NASA/SP—97-7011/SUPPL455
December 29, 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. These results are published by NASA in the NASA STI Report Series, which includes the following report types:

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

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

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

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

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

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

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

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

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

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

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

- Telephone 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

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 **listserve@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 **listserve@sti.nasa.gov**.

New Feature! subscribe SCAN-AEROMED

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.

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.

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 (INlS) representative in their country, or by applying directly to the issuing organization.

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

Addresses of Organizations

British Library Lending Division
Boston Spa, Wetherby, Yorkshire
England

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

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

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

ESDU International
27 Corsham Street
London
N1 6UA
England

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

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

NASA Center for AeroSpace Information
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

Rev. 6/96

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

PENNSYLVANIA

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

SOUTH CAROLINA

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

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

TENNESSEE

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

TEXAS

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

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

UTAH

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

VIRGINIA

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

WASHINGTON

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

WEST VIRGINIA

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

WISCONSIN

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

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

Typical Report Citation and Abstract

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

Key

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

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 455)

DECEMBER 29, 1997

51
LIFE SCIENCES (GENERAL)

19970040652 Geological Survey, Reston, VA USA

Biology of the Rio Grande Border Region: A Bibliography

Johnson, Lynne E., Geological Survey, USA; Jacobs, Linda J., Geological Survey, USA; Papoulias, Diana, Geological Survey, USA; Jul. 1997; ISSN 1081-2911; 156p; In English

Report No.(s): AD-A329147; USGS/BRD/ITR--1997-0001; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

This bibliography includes 1,913 references to the literature of the Rio Grande (Rio Bravo del Norte). The specific geographic area covered extends 100 km on either side of the river from Elephant Butte Dam in New Mexico to the Gulf of Mexico. The bibliography focuses on the biological literature, divided into major subject areas, and also includes supporting literature from the physical and environmental sciences. The database is available in a searchable format on the Internet home page of the U.S. Geological Survey, Biological Resources Division, Environmental and Contaminants Research Center.

DTIC

Bibliographies; Data Bases; Botany; Ecology

19970040735 Wistar Inst. of Anatomy and Biology, Philadelphia, PA USA

Carbohydrate Mimicking Peptides as Inhibitors of Angiogenesis and Metastasis ***Annual Report, 1 Jun. 1996 - 31 May 1997***

Blaszczyk-Thurin, Magdalena, Wistar Inst. of Anatomy and Biology, USA; Jul. 1997; 11p; In English

Contract(s)/Grant(s): DAMD17-96-I-6232

Report No.(s): AD-A329004; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

E-selectin is an inducible cell adhesion molecule which mediates rolling of neutrophils as well as adhesion of carcinoma cells to endothelium. Inhibition of selectin-mediated interaction is a possible means for controlling inflammation induced diseases and metastatic spread. The purpose of these studies is to identify peptide forms mimicking Lewis X (LeX), sialyl-Lewis X (SA-LeX), sialyl-Le(sup a) (SA-Le(sup a)), and Lewis Y (LeY) carbohydrate structures to disrupt lectin-ligand interactions and evaluate their properties to block adenocarcinoma cell adhesion to endothelial cells and tumor metastasis in vitro and in vivo. We used recombinant peptide library to identify novel ligands for E-selectin. We have identified five dodeca peptides mimicking SA-Le(sup a) carbohydrate, which is one of the E-selectin ligands, via means of random peptide library screening using SA-Le(sup a)-specific monoclonal antibody (MAb) NS 19-9. Peptides with the highest binding affinity for the MAb will be synthesized and characterized for its anti-metastatic activity using JC murine breast and H-59 lung carcinoma cells in metastatic model in vivo.

DTIC

Cancer; Carbohydrates; Peptides; Inhibitors; Cells (Biology)

19970040740 Search for Extraterrestrial Intelligence Inst., Mountain View, CA USA

The Evolution of Energy-Transducing Systems. Studies with an Extremely Halophilic Archaebacterium ***Final Report, Feb. 1989 - Aug. 1997***

Stan-Lotter, Helga, Search for Extraterrestrial Intelligence Inst., USA; 1997; 8p; In English

Contract(s)/Grant(s): NCC2-578

Report No.(s): NASA/CR-97-206033; NAS 1.26:206033; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The F-type ATPases are found in remarkably similar versions in the energy-transducing membranes of bacteria, chloroplasts and mitochondria (1). Thus, it is likely that they have originated early in the evolution of life, which is consistent with their function as key enzymes of cellular metabolism. The archaea (formerly called archaebacteria) are a group of microorganisms which, as shown by molecular sequencing and biochemical data, have diverged early from the main line of prokaryotic evolution (2). From

studies of members of all three major groups of archaea, the halophiles, methanogens and thermoacidophiles, it emerged that they possess a membrane ATPase, which differs from the F-ATPases. The goal of this project was a comparison of the ATPase from the halophilic archaebacterium Halobacterium saccharovorum with the well-characterized F-type ATPases on the molecular level. The results were expected to allow a decision about the nature of archaebacterial ATPases, their classification as one of the known or, alternatively, novel enzyme complex, and possibly a deduction of events during the early evolution of energy-transducing systems.
Derived from text
Bacteria; Chloroplasts; Mitochondria; Archaebacteria; Prokaryotes; Biological Evolution

19970040794 Oklahoma State Univ., Stillwater, OK USA
Fifth Pan American Symposium on Animal, Plant and Microbial Toxins ***Final Report, 1 Dec. 1994 - 30 Nov. 1995***
Ownby, Charlotte L., Oklahoma State Univ., USA; Dec. 1996; 247p; In English; Fifth Pan American Symposium on Animal, Plant and Microbial Toxins, 30 Jul. - 4 Aug. 1995, Frederick, MD, USA
Contract(s)/Grant(s): DAMD17-95-I-5004
Report No.(s): AD-A329235; No Copyright; Avail: CASI; A11, Hardcopy; A03, Microfiche; Abstracts Only; Abstracts Only
This report covers recent work in the areas of snake, plant, microbial and arthropod toxins. Presentations on snake toxins include work done on neurotoxins such as B-bungarotoxin and k-neurotoxins, phospholipase A2 myotoxins, anti-muscarinic toxins, metalloproteinases, fibrinolytic enzymes, cardiotoxins, and antihemorrhagic factors. Presentations on plant and microbial toxins include work done on ricin, Clostridium perfringens enterotoxin, cone snail peptides, sea anemone toxins, proteinase inhibitors and maitotoxin. Presentations on arthropod toxins included work on scorpion neurotoxins, K+ channel-blocking peptides, lice and wasp proteins, stinging insect venom allergens and Australian funnel-web spider toxins. Techniques and methods employed in these projects ranged from classical biochemistry, pharmacology and pathology to state-of-the-art molecular biology including cloning, expression and mutation studies.
DTIC
Toxins and Antitoxins; Conferences

19970040944 Texas Univ., Div. of Life Sciences, San Antonio, TX USA
Immobilization and Testing of Proteins on Microsensors ***Final Report, Mar. 1989 - Feb. 1991***
Chambers, James P., Texas Univ., USA; Menking, Darrel E., Edgewood Research Development and Engineering Center, USA; Thompson, Roy G., Edgewood Research Development and Engineering Center, USA; Valdes, James J., Edgewood Research Development and Engineering Center, USA; Jul. 1997; 35p; In English
Contract(s)/Grant(s): DAAA15-89-C-D008
Report No.(s): AD-A329062; ERDEC-CR-229; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
Proteins were covalently immobilized onto surfaces using various techniques, including chemical coupling using glutaraldehyde or via biotin-streptavidin. Testing of a receptor-based biosensor system was accomplished using the 1,4-Dihydropyridine receptor. Antibody-based testing included detection of botulinum toxin and Mojave toxin, Hybridized DNA was used to determine the feasibility of detection of bacteria using gene probes. Antibody and DNA detection were tested on fiber optic (evanescent wave sensor) and potentiometric (light addressable potentiometric sensor) microsensors. The microsensor testing indicated that detection of toxins and DNA was rapid, sensitive, and selective.
DTIC
Deoxyribonucleic Acid; Toxins and Antitoxins; Evanescence; Fiber Optics; Biotin; Bacteria; Antibodies; Microelectronics

19970041029 NERAC, Inc., Tolland, CT USA
Microbiology of Groundwater. (Latest Citations from the Life Sciences Collection Database)
Jul. 1997; p; In English; Page count unavailable. Supersedes PB96-870084
Report No.(s): PB97-862262; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche
The bibliography contains citations concerning the occurrence, distribution, activity, and movement of groundwater microorganisms. Detection of microorganisms and their effects upon groundwater quality are also considered.(Contains 50-250 citations and includes a subject term index and title list.)
NTIS
Bibliographies; Microbiology; Ground Water

19970041114 University Coll., Galway, Ireland

Characterisation of Background Biological Aerosol ***Interim Report No. 3, Apr. - Jun. 1997***

Jennings, S. G., University Coll., Ireland; Kenny, C. M., University Coll., Ireland; Jul. 30, 1997; 18p; In English

Contract(s)/Grant(s): N68171-96-C-9124

Report No.(s): AD-A328969; R/D-8092-EN-O1; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Sampling of ambient air using a glass cyclone system for fluorescence background determination is described. Weekly samples over 12 hour sampling periods are taken at the University College Galway 5 atmospheric research field station at Mace Head, on the west coast of Ireland. The bioaerosol sampling system and procedures used have previously been discussed in the 1st Interim Report. A fluorescence protocol developed in the ERDE C Laboratories is used. Representative fluorescence excitation/emission spectra are presented and compared for both background and polluted conditions. Intercomparison between winter and spring signatures is made.

DTIC

Sampling; Aerosols; Emission Spectra; Fluorescence; Air Pollution; Pollution Monitoring

19970041116 Burnham Inst., La Jolla, CA USA

Yeast Genetics for Delineating Bax/Bc1 Pathway of Cell Death Regulation ***Annual Report, 1 Jul. 1996 - 30 Jun. 1997***

Reed, John C., Burnham Inst., USA; Jul. 1997; 30p; In English

Contract(s)/Grant(s): DAMD17-96-I-6034

Report No.(s): AD-A329121; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Two novel human genes were cloned that inhibit cell death and that therefore may contribute to breast cancer by preventing the normal cell turnover that is essential for keeping overall numbers of cells in the mammary gland within physiologically appropriate ranges. These genes suppress the pro-death activity of a protein called Bax. The Bax protein was shown previously to be present in normal mammary tissue but reduced or absent in one-third of breast cancers, in association with poor patient responses to chemotherapy and shorter overall survival. The cloning of these two new genes, termed Bl-1 and Bl-2 for Bax-inhibitors 1 and 2, may provide insights into how to restore the function of Bax in breast cancer which has reduced levels of this cell death promoting protein.

DTIC

Genetic Engineering; Cancer; Yeast; Cloning (Biology); Cells (Biology)

19970041221 NERAC, Inc., Tolland, CT USA

Antimicrobial Agents for Textiles. (Latest Citations from the U.S. Patent Bibliographic File with Exemplary Claims)

Jul. 1997; p; In English; Page count unavailable. Supersedes PB96-868427

Report No.(s): PB97-861983; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning fabrication methods and applications of compositions which impart antimicrobial properties to textile products. Processes used in the production of a variety of compositions, and methods used in fabric treatment are discussed. Applications of antimicrobial agents include use in permanent fabric finishing and laundry composition. Uses of biocidal fabrics, including packaging materials and surgical fabrics, are presented. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Bactericides; Antibiotics; Antiinfectives and Antibacterials; Textiles

19970041269 Wisconsin Univ., Center for Space Automation and Robotics, Madison, WI USA

Plant Growth and Development in the ASTROCULTURE(trademark) Space-Based Growth Unit-Ground Based Experiments ***Final Report***

Bula, R. J., Wisconsin Univ., USA; Feb. 17, 1997; 7p; In English

Contract(s)/Grant(s): NAG9-851

Report No.(s): NASA/CR-97-206158; NAS 1.26:206158; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The ASTROCULTURE(trademark) plant growth unit flown as part on the STS-63 mission in February 1995, represented the first time plants were flown in microgravity in a enclosed controlled environment plant growth facility. In addition to control of the major environmental parameters, nutrients were provided to the plants with the ZEOPONICS system developed by NASA Johnson Space Center scientists. Two plant species were included in this space experiment, dwarf wheat (Triticum aestivum) and a unique mustard called "Wisconsin Fast Plants" (Brassica rapa). Extensive post-flight analyses have been performed on the plant material and it has been concluded that plant growth and development was normal during the period the plants were in the microgravity environment of space. However, adequate plant growth and development control data were not available for direct

comparisons of plant responses to the microgravity environment with those of plants grown at 1 g. Such data would allow for a more complete interpretation of the extent that microgravity affects plant growth and development.
Derived from text
Spaceborne Experiments; Vegetation Growth; Microgravity; Controlled Atmospheres; Space Transportation System; Plants (Botany)

19970041440 ManTech Environmental Technology, Inc., Dayton, OH USA
Acute and Subchronic Toxicity Evaluations of the Halon Replacement Candidate Phosphorus Tribromide ***Final Report, Oct. 1996 - May 1997***
Wolfe, Robin E., ManTech Environmental Technology, Inc., USA; Feldmann, Marcia L., ManTech Environmental Technology, Inc., USA; Ellis, David H., ManTech Environmental Technology, Inc., USA; Leahy, Harry F., Geo-Center, Inc., USA; Flemming, Carlyle D., ManTech Environmental Technology, Inc., USA; Dodd, Darol E., ManTech Environmental Technology, Inc., USA; Eggers, Jeffrey S., Army Medical Research Detachment, USA; Sep. 1997; 40p; In English
Contract(s)/Grant(s): F41624-96-C-9010; AF Proj. 7757
Report No.(s): AD-A329386; AL/OE-TR-1997-0123; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
Phosphorus tribromide (PBr3) is being considered by the DOD as a possible replacement for Halon 1301. This study was designed to determine the effects following single, high-concentration exposures which could occur in accidents, as well as repeated, low-concentration exposures which could occur on flight lines or where maintenance commonly occurs. Application of 10 or 50 microliters neat PBr3 to intact skin of an anesthetized NZW rabbit caused edema and necrosis of the treated skin within 10 minutes of dosing. Microscopic examination confirmed necrosis of the skin and underlying areas, including the skeletal muscle of the subcutis.
DTIC
Phosphorus Compounds; Bromine Compounds; Toxic Hazards; Edema; Skin (Anatomy); Rabbits

