

NASA/SP—1999-7011/SUPPL493
June 14, 1999

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

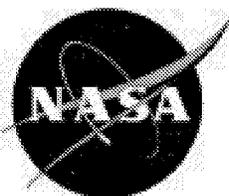
Effective July 1999, this publication will no longer be issued free of charge. Instead, a subscription will be available for an annual fee of \$600. You will have password access to each monthly online issue, and you may elect listserv notification. Postage for hardcopy delivery is an additional \$10/copy for domestic and \$20/copy for international. If you wish to subscribe, please contact the NASA Center for AeroSpace Information (CASI) in one of the following ways:

E-mail: help@sti.nasa.gov

Facsimile: 301-621-0134

Telephone: 301-621-0390

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



National Aeronautics and
Space Administration
Langley Research Center
**Scientific and Technical
Information Program Office**

The NASA STI Program Office . . . in Profile

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

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

- **TECHNICAL PUBLICATION.** Reports of completed research or a major significant phase of research that present the results of NASA programs and include extensive data or theoretical analysis. Includes compilations of significant scientific and technical data and information deemed to be of continuing reference value. NASA's counterpart of peer-reviewed formal professional papers but has less stringent limitations on manuscript length and extent of graphic presentations.
- **TECHNICAL MEMORANDUM.** Scientific and technical findings that are preliminary or of specialized interest, e.g., quick release reports, working papers, and bibliographies that contain minimal annotation. Does not contain extensive analysis.
- **CONTRACTOR REPORT.** Scientific and technical findings by NASA-sponsored contractors and grantees.
- **CONFERENCE PUBLICATION.** Collected papers from scientific and technical conferences, symposia, seminars, or other meetings sponsored or cosponsored by NASA.
- **SPECIAL PUBLICATION.** Scientific, technical, or historical information from NASA programs, projects, and missions, often concerned with subjects having substantial public interest.
- **TECHNICAL TRANSLATION.** English-language translations of foreign scientific and technical material pertinent to NASA's mission.

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

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

- Access the NASA STI Program Home Page at <http://www.sti.nasa.gov>
- E-mail your question via the Internet to help@sti.nasa.gov
- Fax your question to the NASA STI Help Desk at (301) 621-0134
- Telephone the NASA STI Help Desk at (301) 621-0390
- Write to:
NASA STI Help Desk
NASA Center for AeroSpace Information
7121 Standard Drive
Hanover, MD 21076-1320

Introduction

This supplemental issue of *Aerospace Medicine and Biology, A Continuing Bibliography with Indexes* (NASA/SP—1999-7011) 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](ftp://sti.nasa.gov)
[gopher.sti.nasa.gov](gopher://sti.nasa.gov)

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

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

Subscribe SCAN-02-01 Jane Doe

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

Phone: (301) 621-0390

Fax: (301) 621-0134

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

Looking just for *Aerospace Medicine and Biology* reports?

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



Table of Contents

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

51	Life Sciences (General)	1
52	Aerospace Medicine Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.	3
53	Behavioral Sciences Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.	14
54	Man/System Technology and Life Support Includes human engineering; biotechnology; and space suits and protective clothing.	15
55	Space Biology Includes exobiology; planetary biology; and extraterrestrial life.	N.A.

Indexes

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

Subject Term Index	ST-1
Author Index	PA-1

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

Document Availability

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

The New NASA Video Catalog is Here

To order your **Free!** copy,
call the NASA STI 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>

(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
7121 Standard Drive
Hanover, MD 21076-1320

Limited Reproducibility

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

NASA Patents and Patent Applications

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

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

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

The patents and patent applications announced in the STI Database are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

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

Sources for Documents

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

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

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

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

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

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

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

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

- Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, CA. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.
- Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.
- Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration (JBD-4), Public Documents Room (Room 1H23), Washington, DC 20546-0001, or public document rooms located at NASA installations, and the NASA Pasadena Office at the Jet Propulsion Laboratory.
- Avail: NTIS. Sold by the National Technical Information Service. Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) are available. For information concerning this service, consult the NTIS Subscription Section, Springfield, VA 22161.
- Avail: Univ. Microfilms. Documents so indicated are dissertations selected from Dissertation Abstracts and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.
- Avail: US Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of \$1.50 each, postage free.
- Avail: (US Sales Only). These foreign documents are available to users within the United States from the National Technical Information Service (NTIS). They are available to users outside the United States through the International Nuclear Information Service (INIS) representative in their country, or by applying directly to the issuing organization.
- Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed on the Addresses of Organizations page. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Addresses of Organizations

British Library Lending Division
Boston Spa, Wetherby, Yorkshire
England

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

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

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

ESDU International
27 Corsham Street
London
N1 6UA
England

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

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

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

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

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

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

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

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

University Microfilms, Ltd.
Tylers Green
London, England

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

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

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

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

NASA CASI Price Code Table

(Effective July 1, 1998)

U.S., Canada, Code & Mexico Foreign			U.S., Canada, Code & Mexico Foreign		
A01	\$ 8.00	\$ 16.00	E01	\$101.00	\$202.00
A02	12.00	24.00	E02	109.50	219.00
A03	23.00	46.00	E03	119.50	238.00
A04	25.50	51.00	E04	128.50	257.00
A05	27.00	54.00	E05	138.00	276.00
A06	29.50	59.00	E06	146.50	293.00
A07	33.00	66.00	E07	156.00	312.00
A08	36.00	72.00	E08	165.50	331.00
A09	41.00	82.00	E09	174.00	348.00
A10	44.00	88.00	E10	183.50	367.00
A11	47.00	94.00	E11	193.00	386.00
A12	51.00	102.00	E12	201.00	402.00
A13	54.00	108.00	E13	210.50	421.00
A14	56.00	112.00	E14	220.00	440.00
A15	58.00	116.00	E15	229.50	459.00
A16	60.00	120.00	E16	238.00	476.00
A17	62.00	124.00	E17	247.50	495.00
A18	65.50	131.00	E18	257.00	514.00
A19	67.50	135.00	E19	265.50	531.00
A20	69.50	139.00	E20	275.00	550.00
A21	71.50	143.00	E21	284.50	569.00
A22	77.00	154.00	E22	293.00	586.00
A23	79.00	158.00	E23	302.50	605.00
A24	81.00	162.00	E24	312.00	624.00
A25	83.00	166.00	E99	Contact NASA CASI	
A99	Contact NASA CASI				

Payment Options

All orders must be prepaid unless you are registered for invoicing or have a deposit account with the NASA CASI. Payment can be made by VISA, MasterCard, American Express, or Diner's Club credit card. Checks or money orders must be in U.S. currency and made payable to "NASA Center for AeroSpace Information." To register, please request a registration form through the NASA STI Help Desk at the numbers or addresses below.

Handling fee per item is \$1.50 domestic delivery to any location in the United States and \$9.00 foreign delivery to Canada, Mexico, and other foreign locations. Video orders incur an additional \$2.00 handling fee per title.

The fee for shipping the safest and fastest way via Federal Express is in addition to the regular handling fee explained above—\$5.00 domestic per item, \$27.00 foreign for the first 1-3 items, \$9.00 for each additional item.

Return Policy

The NASA Center for AeroSpace Information will 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 CASI within 30 days of your original request.

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

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

Federal Depository Library Program

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

Public Collection of NASA Documents

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

Submitting Documents

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

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

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

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

Federal Regional Depository Libraries

ALABAMA

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

UNIV. OF ALABAMA

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

ARIZONA

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

ARKANSAS

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

CALIFORNIA

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

COLORADO

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

DENVER PUBLIC LIBRARY

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

CONNECTICUT

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

FLORIDA

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

GEORGIA

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

HAWAII

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

IDAHO

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

ILLINOIS

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

INDIANA

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

IOWA

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

KANSAS

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

KENTUCKY

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

LOUISIANA

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

LOUISIANA TECHNICAL UNIV.

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

MAINE

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

MARYLAND

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

MASSACHUSETTS

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

MICHIGAN

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

LIBRARY OF MICHIGAN

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

MINNESOTA

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

MISSISSIPPI

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

MISSOURI

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

MONTANA

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

NEBRASKA

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

NEVADA

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

NEW JERSEY

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

NEW MEXICO

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

NEW MEXICO STATE LIBRARY

325 Don Gaspar Avenue
Santa Fe, NM 87503
(505) 827-3824 Fax: (505) 827-3888

NEW YORK

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

NORTH CAROLINA

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

NORTH DAKOTA

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

UNIV. OF NORTH DAKOTA

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

OHIO

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

OKLAHOMA

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

OKLAHOMA STATE UNIV.

Edmon Low Library
Stillwater, OK 74078-0375
(405) 744-6546 Fax: (405) 744-5183

OREGON

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

PENNSYLVANIA

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

SOUTH CAROLINA

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

UNIV. OF SOUTH CAROLINA

Thomas Cooper Library
Green and Sumter Streets
Columbia, SC 29208
(803) 777-4841 Fax: (803) 777-9503

TENNESSEE

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

TEXAS

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

TEXAS TECH. UNIV. LIBRARIES

Documents Dept.
Lubbock, TX 79409-0002
(806) 742-2282 Fax: (806) 742-1920

UTAH

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

VIRGINIA

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

WASHINGTON

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

WEST VIRGINIA

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

WISCONSIN

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

MILWAUKEE PUBLIC LIBRARY

Documents Division
814 West Wisconsin Avenue
Milwaukee, WI 53233
(414) 286-3073 Fax: (414) 286-8074

Typical Report Citation and Abstract

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

Key

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

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 493)

JUNE 14, 1999

51

LIFE SCIENCES (GENERAL)

19990038350 National Academy of Sciences - National Research Council, Washington, DC USA
Institute of Laboratory Animal Research (ILAR) *Annual Report, 1 Apr. 1998 - 31 Mar. 1999*
Dell, Ralph; Mar. 1999; 13p; In English
Contract(s)/Grant(s): DAMD17-98-1-8275

Report No.(s): AD-A361548; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Institute for Laboratory Animal Research (ILAR) is a component of the Commission on Life sciences (CLS), National Research Council (NRC). Partial support for ILAR has been provided for many years from the Department of the Army to enable ILAR to fulfill its mission. Founded in 1952, ILAR has become recognized nationally and internationally as a leader in developing and making available to the biomedical and laboratory animal science communities guidelines for animal care, breeding, and use; descriptions of animal models for human diseases and physiological processes; and reports on specific issues of humane care and use of laboratory animals. ILAR's mission is to help improve the availability, quality, care, and humane and scientifically valid use of laboratory animals. ILAR accomplishes its goals through its core program, which is carried out by the staff and its special-project program, which is carried out by NRC-appointed committees with staff assistance. The number of committees and size of the staff are dependent on the number of special projects and available funding. Both programs are directed by a 14-member Council comprised of experts in laboratory animal medicine, zoology, genetics, medicine, ethics, and related biomedical sciences. The Army funds partially support general office operations, the Animal Models and Genetic Stocks Information Program, publication of ILAR Journal, and work of the Council.

