athens, GA.

The hemicellulases from the ethanologenic thermophile, Thermoanaerobacter ethanolicus and similar anaerobic thermophiles Annual Technical Progress Report

Wiegel, J.; 1995 9 p

Contract(s)/Grant(s): (DE-FG09-89ER-14059)

Report No.(s): (DE95-014706; DOE/ER-14059/2) Avail: CASI HC A02/MF A01

A Xylanase was fractionated from Thermoanaerobacter ethanolicus, an ethanologenic thermophile, and the preparation so obtained was used to determined enzymatic parameters such as pH profile of enzyme activity. The ability of various mono- and di-saccharides as well as temperature variations to induce this enzyme activity were studied. DOE

Atmospheric Temperature; Biochemistry; Enzyme Activity; Fractionation; Ph; Thermophiles;

N96-11370# New York Univ. Medical Center, New York, NY. Dept. of Physiology and Biophysics.

Biophysical and biochemical mechanisms in synaptic transmitter release Final Report, 1 Jun. 1992 - 30 Nov. 1994

Llinas, Rodolfo R.; 30 Nov. 1994 5 p

Contract(s)/Grant(s): (F49620-92-J-0363)

Report No.(s): (AD-A295051; AFOSR-95-0420TR) Avail: CASI HC A01/MF A01

The project on synaptic transmission in the squid giant synapse was supported from years 1989 to 1994, and was discontinued due to a drastic reduction of funding to this branch of the Air Force Biological Research Program. Over the period of its tenure many fundamental discoveries were reported from the work supported by this grant. Among them (1) The discovery of P type calcium channels as the main trigger for transmitter release in invertebrates and vertebrate synapses, to include mammalian forms; (2) The first demonstration of calcium microdomains in presynaptic terminals and their role in synaptic transmitter release. In addition, measurements were also done of the maximum concentration attained at these microdomains and the time course for the calcium concentration profile; (3) The mechanisms by which botulinum and tetanus toxin block synaptic release; (4) Finally, the role of high inositol phosphate moieties in synaptic release were also studied. DTIC

Actuators; Biochemistry; Biophysics; Calcium; Invertebrates; Mammals; Synapses; Transmitters;

N96-11747 Georgia Univ., Athens, GA.

Regulation of polyamine synthesis in plants Final Progress Report, 1 Jul. 1991 - 31 Dec. 1994

Malmberg, R. L.; 1995 6 p Limited Reproducibility: More than 20% of this document may be affected by microfiche quality

Contract(s)/Grant(s): (DE-FG09-91ER-20034)

Report No.(s): (DE95-015429; DOE/ER-20034/3) Avail: CASI HC A02

This research focused on unusual post-translational modifications occurring in a arginine decarboxylase cDNA clone in oats. A novel regulatory mechanism for polyamines was explored and an attempt was made to characterize it. A plant ornithine decarboxylase cDNA was identified in Ara-

bidopsis. Further work remains on the mechanisms of polyamine regulation and function in plants. DOE
Amines; Biosynthesis; Oats; Proteins;

N96-11751# International Centre for Theoretical Physics, Trieste (Italy).
Some physical problems in biology: Aspects of the origin and structure of the first cell
Chelaflores, J.; Jan. 1995 15 p
Report No.(s): (DE95-625569; IC-95/4) Avail: CASI HC A03/MF A01 (US Sales Only)

A review is presented within the framework of the theory of evolution, after it has been extrapolated from the population level to the cellular and molecular levels. From Darwin's seminal and persuasive insight - the theory of common descent - we assume, with him, that 'probably all the organic beings which have ever lived on this earth have descended from some one primordial form, into which life was first breathed'. We are now aware that his primordial cell may have been a protocyanobacterium, but it has often been called 'a last universal ancestor', a 'breakthrough organism', or a 'progenote', a term introduced by Woese which has gained wide acceptance. Strictly speaking, in the 'intermediate period', ranging from the first living cell to the progenote, life may have evolved in the absence of significant diversity, effectively as a single phylum, incorporating organisms whose genetic systems were already based on DNA. Earlier still, prior to the encapsulation of nucleic acids in microspheres, evolution may already have been at work on RNA molecules. This takes our discussion into the period of chemical evolution, a concept first put forward by Oparin, whose principal merit is to have formulated the underlying problem in clear scientific terms. This review is not comprehensive. It is mainly devoted to the discussion of certain concepts that may have played a relevant role in the pathway that led to the origin and evolution of the progenote. We do not dwell on the main events of the intermediate period. The topic that we have chosen to include are: the origin of chirality of protein amino acids, the origin of translation, and the origin of the genome. We conclude with some comments on one further aspect of the evolutionary process - the development of biodiversity - by considering the origin of the first eukaryotic cell, which, according to the fossil record, may have preceded the evolutionary radiation in the early Cambrian by over a billion years. DOE
Amino Acids; Biochemistry; Biological Diversity; Biological Evolution; Cells (biology); Chemical Evolution; Deoxyribonucleic Acid; Genetics; Proteins; Ribonucleic Acids;

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

N96-10055 Lawrence Livermore National Lab., Livermore, CA.
Research on computed tomography reconstructions from one or two radiographs: A report and the application to FXR radiography Final Report
Back, Norman; Schneberk, Dan; Mcmillan, Charles; Azevedo, Steve; and Gorvad, Michael; 26 Jan. 1995 55 p Limited Reproducibility: More than 20% of this document may be affected by microfiche quality
Contract(s)/Grant(s): (W-7405-ENG-48)
Report No.(s): (DE95-013292; UCRL-ID-120019) Avail: Issuing Activity (Department of Energy (DOE))

This report documents some cooperative research into volumetric image reconstruction from single radiographs. Imaging dynamic events is the most important application for this type of work, but the techniques have possible extensions. Two general objectives guide this work. The first objective is to gain an understanding of the assumptions and limitations of single-view methods for representing internal features. Second, we endeavor to obtain and/or develop techniques for performing image reconstructions with FXR radiographs. If possible, we seek to obtain some quantitative measure of the accuracy of this class of image reconstructions in two respects: (1) in terms of the dimensional accuracy of feature boundaries and (2) as pertains to the accuracy of the voxel intensities. Dynamic events are not always self-calibrating, and it is important to establish the reconstruction accuracy of single-view methods for placing bounds on the kinds of conclusions which can be advanced from single-view reconstructed images. Computed tomographic (CT) image reconstructions provide dimensional detail of internal structures of objects and provide a measure of the per-voxel attenuation of material in the object. When assumptions behind a reconstruction algorithm are not satisfied, or are satisfied in a limited way, the accuracy of the reconstructed image is compromised. It is the goal of CT analysis to discern the 'real' features of the internals of an object in the midst of a certain level of artifactual content in the image. By understanding the ways in which CT reconstructions from a single radiograph can produce misleading results we hope to develop some measure of the benefits and limitations of single view techniques. DOE
Computer Aided Tomography; Image Reconstruction; Imaging Techniques; Technology Assessment; X Ray Imagery;

N96-10184 Selskapet for Industriell og Teknisk Forskning, Trondheim (Norway). Section for Extreme Work Environment.
System for quantifying gas bubbles after decompression

Brubakk, A. O.; and Eftedal, O.; 17 Oct. 1994 11 p
Report No.(s): (PB95-223558; STF23-A94036) Avail: Issuing Activity (National Technical Information Service (NTIS))

A system for quantifying gas bubbles in the pulmonary artery is described. It converts the bubble grade obtained from a Doppler system into the number of bubbles in the pulmonary artery. Preliminary studies have indicated that this system is able the differenciable between safe and unsafe tables. NTIS
Bubbles; Decompression Sickness; Gases; Physiology; Ultrasonics;

N96-10341# Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Effects of altered gravity on jumping performance and intermuscular control Ph.D. Thesis - The Univ. of Texas at Austin
Carpenter, David R.; May 1995 171 p
Report No.(s): (AD-A294279) Avail: CASI HC A08/MF A02

The purpose of this study was to determine the effect of altered gravity on human jump performance and intermuscular control. A musculoskeletal model was used to determine jump height, muscle power and energy delivered to the skeletal system (jump performance), and changes in muscle neuroexcitation and activation patterns (intermuscular control) for different values of gravity. The different values of gravity ranged from 0.2 to 1.8 times earth gravity. Prior to analyzing the musculoskeletal model solutions, the model solutions were validated by comparing predicted jump heights, time-required-to-jump, ground reaction force, joint kinematics, and muscle neuroexcitations to measured experimental data collected in increased gravitational environments. DTIC
Biodynamics; Gravitational Effects; Human Performance; Muscles; Muscular Function; Musculoskeletal System;