19970041589 United Engineering Trustees, Inc., New York, NY USA
Annals of the New York Academy of Sciences, Volume 799. Enzyme Engineering 13 ***Final Report, 1 Sep. 1995 - 31 Aug. 1996***
Russell, Alan, Editor, Pittsburgh Univ., USA; Dordick, Jonathan S., Editor, Iowa Univ., USA; Jul. 1997; 803p; In English; 13th; International Enzyme Engineering Conference, 15-20 Oct. 1995, San Diego, CA, USA
Contract(s)/Grant(s): DAAH04-95-I-0507
Report No.(s): AD-A329120; ARO-34550.1-LS-CF-Vol-799; No Copyright; Avail: CASI; A99, Hardcopy; A10, Microfiche
Partial Contents: Preparation and Properties of Designed Biocatalysts Biopolymer Structure and Function Biocatalysts under Extreme Environments Application o f Protein Expression in Biocatalysis Biochemical Engineering of Enzyme Systems .Biomaterials Synthesis and Design .Enzymes in Organic Synthesis
DTIC
Biochemistry; Biopolymers

19970042221
Noninvasive assessment of regional and temporal variations in tissue oxygenation by near-infrared spectroscopy and imaging
Sowa, Michael G., Natl Research Council Canada, Canada; Mansfield, James R.; Scarth, Gordon B.; Mantsch, Henry H.; Applied Spectroscopy; February 1997; ISSN 0003-7028; vol. 51, no. 2, pp. 143-152; In English; Copyright; Avail: Issuing Activity
A combination of near-infrared spectroscopy and discrete wavelength near-infrared imaging is used to noninvasively monitor the forearm during periods of restricted blood outflow (venous outflow restriction) and interrupted blood inflow (ischemia). Multivariate analysis of image and spectral data time courses was used to identify highly correlated spectral and regional domains, while fuzzy C-means clustering of image time courses was used to reveal finer regional heterogeneities in the response of stressed tissues. Localized near-infrared spectroscopy was used to investigate the magnitude of the bulk changes in the tissue optical properties and the variation in tissue oxygenation saturation during venous outflow restriction and complete forearm ischemia. The imaging and spectroscopic analyses revealed highly localized regional variations in tissue oxygen saturation during forearm ischemia as compared to the more diffuse and global response of the forearm during venous outflow restriction.
Author (EI)
Hemoglobin; Infrared Spectroscopy; Optical Properties; Oxygen; Tissues (Biology)

19970042473

Alignment of dynamic cardiac PET images for correction of motion

Turkington, Timothy G., Duke Univ, USA; Degrado, Timothy R.; Hanson, Michael W.; Coleman, R. Edward; IEEE Transactions on Nuclear Science; April 1997; ISSN 0018-9499; vol. 44, no. 2, pp. 235-242; In English; Copyright; Avail: Issuing Activity

A technique was developed to align images from dynamic cardiac N-13 ammonia positron emission tomography (PET) scans. Inaccurate alignment of images from these scans stems from breathing, motion of the heart within the thorax, and overall motion of the patient (particularly during pharmacologic stress). The images from these scans represent changing distributions, from high blood pool concentrations to predominantly myocardial uptake, and are generally noisy. In this technique, templates are defined from a long, late frame (5-10 min). These templates include a myocardial template, which matches late frames, a blood pool template, which matches frames in which the left ventricle blood pool is dominant, and a modified blood pool template, which reduces the effect of activity in the right ventricle. The correlation function is used as the maximized parameter over shifts between each three-dimensional image frame and the appropriate template. The technique was tested on phantom, human, and animal data with myocardial defects. Phantom data showed the technique to be reliable to within one voxel (1.7 x 1.7 x 4.2 mm(sup 3)), and motion which was apparent in human data was reduced significantly. Blood flow values measured from corrected data showed two traits: higher values, due to better matching regions of interest to images, and better fits, due to smoother time-activity curves. Author (EI)

Cardiology; Image Processing; Positrons; Tomography

19970042475

Spatial variation of SNR in two- and three-dimensional neuro-PET

Li, Henry H., Emory Univ, USA; Votaw, John R.; IEEE Transactions on Nuclear Science; April 1997; ISSN 0018-9499; vol. 44, no. 2, pp. 225-229; In English; Copyright; Avail: Issuing Activity

A method for region of interest (ROI) evaluation for three-dimensional (3-D) positron emission tomography (PET) in the sinogram space was implemented, according to the fully 3-D filtered back-projection algorithm. With this method, the statistical error in the image that propagates from the Poisson noise in the raw data was computed. The signal-to-noise ratio (SNR) for ROI's at various locations inside a cylindrical phantom was computed from both scanner data and simulation data and was verified via the standard deviation method through multiple measurements. As a comparison, two-dimensional (2-D) scans were also collected and similar computations carried out. Results show that the SNR increases with radius due to decreased attenuation at the edge of the phantom. For 3-D scans, the SNR drops gradually for ROI's outside the central 8 cm of the field of view (FOV). Also, it was found that the random events must be recorded and considered in the error computation.

Author (EI)

Positrons; Signal to Noise Ratios; Tomography

19970042476

Compton scatter and X-ray crosstalk and the use of very thin intercrystal septa in high-resolution PET detectors

Levin, Craig S., Univ of California at Los Angeles Sch of Medicine, USA; Tornai, Martin P.; Cherry, Simon R.; Macdonald, Lawrence R.; Hoffman, Edward J.; IEEE Transactions on Nuclear Science; April 1997; ISSN 0018-9499; vol. 44, no. 2, pp. 218-224; In English; Copyright; Avail: Issuing Activity

The use of extremely thin lead strips for passive shielding of Compton scatter and X ray crosstalk in positron emission tomography detectors was investigated. Using annihilation gamma rays and small Bismuth Germanate (BGO) crystal detectors in coincidence, crosstalk studies were performed with either two small adjacent crystals or one crystal inside a volume of BGO. Intercrystal crosstalk was found to affect the tails of the coincident point spread function, but not positioning resolution, at full width at half maximum. This indicates that insertion of the strips can reduced the extent of the positioning errors without introducing additional dead areas.

Author (EI)

Compton Effect; Crosstalk; Electron Scattering; Imagery; Measuring Instruments; Positrons; Tomography

19970042482

4.5 Tesla magnetic field reduces range of high-energy positrons - potential implications for positron emission tomography

Wirrwar, Andreas, Heinrich-Heine Universitaet, Germany; Vosberg, Henning; Herzog, Hans; Halling, Horst; Weber, Simone; Mueller-Gaertner, Hans-Wilhelm; IEEE Transactions on Nuclear Science; April 1997; ISSN 0018-9499; vol. 44, no. 2, pp. 184-189; In English; Copyright; Avail: Issuing Activity

We have theoretically and experimentally investigated the extent to which homogeneous magnetic fields up to 7 Tesla reduce the spatial distance positrons travel before annihilation (positron range). Computer simulations of a noncoincident detector design

using a Monte Carlo algorithm calculated the positron range as a function of positron energy and magnetic field strength. The simulation predicted improvements in resolution, defined as full-width at half-maximum (FWHM) of the line-spread function (LSF) for a magnetic field strength up to 7 Tesla: negligible for F-18, from 3.35 mm to 2.73 mm for Ga-68 and from 3.66 mm to 2.68 mm for Rb-82. Also a substantial noise suppression was observed, described by the full-width at tenth-maximum (FWTM) for higher positron energies. The experimental approach confirmed an improvement in resolution for Ga-68 from 3.54 mm at 0 Tesla to 2.99 mm FWHM at 4.5 Tesla and practically no improvement for F-18 (2.97 mm at 0 Tesla and 2.95 mm at 4.5 Tesla). It is concluded that the simulation model is appropriate and that a homogeneous static magnetic field of 4.5 Tesla reduces the range of high-energy positrons to an extent that may improve spatial resolution in positron emission tomography.
Author (EI)
Magnetic Effects; Monte Carlo Method; Positron Annihilation; Positrons; Spatial Resolution; Tomography

19970042900
Positron emission tomography of large rock samples using a multiring PET instrument
Maguire, R. P., Paul Scherrer Inst, Switzerland; Missimer, J. H.; Emert, F.; Townsend, D. W.; Dollinger, H.; Leenders, K. L.; IEEE Transactions on Nuclear Science; February 1997; ISSN 0018-9499; vol. 44, no. 1, pp. 26-30; In English; Copyright; Avail: Issuing Activity

The technique of positron emission tomography (PET) is well established in the field of medical imaging. Non-medical applications have also been shown to be valuable in the measurement of dynamic chemical processes, specifically in the determination of the characteristics of small rock samples. Since rock is more dense than tissue, the problems of attenuation and scatter are accentuated. However, we are able to show that measurement of porosity in a large rock sample (21.5 cm diameter) is indeed practicable using three-dimensional (3-D) acquisition techniques. Due to multiple scattering of the photons in the rock and the cylindrical symmetry of the experiment, we measured a scatter distribution which is approximately homogeneous, allowing a correction for scattered radiation with a simple method. The problems of determining attenuation coefficients and applying a scatter correction makes absolute quantitation difficult. However, relative changes in porosity within the sample can be measured with a spatial resolution not appreciably different from that in water.
Author (EI)
Chemical Reactions; Light Scattering; Positrons; Rocks; Tomography

52
AEROSPACE MEDICINE

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

19970040623 ManTech Environmental Technology, Inc., Dayton, OH USA
Human Inhalation of Halon 1301, HFC-134a and HFC-227ea for Collection of Pharmacokinetic Data ***Interim Report, Jan. - Aug. 1997***
Vinegar, Allen, ManTech Environmental Technology, Inc., USA; Jepson, Gary W., ManTech Environmental Technology, Inc., USA; Cook, Robert S., Armstrong Lab., USA; McCafferty, James D., III, Armstrong Lab., USA; Caracci, Melanie C., GeoCenters, Inc., USA; Aug. 1997; 20p; In English
Contract(s)/Grant(s): F41624-96-C-9010; AF Proj. 7757
Report No.(s): AD-A329199; AL/OE-TR-1997-0116; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

International agreement and regulatory decisions have driven activities to replace Ozone Depleting Chemicals (ODCs) in fire suppression and refrigeration applications. In order to validate a human physiologically based pharmacokinetic model designed for use in estimating chemical biodistribution and establishing egress times, human volunteers were exposed via inhalation to a series of chemicals relevant to ODC replacement activity. Seven male volunteers ranging from 21-49 years of age were selected to inhale bromotrifluoromethane (Halon 1301 0.5%), 1,1,1,2-tetrafluoroethane (HFC-134a, 0.4%) and 1,1,1,2,3,3,3-heptafluoropropane (HFC-227ea, 0.6%). Each inhalation exposure was to a single chemical and was scheduled to last 30 minutes. Inhaled concentration and end alveolar expired concentration of chemical were continuously measured throughout the procedure using a non-rebreathing valve inhalation apparatus and a mass spectrometer. Blood samples were drawn through an indwelling cannula at times 0, 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 10, 15, 20, 25 and 30 minutes during the exposure and for five minutes at one minute intervals following the inhalation. The blood was analyzed for the chemical of interest to determine the chemical time course in blood. Throughout the exposure period, human subjects were monitored via ECG, blood pressure and pulse rate measurements. All seven volunteers completed the Halon 1301 exposures without effect on ECG, blood pressure or pulse rate. Halon 1301 con-

centrations in blood at exposure termination ranged from 0.19-1.24 mg/L. The HFC-134a and HFC-227ea exposures were terminated for safety reasons following unexpected and uncontrollable rapid rises in pulse rate during the inhalation exposure.
DTIC
Hydrocarbons; Core Sampling; Data Acquisition; Fluorine Compounds; Blood Circulation; Respiration

19970040733 Air Force Academy, Dept. of Biology, CO USA
Mutagenic Potential of Alternating Current Electric Fields
Obringer, John, Air Force Academy, USA; Horne, Brandon, Air Force Academy, USA; Kelchner, Brian, Air Force Academy, USA; Sep. 1997; 28p; In English
Report No.(s): AD-A329378; USAFA-TR-97-7; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Electromagnetic Fields (EMF) such as those produced by power lines have become a growing source of concern to the general public. Many epidemiological studies have linked EMF to carcinogenesis implying an underlying genetic phenomenon mediated by EMF. EMF can be subdivided into either electric fields (E-field) or magnetic fields (B-field). Our research used a reverse mutagenesis bacteriophage T4D model to quantitatively study the effects of E-fields on a molecular genetic level. Statistical analysis of the data indicated that there was no significant difference (p greater than or equal 0.05) in the mutagenic rate of phages grown in the presence of A/C E-fields compared to the controls except at a field-strength of 1053 V/M (p = O.04). This result is not consistent with the other values tested and at this time we are at a loss to explain what appears to be a decrease in background spontaneous reversion rate in the phage T4 mutant.
DTIC
Electromagnetic Fields; Mutagens; Genetics; Public Health; Alternating Current; Radiation Hazards

19970040738 Air Force Academy, Dept. of Biology, CO USA
Assaying the Mutagenic Potential of ELF Radiation through Reverse Mutagenesis via the Ames Test
Moga, Paul D., Air Force Academy, USA; Obringer, John W., Air Force Academy, USA; Sep. 15, 1996; 26p; In English
Report No.(s): AD-A328930; USAFA-TR-96-5; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Ames test is a widely accepted, accurate method of testing for mutagenic potential. We thus hypothesized that the Ames test may provide an assay for assessing the mutagenic effects of extra low frequency (ELF) radiation (a subset of EMFs) on certain strains of Salmonella typhimurium. The strain of S-typhimurium used in the Ames test has a mutation on one gene of the histidine operon which prevents it from growing and replicating without the presence of histidine in the media. When the bacterium is exposed to a mutagen, the defective his gene mutates back to its wildtype state and the bacterium can grow without supplemental histidine. According to Ames tests performed at 1077 volt/meter/AC/E power, 4.6 Gauss AC/B strength, and 3.63 and 5.2 kilo Gauss DC/B power, EMFs appear to have no mutagenic effects on these prokaryotic cells. While it is impossible to test every strength level for all fields and permutations thereof, our tests show that these field strengths failed to demonstrate a mutagenic effect via the Ames test.
DTIC
Extremely Low Frequencies; Electromagnetic Fields; Radiation Hazards; Radiation Damage; Genes; Mutagens; Mutations; Salmonella; Alternating Current; Long Wave Radiation

19970040745 Defence Science and Technology Organisation, Melbourne, Australia
A Sensitive Enzyme Linked Immunosorbent Assay (ELISA) for the Detection of Ricin in Blood
Alderton, Malcolm, Defence Science and Technology Organisation, Australia; Paddle, Brian, Defence Science and Technology Organisation, Australia; Sep. 1997; 12p; In English
Report No.(s): DSTO-TR-0572; AR-010-316; Copyright; Avail: Issuing Activity (DSTO Aeronautical and Maritime Research Lab., PO Box 4331, Melbourne Victoria 3001, Australia), Hardcopy, Microfiche