DTIC

Life Sciences; Animals; Breeding (Reproduction); Diseases; Medical Science; Information Theory; Laboratories

19990040270 Pennsylvania Univ., Center for Bioactive Materials and Tissue Engineering, Philadelphia, PA USA
Reactions and Surface Transformations of a Bone-Bioactive Material in a Simulated Microgravity Environment
Radin, S., Pennsylvania Univ., USA; Ducheyne, P., Pennsylvania Univ., USA; Ayyaswamy, P. S., Pennsylvania Univ., USA;
NASA Microgravity Materials Science Conference; February 1999, pp. 163-167; In English; See also 19990040241
Contract(s)/Grant(s): NAG8-1483; No Copyright; Avail: CASI; A01, Hardcopy; A06, Microfiche

A comprehensive program to investigate the expeditious in vitro formation of three-dimensional bone-like tissue is currently underway at the University of Pennsylvania. The study reported here forms a part of that program. Three-dimensional bone-like tissue structures may be grown under the simulated microgravity conditions of NASA designed Rotating Wall Bioreactor Vessels (RWV's). Such tissue growth will have wide clinical applications. In addition, an understanding of the fundamental changes that occur to bone cells under simulated microgravity would yield important information that will help in preventing or minimizing astronaut bone loss, a major health issue with travel or stay in space over long periods of time. The growth of three-dimensional bone-like tissue structures in RWV's is facilitated by the use of microcarriers which provide structural support. If the microcarrier material additionally promotes bone cell growth, then it is particularly advantageous to employ such microcarriers. We have found that reactive, bone-bioactive glass (BBG) is an attractive candidate for use as microcarrier material. Specifically, it has been found that BBG containing Ca- and P- oxides upregulates osteoprogenitor cells to osteoblasts. This effect on cells is preceded by BBG reactions in solution which result in the formation of a Ca-P surface layer. This surface further transforms to a bone-like mineral (i.e., carbonated crystalline hydroxyapatite (c-HA)). At normal gravity, time-dependent, immersion-induced BBG reactions and transformations are greatly affected both by variations in the composition of the milieu in which the glass is immersed and on the immersion conditions. However, the nature of BBG reactions and phase transformations under the simulated microgravity conditions of RWV's are unknown, and must be understood in order to successfully use BBG as microcarrier material in RWV'S. In

this paper, we report some of our recent findings in this regard using experimental and numerical methods. BBG composition 45S5, the most reactive among known bone-bioactive glasses, was chosen for the study. BBG 45S5 behavior in physiological solutions was tested in simulated microgravity and compared with that at normal gravity. On the basis of our numerical study, we have chosen the BBG granule size to be in the range 40-70 microns, and a RWV rotational speed of 10 rpm. Our numerical study has shown that these parameters enable the microcarrier to remain suspended in the medium without experiencing collisions with the wall of the vessel. Immersion-induced changes in the solution composition and the material surface were analyzed after immersion.

Derived from text

Microgravity; Gravitational Effects; Space Environment Simulation; Tissues (Biology); Bones; Cells (Biology); Phase Transformations

19990040425 Search for Extraterrestrial Intelligence Inst., Moffett Field, CA USA

Energy from Redox Disproportionation of Sugar Carbon Drives Biotic and Abiotic Synthesis

Weber, Arthur L., Search for Extraterrestrial Intelligence Inst., USA; *Journal of Molecular Evolution*; 1997; Volume 44, pp. 354-360; In English; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

To identify the energy source that drives the biosynthesis of amino acids, lipids, and nucleotides from glucose, we calculated the free energy change due to redox disproportionation of the substrate carbon of: (1) 26-carbon fermentation reactions and (2) the biosynthesis of amino acids and lipids of *E. coli* from glucose. The free energy (cal/mmol of carbon) of these reactions was plotted as a function of the degree of redox disproportionation of carbon (disproportionative electron transfers (mmol)/mmol of carbon). The zero intercept and proportionality between energy yield and degree of redox disproportionation exhibited by this plot demonstrate that redox disproportionation is the principal energy source of these redox reactions (slope of linear fit = -10.4 cal/mmol of disproportionative electron transfers). The energy and disproportionation values of *E. coli* amino acid and lipid biosynthesis from glucose lie near this linear curve fit with redox disproportionation accounting for 84% and 96% (and ATP only 6% and 1%) of the total energy of amino acid and lipid biosynthesis, respectively. These observations establish that redox disproportionation of carbon, and not ATP, is the primary energy source driving amino acid and lipid biosynthesis from glucose. In contrast, we found that nucleotide biosynthesis involves very little redox disproportionation, and consequently depends almost entirely on ATP for energy. The function of sugar redox disproportionation as the major source of free energy for the biosynthesis of amino acids and lipids suggests that sugar disproportionation played a central role in the origin of metabolism, and probably the origin of life.

Author

Oxidation-Reduction Reactions; Synthesis (Chemistry); Biosynthesis; Sugars; Glucose; Free Energy; Amino Acids; Adenosine Triphosphate

19990040822 Columbia Univ., Coll. of Physicians and Surgeons, New York, NY USA

Development of the Fish Medaka in Microgravity *Final Report*

Wolgemuth, Debra J., Columbia Univ., USA; [1995]; 14p; In English

Contract(s)/Grant(s): NAG2-987; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The goal of these experiments was to determine the effect of microgravity on the early development of the fish medaka. There were two objectives for this flight series. The primary objective was to assess the effects of microgravity on different stages of development and to ascertain whether the relevant developmental questions can be addressed at the gross morphological level or if the issues involve more subtle questions about regulation at the molecular and cellular levels. The secondary objective was the assessment of the utility of flight hardware with the capabilities to perform embryological studies. We have been able to take advantage of the flight testing phase of the STL-B hardware to also study the effects of microgravity on the early development of the fish, Medaka. Our initial studies involved monitoring the early Medaka development and raising flight embryos for breeding. Images of the developing embryos were collected either via video which was either taken by the astronauts or broadcast to Earth. Sample video images were digitized and stored on a hard drive resident within the on-board STL-B unit. Embryos were fixed at specific intervals, returned to Earth and are being analyzed for the timing and location of molecular events associated with controlling the morphological pattern for the onset of adult structures.

Author

Breeding (Reproduction); Fishes; Microgravity; Spaceborne Experiments

AEROSPACE MEDICINE

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

19990038349 Louisiana State Univ., Pennington Biomedical Research Center, Baton Rouge, LA USA
 Determination of Total Daily Energy Requirements and Activity Patterns of Service Women *Annual Report, 26 Sep. 1997 - 25 Sep. 1998*

Delany, James P.; Oct. 1998; 28p; In English

Contract(s)/Grant(s): DAMD17-96-2-6025

Report No.(s): AD-A361586; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The objective of the current study is to define a range of energy requirements of service women, defining the variation as it relates to jobs, military settings, and activity patterns. This is crucial information needed not only for determination of nutritional requirements for energy balance, but specific nutrient density standards for servicewomen. Total daily energy expenditure is measured using the doubly labeled water (DLW) method. Activity patterns from actigraphs will be analyzed for hours of sleep, description of job/work patterns by examining bursts of concerted activity versus steady activity. Men will also be studied in these settings. Energy requirements' for men have been better established and will serve to anchor the results obtained in women to previously established norms in men. Several field studies will be conducted over the course of the grant. The first field study was conducted at Fort Bragg/Camp Mckall during a Combat Support Hospital training exercise. Energy expenditures were moderate, and higher in men than women. However, when adjusting for differences in body size, energy expenditures were similar.

DTIC

Nutrition; Balance; Nutritional Requirements; Physical Exercise; Energy Budgets; Fatigue (Biology); Human Tolerances

19990040418 Aerospace Corp., Technology Operations, El Segundo, CA USA
 A Survey of the Potential Effects of Increasing UV-B Radiation on the Biosphere. Revision

Martin, L. R.; Sep. 30, 1998; 38p; In English

Contract(s)/Grant(s): F04701-93-C-0094

Report No.(s): AD-A361283; TR-98(1306)-6; SMC-TR-99-08; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

There are by now well-established connections between the introduction of chlorine-containing molecules into the stratosphere, a consequent decrease in the concentration of stratospheric ozone, and an increase in UV-B radiation at the surface of the Earth. An increase in UV-B on average would increase the incidence rate of non-melanoma skin cancer worldwide, with an unproved but likely increase in melanoma skin cancer. Other effects on humans could include cataracts and immune system inhibition, but these are less well established. The response of domestic and wild animal populations to UV-B is not thought to be a serious problem at this time, in part because they are protected by fur. The response of plants is complex because plants exist in a highly competitive situation with other plants for water and light, and must survive in an environment of pests and diseases, which may also be affected by UV-B. The oceanic phytoplankton are the basis of the ocean food chain and are responsible for half of the natural carbon dioxide fixation. Studies have indicated that the phytoplankton are adversely affected by UV-B, and thus there is a potential for excess UV-B to affect fishing yields and the amount of carbon dioxide in the atmosphere.

DTIC

Cancer; Ozone Depletion; Ultraviolet Radiation; Atmospheric Composition; Ozone

19990040686 NASA Langley Research Center, Hampton, VA USA
 Aerospace Medicine and Biology: A Continuing Bibliography With Indexes, Supplement 491

May 17, 1999; 22p; In English

Report No.(s): NASA/SP-1999-7011/SUPPL491; NAS 1.21:7011/SUPPL491; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report lists reports, articles and other documents recently announced in the NASA STI Database.

Author

Aerospace Medicine; Bibliographies

19990040936 Aeromedical Inst., Soesterberg, Netherlands
 Degenerative Changes of the Spine in Pilots of the RNLAF *Final Report Degeneratieve Veranderingen in de Wervelkolom bij F-16 Vliegers*

Hendriksen, I. J. M., Aeromedical Inst., Netherlands; Holewijn, M., Aeromedical Inst., Netherlands; Mar. 1998; 32p; In English
 Contract(s)/Grant(s): A96/KLu/02

Report No.(s): Rept-1998-K2; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The aim of this study was to examine whether F-16 pilots are at an increased risk of(cervical) spine degeneration. Retrospectively, all pilots of the Royal Netherlands Air Force (RNLAf) that were systematically radiographed (at least twice) in the period between 1982 and 1994, were examined. In total 316 pilots were evaluated, 188 F-16 pilots (mean age 28.5 years at initial x-ray) and 128 pilots in the Control group (mean age 24.2 years at initial x-ray). The Control group consisted of 64 helicopter pilots, 63 NF-5 pilots and 1 F-27 Pilot. None of this group of pilots had more than 150 hours flying experience with an F-16. Two radiologists, who were blinded as to whether the x-ray films were of F-16 pilots or Control group, examined these x-rays separately. In both groups, the time between the two x-rays was on average 6 years. In these years the Control group had a significantly higher mean number of flying hours compared to the F-16 group (resp. 922 versus 690 hrs). Though the inter-rater agreement of the x-rays was rather low, both radiologists found comparable statistical significant differences between the two groups, on several levels of the cervical spine. In the F-16 group, an increased osteophytic spurring was found at levels C4-C5 and C6-C7, and increased arthrosis deformans was found in the cervical spine. Further analysis of the data of a selection of the total group of pilots, whereby the difference in age between both groups was minimized, showed that the higher mean age of the F-16 pilots was possibly correlated with the increased degeneration in this group. No consistent relationship was found between spinal degeneration and initial radiological status. Also, it appeared that increasing levels of spinal degeneration were not related to increasing flight hours. These findings suggest that frequent exposure to high + G(sub z) forces might cause premature degeneration of the spine in F-16 pilots. Future research has to demonstrate to what extent age, mission, and number of flying hours have influenced the results. An uniform international classification and coding system in combination with establishing an international data-base is recommended in order to more fully understand the relationship between exposure to high + G(sub z) forces and spinal degeneration.