N96-10351# Army Research Inst. of Environmental Medicine, Natick, MA.
Environmental influences on body fluid balance during exercise - cold exposure
Freund, Beau J.; and Young, Andrew J.; Apr. 1995 46 p
Report No.(s): (AD-A294032; USARIEM-TN-95-3) Avail: CASI HC A03/MF A01

Body fluid losses in cold climates can be similar to those in hot environments. Fluid loss results from sweating and increased respiratory water losses as well as cold induced diuresis. Additional studies are needed to further document the magnitude of cold-induced dehydration as well as the specific distribution of these losses throughout various body water compartments. Fluid intake in cold environments can be reduced as a result of logistical constraints in fluid delivery, problems with water freezing, reduced thirst sensation, and voluntary fluid restriction. Dehydration negatively influences physical and cognitive performance as well as thermoregulation and possible susceptibility to peripheral cold injury. The research is needed to determine the direct effects of cold-induced dehydration on thermoregulatory responses to cold and susceptibility to peripheral cold injury. Recent experimental findings suggest that ingestion of glycerol in drinking water might be an effective countermeasure to reduce or delay cold-induced dehydration and the associated decrements to performance. Additional countermeasures and aids for maintaining hydration during cold exposure should be explored. DTIC
Body Fluids; Cold Tolerance; Dehydration; Physical Exercise; Stress (physiology); Thermoregulation; Water Loss;

N96-10367# Lawrence Livermore National Lab., Livermore, CA.
Modeling of endovascular patch welding using the computer program LATIS
Glinsky, Michael E.; London, Richard A.; Zimmerman, George B.; and Jacques, Steven L.; (Texas Univ., Houston, TX.) 1 Mar. 1995 13 p Presented at the SPIE 1995: SPIE Conference on Optics, Electro-optics, and Laser Application in Science, Engineering and Medicine, San Jose, CA, 5-14 Feb. 1995
Contract(s)/Grant(s): (W-7405-ENG-48)
Report No.(s): (DE95-011749; UCRL-JC-120178; CONF-950226-42) Avail: CASI HC A03/MF A01

A new computer program, LATIS, being developed at Lawrence Livermore National Laboratory is used to study the effect of pulsed laser irradiation on endovascular patch welding. Various physical and biophysical effects are included in these simulations: laser light scattering and absorption, tissue heating and heat conduction, vascular cooling, and tissue thermal damage. The geometry of a patch being held against the inner vessel wall (500 micrometers inner diameter) by a balloon is considered. The system is exposed to light pulsed from an optical fiber inside the balloon. A minimum in the depth of damage into the vessel wall is found. The minimum damage zone is about the thickness of the patch material that is heated by the laser. The more ordered the tissue the thinner the minimum zone of damage. The pulse length which minimizes the zone of damage is found to be the time for energy to diffuse across the layer. The delay time between the pulses is determined by the time for the heated layer to cool down. An optimal pulse length exists which minimizes the total time needed to weld the patch to the wall while keeping the thickness of the damaged tissue to less than 100 micrometers. For the case that is considered, a patch dyed with light absorbing ICG on the side next to the vessel (thickness of the dyed layer is 60 micrometers, the best protocol is found to be 65-200 ms pulses applied over 2 min. DOE
Biological Effects; Biophysics; Blood Vessels; Cardiovascu-

lar System; Computer Programs; Computerized Simulation; Irradiation; Laser Welding; Pulsed Lasers;

N96-10479# Lawrence Livermore National Lab., Livermore, CA.

Spontaneous origin of topological complexity in the cerebral cortex

Chapline, G.; Apr. 1995 16 p

Contract(s)/Grant(s): (W-7405-ENG-48)

Report No.(s): (DE95-011698; UCRL-ID-120740) Avail: CASI HC A03/MF A01

Attention is drawn to the possibility of regarding the cerebral cortex as a physical system whose only excitations are topological. An attractive feature of such a hypothesis is that it is possible to understand how local dynamics could spontaneously give rise to a large scale organization of neurons and synapses that one might associate with sophisticated cognitive capabilities. It is suggested that the spontaneous appearance of topological disorder in the topological phases of 2-D and 4-D quantum gravity illustrates how the topological complexity of the human brain can develop. In particular the cooperative behavior of different neural circuits in the cerebral cortex may be closely related to the topology of certain 4-manifolds. DOE

Brain; Cerebral Cortex; Topology;

N96-10672# Meharry Medical Coll., Nashville, TN.

Role of proteoglycans in cellular signaling Final Report, 1 Oct. 1990 - 31 Sep. 1993

Blake, Diane A.; Apr. 1995 15 p

Contract(s)/Grant(s): (DAAL03-90-G-0210)

Report No.(s): (AD-A295218; ARO-28167.1-LS-SAH) Avail: CASI HC A03/MF A01

Proteoglycans have the ability to regulate the activity of several growth factors important to wound healing, including basic fibroblast growth factor and transforming growth factor-beta. In this project, we surveyed proteoglycan synthesis in a number of strains of normal human skin fibroblasts and in fibroblast strains derived from benign dermal tumors (keloids) which show a prolonged wound healing response and abnormal responses to hydrocortisone in tissue culture. Anion exchange chromatography was used to separate radiolabeled proteoglycans into heparan sulfate and dermatan sulfate charge classes. The most consistent and dramatic trend observed for all strains was the apparent hydrocortisone-induced decrease of dermatan sulfate proteoglycan accumulation in the cell-associated fraction from normal strains but not from keloid strains. Experiments are in progress to measure file messenger RNA for several dermatan sulfate proteoglycan core proteins known to be synthesized by human skin fibroblasts. Since the data collected so far are still incomplete, we intend to finish this project by measuring message levels for these core proteins mentioned above. Once these experiments are completed, we plan to publish these data and conclude this project. DTIC

Cells (biology); Fibroblasts; Proteins; Skin (anatomy); Tumors; Wound Healing;

N96-10741* National Aeronautics and Space Administration, Washington, DC.

Aerospace medicine and biology: A continuing bibliography with indexes (supplement 405)

Sep. 1995 77 p

Report No.(s): (NASA-SP-7011(405); NAS 1.21:7011(405)) Avail: CASI HC A05

This bibliography lists 225 reports, articles and other documents introduced into the NASA Scientific and Technical Information System during Sep. 1995. Subject coverage includes: aerospace medicine and physiology, life support systems and man/system technology, protective clothing, exobiology and extraterrestrial life, planetary biology, and flight crew behavior and performance. Author

Aerospace Medicine; Bibliographies; Exobiology; Extraterrestrial Life; Indexes (documentation); Life Sciences;

N96-10894 Naval Aerospace Medical Research Lab., Pensacola, FL.

Occupational strength testing related to gender-neutral issues in naval aviation: A selected bibliography Final Report, 1992 - 1994

Luzier, A. R.; Erickson, D. G.; Mckay, J. R.; Baisden, A. G.; and Pokorski, T. L.; Feb. 1995 54 p Limited Reproducibility: More than 20% of this document may be affected by poor print

Contract(s)/Grant(s): (NR PROJ. M33P-30)

Report No.(s): (AD-A296866; NAMRL-MONO-47) Avail: Issuing Activity (Defense Technical Information Center (DTIC))

This bibliography presents the results of a literature review to provide background information for the study 'Performance-based Occupational Strength Testing for Candidate Navy Pilots/Naval Flight Officers.' The purpose of this work is to develop an occupational strength test battery to establish gender-neutral standards in naval aviation selection. This research, partially Funded by the Defense Women's Health Research Program, was prompted by a congressional decision to allow smaller statured individuals entry into military aviation. The long-range objective is to test and identify individuals capable of meeting specific strength requirements to safely operate naval aircraft. The cited publications cover the time period from 1972 through October 1994. The literature search was conducted using the following databases: Defense Technical Information Center (DTIC), Medline, and PsychLit. The abstracts included in this bibliography are in original form. An index organized by subject matter is provided. DTIC

Aerospace Medicine; Aircraft Pilots; Bibliographies;

Females; Flight Fitness; Indexes (documentation); Military Aviation; Muscular Strength; Physical Fitness; Pilot Selection;

N96-11020*# California Univ., Berkeley. Lawrence Berkeley Lab, CA.
Neoplastic transformation of human cells Final Report, 1 Jun. 1993 - 31 Jul. 1995
Goth-Goldstein, Regine; 31 Jul. 1995 26 p
Contract(s)/Grant(s): (NASA ORDER T-9297-R)
Report No.(s): (NASA-CR-199483; NAS 1.26:199483) Avail: CASI HC A03/MF A01

The goal of this project was to gain a better understanding of the cellular mechanisms of cancer induction by ionizing radiation as a risk assessment for workers subjected to high LET irradiation such as that found in space. The following ions were used for irradiation: Iron, Argon, Neon, and Lanthanum. Two tests were performed: growth in low serum and growth in agar were used as indicators of cell transformation. The specific aims of this project were to: (1) compare the effectiveness of various ions on degree of transformation of a single dose of the same RBE; (2) determine if successive irradiations with the same ion (Ge 600 MeV/u) increases the degree of transformation; (3) test if clones with the greatest degree of transformation produce tumors in nude mice; and (4) construct a cell hybrid of a transformed and control (non-transformed) clone. The cells used for this work are human mammary epithelial cells with an extended lifespan and selected for growth in MEM + 10% serum.