A sensitive and reproducible enzyme linked immunosorbent assay (ELISA) has been developed for the detection of ricin. The assay was developed using mouse polyclonal anti-ricin antibodies produced at AMRL and commercially available antibodies. The most efficient ELISA, using a goat anti-ricin antibody as the capture antibody, a rabbit anti-ricin as the second antibody and an alkaline phosphatase labelled goat anti-rabbit IgG as the conjugate, had a detection limit of 10 pg/ml.
Author
Enzymes; Antibodies; Blood; Detection; Proteins; Poisons

19970040782 Madigan Army Medical Center, Takoma, WA USA

Collaborative Research and Support of Fitzsimmons Army Medical Center and Research Program Projects: Evaluation of the Performance Impact and Treatment of Exercise Induced Urinary Incontinence among Female Soldiers ***Final Report, 1 Feb. 1995 - 31 Jul. 1996***

Mulligan, Hugh, Facilitators of Applied Clinical Trials, USA; Davis, Gary, Facilitators of Applied Clinical Trials, USA; Jul. 1996; 14p; In English

Contract(s)/Grant(s): DAMD17-95-2-5003

Report No.(s): AD-A329559; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Results of the Incidence survey indicate that about one third of 450 female soldiers experience problematic urinary incontinence during exercise and field training activities. No studies have previously been performed to determine the effectiveness of behavioral treatments, such as Kegel (pelvic muscle) exercises or vaginal electromyographic biofeedback1 for urinary incontinence within this population. Thirty-nine female soldiers reporting exercise induced urinary incontinence were recruited by means of questionnaires and referrals. All underwent an objective urodynamic assessment (UCMG) of bladder capacity, urethral closure pressure, and detrusor contraction pressures. They were also given a questionnaire before and after therapy. Subjects were then stratified according to diagnosis of genuine stress incontinence or mixed urge/stress incontinence and were then randomized into one of two groups. Group one's 23 participants received pelvic muscle exercises with biofeedback for eight weeks. Group two's 16 participants received only pelvic muscle exercises for eight weeks. Patient's reports as well as the post-treatment urodynamic and physical examinations indicated that all subjects improved.

DTIC

Human Performance; Physical Exercise; Females; Physical Examinations; Urology

19970040820 Army Aeromedical Research Lab., Aircrew Health and Performance Div., Fort Rucker, AL USA

A Comparison of EEG and Evoked Response Data Collected in a UH-1 Helicopter to Data Collected in a Standard Laboratory Environment ***Final Report***

Caldwell, John A., Jr, Army Aeromedical Research Lab., USA; Kelly, C. Frank, Army Aeromedical Research Lab., USA; Roberts, Kristi A., Army Aeromedical Research Lab., USA; Jones, Heber D., Army Aeromedical Research Lab., USA; Lewis, James A., Army Aeromedical Research Lab., USA; Aug. 1997; 120p; In English

Contract(s)/Grant(s): DA Proj. 3M1-62787-A-879

Report No.(s): AD-A329017; USAARL-97-30; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The in-flight collection and analysis of physiological data such as central nervous system activity may provide real-time, objective evaluations of aviator status during flight operations. However, little research has been done to assess the feasibility and validity of such a strategy. Some investigations (conducted in the fixed wing environment) have suggested that tape-recorded electroencephalographic (EEG) data are sensitive to changes in cockpit workload, but similar studies have not been performed in rotary-wing aircraft. In addition, none of the past investigations have focused on real-time telemetry of EEG from pilots under actual in-flight conditions, nor have they considered the feasibility of collecting valid cortical evoked potentials from helicopter or fixed wing pilots in flight. The present investigation was designed to verify indications from a small, previously conducted USAARL investigation that useable spontaneous EEG recordings could be made from helicopter pilots in flight. In addition, this study examined the feasibility of recording and telemetering cortical evoked potentials from subjects flying a UH-1 helicopter. Twenty subjects (10 aviators and 10 nonaviators) were tested both in the laboratory and in the aircraft. Spontaneous EEGs were collected once during eyes-open and eyes-closed conditions on the ground and once again in the air. Cortical evoked responses (P300s) were collected once on the ground and twice in the air (initially after takeoff and prior to flying an instrument approach). The pilots remained 'on the controls' during the collection of the second in-flight P300. Results confirmed indications from an earlier investigation that it was feasible to collect and telemeter valid spontaneous EEG activity from personnel flying onboard a UH-1 helicopter.

DTIC

Physiological Effects; Central Nervous System; Data Acquisition; Rotary Wings; In-Flight Monitoring

19970040957 Armstrong Lab., Physiological Research Branch, Brooks AFB, TX USA

Modeling of Arterial Baroceptor Feedback in a Hydromec Cardiovascular Pulse Duplicator System ***Final Report***

Convertino, Victor A., Armstrong Lab., USA; Sep. 1997; 5p; In English

Contract(s)/Grant(s): AF proj. 2301

Report No.(s): AD-A329508; AL/AO-TM-1997-0001; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

We have developed a hydro-mechanical Cardiovascular Pulse Duplicator System (CPDS) for modeling the systemic arterial system. The CPDS has the ability to reproduce physiologically equivalent aortic pressures and flows and has been used to test

and evaluate electrical analog arterial models of the systemic circulation. Feedback from a flow probe from measuring flow through a simulated aorta has been developed for regulating cardiac output by controlling heart rate and/or stroke volume. The output from a pressure sensor adjacent to the flow probe provides the opportunity to regulate heart rate using pressure feedback. The primary objective of the proposed research was to te st the hypothesis that a physiologically equivalent arterial-cardiac baroreflex feedback mechanism can be accurately modeled by integrating a pressure sensor into the existing CPDS. A secondary objective was to cross-validate the mechanical feedback model by comparing heart rate responses during tilt tests with those of existing physiologic experimental data. Because of significant cracks and leaks in various plexiglas parts of the original Ormec CPDS, a number of parts had to be refabricated. All of the parts subjected to the most stress were refabricated from aluminum and anodized for protection against corrosion. Aluminized parts included both walls of the atrium and inlet hose connection, and all inlet and outlet hose connections to the Systemic Reservoir with their supporting parts. All other parts which included the walls surrounding the mitral valve test section required fabrication from plexiglas in order to provide a clear view of the valve in the test section. All hardware fabrication has been and have been completed completed by the fabrication shop at Brooks AFB.
DTIC
Arteries; Feedback; Cardiovascular System; Product Development; Reproduction (Copying)

19970040982 Virginia Univ., Dept. of Biology, Charlottesville, VA USA
The Regulation of Mammalian Circadian Physiology by Light ***Final Report, 15 Mar. 1995 - 14 Mar. 1997***
Foster, Russel, Virginia Univ., USA; Mar. 1997; 15p; In English
Contract(s)/Grant(s): F49620-95-I-0174; AF Proj. 2312
Report No.(s): AD-A329535; AFOSR-TR-97-0339; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The sensory demands of photoentrainment have imposed a unique set of selection pressures, which have led to the evolution of specialized photoreceptor systems. Our work studies on retinally degenerate mammals have shown that visual blindness need not mean circadian blindness, and that two functionally distinct systems for processing light information must exits within the mammal eye. An image-forming system, which constructs an representation of the environment, and a non-image-forming photoreceptor system, which deduces gross changes in the overall amount of light at different times of day. specializations of the mammalian photoentrainment pathway include a distinct set of retinal ganglion cells that project exclusively to the circadian centres within the brain, and the possible utilisation novel ocular photoreceptors. The features of the light environment that mediate entrainment have yet to be fully defined. Environmental irradiance appears to be a critical influence, but spectral changes and/or the position of the sun could theoretically provide useful information about the phase of twilight. Finally the extent to which expressed circadian rhythms arise directly from a clock, or are the products or an interacting between a clock and the entrainment pathway, remains unclear in the vertebrates. In mammals at least, major lesions to the retina, at a time when both the retina and SCN are developmentally plastic, appear to markedly influence some aspects of the circadian phenotype.
DTIC
Circadian Rhythms; Mammals; Retina; Eye (Anatomy); Entrainment; Photoreceptors

19970041073 Maryland Univ., School of Medicine, Baltimore, MD USA
Molecular Targets for Organophosphates in the Central Nervous System, ***18 May 1995 - 17 Nov. 1996***
Albuquerque, Edson X., Maryland Univ., USA; Nov. 1996; 24p; In English
Contract(s)/Grant(s): DAMD17-95-C-5063
Report No.(s): AD-A329221; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In this study, the patch-clamp technique was used as an approach to evaluate the pre- and postsynaptic effects of VX and soman on synaptic currents of cultured hippocampal neurons. Compared to control, the frequency of the currents mediated by the activation of GABA or glutamate receptors was increased in a concentration-dependent manner from 200% to 550%, when exposed to VX from 10 nM to 1 pM. The effect of VX was observed in the presence of TTX and atropine, indicating that it was a presynaptic effect unrelated to the activation of muscarinic receptors. In addition, it was found that the dlhydron-B-erythroldine did not prevent or abolished the effects of VX. Because, either soman or acetylcholine at high concentrations, applied for 5 to 10 min to the cultured neurons did not mimic the potentiation of transmitter release induced by VX, it was concluded that the presynaptic effect of VX was unrelated to the inhibition of cholinesterase enzyme. At the concentrations studied, VX and soman did not change the post-synaptic properties of GABAA, NMDA, and AMPA receptors. The effect of VX was markedly reduced when the extracellular calcium was removed, but was unaffected when the calcium channel blocker verapamil was added to the preparation. The present findings shows that VX exerts a presynaptic effect unrelated to cholinesterase enzyme that is unaffected by the common antidote atropine used for treating intoxication with VX.
DTIC
Organic Phosphorus Compounds; Central Nervous System; Neurons

19970041081 Environmental Protection Agency, Cincinnati, OH USA

Adduction of Nitroaromatic Compounds with Blood Proteins and DNA as Biological Markers of Exposure ***Final Report, 19 Jan. 1993 - 15 May 1997***

Reddy, Tirumuru V., Environmental Protection Agency, USA; Jun. 1997; 117p; In English

Report No.(s): AD-A329242; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The ability of TNB, DNB and tetryl to form adducts in rats was investigated using 14C labeled compounds. Our results showed that all three test chemicals (TNB, DNB and tetryl) were able to form adducts with blood proteins and tissue DNA. The optimum time required for maximum adduct formation for TNB, DNB and tetryl varied. For example, TNB adducts (blood proteins and DNA) were maximum at 48 h. Peak levels of DNB adducts (blood proteins) were detected at 8 h and maximum DNB-DNA adducts levels reached by 24 hours. In the case of tetryl the maximum blood protein adduct levels were observed at 24 h, while DNA adducts peaked at 48 h after exposure. The albumin adducts persisted up to two weeks, while globin adducts persisted for ten weeks. At the end of ten weeks significant amount (10-50%) of radioactivity was intact in the DNA of TNB or tetryl treated rat liver, kidney and spleen. 3,5-dinitroaniline was identified from TNB treated rat liver DNA and picric and picramic acids from tetryl treated rat liver and kidney DNA. This suggests that these are the adducts of DNA and released during hydrolysis. In contrast, 3-nitroaniline was identified in hemoglobin hydrolysate as well as in albumin soup from rats treated with DNB. Hence, protein and DNA adducts appear to have promise as dose monitors for nitroaromatic munitions and their by-products.

DTIC

Nitrogen Compounds; Aromatic Compounds; Deoxyribonucleic Acid; Blood; Proteins; Adducts

19970041105 Air Force Academy, Dept. of Biology, CO USA

Mutagenic Effect on Alternating Current Magnetic Fields

Obringer, John W., Air Force Academy, USA; Horne, Brandon, Air Force Academy, USA; Kelchner, Brian, Air Force Academy, USA; Aug. 1997; 28p; In English

Report No.(s): AD-A328929; USAFA-TR-97-5; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

ElectroMagnetic Fields (EMF) such as those produced by power lines have become a growing source of concern to the general public. Many epidemiological studies have linked EMF to carcinogenesis implying an underlying genetic phenomenon mediated by EMF. EMF can be subdivided into either electric fields (E-field) or magnetic fields (B-fields). Our research used a reverse mutagenesis bacteriophage T4D model to quantitatively study the effects of E-fields on a molecular genetic level. Statistical analysis of the data indicated that there was no significant difference (greater than 0.05) in the mutagenic rate of phages grown in the presence of A/C E-fields compared to the controls except at a field strength of 1053 V/M (p=0.04). This result is not consistent with the other values tested and at this time we are a loss to explain what appears to be a decrease in background spontaneous reversion rate in the phage T4 mutant.