Author

Data Bases; Degeneration; Exposure; Radiology; Spine; X Rays; Pilots (Personnel); Research

19990040967 Bionetics Corp., Cocoa Beach, FL USA

Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence

Hoffler, G. Wyckliffe, Editor, Bionetics Corp., USA; O'Donnell, Michele D., Editor, Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999; 254p; In English; 2nd; Benchmarking For Excellence, 24-28 Aug. 1998, Orlando, FL, USA; Sponsored by NASA Kennedy Space Center, USA; See also 19990040968 through 19990041018

Contract(s)/Grant(s): NAS10-12180; S-NAS10-001; RTOP 004-Y3

Report No.(s): NASA/CP-1999-208543; NAS 1.55:208543; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

The theme of the 1998 NASA Occupational Health Conference was "Benchmarking for Excellence." Conference participants included NASA and contractor Occupational Health professionals, as well as speakers from NASA, other Federal agencies and private companies. Addressing the Conference theme, speakers described new concepts and techniques for corporate benchmarking. They also identified practices used by NASA, other Federal agencies, and by award winning programs in private industry. A two-part Professional Development Course on workplace toxicology and indoor air quality was conducted a day before the Conference. A program manager with the International Space Station Office provided an update on station activities and an expert delivered practical advice on both oral and written communications. A keynote address on the medical aspects of space walking by a retired NASA astronaut highlighted the Conference. Discipline breakout sessions, poster presentations, and a KSC tour complemented the Conference agenda.

Author

Conferences; Health; Standardization; Safety Management; Personnel Management; Quality Control

19990040968 Blair and Burke, College Station, TX USA

Benchmarking: Workplace Trends and Current Issues in Occupational Health

Blair, Brenda R., Blair and Burke, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 4-17; In English; See also 19990040967; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

Occupational health services, like similar employer-provided services in the workplace, must assist in improving employee health and well being while at the same time enhancing productivity. This dual mission requires that Occupational Health Departments adopt continuous quality improvement systems just like any other function within the organization. It thus requires internal analysis, periodic benchmarking against other organizations, and constant monitoring of trends in the larger society which affect the delivery of occupational health services. The purpose of this paper is fourfold: (1) to present an overview of benchmarking, including definitions, objectives and methods; (2) to discuss trends in the workplace which affect the delivery of occupational

health services; (3) to identify trends in healthcare delivery in the US which affect the delivery of occupational health services; and (4) to identify and discuss trends in occupational health care in the US today.

Derived from text

Medical Services; Public Health; Standards; Quality Control

19990040969 NASA Kennedy Space Center, Cocoa Beach, FL USA

Results Oriented Benchmarking: The Evolution of Benchmarking at NASA from Competitive Comparisons to World Class Space Partnerships

Bell, Michael A., NASA Kennedy Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 20-23; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Informal benchmarking using personal or professional networks has taken place for many years at the Kennedy Space Center (KSC). The National Aeronautics and Space Administration (NASA) recognized early on, the need to formalize the benchmarking process for better utilization of resources and improved benchmarking performance. The need to compete in a faster, better, cheaper environment has been the catalyst for formalizing these efforts. A pioneering benchmarking consortium was chartered at KSC in January 1994. The consortium known as the Kennedy Benchmarking Clearinghouse (KBC), is a collaborative effort of NASA and all major KSC contractors. The charter of this consortium is to facilitate effective benchmarking, and leverage the resulting quality improvements across KSC. The KBC acts as a resource with experienced facilitators and a proven process. One of the initial actions of the KBC was to develop a holistic methodology for Center-wide benchmarking. This approach to Benchmarking integrates the best features of proven benchmarking models (i.e., Camp, Spendolini, Watson, and Balm). This cost-effective alternative to conventional Benchmarking approaches has provided a foundation for consistent benchmarking at KSC through the development of common terminology, tools, and techniques. Through these efforts a foundation and infrastructure has been built which allows short duration benchmarking studies yielding results gleaned from world class partners that can be readily implemented. The KBC has been recognized with the Silver Medal Award (in the applied research category) from the International Benchmarking Clearinghouse.

Derived from text

Standardization; NASA Programs; Cost Effectiveness; Quality Control; Specifications

19990040970 Bionetics Corp., Occupational Health Program Support Office, Cocoa Beach, FL USA

Benchmarking the Federal Agencies

Ferguson, Emmett B., Jr., Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 24-30; In English; See also 19990040967; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The theme of benchmarking for this year's annual conference was selected almost one year ago. A group of excellent speakers was identified to discuss the process of benchmarking and describe some of the outstanding examples in corporate occupational health. The possibility was recognized that there might be excellent examples of occupational health services in the Federal sector. A meeting to discuss benchmarking Occupational Health Services in the Federal agencies was held early this year. Based on these discussions, a study was funded to identify the best practices and innovative approaches within other Federal agencies that provide employee health services. The study is intended to scope the investment in occupational health services in the Federal government and to recommend a benchmarking approach that can be used by the NASA centers as an ongoing program evaluation tool.

Derived from text

Health; Medical Services; Standardization; Organizations

19990040971 American Airlines, Inc., AMR Corp., Fort Worth, TX USA

Technological Advances in Travel Medicine

McKenas, David K., American Airlines, Inc., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 31-39; In English; See also 19990040967; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

It has been said that 100,000 people, the population of a moderate-sized city, travel in the skies over the domestic USA at any moment. Unlike a city, however, not much in the way of on-board emergency medical systems are available to them-that is, until recently. Many factors went into American's decision to greatly enhance on-board medical equipment on its fleet, and this paper will present that rationale. All major air carriers are following American's lead in these programs, and as a result, many

customer lives will be saved, and on-board passenger medical morbidity due to on-board illnesses and emergencies will be reduced.

Derived from text

Medical Equipment; Medical Services; Emergency Life Sustaining Systems; Technology Assessment; Airline Operations

19990040972 International SOS Assistance, Inc., International Healthcare Div., Indonesia

International Travel Health Considerations

Weston, Robert L., International SOS Assistance, Inc., Indonesia; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 40-43; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The paper summarizes the development and evolution of the travel medicine specialty (Emporiatrics). The major travel medicine problems (diarrhea, accident, illness, malaria), evolution of entry requirements, eradication programs, emergence and reemergence of infectious disease, special risks, preventive measures, political and environmental risks, stress of overseas duties, and the need for reliable resources and assistance are reviewed.

Derived from text

Public Health; Travel; Sickesses; Diseases; Medical Services

19990040975 Postal Service, Risk Management, Washington, DC USA

U.S. Postal Service Safety and Risk Management Overview

Jones, Jerry A., Postal Service, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 54-56; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The Benchmarking study of Ferguson provided a large amount of information from other government agencies. Perhaps the most impressive and useful with regard to implementation of well-conceived programs was by the U. S. Postal Services. The manager of Risk Management for the U.S. Postal Services describes the health and safety services implemented for the 890,000 employees in more than 38,000 locations in the Postal Service and illustrates the magnitude of the undertaking. The salient features of the program are outlined and material that address programs, strategies and assessment of outcomes is presented.

Derived from text

Risk; Standardization; Safety Management

19990040976 MEDSTAT Group, Washington, DC USA

Developing Normative and Benchmark Data For Health and Productivity Management: Results of a Multi-Employer Benchmarking Study

Goetzel, Ron Z., MEDSTAT Group, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 57-64; In English; See also 19990040967; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The following topics are discussed in the paper: (1) Developing a Model for Health and Productivity Management (HPM); (2) Results of the American Productivity and Quality Council (APQC)/MEDSTAT HPM Consortium Benchmarking Study; (3) Case Studies of Best Practice Organizations; and (4) Implications and Future Directions.

Derived from text

Health; Productivity; Standardization; Management Methods

19990040977 Johnson and Johnson, Inc., New Brunswick, NJ USA

Johnson & Johnson Benchmarking for Excellence Corporate Health Achievement Award Winner

Lemons, Susan L., Johnson and Johnson, Inc., USA; Isaac, Fikry W., Johnson and Johnson, Inc., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 67-72; In English; See also 19990040967; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The Signature of Quality Program, the name given to the continuous improvement and Total Quality Management at Johnson & Johnson, is presented. The company's background as a diversified health care company is described. The credo of Johnson & Johnson, their definition of Benchmarking, three types of Benchmarking, process management, their code of conduct, and what is being offered in the market place is also presented.

Derived from text

Health; Total Quality Management; Standardization; Industrial Management

19990040978 Johnson and Johnson, Inc., New Brunswick, NJ USA

An Integrated Shared Services Model

Isaac, Fikry W., Johnson and Johnson, Inc., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 73-80; In English; See also 19990040967; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Johnson & Johnson embarked on a study of their Health and Wellness services to benchmark similar programs and develop an improvement plan. The effort resulted in actions to integrate a number of related support services throughout the Corporation. The comprehensive employee health services, employee assistance programs and wellness programs were targeted for the reorganization. The resulting organization provides unified leadership standardized procedures including accountability, and cost assessments. Prevention and education were priorities in the new organization, but direct input into employee health benefits was an important part of the integrated services. The report describes the extensive service delivery model and provides details of the successful implementation of the integrated services plan.

Derived from text

Medical Services; Health; Models; Support Systems

19990040982 NASA Kennedy Space Center, Cocoa Beach, FL USA

NASA Occupational Health Program FY98 Self-Assessment

Brisbin, Steven G., NASA Kennedy Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 96-97; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche; Abstract Only; Abstract Only

The NASA Functional Management Review process requires that each NASA Center conduct self-assessments of each functional area. Self-Assessments were completed in June 1998 and results were presented during this conference session. During FY 97 NASA Occupational Health Assessment Team activities, a decision was made to refine the NASA Self-Assessment Process. NASA Centers were involved in the ISO registration process at that time and wanted to use the management systems approach to evaluate their occupational health programs. This approach appeared to be more consistent with NASA's management philosophy and would likely confer status needed by Senior Agency Management for the program. During FY 98 the Agency Occupational Health Program Office developed a revised self-assessment methodology based on the Occupational Health and Safety Management System developed by the American Industrial Hygiene Association. This process was distributed to NASA Centers in March 1998 and completed in June 1998. The Center Self Assessment data will provide an essential baseline on the status of OHP management processes at NASA Centers. That baseline will be presented to Enterprise Associate Administrators and DASHO on September 22, 1998 and used as a basis for discussion during FY 99 visits to NASA Centers. The process surfaced several key management system elements warranting further support from the Lead Center. Input and feedback from NASA Centers will be essential to defining and refining future self assessment efforts.