Derived from text

Cancer; Cells (biology); Cytology; Ion Irradiation;

N96-11062# Maryland Univ., Baltimore, MD.
Effects of pressure on intravascular adhesion molecules Final Report, 1 May 1989 - 30 Apr. 1995
Marzella, Louis; 30 Apr. 1995 9 p
Contract(s)/Grant(s): (N00014-89-J-1808)
Report No.(s): (AD-A296124) Avail: CASI HC A02/MF A01

We have developed a rodent model of decompression sickness and have used it to characterize the pathophysiology of spinal cord injury using quantitative histopathology, immunocytochemistry, flow cytometry, and hemodynamic measurements. The results indicate that accumulation of nitrogen gas extravascularly or intravascularly does not play a role in the cord injury. The expression of ICAM-1 in the endothelium of the cord increases after decompression. However, there is no corresponding increase in surface expression of adhesion counterreceptors on leucocytes. No recruitment of leucocytes to the cord or activation of endogenous effector cells was identified. These results indicate that the cellular inflammatory reaction is not activated and does not contribute to the cord injury induced by decompression sickness. We have also used the rat model to develop a rapid quantitative assay of cord trauma that will be useful for testing pharmacologic interventions designed to decrease the severity of the injury and enhance recovery. DTIC

Barotrauma; Blood Circulation; Decompression Sickness; Intravascular System; Pathology; Physiological Effects; Pressure Effects; Spinal Cord;

N96-11099# Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Effects of exercise and exercise combined with electrical stimulation on a diastasis recti: A single subject design M.S. Thesis
Sitler, Kerry L.; 7 Jun. 1995 76 p
Report No.(s): (AD-A296340; AFIT/CI/CIA-95-047) Avail: CASI HC A05/MF A01

In the physical therapy management of the obstetrical patient, the opportunity to effectively evaluate and treat associated musculoskeletal dysfunction is gaining popularity. A common musculoskeletal condition found during and after pregnancy is a diastasis recti abdominis. The term diastasis simply means 'separation of.' Many researchers believe that this separation occurs secondary to the softening of connective tissues related to the hormonal releases of progesterone and relaxin, and to the prolonged stress of a progressive weight gain, and subsequent weakness of the abdominal muscles associated with pregnancy. Other sources have speculated that a diastasis recti may be directly related to a large birth weight baby or to multiple births, to the mother's fitness level before and during her pregnancy, to a previous history of connective tissue disease, or to belonging to a particular race. Diastasis recti can also be found in young children, in patients with chronic obstructive pulmonary disease, or following abdominal surgery, with obesity and malnutrition, or with chronic constipation. DTIC

Exercise Physiology; Musculoskeletal System; Physical Exercise; Pregnancy; Ultrasonics;

N96-11119# Army Research Inst. of Environmental Medicine, Natick, MA.
Environmental considerations for exercise
Montain, Scott J.; and Freund, Beau J.; May 1995 89 p
Report No.(s): (AD-A294350; USARIEM-TN-T95-4) Avail: CASI HC A05/MF A01

Exercise in either hot or cold climates, at high altitude or in air polluted environments can reduce exercise tolerance and physical performance. This report discusses environmental considerations for exercise. It reviews the general physiological responses at each environmental extreme and presents special considerations for exercise in hot and cold climates, at high altitude and air polluted areas. It also discusses, albeit briefly, medical management of persons who develop heat, cold, or high-altitude related illnesses. The report concludes with a discussion of the interaction of the

individual environmental extremes on exercise and physical performance. DTIC
Climate; Exercise Physiology; High Altitude; Human Performance; Physical Exercise; Physiological Responses;

N96-11137# Rockefeller Univ., New York, NY.
Carboxyalkylated crosslinked hemoglobin as a potential blood substitute Annual Report, 15 Jun. 1994 - 14 Jun. 1995
Manning, James M.; Jul. 1995 34 p
Contract(s)/Grant(s): (DAMD17-94-V-4010)
Report No.(s): (AD-A296762) Avail: CASI HC A03/MF A01

Our research supported by this contract has been directed along 3 main lines: (1) analysis of crosslinked hemoglobin samples (64,000 MW) from the U.S. Army Medical Research Detachment headed by Col. John Hess. This has been achieved by various protein separation methods under both native and denaturing conditions in order to monitor the product of the pilot plant; (2) studies on the preparation of higher molecular weight crosslinked hemoglobins (128,000 MW). Various bifunctional agents are being evaluated; and (3) studies on recombinant hemoglobins to understand the molecular basis for the low oxygen affinity of certain hemoglobins as a basis for future blood substitute research. DTIC
Blood; Crosslinking; Detachment; Gaps (geology); Hemoglobin; Medical Science; Pilot Plants; Proteins;

N96-11184# Indiana Univ., Indianapolis, IN. Research and Sponsored Programs.
Nerves and tissue repair Final Report, 10 Dec. 1990 - 9 Jun. 1994
Mescher, Anthony L.; 1 Jul. 1994 35 p
Contract(s)/Grant(s): (DAMD17-91-Z-1002)
Report No.(s): (AD-A288730) Avail: CASI HC A03/MF A01

This report covers studies of regenerating peripheral nerves and the effect such nerves exert on regenerative growth of the tissue innervated. The iron-transport protein transferrin is an absolute requirement for cell proliferation and is abundant in peripheral nerves. The hypothesis investigated here is that transferrin is delivered axonally and is involved in the nerve-dependent cell proliferation which characterizes repair in avascular tissues. Amphibian (axoloti) limb regeneration is a well characterized model system for nerve-dependent reparative growth and was used here in experiments testing the hypothesis. Results include demonstrations that transferrin is present in both axons and Schwann cells of peripheral nerves, that the concentration of this factor increases greatly during regeneration, that transferrin is transported distally in regenerating axons at the expected rate for last axonal transport in amphibians, and is released at the growing tips of such axons. Previous work has shown that when nerves to regenerating axolotl limbs are transected the concentration of transferrin in the distal limb tissue declines rapidly and limb regeneration stops. These results strongly support the hypothesis that neural transferrin is important in nerve-dependent growth during vertebrate limb regeneration. Studies of both transferrin binding and expression of the transferrin gene in cells of axolotl peripheral nerve indicate that both uptake and synthesis of this factor occur in the regenerating nerve. These results have important implications for understanding the trophic effect of nerves in tissue repair. DTIC
Axons; Nerves; Peripheral Nervous System; Regeneration (physiology); Tissues (biology); Wound Healing;

N96-11242# Brookhaven National Lab., Upton, NY.
Data resources for nuclear medicine
Bhat, M. R.; and Lemmel, H. D.; (International Atomic Energy Agency, Vienna, Austria.) 1995 10 p
Contract(s)/Grant(s): (DE-AC02-76CH-00016)
Report No.(s): (DE95-014552; BNL-61919) Avail: CASI HC A02/MF A01

The objective of this article is to list data resources needed for nuclear medicine and provide information on how to access them. This list will include publications of data compilations or evaluations, databases, and data processing codes for both nuclear structure and decay, as well as reaction data. Sources of bibliographic and related information on nuclear data are also be listed. The authors of this article have used their judgement in choosing a representative list of data sources; a more complete listing may be found in the references. DOE
Data Bases; Decay; Information Management; International Cooperation; Nuclear Energy; Nuclear Medicine; Nuclear Structure;

N96-11367# Brown Univ., Providence, RI. Dept. of Physics and Neuroscience.
Effect of eye misalignment on ocular dominance according to BCM and PCA synaptic modification
Shouval, Harel; Intrator, Nathan; and Cooper, Leon N.; 30 May 1995 12 p
Contract(s)/Grant(s): (N00014-91-J-1316)
Report No.(s): (AD-A294815) Avail: CASI HC A03/MF A01

In this paper we realistically model a two-eye visual environment and study its effect on single cell synaptic modification. In particular, we study the effect of image misalignment on receptive field formation after eye opening. We show that binocular misalignment effects PCA and BCM learning in different ways. For the BCM learning rule this misalignment is sufficient to produce varying degrees of ocular dominance, whereas for PCA learning binocular neurons emerge in every case. Network results seem dominated

by single cell results. Such differences should help us distinguish between these learning rules. DTIC
Binocular Vision; Eye (anatomy); Eye Dominance; Misalignment; Neurons; Neurophysiology; Principal Components Analysis;