DTIC

Electromagnetic Fields; Alternating Current; Mutagens; Statistical Analysis

19970041109 Army Aeromedical Research Lab., Aircrew Health and Performance Div., Fort Rucker, AL USA

The Use of Bifocal Soft Contact Lenses in the Fort Rucker Aviation Environment ***Final Report***

Morse, Stephen E., Army Aeromedical Research Lab., USA; Reese, Melisa A., Army Aeromedical Research Lab., USA; Aug. 1997; 95p; In English

Contract(s)/Grant(s): DA Proj. 3M1-62787-A-879

Report No.(s): AD-A329048; USAARL-97-27; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

There are problems with the compatibility of spectacles and certain helmet mounted electro-optical visual display systems. The incompatibility has been partially resolved with single vision contact lenses. However, these contact lenses have not helped senior aviators, who must wear bifocal glasses due to their presbyopia. The purpose of this study was to compare the performance of bifocal soft contact lenses with that of bifocal spectacle lenses to determine if contact lenses are an option for helping older aviators meet the visual requirements needed to fly military aircraft. Seventeen volunteer presbyopic aviators from Fort Rucker were fitted with five bifocal soft contact lens combinations and bifocal glasses. A four-phase investigation was conducted: a clinical phase involving the fitting of the bifocal contact lenses; a laboratory phase involving measurements of visual functions; a simulator phase involving measures of visual performance in simulated flight conditions; and an operational phase consisting of subjective responses regarding in-flight use of bifocal contact lenses. In general, vision in the best performing bifocal contact lenses typically was slightly reduced from vision in bifocal spectacles. The amount of the reduction, and whether it was clinically significant, depended on the refractive error of the subject (myopes generally performed better), the add group of the subject (low add group subjects performed better), and the type of bifocal contact lens. Aviators performed flight simulation maneuvers better in bifocal contact lenses than in bifocal glasses, and they evaluated their own ease of vision while performing aviation duties to

be much easier in bifocal contact lenses than in bifocal glasses. In actual flight operations, each aviator preferred bifocal contact lenses over bifocal spectacles. Bifocal soft contact lenses are an acceptable alternative to glasses for presbyopic aviators. However, there is not one specific bifocal lens type that performs optimally on all subjects.
DTIC
Presbyopia; Flight Safety; Contact Lenses

19970041110 Department of Health and Human Services, Washington, DC USA
Physical Activity and Health: A Report of the Surgeon General
Manley, Audrey F., Department of Health and Human Services, USA; Sep. 15, 1997; 293p; In English
Report No.(s): AD-A329047; No Copyright; Avail: CASI; A13, Hardcopy; A03, Microfiche

This report is the first report of the Surgeon General on physical activity and health. For more than a century, the Surgeon General of the Public Health Service has focused the nation's attention on important public health issues. Reports from Surgeons General on the adverse health consequences of smoking triggered nationwide efforts to prevent tobacco use. Reports on nutrition, violence, and HIV/AlDS - to name but a few - have heightened America's awareness of important public health issues and have spawned major public health initiatives. This new report, which is a comprehensive review of the available scientific evidence about the relationship between physical activity and health status, follows in this notable tradition. Scientists and doctors have known for years that substantial benefits can be gained from regular physical activity. The expanding and strengthening evidence on the relationship between physical activity and health necessitates the focus this report brings to this important public health challenge. Although the science of physical activity is a complex and still-developing field, we have today strong evidence to indicate that regular physical activity will provide clear and substantial health gains. In this sense, the report is more than a summary of the science - it is a national call to action.
DTIC
Public Health; Physical Fitness

19970041111 Civil Aeromedical Inst., Oklahoma City, OK USA
Stereochemical Determination of Selegiline Metabolites in Postmortem Biological Specimens ***Final Report***
Kupiec, T. C., Civil Aeromedical Inst., USA; Chaturvedi, A. K., Civil Aeromedical Inst., USA; Jul. 1997; 13p; In English
Report No.(s): AD-A329026; DOT/FAA/AM-97/14; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Federal Aviation Administration's Toxicology and Accident Research Laboratory determines the presence of drugs, volatiles, and primary combustion gases in biological samples from aircraft accident victims and also establishes any medical condition for which the drugs might have been taken. In this study, findings related to an aircraft accident are reported. Along with biological specimens from the pilot of this fatal accident, two types of tablets found at the accident scene were submitted for analysis. These tablets were identified as levodopa and selegiline, commonly prescribed for the treatment of Parkinson's disease. Selegiline, a stereospecific compound, is biotransformed into (-)-N-desmethylselegiline, (-)-methamphetamine, and (-)-amphetamine. During this process, the chiral center of the parent molecule is not affected. The latter two levorotatory metabolites cannot be easily distinguished by routine analysis from their dextrorotary isomers, which are controlled substances. Therefore, it was prudent to differentiate these isomers to prove or disprove the controlled substance categorization. Initial immunoassay drug screenings revealed the presence of amphetamine class drugs (867 ng/ml) and amphetamine/methamphetamine (261 ng/ml) in urine and methamphetamine (46 ng/ml) in blood. The gas chromatography-mass spectrometry (CC/MS) results revealed the presence of methamphetamine in the concentrations of 76 ng/ml of blood and 685 og/mI of urine. The level of amphetamine was 52 ng/ml in blood and 320 ng/ml in urine. To determine the stereospecificity of these amines, the isolated amines from the biosamples were derivatized by a stereospecific agent, (s)-(-)-N- (trifluoroacetyl)prolyl chloride, and characterized by a CC/MS method to be levorotatory. The 2.14 ratio of (-)-methamphetamine to (-)-amphetamine concentrations in the urine was consistent with a sele
DTIC
Medical Services; Metabolites; Accident Prevention

19970041183 Tufts Univ., School of Medicine, Boston, MA USA
IL-1 Effects in Brain ***Final Report, 1 Jun. 1991 - 31 Dec. 1996***
Miller, Lawrence G., Tufts Univ., USA; Fahey, Jeanne M., Tufts Univ., USA; Aug. 28, 1997; 5p; In English
Contract(s)/Grant(s): N00014-91-J-1788
Report No.(s): AD-A329143; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

This research explored the effect of cytokines and neurosteroids on the GABAergic and I glutamatergic neurotransmitter systems in the CNS. lnterleukin-1 (IL-1) augmented GABAA receptor function in behavioral, neurochemical and electrophysiological paradigms both in vivo and in vitro. These effects of IL-1 were inhibited by the IL-1 receptor antagonist suggesting an indirect

effect of IL-1 at its own receptor in the modulation of the GABAA receptor. Subsequent experiments demonstrated a negative modulatory role of IL-1 on NMDA receptor-mediated intracellular calcium increases which was unique to both IL-1 and to the NMDA receptor. These results provided the first direct evidence of a functional interaction of IL-1 with the NMDA receptor and implies a beneficial role of this cytokine in neurodegenerative processes. Additional work in our laboratory confirmed that pregnenolone sulfate (PS) potentiated the NMDA receptor-mediated increases in calcium flux, most likely acting at a unique steroid recognition site on the NMDA receptor. Further studies demonstrated a neurotoxic effect of PS on these cortical neurons in vitro. This study also demonstrated a synergistic toxic effect of PS and NMDA/glycine, providing additional evidence of the possible involvement of PS in the excitotoxic damage.
DTIC
Brain; Steroids; Neurotransmitters; Glutamates; Receptors (Physiology)

19970041192 Wyoming Univ., Dept. of Molecular Biology, Laramie, WY USA
Turnover of the Stress Induced Protein, HSP7O ***Final Report, 1 Oct. 1994 - 28 Feb. 1997***
Petersen, Nancy S., Wyoming Univ., USA; Feb. 1997; 26p; In English
Contract(s)/Grant(s): F49620-95-I-0032; AF Proj. 2312
Report No.(s): AD-A329602; AFOSR-TR-97-0333; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The heat shock response has been studied in rainbow trout to investigate the possibility that accumulation of the heat shock protein, hsp70, may be useful as a biomarker for environmental stress due to metal contaminated water. The heat shock response of rainbow trout has been characterized, and the rainbow trout hsp70 gene sequenced. A polyclonal antibody has been generated which is very specific for trout hsp7O. Hps7O does accumulate in juvenile trout tissues including gill, liver, in response to metal (Cd(++), Cu(++), Pb(++), Zn(++)) contaminated water and diet. Hsp7O levels in juvenile rainbow trout do not increase significantly when live rainbow trout tissues are exposed singly to environmentally relevant Cd(++) or Cr(++) levels. Experiments done in Drosophila to determine the basis for the rapid turnover of hsc7O following heat shock indicate that the rate of turnover of hsc7O is determined by the temperature at which it is synthesized, suggesting the conformation of the protein is critical in the regulation of its turnover. Possible differences in the folding environment which could account for this are the temperature itself and the association of nascent hsc7O with nascent hsp7O. This turnover does not depend on the ubiquitin pathway for proteolysis.
DTIC
Contamination; Thermal Shock; Proteins; Stresses; Drosophila; Environment Effects; Tissues (Biology); Fishes

19970041253 NERAC, Inc., Tolland, CT USA
Biocompatibility of Polymeric Implantation Devices. (Latest citations from the Rubber and Plastics Research Association Database)
Feb. 1997; p; In English; Page count unavailable. Supersedes PB96-871363
Report No.(s): PB97-855811; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development and assessment of elastomeric and plastic biomaterials used for implants and prostheses in humans and animals. References discuss tissue and blood compatible biomaterials. Applications include pacemakers, bone repair, ophthalmological devices, blood pumps, contraceptives, drug delivery and release devices, and dental materials. Ion implantation techniques, ion-assisted film deposition, cell growth, and toxicological evaluation of biomaterials are also discussed. (Contains 50-250 citations and includes a subject term index and title list.)
NTIS
Bibliographies; Biocompatibility; Implantation

19970041315 Stanford Univ., School of Medicine, Stanford, CA USA
Worldwide Efforts to Improve Heart Health. A Follow-up to the Catalonia Declaration: Selected Program Descriptions
Grabowsky, Tara A., Stanford Univ., USA; Farquhar, John W., Stanford Univ., USA; Sunnarborg, Kathryn R., Stanford Univ., USA; Bales, Virginia S., Stanford Univ., USA; Jun. 1997; 211p; In English
Report No.(s): AD-A329051; No Copyright; Avail: CASI; A10, Hardcopy; A03, Microfiche

In 1995 the Pan American Health Organization (PAHO) initiated Conjunto de Acciones para Ia Redudon Multifactorial de las En fermeda des No Transmisibles (CARMEN) as a practical tool for helping member nations meet the World Health Organization's challenge of Health for All by the Year 2000. The project's main objective is to create national and local coalitions that can set policies and implement interventions designed to reduce risk factors for noncommunicable diseases (NCDs). CARMEN projects focus on risk factors such as smoking, high blood pressure, overweight, diabetes, and excessive alcohol consumption; the specific risk factors addressed depend on the priorities of each participating nation. CARMEN takes an integrated approach that combines preventive health care services for individuals at high risk for NCDs with health promotion efforts directed at the general

population. CARMEN projects reach their target audience through community, workplace, and school settings as well as through local health services.
DTIC
Heart Diseases; Medical Services; Public Health

19970041352 Armstrong Lab., Crew Systems Directorate, Brooks AFB, TX USA
Test and Evaluation of the Zoll Medical Inc., PD2OOO Cardiac Monitor/Pacemaker/Defibrillator System ***Final Report***
Hade, Edward W., Krug Life Sciences, Inc., USA; Hale, Jacqueline D., Armstrong Lab., USA; Sep. 1997; 22p; In English
Contract(s)/Grant(s): AF Proj. 7184
Report No.(s): AD-A329155; AL/CF-TR-1997-0084; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Zoll PD2000 is a portable cardiac monitor, defibrillator and pacemaker that offers synchronized defibrillation, electrocardiogram monitoring, noninvasive temporary pacing and advisory capability. The Power Charger is designed to allow the PD2000 to be powered from a 120VAC/60 Hz source. Additionally, the PD2000 can receive power via a rechargeable 12 Volt Seal Lead-Acid battery pack. The Zoll PD2OOO is a portable cardiac monitor, defibrillator and pacemaker that offers synchronized defibrillation, electrocardiogram monitoring, noninvasive temporary pacing and advisory capability. The Power Charger is designed to allow the PD2OOO to be powered from a l2OVAC/6O Hz source. Additionally, the PD2OOO can receive power via a rechargeable 12 Volt Seal Lead-Acid battery pack.
DTIC
Portable Equipment; Electrocardiography; Evaluation; Performance Tests

19970041360 EG and G Energy Measurements, Inc., Albuquerque, NM USA
Blast Overpressure Studies with Animals and Man: Nonauditory Damage Risk Assessment for Simulated 155 mm Self-Propelled Howitzer Blast ***Final Report, 21 Jun. 1993 - 28 Feb. 1997***
Johnson, Daniel L., EG and G Energy Measurements, Inc., USA; Yelverton, John T., EG and G Energy Measurements, Inc., USA; Hicks, William, EG and G Energy Measurements, Inc., USA; Merickel, Barbara, EG and G Energy Measurements, Inc., USA; May 1997; 170p; In English
Contract(s)/Grant(s): DAMD17-93-C-3101
Report No.(s): AD-A329424; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

This study was undertaken to establish the nonauditory injury subthreshold in a simulate d muzzle blast environment like that produced when tiring an M109 155 mm self-propelled howitzer (SPH) with one or more hatches open. An explosively driven shock tube, the hull of an M108 SPH, and a six-plate reflector system were used to produce the required muzzle blast signature. Using as many as 40 anesthetized sheep for each exposure condition, safe no-injury levels were established with an occasional minor upper respiratory tract lesion. These levels were 24 kPa for 6 blasts and 20 kPa for 25 to 100 blasts.
DTIC
Injuries; Damage Assessment; Jet Blast Effects

19970041366 Bioanalytical Systems, Inc., West Lafayette, IN USA
Monitoring Physiological Variables with Membrane Probes ***Final Report***
Janle, Elsa M., Bioanalytical Systems, Inc., USA; 1997; 20p; In English
Contract(s)/Grant(s): NAGw-4525
Report No.(s): NASA/CR-97-112558; NAS 1.26:112558; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This project has demonstrated the possibility of using membrane probes in rodents to monitor physiological variables for extended periods of time. The utility of these probes in physiological studies of microgravity has been demonstrated. The feasibility of developing on-line sensors has also been demonstrated and allows for the possibility of developing real-time automated monitoring systems which can be used in ground-base physiological research as well as in research and medical monitoring in space. In addition to space applications these techniques can be extended to medical monitoring in critical care situations on earth as well as facilitating research in many human and animal diseases.
Derived from text
Membranes; Probes; Microgravity; Aerospace Medicine; Physiological Effects

19970041620 Air Force Academy, CO USA
Mutagenic Potential of Direct Current Magnetic Fields
Obringer, John W., Air Force Academy, USA; Nolan, Tara E., Air Force Academy, USA; Horne, Brandon, Air Force Academy, USA; Kelchner, Brian, Air Force Academy, USA; Sep. 1997; 28p; In English

Report No.(s): AD-A329411; USAFA-TR-97-8; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Electromagnetic Fields (EMF) such as those produced by power lines have become a growing source of concern to the general public. Many epidemiological studies have linked EMF to carcinogenesis implying an underlying genetic phenomenon mediated by EMF. EMF can be subdivided into either electric fields (E-field) or magnetic fields (B-field). Our research used a reverse mutagenesis bacteriophage T4D model to quantitatively study the effects of direct current magnetic fields (DC/B) on a molecular genetic level. Statistical analysis of the data indicated that there was no significant difference in the mutagenic rate of phages grown in the presence of DC/B fields compared to the controls.