Derived from text

Industrial Safety; Safety Management; Health; Hygiene; NASA Programs

19990040983 Bionetics Corp., Cocoa Beach, FL USA

Occupational Health Program Performance Measures (Metrics)

Ferguson, Emmett B., Jr., Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 98-101; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Occupational Health Services are periodically re-justified to senior management. This process can best be accomplished by taking objective measurements of the services provided. There are three general categories of metrics, which are familiar, and are used formally, or informally to describe and justify services. They are: (1) Quality assurance metrics; (2) Productivity metrics; and (3) Outcome metrics. Patient satisfaction surveys and retrospective medical record audits help to measure quality and are important when used to reassure users of a concern for maintaining quality of local service. Both these types of metrics are important and should be thoughtfully collected for internal and local use. However, they are of very limited use in comparing services with those of other NASA Centers or Agencies. Counting the number of clinic visits and exams are measures of productivity and may be important when advocating for services locally. They may be presented as factors in justifying cost. Outcome measures often require a more intensive effort to collect and are more difficult to quantify, but they may be the most useful for our program management needs. Our challenge is to find a few performance measures that can be collected without extreme hardship on the

NASA Centers that are of significant use to demonstrate the value of providing Occupational Health Services and for comparing the effectiveness of those services with similar services in other Agencies.

Derived from text

Health; NASA Programs; Productivity; Quality Control

19990040985 Bionetics Corp., Cocoa Beach, FL USA

Physical Examination Nomenclature and Standardization

Ferguson, Emmett B., Jr., Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 105-108; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The purpose of this presentation is to introduce a draft document for consideration and review. The NASA Occupational Health Program proposes usage of the following categories and definitions of physical examinations. These include: (1) Pre-Placement; (2) Surveillance; (3) Job Certification; (4) Health Maintenance; and (5) Special Purpose. Also included in the report are tables of NASA's Physical Examination Matrices.

Derived from text

Physical Examinations; Nomenclatures; Standardization

19990040986 NASA Kennedy Space Center, Cocoa Beach, FL USA

Employee Assistance Program Issues

Gettleman, Alan G., NASA Kennedy Space Center, USA; McGuire, William, Edgerton, Germeshausen and Grier, Inc., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 109; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche; Abstract Only; Abstract Only

Employee Assistance Program (EAP) officers, as well as personnel in other disciplines from eight NASA Centers, attended this breakout session. Ms. Brenda Blair, MA, CEAP, a guest speaker at the conference, also attended as a consultant. Representatives from the NASA Centers introduced themselves and spoke briefly about their programs. In a discussion related to the conference theme on benchmarking, quality control issues within the EAP community and adequate documentation of cases were addressed. Disposition and provision for quality assurance checks for EAP providers in single person offices were also discussed. Ms. Blair presented methods for consulting with other NASA personnel in single person EAP offices as a quality control measure. EAP intervention in critical incidents was discussed. The question of whether EAP assistance is an asset or a potential liability in those situations was addressed. Suggestions were made of topics for future EAP video-teleconference topics. A program on EAP ethics was planned for a September video teleconference. Each person was asked to provide intake forms they use to Mr. Gettleman or Ms. Blair. Ms. Blair said she would review the forms to ensure that adequate notification is provided to the client for confidentiality. She would also review them to ensure they have adequate limits of confidentiality--a topic for future video teleconferencing. Mr. Gettleman described the NASA initiative to reduce stresses in the workplace, and the activities of an ad-hoc EAP group that will make recommendations to NASA senior management. Alternative training methods were discussed for reaching target audiences such as employees at risk, supervisors, and others. Pfc. David A. Pendleton, Victim Assistance Coordinator, U.S. Capitol Police. U.S. House of Representatives made a special presentation. Pfc. Pendleton was on duty during the tragic shooting of two Federal guards at the U.S. Capitol. He related the events immediately after the incident. He described the nature and structure of the EAP's and the separate nature of the House and Senate programs. This episode was a particularly difficult situation as large numbers of tourists were involved. William S. Barry, MD, the new Manager of the NASA Occupational Health Program Office was introduced to those attending the breakout session.

Derived from text

Employee Relations; Personnel Management; Health; Personnel

19990040987 NASA Dryden Flight Research Center, Edwards, CA USA

Benchmarking for Excellence and the Nursing Process

Sleboda, Claire, NASA Dryden Flight Research Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 110-111; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Nursing is a service profession. The services provided are essential to life and welfare. Therefore, setting the benchmark for high quality care is fundamental. Exploring the definition of a benchmark value will help to determine a best practice approach.

A benchmark is the descriptive statement of a desired level of performance against which quality can be judged. It must be sufficiently well understood by managers and personnel in order that it may serve as a standard against which to measure value.

Derived from text

Standardization; Medical Services; Quality Control

19990040988 Bionetics Corp., Cocoa Beach, FL USA

NASA Occupational Health Procedures and Guidelines on Health Services for International Travel or Assignment

Ferguson, Emmett B., Jr., Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 112-117; In English; See also 19990040967; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

This NASA Occupational Health Procedures and Guidelines prescribes the responsibilities and procedures for safeguarding the health of NASA employees on international travel or assignment. The goal of the traveler health services is to prevent travel-related illness or mishap and promote effective management of health issues while on foreign travel. This document establishes the minimum traveler health program content. It is recognized that NASA Centers may have additional needs based on the specific number, composition, mission and destination of the traveling employees. This document should not limit NASA Centers from providing additional services in order to meet their unique requirements.

Derived from text

NASA Programs; Health; Medical Services; Travel; Procedures

19990040989 Bionetics Corp., Cocoa Beach, FL USA

RehabWorks at the Kennedy Space Center

Kirkland, Mary K., Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 118-121; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The topics of the Certified Athletic Trainer, the "Industrial Athlete", On-site athletic training, the training facility at KSC, and the success of RehabWorks at KSC is presented. Results and cost savings as a result of the facility are discussed.

Derived from text

Injuries; Personnel; Health; Physical Exercise

19990040990 Bionetics Corp., Cocoa Beach, FL USA

Health Risk Appraisal and Health Education Programs

Ferguson, Emmett B., Jr., Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 122-123; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

An integral part of all NASA Center Occupational Health Programs should be an effective Health Education Program (HEP). An effective HEP should focus resources on preventing premature or disabling health problems in those employees at greatest risk of developing preventable health problems. Resources can be used most effectively and efficiently if they can be identified and offered intervention as early as possible. The Health Risk Appraisal (HRA) is a standardized instrument used to stratify risks for cardiovascular, cerebrovascular and behavior-related illness in a population. The HRA should be acceptable to the subject and the user. It should be simple, easy to complete and inexpensive.

Derived from text

Health; Education; Risk

19990040991 NASA Kennedy Space Center, Cocoa Beach, FL USA

Kennedy Space Center Coronary Heart Disease Risk Screening Program

Tipton, David A., NASA Kennedy Space Center, USA; Scarpa, Philip J., NASA Kennedy Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 124; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche; Abstract Only; Abstract Only

The number one cause of death in the U.S. is coronary heart disease (CHD). It is probably a major cause of death and disability in the lives of employees at Kennedy Space Center (KSC) as well. The KSC Biomedical Office used a multifactorial mathematical formula from the Framingham Heart Study to calculate CHD risk probabilities for individuals in a segment of the KSC population that required medical evaluation for job certification. Those assessed to be high-risk probabilities will be targeted for intervention. Every year, several thousand KSC employees require medical evaluations for job related certifications. Most medical information for these evaluations is gathered on-site at one of the KSC or Cape Canaveral Air Station (CCAS) medical clinics. The formula

used in the Framingham Heart Study allows calculation of a person's probability of acquiring CHD within 10 years. The formula contains the following variables: Age, Diabetes, Smoking, Left Ventricular Hypertrophy, Blood Pressure (Systolic or Diastolic), Cholesterol, and HDL cholesterol. The formula is also gender specific. It was used to calculate the 10-year probabilities of CHD in KSC employees who required medical evaluations for job certifications during a one-year time frame. This KSC population was profiled and CHD risk reduction interventions could be targeted to those at high risk. Population risk could also be periodically reevaluated to determine the effectiveness of intervention. A 10-year CHD risk probability can be calculated for an individual quite easily while gathering routine medical information. An employee population's CHD risk probability can be profiled graphically revealing high risk segments of the population which can be targeted for risk reduction intervention. The small audience of NASA/contractor physicians, nurses and exercise/fitness professionals at the breakout session received the lecture very well. Approximately one third indicated by a show of hands that they would be interested in implementing a similar program at their NASA Center. Questions were asked pertaining to standardization for age, the validity of using the idealized male values also for the female population, and indications of the screening test's sensitivity and specificity.

Derived from text

Medical Services; Risk; Personnel; Heart Diseases; Surveys; Clinical Medicine

19990040992 NASA Kennedy Space Center, Cocoa Beach, FL USA

Industrial Hygiene Issues

Brisbin, Steven G., NASA Kennedy Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 125-126; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche; Abstract Only; Abstract Only

This breakout session is a traditional conference instrument used by the NASA industrial hygiene personnel as a method to convene personnel across the Agency with common interests. This particular session focused on two key topics, training systems and automation of industrial hygiene data. During the FY 98 NASA Occupational Health Benchmarking study, the training system under development by the U.S. Environmental Protection Agency (EPA) was deemed to represent a "best business practice." The EPA has invested extensively in the development of computer based training covering a broad range of safety, health and environmental topics. Currently, five compact disks have been developed covering the topics listed: Safety, Health and Environmental Management Training for Field Inspection Activities; EPA Basic Radiation Training Safety Course; The OSHA 600 Collateral Duty Safety and Health Course; and Key program topics in environmental compliance, health and safety. Mr. Chris Johnson presented an overview of the EPA compact disk-based training system and answered questions on its deployment and use across the EPA. This training system has also recently been broadly distributed across other Federal Agencies. The EPA training system is considered "public domain" and, as such, is available to NASA at no cost in its current form. Copies of the five CD set of training programs were distributed to each NASA Center represented in the breakout session. Mr. Brisbin requested that each NASA Center review the training materials and determine whether there is interest in using the materials as it is or requesting that EPA tailor the training modules to suit NASA's training program needs. The Safety, Health and Medical Services organization at Ames Research Center has completed automation of several key program areas. Mr. Patrick Hogan, Safety Program Manager for Ames Research Center, presented a demonstration of the automated systems, which are described by the following: (1) Safety, Health and Environmental Training. This system includes an assessment of training needs for every NASA Center organization, course descriptions, schedules and automated course scheduling, and presentation of training program metrics; (2) Safety and Health Inspection Information. This system documents the findings from each facility inspection, tracks abatement status on those findings and presents metrics on each department for senior management review; (3) Safety Performance Evaluation Profile. The survey system used by NASA to evaluate employee and supervisory perceptions of safety programs is automated in this system; and (4) Documentation Tracking System. Electronic archive and retrieval of all correspondence and technical reports generated by the Safety, Health and Medical Services Office are provided by this system.