N96-11403 State Univ. of New York, Plattsburgh, NY. Albany Research Foundation.
The effects of reverberant blast trauma (Impulse noise) on hearing: Parametric studies Final Report, 9 Sep. 1991 - 8 Sep. 1994
Hamernik, Roger P.; Ahroon, William A.; and Lei, Sheau-Fang; Oct. 1994 97 p Limited Reproducibility: More than 20% of this document may be affected by poor print
Contract(s)/Grant(s): (DAMD17-91-C-1113)
Report No.(s): (AD-A294548; ARL-95-1) Avail: Issuing Activity (Defense Technical Information Center (DTIC))

The effects of exposure to high levels of reverberant blast waves (impulse noise) on the auditory system using an animal (chinchilla) model are reported. Blast waves were generated by two different shock tubes which produced wave signatures having different spectral distributions of energy. Intensities for each blast wave source were 150, 155, and 160 dB peak SPL with exposure to 1, 10, or 100 impulses. Repetition rates were fixed at one impulse/sec. There were 15 subjects per group. Brainstem evoked potentials were used to estimate temporary and permanent threshold shifts and conventional surface preparations of the cochlea were used to quantitatively assess sensory cell loss. In addition, pre and postexposure cubic distortion product otoacoustic emissions (3DPE) were collected on a subset of these animals for correlation with audiometric and histological indices of trauma. Trauma systematically increased with sound exposure level (SEL) and was dependent on the energy spectrum of the impulse. An application of the A and P weighting functions to the spectra improved the correlations between indices of trauma and SEL. The 3DPE data were consistent with PTS and, overall, both measures were correlated with sensory cell loss. DTIC
Animals; Bioelectric Potential; Detonation Waves; Evoked Response (psychophysiology); Exposure; Hearing; Impulses; Shock Tubes; Shock Waves; Signatures;

N96-11474*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Beat frequency ultrasonic microsphere contrast agent detection system Patent Application
Pretlow, III, Robert A.; inventor (to NASA); Yost, William T.; inventor (to NASA); and Cantrell, Jr., John H.; inventor (to NASA) 12 May 1995 22 p Filed 12 May 1995
Report No.(s): (NASA-CASE-LAR-15211-1; NAS 1.71: LAR-15211-1; US-PATENT-APPL-SN-440266) Avail: CASI HC A03/MF A01

A system for and method of detecting and measuring concentrations of an ultrasonically-reflective microsphere contrast agent involving detecting non-linear sum and difference beat frequencies produced by the microspheres when two impinging signals with non-identical frequencies are combined by mixing. These beat frequencies can be used for a variety of applications such as detecting the presence of and measuring the flow rates of biological fluids and industrial liquids, including determining the concentration level of microspheres in the myocardium. NASA
Beat Frequencies; Concentration (composition); Detection; Microparticles; Signal Mixing; Ultrasonic Tests;

N96-11631* National Aeronautics and Space Administration, Washington, DC.
Aerospace medicine and biology: A continuing bibliography with indexes (supplement 406)
Oct. 1995 134 p
Report No.(s): (NASA-SP-7011(406); NAS 1.21:7011(406))
Avail: CASI HC A07

This bibliography lists 346 reports, articles and other documents introduced into the NASA Scientific and Technical Information System during Oct. 1995. Subject coverage includes: aerospace medicine and physiology, life support systems and man/system technology, protective clothing, exobiology and extraterrestrial life, planetary biology, and flight crew behavior and performance. Author
Aerospace Medicine; Bibliographies; Biological Effects; Exobiology; Indexes (documentation); Life Sciences;

N96-11892# Pacific Northwest Lab., Richland, WA.
Adaptive life simulator: A novel approach to modeling the cardiovascular system
Kangas, L. J.; Keller, P. E.; and Hashem, S.; Jun. 1995 6 p Presented at the 1995 American Control Conference, Seattle, WA, Jun. 1995
Contract(s)/Grant(s): (DE-AC06-76RL-01830)
Report No.(s): (DE95-014634; PNL-SA-26069; CONF-950653-3) Avail: CASI HC A02/MF A01

In this paper, an adaptive life simulator (ALS) is introduced. The ALS models a subset of the dynamics of the cardiovascular behavior of an individual by using a recurrent artificial neural network. These models are developed for use in applications that require simulations of cardiovascular systems, such as medical mannequins, and in medical diagnostic systems. This approach is unique in that each cardiovascular model is developed from physiological measurements of an individual. Any differences between the modeled variables and the actual variables of an individual can subsequently be used for diagnosis. This approach also exploits sensor fusion applied to biomedical sensors. Sensor fusion optimizes the utilization of the sensors. The advantage of sensor fusion has been demonstrated in applications

including control and diagnostics of mechanical and chemical processes. DOE
Cardiovascular System; Computerized Simulation; Diagnosis; Multisensor Fusion; Neural Nets;

N96-11978# California Univ., San Diego, La Jolla, CA.
Artificial Cells, Blood Substitutes, and Immobilization Biotechnology, volume 22, number 4, 1994 Final Report
Winslow, Robert M.; and Riess, Jean G.; ; ed. (Nice Univ., France.) New York Marcel Dekker, Inc. 1994 604 p Fifth International Symposium on Blood Substitutes held in San Diego, CA, 17-20 Mar. 1993
Contract(s)/Grant(s): (DAMD17-93-J-3024) (ISSN 1073-1199)
Report No.(s): (AD-A296656) Copyright Avail: CASI HC A99/MF A06

Aims and Scope's journal covers artificial cells, blood substitutes, and immobilization biotechnology. The emphasis of this journal is to allow for interdisciplinary interactions. Therefore, we welcome approaches based on biotechnology, chemical engineering, medicine, surgery, biomedical engineering, basic medical sciences, chemistry and others. The following areas are particularly welcomed: (1) Immobilized bioreactants including cells culture, microorganisms, enzymes, drugs, receptors, sorbents, immunosorbents and other biologically active molecules; (2) Artificial cells, microcapsules, liposomes, nanoparticles and other carriers; (3) Blood substitutes from fluorocarbon, modified hemoglobin, encapsulated hemoglobin, synthetic heme, recombinant hemoglobin, and others. Chemistry, methods, in-vitro studies, in-vivo evaluations and clinical results; (4) Microencapsulation and other methods of immobilization of cells (e.g. hybridoma, endocrine cells and liver cells, etc.) or microorganisms. Cells immobilized by different approaches. Methods, evaluation, and applications. Cell culture technologies related to immobilization. Hybrid artificial organs based on cell cultures; (5) Enzyme replacement, enzyme therapy, immunosorption, detoxification, hemoperfusion, metabolite conversions and drug delivery; (6) Design, evaluation and clinical application of hemoperfusion, artificial kidneys, plasmapheresis, and other artificial replacements; (7) Synthetic and biological biomaterials related to artificial cells and immobilization biotechnology. Blood compatible materials. Synthesis, biocompatibility, blood compatibility and evaluations; (8) Biotechnologically derived biologically active molecules related to artificial cells and immobilization biotechnology; and (9) Drug delivery systems. DTIC
Activity (biology); Biotechnology; Blood; Cells (biology); Clinical Medicine; Conferences; Immobilization; Medical Science; Substitutes;

53 BEHAVIORAL SCIENCES

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

N96-10121# Johns Hopkins Univ., Baltimore, MD. Dept. of Psychology.
Stochastic models of attention and search Final Technical Report, 1 Mar. 1992 - 28 Feb. 1995
Yantis, Steven Feb.; 1995 16 p
Contract(s)/Grant(s): (F49620-92-J-0186)
Report No.(s): (AD-A294317; AFOSR-95-0379TR) Avail: CASI HC A03/MF A01

Seven lines of experimentation have been carried out over three years. In the first set of experiments, the PI has tested and rejected a two- process model of visual attention allocation. He has proposed an alternative perceptual sampling model and performed stochastic simulations of the model to show that it can account for certain aspects of human performance in cued visual search tasks. In the second set of experiments, the PI has found evidence that observers perceive occluded objects across time, a finding that complements an analogous alibi to perceptually complete partially occluded objects across space. Several lines of experimentation have been carried out using a bistable apparent motion display (the Ternus display) as a tool to explore the assignment of object identity over time. For example, the PI has found evidence that a common mechanism may underlie the perception of bistable apparent motion and the capture of visual attention in certain visual search tasks, and he has discovered that perceptual grouping by proximity can precede the assignment of motion correspondences in bistable apparent motion. DTIC
Attention; Display Devices; Human Performance; Mathematical Models; Stochastic Processes; Visual Perception;

N96-10683 National Defence Research Establishment, Stockholm (Sweden). Huvudavdelning foer Maensklig Prestation och Funktion.
Studies of human behavior in crisis and disaster situations: Measurement and methods [Studier av maenniskors beteende i samband med kris och katastrofsituationer: Maetning och metodik]
Enander, A.; Wallenius, C.; and Larsson, G.; Jan. 1995 81 p In SWAHILI
Report No.(s): (PB95-223616; FOA-R-95-00088-5.3-SE) Avail: Issuing Activity (National Technical Information Service (NTIS))

The present study was commissioned by the Swedish Rescue Services Agency to identify and analyze methodological questions of relevance for research on individual reactions to disaster situations. One aim of the study was to provide a basis for method development and future empirical work. The report comprises three sections: Section 1 discusses some general aspects concerning studies of human

behavior in disaster. Section 2 provides an overview of some general methodological issues of particular relevance for disaster research. Section 3 takes as a starting point a general model of factors influencing the reactions of a single individual in an accident or disaster. NTIS
Accidents; Disasters; Human Behavior; Human Reactions; Methodology; Physiological Responses; Research Projects; Stress (psychology);

N96-11091# Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
Ultradian rhythms in prolonged human performance Final Report, 1980 - 1981
Lavie, Peretz; Zomer, Jacob; and Gopher, Daniel; Feb. 1995 32 p
Report No.(s): (AD-A296199; ARI-RN-95-30) Avail: CASI HC A03/MF A01

The recent wave of interest in rhythms in human behavior is erroneously attributed to the recent developments in the study of biological rhythms. In a recent historical review of the field of behavioral rhythmic research Lavie (1980) uncovered several independent roots of research unrelated to questions regarding the nature and functions of biological rhythms. One of those roots was the rather naive ambition of educational psychologists to schedule school hours according with the optimal times for cognitive functioning such as mathematics, reading, etc, on the one hand, and activities requiring psychomotor skills, on the other. This research which attracted quite a number of investigators around the turn of the century, died away around the mid 1920's. Recently it has been revived by the renewed interest in biological rhythms, sleep rhythms, and their interaction with behavior. The notion of an optimal schedule of human behavior is indeed an attractive one. In nature, optimal scheduling and synchronization of different behaviors with the geophysical environment is for many species a crucial survival issue. Displaying courting behavior at the wrong times of the year is dangerously maladaptive, while synchronization of courting and mating behavior with suitable environmental conditions ensures offspring survival. DTIC
Human Behavior; Human Performance; Rhythm (biology); Sleep;

N96-11150# Syracuse Univ., NY.
The relation between group cohesiveness and performance: An integration Final Report
Mullen, Brian; and Copper, Carolyn; Feb. 1995 68 p
Contract(s)/Grant(s): (MDA903-90-C-0102; AF PROJ. 2901)
Report No.(s): (AD-A296297; ARI-RN-95-31) Avail: CASI HC A04/MF A01

This paper reports on a meta-analytic integration of the relation between group cohesiveness and performance. Overall, the cohesiveness-performance effect was highly significant and of small magnitude. Several theoretically informative determinants of the cohesiveness-performance effect were examined. This effect was significantly stronger when cohesiveness was operationalized in terms of measurements of group members' perceptions of cohesiveness than when cohesiveness was operationalized in terms of experimental inductions of cohesiveness. The results of this analysis suggest that the more direct effect may be from performance to cohesiveness rather than from cohesiveness to performance. Discussion considers the implications of these results for future research on the relation between cohesiveness and performance. DTIC
Cohesion; Group Dynamics; Human Performance; Perception;

N96-11198# Personnel Decisions Research Inst., Minneapolis, MN.
Development and construct validation of the Situational Judgment Test Final Report, Apr. - Sep. 1992
Hanson, Mary Ann; and Borman, Walter C.; Apr. 1995 94 p
Contract(s)/Grant(s): (MDA903-92-M-3490; AF PROJ. 2211)
Report No.(s): (AD-A296511; PDRI-230; ARI-RN-95-34) Avail: CASI HC A05/MF A01

This report describes the development of the Situational Judgment Test (SJT), the development and evaluation of basic SJT scores, explorations of the dimensionality of the SJT, and detailed investigations of the relationships between SJT scores and scores on temperament, cognitive ability, and other job performance measures. The SJT was developed to be a criterion measure of supervisory job knowledge and administered to over 1,000 second-tour Noncommissioned Officers (NCO's) in the U.S. Army. These data were used, along with several rational approaches, to explore the dimensionality of the SJT. Relationships between SJT total scores, several experimental SJT subscores, and scores on the other available measures were also examined, and structural modeling was used to test several hypotheses concerning reasons for some of the relationships that were found. Finally, conclusions were drawn, based on the results of these analyses, concerning what the SJT measures. DTIC
Decision Making; Experiment Design; Mental Performance; Psychological Tests; Tasks;

N96-11371# Virginia Univ., Charlottesville, VA.
Photoreceptors regulating circadian behavior Final Technical Report, 15 Mar. 1992 - 14 Mar. 1995
Foster, Russell G.; 14 Mar. 1995 14 p
Contract(s)/Grant(s): (F49620-92-J-0205; AF PROJ. 2312)
Report No.(s): (AD-A295056; AFOSR-95-0419TR) Avail: CASI HC A03/MF A01

In mammals circadian responses to light are regulated by photoreceptors within the eye. Aged rd/rd mice (80-800

days) show unattenuated circadian responses to light but lack visual responses, while rodless transgenic mice (which lose rods earlier in development) show increased circadian responses to light. These data indicate that rod photoreceptors are not required for photoentrainment, but the early loss of rods may affect the development of the entrainment pathway. Aged rds/rds mice, lacking rod and cone outer segments, show circadian photo-sensitivities indistinguishable from +/+ animals. The circadian system of aged rd/rd mice shows spectral responses that are consistent with the involvement of the known mouse cone opsins (green cone-511 nm; UV cone-359 nm). Low levels of both the green and UV cone opsin mRNA remain with the eyes of aged rd/rd mice. The subcutaneous eyes of the blind mole rat are used to regulate circadian responses to light. Preliminary data suggest that these eyes contain a single opsin that most closely resembles a green cone opsin. Collectively these data suggests that photoentrainment in mammals is mediated by cones. However, if the residual cones mediate circadian responses to light then very few are needed to maintain sensitivity and they do not require an outer segment. DTIC

Circadian Rhythms; Eye (anatomy); Light (visible Radiation); Photoreceptors;

N96-11373# Scripps Research Inst., La Jolla, CA.

Molecular approach to hypothalamic rhythms Final Report, 15 Mar. 1992 - 14 Mar. 1995

Sutcliffe, J. Greager; 14 Mar. 1995 13 p

Contract(s)/Grant(s): (F49620-92-J-0188)

Report No.(s): (AD-A295080; AFOSR-95-0310TR) Avail: CASI HC A03/MF A01

The suprachiasmatic nucleus (SCN) of the hypothalamus is the anatomical seat or the mammalian endogenous biological clock which regulates the temporal expression of hormonal and behavioral circadian rhythms. Light, serotonin and melatonin are the dominant stimuli that affect the phase of the endogenous clock. The grantee has devised strategies to identify molecules that mediate the action of these stimuli within the SCN. The grantee has identified a novel receptor for serotonin, the 5-HT7 receptor, and determined its aminoacid structure. Its pharmacological ligand binding properties ahve been measured and a unique profile of agonists and antagonists defined. These allowed demonstration that the 5-HT7 receptor mediated circadian activity of cultured SCN. The receptor has been shown to couple to activation on adenylyl cyclase and to be synthesized by neurons of the subparaventricular zone immediately dorsal to the SCN. Molecules whose expression within the SCN is activated by light entraining cues have also been identified and their characterization is under way. DTIC

Activity (biology); Amino Acids; Circadian Rhythms; Hypothalamus; Neurotransmitters; Serotonin;

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

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

N96-10124# S-Tron Corp., Mountain View, CA.

Robust fixed-wavelength laser eye protection Final Report, Oct. 1988 - Feb. 1990

Edwards, Oliver; Lawrence, Nick; and Healy, Edward M.; Jun. 1994 28 p

Contract(s)/Grant(s): (DAAK60-89-C-0001)

Report No.(s): (AD-A294398) Avail: CASI HC A03/MF A01

The objective of this work was to develop the technology for depositing a dielectric narrow-band reflector on thin glass foil without unmanageable stress and bond this filter face-in to a cylindrically curved polycarbonate substrate to form an environmentally durable laminated visor. A dielectric coating that blocked three laser wavelengths (532 nm, 694 nm, and 1064 mn) was applied to paper-thin glass foil. Methods were developed for cementing this glass filter to the polycarbonate insert for the Sun, Wind and Dust Goggle, and trimming away the excess glass foil. In every case, the bonded glass film cracked and separated from the polycarbonate substrate. Failure analysis performed on the fractured glass indicated that the primary mechanism of failure involved microfractures at the glass edge. Several methods were used to prevent their formation or inhibit their growth, without success. The effort to construct the visor was unsuccessful. DTIC

Bandstop Filters; Dielectrics; Eye Protection; Glass Coatings; Goggles; Laser Damage; Optical Filters; Polycarbonates; Radiation Protection; Visors;

N96-10139# Naval Health Research Center, San Diego, CA.

Cool vests worn under firefighting ensemble reduces heat strain during exercise and recovery Final Report

Ramirez, L. R.; Hagan, R. D.; Shannon, M. P.; Bennett, B. L.; and Hodgdon, J. A.; Nov. 1994 37 p

Report No.(s): (AD-A294494; NHRC-95-2) Avail: CASI HC A03/MF A01

The purpose of this study was to evaluate the effectiveness of a cool vest (CV) to reduce heat strain during exercise, facilitate recovery, and minimize heat strain during subsequent return to exercise and heat exposure. Male volunteers (n=12) were monitored for heart rate (HR), and rectal (Tre), chest (Tch), arm (Tar), thigh (Tth), and calf (Tca) temperatures during randomly ordered no vest (NV) and cool vest (CV) tests. CV was worn over cotton work clothes and under firefighting ensemble (FFE). Test protocol consisted of 20 min each of rest, exercise, recovery, exercise, and recovery. Rest and recovery occurred in 29 C/65% relative humidity

(rh) air, while walking exercise (1.12 m/s and 0% grade) occurred in 48 C/50% rh air. All NV and CV subjects completed the 100 min tests. Repeated-measures analysis of variance revealed significantly lower Tre, Tch, Tar, and Tch for CV compared to NV, while differences in Tca and HR were nonsignificant. Compared to NV, Tre, Tch, Tar, and Tth for CV decreased faster (p less than 0.05) during recovery and rose less (p less than 0.05) during subsequent exercise. Our findings indicate that CV minimizes heat strain during exercise in hot/humid air, hastens recovery from heat strain in warm/humid air, and attenuates heat strain during subsequent exercise in hot/humid air. DTIC

Body Temperature; Fire Fighting; Heat Tolerance; Human Tolerances; Physical Exercise; Protective Clothing; Stress (physiology); Temperature Control; Vests;

N96-10151# Technical Cooperation Program, Redstone Arsenal, AL.

Physiological evaluation of two heat strain models effective in protective clothing systems

Gonzalez, R. R.; Mclellan, T. M.; and Withey, W. R.; May 1995 69 p

Report No.(s): (AD-A294506; TTCP/SGU/94/006) Avail: CASI HC A04/MF A01

This report presents a brief review of thermoregulatory models applicable to persons wearing NBC protective clothing. Two models were compared: the USARIEM Heat Strain Model and the UK Loughborough Model (LUT25). Experimental data were derived from an intermittent work protocol (CANADA) and from The Technical Cooperation Program (TTCP) approved continuous work standard research method (UK and US). Subject volunteers from the U.S. and the U.K. were exposed to the TTCP research protocol (T sub a = 350 C/50% RH, wind speed V = 1 m/s, level treadmill speed 3 to 3.5 mph) in their respective country laboratories. Canadian forces volunteers did an intermittent work protocol (15 min moderate work/15 min rest at T sub = 400 C/30% RH, V approximately equal to 0.4 m/s). Time analyses of core temperature response predicted from both models and experimental observations were compared using all respective country's data. Other physiological responses, which are affected during the wearing of protective clothing, are discussed for future modeling consideration in TTCP UTP-6 efforts. DTIC

Heat Tolerance; Mathematical Models; Physical Exercise; Physiological Responses; Physiological Tests; Protective Clothing; Thermoregulation;

N96-10336# Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.

Virtual reality psychophysics: Forward and lateral distance, height, and speed perceptions with a wide-angle helmet display Final Technical Report, Jul. 1992 - Apr. 1994

Wright, Robert H.; Apr. 1995 42 p

Report No.(s): (AD-A294027; ARI-TR-1025) Avail: CASI HC A03/MF A01

Psychophysics of a color, high resolution, very wide angle, virtual reality type of helmet-mounted display were investigated. Subjects used a joystick to set their viewpoint within a computer-generated image database to requested target values in forward and lateral distance, height, and speed. Test factors for each type of perception included helicopter flying experience, replications, 3-D with familiar objects or 2-D texture visual databases, relative or absolute perceptions, viewpoint motion rail row and column offsets, increasing or decreasing change in target values, and six target values. Median forward distance and speed perceptions were 41% of simulated physical stimuli, 50% for lateral distance, and 72% for height. These accuracies contrast with typical real-world accuracies for similar ranges of about 90% for distance, height, and speed. Main effort differences between most of the test factor levels were highly significant for all four types of perceptions. DTIC

Computer Graphics; Flight Simulation; Flight Simulators; Helmet Mounted Displays; Motion Perception; Perceptual Errors; Psychophysics; Space Perception; Virtual Reality;

N96-10653# Southwestern Ohio Council for Higher Education, Dayton, OH.

Evaluation of comfort liners for pilot helmets Final Report, 15 Mar. 1993 - 15 Sep. 1994

Kistner, Mark D.; Wiley, Larry L.; and Cassoni, Robert P.; Sep. 1994 50 p

Contract(s)/Grant(s): (F33615-89-C-5643)

Report No.(s): (AD-A294242; WL-TR-94-4115) Avail: CASI HC A03/MF A01

Armstrong Laboratory the Helmet Mounted Systems Technology Section (AL/CFA (HMST)) requested that the Systems Support Division, Materials Behavior and Evaluation Section (WL/MLSE) evaluate several existing pilot helmet comfort liner systems. A database on current custom fit helmet comfort liners did not exist. Armstrong Laboratory needs this database to guide the development of advanced helmet comfort liner systems. This report evaluated three different helmet comfort liner systems. The softest system is a closed cell foam-in-place silicone liner (FIPSL) by GEC Marconi. This system consists of an outer bag into which is foamed a silicone closed cell foam material. The most common currently used system is a Thermoplastic-1 Sheet Liner (TPL) by Gentex. This system consists of four or five sheets of thermoplastic material with hemispherical bumps. The most rigid system is an epoxy coated open-cell foam system called a Thermoformed Liner (TFL) by Kaiser Electronics.

Coefficient of friction, compression and creep data are generated on each of the 2 helmet comfort liner materials.
DTIC
Aircraft Pilots; Comfort; Helmet Mounted Displays; Linings; Mechanical Properties;

N96-10728 National Defence Research Establishment, Stockholm (Sweden). Dept. of Human Sciences.
Visit to two US defense/research institutes. Symposium on electronic imaging
Derefeldt, G.; and Swartling, T.; Nov. 1994 68 p In ENGLISH and SWEDISH
Report No.(s): (PB95-211199; FOA-R-94-00049-5.2-SE) Avail: Issuing Activity (National Technical Information Service (NTIS))

This document reports on a visit to two defense-research institutes and participation in a symposium on electronic imaging: University of Dayton Research Institute (UDRI) and Armstrong Laboratory, Aircrew Training Research Division (AL/ATRD) located at Mesa, Arizona. The purpose of the visit was to strengthen established contacts between FOA and UDRI, Armstrong Laboratory. AL/ATRD is the US Air Force's premier organization for research and development in aircrew training techniques and technologies. Its basic mission is to increase aircrew effectiveness and to provide enhanced training systems for combat preparation; NASA - Ames Research Center, Human Factors Research Lab, Moffett Field, CA. The purpose of the visit was to obtain insight into current research at NASA Human Factors Research Lab. Research is in progress on virtual reality and planetary exploration, telerobotics, manmachine interaction (MMI) and human engineering, vision, advanced displays and spatial perception, video display engineering and optimization system (VIDEOS); IS&T/SPIE symposium on 'Electronic Imaging: Science and Technology' covered about 20 conferences in six programs. We participated in the following conferences: Stereoscopic Displays and Applications V, Human Vision, Visual Processing, and Digital Display V, The Engineering Reality of Virtual Reality, and Visual Data Exploration and Analysis. NTIS
Flight Crews; Flight Simulators; Flight Training; Human Factors Engineering; Imaging Techniques; Research and Development;

N96-10968# Analytic Sciences Corp., San Antonio, TX.
Laser range evaluation for the Avon Park Range, MacDill Air Force Base, Florida Final Technical Report, 25 - 29 Sep. 1994
Baker, Boyd C.; Jul. 1995 129 p
Contract(s)/Grant(s): (F33615-92-C-0017)
Report No.(s): (AD-A296886; AL/OE-TR-1995-0018) Avail: CASI HC A07/MF A02

At the request of the 6th Medical Group Bioenvironmental, TASC, Incorporated personnel (through a contract let by the Armstrong Laboratory) performed a laser range evaluation at the Avon Park Range, FL, on 25-29 September 1994. Subjects covered included lasers used on the range and the various missions to be conducted on the ranges. Recommendations and footprint evaluations were made to provide effective use of the Foxtrot and Echo complexes. Laser range procedures and laser goggle data were detailed, as well as required medical surveillance requirements for range personnel. Range assessment consisted of on-site (laser target) visit, review of range procedures, and an evaluation as detailed in checklists from MIL-HDBK-828 and Range Commanders1 Council Document 306-91. DTIC
Eye Protection; Goggles; Laser Range Finders; Laser Targets; Laser Weapons; Range Safety; Target Recognition; Technology Assessment;

N96-11083# George Mason Univ., Fairfax, VA.
The role of individual differences in choice of strategy and performance in a computer-based task
Bohan, Jennifer A.; Boehm-Davis, Deborah A.; and Marshall, Raphael; Jun. 1995 50 p
Contract(s)/Grant(s): (N00014-94-1-G007)
Report No.(s): (AD-A296621) Avail: CASI HC A03/MF A01

Past research using different learning tasks has consistently shown different performance strategy patterns for field independent and dependent individuals. This research has shown that different computer environments affect how well individuals learn and that learning is dependent upon an individual's cognitive style. Other research has shown that there are individual differences (in cognitive ability, perceptual speed, and performance on a noun-pair task) in learning and executing computer tasks, specifically with regard to the type of interaction individuals choose to use. The present study is an attempt to correlate field dependence with performance strategies when using a specific task, the SigmaPlot graphing task. Field dependency, as measured by scores on the Group Embedded Figures Test (GEFT), was correlated with the mean time to complete a graph. Contrary to previous findings, field dependency was not correlated with performance; however, it was found that years of computer experience, perceptual speed, and cognitive reasoning ability were. DTIC
Cognition; Graphical User Interface; Human-computer Interface;Learning; Mental Performance; Psychological Tests; Psychometrics;

N96-11085# Edgewood Research Development and Engineering Center, Aberdeen Proving Ground, MD.
Cognitive performance during 10 hours of continuous respirator wear under resting conditions Final Report, Feb. 1994 - Apr. 1994

Caretti, David M.; Mar. 1995 29 p
Report No.(s): (AD-A296968; ERDEC-TR-243) Avail: CASI HC A03/MF A01

In order to assess the effects of long-term respirator wear on cognitive performance and signal detection, nine subjects continuously performed various computer controlled tasks under non-exercise conditions during two 10 hr days one with and one without (control) wearing a respirator. Cognitive tasks assessed speed of information processing, language skills, rapid visual scanning, recognition memory, and divided attention. Subject anxiety levels were also assessed. Cognitive performance did not differ significantly between respirator and control trials and was not changed over time. In general, mean decision-making times were slower during respirator wear compared to control, but the differences were not significant. DTIC

Cognition; Decision Making; Information Processing (biology); Mental Performance; Respirators; Visual Perception;

N96-11118# Naval Air Warfare Center, Patuxent River, MD.

Night vision for the F-14 tomcat

Rabens, Mike; and Klaasse, Dave; 27 Apr. 1995 6 p
Report No.(s): (AD-A294348) Avail: CASI HC A02/MF A01

NAVMRWARCENACDIV Warminster began working on an integrated Tomcat NVIS compatible cockpit nearly 8 years ago. This effort continued for many years and would have ultimately been incorporated into the Block 1 upgrade to the F-14. However, F-14 upgrade plans changed, and the Warminster efforts shifted to designing a nonintegral (and less expensive) NVO cockpit. Independently, several years ago, the Red Rippers of VF-11 set out to find a low cost NVU compatible kit for their F-14D's. Working with industry to design a proof of concept cockpit, they successfully enlisted the help of a manufacturer and installed NVIS filters over many of their displays. Finally, in 1994, the F-14 Program Manager initiated a program to develop NVIS compatible cockpit lighting kits for the F-14 series using the best of the Warminster and VF-11 developed components. DTIC

Cockpits; F-14 Aircraft;Kits; Low Cost; Night Vision;

N96-11144# Brooke Army Medical Center, Fort Sam Houston, TX.

The induction of Fibromyalgia symptoms in athletes versus sendentary controls; correlations with somatomadin-C Final Report, 1 Aug. 1993 - 15 Nov. 1994

Older, Steven A.; Battafarano, D. F.; Danning, C. L.; Ward, J. A.; and Grady, E. P.; 15 Jun. 1995 21 p
Contract(s)/Grant(s): (MIPR-93MM3583)
Report No.(s): (AD-A296833) Avail: CASI HC A03/MF A01

Fibromyalgia syndrome (FMS) is a chronic and debilitating illness characterized by diffuse musculoskeletal pain, nonrestorative sleep, and the presence of localized tenderness at characteristic sites (1-4). An estimated three to six million Americans are affected (5). The prevalence of FMS in the general population has recently been assessed at roughly 2.0% (6). It occurs most commonly in females between the ages of 20 and 60 years, but all ages and both genders are susceptible (2). The incidence and sex ratio of FMS in the active duty military population is unknown, however it may be responsible for many of the musculoskeletal complaints evaluated at troop medical clinics and military hospitals. At the Brooke Army Medical Center Rheumatology Clinic, 35 of 83 (43%) FMS patients fall within the typical active duty age range (less than 50 years of age), and 20% are less than 40 years of age. During Operation Desert Storm soft tissue rheumatic disease accounted for 22% of outpatient visits over a one month period (7). Several soldiers required air evacuation to CONUS because of FMS (personal communication, Gary L. Klipple, COL, MC); at least two were medically retired. DTIC

Athletes; Clinical Medicine; Correlation; Estimating; Females; Hospitals; Medical Services; Musculoskeletal System; Pain; Populations; Rheumatic Diseases; Sicknesses; Signs and Symptoms;

N96-11170# Logicon, Inc., Dayton, OH.

Hybrid video amplifier chip set for helmet-mounted visually coupled systems Final Report, Mar. 1992 - Nov. 1993

Ross, Jeff A.; and Kocian, Dean; (Air Force Materiel Command, Wright-Patterson AFB, OH.) Nov. 1994 8 p
Contract(s)/Grant(s): (AF PROJ. 3257)
Report No.(s): (AD-A293506; AL/CF-SR-1994-0031) Avail: CASI HC A02/MF A01

This paper discusses a new wide-bandwidth Hybrid Video Amplifier Chip Set (HVACS) developed in conjunction with a Quick Disconnect Connector (QDC) with primary application to helmet-mounted displays (HMD). Its major objective is to provide improved control and modulation of the video signal at the cathode ray tube (CRT) while permitting an off-helmet location that places the final video amplification stage much further from the CRT than is the case for direct-view chassis mounted CRT's. The results of this work are being incorporated into a standard pilot vehicle interface for helmet displays and sights by the Air Force. It is also hoped that this work will lead to an off the shelf device for military and industrial applications of helmet displays hat utilize helmet mounted CRT image sources. DTIC

Broadband; Chips (electronics); Disconnect Devices; Helmet Mounted Displays; Integrated Circuits; Military Operations; Military Technology; Video Signals;

N96-11299# Analytic Sciences Corp., Reading, MA.

Logistics support analysis of absorptive dye-based laser eye protection (LEP) visors for advanced aircrew vision

protection (AAVP) Out-of-Band laser (OBL) Final Report
Awtry, Mark H.; and Maier, Dennis A.; Jul. 1995 29 p
Contract(s)/Grant(s): (F33615-92-C-0017)
Report No.(s): (AD-A296847; AL/OE-TR-1995-0074) Avail: CASI HC A03/MF A01

This Logistics Support Analysis (LSA) was conducted as part of the Armstrong Laboratory, Advanced Aircrew Vision Protection/Out-of-Band Laser (AAVP/OBL) program which transitioned absorptive dye-based laser eye protection (LEP) pilot helmet visors to the Human Systems Center for acquisition. The use rates, annual-demand and support requirements for LEP visors were examined and projected based on the clear and neutral gray (sun) helmet visors currently in use. Aircrew strengths for different aircraft types, visor usage rates and different configurations of visors required to interface with the different helmets and oxygen masks are considered. Expected initial and recurring requirements for LEP visors are tabulated and discussed. The U.S. Air Force will require 7000 to 14000 laser/day visors and 3000 to 5000 laser/night visors annually. The maintenance and support of LEP visors can be accomplished for the most part with the personnel, training and equipment currently in place. The singular cause for removing helmet visors from service was found to be due to scratches. Improved scratch resistance coatings are recommended. DTIC

Abrasion Resistance; Eye Protection; Flight Crews; Helmets; Lasers; Logistics; Support Systems; Visors;

N96-11303# Naval Aerospace Medical Research Lab., Pensacola, FL.
Sound attenuation evaluation of the navy's HGU-84/P helicopter helmet
Maxwell, D. W.; and Williams, C. E.; Jan. 1995 18 p
Report No.(s): (AD-A296871; NAMRL-TM-95-1) Avail: CASI HC A03/MF A01

First article sound attenuation tests were conducted on samples of the HGU-84/P helicopter helmet, candidate replacement for the SPH-3C series of helmets, supplied for evaluation by the Naval Air Warfare Center Aircraft Division, Warminster, Pennsylvania. The tests were conducted in accordance with American National Standard ANSI 512.6-1984, Method for the Measurement of Real-Ear Attenuation of Hearing Protectors. Objective measurements of attenuation, microphone-in-real-ear (MIRE), were also obtained for database and record purposes. Ten Marine Corps student aviators in the Naval Aviation Flight Training Program served as volunteer test subjects. Real-ear attenuation values calculated from measurements made at the nine, one-third octave test frequencies met or exceeded the required minimum real-ear attenuation specifications for the newly developed helmet. This technical memorandum documents the results of the sound attenuation tests. The HGU-84/P helmet is currently being fielded as a replacement for the SPH-3C helmet. DTIC

Acoustic Attenuation; Data Bases; Hearing; Helicopters; Helmets; Protectors; Replacing; Warfare;

N96-11379# Armstrong Lab., Brooks AFB, TX. Crew Systems Directorate.
Test and evaluation of the Bird Products, Corporation Bird Avian Portable Ventilator (Military version) model 15300 Final Technical Report, Apr. - Jul. 1994
Blake, Butch O.; May 1995 20 p
Contract(s)/Grant(s): (AF PROJ. 7930)
Report No.(s): (AD-A295135; AL/CF-TR-1995-0060) Avail: CASI HC A03/MF A01

Aeromedical Research tested and evaluated the Bird Avian Portable Ventilator for use on aeromedical evacuation aircraft in response to a request from the Defense Logistics Agency. A collaborative evaluation was conducted with the U.S. Army Aeromedical Research Laboratory, Ft Rucker, Alabama. The Bird Products, Corp. Bird Avian Portable Ventilator (Military Version) Model 13300 was found acceptable for use on cargo aircraft used for USAF aeromedical evacuation. DTIC

Aerospace Medicine; Air Transportation; Evacuating (transportation); Medical Equipment; Medical Services; Performance Tests; Portable Equipment; Ventilators;

N96-11391# Lawrence Livermore National Lab., Livermore, CA. Inst. for Scientific Computing Research.
Mathematical analysis of errors resulting from choice of reference frame coordinates in measuring human joint motion
Hollerbach, Karin; and Hollister, Anne; (Rancho Los Amigos Hospital, Inc., Downey, CA.) Feb. 1995 5 p Presented at the 15th Congress of the International Society of Biomechanics, Jyvaskyla, Finland, 2-6 Jul. 1995
Contract(s)/Grant(s): (W-7405-ENG-48)
Report No.(s): (DE95-010918; UCRL-JC-119789; CONF-9507124-1) Avail: CASI HC A01/MF A01

Measurements of human joint motion frequently involve the use of opto-electronic and other motion analysis systems where some type of makers are used to establish joint motion within a global reference coordinate frame. Typically, this global reference coordinate frame is chosen to be most convenient for the person carrying out the experiment in which the joint motion is measured, and Euler angles are chosen as the measure of joint motion. Results, however, may be quite arbitrary and therefore rendered meaningless if the reference frame is not properly chosen with respect to the physical joint axis. In order to make a proper choice of coordinate axes in the reference frame, one must take into consideration both the location and the orientation of die physical joint axis relative to the reference frame's axes. In nature, joint axes can exist at any orientation and location

relative to an arbitrarily chosen global reference frame. An axis that is not properly aligned with the global reference frame is therefore called an arbitrary axis. We demonstrate that errors result when measurements and calculations are made in a global reference frame that is arbitrarily placed and oriented, with little regard for the physical axis. Slight offsets of global reference frame produce significant errors in recording rotations about the joint axis. We conclude that, in order to be able to reach valid conclusions from joint motion measurements, the reference frame with respect to which all are taken must be brought to the physical axis; furthermore, one of the reference axes must be aligned with the physical axis. Any other choice of reference axes will result in misleading an often erroneous results. DOE

Axes (reference Lines); Error Analysis; Joints (anatomy); Mathematical Models; Motion;

N96-12023 Cincinnati Univ., OH.

Analysis of lateral dynamics of a human steered vehicle and its application to the optimal four-wheel steering system Ph.D. Thesis

Cho, Young Ho; 1993 109 p Avail: Univ. Microfilms Order No. DA9416778

A method to study the handling characteristics of a vehicle moving along a curved path is presented. A simple bicycle model and a feedback controller with proportional gain are used to simulate the vehicle and the driver. The lateral stability of the vehicle-driver system is analysed by using the root locus method and numerical integration in the time domain. The effect of the curvature on the system stability is discussed in detail. A new suggestion is made for the look ahead distance to calculate the preview lateral error of the vehicle with respect to the center of the road. Interesting results are shown for some important parameters such as the gain factor, the vehicle speed and the curvature of the path. Possible extensions of the method to more general cases and other applications are discussed. Various methods to design the four wheel steering system (4WS) are discussed. The vehicle is modeled as a closed loop system using a bicycle model with a human controller and a rear wheel steering scheme. General formulation of the system equation is made using the state space form. An optimal control algorithm is developed using a linear quadratic regulator model. Three optimal control schemes with different performance indices are analysed and compared in terms of handling responses. Two simple feedback control 4WS systems are suggested as alternatives of the optimal control 4WS system. The systems are essentially variations of the existing vehicle speed function based (VSF) system. They utilize information from the system stability analysis and the results of optimal control system simulations. Numerical simulation shows that the new systems show better performance than the existing VSF system. Dissert. Abstr.

Controllability; Feedback Control; Human Factors Engineering; Lateral Stability; Linear Quadratic Regulator; Optimal Control; Steering;

55 SPACE BIOLOGY

Includes exobiology; planetary biology; and extraterrestrial life.

N96-11919*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

Spacelab Life Sciences-1 Final Report

Dalton, Bonnie P.; Jahns, Gary; Meylor, John; (Lockheed Martin Missiles and Space, Moffett Field, CA.); Hawes, Nikki; (Lockheed Martin Missiles and Space, Moffett Field, CA.); Fast, Tom N.; (Lockheed Martin Missiles and Space, Moffett Field, CA.); and Zarow, Greg; (Veterans Administration Hospital, San Francisco, CA.) Aug. 1995 98 p

Contract(s)/Grant(s): (RTOP 106-30-02)

Report No.(s): (NASA-TM-4706; A-950059; NAS 1.15: 4706) Avail: CASI HC A05/MF A02

This report provides an historical overview of the Spacelab Life Sciences-1 (SLS-1) mission along with the resultant biomaintenance data and investigators' findings. Only the nonhuman elements, developed by Ames Research Center (ARC) researchers, are addressed herein. The STS-40 flight of SLS-1, in June 1991, was the first spacelab flown after 'return to orbit', it was also the first spacelab mission specifically designated as a Life Sciences Spacelab. The experiments performed provided baseline data for both hardware and rodents used in succeeding missions. Author

Applications Programs (computers); Assessments; Hardware; Histories; Life Sciences; Space Shuttle Missions; Space Shuttle Payloads; Spaceborne Experiments; Spacelab; Test Equipment;

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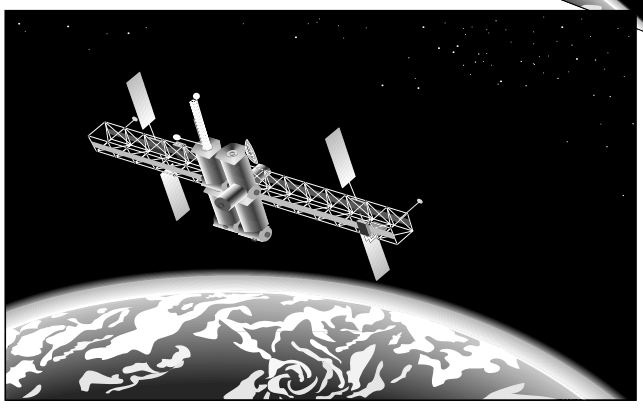

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