DTIC

Direct Current; Magnetic Fields; Statistical Analysis; Genetics; Mutagens

19970042906

Lead and tungsten pinhole inserts for I-131 SPECT tumor imaging: Experimental measurements and photon transport simulations

Smith, Mark F., Duke Univ, USA; Jaszczak, Ronald J.; Wang, Huili; Li, Jianying; IEEE Transactions on Nuclear Science; February 1997; ISSN 0018-9499; vol. 44, no. 1, pp. 74-82; In English; Copyright; Avail: Issuing Activity

The potential use of lead and tungsten pinhole inserts for high-resolution SPECT imaging of intratumor activity in I-131 radioimmunotherapy was investigated using experimental point source measurements and photon transport simulations. I-131 imaging is challenging because the primary photon emission is at 364 keV and penetration through the insert near the pinhole aperture is significant. Point source response functions (PSRF's) for lead (Pb) and tungsten (W) pinhole inserts were measured experimentally. These response functions were simulated using a photon transport computer code that modeled the primary emission at 364 keV and secondary emissions at 284, 637, and 723 keV. Scatter within the pinhole insert, camera shielding, and scintillation crystal was modeled. There was good agreement between the experimental and simulated PSRF's. Simulated point source response functions for geometrically identical Pb and W pinhole inserts were narrower for the W insert due to reduced penetration. SPECT pinhole imaging with these inserts was simulated for 3-cm-diameter tumors with a central core and 3-5-mm-thick shells. For one set of simulations there was no core activity, and for a second set the shell:core activity concentration ratio was 5:1. In both cases, the tumor shells were better resolved with the W insert. As a result, shell:core activity ratios were more accurate and contrast was improved with the use of the W pinhole insert. This study suggests that W inserts have potential advantages over Pb inserts for high-resolution I-131 pinhole imaging.

Author (EI)

Collimators; Computer Aided Tomography; Computerized Simulation; Lead (Metal); Medical Science; Point Sources; Tungsten

19970042907

Advantage of fan beam collimators for contrast recovery of hyperfixation in clinical SPECT

Vera, Pierre, Hopital Beaujon, France; De Dreuille, Olivier; Bendriem, Bernard; Gardin, Isabelle; Stievenart, Jean Louis; Menard, Jean Francois; Pare, Christian; Bourguignon, Michel; Bok, Bernard; Syrota, Andre; IEEE Transactions on Nuclear Science; February 1997; ISSN 0018-9499; vol. 44, no. 1, pp. 83-89; In English; Copyright; Avail: Issuing Activity

The influence of the collimator on the contrast recovery of hyperfixation was studied using a dual-headed single photon emission computed tomography (SPECT) system with standard clinical acquisition parameters. Three parallel collimator sets and two fan beam collimator sets were tested with a Jaszczak phantom. The six spheres of the phantom were filled with (sup 99m)Tc, and four background levels were progressively obtained by adding radioactivity to the cylinder of the phantom, providing four hyperfixation levels. The effects of angular sampling and reconstruction filters have been tested. The statistical analysis was performed with analysis of variance (ANOVA). This study demonstrates the advantage of ultra-high resolution fan beam collimators for contrast recovery of hyperfixation with SPECT when using 64 projections over 360 deg, in particular when the contrast is low. We also demonstrate that fan beam collimators permit smaller size hyperfixation detection.

Author (EI)

Collimators; Computer Aided Tomography; Parameter Identification; Statistical Analysis

19970042908

Evaluation of simulation-based scatter correction for 3-D PET cardiac imaging

Watson, C. C., CTI PET Systems, Inc, USA; Newport, D.; Casey, M. E.; Dekemp, R. A.; Beanlands, R. S.; Schmand, M.; IEEE Transactions on Nuclear Science; February 1997; ISSN 0018-9499; vol. 44, no. 1, pp. 90-97; In English; Copyright; Avail: Issuing Activity

Quantitative imaging of the human thorax poses one of the most difficult challenges for three-dimensional (3-D) (septaless) positron emission tomography (PET), due to the strong attenuation of the annihilation radiation and the large contribution of scat-

tered photons to the data. In (left bracket)(sup 18)F(right bracket) fluorodeoxyglucose (FDG) studies of the heart with the patient's arms in the field of view, the contribution of scattered events can exceed 50% of the total detected coincidences. Accurate correction for this scatter component is necessary for meaningful quantitative image analysis and tracer kinetic modeling. For this reason, we have implemented a single-scatter simulation technique for scatter correction in positron volume imaging. In this paper we describe this algorithm and present scatter correction results from human and chest phantom studies.
Author (EI)
Compton Effect; Computerized Simulation; Electron Scattering; Light Scattering; Photons; Positrons; Tomography

19970042909
Iterative reconstruction with attenuation compensation from cone-beam projections acquired via nonplanar orbits
Zeng, Gengsheng L., Univ of Utah, USA; Weng, YI; Gullberg, Grant T.; IEEE Transactions on Nuclear Science; February 1997; ISSN 0018-9499; vol. 44, no. 1, pp. 98-106; In English; Copyright; Avail: Issuing Activity

Single photon emission computed tomography (SPECT) imaging with cone-beam collimators provides improved sensitivity and spatial resolution for imaging small objects with large field-of-view detectors. It is known that Tuy's cone-beam data sufficiency condition must be met to obtain artifact-free reconstructs. Even though Tuy's condition was derived for an attenuation-free situation, we hypothesize that an artifact-free reconstruction can be obtained even if the cone-beam data are attenuated, provided the imaging orbit satisfies Tuy's condition and the exact attenuation map is known. In our studies, emission data are acquired using nonplanar circle-and-line orbits to acquire cone-beam data for tomographic reconstructions. An extended iterative ML-EM (maximum likelihood-expectation maximization) reconstruction algorithm is derived and used to reconstruct projection data with either a pre-acquired or assumed attenuation map. Quantitative accuracy of the attenuation corrected emission reconstruction is significantly improved.
Author (EI)
Collimators; Computer Aided Tomography; Electromagnetic Wave Transmission; Sensitivity; Wave Attenuation

53
BEHAVIORAL SCIENCES

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

19970040671 Institute for Human Factors TNO, Soesterberg, Netherlands
A Proposal for Research on a Methodology for Developing Team Training Systems ***Interim Report Een voorstel voor onderzoek naar een opleidingsontwikkelsystematiek voor team training***
vanBerlo, M. P. W., Institute for Human Factors TNO, Netherlands; Sep. 19, 1997; 26p; In English
Contract(s)/Grant(s): B96-036
Report No.(s): TD97-0239; TM-97-B018; Copyright; Avail: Issuing Activity (TNO Human Factors Research Inst., Kampweg 5, 3769 DE Soesterberg, The Netherlands), Hardcopy, Microfiche

Despite the acknowledgment of the importance of team performance and team training, relatively few endeavors have been undertaken to actually train teams in a systematic way. A possible explanation could be that there is not yet a methodology to guide the instructional developers and trainers in designing, executing, and evaluating team training systems. The research question to be answered in this study is which guidelines should be included in a methodology supporting the systematic development of team training systems. In order to give an answer to this question the following strategy is proposed: conduct a literature study, conduct a field study, develop a prototype of the methodology, conduct an expert-evaluation, test the prototype in various experiments, and apply the methodology in real-life cases. This strategy is discussed extensively. The results of the literature study (Van Berlo) and the field study (Van Berlo) are briefly reviewed.
Author
Education; Proposals; Research; Methodology; Training Devices; Teams

19970040896 Civil Aeromedical Inst., Oklahoma City, OK USA
Personality Characteristics of Pre/Post-Strike Air Traffic Control Applicants ***Final Report***
Schroeder, David J., Civil Aeromedical Inst., USA; Dollar, Carolyn S., Civil Aeromedical Inst., USA; Jul. 1997; 20p; In English
Report No.(s): AD-A328998; DOT/FAA/AM-97/17; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The 16 Personality Factors (16PF) test has been routinely administered to personnel applying for Air Traffic Control Specialist (ATCS) positions within the Federal Aviation Administration for more than 3 decades. This study was designed to assess the relationship between personality characteristics of a group of post-strike applicants (1984) with data gathered in the late 1960s

to early 1970s (Karson and O'Dell). Additionally, the comparisons provide a baseline with which to assess characteristics of the new controllers who will start to enter the workforce as the post-strike workforce begins to retire following the year 2000. Outcomes were consistent with previous findings, in revealing that female and male ATCS applicants are brighter than the average individual. When compared with the general population norms, the applicant groups are less anxious, report higher self-discipline, and are more emotionally stable. They are also more self-reliant and assertive. These characteristics appear to be ideally suited for applicants to an occupation that requires quick decision-making and calm, thoughtful responses during emergencies.
DTIC
Air Traffic Control; Personality Tests; Stability; Personnel; Decision Making; Personality

19970040947 Armstrong Lab., Human Resources Directorate, Mesa, AZ USA
Above Real-Time Training Applied to Air Combat Skills ***Final Report, Jul. 1995 - Dec. 1996***
Crane, Peter M., Armstrong Lab., USA; Guckenberger, Dutch, ECC International Corp., USA; Schreiber, Brian T., Hughes Training, USA; Robbins, Robert L., Hughes Training, USA; Aug. 1997; 77p; In English
Contract(s)/Grant(s): F41624-95-C-5011; AF Proj. 1123
Report No.(s): AD-A329018; AL/HR-TR-1997-0104; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

Above real-time training (ARTT) is an instructional strategy in which events in a training simulator occur faster than normal. Three experiments were conducted to evaluate applications of ARTT for training air combat skills and emergency procedures. Two of these experiments were conducted with experienced Air Force F-16 pilots who practiced air-to-air radar skills, air intercepts, and emergency procedures using conventional, real-time simulation or ARTT at 1.5 times real time. The pilots trained using ARTT received the same number of training trials but less clock time in the simulator as pilots trained in real time. All pilots were then tested in real time. Pilots trained using ARTT performed radar-skills tasks as well as pilots trained in real time. Pilots trained using ARTT performed emergency procedures tasks more quickly than pilots trained in real time. In a third experiment, student F-16 pilots practiced using air-to-air radar in real time or ARTT. Students trained using ARTT received more training trials in approximately the same amount of clock time as the students trained in real time. ARTT students performed better on a real-time test than students trained in real time. It is concluded that for selected tasks ARTT is more time efficient than conventional, real-time simulation because it allows more events to be experienced within a given period of training time. ARTT also supported better real-time test performance under some conditions.
DTIC
Aircraft Pilots; Pilot Performance; Training Simulators

19970040948 Civil Aeromedical Inst., Oklahoma City, OK USA
Distribution of Attention, Situation Awareness, and Workload in a Passive Air Traffic Control Task: Implications for Operational Errors and Automation ***Final Report***
Endsley, Mica R., Texas Technological Univ., USA; Rodgers, Mark D., Civil Aeromedical Inst., USA; Jul. 1997; 25p; In English
Report No.(s): AD-A328997; DOT/FAA/AM-97/13; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A study was conducted to investigate factors underlying operational errors (OEs) in en route air traffic control. Twenty active duty controllers watched re-creations of OEs and were asked to report on their situation awareness and workload on two occasions during the re-creations. A total of 14 OEs were examined. Responses were analyzed to determine how subjects allocated their attention while viewing the scenarios. While observed patterns probably reflect necessary prioritization schemes, attention strategies identified in this study can be linked to data on factors underlying OEs. Both objective taskload, as indicated by the number of aircraft being controlled, and subjective workload were found to be related to controllers' ability to report situation awareness information. Workload was found to be higher at the time of the QE than at the other stop during the re-creation. During high workload, controllers appeared to reduce attention paid to certain aircraft and variables to maintain awareness of more important information. Implications of this research are drawn for potential problems in situation awareness under passive monitoring conditions that may be present if certain forms of automation are introduced in the future air traffic control system.
DTIC
Air Traffic Control; Workloads (Psychophysiology); Errors; Creativity

19970040951 Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA USA
Does Thinking About the Values of One's Peers Make These Values Seem More Important? ***Final Report, Jun. 1995 - Apr. 1997***
Savell, Joel M., Army Research Inst. for the Behavioral and Social Sciences, USA; May 1997; 66p; In English
Contract(s)/Grant(s): DA Proj. 2O1-61102-B7-4F
Report No.(s): AD-A329110; ARI-TR-1065; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This experiment investigated the effect of peer-reference-group salience on the judged importance of specified values using a sample of 143 male and female African-American high school seniors. In half the cases students first judged the importance of these values to themselves and then judged the importance of these values to their friends. In the rest of the cases students first judged the importance of the values to their friends and then judged the importance of the values to themselves. Students who gave their own judgments in second position (and thus had a chance to think about these friends and their values before indicating their own judgments) gave own judgments that were closer to the judgments they attributed to their friends than did those who gave their own judgments first (p less than .001). Students attributed to their friends a level of interest in joining the military that was similar to their own, but the peer-salience variable seemed not to have an effect. An unpredicted finding was that neighborhood socioeconomic status was negatively correlated (r equal to -.43 p less than .001) with the absolute difference between own and attributed likelihood of joining the military, although it was uncorrelated (ps less than .05) (1) with the subject's own likelihood of joining, (2) with the likelihood they attributed to their friends, and (3) with the arithmetic difference between these two values. DTIC

Armed Forces (USA); Judgments; Minorities

19970040987 Northeastern Univ., Dept. of Psychology, Boston, MA USA

Spatial Frameworks for Perceived Environments ***Final Report, 1 May 1994 - 30 Apr. 1997***

Bryant, David J., Northeastern Univ., USA; Apr. 1997; 13p; In English

Contract(s)/Grant(s): F49620-94-I-0220; AF Proj. 2313

Report No.(s): AD-A329616; AFOSR-TR-97-0384; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Research completed under this grant has led to the discovery of two mental frames for representing space. One is the spatial framework, based on the egocentric body axes, and the other is intrinsic computation, based on analysis of body sides from an external perspective. Experiments demonstrated that spatial frameworks are used in discourse comprehension and memory for physical scenes. Intrinsic computation was observed in perception of model scenes. The current research extends this program by exploring the conditions under which people use spatial frameworks versus intrinsic computation. Experiments determined whether diagrams and models induce or favor different mental representations. Diagrams were studied because they are representational but also have their own spatial properties. A second question was whether the spatial framework and intrinsic computation analyses different processes for expressing spatial knowledge in memory versus perception. Previous research observed spatial frameworks in memory, suggesting that it is a general representation for spatial memory. In contrast, intrinsic computation has been observed in perception of observed scenes. Results of the current research indicate that people employ spatial frameworks for memory of 3D models and intrinsic computation for both memory and perception of diagrams. Instructions to use a given frame alters people's performance. The kind of depiction and task favors a particular frame, but the use of mental frames is under strategic control. A second series of experiments explored how physical asymmetry of body axes produces differential accessibility, and whether functional laterality plays a role in determining the accessibility of left/right locations relative to other directions. It was found that differences in accessibility are not produced by a decision process for distinguishing directional poles of spatial axes. Rather, accessibility depends on the salience of the entire body axis. Laterality and hardness do not affect the accessibility of objects associated with the left/right axis. A third project examined rehearsal of spatial location in visual perception. Spatial location is effortfully rehearsed, rather than encoded automatically. The rehearsal process depends critically on eye movements between locations. Sequentially presented locations are stored primarily by their temporal order of presentation. DTIC