Derived from text

Health; Hygiene; Training Devices; Industrial Safety; Safety Management

19990040993 Johnson Controls, Inc., Bay Saint Louis, MO USA

SSC Environmental Health Project Program

Brever, Denise C., Johnson Controls, Inc., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 128-132; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The Facility Operations and Support Services Contract Environmental Health Office provides Environmental Health service to all groups at Stennis Space Center. Over the past four years, we have grown from a staff of five to a staff of nine. We have gained three Environmental Engineers and an Environmental Health Specialist. In addition, our cost plus contract was converted to a

performance-based contract in August 1997. These factors coupled with an overall desire to operate more efficiently prompted us to improve our record keeping systems. Our intent is to demonstrate the capabilities and benefits of a customized automated information tracking system for Environmental Health data. We will present a demonstration of our Environmental Health Project (EHP) tracking program through the use of printed screen images with captions describing our documentation process. We will also provide a list of the benefits that we have derived from using this system.

Derived from text

Project Management; Environmental Quality; Health; Information Systems

19990040994 NASA Marshall Space Flight Center, Huntsville, AL USA

MSFC Respiratory Protection Services

CoVan, James P., NASA Marshall Space Flight Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 133-135; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

An overview of the Marshall Space Flight Center Respiratory Protection program is provided in this poster display. Respiratory protection personnel, building, facilities, equipment, customers, maintenance and operational activities, and Dynatech fit testing details are described and illustrated.

Derived from text

Respiratory System; Medical Equipment; Respirators; Health

19990040996 University of South Florida, Saint Petersburg, FL USA

Predicting Return to Work in Patients with Coronary Heart Disease

Francois, Rony, University of South Florida, USA; David, Patricia, University of South Florida, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 139-143; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The prevalence of coronary heart disease in the USA is estimated at 13.49 million. It remains the leading cause of death, claiming 489,970 lives in 1993. The incidence of acute myocardial infarction is 1.5 million cases per year. Successful return to work by patients following a myocardial infarction (MI) could recuperate lost income, improve workplace productivity, and decrease the cost associated with cardiovascular disease. The ability to predict return to work would thus allow a more efficient use of increasingly limited resources. The purpose of this thesis was to design and test a new tool that physicians and others could use to more accurately assess the prospect of a person returning to work after a myocardial infarction. This new tool was based upon two previous scales (Jezer, 1959 and Schiller, 1971) and a literature review. To assess its validity, this scale was tested on 81 post-MI patients at the Bay Pines Veterans Hospital. They were surveyed by phone and/or had their charts reviewed. The patients were asked to answer 13 questions in the survey. The factors assessed included: age, current episodes of angina, working status at time of MI, educational level, perception of health, physical demands of their previous job, co-morbidity, disability/pension/social security benefits, sex, psychological status, cardiac rehabilitation participation, duration of angina, and current working status. For each factor, a numerical value of 0, 1, or 2, was assigned based on the patient's answer. These values changed for age (0, 1, 4) and sex (0, 2)). Each patient thus had a total score and was placed in one of four categories (I-IV). A 4x2 table was generated with two columns of working and non-working individuals. Four rows depicted categories I to IV. Each cell contained the number of patients falling into that Category and working status. A Chi square test was conducted to determine whether the various Categories indeed predicted the patients' current working status. At a p value of .05, the Chi square of 42.60 was statistically significant and the null hypothesis that the categories were unrelated to return to work was rejected. A t-test was then conducted to compare the mean scores of patients presently working, versus those not currently working. At a p value of .05, and a critical t of 2.0, the obtained t value of 7.36 was statistically significant and the null hypothesis was again rejected. The 95% confidence interval was calculated to be 4.29 to 7.49. In other words, the total score of the patients who were not working was 4 to 7.5 points higher than those currently working. A regression analysis revealed that the full model of the predictive rating scale had an overall accuracy of 95.06%. A backward elimination procedure identified current angina, baseline employment status, co-morbidity, and benefits as the key predictors of successful return to work. A model based only on these variables was also 95.06% accurate in its predictive accuracy. This rating scale appears to be a valid tool in the prediction of return to work in patients with coronary heart disease. Testing of this scale on a larger sample of female and male patients will help establish its validity and assess its reliability.

Author

Myocardial Infarction; Predictions; Productivity; Statistical Tests

19990040999 National Inst. for Occupational Safety and Health, Cincinnati, OH USA

Lead Poisoning in a Construction Company: Science Effecting Policy

Hales, Thomas R., National Inst. for Occupational Safety and Health, USA; McCammon, C., National Inst. for Occupational Safety and Health, USA; Daniels, W., National Inst. for Occupational Safety and Health, USA; Lee, S., National Inst. for Occupational Safety and Health, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 153-155; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

An estimated 1,000,000 construction workers are exposed to lead. Case studies and State occupational lead registries have documented the problem of lead poisoning in the construction industry. Despite this information, the construction industry has been exempt from the OSHA general industry lead standard, primarily due to economic and technical feasibility concerns. In 1991, a study of "lead burners" at a construction company in Utah was undertaken to determine: (1) Airborne lead exposures; (2) Whether adverse health effects were occurring among employees; and (3) Whether this company could implement provisions of the OSHA general industry lead standard.

Derived from text

Lead Poisoning; Industrial Safety; Environment Pollution; Construction Industry; Feasibility Analysis

19990041000 Kelsey Seybold, Huntsville, AL USA

The Nurse Practitioner in NASA Occupational and Preventive Medicine Programs

Kiessling, Janet, Kelsey Seybold, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 156-157; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The NASA Marshall Space Flight Center has implemented a cost-effective benchmark of excellence in the integration of a nurse practitioner into the Center's occupational and preventive medicine programs. This paper defines the position of nurse practitioner and describes the versatility, value added, and cost savings achievable by employing a nurse practitioner in NASA Center medical programs.

Derived from text

Health; Cost Effectiveness; NASA Programs; Medical Services

19990041003 NASA Lewis Research Center, Cleveland, OH USA

Chemical Hygiene Program

Mayor, Antoinette C., NASA Lewis Research Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 164; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche; Abstract Only; Abstract Only

The Chemical Management Team is responsible for ensuring compliance with the OSHA Laboratory Standard. The program at Lewis Research Center (LeRC) evolved over many years to include training, developing Standard Operating Procedures (SOPs) for each laboratory process, coordinating with other safety and health organizations and teams at the Center, and issuing an SOP binder. The Chemical Hygiene Policy was first established for the Center. The Chemical Hygiene Plan was established and reviewed by technical, laboratory and management for viability and applicability to the Center. A risk assessment was conducted for each laboratory. The laboratories were prioritized by order of risk, higher risk taking priority. A Chemical Management Team staff member interviewed the lead researcher for each laboratory process to gather the information needed to develop the SOP for the process. A binder containing the Chemical Hygiene Plan, the SOP, a map of the laboratory identifying the personal protective equipment and best egress, and glove guides, as well as other guides for safety and health. Each laboratory process has been captured in the form of an SOP. The chemicals used in the procedure have been identified and the information is used to reduce the number of chemicals in the lab. The Chemical Hygiene Plan binder is used as a training tool for new employees. LeRC is in compliance with the OSHA Standard. The program was designed to comply with the OSHA standard. In the process, we have been able to assess the usage of chemicals in the laboratories, as well as reduce or relocate the chemicals being stored in the laboratory. Our researchers are trained on the hazards of the materials they work with and have a better understanding of the hazards of the process and what is needed to prevent any incident. From the SOP process, we have been able to reduce our chemical inventory, determine and implement better hygiene procedures and equipment in the laboratories, and provide specific training to our employees. As a result of this program, we are adding labeling to the laboratories for emergency responders and initiating a certified chemical user program.

Derived from text

Hazardous Materials; Safety Management; Industrial Safety; Hygiene; Laboratories

19990041005 Bionetics Corp., Cocoa Beach, FL USA

The Effectiveness of an On-site Musculoskeletal Rehabilitation Program at the Kennedy Space Center

Nason, Erik T., Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 166-169; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

This study gathered data using the employees that were treated at the Kennedy Space Center (KSC) RehabWorks program between July 1, 1997 and June 30, 1998. The study showed the time lapses between: 1) the patient's date of injury and the first doctor's visit; 2) first doctor's visit and first RehabWorks appointment; and 3) first RehabWorks visit and the discharge date. Also delineated were the most common body part injured, the most common injury type and the total number of visits. All results were differentiated between worker's compensation patients and non-worker's compensation patients. Analysis of the data reflected the effectiveness of the onsite musculoskeletal rehabilitation program known as RehabWorks.

Author

Injuries; Musculoskeletal System; Effectiveness; Physical Exercise

19990041009 Edgerton, Germeshausen and Grier, Inc., Cocoa Beach, FL USA

Evaluation of Cardiovascular Screening Retest for High Risk Employees: Update

Roth, Carol A., Edgerton, Germeshausen and Grier, Inc., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 182-185; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The Kennedy Space Center (KSC) Health Education and Wellness Program, initiated in 1984, is open to all employees at KSC and Cape Canaveral Air Station (CCAS) at no charge. The goals of the program are to make employees more aware of their health and to screen for early detection of health problems. These are achieved through training classes, worksite lectures, health screenings, informational health packets, individual counseling, pamphlets and videotapes. Prevention is the focus of the program. It is based on four principles: (1) Educate employees about their bodies and healthy lifestyles; (2) Help employees identify present problems and risks factors for potential problems; (3) Assist employees in the reduction or elimination of risk factors; and (4) Support employees in maintaining their healthy lifestyle through monitoring and evaluation. Every month a different health program is featured on a wide variety of topics.

Derived from text

Cardiovascular System; Health; Education; Risk; NASA Programs; Physiological Tests

19990041013 NASA Kennedy Space Center, Cocoa Beach, FL USA

Kennedy Space Center Coronary Heart Disease Risk Screening Program

Tipton, David A., NASA Kennedy Space Center, USA; Scarpa, Philip J., NASA Kennedy Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 195-199; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Coronary heart disease (CHD) is the number one cause of death in the U.S. It is a likely cause of death and disability in the lives of employees at Kennedy Space Center (KSC) as well. The KSC Biomedical Office used a multifactorial formula developed by the Framingham Heart Study to calculate CHD risk probabilities for individuals in a segment of the KSC population who require medical evaluation for job certification. Those individuals assessed to have a high risk probability will be targeted for intervention.

Derived from text

Coronary Artery Disease; Risk; Personnel

19990041014 NASA Johnson Space Center, Houston, TX USA

Monitoring and Modeling Astronaut Occupational Radiation Exposures in Space: Recent Advances

Weyland, Mark, Lockheed Martin Corp., USA; Golightly, Michael, NASA Johnson Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 200; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche; Abstract Only; Abstract Only

In 1982 astronauts were declared to be radiation workers by OSHA, and as such were subject to the rules and regulations applied to that group. NASA was already aware that space radiation was a hazard to crewmembers and had been studying and monitoring astronaut doses since 1962 at the Johnson Space Center. It was quickly realized NASA would not be able to accomplish all of its goals if the astronauts were subject to the ground based radiation worker limits, and thus received a waiver from OSHA to establish independent limits. As part of the stipulation attached to setting new limits, OSHA included a requirement to perform preflight dose projections for each crew and inform them of the associated risks. Additional requirements included measuring

doses from various sources during the flight, making every effort to prevent a crewmember from exceeding the new limits, and keeping all exposures As Low As Reasonably Achievable (a.k.a. ALARA - a common health physics principle). The assembly of the International Space Station (ISS) and its initial manned operations will coincide with the 4-5 year period of high space weather activity at the next maximum in the solar cycle. For the first time in NASA's manned program, US astronauts will be in orbit continuously throughout a solar maximum period. During this period, crews are at risk of significantly increased radiation exposures due to solar particle events and trapped electron belt enhancements following geomagnetic storms. The problem of protecting crews is compounded by the difficulty of providing continuous real-time monitoring over a period of a decade in an era of tightly constrained budgets. In order to prepare for ISS radiological support needs, the NASA Space Radiation Analysis Group and the NOAA Space Environment Center have undertaken a multiyear effort to improve and automate ground-based space weather monitoring systems and real-time radiation analysis tools. These improvements include a coupled, automated space weather monitoring and alarm system--SPE exposure analysis system, an advanced space weather data distribution and display system, and a high-fidelity space weather simulation system. In addition, significant new real-time space weather data sets, which will enhance the forecasting and now-casting of near-Earth space environment conditions, are being made available through unique NASA-NOAA-USAF collaborations. These new data sets include coronal mass ejection monitoring by the Solar and Heliospheric Observatory (SOHO) and in-situ plasma and particle monitoring at the L1 libration point by the Solar Wind Monitor (SWIM) and Advanced Composition Explorer (ACE) spacecraft. Advanced real-time radiation monitoring data from charged particle telescopes and tissue equivalent proportional counters will also be available to assist crew and flight controllers in monitoring the external and intravehicular radiation environment.

Author

Aerospace Environments; Solar Activity Effects; Radiation Dosage; Radiation Hazards; Solar Radiation

19990041017 Florida State Univ., Center for Biomedical and Toxicological Research, Gainesville, FL USA

Toxicology & Health-Based Risk Assessment: Applications in the Workplace

Teaf, Christopher M., Florida State Univ., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 208-210; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Although the term may not be universally familiar, "risk assessment" is practiced on a regular basis in the workplace, both in consideration of chemical and physical hazards. Occupational guidelines or standards, as promulgated by organizations such as OSHA or ACGIH, represent a fundamental form of risk assessment which defines the levels of acceptable exposure under assumptions of regular worker exposure. More specific forms of risk assessment are based upon specific "exposure estimation" that seeks to carefully define the actual duration and magnitude of exposure to an individual under a particular set of conditions. Exposure details will determine the estimate of intake, or absorption, and hence the associated potential health risk. Simply put, the mere presence of a chemical in the environment does not necessarily indicate that harm will occur. That determination can only be made on the basis of the case-specific exposure characterization.

Derived from text

Toxicology; Risk; Toxic Hazards; Exposure

53

BEHAVIORAL SCIENCES

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

19990039548 Army Aeromedical Research Lab., Fort Rucker, AL USA

Evaluation of a Standardized Spatial Disorientation Flight Profile

Feb. 1999; 20p; In English

Report No.(s): AD-A361470; USAARL-99-04; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This study was designed to examine the feasibility of using visual-vestibular mismatch software to produce disorienting events in flight within a standardized simulator flight profile. Data were examined in order to ensure that collection of standard flight performance measures was not interrupted by the addition of disorienting events. Twenty-one UH-60 qualified Army aviators flew a 1-hour UH-60 simulator flight profile containing three visual-vestibular mismatch events (visual and vestibular divergence used, 4 degrees per sec with pitch, 6 degrees per sec with roll, and 8 degrees per sec with drift) . Following the flight, aviators filled out a simulator sickness questionnaire and rated each event in terms of difficulty of aircraft control recovery.

DTIC

Flight Characteristics; Aircraft Control; Disorientation; Motion Sickness

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

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

19990039553 Biodynamic Research Corp., San Antonio, TX USA

A PC-Based Head-Spine Model, HSM-PC

Jan. 1999; 29p; In English

Report No.(s): AD-A361392; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Head Spine Model (HSM) was originally developed by the USAF Aeromedical Research Laboratory during the late seventies. The HSM was created to aid the solution of problems related to spinal loads resulting from ejection seat acceleration. Unfortunately, the original researchers who developed and used the HSM left the Government and the original code has not been maintained or used in research for several years. Biodynamic Research Corporation contracted with the USAF to create a computer model of the dynamic response of the human head and spine that executes on a PC compatible computer under a Windows environment. The HSM-PC is aimed at creating simulations of the biomechanical responses of the head and spine to potentially traumatic impulsive acceleration and impact events.

DTIC

Computerized Simulation; Spinal Cord; Head (Anatomy)

19990039571 Department of Energy, Assistant Secretary for Management and Administration, Washington, DC USA

Reusability study with organic vapor air-purifying respirator cartridges

Wood, G. O., Department of Energy, USA; Kissane, R., Department of Energy, USA; Nov. 30, 1997; 8p; In English; Chemical and Biological Defense Research, 1997, USA; Sponsored by Army Edgewood Arsenal, USA

Report No.(s): DE98-002926; LA-UR-97-4458; No Copyright; Avail: Department of Energy Information Bridge, Microfiche

The question often arises about the reusability of organic vapor adsorption beds, such as air-purifying respirator cartridges, after periods of storage without use (airflow). The extremes of practice are: (1) use once and discard or (2) reuse multiple times assuming the protection is still afforded. The goal is to develop data and a model to provide guidance to decide when reuse is acceptable. They have studied the loss of protection of a commercial organic vapor cartridge after storage for varying periods of time. Three vapors (ethyl acetate, methylene chloride, and hexane) were individually loaded onto test cartridges using a breathing pump. Extents of loading, times of loading, and vapor concentrations were varied. After selected periods of storage the cartridges were again challenged with the same vapor concentration. The increases in concentration of a vapor in the effluent air (simulated breaths) from a cartridge immediately upon reuse depended on the storage period, the extent of loading during initial use, the volatility of the vapor, and the water vapor adsorbed, but not much on the vapor concentration.

NTIS

Respirators; Service Life; Water Vapor; Organic Materials; Purification; Cartridges; Adsorption

19990040183 Biodynamic Research Corp., San Antonio, TX USA

A Personal Computer-Based Head-Spine Model *Final Report, May 1996 - Sep. 1998*

Pancratz, David J.; Rogers, Linda J.; Bomar, John B., Jr; Sep. 1998; 139p; In English

Report No.(s): AD-A361188; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Biodynamic Research Corporation (BRC) of San Antonio, TX, completed an SBIR Phase II project to port the Air Force's Head-Spine Model (HSM) to a personal computer environment, improve certain features of the software, and add a user-friendly interface. The impetus for this project was the Air Force's desire to have a software tool capable of modeling the internal forces and motions of the human head and spine during impulsive acceleration events, particularly aircraft ejections. Although models exist to predict the gross motion of a human under acceleration loading, such as the Air Force Articulated Total Body (ATB) model, Dynamman, and MADYMO, the Head-Spine Model is the only tool able to provide estimates of internal forces. For this reason, the HSM could be valuable to the Air Force and other scientists for simulating acceleration environments.

DTIC

Human-Computer Interface; Head (Anatomy); Biodynamics; Computer Techniques; Spinal Cord

19990040218 Army Research Lab., Human Research and Engineering Directorate, Aberdeen Proving Ground, MD USA
Aviator Behavior and Performance as Affected by Aircrew Life Support and Protective Equipment
Waugh, John D.; Fatkin, Linda T.; Patton, Debra J.; Mullins, Linda L.; Burton, Pamela A.; Mar. 1999; 110p; In English; Original contains color plates

Contract(s)/Grant(s): Proj-1L161110274A

Report No.(s): AD-A361321; ARL-MR-440; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

A methodology for quantifying Army rotary wing aviator performance as influenced by aircrew life support, survival, and nuclear-biological-chemical clothing and equipment ensembles was examined in a set of experimental trials conducted in an AH-64 (Apache) combat mission simulator. The methodology was based on an aircrew evaluation procedure originally developed for use in the crew coordination training of all Army aviators. It uses a set of 13 basic qualities, each with behavioral anchors and a 7-point rating scale, and it is administered by specifically trained senior aviator evaluators. Ten crews, two aviators in each, while fully encumbered, performed three combat missions for record, representative of typical operational tasks, with one "variation" trial conducted without the over-water components of the ensemble. Measures of effectiveness and flight data, as well as stress assessment and equipment "complaints" citations, were recorded. The results indicated that the behavior-anchored scores were not sensitive enough to statistically discriminate among the independent variables of repeated measures and the variation trials even though graphically, differences were readily apparent. Attempts to apply transformations to the data, based on the aviator subjects' relative flying experience and their apparent accommodation to the trials were also statistically unsuccessful. The additional measures collected did not yield statistically significant discriminations nor did they correlate well with the evaluation score. A number of options for improving the technique are offered.

DTIC

Protective Clothing; Aircraft Pilots

19990040400 Armstrong Lab., Aerospace Medicine Directorate, Brooks AFB, TX USA
Testing and Evaluation of the Modified Gentex Mask Assembly in the Hyperbaric Environment *Final Report, Feb. 1996 - Apr. 1997*

Massa, Thomas V.; Apr. 1998; 20p; In English

Report No.(s): AD-A361226; AL-AO-BR-TR-1998-0038; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Since the late 1970's Air Force hyperbaric facilities have been utilizing the MBU 5/P aviator's mask with a unique hyperbaric adapter assembly as a way to safely exhaust exhaled breathing gas from inside a high pressure chamber to ground level ambient pressure. Although the MBU 5/P mask, developed in the 1950's, is still available through depot, the modified adapter assembly is not. In order to purchase additional units, the adapter assembly must be re-milled at considerable expense to the government. Recently developed mask technology has evolved new systems which may provide increased comfort and reduced maintenance at less cost to the government. The Modified Gentex Mask Assembly (MGMA) was evaluated by hyperbaric technologists at 3.0, 2.4 and 2.0 ATA using a pressure demand regulator, pressure transducers and a mass spectrometer to determine if the MGMA could physiologically maintain levels of inspired oxygen while also exhausting expired carbon dioxide and other exhaled gases to ambient pressure. Equipment testing has identified the MGMA as a suitable substitute for implementation at Air Force and possibly civilian hyperbaric facilities. Inspiratory and expiratory gas analysis indicate the MGMA and current A-14 regulator constitute a highly efficient oxygen delivery system for hyperbaric use. MGMA met or exceeded industry standards established by Sheffield, Stork and Morgan. Currently, the MGMA is being modified for improvements by the Gentex Corporation.

DTIC

Oxygen Masks; Oxygen Supply Equipment; Aircraft Pilots; Breathing Apparatus; Gas Mixtures

19990040660 NASA Marshall Space Flight Center, Huntsville, AL USA

Human Factors Engineering at Marshall Space Flight Center

Dunn, M. C., NASA Marshall Space Flight Center, USA; Hutchinson, Sonya L., NASA Marshall Space Flight Center, USA; 1999; 8p; In English; 25th, 24-28 Mar. 1999, Kansas City, MO, USA; Sponsored by California State Univ., USA; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The mission of NASA Marshall Space Flight Center (MSFC) is to develop, implement, and maintain systems for space transportation and microgravity research. Factors impacting the MSFC position as a leader in advancing science and technology include: (1) heightened emphasis on safety; (2) increased interest in effective resource utilization; and (3) growing importance of employing systems and procedures that pragmatically support mission science. In light of these factors, MSFC is integrating

human factors engineering (HFE) into the systems engineering process. This paper describes the HFE program, applications of HFE in MSFC projects, and the future of HFE at MSFC.