Visual Perception; Asymmetry; Three Dimensional Models; Lateral Stability; Spatial Distribution

19970041022 Civil Aeromedical Inst., Oklahoma City, OK USA

Review of Air Traffic Controller Selection: An International Perspective ***Final Report***

Broach, Dana, Civil Aeromedical Inst., USA; Manning, Carol A., Civil Aeromedical Inst., USA; Jul. 1997; 27p; In English

Report No.(s): AD-A328993; DOT/FAA/AM-97/15; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report provides a review of research on air traffic controller selection in the USA, Germany, the UK, and Sweden. The development and validation of the multiple hurdle selection system used by the US Federal Aviation Administration (FAA) from 1976 through 1992 is described first. The computer-administered test battery that supplanted the second-stage screening conducted at the FAA Academy is discussed next. Work by Eissfeldt for the German Air Navigation Services at the Aerospace Research Establishment (DLR) in Hamburg is reviewed. Job analysis, test battery development, and validation research for the controller occupation in the UK is presented next, followed by a description of the Swedish "MRU Project" on controller selection. The report closes with a discussion of issues surrounding controller job performance measurement. The advantages and disadvantages of historical criteria, such as training records, are reviewed. Alternative approaches to job performance measurement, such

as simulations and operational data replay and analysis, are then described. The report closes with suggestions for future directions in controller selection research.
DTIC
Air Traffic Controllers (Personnel); Human Performance; Education; Air Navigation; Tasks; Simulation

19970041113 Logicon Technical Services, Inc., Dayton, OH USA
Computer Modeling of Operator Mental Workload during Target Acquisition: An Assessment of Predictive Validity ***Interim Report, Apr. - Dec. 1996***
Vidulich, Michael A., Armstrong Lab., USA; See, Judi E., Logicon Technical Services, Inc., USA; Jan. 1997; 47p; In English
Contract(s)/Grant(s): F41624-94-C-6007; AF Proj. 7184
Report No.(s): AD-A328970; AL/CF-TR-1997-0018; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The predictive validity of computer simulation modeling of the operator's mental workload and situational awareness (SA) during a target acquisition mission was assessed in the present study. In Phase 1, twelve participants completed a series of target acquisition trials in a laboratory flight simulator and provided subjective ratings of workload (using the Subjective Workload Assessment Technique (SWAT)) and SA (using the Situational Awareness Rating Technique (SART)). In Phase 2 computer models of the laboratory task were constructed using the Micro Saint modeling tool. The visual, auditory, kinesthetic, cognitive, and psychomotor components of the workload associated with each task were estimated and used to obtain the measures of average and peak workload. The results from the lab data versus the Micro Saint data were similar but not identical, indicating the computer models were partially, but not completely valid predictors of mental workload and SA. The computer modeling appeared to be a more effective predictor of SA rather than mental workload.
DTIC
Computerized Simulation; Workloads (Psychophysiology); Psychomotor Performance; Flight Simulators; Mental Performance; Ratings

19970041217 Oklahoma Univ., Norman, OK USA
Use of Object-Oriented Programming to Simulate Human Behavior in Emergency Evacuation of an Aircraft's Passenger Cabin ***Final Report***
Court, Mary C., Oklahoma Univ., USA; Marcus, Jeffrey H., Federal Aviation Administration, USA; Aug. 1997; 11p; In English
Report No.(s): AD-A329462; DOT/FAA/AM-97-20; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Progress in the development of a computerized aircraft cabin evacuation model is described. The model has a two-fold purpose (1) to supplement current certification tests that use human subjects, and (2) to serve in the investigation of aircraft accidents as a reconstruction tool and identify factors influencing survival of passengers. For the model to be a valid predictive tool when simulating aircraft accidents, the toxic and debilitating effects on passenger behavior of fire and smoke must be modeled. Other aircraft cabin evacuation models use an expert system/rule-based approach to simulate these effects. The work described here presents an object-oriented approach to modeling human behavior in aircraft cabin evacuations. Object-oriented programming (OOP) lends itself to the modeling of complex systems. OOP's foundation is modularity. OOP allows a one-to-one correspondence with the physical world, and thus, eases the burden of model validation. Validation is critical to the successful use of a model as a predictive tool and involves testing to ensure that the model accurately reflects the behavior of a real system. Easing model validation is of particular importance since the real system's environment is hazardous, and perform ing any tests on the real system is either impossible or not repeatable. The result of this work will help to expand the simulation's capabilities in improved passenger queuing analysis by allowing the incorporation of human behavior into class objects.
DTIC
Object-Oriented Programming; Computer Programs; Computerized Simulation; Evacuating (Transportation); Aircraft Accidents; Aircraft Compartments; Human Behavior; Flight Simulation

19970041302 NERAC, Inc., Tolland, CT USA
Training Effectiveness. (Latest Citations from the NTIS Bibliographic Database)
Jul. 1997; p; In English; Page count unavailable
Report No.(s): PB97-861967; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the effectiveness of on-the-job and formalized training in relation to job performance, productivity, and job satisfaction. The use of simulators, computers, and hands-on training, in relation to performance

improvements are modeled. Commercial and military applications are discussed. (Contains 50-250 citations and includes a subject term index and title list.)
NTIS
Bibliographies; Management; Personnel Development; Data Bases; Effectiveness

19970041345 Armstrong Lab., Neuropsychiatry Branch, Brooks AFB, TX USA
Pilot Personality: Gender and Career-Level Differences ***Interim Report, Aug. 1996 - Jul. 1997***
King, Raymond E., Armstrong Lab., USA; Callister, Joseph D., Armstrong Lab., USA; Retzlaff, Paul D., Armstrong Lab., USA; McGlohn, Suzanne, Armstrong Lab., USA; Jul. 1997; 19p; In English; Sponsored in part by the Air Force Medical Operating Agency
Report No.(s): AD-A328845; AL/AO-TR-1997-0095; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Little work has been done to examine personality differences between female and male Air Force pilots. The current study investigates gender differences at beginning and mid-career points. These samples are compared to non-pilots controls. Female pilots differ from control subjects on most variables. Female student pilots are higher on Neuroticism and Openness than male student pilots. Mid-career female pilots are found only to be higher on Agreeableness compared to mid-career male pilots. Finally, differences are also found when comparing female student pilots to female mid-career pilots with the student pilots higher on Neuroticism and lower on Agreeableness.
DTIC
Psychological Tests; Aircraft Pilots; Personnel Development

19970041358 Massachusetts Inst. of Tech., Research Lab. of Electronics, Cambridge, MA USA
Psychophysical Research on Telepresence ***Final Report, 1 Aug. 1994 - 31 Jul. 1997***
Durlach, Nathaniel I., Massachusetts Inst. of Tech., USA; Sep. 11, 1997; 6p; In English
Contract(s)/Grant(s): N00014-94-I-1079
Report No.(s): AD-A329480; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Subjective telepresence may be defined quantitatively in terms of the probability that the human operator will perceive him or herself to be located in the remote environment. This idea, which may be extended to include virtual environments, is developed in Schloerb's paper. Given this theoretical approach one might vary parameters of a teleoperation system in an experiment and observe how the degree of subjective telepresence varies. The parameters of a telepresence system may be effectively summed up by describing the way the system transforms the human operator's interaction with the remote environment and, ultimately, one could study telepresence in terms of sensorimotor transformations in general, without regard to a specific teleoperation system. One could also observe how objective performance in a remote task is affected in such a test in an attempt to understand the relationship between subjective telepresence and task performance.
DTIC
Teleoperators; Human Performance; Man Machine Systems; Psychomotor Performance

19970041359 Stanford Univ., Stanford, CA USA
Dynamic Adaptation of Individual Perception-Action Control Plans in a Heterogeneous Team of Intelligent Mobile Agents ***Final Report***
Latombe, Jean Claude, Stanford Univ., USA; Jun. 1997; 137p; In English
Contract(s)/Grant(s): N00014-94-I-0721
Report No.(s): AD-A329458; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The objective of this project was to explore the development of new type of physical agents, called autonomous observers. An autonomous observer is a mobile robot equipped with cameras that can perform vision tasks in response to high level inputs given by human users. to perform such tasks, multiple observers may team to reach the same results quicker or to attain goals that no agent could achieve alone. For example, finding and/or tracking a fast target reliably in a complex environment may not be possible with a single observer. Autonomous observers allow users to perform remote observation tasks without worrying about the details of camera motions. Instead, these motions are automatically computed and executed. Our research has addressed three major topics: model building, target seeking, and target tracking. This sequence of three topics is implicitly based on the following hypothetical scenario: autonomous observers are dropped into an unknown environment, of which they first have to build a model; then they have to find a smart target hiding among view obstructing obstacles; finally, they have to monitor this target and track

its motions. For each topic, we have developed and implemented new algorithms. We have experimented with our software both in simulation and with an autonomous observer prototype that we have designed and built.
DTIC
Product Development; Tracking (Position); Target Acquisition; Target Recognition

19970041435 Armstrong Lab., Brooks AFB, TX USA
Psychological Aspects of Aviators' Success ***Final Report, 22 Dec. 1995 - 30 Sep. 1996***
McGlohn, Suzanne E., Armstrong Lab., USA; Dec. 1996; 67p; In English
Contract(s)/Grant(s): MIPR-96MM6644
Report No.(s): AD-A328834; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This study compared female and male Air Force pilots across four differing methodologies. A computerized interview survey indicated several gender differences in attitudes toward military aviation. Males appear to continue to be uncomfortable with mixed squadrons. Females seem to have concerns about flying in combat. An in-depth personality test showed female pilots were in between male pilots and college student controls. A more global personality study showed that there are differences between early and mid-career female pilots with apparent changes across time. Finally, a new test of personality, psychopathology, and crew interaction was developed in order to more specifically quantify gender, selection, training, and retention issues.
DTIC
Personality; Aircraft Pilots; Males; Females; Personality Tests; Surveys

19970041561 Institute for Human Factors TNO, Soesterberg, Netherlands
State-of-the-art Review of Cognitive Task Analysis Techniques ***Interim Report Literatuurstudie naar methoden voor cognitieve taakanalyse***
Schraagen, J. M. C., Institute for Human Factors TNO, Netherlands; Chipman, S. E., Institute for Human Factors TNO, Netherlands; Shute, V., Institute for Human Factors TNO, Netherlands; Annett, J., Institute for Human Factors TNO, Netherlands; Strub, M., Institute for Human Factors TNO, Netherlands; Sheppard, C., Institute for Human Factors TNO, Netherlands; Ruisseau, J.-Y., Institute for Human Factors TNO, Netherlands; Graff, N., Institute for Human Factors TNO, Netherlands; Jul. 22, 1997; 54p; In English
Contract(s)/Grant(s): B97-021
Report No.(s): TD97-0221; TM-97-B012; Copyright; Avail: Issuing Activity (TNO Human Factors Research Inst., Kampweg 5, 3769 DE Soesterberg, Netherlands), Hardcopy, Microfiche

Cognitive task analysis is the extension of traditional task analysis techniques to yield information about the knowledge, thought processes and goal structures that underlie observable task performance. Interest in the cognitive aspects of behavior has grown since the mid 1980's because of the growing use of automated systems in task performance. In the armed forces, this is denoted with the term 'digitization of the battlefield'. Cognitive processes such as diagnosis, judgment, planning and decision making have come to the fore as a result of this development. As part of its Programme of Work, NATO Research Study Group 27 on Cognitive Task Analysis has undertaken the task of reviewing existing cognitive task analysis techniques. The Group concludes that few integrated methods exist, that little attention is being paid to the conditions under which methods are appropriate, and that often it is unclear how the products of cognitive task analysis should be used. The Group recommends the organization of a workshop with experts in the field of cognitive task analysis in order to address the issues that have arisen from this review.
Author
Cognition; Automatic Control; Decision Making; Human Performance

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.

19970040622 Federal Aviation Administration, William J. Hughes Technical Center, Atlantic City, NJ USA
Human Factors Recommendations for Airborne Controller-Pilot Data Link Communications (CPDLS) Systems: A Synthesis of Research Results and Literature
Rehmann, Albert J., Federal Aviation Administration, USA; Jun. 1997; 93p; In English
Contract(s)/Grant(s): SPO900-94-D-0001
Report No.(s): AD-A329207; DOT/FAA/CT-TN97/6; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This document provides a synthesis of research results and literature culminating in specific human factors recommendations for Controller-Pilot Data Link Communications (CPDLC) systems. The report concentrates on two major human factors top areas; system operability, and system implementation. System operability includes issues such as display location, crew alerting, and message formatting, etc. System implementation includes issues such as situation awareness/party line, airspace environment, mixed modality communications, etc. The findings provide a synthesis of past Data Link research and specifically address the work performed by or supported by the Technical Center's Airborne Data Link Group (ADLG) over the past several years. The goal of the Technical Center's research is to support rulemaking, certification, and the testing of Air Traffic Control (ATC) systems in end-to-end environments.
DTIC
Human Factors Engineering; Recommendations; Data Links; Telecommunication; Air Traffic Control; Control Systems Design

19970040646 Maryland Univ., Office of Research Administration and Advancement, College Park, MD USA
Coordinated Action in 3-D Space, 2 ***Final Report, 1 Jun. 1994 - 31 May 1997***
Stienman, Robert M., Maryland Univ., USA; Jun. 30, 1997; 11p; In English
Contract(s)/Grant(s): F49620-94-I-0333; AF Proj. 2313
Report No.(s): AD-A329623; AFOSR-TR-97-0380; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
Accurate measurements of coordinated human head/eye/hand actions Were made as subjects manipulated or fixated objects within arms' reach. Both tasks were performed under natural conditions in that: (1) binocular gaze was recorded with the upper body free from restraints, and (2) the objects serving as stimuli for the visually-guided motor responses were near the subject's head (<1m).Accurategazeunderthes conditions required that even the smallest movements of the head were compensated by carefully coordinated conjunctive/disjunctive (version/vergence) eye movements. Conditions like these are particularly important for human beings, whose ability to design, fabricate and use tools have given them unmatched mastery of their environment Making accurate measurements under these conditions was novel. It required unique instrumentation developed and only available at the University of Maryland, College Park. Research completed on this grant showed that the large literature on human oculomotor performance, based mainly on recordings made under unnatural conditions (monocular input, a restrained head and targets beyond arms' reach), tends: (1) to underestimate both the flexibility and capacity of the oculomotor system, and (2) to obscure its preferred mode of operation under the conditions that made it possible for humans to evolve their exceptional manipulative skills.
DTIC
Eye Movements; Three Dimensional Models; Dimensional Measurement; Head (Anatomy)

19970040653 Army Aeromedical Research Lab., Aircrew Health and Performance Div., Fort Rucker, AL USA
Effects of Pilot Workload on EEG Activity Recorded during the Performance of In-Flight Maneuvers in a UH-1 Helicopter ***Final Report***
Caldwell, John A., Jr., Army Aeromedical Research Lab., USA; Roberts, Kristi A., Army Aeromedical Research Lab., USA; Kelly, C. F., Army Aeromedical Research Lab., USA; Jones, Heber D., Army Aeromedical Research Lab., USA; Lewis, James A., Army Aeromedical Research Lab., USA; Aug. 1997; 62p; In English
Contract(s)/Grant(s): DA Proj. 3M1-62787-A-879
Report No.(s): AD-A329208; USAARL-97-31; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche
The present investigation was designed to: (1) assess the overall quality of EEG recordings collected from helicopter pilots during the actual performance of in-flight maneuvers; (2) determine whether there are workload-induced changes in the EEGs recorded under resting in-flight conditions and 'on-the-controls' in-flight conditions; and (3) evaluate whether in-flight EEGs are sufficiently sensitive to detect small changes in the workload levels associated with different types of flight maneuvers. Twenty subjects (10 aviators and 10 nonaviators) were tested during the performance of standardization flight profiles in a UH-1 helicopter. There was a resting eyes-open EEG condition at the beginning which EEG data were recorded. During the maneuvers, the pilots maintained full control of the aircraft and attempted to maintain ideal flight parameters. The nonaviators sat quietly with their eyes focused on a fixation point.
DTIC
Aircraft Pilots; Electroencephalography; Workloads (Psychophysiology); Pilot Performance; UH-1 Helicopter; Aerospace Medicine; Aircraft Maneuvers

19970040666 Army Aeromedical Research Lab., Aircrew Health and Performance Div., Fort Rucker, AL USA
Effects of Pilot Workload on EEG Activity Recorded during the Performance of In-Flight Maneuvers in a UH-1 Helicopter ***Final Report***
Caldwell, John A., Jr., Army Aeromedical Research Lab., USA; Roberts, Kristi A., Army Aeromedical Research Lab., USA;

Kelly, C. F., Army Aeromedical Research Lab., USA; Jones, Heber D., Army Aeromedical Research Lab., USA; Lewis, James A., Army Aeromedical Research Lab., USA; Aug. 1997; 63p; In English
Contract(s)/Grant(s): DA Proj. 3M1-62787-A-879
Report No.(s): AD-A329232; USAARL-97-31; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The present investigation was designed to: (1) assess the overall quality of EEG recordings collected from helicopter pilots during the actual performance of in-flight maneuvers; (2) determine whether there are workload-induced changes in the EEGs recorded under resting in-flight conditions and on-the-controls in-flight conditions; and (3) evaluate whether in-flight EEGs are sufficiently sensitive to detect small changes in the workload levels associated with different types of flight maneuvers.
DTIC
Electroencephalography; Workloads (Psychophysiology); Pilot Performance; UH-1 Helicopter; Aircraft Maneuvers

19970040673 Institute for Human Factors TNO, Soesterberg, Netherlands
Cockpit Information for Local and Global Spatial Task Support in Fighter Aircraft ***Interim Report Cockpit informatie voor de ondersteuning van lokale en globale taken in gevechtsvliegtuigen***
deVries, S. C., Institute for Human Factors TNO, Netherlands; vanBreda, L., Institute for Human Factors TNO, Netherlands; Sep. 25, 1997; 33p; In English
Contract(s)/Grant(s): A95/KLu/341
Report No.(s): TD97-0243; TM-97-A061; Copyright; Avail: Issuing Activity (TNO Human Factors Research Inst., Kampweg 5, 3769 DE Soesterberg, The Netherlands), Hardcopy, Microfiche

An experiment was conducted to investigate the potential benefits of perspective displays in the cockpit for support of global spatial orientation tasks in fighter aircraft. In a flight simulator, eight pilots were required to simultaneously perform a local task and a global task, i.e. closely follow a leading aircraft, and detect threat zones. The lead aircraft was visible in the outside scene, the threat zones were presented on three different display configurations in the cockpit: a plan-view map display as is currently used in fighter aircraft, a plan-view moving map display as will be used shortly, or a perspective map display. Pilot performance was determined in terms of tracking accuracy (local task) and threat-zone detection accuracy (global task). The results of the experiment indicate that navigational performance was best with the perspective map display, followed by the moving map display. Worst performance was found with the static map display. Display type did not significantly affect the tracking accuracy. Implications of the use of perspective radar displays in the cockpit are discussed.
Author
Fighter Aircraft; Pilot Performance; Cockpits; Radarscopes; Tracking (Position); Flight Simulators; Accuracy

19970040732 Federal Aviation Administration, John A. Volpe National Transportation Systems Center, Cambridge, MA USA
Human Factors and Operations Issues in GPS and WAAS Sensor Approvals: A Review and Comparison of FAA and RTCA Documents ***Final Report, 1992-1996***
Wright, M., Federal Aviation Administration, USA; Jul. 1997; 42p; In English
Report No.(s): AD-A329440; DOT-VNTSC-FAA-97-7; DOT/FAA/AAR-100-97-1; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report is the culmination of the first task in a project to evaluate human factors and operations issues associated with the integration of Class C Global Positioning System (GPS) sensors and Class Beta GPS/Wide Area Augmentation System (WAAS) sensors into navigation systems in low-end transport category aircraft. The objective of the project is to provide aircraft certification specialists with information and, eventually, with a job aid to help them evaluate GPS and GPS/WAAS sensors within integrated navigation systems. The first task of the project was to compare the requirements of the various FAA and industry documents currently used in the approval of GPS and GPS/WAAS sensor equipment and installation. The impact of the use of Required Navigation Performance (RNP) standards on approval also was evaluated. The comparison of the requirements specified in the document is presented in table form and maj or differences are discussed.
DTIC
Human Factors Engineering; Global Positioning System; Radio Navigation; Evaluation; Tasks; Education

19970040747 ILC Dover, Frederica, DE USA
NASA Research Announcement Phase 1 Report and Phase 2 Proposal for the Development of a Power Assisted Space Suit Glove Assembly ***Final Report***
Cadogan, Dave, ILC Dover, USA; Lingo, Bob, ILC Dover, USA; Oct. 30, 1996; 52p; In English
Contract(s)/Grant(s): NASw-96015
Report No.(s): NASA/CR-97-206051; NAS 1.26:206051; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

In July of 1996, ILC Dover was awarded Phase 1 of a contract for NASA to develop a prototype Power Assisted Space Suit glove to enhance the performance of astronauts during Extra-Vehicular Activity (EVA). This report summarizes the work performed to date on Phase 1, and details the work to be conducted on Phase 2 of the program. Phase 1 of the program consisted of research and review of related technical sources, concept brainstorming, baseline design development, modeling and analysis, component mock-up testing, and test data analysis. ILC worked in conjunction with the University of Maryland's Space Systems Laboratory (SSL) to develop the power assisted glove. Phase 2 activities will focus on the design maturation and the manufacture of a working prototype system. The prototype will be tested and evaluated in conjunction with existing space suit glove technology to determine the performance enhancement anticipated with the implementation of the power assisted joint technology in space suit gloves.
Author
Space Suits; Gloves; Product Development

19970040786 Defence and Civil Inst. of Environmental Medicine, Downsview, Ontario Canada
Risk Assessment of Bacteriologic Health Hazards in the Helmet Bladder Component of a Pressure Breathing for G (PBG) System
Severs, Yvonne D., Defence and Civil Inst. of Environmental Medicine, Canada; Sabiston, Brian H., Defence and Civil Inst. of Environmental Medicine, Canada; May 1997; 13p; In English
Report No.(s): AD-A329091; DCIEM-97-TM-28; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
One of the components of the experimental development G protection ensemble known as STING (Sustained Tolerance to INcreased G) is a breathing loop consisting of a pressurized oxygen supply, regulator, face mask, and an inflatable helmet bladder. The bladder, located in the back of the pilot's helmet, at the occipital level of the skull, inflates during the positive pressure breathing phase of the Pressure Breathing for C (PBG) cycle. The bladder is inflated to the same pressure as the mask, thus pulling the mask tighter to the face; preventing mask leakage; and, ensuring an adequate supply of pressurized oxygen to the user. Upon cessation of PBG, the helmet bladder deflates.
DTIC
Breathing Apparatus; Helmets; Risk; Pressure Breathing; Hazards; Skull

19970040821 Armstrong Lab., Human Systems Center, Wright-Patterson AFB, OH USA
The Optokinetic Cervical Reflex (OKCR) in Pilots of High-Performance Aircraft ***Interim Report, Jun.1995 - Dec. 1995***
Merryman, Ronald F. K., Armstrong Lab., USA; Apr. 1997; 93p; In English
Contract(s)/Grant(s): AF Proj. 7184
Report No.(s): AD-A329028; AL/CF-TR-1997-0082; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche
For over sixty years, researchers and engineers have based investigations and the design of cockpit displays and structures upon the presupposition that, during flight, the pilot maintains a head alignment coincident with the aircraft's vertical axis (Z-axis). Recent flight simulator studies have verified the existence of a pilot neck reflex which refutes this long-standing assumption. This reflex, named the OptoKinetic Cervical Reflex (OKCR), occurs during visual flight and is theorized to be an attempt by the pilot to stabilize a retinal image of the horizon to maintain spatial orientation. As a result, pilots view a fixer-horizon image and not a moving-horizon. The objectives of the research were to determine if the optokinetic cervical reflex occurs during actual flight of high performance jet aircraft and to model the response. This was an observational study in which the head positions of nine pilots were recorded during actual F-15 aircraft flight and analyzed. Results indicate that the OKCR caused pilots to tilt their heads during aircraft bank. Also, the reflex was found to be independent of the bank phase: entering versus exiting the turn. The OKCR was shown to be a strong, natural response and the flight results correlated extremely well with the simulator results. The impact of these results on pilot training, spatial disorientation, physiological injury and safety, and the re-design of displays for aircraft attitude and virtual reality are discussed.
DTIC
Flight Simulators; Aircraft Performance; Disorientation; Display Devices; Reflexes; Pilot Training; Physical Examinations

19970041042 NERAC, Inc., Tolland, CT USA
Virtual Reality: Devices and Applications. (Latest citations from the U.S. Patent Bibliographic File with Exemplary Claims)
Feb. 1997; p; In English; Page count unavailable
Report No.(s): PB97-855134; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche
The bibliography contains citations of selected patents concerning the design, construction, and applications for virtual reality systems. Devices include simulators for training purposes, manipulators providing tactile responses, and head tracking displays.

Applications in sports training, rehabilitation of muscles and limbs, pilot training, and video games are presented. (Contains 50-250 citations and includes a subject term index and title list.)
NTIS
Bibliographies; Virtual Reality; Human Factors Engineering; Simulators

19970041084 Army Aeromedical Research Lab., Aircrew Protection Div., Fort Rucker, AL USA
Long-Duration Exposure Criteria for Head-Supported Mass ***Final Report***
Butler, Barclay P., Army Aeromedical Research Lab., USA; Allen, Nabih M., Army Aeromedical Research Lab., USA; Aug. 1997; 59p; In English
Contract(s)/Grant(s): DA Proj. 301-62787-A-878
Report No.(s): AD-A329484; USAARL-97-34; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The modern crew station of Army helicopters uses the helmet as an integral component of the aircraft control systems. What was once viewed as a simple device for crash protection now supports devices including night vision goggles, chemical mask, head-up displays, and weapon aiming systems. These devices combine to increase the biomechanical stress in the neck. This study investigated the effects of increasing helmet torque on the motion of the helmeted head under the conditions of long duration whole body vibration exposure. Twelve U.S. Army volunteer aviators were exposed to 4 hours of whole body vibration, similar to that found in a UH-60 helicopter, while wearing four different helmets. Helmet torques, as calculated at the point where the head connects to the spine, ranged from a standard aviator helmet to a helmet with a chemical mask and a night vision goggle. Head motion was measured using a three dimensional active infrared marker system attached to a fixture held in the subject's teeth.
DTIC
Human Factors Engineering; Exposure; Head-Up Displays; Flight Clothing; Helmet Mounted Displays; Time

19970041088 Fakespace, Inc., Mountain View, CA USA
A Hybrid Immersive/Non-Immersive Virtual Environment Workstation
Sep. 1997; 12p; In English
Report No.(s): AD-A329354; Rept-97265; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Hybrid Immersive/Non-Immersive Virtual Environment workstation integrates two different approaches to the presentation and exploration of virtual spaces. The Immersive and Non-Immersive components of the system are complimentary in that each approach provides a distinct perspective on the virtual environment being examined.
DTIC
Virtual Reality; Workstations

19970041235 NERAC, Inc., Tolland, CT USA
Night Vision and Dark Adaptation. (Latest citations from the NTIS Bibliographic Database)
Jun. 1997; p; In English; Page count unavailable. Supersedes PB96-864012
Report No.(s): PB97-860829; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the physiological aspects of night vision and dark adaptation. The reports pertain to performance in low light level illumination of motor vehicle operators, pilots, military personnel, and others who are subject to reduced lighting conditions. Some citations report on research on the response and adaptation of visual sensory functions of humans and animals under low light levels. The data can be used in human engineering to define night vision limits and capabilities, or to increase conspicuity of objects or surroundings to assist in the performance of tasks at night.(Contains 50-250 citations and includes a subject term index and title list.)
NTIS
Bibliographies; Night Vision; Dark Adaptation; Visual Perception; Physiology; Illuminating; Visibility

19970041252 NERAC, Inc., Tolland, CT USA
Protective Clothing: Survival, Aircraft, and Combat Environments. (Latest citations from the NTIS Bibliographic Database)
Feb. 1997; p; In English; Page count unavailable. Supersedes PB96-870588
Report No.(s): PB97-855787; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning design, testing, and evaluation of protective apparel for military and other non-commercial pilots. The citations focus on clothing appropriate to varying climatic and gravitational conditions, combat con-

ditions, and special circumstances of exposure and survival, such as the ocean environment. (Contains 50-250 citations and includes a subject term index and title list.)
NTIS
Bibliographies; Protective Clothing

19970041262 Institute for Nutrition and Food Research TNO, Zeist, Netherlands
Modernizing Military Rations, Part 1, Nutritional Requirements of Arctic Rations ***Interim Report Modernisering rantsoenen, Deel 1, Voeding bij militaire operaties onder arctische omstandigheden***
vanErp-Baart, A. M. J., Institute for Nutrition and Food Research TNO, Netherlands; Jul. 1997; 24p; In Dutch
Contract(s)/Grant(s): A96/KL/105
Report No.(s): TD97-0276; TNO-V97.573; Copyright; Avail: Issuing Activity (TNO Nutrition and Food Research Inst., PO Box 360, NL-3700 AJ Zeist, The Netherlands), Hardcopy, Microfiche

A literature search has been carried out to formulate the nutritional requirements of arctic rations. Because information on the actual military arctic situation in the Netherlands is limited, it is advised to use the American Military Recommended Daily Allowances for nutrition in the cold for the compilation of the arctic rations. Furthermore it is concluded that more research on energy expenditure and nutrient requirements is needed to make the recommendations definitive.
Author
Arctic Regions; Netherlands; Rations; Nutritional Requirements

19970041415 Institute for Human Factors TNO, Soesterberg, Netherlands
Position Paper Battlespace Digitization ***Final Report***
Janssen, W. H., Institute for Human Factors TNO, Netherlands; Rasker, P. C., Institute for Human Factors TNO, Netherlands; Sep. 11, 1997; 34p; In Dutch
Contract(s)/Grant(s): A96/CO/361
Report No.(s): TD97-0235; TM-97-A056; Copyright; Avail: Issuing Activity (TNO Human Factors Research Inst., Kampweg 5, 3769 DE Soesterberg, The Netherlands), Hardcopy, Microfiche

This report provides an inventory of the human factors consequences of so-called 'battlespace digitization', the large-scale implementation of information technology in the armed forces. It also tries to identify means of anticipating upon these consequences. The report discusses the following issues and their implications: 1 Situation Awareness. Digitalization will have profound effects on the 'Situation Awareness' of those involved, which makes it a core issue for consideration, It is of the utmost importance to realize that situation awareness will not naturally result from the implementation of information technology, but that thought needs to be given to the way in which it can maximally be stimulated. it is also of relevance to note that situation awareness is not only a matter of knowing where things are, but also of what they mean and what future actions is implicated by certain configurations. The paper discusses the following digital elements that will affect situation awareness: 2 Battlespace visualization. While higher-order elements are essential to the formation of an adequate level of situation awareness the ultimate form the user interface has-in particular: the way in which battlespace configurations are visually presented to users-will be of vital importance in actually achieving that level. For this reason interface considerations should be pan of any digitalisation program right from the start. 3 Agent models. These can assist in filtering out user-relevant data from large 'infospheres', provided that their modus operandus is tuned to user needs. 4 'Decide how to decide'. Digitalisation will permit new forms of adaptive decision support, such that decision procedures will be more adequately tuned to prevailing circumstances. Thus, they can lead to a more adequate use of decision heuristics in cases where classic multi-attribute utility maximization is not a feasible option. 5 Role changes. Because information will be so widely available to all levels of an organization there will be extensive opportunities to change roles throughout the organization. These may happen on purpose or in an ad hoc way. It should be clarified under what conditions role changes can be permitted, or even stimulated, and when they should not be allowed to happen at all. The report concludes by identifying future steps in human factors research aimed towards clarifying these issues.
Author
Human Factors Engineering; Information Systems; Decision Support Systems

19970041438 Fakespace, Inc., Mountain View, CA USA
A Hybrid Immersive/Non-Immersive Virtual Environment Workstation
Sep. 1997; 5p; In English
Report No.(s): AD-A329287; R-97248; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

In the design considerations of the Immersive portion of this system, it is important to keep the expected setting in mind. The expected setting is on board a ship or other Naval vessel. In such a situation, it is expected that the deck may well be rolling back

and forth to some degree. Floor space is also a limited resource and the physical footprint of the system needs to be relatively small. In addition, the systems must integrate with other equipment which is already there. Thus, systems which require a stable frame of reference, demand a large area, or a specialized room are less preferred.
DTIC
Workstations; Footprints

19970041484 Southwest Research Inst., Dept. of Biosciences and Bioengineering, San Antonio, TX USA
Research to Support the Determination of Spacecraft Maximum Acceptable Concentrations of Potential Atmospheric Contaminants ***Final Report***
Orr, John L., Southwest Research Inst., USA; [1997]; 72p; In English
Contract(s)/Grant(s): NAG9-638; SwRI Proj. 12-5326
Report No.(s): NASA/CR-97-206352; NAS 1.26:206352; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

In many ways, the typical approach to the handling of bibliographic material for generating review articles and similar manuscripts has changed little since the use of xerographic reproduction has become widespread. The basic approach is to collect reprints of the relevant material and place it in folders or stacks based on its dominant content. As the amount of information available increases with the passage of time, the viability of this mechanical approach to bibliographic management decreases. The personal computer revolution has changed the way we deal with many familiar tasks. For example, word processing on personal computers has supplanted the typewriter for many applications. Similarly, spreadsheets have not only replaced many routine uses of calculators but have also made possible new applications because the cost of calculation is extremely low. Objective The objective of this research was to use personal computer bibliographic software technology to support the determination of spacecraft maximum acceptable concentration (SMAC) values. Specific Aims The specific aims were to produce draft SMAC documents for hydrogen sulfide and tetrachloroethylene taking maximum advantage of the bibliographic software.
Derived from text
Bibliographies; Word Processing; Tables (Data); Personal Computers; Management Methods; Computer Programs; Costs; Software Engineering

19970041511 Defence Science and Technology Organisation, Aeronautical and Maritime Research Lab., Melbourne, Australia
A Physiological Evaluation of the Chemical, Biological Combat Suit under Warm, Humid and Hot, Dry Climatic Conditions
Amos, D., Defence Science and Technology Organisation, Australia; Gray, B., Defence Science and Technology Organisation, Australia; Hansen, R., Sydney Univ., Australia; Sep. 1997; 16p; In English
Report No.(s): DSTO-TR-0570; AR-010-315; Copyright; Avail: Issuing Activity (DSTO Aeronautical and Maritime Research Lab., P O Box 4331, Melbourne Victoria 3001,Australia), Hardcopy, Microfiche

The physiological responses of a group of nine subjects exercising at a medium metabolic rate in a concept demonstrator low burden chemical protective ensemble have been determined under warm, humid and hot, dry climatic conditions typical of the Townsville and Pilbara regions of northern Australia. At 30oC and 60% relative humidity (RH) and at 40oC and 30% RH, the Chemical, Biological Combat Suit (CBCS) was significantly superior to the current in-service NBC overgarment in terms of physiological thermal strain. Furthermore, there was little difference between the normal combat uniform and the CBCS worn as a combat uniform, without hood, mask and gloves, in terms of increase in rectal temperature and increase in heart rate. The major limitation on soldier performance in the fully encapsulated Chemical, Biological Combat Suit was imposed by the combination of mask, permeable hood and impermeable gloves and not by the suit itself.
Author
Combat; High Temperature Environments; Physiological Responses; Body Temperature; Heart Rate; Metabolism; Humidity

19970041534 Fakespace, Inc., Mountain View, CA USA
A Hybrid Immersive/Non-Immersive Virtual Environment Workstation
Jan. 1997; 8p; In English
Report No.(s): AD-A329243; Rept-97233; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The Hybrid Immersive/Non-Immersive Virtual Environment workstation combines two technologies for the presentation and exploration of virtual spaces. The Immersive and Non-Immersive components of the system are complimentary in that each approach provides a distinct perspective on the virtual environment being examined. The Immersive component provides a user with a computer generated environment which completely surrounds the user. The computer generates images which surround the user in the virtual space and provides a first person perspective. Thus, if one is looking around in an environment along the coast then as one looks about, one can see the ocean and sea shore. This first person point of view will provide a good sense of

the surroundings and the nearby features. The Non-Immersive component of the system provides more of an overall view of the scene, much as one might gain from an aerial photograph of an area. In contrast to the Immersive experience, the Non-Immersive experience provides an overall impression of the situation and provides a context for overall strategic decision making. We are experimenting with the components each part of the system can use and looking for effective combinations. In particular, we have been looking at using a projective image surface for the Non-Immersive user.
DTIC
Workstations; Virtual Reality; Oceans; Experimentation; Decision Making

19970041568 Geo-Centers, Inc., Newton, MA USA
Compatibility of Army Systems with Anthropometric Characteristics of Female Soldiers ***Final Report, Jan. 1995 - Sep. 1996***
Todd, Wendy L., Geo-Centers, Inc., USA; Paquette, Steven P., Geo-Centers, Inc., USA; Bensel, Carolyn K., Geo-Centers, Inc., USA; Sep. 1997; 221p; In English
Contract(s)/Grant(s): DAAK60-93-D-0005
Report No.(s): AD-A329489; NATICK-TR-97/017; No Copyright; Avail: CASI; A10, Hardcopy; A03, Microfiche

Many Army Clothing and Individual Equipment (CIE) systems used today were designed to accommodate male soldiers in the 5th-95th percentile range for critical body dimensions. Thus, female soldiers whose body dimensions are outside the design envelope may be compromised. This study was conducted to determine the compatibility of some currently fielded systems with body dimensions of female soldiers. Participation was limited to female soldiers whose height did not exceed 5' 5", the 5th percentile value of male soldiers' height. Tasks associated with the operation of five workstations were evaluated by 205 subjects. The workstations included a mobile kitchen, a fuel tanker, a fork lift and two other vehicles. Static and functional characteristics of 11 CIE items were also evaluated on 203 subjects. The workstation testing revealed difficulties, particularly among shorter subjects, in executing tasks involving overhead reach and in positioning vehicle seats for unobstructed outside views. Fit characteristics of 8 of the 11 CIE items were found to be unacceptable on more than 15% of the subjects. The best-fitting CIE sizes tended to be too large and long, particularly on shorter subjects. Potential solutions to the compatibility problems were developed and cost estimates were generated for implementing the solutions.
DTIC
Anthropometry; Females; Armed Forces (USA)

19970041595 Seagull Technology, Inc., Los Gatos, CA USA
Advanced Free Flight Planner and Dispatcher's Workstation: Preliminary Design Specification
Wilson, J., Seagull Technology, Inc., USA; Wright, C., Seagull Technology, Inc., USA; Couluris, G. J., Seagull Technology, Inc., USA; Nov. 1997; 74p; In English
Contract(s)/Grant(s): NAS2-14289
Report No.(s): NASA/CR-97-206379; NAS 1.26:206379; Rept-97139-01; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The National Aeronautics and Space Administration (NASA) has implemented the Advanced Air Transportation Technology (AATT) program to investigate future improvements to the national and international air traffic management systems. This research, as part of the AATT program, developed preliminary design requirements for an advanced Airline Operations Control (AOC) dispatcher's workstation, with emphasis on flight planning. This design will support the implementation of an experimental workstation in NASA laboratories that would emulate AOC dispatch operations. The work developed an airline flight plan data base and specified requirements for: a computer tool for generation and evaluation of free flight, user preferred trajectories (UPT); the kernel of an advanced flight planning system to be incorporated into the UPT-generation tool; and an AOC workstation to house the UPT-generation tool and to provide a real-time testing environment. A prototype for the advanced flight plan optimization kernel was developed and demonstrated. The flight planner uses dynamic programming to search a four-dimensional wind and temperature grid to identify the optimal route, altitude and speed for successive segments of a flight. An iterative process is employed in which a series of trajectories are successively refined until the LTPT is identified. The flight planner is designed to function in the current operational environment as well as in free flight. The free flight environment would enable greater flexibility in UPT selection based on alleviation of current procedural constraints. The prototype also takes advantage of advanced computer processing capabilities to implement more powerful optimization routines than would be possible with older computer systems.
Author
Air Traffic Control; Free Flight; Flight Plans; Iterative Solution; Computer Graphics

19970041618 Technische Univ., Centre for Telematics and Information Technology, Twente, Netherlands

Results of the CEO Project WWW Management

Hazewinkel, H., Technische Univ., Netherlands; van Hengstum, E., Technische Univ., Netherlands; Pras, A., Technische Univ., Netherlands; Nov. 1996; ISSN 1381-3625; 142p; In English

Report No.(s): PB97-190300; CTIT-TR-96-18; Copyright Waived; Avail: CASI; A07, Hardcopy; A02, Microfiche

The subject of the study was the design and implementation of tools that allow status and utilization monitoring of networks and distributed information servers. In the specific case of the CEO program, these information servers are accessible via the WWW and contain large amounts of earth observation data (e.g. satellite pictures). The work division within the project was that ESYS investigated the management applications, which had to run on top of HP-Openview, and the CTIT designed and implemented the management agents. These agents had to include the following Management Information Bases (MIBs): HTTP-MIB, with detailed information concerning the WWW document transfer protocol; Retrieval Service (RS) MIB, with information concerning the WWW server and the documents provided by that server.

NTIS

World Wide Web; Satellite Imagery; Network Control

19970042789

Impact and the design of the human-machine interface

Dearden, A. M., Univ of York, UK; Harrison, M. D.; IEEE Aerospace and Electronic Systems Magazine; February 1997; ISSN 0885-8985; vol. 12, no. 2, pp. 19-25; In English; Copyright; Avail: Issuing Activity

In this paper, we consider the concept of the impact of an action or human error. We begin from an informal definition of impact as: the effect that an action or sequence of actions has on the safe and successful operation of a system; and develop a quantitative measure of the impact of specified behaviors. It is important that human-machine interface designers should understand the relationship between operator actions and the hazards associated with a system. We demonstrate how impact can be assessed prior to, or in parallel with, the design of the human-machine interface, and show how impact assessments could be used to allow risk analysts to inform designers about the relationship between operator actions and system hazards. to illustrate our approach we present a simple case study.

Author (EI)

Errors; Human Performance; Human-Computer Interface; Man Machine Systems

Subject Term Index

T

U

V

W

Y

Personal Author Index

Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NASA/SP—97-7011/SUPPL455		

4. Title and Subtitle	5. Report Date
Aerospace Medicine and Biology A Continuing Bibliography (Supplement 455)	December 29, 1997
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
	10. Work Unit No.
9. Performing Organization Name and Address	
NASA Scientific and Technical Information Program Office	11. Contract or Grant No.

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
National Aeronautics and Space Administration Langley Research Center Hampton, VA 23681	Special Publication
	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))	18. Distribution Statement
Aerospace Medicine Bibliographies Biological Effects	Unclassified – Unlimited Subject Category – 52

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	47	A03/HC

For sale by the NASA Center for AeroSpace Information, 800 Elkridge Landing Road, Linthicum Heights, MD 21090-2934