Author

Human Factors Engineering; Product Development; Research and Development; Microgravity; Safety

19990040859 NASA Marshall Space Flight Center, Huntsville, AL USA

Using Virtual Simulations in the Design of 21st Century Space Science Environments

Hutchinson, Sonya L., NASA Marshall Space Flight Center, USA; Alves, Jeffery R., Sigmatech, Inc., USA; 1996; 8p; In English; Technical Professional Conference, 24-28 Mar. 1999, Kansas City, MO, USA; Sponsored by California State Univ., USA; Original contains color illustrations; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Space Technology has been rapidly increasing in the past decade. This can be attributed to the future construction of the International Space Station (ISS). New innovations must constantly be engineered to make ISS the safest, quality, research facility in space. Since space science must often be gathered by crew members, more attention must be geared to the human's safety and comfort. Virtual simulations are now being used to design environments that crew members can live in for long periods of time without harmful effects to their bodies. This paper gives a few examples of the ergonomic design problems that arise on manned space flights, and design solutions that follow NASA's strategic commitment to customer satisfaction. The conclusions show that virtual simulations are a great asset to 21st century design.

Author

Simulation; Safety; International Space Station; Comfort; Aerospace Engineering

19990040910 Defence Science and Technology Organisation, Combatant Protection and Nutrition Branch, Melbourne, Australia
A Methodology for Measuring the Physiological Strain of Enhanced Soldiers: The 1998 Soldier Combat System Enhancement Study

Amos, Denys, Defence Science and Technology Organisation, Australia; Cotter, James D., Defence Science and Technology Organisation, Australia; Lau, Wai-Man, Defence Science and Technology Organisation, Australia; Forbes, Christopher H., Defence Science and Technology Organisation, Australia; November 1998; In English; Original contains color illustrations
Report No.(s): DSTO-TR-0747; DODA-AR-010-678; Copyright; Avail: Issuing Activity (DSTO Aeronautical and Maritime Research Lab., PO Box 4331, Melbourne, Victoria 3001, Australia), Hardcopy, Microfiche

The prime objective of the 1998 Soldier Combat System Enhancement Study was to assess, develop and verify methods to evaluate the physiological performance of dismounted soldiers with basic or enhanced capabilities conducting routine operations in the tropics. Core temperature, mean skin temperature and heart rate are appropriate measures for evaluating the physiological burden of soldier combat system enhancements. Current techniques for measuring mean skin temperature and heart rates are adequate. The measurement of core temperature using rectal thermistors has significant limitations, especially during vigorous activities. Studies of the hydration status of soldiers can be conducted using relatively straightforward methods to determine water intake, weight loss, urine production, and total sweat rate by weight differences. For field studies of hydration, there may be no need to analyse urine for sodium; specific gravity is more easily measured and appears to provide adequate information on hydration status. The robustness of the Metamax used for VO₂ measurements was demonstrated and provided real time measurements of oxygen consumption, and of metabolic stress associated with activities.

Author

Body Temperature; Combat; Heart Rate; Physiology; Skin Temperature (Biology); Temperature Measurement; Time Measurement; Procedures

19990040938 Institute for Human Factors TNO, Soesterberg, Netherlands

Asymmetrical Tracking Accuracy in Three Translational Degrees of Freedom Final Report Asymmetrische Tracking Prestatie bij drie Translatoire Vrijheidsgraden

vanErp, J. B. F., Institute for Human Factors TNO, Netherlands; Oving, A. B., Institute for Human Factors TNO, Netherlands; Jan. 23, 1998; 35p; In English

Contract(s)/Grant(s): B97-031; Proj. 788.1

Report No.(s): TD98-0009; TM-98-8002; Copyright; Avail: Issuing Activity (TNO Human Factors Research Inst., Kampweg 5, 3769 De Soesterberg, The Netherlands), Hardcopy, Microfiche

Recent developments in the domain of 3D visualization ask for control devices with three or more degrees of freedom. Applications can be encountered within CAD/CAM applications, virtual environments, computer games, but also within the remote control of devices and platforms. To integrate two or more degrees of freedom (for example, three translational degrees of freedom) has some potential advantages. The question, however, is how accurate operators can control the different degrees

of freedom with such an integrated device. Former experiments report tracking errors in the depth dimension which are up to 4 times larger than on the other two dimensions. The cause for this may be found in two systems. First, it might be found in the visual system, in which the missing depth cues result in performance degradation. Second, it might be found in the motor system because not all axes may be controlled with the same accuracy. Usually, not much attention is given to the motor component. Sometimes, even a description of the specific coupling between motor and visual dimension lacks. Earlier in the present research project, it was claimed that two compatible control-display mappings exist for the translational degrees of freedom in 3D: spatial-motion mapping, and reference-frame mapping. In the former, motions of device and object are always parallel in 3D, in the latter motions of device and object are always equal in respect to their respective reference planes, which are differently orientated in common situations (for example, a table with a mouse and a monitor). Both mappings lead to the coupling of a different motor component to the depth dimension of the display: up-down and forward- backward, respectively. Both mappings are tested with a pursuit and compensatory task, which enables the separation of the visual and the motor component. Besides this, the effects of additional visual depth cues is investigated. The results show that in the present experiment the visual component causes by far the largest part of the effects. The tracking error in the visual depth dimension is about four times larger than those on the other dimensions. The effect of the motor component is less, it causes a 10 percent enlarged tracking error in the up-down axis, but it is consistent over different couplings with the visual dimension. Providing additional visual depth cues in the display leads to a decrease of the tracking error on the visual depth dimension. However, no stereoscopic views were provided, while this may be the strongest depth cue. There are no differences between the pursuit and compensatory tracking task, which may be due to the more experience when executing the latter task.

Author

Asymmetry; Accuracy; Degrees of Freedom; Three Dimensional Models; Visual Stimuli; Pursuit Tracking

19990040981 NASA Johnson Space Center, Houston, TX USA

Medical Aspects of Space Walking

Musgrave, Story, NASA Johnson Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 92-93; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Dr. Musgrave has acquired extensive experience during a distinguished and impressive career that includes flying as an astronaut on six Shuttle missions, participating in many hours of extravehicular activity, and contributing his myriad talents toward great public service, especially in the area of education. He has a unique perspective as a physician, scientist, engineer, pilot, and scholar. His interests and breadth of knowledge, which astound even the seasoned space enthusiast, have provided the space program an extraordinary scientific and technical expertise. Dr. Musgrave presented a personal perspective on space flight with particular emphasis on extravehicular activity (EVA or space walking), which was copiously illustrated with photographs from many space missions. His theme was two fold: the exacting and detailed preparations required for successful execution of a mission plan and a cosmic view of mankind's place in the greater scheme of things.

Derived from text

Astronauts; Extravehicular Activity; Medical Phenomena; Space Maintenance

19990040997 Edgerton, Germeshausen and Grier, Inc., Cocoa Beach, FL USA

A Follow-up Study of Ergonomic Evaluations Performed at KSC/CCAS in 1997

Geyer, Bart, Edgerton, Germeshausen and Grier, Inc., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 144-147; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

As awareness concerning ergonomics has increased, injuries resulting from ergonomic hazards are becoming more recognized in the Kennedy Space Center (KSC) and Cape Canaveral Air Station (CCAS) workplace. This increased awareness has led to greater numbers of KSC/CCAS personnel reporting to KSC medical facilities with symptoms related to ergonomic problems in their workplace. In response to these medical visits, the Base Operations Contractor (BOC, EG&G Florida Inc.) Industrial Hygiene (IH) Office initiates an ergonomic evaluation of the patient's workplace. In the 1997 calendar year, the EG&G IH Office completed 72 ergonomic workplace evaluations. Following these evaluations, recommendations were provided to the employee on how to minimize or eliminate ergonomic hazards at their workplace. For this study, a follow-up evaluation was performed on the 72 personnel evaluated in 1997. The follow-up entailed: (1) determining if improvements had been implemented to alleviate or correct the identified ergonomics hazards(s); (2) determining if those improvements were effective; and (3) identifying various trends in the implementation of the recommendations provided at the completion of the evaluations. The objective of this study

was to aid the BOC IH Office in developing a focused ergonomic program management plan and associated program implementation strategies, which would reduce the number of ergonomic injuries and minimize ergonomic hazards at KSC and CCAS.

Derived from text

Human Factors Engineering; Industrial Safety; Workstations

19990041002 Bionetics Corp., Cocoa Beach, FL USA

A Comparison of the Effects of Various Exercise Programs on the Reduction of Body Fat

Mathews, Cristy L., Bionetics Corp., USA; Symons, Chris A., Bionetics Corp., USA; Arnold, Arthur A., Bionetics Corp., USA; Woodard, Daniel, Bionetics Corp., USA; Merz, Marion P., Bionetics Corp., USA; Deppensmith, Barbara, Bionetics Corp., USA; Ghiotto, Deborah, Bionetics Corp., USA; DiBiase, Cathy, Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 159-163; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The interrelationships that exist between exercise and reduction of body fat have been well established. A number of studies have reported that people who exercise have a reduction in body fat. One of the studies by Ballor & Keesey was a meta-analysis of 53 studies that looked at exercise induced changes in body composition. This study looked at aerobic exercise (walk/run & bike) and weight training and found that all forms of exercise reduced body fat. However, much of the research does not compare different types of exercise to the greatest loss of body fat. The following study was conducted to determine the effect of specific fitness programs on body fat. The changes in body fat due to the type of activity allowed inferences to be made regarding the type of exercise program that produces the greater body fat reduction.

Derived from text

Physical Exercise; Physical Examinations; Body Weight; Fats

19990041006 NASA Kennedy Space Center, Cocoa Beach, FL USA

Health Physics Innovations Developed During Cassini for Future Space Applications

Nickell, Rodney E., Edgerton, Germeshausen and Grier, Inc., USA; Rutherford, Theresa M., Edgerton, Germeshausen and Grier, Inc., USA; Marmaro, George M., NASA Kennedy Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 170-177; In English; See also 19990040967; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The long history of space flight includes missions that used Space Nuclear Auxiliary Power devices, starting with the Transit 4A Spacecraft (1961), continuing through the Apollo, Pioneer, Viking, Voyager, Galileo, Ulysses, Mars Pathfinder, and most recently, Cassini (1997). All Major Radiological Source (MRS) missions were processed at Kennedy Space Center/Cape Canaveral Air Station (KSC/CCAS) Launch Site in full compliance with program and regulatory requirements. The cumulative experience gained supporting these past missions has led to significant innovations which will be useful for benchmarking future MRS mission ground processing. Innovations developed during ground support for the Cassini mission include official declaration of sealed-source classifications, utilization of a mobile analytical laboratory, employment of a computerized dosimetry record management system, and cross-utilization of personnel from related disciplines.

Author

Cassini Mission; Health Physics; Radiation Dosage; Nuclear Auxiliary Power Units; Safety Management

19990041010 NASA Kennedy Space Center, Cocoa Beach, FL USA

The Need to Reevaluate Nonresponding Ergonomic Patients

Scarpa, Philip J., NASA Kennedy Space Center, USA; Field, Steven A., NASA Kennedy Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 186-187; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The Kennedy Space Center (KSC) Environmental Health (EH) contractor performs ergonomic evaluations under its Ergonomic Program. Any KSC employee may request one or the reviewing physician may request one for a patient during a visit to an onsite medical facility. As part of the ergonomic evaluation, recommendations are given to the patient to help reduce any ergonomic problems they experience. The recommendations, if implemented, are successful in the majority of KSC patients; however, a group of patients do not seem to improve. Those who don't improve may be identified by reevaluations, which are performed to implement maximum resolution of ergonomic problems.

Derived from text

Human Factors Engineering; Health; Injuries; Medical Services

Subject Term Index

A

ACCURACY, 18
ADENOSINE TRIPHOSPHATE, 2
ADSORPTION, 15
AEROSPACE ENGINEERING, 17
AEROSPACE ENVIRONMENTS, 14
AEROSPACE MEDICINE, 3
AIRCRAFT CONTROL, 14
AIRCRAFT PILOTS, 16
AIRLINE OPERATIONS, 6
AMINO ACIDS, 2
ANIMALS, 1
ASTRONAUTS, 18
ASYMMETRY, 18
ATMOSPHERIC COMPOSITION, 3

B

BALANCE, 3
BIBLIOGRAPHIES, 3
BIODYNAMICS, 15
BIOSYNTHESIS, 2
BODY TEMPERATURE, 17
BODY WEIGHT, 19
BONES, 2
BREATHING APPARATUS, 16
BREEDING (REPRODUCTION), 1, 2

C

CANCER, 3
CARDIOVASCULAR SYSTEM, 13
CARTRIDGES, 15
CASSINI MISSION, 19
CELLS (BIOLOGY), 2
CLINICAL MEDICINE, 10
COMBAT, 17
COMFORT, 17
COMPUTER TECHNIQUES, 15
COMPUTERIZED SIMULATION, 15
CONFERENCES, 4
CONSTRUCTION INDUSTRY, 12
CORONARY ARTERY DISEASE, 13
COST EFFECTIVENESS, 5, 12

D

DATA BASES, 4
DEGENERATION, 4

DEGREES OF FREEDOM, 18
DISEASES, 1, 6
DISORIENTATION, 14

E

EDUCATION, 9, 13
EFFECTIVENESS, 13
EMERGENCY LIFE SUSTAINING SYSTEMS, 6
EMPLOYEE RELATIONS, 8
ENERGY BUDGETS, 3
ENVIRONMENT POLLUTION, 12
ENVIRONMENTAL QUALITY, 11
EXPOSURE, 4, 14
EXTRAVEHICULAR ACTIVITY, 18

F

FATIGUE (BIOLOGY), 3
FATS, 19
FEASIBILITY ANALYSIS, 12
FISHES, 2
FLIGHT CHARACTERISTICS, 14
FREE ENERGY, 2

G

GAS MIXTURES, 16
GLUCOSE, 2
GRAVITATIONAL EFFECTS, 2

H

HAZARDOUS MATERIALS, 12
HEAD (ANATOMY), 15
HEALTH, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 19
HEALTH PHYSICS, 19
HEART DISEASES, 10
HEART RATE, 17
HUMAN FACTORS ENGINEERING, 17, 19
HUMAN TOLERANCES, 3
HUMAN-COMPUTER INTERFACE, 15
HYGIENE, 7, 10, 12

I

INDUSTRIAL MANAGEMENT, 6
INDUSTRIAL SAFETY, 7, 10, 12, 19
INFORMATION SYSTEMS, 11
INFORMATION THEORY, 1
INJURIES, 9, 13, 19
INTERNATIONAL SPACE STATION, 17

L

LABORATORIES, 1, 12
LEAD POISONING, 12
LIFE SCIENCES, 1

M

MANAGEMENT METHODS, 6
MEDICAL EQUIPMENT, 6, 11
MEDICAL PHENOMENA, 18
MEDICAL SCIENCE, 1
MEDICAL SERVICES, 5, 6, 7, 9, 10, 12, 19
MICROGRAVITY, 2, 17
MODELS, 7
MOTION SICKNESS, 14
MUSCULOSKELETAL SYSTEM, 13
MYOCARDIAL INFARCTION, 11

N

NASA PROGRAMS, 5, 7, 8, 9, 12, 13
NOMENCLATURES, 8
NUCLEAR AUXILIARY POWER UNITS, 19
NUTRITION, 3
NUTRITIONAL REQUIREMENTS, 3

O

ORGANIC MATERIALS, 15
ORGANIZATIONS, 5
OXIDATION-REDUCTION REACTIONS, 2
OXYGEN MASKS, 16
OXYGEN SUPPLY EQUIPMENT, 16
OZONE, 3
OZONE DEPLETION, 3

P

PERSONNEL, 8, 9, 10, 13
PERSONNEL MANAGEMENT, 4, 8
PHASE TRANSFORMATIONS, 2
PHYSICAL EXAMINATIONS, 8, 19
PHYSICAL EXERCISE, 3, 9, 13, 19
PHYSIOLOGICAL TESTS, 13
PHYSIOLOGY, 17
PILOTS (PERSONNEL), 4
PREDICTIONS, 11
PROCEDURES, 9, 17
PRODUCT DEVELOPMENT, 17
PRODUCTIVITY, 6, 8, 11
PROJECT MANAGEMENT, 11
PROTECTIVE CLOTHING, 16
PUBLIC HEALTH, 5, 6
PURIFICATION, 15
PURSUIT TRACKING, 18

Q

QUALITY CONTROL, 4, 5, 8, 9

R

RADIATION DOSAGE, 14, 19
RADIATION HAZARDS, 14
RADIOLOGY, 4
RESEARCH, 4
RESEARCH AND DEVELOPMENT, 17
RESPIRATORS, 11, 15
RESPIRATORY SYSTEM, 11
RISK, 6, 9, 10, 13, 14

S

SAFETY, 17
SAFETY MANAGEMENT, 4, 6, 7, 10,
12, 19
SERVICE LIFE, 15
SICKNESSES, 6
SIMULATION, 17
SKIN TEMPERATURE (BIOLOGY), 17
SOLAR ACTIVITY EFFECTS, 14
SOLAR RADIATION, 14
SPACE ENVIRONMENT SIMULA-
TION, 2
SPACE MAINTENANCE, 18
SPACEBORNE EXPERIMENTS, 2
SPECIFICATIONS, 5
SPINAL CORD, 15
SPINE, 4
STANDARDIZATION, 4, 5, 6, 8, 9
STANDARDS, 5

STATISTICAL TESTS, 11
SUGARS, 2
SUPPORT SYSTEMS, 7
SURVEYS, 10
SYNTHESIS (CHEMISTRY), 2

T

TECHNOLOGY ASSESSMENT, 6
TEMPERATURE MEASUREMENT, 17
THREE DIMENSIONAL MODELS, 18
TIME MEASUREMENT, 17
TISSUES (BIOLOGY), 2
TOTAL QUALITY MANAGEMENT, 6
TOXIC HAZARDS, 14
TOXICOLOGY, 14
TRAINING DEVICES, 10
TRAVEL, 6, 9

U

ULTRAVIOLET RADIATION, 3

V

VISUAL STIMULI, 18

W

WATER VAPOR, 15
WORKSTATIONS, 19

X

X RAYS, 4

Personal Author Index

A

Alves, Jeffery R., 17
Amos, Denys, 17
Arnold, Arthur A., 19
Ayyaswamy, P. S., 1

B

Bell, Michael A., 5
Blair, Brenda R., 4
Bomar, John B., Jr, 15
Brever, Denise C., 10
Brisbin, Steven G., 10
Brisbin, Steven G., 7
Burton, Pamela A., 16

C

Cotter, James D., 17
CoVan, James P., 11

D

Daniels, W., 12
David, Patricia, 11
Delany, James P., 3
Dell, Ralph, 1
Deppensmith, Barbara, 19
DiBiase, Cathy, 19
Ducheyne, P., 1
Dunn, M. C., 16

F

Fatkin, Linda T., 16
Ferguson, Emmett B., Jr., 5, 7, 8, 9
Field, Steven A., 19
Forbes, Christopher H., 17
Francois, Rony, 11

G

Gettleman, Alan G., 8
Geyer, Bart, 18
Ghiotto, Deborah, 19

Goetzel, Ron Z., 6
Golightly, Michael, 13

H

Hales, Thomas R., 12
Hendriksen, I. J. M., 3
Hoffler, G. Wyckliffe, 4
Holewijn, M., 3
Hutchinson, Sonya L., 16, 17

I

Isaac, Fikry W., 6, 7

J

Jones, Jerry A., 6

K

Kiessling, Janet, 12
Kirkland, Mary K., 9
Kissane, R., 15

L

Lau, Wai-Man, 17
Lee, S., 12
Lemons, Susan L., 6

M

Marmaro, George M., 19
Martin, L. R., 3
Massa, Thomas V., 16
Mathews, Cristy L., 19
Mayor, Antoinette C., 12
McCammon, C., 12
McGuire, William, 8
McKenas, David K., 5
Merz, Marion P., 19
Mullins, Linda L., 16
Musgrave, Story, 18

N

Nason, Erik T., 13
Nickell, Rodney E., 19

O

O, 4
Oving, A. B., 17

P

Pancratz, David J., 15
Patton, Debra J., 16

R

Radin, S., 1
Rogers, Linda J., 15
Roth, Carol A., 13
Rutherford, Theresa M., 19

S

Scarpa, Philip J., 9, 13, 19
Sleboda, Claire, 8
Symons, Chris A., 19

T

Teaf, Christopher M., 14
Tipton, David A., 9, 13

V

vanErp, J. B. F., 17

W

Waugh, John D., 16
Weber, Arthur L., 2
Weston, Robert L., 6
Weyland, Mark, 13
Wolgemuth, Debra J., 2
Wood, G. O., 15
Woodard, Daniel, 19

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE June 14, 1999	3. REPORT TYPE AND DATES COVERED Special Publication	
4. TITLE AND SUBTITLE Aerospace Medicine and Biology A Continuing Bibliography (Supplement 493)			5. FUNDING NUMBERS	
6. AUTHOR(S)				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) NASA Scientific and Technical Information Program Office			8. PERFORMING ORGANIZATION REPORT NUMBER NASA/SP-1998-7011/Suppl493	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) National Aeronautics and Space Administration Langley Research Center Hampton, VA 23681			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT Subject Category: Availability: NASA CASI (301) 621-0390			12b. DISTRIBUTION CODE Unclassified--Unlimited Subject Category - 52	
13. ABSTRACT (Maximum 200 words) This report lists reports, articles and other documents recently announced in the NASA STI Database.				
14. SUBJECT TERMS Aerospace Medicine Bibliographies Biological Effects			15. NUMBER OF PAGES 35	
			16. PRICE CODE A03/HC	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT	