MAN-SYSTEMS INTEGRATION STANDARDS

NASA-STD-3000
VOLUME II

REVISION B
JULY 1995

NASA
National Aeronautics and
Space Administration

FOREWORD

This is Volume II of the Man-Systems Integration Standards (MSIS) prepared for the National Aeronautics and Space Administration (NASA) The MSIS consists of a family of documents with a video tape as an adjunct . Each document volume has a specific purpose, as stated below, and each has been assembled from the data contained in Volume I.

The title and scope of each current volume are given below:

Volume I - Man Systems Integration Standards

This document contains man-systems integration design considerations, design requirements, and example design solutions for development of manned space systems. This is a NASA-level standards document applicable to all manned space programs including NASA, military, and commercial programs.

Volume II - Man-Systems Integration Standards - Appendices

This volume contains the appendices which pertain to the MSIS, and is organized as follows:

Appendix A	Bibliography
Appendix B	Paragraph References
Appendix C	Glossary
Appendix D	Abbreviations and Acronyms
Appendix E	Units of Measure and Conversion Factors
Appendix F	Not Applicable
Appendix G	Acceleration Regime Applicability
Appendix H	Video Tape User's Guide
Appendix I	Not Applicable
Appendix J	Keywords
Appendix K	MSIS Recipients Listing

Volume III - Man-Systems Integration Standards - Design Handbook

This volume is a condensed field guide of pertinent quantitative data extracted from Volume I.

Chapters of the MSIS family of documents are as follows:

1. Introduction
2. General Requirements
3. Anthropometry and Biomechanics
4. Human Performance Capabilities
5. Natural and Induced Environments
6. Crew Safety

7. Health Management
8. Architecture
9. Work stations
10. Activity Centers
11. Hardware and Equipment
12. Maintainability
13. Facility Management
14. Extravehicular Activity

Volume IV - Space Station Man-Systems Integration Standards

This volume underwent many changes as we phased into the International Space Station Alpha (ISSA) program. A smaller volume was developed from Volume IV and published as an ISSA document entitled **International Space Station Flight Crew Integration Standard (NASA-STD-3000/T)** with ISSA document number **SSP-50005**. This document will be maintained by the ISSA publishing operations in Interleaf format. The contents of the SSP-50005 document will be monitored and controlled by the ISSA Flight Crew Support and Integration Team.

Volume V - STS Man-Tended Payload Man-Systems Integration Standards

Deleted.

Volume VI - Assured Crew Return Vehicle Man-Systems Integration Standards

This document served as the Assured Crew Return Vehicle (ACRV) project man-systems integration design requirements. The data in this document is a subset of the data found in Volume I and defines the requirements which were pertinent to the ACRV as defined in the ACRV documentation. Additional data and guidelines were provided to assist in the design. The data contained in this volume which is pertinent to the International Space Station Alpha (ISSA) has been incorporated into ISSA document SSP-50005.

The original MSIS document was assembled for NASA by the Boeing Aerospace Company (BAC), Kent, Washington, in conjunction with subcontractors Lockheed Missiles and Space Company (LMSC), Sunnyvale, California; Essex Corporation, Huntsville, Alabama; and CAMUS, Inc., Springdale, Arkansas. The contractor team leaders and section authors for this effort are listed in Figure F-1. Subsequent iterations to the MSIS will be developed for NASA by the custodial organization at JSC.

A Government\Industry Advisory Group (GIAG), composed of a panel of "Experts" and "Users", met four times to review the technical content as it was being developed.

The six GIAG Experts were as follows:

Julien M Christensen (PhD) - Chief Scientist, Human Factors, Universal Energy Systems, Inc., Dayton, Ohio.

James W. McBarron - Chief, Shuttle Support Branch, Crew Systems Division, NASA-Johnson Space Center, Houston, Texas.

John T. McConville (PhD) - President, Anthropology Research Project, Inc, Yellow Springs, Ohio.

William R. Pogue - Ex-Skylab astronaut, CAMUS, Inc., Springdale, Arkansas.

Robert C. Williges (PhD) - Prof. of Industrial Engineering and Operations Research/Prof. of Psychology, Virginia Polytechnic Institute, Blacksburg, Virginia.

Wesley E. Woodson - President and Research Director, Man-Factors, Inc., El Cajon, California.

The GIAG User group was composed of invited representatives form all of the prime aerospace contractors, support contractors, NASA centers and Headquarters, other Government agencies, and some non-aerospace contractors. The GIAG Users who participated in at least one of the GIAG meetings are listed in Figure F-2.

The technical content of these documents has been thoroughly reviewed by the GIAG participants. The data can be used with confidence that all known relevant human engineering requirements applicable to the space environment have been documented and are as technically valid as it is possible to determine. Iterations to the MSIS will be developed as physiological and technical knowledge and requirements dictate.

Comments from any user are welcome and will be considered for updating the database and the documentation. A Recommendations and Comments form appears at the end of this volume to facilitate user inputs.

Figure F-1

Contractor Team and Topic Assignments		
BOEING AEROSPACE COMPANY		
Charles W. Geer	Program Manager	
Keith H. Miller	Technical Leader/Editor-in-Chief	
	1.0	Introduction
	2.0	General Requirements
	6.0	Crew Safety
(Robert Horne)	11.0	Hardware and Equipment
	13.0	Facility Management
	Vol. 2	Appendix
Eric Liening/Han Peters	5.1	Atmosphere
	5.8	Thermal Environment
Patrick Cornelius/Keith Miller	5.2	Microgravity
	5.3	Acceleration
	5.9	Combined Environmental E
Charles Wright	5.4	Acoustics
	5.5	Vibrations
Eugene Normand	5.7	Radiation
Ethel E. Erickson		SDMS Data Entry and Proofreading
LOCKHEED MISSILES & SPACE COMPANY		
Dr. David Regal	Subcontract Technical Leader	
	4.0	Human Performance Capabilities
	9.0	Workstations
Barry Tillman	3.0	Anthropometry and Biomechanics
	7.0	Health Management
	8.0	Architecture
	10.0	Activity Centers
Stuart Parsons/David Regal	12.0	Design for Maintainability
ESSEX CORPORATION		
Nicholas Shields	Subcontract Technical Leader	
	14.0	Extravehicular Activity (EVA)

Figure F-2

Government/Industry Advisory Group
User Group
(Attended One or More of the GIAG Meetings)

Cletis Booher	NASA - Johnson Space Center
Gerald Carr	CAMUS, Inc
Gerald Chaikin	Chief, HEL Detachment, MICOM
Bryant Cramer	NASA Headquarters
T. Lee Doolittle	University of Washington
Capt. Vance Gilstrap	USAF Space Division
Rob Gray	ILC Dover
Richard F. Haines	NASA - Ames Research Center
Lt. Cdr. Steve Harris	Naval Air Test Center
Marion Hix	NASA - Goddard Space Flight Center
Capt. David Hoerr	NASA - Johnson Space Center
Marshall W. Horton	NASA - Johnson Space Center
Gary A. Johnson	McDonnell Douglas Astronautics Company
Neil A. Johnson	United Airlines Aircrew Training Center, Inc.
Rod Jones	NASA - Johnson Space Center
Joseph P. Joyce	NASA - Lewis Research Center
Mary M. Jurmain	Technology Inc.
Robert Kain	NASA - Johnson Space Center
Robert Kerle	Grumman Aerospace Corp.
Dave Kissinger	NASA - Johnson Space Center
Joseph J. Kosmo	NASA - Johnson Space Center
Ronald V. Kruk	CAE Electronics Ltd.
Lynn L. Lally	Lockheed Emsco
Pieter Lammers	European Space Agency
William A. Langdoc	NASA - Johnson Space Center
John Lauffer	Rocketdyne Corp.
Joel H. Leet	NASA - Kennedy Space Center
Charles M. Lewis	NASA - Marshall Space Flight Center
James L. Lewis	NASA - Johnson Space Flight Center
James S. Logan M.D.	NASA - Johnson Space Center

Figure F-2 (Continued)

Government/Industry Advisory Group

User Group
(Attended One or More of the GIAG Review Meetings)

Mike Lounge	NASA - Johnson Space Center
Don B. Morris	Rockwell International
Debra Muratore	Mitre Corporation
Melinda H. Naderi	NASA - Marshall Space Flight Center
D. C. Nagel	NASA - Ames Research Center
George Nelson	NASA - Johnson Space Center
Bob Overmyer	Martin Marietta Corp.
Stuart Parsons	Lockheed Missiles and Space Company
Virgil A. Paull	Martin Marietta Corp.
Maj. John C. Pellosie	USAF AAMRL/HEG
Martin Pollack	Grumman Aerospace Corp.
Larry Price	McDonnell Douglas Astronautics
A. M. Lex Ray	Martin Marietta
John A. Roebuck	Rockwell International
Dane Russo	Northrup Services
Patricia Santy, M.D.	NASA - Johnson Space Center
Richard Sauer	NASA - Johnson Space Center
R. W. Scarlata	General Electric
Gerald Shinkle	NASA - Johnson Space Center
Daniel H. Spoor, M.D.	Technology Inc.
Jack Stokes	NASA - Marshall Space Flight Center
Earl Switzer	Arinc Research Corp.
Allen B. Thompson	Martin Marietta - Denver
Robert Trevino	NASA - Johnson Space Center
Conway Underwood	Boeing Aerospace Company
Frank Welman	Arinc Research Corp.
Charles Wheelwright	NASA - Johnson Space Center
H. Eugene Winkler	NASA - Johnson Space Center
Harry L. Wolbers	McDonnell Douglas Astronautics Company
Maj. Lynn Woolard	NASA - Kennedy Space Center
Barbara Woolford	NASA - Johnson Space Center

CONTENTS

APPENDIX A

BIBLIOGRAPHY

USER'S GUIDE

This bibliography includes all of the human engineering standards, data books, and technical documents that were reviewed to obtain the man-systems integration design considerations, requirements, and examples given in this document. The references that are cited as source documents for either the text or figures are noted by having an asterisk located after the reference number. Those references that are not so notated were given due consideration but found not to have data appropriate for these standards.

In the following listing, the reference citation is as follows:

Reference No.
Document No.
Used by Originator
Author (if cited)
Document Title
(Document Title Line 2, if required)
Prepared by
Published by
Publication Date

Note on Applicable Revisions - Whenever a reference document is cited in the REQUIREMENTS paragraphs, the specific document revision cited in this Appendix A is the only version to be used even though there may be later revisions than the one cited.

1 * MSFC-STD-512A, Stokes, J.W. ,Man/System Requirements for Weightless Environments Airesearch Mfg. Co., NASA-MSFC, 11/25/76

2 * MIL-STD-1472C, Notices 1 and 2 Human Engineering Design Criteria for Military Systems, Equipment and Facilities, DOD, C Revision 05/02/81, (Notice 3 3/17/87)

3 * JSC-07387B ,Langdoc, W.A. ,Crew Station Specifications, (Refer to references 193 thru 202 for specifications contained herein), NASA-JSC 5-6-3

4 * D180-19063-1, Farrell, R.J., Booth, J.M. ,Design Handbook for Imagery Interpretation Equipment Boeing Aerospace Co., 2-84

5 * MSFC-STD-267, A Human Engineering Design Criteria, NASA-MSFC, 09-23-66

6 * ED-2002-210 , Tobias, L. Apollo Applications Program Payload Integration Technical Study and Analysis Report, Bendix Corp., 11/30/67

7 * JSC-14581, Griffin, B.N. , The Influence of Zero-g and Acceleration on the Human Factors of Spacecraft Design , NASA-JSC, 8-78

8 * HEL STD 5-6-66 , Chaillet, R.F., Honiafeld, A.R. , Human Factors Engineering Design Standard for Wheeled Vehicles (Superseded by MIL-HDBK-759, Ref. 15), Tech Spec Office/Systems Res. Lab, ARMY-HEL, 9-66

9 * NASA CR-1205(I), Roth, E.M., Compendium of Human Responses to the Aerospace Environment:, Volume I , Lovelace Foundation for Med Ed & Resch., NASA, 11-68

10 * NASA CR-1205(II), Roth, E.M. , Compendium of Human Responses to the Aerospace Environment: Volume II , Lovelace Foundation for Med Ed & Research, NASA, 11-68

11 * NASA CR-1205(III) Roth, E.M. , Compendium of Human Responses to the Aerospace Environment: Volume III, Lovelace Foundation for Med Ed & Research, NASA, 11-68

12 White, R.M. , Anthropometric Survey of the Armed Forces of the Republic of Vietnam, U.S. Army Natick R&D Laboratories, Adv. Res. Proj. Agency, 10-64

13 MIL-STD-1333A , Aircrew Station Geometry for Military Aircraft Naval Air Systems Command, DOD, 06/30/76

14 DOD-HDBK-743, Anthropometry of U.S. Military Personnel, U.S. Army Natick R&D Laboratories, DOD, 10/03/80

15 * MIL-HDBK-759A (MI), Human Factors Engineering Design for Army Material, U.S. Army Human Engineering Lab, DOD, 6-30-81

16 * NASA RP 1024, Anthropometric Source Book: Volume 1: Anthropometry for Designers Anthropology Staff/Webb Associates, NASA, 7-78

17 * NASA TM X-62, 101, Haines, R.F., Barrt, A.E., Zahn, J.R., Cederwall, F.T., Human Performance Capabilities in Simulated Space Station Concordia College, San Jose State, NASA-ARC 1-72

18 * AFSC DH 1-2 ,General Design Factors Dept. of the Air Force, HQ A/F Systems Command, 02/20/74

19 * AFSC DH 1-3, Human Factors Engineering Dept. of the Air Force, HQ A/F Systems Command, 01/01/72

20 AFSC DH 1-5, Environmental Engineering Dept. of the Air Force ,HQ A/F Systems Command, 03/10/74

21 * AFSC DH 1-6, System Safety Dept. of the Air Force HQ A/F Systems Command, 12/20/78

22 * AFSC DH 2-2 ,Crew Stations and Passenger Accommodations Dept. of the Air Force, HQ A/F Systems Command, 05/01/72

23 AMRL-TR-69-6 , Alexander, M., Garrett, J.W., Flannery, M. P., Anthropometric Dimensions of A/F Pressure-Suited Personnel for Workspace and Aerospace, Medical Research Laboratory Air Force Systems Command, 8-69

24 * NHB 8060.1B , Flammability, Odor Offgassing Requirements and Test Proc. for Materials in Environment Office of Space Transportation Systems Office of Space Transportation Systems, NASA, 9-81

25 * MIL-A-8806A, Acoustical Noise Level in Aircraft, General Specification for DOD, 07/11/66

26 MIL-STD-783B, Legends for Use in Aircrew Stations and on Airborne Equipment DOD, 10/31/69

27 MIL-C-8779D, Colors, Interior, Aircraft, Requirements for DOD, 08/23/71

28 MIL-M-18012B, Markings for Aircrew Station Displays, Design and Configuration of DOD, 07/20/64

29 * MIL-S-008806B, Sound Pressure Levels in Aircraft, General Specification for Dept. of the Air Force, 09/21/70

30 MIL-STD-411D, Aircrew Station Signals Naval Air Systems Command DOD, 06/30/70

31 MIL-STD-203F, Aircrew Station Control and Displays: Assignment Location and Actuation of, for Fixed Wing Naval Air Systems Command DOD, 12/28/73

32 MIL-L-5667B, Lighting Equipment, Aircraft Instrument Panel: General Specification for Installation of USAF, 02/04/64

33 MIL-L-18276C, Lighting, Aircraft Interior, Installation of DOD, 06/19/64

34 MIL-STD-12D, Abbreviations for use on Drawings Specifications, Standards and in Technical Documents, U. S. Army Armament R&D Command DOD, 06/15/68

35 D-NA-0002, Procedures and Requirements for Flammability and Offgassing Evaluation Manned Spacecraft Nonmetallic Materials, NASA/JSC, 07/18/68

36 * AFFDL-TR-70-174, Semple, C.A., Heapy, R.J., Conway, E.J., Burnette, K.T., Analysis of Human Factors Data for Electronic Flight Display Systems, Manned Systems Sciences, Inc., A/F Flight Dynamics Lab

37 * TBD , Space Station Human Productivity Requirements, Lockheed, NASA/JSC

38 AFR 161-35 Briftofd, D. , Hazardous Noise Exposure, HQ AFMSC/SGPA HQ AFMSC/SGP, 04/09/82

39 MIL-STD-740B, Airborne and Structureborne Noise Measurements and Acceptance Criteria of Shipboard Equipment ,NAVY - SH USN, 01/13/65 (This standard was superseded by MIL-STD-740-1, Airborne Sound Measurements and Acceptance Criteria of Shipboard Equipment, and MIL-STD-740-2, Equipment Structureborne Vibratory Measurements and Acceptance Criteria of Shipboard Equipment, 12/30/86).

40 MIL-T-23991T, Training Devices, Military: General Specification for, NAVY (TD) DOD, 02/20/74

41 MIL-STD-195, Marking of Connections for Electric Assemblies Office of Assistant Secretary of Defense, DOD, 10/20/55

42 * NASA CR 3857, Peerly, R.L. Jr., Rockoff, L.A., Raasch, R.F., Space Station Crew Safety Alternatives Study - Final Report, Rockwell Intl. , NASA-Langley Research Center, 6-85

43 Fed. Std. No. 3, Colors, Aeronautical Lighting Federal Supply Services, GSA, 08/27/51

44 * MIL-A-25165B, Aircraft Emergency Escape System, Identification of Bureau of Naval Weapons, DOD, 10/05/64

45 MIL-C-25050, A Color, Aeronautical Lights and Lighting Equipment, General Requirements for Bureau of Naval Weapons, DOD, 12/02/63

46 MIL-STD-45662 Calibration Systems Requirements Dept. of the Army - MI DOD 06/10/80

47 * MIL-I-38038A Instrument Lighting System, Electro-Luminescent, General Specification for USAF 02/13/63

48 MIL-L-006730C Lighting Equipment; Exterior, Aircraft, General Requirements for Naval Air Systems Command Dept. of Navy 05/17/71

49 MIL-L-25467D Lighting, Integral, Red, Aircraft Instrument, General Specification for Naval Air Systems Command DOD 06/12/77

50 * MIL-L-27160C Lighting, Instrument, Integral, White, General Specification for USAF USAF 07/31/75

51 MIL-P-21563B Paint System, Fluorescent, for Aircraft Application Bureau of Naval Weapons DOD 12/11/62

52 MIL-P-7788E Panels, Information, Integrally Illuminated Naval Air Systems Command DOD 04/16/79

53 MIL-STD-1180A, Safety Standards for Military Ground Vehicles, U.S. Army Tank-Automotive Command, DOD, 01/26/83

54 MIL-STD-1280, Keyboard Arrangements U.S. Army Electronics Command, DOD, 01/28/69

55 MIL-STD-1348 Knobs, Control, Selection of Naval Electronic Systems Command DOD 07/30/69

56 MIL-STD-143B Standards and Specifications, Order of Precedence for the Selection of Aeronautical Systems Division, DOD, 11/12/69, (This standard was superseded by MIL-STD-970, Standards and Specifications, Order of Preference for the Selection of Aeronautical Systems Division, 10/1/87).

57 MIL-STD-1473A, Standard General Requirements for Color and Marking of Army Material, Dept of the Army (MI), DOD, 02/10/76

58 * MIL-STD-1474B, Noise Limits for Army Material US Army-Missile Research and Dev. Command, DOD, B Revision, 06/18/79 (Notice 2 - 04/20/84)

59 MIL-HDBK-141, Optical Design Defense Supply Agency, DOD, 10/05/62

60 NASA SP-7, Dictionary of Technical Terms for Aerospace Use Scientific & Technical Information Div., NASA

61 * ANSI S1.1-1960, Acoustical Terminology Acoustical Society of America American Standards Assoc., 05/25/60

62 * ASTM E308, Computing the Color of Objects by Using the CIE System, ASTM

63 NASA TM-82585 , William W. Vaughan, Natural Environment Criteria for the Space Station Program Definition Phase Atmos. Sciences Div/Systems, Dynamics Lab, NASA, 3-18-53

64 MIL-STD-1179B, Lamps, Reflectors and Associated Signalling Equipment for Military Vehicles, US Army Tank Automotive Command, DOD, 09/14/82

65 MSFC-STD-350A, Abbreviations for Use on Drawings NASA-MSFC, NASA, 06/26/67

66 SAE J185, Access Systems for Off-road Machines Off-road Machinery Technical Committee, SAE 6-8-85

67 SAE J925, Minimum Service Access Dimensions for Off-road Machines Const. & Ind. Machinery Tech. Committee ,SAE 10-25-84

68 SAE J833 USA, Human Physical Dimensions Const. & Ind. Machinery Tech. Committee, SAE 12-83

69 MH01-05175-414, Panel Controls (CM/LEM Control and Display Standardization), North American Aviation, 06/15/65

70 MH01-05176-414, Display Faces (CM/LM Control and Display Standardization), North American Aviation, 06/15/65

71 MH01-05178-414, Annunciator and Electromechanical Status Indicator North American Aviation, 06/15/65

72 MH01-05174-414, Nomenclature, Markings and Color North American Aviation, 08/26/65

73 MH01-01388-416, Interior Lighting Functional Performance Criteria North American Aviation, 07/30/65

74 MF0004-050, J. T. Horton Panel Design Criteria and Guidelines - Controls and Displays - Orbiter, Rockwell Intl. - Space Di, 10/15/76

75 ANSI S1.4-1971, Writing Group S1-W-45 Specification for Sound Level Meters Acoustical Society of America, ANSI, 04/27/71

76 ANSI/IEEE STD 260-1978, IEEE Standard Letter Symbols for Units of Measurement Int. Electrotech. Comm., IEEE, 12/29/78

77 ANSI Y10.20.1975, Mathematical Signs and Symbols for Use in Physical Sciences and Technology, ASME, ASME, 10/15/75

78 * NASA CR-1726, Marton, T., Rudek, F.P., Miller, R.A., Norman, D.G., Handbook of Human Eng. Design Data for Reduced Gravity Conditions, General Electric Co. NASA, MSFC

79 * NASA CR-3751, Shields, N.L. Analysis of Large Space Structures Assembly Essex Corp., NASA-MSFC, 12-83

80 NASA SP-5093, Athey, S. W. Acoustics Technology - A Survey Technology Utilization, Division Office of Tech Util-NASA

81 NASA SP-7012, Mechtly, E. A. The Intl. System of Units Physical Constants and Conversion Factors, Scientific and Technical Info. Office, NASA

82 NHB 1700.7, Safety Policy and Requirements for Payloads Using the STS, NASA

83 D6-49958, Farrell, R. J., Guidelines for CRT Workstations Boeing Commercial Airplane, 03/22/82

84 VOL.27, #2, APRIL 1985, Simpson, C.A., et.al., System Design for Speech Recognition and Generation Human Factors Society, Inc., Human Factors, 4-85

85 ANSI S1.6-1967, Preferred Frequencies and Band Numbers for Acoustical Measurements Acoustical Society of America, ANSI, 03/17/67

86 * NASA SP-483, Connors, M. M., Harrison, A. A., Akins, F. R., Living Aloft: Human Requirements for Extended Spaceflight, Ames Research Center, NASA 2-76

87 Personnel and CE Equipment Shock Tolerance - Final Report, U.S. Army Communications Command, Boeing Aerospace Co.

88 Harris, C. M. Crede, C. E., Shock and Vibration Handbook, McGraw-Hill Book Co.

89 * NASA-TM-85355, Shuttle EVA Description and Design Criteria (Superseded by JSC-10615, Ref. 100), NASA

90 * JSCM 8080, Manned Spacecraft Criteria and Standards, JSC NASA, 04/26/71

91 MIL-STD-250D, Aircrew Station Controls and Displays for Rotary Wing Aircraft, DOD, 08/28/74

92 * NASA-SP-3006, Parker, J.F., Wext, V.R. ,Bioastronautics Data Book, Biotechnology, Inc., Office of Nav Res/NASA

93 ANSI Y10.3-1968 Letter Symbols for Quantities used in Mechanics of Solids, ANSI, ASME, 10/29/68

94 ANSI/IEEE STD 289-1985, IEEE Std. Letter Symbols for Quantities used in Elec. Sci. and Engineering, IEEE Stds. Coord Committee 14, IEEE, 12/12/84

95 NAS 1282, Hook, Snap, Bolt, Natl. Aero Stds. Committee, AIAA, 06/30/66

96 ESSEX-H-82-04, Shields, N., Pruett, E., HF and Space Technology: Notes on Space Related Human Factors R&D, History, Facilities, etc., Essex, 08/26/82

97 MSFC-PROC-711A, Spacelab Display Design and Command Usage Guidelines, Essex Corp., NASA-MSFC, 1-79

98 ISO Stds. Handbook 4, Acoustics, Vibration and Shock, ISO

99 MCR-70-446, Rosener, A. A., et al, Architectural/Environmental Handbook for Extra-terrestrial Design, Martin Marietta Corp., 11-70

100 * JSC-10615, Shuttle EVA Description and Design Criteria, Crew Training & Procedures Div - NASA, NASA-JSC, 5-83

101 * ISO 2631-1978(E), Guide for the Evaluation of Human Exposure to Whole Body Vibration, ISO, 01/15/78

102 * Kirkpatrick, M., Malone, T., Shields, N., Earth Orbital Teleoperator Visual System Evaluation Program (Report 1), Essex Corp., NASA-MSFC, 3-73

103 H-84-04, Shields, N., Fagg, M., Analysis and Selection of a Remote Docking Simulation Visual Display System, Essex Corp., NASA-MSFC, 4-84

104 H-82-01/H-82-01.1, Shields, N., Piccione, F., Malone, T., et al, Human Operator Performance of Remotely Controlled Tasks, Essex Corp., NASA-MSFC, 3-82

105 Brye, R., Kirkpatrick, M., Malone, T., Shields, N., Earth Orbital Teloperator Manipulator System Evaluation Program (Report 3), Essex Corp., NASA-MSFC, 2-76

106 H-77-2, Brye, R., Frederick, P., Malone, T., Shields, N., Earth Orbital Teloperator Manipulator System Evaluation Program (Report 4), Essex Corp., NASA-MSFC, 01/28/77

107 * JSC 19617, Mitchell, J. P., Crew Interface Panel Space Station Habitability Requirements Document, NASA-JSC, 12-83

108 * NASA TM X-64825, MSFC Skylab Crew Systems Mission Evaluation, System Analysis and Integration Lab, NASA-MSFC, 8-74

109 NATICK/TR-77/024, Anthropometry of Women of the U.S. Army - 1977, Rep. 2 - Basic Univariate Statistic, Webb Associates, Inc., US Army Natick R&D CMD

110 AMRL-TR-70-5, Clauser, C., McConville, J., Tucker, P., et al, Anthropometry of Air Force Women, AMRL

111 * Woodson, Wesley E., Human Factors Design Handbook, McGraw-Hill, Inc., 5-81

112 SAE J898, Control Locations far Off-Road Work Machines Transactions: Society of Automotive Engineers, SAE, 7/82

113 Lessons Learned on the Skylab Program - Headquarters, HQ Skylab Program Office Eng. Direc., NASA-HQ, 11-74

114 * Lessons Learned on the Skylab Program - MSFC, MSFC Skylab Program Office, NASA-MSFC, 2-22-74

115 * JSC-09535, Skylab Experience Bulletin No. 1 - Translation Modes and Bump Protection, NASA-JSC 6-74

116 JSC-09537, Skylab Experience Bulletin No. 3 - Architectural, Evaluation of Sleeping Quarters NASA-JSC, 7-74

117 JSC-09538, Skylab Experience Bulletin No. 4 - Design, Characteristics of the Sleep Restraints NASA-JSC, 7-74

118 JSC-09539, Skylab Experience Bulletin No. 5 - Inflight Maintenance, NASA-JSC, 9-74

119 * JSC-09540, Skylab Experience Bulletin No. 6 - Space Garments for IVA Wear, NASA-JSC, 8-74

120 JSC-09541, Skylab Experience Bulletin No. 7 - IVA Personal Restraints, NASA-JSC, 10-74

121 JSC-09542, Skylab Experience Bulletin No. 8 - Cleaning Provisions Within the Waste Management Compartment, NASA-JSC, 10-74

122 JSC-09543, Skylab Experience Bulletin No. 9 - Foot Restraint Systems, NASA-JSC, 12-74

123 JSC-09544, Skylab Experience Bulletin No. 10 - Body Restraint Systems, NASA-JSC, 12-74

124 * JSC-09545, Skylab Experience Bulletin No. 11 - Personal Mobility Aids, NASA-JSC, 1-75

125 * JSC-09546, Skylab Experience Bulletin No. 12 - Temporary Equipment Restraints, NASA-JSC, 2-75

126 JSC-09547, Skylab Experience Bulletin No. 13 - Tools, Test Equipment, and Considerations for Inflight Maintenance, NASA-JSC, 11-74

127 JSC-09548, Skylab Experience Bulletin No. 14 - Personal Hygiene Equipment, NASA-JSC, 1-75

128 JSC-09549, Skylab Experience Bulletin No. 15 - Cable Management in Zero-G, NASA-JSC, 9-75

129 * JSC-09551, Skylab Experience Bulletin No. 17 - Neutral Body Posture in Zero G, NASA-JSC, 7-75

130 * JSC-09552, Skylab Experience Bulletin No. 18 - Evaluation of Skylab IVA Architecture, NASA-JSC, 12-75

131 * JSC-09553, Skylab Experience Bulletin No. 19 - Food System, NASA-JSC, 2-76

132 * JSC-09561, Skylab Experience Bulletin No. 27 - Personnel, and Equipment Restraints and Mobility Aids, NASA-JSC, 5-75

133 MSC-03909, Habitability Data Handbook - Vol. 1, Mobility and Restraint, NASA-MSFC, 7-31-71

134 * MSC-03909, Habitability Data Handbook - Vol. 2, Architecture and Environment NASA-MSFC, 7-31-71

135 MSC-03909, Habitability Data Handbook - Vol. 2, Architecture and Environment, Supplement 2, NASA-MSFC, 4-72

136 MSC-03909, Habitability Data Handbook - Vol. 2, Architecture and Environment, Supplement 2, NASA-MSFC, 5-73

137 * MSC-03909, Habitability Data Handbook - Vol. 3, Housekeeping, NASA-MSFC, 7-31-71

138 * MSC-03909, Habitability Data Handbook - Vol. 4, Food Management, NASA-MSFC, 7-31-71

139 * MSC-03909, Habitability Data Handbook - Vol. 5, Garments and Ancillary Equipment, NASA-MSFC, 7-31-71

140 MSC-03909, Habitability Data Handbook - Vol. 6, Personal Hygiene, NASA-MSFC, 7-31-71

141 70-6651, Habitability Guidelines and Criteria, Airesearch Mfg. Co., NASA-MSFC, 1-7-71

142 * NASA SP-3006, Webb, P. ,Bioastronautics Data Book, Webb Associates, NASA, 1964

143 * NASA SP-3006, Parker, J., West, V., Bioastronautics Data Book - Second Ed., Biotechnology, Inc., NASA, 1973

144 MDC H0843, Initial Spacelab VFT Report, Vol. V, Habitability McDonnell Douglas Corp. 9-84

145 JSC-20466, EVA Catalog - Tools and Equipment, NASA-JSC, 11-4-85

146 * D180-27863-2 II, System Analysis Study of Space Platform and Station Accommodations For Life Sciences Research Facilities, Boeing Aerospace Co., 10-85

147 Human Capabilities in Space, Life Sciences Div., NASA-HQ, 3-84

148 NASA Ref Pub 1045, Waligora, J.M. The Physiological Basis for Spacecraft, Environmental Limits, NASA-JSC, NASA, 1979

149 SR-ER-0003, Habitability and Human Engineering, ERNO, 3-81

150 * JSC-12770, Shuttle Flight Operations Manual, NASA-JSC, 8-16-85

151 Calvin, M., and Gazenko, O. Foundations of Space Biology and Medicine - Vol. I, NASA 1975

152 Calvin, M., and Gazenko, O. Foundations of Space Biology and Medicine - Vol. II, Book 1, NASA 1975

153 Calvin, M., and Gazenko, O., Foundations of Space Biology and Medicine - Vol. II, Book 2, NASA, 1975

154 Calvin, M., and Gazenko, O. ,Foundation of Space Biology and Medicine - Vol. III, NASA, 1975

155 * MSFC-STD-512, Standard Man/System Design Criteria for Manned Orbiting Payloads, NASA-MSFC, 8-12-74

156 * JSC-09096 Lessons Learned on the Skylab Program - JSC, NASA-JSC, 7-18-74

157 * Van Cott, H.P., and Kinkade, R.G., Human Engineering Guide to Equipment Design, US Government Printing Office, 1972

158 * Approaches to the Design of the Housekeeping System for the Space Station, LEMSCO, NASA-JSC, 3-18-85

159 * JSC-07387B, SC-S-0014, Crew Station Specifications - Inflight Stowage Management Data Requirements, NASA-JSC, 10-72

160 * JSC-07387B, SC-S-0011, Crew Station Specification - Loose Equipment and Stowage Management Requirement, NASA-JSC, 10-72

161 JSC-302XX, Space Station Program - Phase B Commonality Plan, Space Station Program Office, NASA-JSC 11-22-85

162 TM X-53957, Weidner, D. K. Space Environment Criteria Guidelines for Use in Space Vehicle Development, NASA-MSFC, 10-17-69

163 * Sinclair, W. K., Radiation Safety Standards: Space Hazards vs. Terrestrial Hazards, Advances in Space Research, Vol. 3, No. 8, 1983

164 * Sinclair, W. K., Radiation Risk Estimation and Its Application to Human Beings in Space, Advances in Space Research, Vol. 4, No. 10, 1984

165 Shoenberger, R. W., Research Related to the Expansion and Improvement of Human Vibration Exposure Criteria, Shock and Vibration Bulletin, 9-79

166 Bangs, W.F., Development of STS Payload Environmental Engineering Standards, Proc. Inst. of Env. Sci., NASA-GSFC, 1981

167 Ewing, D.E., A Space Radiation Monitoring System for Support of Manned Spaceflight, Intl. Astronautical Congress - Vol. 5, Kirtland AFB. 1966

168 Edman, T.R., Human Factors Guidelines for the Use of Synthetic Speech Devices, Proc. Human Factors Society, Human Factors Society, 1982

169 Courtney, A.J., and Ng, M.K., Hong Kong Female Hand Dimensions and Machine Grinding, Ergonomics, Vol. 2,7, No. 2, 1984

170 Ramsey, H.R., Human Factors and Artificial Gravity: A Review Human Factors, 13(6), Human Factors Society, 1971

171 Haines, R.F., A Review of Peripheral Vision Capabilities for Display Layout Designers, Proc. of S.I.D., Vol. 16/4, 1975

172 Haines, R.F., Color Design for Habitability, Northwest Architect, 4-74

173 Haines, R.F., Bartz, A.E., and Zahn, J.R., An Investigation of Visual Performance Capabilities in a Space Station-Like Environment, Proc. Aerospace Medical Assoc., 4-28-71

174 Haines, R.F., and Gillaland, K., Response Time in the Full Visual Field, Journal of Applied Psych, Vol. 58, No. 3, 12-73

175 Haines, R. F., Visual R esponse Time to Colored Stimuli in Peripheral Retina:Evidence for Binocular Summation, Am. J. Optometry and Physio. Op., Vol. 54, No. 6, 6-77

176 Haines, R.F., and Allen, W.H., Irradiation and Manual Navigation, Navigation, 1969

177 Haines, R.F., Detection Time to a Point Source of Light Appearing in a Star Field Background With and Without a Glare Source Present, J. of Hum. Fac. Soc., 10-68

178 * NASA TM 88233 (1986), Haines, R.F. Space Station Proximity Operations Windows: Human Factors Design Guidelines, NASA-ARC, 1986

179 * CONF-7809164, Schimmerling, W., and Curtis, S.B., Workshop on the Radiation Environment of the Satellite Power System (SPS), Satellite Power System Project, DOE, 12-79

180 * American National Standard for Human Factors Engineering of Visual Display Terminal Workstations (DRAFT), Human Factors Society, 4-20-85

181 Muckler, F.A., Human Factors Review: 1984, Human Factors Society, 1984

182 * Boff, E.R., and Lincoln, J.E., Engineering Data Compendium: Human Perception and Performance, USAF-WPAFB, DRAFT

183 CONF-830609-64, Clarke, M., Hamel, W., and Draper, J. Human Factors in Remote Control Engineering Development Activities, Union Carbide Co., American Nuclear Society, 6-83

184 Shea, M.L. Proceedings of the Submarine Atmosphere Contaminant Workshop, Naval Submarine Medical Research Lab., USN, 9-83

185 C1, HEL, Hendricks, D.E., et al, Human Engineering Guidelines for Management Information Systems (See Ref. 279 for final revised document issued as DOD-HDBK-761), US Army Human Engineering Lab., US Army 6-1-83

186 NASA CR-172590, White, R.W., and Parks, D.L., Study to Determine Potential Flight Applications and Human Factors Design Guidelines for Voice Recognition and Synthesis Systems, Boeing Commercial Airplane Co., NASA-LaRC, 7-85

187 MS254V1003, Space Shuttle Orbiter Waste Collection System Conceptual Study, Fairchild Corp., NASA-JSC, 1-18-85

188 Radiological Health Handbook, Bureau of Radiological He, 1970

189 * Grahn, D., HZE-Particle Effects in Manned Spaceflight, National Academy of Science, 1973

190 NSSDC/WDC-A-R&S 76-06, Sawyer, D.M., and Vette, J.I.. AP-8 Trapped Proton Environment for Solar Maximum and Solar Minimum, NSSDC, 12-76

191 NSSDC 72-06, Singley, G.W., and Vette, J.I., The AE-4 Model of the Outer Radiation Zone Electron Environment, NSSDC, 8-72

192 NSSDC/WDC-A-R&S 76-04, Teague, M.J., Chan, E.W., and Vette, J.I., AE-6: A Model Environment of Trapped Electrons for Solar Maximum, NSSDC, 5-76

193 * JSC-07387B, SC-D-0007B, Langdoc, W.A., Crew Station Specifications - Displays, NASA-JSC, 1-82

194 * JSC-07387B, SC-C-0005B, Langdoc, W.A. Crew Station Specifications - Controls, NASA-JSC, 1-82

195 * JSC-07387B, SC-M-0003, Wheelwright, C. D., Crew Station Specifications - Markings, NASA-JSC, 8-81

196 JSC-07387B, SC-A-0004B, Langdoc, W. A., Crew Station Specifications - Abbreviations, NASA-JSC, 8-81

197 JSC-07387B, SC-D-0001, Nussman, D. A., Crew Station Specifications - Metal Foil Decals, NASA-JSC, 02/16/71

198 * JSC-07387B, SC-E-0010, Wheelwright, C. D., Crew Station Specifications - Environmental Criteria, NASA-JSC, 9-81

199 * JSC-07387B, SC-L-0002B, Wheelwright, C. D., Crew Station Specifications - Lighting, NASA-JSC, 9-81

200 * JSC-07387B, SC-E-0006, Smith, J. R., Crew Station Specifications - EVA/IVA Support Equipment, NASA-JSC, 12/01/72

201 * JSC-07387B, SC-C-0009, Franklin, G. C. Crew Station Specifications - Operation Location Coding Form Crew Interfaces, NASA-JSC, 4-10-72

202 JSC-07387B, SC-C-0009, S1, Hix, M. W., Crew Station Specifications - Exterior Location Coding, NASA-JSC, 01/03/77

203 NASA CR-3857, APP. C, Peerly, R.L., Rockoff, L. A., and Raasch, R. F., Space Station Crew Safety Alternatives Study - Final Report, Appendix C, Rockwell International, NASA - LaRC, 6-85

204 * NASA CR-3855, APP. D, Peercy, R. L., Raasch, R. F., and Rockoff, L. A., Space Station Crew Safety Alternatives Study - Final Report, Appendix D, Rockwell International, NASA - LaRC, 6-85

205 NASA CR-3855, App. E, Peerly, R. L., Rockoff, L. A., and Raasch, R. F., Space Station Crew Safety Alternatives, Study - Final Report, Appendix E, Rockwell International, NASA - LaRC, 6-85

206 * NASA CR-3855, Vol. II, Raasch, R. F., Peercy, R. L., and Rockoff, L. A., Space Station Crew Safety Alternatives Study, Final Report Vol. II - Threat Development, Rockwell International, NASA - LaRC, 6-85

207 * ESD-TR-83-122, Smith, S. L., and Aucella, A. F., Design Guidelines for the User Interface to Computer-Based Information Systems, The MITRE Corp., AFSC, 3-83

208 * NASA SP-447, Nicogossian, A.E., and Parker, J.F., Space Physiology and Medicine, NASA

209 * NASA TN D-6600, Burrell, M. O., and Wright, J. J., The Estimation of Galactic Cosmic Ray, Penetration and Dose Rates, NASA-MSFC, NASA, 3-73

210 * Mewaldt, R. A., The Elemental and Isotopic Composition of Galactic Cosmic Ray Nuclei (Paper 2R1868), Rev. of Geophysics and Space Physics, AGU, 3-83

211 McGuire, R. E., et al, Solar Flare Particle Fluences During Solar Cycles 19, 20, and 21, Proc. of 18th Intl. Cosmic Ray Conference, NASA - GSFC, 1983

212 STP-84-4, Data Announcement: World Data Center-A, Archive of Zurich and International Sunspot Numbers, National Geophysics Data Center, NOAA, 3-85

213 * NASA CR-174696, Silverman, S.W., Willenberg, H.J. & Robertson, C., Applicability of 100 KWe Class of Space Reactor Power Systems to NASA Manned Space Station Missions, Boeing Aerospace Company, NASA - LeRC, 8-84

214 * 94SSV154970, Hill, R. E. Space Shuttle Orbiter Crew Compartment Acoustic Noise - Environments and Control Considerations, Rockwell International

215 Alberti, P. W., Personal Hearing Protection in Industry, Raven Press, New York, 1982

216 OSHA Field Operations Manual, OSHA, Dept. of Commerce

217 ANSI S1.2-1962 (R1976), American National Standard Method for the Physical Measurement of Sound, ANSI, Acou. Soc. of America, 8-20-62

218 * BS 6472: 1984, British Standard Guide: Evaluation of Human Exposure to Vibration in Building Mechanical Engineering Standards Comm., British Stands. Inst., 1984

219 * ANSI S1.10-1966 (R1976), American National Standard Method for the Calibration of Microphones, ANSI, Acoustical Society of America, 1966

220 ASA S1.11-1966, American Standard Specification for Octave, Half-Octave, and Third-Octave Band Filter Sets, American Standards Association, Acous. Soc. of America

221 MIL-S-3151, Sound-Level Measuring and Analyzing Equipment

222 ANSI S3.5-1969 (R1978), American National Standard Methods for the Calculation of the Articulation Index, ANSI, Acous. Soc. of America, 1978

223 * NASA RP 1115, Krytor, K.D., Physiological, Psychological, and Social Effects of Noise, NASA - LaRC, 7-84

224 * Stevens, D.G., Vibroacoustic Habitability of Space Stations, NASA - LaRC, 8-30-83

225 JSC 32003, Space Station Viewport Study - First Edition, Space and Life Sciences Directorate, NASA - JSC, 12-85

226 NASA CR-160861, Roebuck, J. A., Shuttle Considerations for the Design of Large Space Structures, Rockwell International Corp., NASA-JSC, 11-80

227 LEMSCO 21493, The Historical Development and Human Factors Evaluative Design Criteria of Intravehicular Crew Restraints and Positioning Devices, LEMSCO, NASA - JSC, 3-85

228 * Medical Requirements of an Inflight Medical System for Space Station, NASA - JSC

229 * Space Station Health Maintenance Facility Status Update, Medical Operations Branch, NASA - JSC, 2-86

230 * HMF STATUS, Space Station Health Maintenance Subsystems, NASA - JSC, 2-86

231 * HMF (Health Maintenance Facility) Requirements Documents, NASA - JSC, 11-85

232 * Microbiology Requirements and Specifications for Space Station, Biomedical Laboratories Branch, NASA - JSC, 2-14-86

233 * Particulates, Biomedical Laboratories Branch, NASA - JSC

234 Microbiology, Biomedical Laboratories Branch, NASA - JSC

235 * JSC 30203, Space Station Program Office On-Orbit Maintenance Operations Plan, McDonnell Douglas Astronautics Corp., NASA - JSC, 2-21-86

236 LMSC/D927646, Development of Reliability/Maintainability Guidelines, Final Report, Lockheed Missiles and Space Company, NASA - JSC 11-18-83

237 AFSC-PAM 800-39, Built-in-Test Design Guide, Departments of the Army, N, 3-19-81

238 * Lusk, J., Maintainability Design Requirements, MSFC (Draft), NASA - MSFC, 11-85

239 EPRI NP-4350s, Pack, R.W., et al, Human Engineering Design Guidelines for Maintainability, General Physics Corp., Elec. Pwr. Res. Inst., 12-31-85

240 ISBNO-03-070741-2, Stine, H.G., Handbook for Space Colonists Holt, Rinehart, and Winst 1985

241 * D180-28182-1, Bluth, B.J. Soviet Space Stations as Analogs, National Behavior Systems, Boeing Aerospace Company 10-83

242 Health Maintenance Facility Data Requirement, Phase 2 Data Book (Draft), Lockheed Missiles and Space, 1-86

243 SSCBD/SSCN BG030038, Establish Servicing Facility Requirements

244 JSC 30000, Sec. 5, App. D, Space Station Program Definition and Requirements, Section 5: Space Station Mission Integration Requirements, NASA - JSC, 12-9-85

245 Toxicology, Biomedical Laboratories Branch, NASA - JSC

246 JSC, 07700, Rev. D, Space Shuttle System Payload Accommodations, Vol. XIV, NASA-JSC

247 NASA CR-2160, Brown, N. E.. Dashner, T. R., and Hayes B. C. Extravehicular Activities Guidelines and Design Criteria URS/Matrix Company NASA-MSFC 1-73

248 H-76-6, Pruett, E. C, Dodson, D. W., and Kirkpatrick, M., Extravehicular Activity Design Guidelines and Criteria, Essex Corporation, Essex Corporation, 5-76

249 * JSC-18702, Flight Data File, Spacelab, In-Flight Maintenance (IFM) Checklist, Mission Operations Directorate, NASA-JSC, 10-15-85

250 * NASA Judgement Call, NASA - JSC

251 NASA CR-167614, Nash, J.D., Wilde, R.C., and King, K.R., Study of EVA Operations Associated with Satellite Services, Hamilton Standard, NASA-JSC, 4-82

252 JSC 18201, Rouen, M.N., and King, K.R., The Shuttle Extravehicular Mobility Unit, Proc. of the Satellite Services Workshop, NASA-JSC and Hamilton Standard, NASA-JSC, 6-82

253 * JSC-19212, Satellite Services Handbook: Interface Guidelines, Lockheed Missiles and Space Company, NASA-JSC, 12-23-83

254 Santy, P., The Journey Out and In: Psychiatry and Space Exploration, Am. J. Psychiatry, 140, 5-83

255 NASA TM X-58067, Kanas, N.A., and Fedderson, W.E., Behavioral Psychiatric and Sociological Problems of Long Duration Space Missions, NASA-JSC, 10-71

256 * Psychological, Sociological, and Habitability Issues of Long Duration Space Missions, Dept. of Behav. Science & Leadership, USAF Acad., NASA-JSC, 1-85

257 * Parker, J.F., Christensen, D., Sheehan, B.M., U.S. Naval Flight Surgeon's Manual (Second Edition - 1970), Biotechnology, Inc., Office of Naval Research, 1978

258 Code of Federal Regulations, Aeronautics and Space, Vol. 14, Parts 1 to 59, Office of the Fed. Reg., 1-1-85

259 * Space Transportation System User Handbook, NASA, 5-82

260 * D180-28806-3, Advanced EVA System Design Requirements Study, Final Report, Vol. III, Boeing Aerospace Company, 3-3-86

261 * D180-28402-1, Jones, H.V,. Space Station Habitability Design Recommendations, Vol. I & Vol. II, Boeing Aerospace Company,11-15-84

262 * JSC-18201, Rouen, M.N., and King, K.R., Satellite Services Workshop, NASA-JSC and Hamilton Standard, NASA-JSC, 6-82

263 * NASA CR-167614, Nash, J.D., Wilde, R.C., and King, K.R., Study of EVA Operations Associated With Satellite Services, Hamilton Standard, NASA-JSC, 4-82

264 * SSCN JJ020011, Covington, C. EVA/Airlock Medical Requirements Section of JSC 31000, JSC Systems Engineering Office, NASA-JSC 10-15-85

265 * Slade, H.G, and Newman, R.L., Shuttle EMU Capabilities for Satellite Servicing, Hamilton Standard and ILC, 8-85

266 * H-76-5 Malone, J.B. et al, External Operations, Maintenance and Repair (OMR) Mode Selection Criteria, Essex Corporation, NASA-MSFC, 5-10-76

267 The NOAA Diving Manual - Diving for Science and Technology, National Oceanic and Atmospheric Admin., U.S. Dept of Commerce

268 * Herbert R. Hazard, U. S. Navy Diving - Gas Manual, Battelle Memorial Institute, National Technical Inform

269 ASME Ocean Tech Div/USN/Marine Tech Soc/Battelle, The Working Diver - 1974, Marine Technology Society, Marine Technology Society

270 Buoni, et.al., Space Station Contamination in Pressurized Environments: Issues and Options, Battelle Columbus Laboratories, NASA/KSC

271 Churchill, E., Kikta, P., Churchill, T., Intercorrelations of Anthropometric Measurements: A source Book for USA Data, Webb Associates, Inc., A/F Aerospace Medical Res, 5-78

272 * Martin, A. D., Drinkwater, D. T., Clarys, J. P., Human Body Surface Area: Validation of Formulae Based on a Cadaver Study, Human Biology, Wayne State University Pr, 9-84

273 * FAA-AM-83-16 Young, J. W., Anthropometric and Mass Distribution Characteristics of the Adult Female, FAA Civil Aeromedical Institute, FAA, 9-83

274 * AMRL-TR-74-102, Churchill, E. Sampling and Data Gathering Strategies for Future USAF Anthropometry, Webb Associates, Inc., A/F Aerospace Medical Res, 2-76

275 * Roebuck, J. A., Kroemer, K. H. E., Thomson, W. G., Engineering Anthropometry Methods, John Wiley and Sons, Inc., 1975

276 * AF AMRL-TR-180-119, McConville, John, Anthropometric Relationships of Body and Body Segments Moments of Inertia, Anthropology Research Project, Inc., A/F Aerospace Medical Res, 12-80

277 * JSC 30213, Space Station Program Design Criteria and Practices, Space Station Program Office, NASA-JSC, 4-15-86

278 * JSC 30000 Sec. 3 App. C, Space Station Program Definition and Requirements Section 3: Space Station, Systems Requirements (Rev B), Space Station Program Office, NASA-JSC, 4-15-86

279 * DOD-HDBK-761, Human Engineering Guidelines for Management Information Systems (Metric), DOD, 6-28-85

280 * DeHart, Roy, M.D., Fundamentals of Aerospace Medicine, Lea and Febiger

281 * TB Med 501, Hearing Conservation, Hdqtrs. Department of the Army, U.S. Government Printing, 3-15-80

282 ASHRAE Handbook 1984, Systems, ASHRAE, 1984

283 * Vol. 2, #3; Vol. 2, #4; Vol. 3, #1, Backteman, O., Kohler, J. Sjoberg, L., Infrasound - Tutorial and Review, Journal of Low Frequency Noise and Vibration, 1983

284 * Bennet, G.L., Lombardo, J.J. and Rock, B.J., Development and Use of Nuclear Power Sources for Space Applications, The Journal of the Astronautical Sciences, Vol. 29, No. 4, pp 321-342, Oct.-Dec., 1981.

285 * Fry, R.J.M., Approaches to Radiation Guidelines for Space Travel, Advances in Space Research, Vol. 4, No. 10, Committee on Space Research (COSPAR), Pergamon Press, 1984

286 * Hall, Eric, Radiobiology for the Radiologist, Harper and Row, 1978

287 * NASA TM 86265, Townsend, L.W. Galactic Heavy-Ion Shielding Using Electrostatic Fields, NASA - Langley Research Center, 1984

288 * Bernet, R. E. and Stekly, Z. J., Magnetic Radiation Shielding Using Superconducting Coils in NASA SP-71 Second, Symposium on Protection Against Radiation in Space, 1965

289 * D180-28806-3, Thompson, J.J., Space Station Advanced EVA Systems Design Requirements, Boeing Aerospace Company 1986

290 * FED-STD-595, Color

291

292 * Broch, J.T., Mechanical Vibration and Shock Measurements, Bruel & Kjaer Instruments, Inc., Bruel & Kjaer Instruments, 10/80

293 Guignard, John C., Patty's Industrial Hygiene and Toxicology John Wiley & Sons

294 * Rasmussen, G., Human Body Vibration Exposure and its Measurement, Technical Review, Bruel & Kjaer Instruments, Inc., 1982

295 * Peterson, A. P., Handbook of Noise Measurement - 9th. Edition, General Radio, Inc., 1980

296 * S3-W-39, Godlman, D. E. and Von Gierke, H. E., The Effects of Shock and Vibration on Man, Naval Medical Research Institute, U.S.A. Standards Institute, 1-8-60

297 * Graf, R.F., Electronic Databook: A Guide for Designers, Second Edition, Van Nostrand Reinhold, 1974

298 * ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency, IEEE, 1982

299 * Wilkening, G.M., Commentary on the Non-ionizing Radiations, Proc. SPIE, Vol. 229, Soc. of Photo-Optical Inst

300 * Review of Concepts, Quantities, Units and Terminology for Non-Ionizing Radiation Protection, Health Physics 49, Intl. Rad. Protec. Assoc. 1985

301 * Preliminary Report and Forecasting of Solar Geophysical Data - Descriptive Text, Space Environmental Services Center, US Dept. of Commerce, 6-86

302 * Interim Guidelines on Limits of Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range From 100 kHz to 300 kHz Health Physics, Vol. 46, IRPA, 4-84

303 * Guidelines on Limits of Exposure to Laser Radiation of Wavelengths Between 180 nm and 1 mm Health Physics, Vol. 49, IRPA, 8-85

304 * Guidelines on Limits of Exposure to Ultraviolet Radiation of Wavelengths Between 180 - 400 nm (Incoherent Optical Radiation), Health Physics, Vol. 49, IRPA, 8-85

305 * ANSI Z.136.1, Safe Use of Lasers, ANSI, 1980

306 * Rationale for the Threshold Limit Values of Chemical Substances and Physical Agents in the Work Environment, Amer. Conf. of Govt Indus, 1982

307 * AMRL-TR-75-32 Laubach, Lloyd L. Muscular Strength of Women and Men: A Comparative Study Aerospace Medical Research Laboratory Wright-Patterson AFB Ohio 1976

308 * ST-E-1321, Japanese Female Body Size Natl Space Development Agency of Japan 06-05-86

309 * Edited by Altman, P.L. and Fisher, K.D. Research Opportunities in Nutrition and Metabolism in Space, Fed. of Amer. Societies for Exp. Biology

310 * AMRL-TR-77-50, Kenneth Kennedy Reach Capability of Men & Women: A Three Dimensional Analysis, Aerospace Medical Research Laboratory, 7-78

311 * Trabanino, R. Space Station Galley Design Proceedings, 16th ICES Conference Society of Automotive Eng, 8-86

312 * Winkler, E.H., Shuttle Waste Management System Design Improvements and Flight Evaluation Proceedings, 16th ICES Conference Society of Automotive Eng, 8-86

313 * Thornton, W.E., Improved Waste Collection System for Space Flight Proceedings, 16th ICES Conference Society of Automotive Eng, 8-86

314 Orbiter Location Coding Control Drawing Number, VC70-660010, Rockwell International Corporation

315 * NAG2-346, Wise, J. A. ,Quantitative Modeling of Human Spatial Habitability NASA - Ames Research Cent, 12-85

316 * NAS2-11690, Stuster, J.W., Space Station Habitability Recommendations Based on a Systematic Comparative Analysis of Analogous Conditions Anacapa Sciences, Inc., NASA - Ames Research Cent, 12-84

317 * D180-28182-1, Soviet Space Stations as Analogs, Boeing Aerospace Co., 10-83

319 * MDC H2068 ,Tullis T.S., and Bied, B.R., Space Station Functional Relationships Analysis - Final Technical Report, McDonnell Douglas Astrona 2-86

320 * GIAG-3, Technical Panel Instructions, 8-23-86

321 * SS-SRD-600, REV. RUR-1.A, Space Station Environmental Control and Life Support (ECLS), Systems Requirements Document, NASA-MSFC

322 * Life Systems, Cleveland, Ohio Graph - CO2 Partial Pressure Increase Without CO2 Removal Life Systems, Cleveland, Ohio Life Systems, Cleveland, 1983

323 * 9-BF-10-4-01P, Space Station Definition and Preliminary Design Request for Proposal, NASA-JSC, NASA, 9-15-84

324 * Natural and Induced Environments Panel Meeting Int. Environ. Working Group (JSC), NASA - JSC ,2-19-86

325 * DWG 4380001, Rev A, Glazing - Window, Photographic, SAL Actron Industries, Inc., NASA-JSC 7-12-71

326 * Cox, John, Space Station Program Description Document, Book No. 6, Appendix B, System Operations Sp. Sta. Operations Working Group, NASA, 8-83

327 * Thompson, A. B., The Physiological Stresses of Vibration, Noise Acceleration and Weightlessness on Space Crews - Tolerance Criteria Vought Astronautics/LTV, Inc., Vought Astronautics/LTV, 1962

328 * Mc Cormack, P. D., Radiation Pose Prediction for Space Station Proceedings of 16th ICES, 7-86

329 * ICRP Publication 26, Recommendations of the Intl. Commission on Radiological Protection Annals of the ICRP ICRP, Pergamon Press, 1-77

330 * Silberg, R., et. al., LET - Distributions and Doses of HZE Radiation Components at Near-Earth Orbits Advances in Space Research, Vol. 4, #10 Committee on Space Research, Pergamon Press, 1984

331 ASHRAE, Transactions Fanger, P. O., Calculation of Thermal Comfort: Introduction of a Basic Comfort Equation ASHRAE Transactions Lab of Htg. & Vent. Tech U of Denmark, ASHRAE, 1967

332 * Thompson A. B. A Time-Sharing Computer Program for Defining Human Thermal Comfort Conditions in any Atmosphere, Apollo & Ground Systems, G.E., ASME 1972 Env. Control/Li, 8-15-72

333 * IAA 8220, Novak, L., Skin Temperature and Thermal Comfort in Weightlessness, AIAA Lab of Appl. Physiological Sci, Polish AIAA, 1982

334 * IAA 8011, Baranski, S, et. al., Investigation of the Cooling Properties of the Spacecraft Atmosphere Postepy Astronautyki Woiskowy Instytut Medycyny Lotniczet, WIML, 1979

335 * Woodson, W., Conover, D. W., Human Engineering Guide for Equipment Design, 2nd. Edition, Univ. of Calif. Press, 1964

336 * Boff, K.R., et . al. (Editors), Handbook of Perception and Human Performance, Wiley-Interscience, 1986

337 * Graham (Editor), Vision and Visual Perception, John Wiley and Sons, 1966

338 * Hecht, Haig, and Chase The Influence of Light-Adaptation on Subsequent Dark Adaptation J. Gen. Physiol. 1937

339 * 72-ENAv-13 Behrend, A.F., Swider, J.E. Development of a Waste Collection System for the Space Shuttle ASME 6-1-73

340 Boyce, P.R. Human Factors in Lighting MacMillan Publishing Co., 1981

341 * Doolittle, T.L., Spurlin, O. Trends in Ergonomics / Human Factors III Elsevier Science Publisher

342 Underwood, K. Advanced EVA Systems Design Requirements Study ILC Dover, Inc. 8-25-85

343 * Johnston, R.S., Dietlein, L.F. Biomedical Results from Skylab NASA - JSC US Government Printing Office 1977

344 * Kira, A. The Bathroom Viking Press 1976

345 * JSC 30000 (Draft) On-Orbit Maintenance Operations Requirements Document Space Station Program Office NASA - JSC 8-22-86

346 * MIL-STD-1472C, Not. 3 (pro) Military Standard, Human Engineering Criteria for Military Systems, Equipment, and Facilities (Proposed Notice 3) Project HFAC-0030) US ARMY MISSILE COMMAND 8-28-86

347 BuAer Report AE-61-4 Fundamentals of Design of Piloted Aircraft Flight Control Systems, Vol. III, The Human Pilot Bureau of Aeronautics 8-54

348 JSC-17727, CSD-SS-059 Lin, C.H. Space Station Environmental Control and Life Support System, Preliminary Conceptual Design Crew Systems Div. NASA - JSC 9-82

349 * Environmental Health Monitoring Facility (proposed new subsection provided at MSIS GIAG-4) Biomed Lab Branch, Med Sciences Div. NASA - JSC 10-27-86

350 * JSC 16536, Rev. C Orbiter Mid-deck Payload Provisions Handbook NASA-JSC

351 * GIAG-4 Technical Panel Instructions 10-30-86

352 NASA CR-4010 Nixon, D. Space Station Group Activities Habitability Module Study Inst. for Future Studies NASA - ARC 6-86

353 * Dixon, G. A., Adams, J. D., and Harvey, W. T., Decompression Sickness and Intravenous Bubble Formation Using a 7.8 psi Simulated Pressure Suit Environment, Aviation Space Environmental Medicine 1986

354 * NASA TM 58263 Waligora, J. M., and Horrigan, D. J., Detection of Incipient Altitude Decompression Sickness in Flight - Research and Technology Annual Report, NASA-JSC, 1984

355 * Dixon, G. A., and Krutz, R. W., Female Susceptibility to Decompression Sickness and Bubble Formation Using a Simulated 7.8 psia Suit Environment, Aviation Space Environmental Medicine, 1986

356 * Dixon, G. A, et al, 8.3 psi Decompression Sickness Risk Evaluation and Evaluation of 9.5 psia as a Suit Pressure for Prolonged EVA, NASA-JSC, 1986

357 * Krutz, R.W., Dixon, G.A., and Harvey, W.T. Minimum Pressure for a Zero-Prebreathe Pressure Suit, SAE, 1985

358 NASA TM 58259, Waligora, J. M., et .al., Verification of an Altitude Decompression Sickness Preventing Protocol for Shuttle Operations Utilizing a 10.2 psi Pressure Stage, NASA-JSC, 1984

359 * Allen, T. H., Mario, D. A., and Bancroft, R. W., Body Fats Denitrogenation and Decompression Sickness in Man Exercising After Abrupt Exposure to Altitude, Aerospace Medicine, 1971

360 * USNRC Reg. Gd. 8.8, Information Relevant to Maintaining Occupational Radiation Exposures as Low as, Reasonably Achievable (ALARA) (Rev. 3), U. S. Nuc. Reg. Commission, 1978

361 * Normane, D. Production of Activation Products in Spacecraft Components by Protons in Low Earth Orbit Trans. Am. Nucl. Soc. 11-86

362 * Benton, E. V., Summary of Current Radiation Dosimetry Results on Manned Spacecraft, Adv. in Space Research, 1984

363 Dorland Illustrated Medical Dictionary, W. B. Saunders Co., 1974

364 NASA TMX 2440, Spalding, J. F., et .al., Effects of Continuous Gamma-ray Exposure on Performance of Learned Tasks and Effects of Subsequent Fractionated Exposures, NASA, 1972

365 * SP-2-86L-064, Thornton, W, and Jackson, J., Anthropometric Study of Astronaut Candidates, 1979 to 1980, (Unpublished Data), NASA-JSC

366 8 JSC 31013, Medical Requirements of an Inflight Medical System for Space Station, NASA-JSC, 7-14-86

367 * Curtis, S., Atwell, W., Beever, R., and Hardy, A., Radiation Environments and Absorbed Dose Estimation on Manned Space Missions 26th Common Sp. Research, 7-86

368 * Matesky, I., Encyclopedia of Occupational Health and Safety, 3rd. Ed. Intl. Labor Office, 1983

369 * Mikolajczyle, H., Encyclopedia of Occupational Health and Safety, 3rd. Ed. Intl. Labor Office, 1983

370 * (FIR) AML-005, Woolford, B. Dressing Room Anthropometric Measurement Laboratory, NASA - JSC

371 * JSC 32003, Bell, L. et. al., Space Station Viewport Study Bell, and Trotti, Inc.

372 * Haines, R. F., Space Station Proximity Operations and Window Design, NASA - Ames, 3-24-86

373*CSD-A-518, Lem, J. D. and Booher, C. R., Study of the Apollo Space Suite Electrical Fire Hazard Crew Systems Division, NASA - JSC, 1-8-86

374 * MSIS Advisory Group #1 Technical Panel Instructions, 1/14/88

375 * Anatomy: A Regional Study of Human Structure, 4th ed., W. B. Saunders Co.

376 * Atlas of Topographical and Applied Human Anatomy; Urban & Schwarzenherg

377 * Wise, J. A. and Rosenberg, Erika, Interior Design and Performance Stress in Three types of Mental Tasks Environment and Behavior

378 * ANSI ES1, American National Standard for Safe Current Limits for Electromedical Apparatus, ANSI, 7/9/85

379 * Data Generated as a result of MSIS Advisory Group #1 Direction, 6/30/81

380 * NASA Life Sciences Data Book, Webb and Associates, Yellowsprings, Ohio 6/62

381 * Spacelab Payload Accommodation Handbook, T. Lee and B. Pfeiffer NASA - Marshal Space Flight Center, 7/79

382 * ANSI C95.1-1982, American National Standard Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 KHz to 100 KHz

383 * ANSI z136.1-1986, American National Standard for the Safe Use of Lasers, 5/23/86

384 * NSTS - 18798, Rev. A Interpretations of NSTS Payload Safety Requirements, NASA - JSC, 4/89

385 * Threshold Limit Values and Biological Exposure Indices for 1987-1988, American Conference of Governmental Industrial Hygienists

386 * JSC 3000 Vol. IV NC, Curves Handbook of Noise, Figure 4-6, pp. 55, Measurements, Arnold P.C. Peterson, GEN RAD Inc. , Concord, MA 1980

387 * SSP 30000 Sec. 3, Space Station Program Definition and Requirements Section 3: Space Station Systems Requirements (Rev. G), Space Station Program Office, NASA - Reston, 10/31/88

388 * Data Generated as a Result of The Space Station Freedom Man-Systems Working Group Review of Vol. IV of the MSIS 1989

389*NASA Contractor Report 187077, An Assessment of the Space Station Freedom's Leakage Current Requirement., *March 1991*

390*Roth, E.M., NASA-CR-1205, Compendium of Human Responses to the Aerospace Environment: Vol. I, Section 5, Figure 5-3. Lovelace Foundation for Med Ed & Research, NASA, November 1968

391*Dalziel, Charles F., "The Threshold of Perceptio,,,,,n Currents," AIEE Transactions, 73: 990 996, August 1954

392*MIL-STD-454M, Standard General Requirements for Electronic Equipment, December 15, 1989

393*JSCM 8080, JSC Design and Procedural Standards Manual

394*UL 544 Standard for Safety, Standard for Medical and Dental Equipment, Underwriters Laboratories, Inc., Northbrook IL, February 3, 1988

395*AFSC DH 1-6, Section 3H, Electrical/Electronic Systems, DN-3H1 "Safety Design Requirements," December 1, 1982

396*IEC 479-1, Effects of Current Passing Through The Body, 1984

397*Conversation between Calspan/M. Barry Greenberg, PE, and UL shock specialist Mr. Walter Skug-gevig, UL: Melville, NY, October 1990

398*Dalziel, Charles F. , "Electric Shock Hazard," IEEE Spectrum, 41-50 February 1972

399*NFPA 99, Standard for Health Care Facilities, National Fire Protection Association, Inc., Quincy MA, January 12, 1990

400*NFPA 70 National Electric Code, Article 517 "Health Care Facilities," Paragraph 517-11 "General Installation/Construction Criteria," National Fire Protection Association, Inc., Quincy, MA, January 12, 1990

401*NFPA 70 National Electric Code, Article 517 "Health Care Facilities," Paragraph 517-15 "Maximum Potential Difference," National Fire Protection Association, Inc., Quincy, MA, January 12, 1990

402*DOD-E-8983C, Electronic Equipment, Aerospace, Extended Space Enviornment General Specification for, General Design Requirements Paragraph 3.3.16. December 29, 1977

403*Contract CPSC-C-79-1034, Development of Test Equipment and Methods for Measuring Potentially Lethal and Otherwise Damaging Current Levels, October 1982. Prepared for US Consumer Product Safety Commission, Division of Electrical and Electronic Engineering, Washington, DC, by Underwriters Labortories, Inc., Melville, NY

404*Sensitivity analyses by Calspan/M. Barry Greenberg, PE, of data presented to U.S. Consumer Product Safety Commission in Contract, CPSC-C-79-1034

405*NASA/Human Resource Policies and Procedures Committee (HRPPC), "Redbook" for crewmembers unable to readily remove bioinstrumentation electrodes

406*JSC - 32283 - Nutritional Requirements for Extended Duration Orbiter Missions (30-90 d) and Space Station Freedom

407*Snyder, R. G., Physiological effects of impact: Man and other mammals., In P.L. Altman & D.S. Dittmer (Eds.), Environmental biology. AMRL-TR-66-194, Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio, 1966(b)

408*Synder, R. G., Human tolerances to extreme impacts in free fall, Aerospace Medicine, 1963, 34(8), 695-709

409*Snyder, R. G., & Snow, C. C., Fatal injuries resulting from extreme water impact, Aerospace Medicine, 1967, 38(8), 779-783.

410*IEEE C95.1-1991- "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz", April 27, 1992

411*Space Radiation Analysis Group, SN31, JSC

412*Smart, D. F. & Shea, M.A., Private Communication

413*Reedy, R. et. al., "Solar Particle Events During the Rising Phase of Solar Cycle 22, Workshop on Ionizing Radiation Environment Models and Methods, Part I, April 16-18, 1991, Huntsville, Alabama

414*Golightly, M.M. , Hardy, A. C., and Hardy, K., "Results of Time Resolved Radiation Exposure Measurements made During US Shuttle Mission with a Tissue Equivalent Proportional Counter," Advances in Space Research, Volume 14, No. 10, pages 923-926, 1994

415*Chambers, R. M., & Hitchcock, L. The effects of acceleration on pilot performance. NADC-MA-6219, Naval Air Development Center, Johnsville, Pennsylvania, 1963

416 *ICRP Report 60, "1990 Recommendations of the International Commission on Radiation Protections (ICRP)

417* Smedal, H.A., et. al., The Psysiological Limitations of Performance During Acceleration, Aerospace Medicine, June 1963

418* Hyde, Alvin S. , The Effect of Back Angle, Molded Support, and Staged Evisceration Upon Intrapulmonary Pressure in Dogs and a Monkey During Forward (+Gx) Acceleration, Tech. Doc. Report AMRL-TDR 62-106, September, 1962

419* "Guidance on Radiation received in Space Activities," National Council on Radiation Protection and Measurement, NCRP Report #98, 7-31-89

APPENDIX C

MSIS GLOSSARY LIST

5th Percentile Oriental Female

Oriental females falling at the 5th percentile based on the size of the oriental female population. The smallest human size considered for design purposes.

95th Percentile Caucasian Male

Caucasian males falling at the 95th percentile based on the size of the Caucasian male population. The largest size considered for design purposes.

Abduction

The movement of a body segment away from the midline of the body or body part to which it is attached.

Acceleration

The time rate of change of velocity.

Acidosis

Reduction of alkali reserve due to excess of acid metabolites.

Actuation force

The force required to operate a mechanical device such as a tool, access door, or fastener.

Acute $C0_2$ Toxicity

Condition of exposure to high-level concentrations of carbon dioxide; associated physiological response.

Adaptive Response

Change in structure, form, or behavior of an organism to suit a new environment.

Adduction

The movement of a body segment or segment combination toward the midline of the body or body part to which it is attached.

Aerobic Power

Aerobic power is the total amount of power an individual generates. It is related to useable power output by an efficiency factor which varies with the task and the individual.

Alveolar Pressure

Gas pressure existing within alveoli.

Alveoli

The air sacs of the lung.

Anatomical Position

A baseline posture for measuring joint motion range. The posture is standing upright, head facing forward, arms hanging down with the palms facing forward.

Annoyance

The sense of being troubled, irritated, or disturbed by unwanted noise

Anoxia

Total lack of oxygen.

Anthropometry

Anthropometry is the application of scientific physical measurement methods to human subjects for the development of engineering design standards and specific requirements and for evaluation of engineering drawings, mock-ups, and manufactured products for the purpose of assuring suitability of these products for the intended user population.

Anxiety

Nervous or fear reaction to perception of danger.

Astigmatism

A defect of an optical system in consequence of which rays from a point fail to meet in a focal point resulting in a blurred and imperfect image.

Atelactasis

Collapsed or airless state of all or part of the lung.

Atmosphere

1) The mixture of gasses surrounding the Earth or filling the habitable volume of a spacecraft.

2) The pressure exerted by a column of mercury 760 mm high at 1 G, equal to 101.329 kilopascals.

Beats

A periodic sound resulting from the interaction of two or more sounds of different frequencies.

Bends

Common symptom of decompression sickness. Caused by gas bubbles in blood stream. Characterized by pain, poorly localized but tending to occur in joints.

Binary Number System

A base 2 number system using only 1's and 0's. Well suited for electronic logic where the 1's and 0's can be represented by signal present and signal absent.

Binaural

Of, relating to, or involving both ears.

Biomechanics

Biomechanics is the interdisciplinary science (comprising mainly anthropometry, mechanics, physiology, and engineering) of the mechanical structure and behavior of biological materials. It concerns primarily the dimensions, composition, and mass properties of body segments; the joints linking the body segments together; the mobility in the joints; the mechanical reactions of the body to force fields, vibrations, and impacts; the voluntary actions of the body in bringing about controlled movements, in applying forces, torques, energy and power to external objects like controls, tools, and other equipment.

Bit-Mapped Graphics

The data that defines the pixel color which is behind the screen pixel.

Blackout

(see Graying of Vision)

Body Envelope

The volume envelope which just encloses the body and body motions during an activity.

Bolus

Used in this document to designate mass of fecal discharge.

Bremsstrahulung

Gamma radiation emitted by an electron when it is deflected by the Coulomb field of an atomic nucleus of charge Z; the fraction of energy radiated as photons by an electron of initial energy E (Mev) is approximated numerically by ZE/1000.

Brightness

The amount of light emitted or reflected from a surface.

Brightness Ratio

The ratio of the luminance of two areas or surfaces.

British Thermal Unit (Btu)

The amount of heat required to raise 1 lb of water 60 degrees F, 1 degree F.

Cabinet

A structural housing into which drawers and shelves are installed. Generally, there is no utility connections between the cabinet and the items installed within it. (See: Housing).

Carcinogenesis

Origin or production of cancer

Cardiac Arrythmias

Periodic irregular heartbeat

Cardiovascular System

Pertaining to the heart and blood vessels.

Cartwheeling

Vernacular descriptive of inertial resultant of human body to rotational acceleration around the x-axis. (Refer to Figure 5.3.1-1.)

Cataractogenesis

Causing the formation of cataracts

Central Acuity

Center part of the visual field.

Cerebral Hemodynamic Effects

Blood circulation and pressure effects in the head.

Chassis Leakage Currents

Currents generated by such internal sources as filter capacitors terminated to accessible parts or ground, and capacitive and inductive coupling to accessible parts or ground. These currents can be conveyed form accessible parts and subsequently applied to a crew member.

Chokes

Syndrome of chest pain, cough, and respiratory distress.

Chronic CO_2 Toxicity

Condition of exposure to long-term, low-level excess concentrations of carbon dioxide, associated physiological response.

Circadian Rhythms

Bodily functions rhythmically fluctuating with time. These functions include heart rate, blood pressure, body temperature, and respiratory volume. Generally, these metabolic functions slow for a period of time once during a 24 hour period. The most important activity geared to circadian rhythms is sleep.

CO_2 Withdrawal

Symptoms arising from cessation of exposure to excess CO_2.

Color Saturation

Saturation is the extent to which an object has more or less color. Saturation is, therefore, relative colorfulness.

Coma

Unconsciousness from which an individual cannot be aroused.

Command Language (command set)

A set of terms, each with a precise function, used to control the operations of a computer.

Contaminants

Unwanted material or bacteria.

Continuous Noise

A noise with negligibly small fluctuations of level within the period of observation

Contrast

The difference between the luminance of an object or figure $C = [(Lc + Lr) - (Ld + Lr)] / (Lc + Ld + 2Lr)$ and its immediate background.

C = Contrast

Lc = Object luminance

Ld = Background luminance

Lr = Reflected luminance

Control

A manually operated hardware item used to operate or change the performance of a machine or system.

Core-Shell Concept

Concept of representing a human as a heat-producing core surrounded by a shell (skin) through which heat exchange with the environment takes place.

Coronary Occlusion

Occlusion of a branch of the arterial system that supplies blood to the heart muscle.

Coulomb Friction

Sliding or kinetic Friction.

Crew Station

Any location where a task or activity is performed. There are two basic types of crew stations: workstation and activity center.

Critical Flicker Fusion Frequency

The frequency at which a flashing light will appear as a steady state light - approximately 65 Hz.

Cyanosis

Bluish tinge in mucous membranes and skin due to excessively reduced hemoglobin In capillaries.

Dark Adaptation

Dark adaptation is the state of being adapted (sensitive) to low levels of ambient luminance (brightness). At any one time the visual system operates well within only a limited range of luminance levels. This range is centered about a particular adaptation level that is determined by the prevailing luminance. As the prevailing luminance changes the adaptation level will also change. The adaptation level shifts more quickly to higher than lower luminance levels.

Dead-Faced

An electrically conductive surface incapable of supplying sufficient energy under normal conditions to present a hazard (e.g., the output of a solid-state switch when in the "STANDBY" state).

Decompression Sickness

Collective term for symptoms caused by gas bubbles formed in body tissues and blood from exposure to rapid decrease in barometric pressure.

Default Values

A value or option automatically provided by the computer system for use in processing when no alternative has been specified by the operator.

Delirium

A condition of mental confusion, often with hallucinations.

Denitrogenation

The act of reducing dissolved nitrogen concentration in tissues, usually by breathing mixture devoid of nitrogen.

Dependent Elbow

The elbow being engorged with blood during acceleration.

Design Eye Volume

That volume of space in front of a workstation within which a user's head and eyes should be located to guarantee visual access to all display information. The design of displays and display layout may be guided by a specified design eye volume.

Desquamation

Shedding, peeling, casting off

Diluent Gas

Physiologically inert component of an atmosphere, purpose of which is to reduce oxygen partial pressure-

Direct Contact

The personal contact of a crewmember to electrically powered surfaces.

Direct Glare

Glare produced by a light source located within a person's field-of-view.

Display

Hardware item used to present system information needed by the operator to make decisions for controlling the system.

Door

Used in Section 8.0, Architecture, to denote a full opening body passageway. A door opening is closed with a door cover. A door cannot be sealed against a differential pressure.

Double Insulated Enclosure/Chassis

An enclosure/chassis which incorporates an insulation system comprised of basic insulation and supplementary insulation with the two insulations physically separated and so arrancged that they are not subject to the same deteriorating influences (e.g., temperature, contaminants, and the like) to the same degree.

Drawer

A hardware element designed to slide in and out of a cabinet, rack, or housing. (See: Equipment drawer, Storage drawer)

Dry Bulb Temperature

Air temperature measured by a common thermometer.

Dysbarism

Condition arising from differential pressures between gas pockets in body and ambient. In this document, considered to indicate greater pressure within body cavities.

Dyskinesia

Impaired or abnormal motion of voluntary or involuntary muscles

Dysmetria

Impaired ability to estimate distance in muscular action.

Dyspnea

Difficult or labored breathing.

Ear Clearing

Act of equalizing pressure between inner ear and ambient.

Ebullism

Vaporization of body fluids at body temperature and low barometric pressure.

Edematous Eyelids

Excessive accumulation of fluid in eyelids due to the disturbances of fluid exchange.

Effective Temperature

Empirical sensory index accounting for temperature, humidity and air movement.

Electrical Shock

Sudden stimulation of the nerves and convulsive constriction of the muscles caused by the discharge of electricity through the body.

Emboli

Abnormal particles such as air bubbles circulating in the blood

Embolism

Occlusion of a blood vessel. In the case of gas embolism, by a bubble of gas.

Enclosure/Chassis

The outer casing of an electrical/electronic device.

Enhancement Coding

Any of a variety of techniques used to enhance, or increase the salience of selected items of information (e.g., color coding. It is well suited for interactive computer applications.

Environmental Control

Control of ambient conditions to produce habitable environments.

Equipment Drawer

A drawer used to house subsystem components. The installed components are generally attached to the drawer using fasteners which require tools for attachment/disattachment. It has utility connections to its housing's utility distribution system.

Erythema

Skin reddening (e.g., sun burn)

EVA (Extravehicular Activity)

Activities performed by a space-suited crewmember in an unpressurized or space environment.

EVA Restraint

A means of stabilizing the EVA crewmember which requires physical ingress and egress by the crewmember.

EVA Workstation

Any area at which an EVA task is performed.

Exchange Rate

The increase in sound level (dBA) for which permissible exposure time is halved

Exposure Limit

Maximum safe acceleration exposure limit as a function of vibration frequency and exposure time.

Extension

Straightening or increasing the angle between the parts of the body.

Extravehicular Mobility Unit

An independent anthropometric space suit system that provides crewmembers with environmental protection, life support, mobility, communications, and visibility while performing various EVAs.

Eyeballs Down

Vernacular descriptive of inertial resultant of human body to linear acceleration in the upward + Gz vector. (Refer to Figure 5.3.1-1).

Eyeballs In

Vernacular descriptive of inertial resultant of human body to linear acceleration in the forward -Gx vector. (Refer to Figure 5.3.1-1.)

Eyeballs Left

Vernacular descriptive of inertial resultant of human body to linear acceleration in the left yaw +Gy vector. (Refer to Figure 5.3.1-1.)

Eyeballs Out

Vernacular descriptive of inertial resultant of human body to linear acceleration in the backward +Gx vector. (Refer to Figure 5.3.1-1.)

Eyeballs Right

Vernacular descriptive of inertial resultant of human body to linear acceleration in the right yaw -Gy vector. (Refer to Figure 5.3.1-1.

Eyeballs Up

Vernacular descriptive of inertial resultant of human body to linear acceleration in the downward -Gz vector. (Refer to Figure 5.3.1-1.)

Facility

Equipment or equipment and the area dedicated to a specific crew activity. Similar to the term "Center," but "Facility" can refer to only equipment without specifying an area of use. Examples: Shaving Facilities, Recreation Facility.

Fatigue Decreased Proficiency Boundary

Acceleration boundaries as a function of vibration and exposure time for the preservation of working efficiency.

Flexion

Bending or decreasing the angle between the parts of the body.

Follower

The visual movable indicator on a computer video screen that points to or marks the current position at which a character may be entered.

Foot Restraint

A restraint which stabilizes a crewmember by providing a platform for immobilizing the feet.

Gas Exchange

The flow of gas through a membrane in the small air sacs in the lungs to the blood stream and vice versa.

Gas Tension

The partial pressure exerted by a gas.

Glare

A consequence of bright light sources in the visual field that cause discomfort and/or a decrease in visual functioning. The effect is worse the closer the light source is to the line of gaze. The amount of light scattering within the eye (which varies between individuals effects susceptibility to glare.

Globe Temperature

Physical composite of dry bulb temperature, radiation, and wind effects measured by placing a temperature sensing device in the center of a blackened sphere.

Glottis

Opening between the free margins of the vocal folds.

Graying of Vision

Due to the draining of blood from the occipital region of the brain during acceleration, the vision begins to narrow (tunnel vision) and things appear less bright.

Grayout

(see Graying of Vision)

Grounded Enclosure/Chassis

An enclosure/chassis electrically connected to the ground return.

Gustatory Sensations

Pertaining to the sense of taste.

Habitable Volume

Habitable volume is defined as free, pressurized volume, excluding the space required for equipment, fixtures,

Handhold

A handle or grasp area which is slightly larger than the hand and is used as a mobility aid, hand restraint, or as a hardware mounting surface.

Handrail

A handle or grasp area which is several times longer' than the hand that is used as a mobility aid, hand restraint, or as a hardware mounting surface.

Harmonic

An overtone having a frequency that is an integral multiple of a given primary tone.

Hatch

Used in this document to denote a full body passageway. A hatch opening is closed with a hatch cover. A hatch can be sealed against a differential pressure

Heart Arrhythmia

Lack of rhythm in heart action.

Heat Exhaustion

(Also known as heat prostration) - A syndrome resulting from exposure to high temperatures; characterized by a moist, cold skin, poor circulation, a normal temperature but elevated rectal temperature, restlessness and anxiety.

Heat Stroke

The body temperature rises because of faulty heat dissipation due to high environmental temperature and humidity. Rectal temperatures may go from 106 - 100 deg F.

Hematopoietic

Blood producing

Hemoglobin

Oxygen carrying cells of the blood.

Hemorrhage

Escape of blood from vessels.

Hexadecimal Number System

A base 16 number system used by computers in which each digit represents a power of sixteen. For each digit of a hexadecimal number four digits (24=16) of binary logic are required.

Hierarchical Menu

A set of embedded menus such that entries in all but the lowest level menu will produce another menu when selected.

Housing

A structure into which equipment is installed. (See: Cabinet, Rack)

Hyperbaric

Dealing with ambient pressures which are greater than the gas pressures in the body.

Hyperoxia

Oxygen excess condition arising when greater than normal oxygen partial pressures are encountered.

Hypobaric

Dealing with ambient pressures which are less than the gas pressures within the body.

Hypotension

Low blood pressure

Hypothermia

Subnormal temperature of the body.

Hypoxia

Oxygen deficiency.

Icon

A symbol that graphically resembles its intended meaning (e.g., a schematic drawing or a headlight on the control that is used to control an automobile's headlights).

Illumination

The amount of light (luminance flux) falling on a surface. Measured in lumen/m_2 lux = 0.093 ft-c. Illumination decreases with the square of the distance from a point source.

Impact Acceleration

Pulsed or short-duration accelerations of less than 1 sec. duration.

Impact Noise

See Impulse Noise

Impulse Noise

A noise consisting of one or more bursts of sound energy, each of a duration less than about one second

Inaccessible area

Any area with an opening that will accept a loose and floating object of 10mm (0.4in.) diameter and cannot be retrieved or captured by using a retrieval tool and/or crewmember reaching their hand and forearm into the area.

Inclusions

Tiny particles of foreign matter or air bubbles entrained in glass.

Incontinence

Inability to control the natural evacuation of the feces or urine; specifically, involuntary evacuation due to organic causes.

Infrasonic

Sound at frequencies below the audio range, f 20 Hz

Indirect Contact

The contact of a crewmember to electrically powered surfaces through an electrically conducting medium (e.g., probe, rod).

In-Line Circuit Leakage Currents

Unintentional currents which can flow in a conductor. These currents may result from the inability of solid-state electronics to reach an "infinite" impedance "OFF" state, as is the ability of a mechanical switch. The solid-state electronic device has a finite impedance which undesirably completes the input/output circuit thus providing a means for current to flow. Connections to in-line circuits are normally isolated from crewmember inadvertent contact by barriers and may be considered a hazard if accessible to inadvertent crewmember contact. In-line circuits with leakage currents are referred to as in "STANDBY" when placed in the high impedance state since a complete disconnect is not possible and the circuit output is still energized.

Intermittent Noise

A noise whose level suddenly drops to the level of the background noise several times during the period of observation, the time during which the level remains at a constant value, different from that of the ambient being of the order of magnitude of one second or more

Ischial Tuberoscities

Two bony protuberances in the hip structure. These bones support a major portion of the seated body weight in 1-G conditions.

Isolated Patient Contact

A direct or indirect patient contact that is deliberately separated from the supply circuit and ground by virtue of spacings, insulation, protective impedance, or a combination thereof (e.g. intra-aortic pressure monitor).

Isometric Joystick

The isometric joystick, often referred to as a force joystick or a pressure joystick, is a lever that doesn't move. The output of the isometric joystick is a function of the amount of force applied to it.

Isotonic Joystick

The isotonic joystick, often referred to as a displacement joystick, provides an output which is proportional to the displacement of the joystick from the center.

Keystone Effect

A distortion in the shape of a projected image resulting from the film plane and screen plane not being parallel. Usually, magnification will vary from top to bottom or right to left.

Kinesthetic System

Sensations originating in the sense organs of the muscles, tendons, and joints that provide us with a sense of relative body segment movement and position.

Lacrimation

Crying. tear production.

Lateral Rotation

The turning away from the midline of the body.

Leakage Currents

Unconditional currents which can be applied to a crewmember.

Level Equivalent or L_{eq}

Equivalent sound level or time-average sound level in dB. The level of steady sound which, in a stated time period and at a stated location, has the same A-weighted sound in dB energy as the time-varying sound.

Leukopenia

Lack of white blood cells

Light scatter fraction

The ratio of scattered light to specular reflected light.

Line of sight

The optical axis extending from the observers eyes to the target viewed.

Line of sight deviation

The angle which the line of sight is redirected into the eye due to intervening optically refractive material (e.g., prism).

Linear Acceleration

The rate of change of velocity of a mass; the direction of movement of which is kept constant.

Local Vertical

Local vertical is achieved by a consistent arrangement of vertical cues within a given visual field to provide an definable demarcation at the crew station boundary within the visual field. A consistent local vertical within modules is highly desirable.

Long Term Mission

Any mission in which crewmembers are away from earth for a period greater than two weeks.

Luminance

The photometric equivalent of the brightness of an area as viewed from a given direction. More technically, luminance flux per unit of projected area per unit solid angle. Measured in candela per square meter (cd/m2), footlamberts (ft-L, or millilamberts (mL). 1.0 cd/m2 0.31 mL = 0.29 ft-L. The luminance of a surface does not vary with the distance of the observer from the surface being viewed.

Luminance Ratio

The difference between the luminance of an object and its surroundings.

Masking Noise

A background noise or signal with dynamic range in frequency and level sufficient to obscure another noise or signal from aural awareness

Mean Perception

A mild shock perceived by 50% of the population.

Medial Rotation

The toning toward the midline of the body.

Mediastinal Emphysema

Accumulation of gas in the tissues of the mediastinum.

Menu

A method for inputting information to a computer. The menu is a list of the available input options that may be selected.

Meridional

A line or a plane which is normal to the line of sight.

Metabolism

Physiological activity involving utilization of foodstuffs and oxygen to produce tissues and provide for production of energy.

Micturition

Urinary discharge.

Minification

An image that is smaller than actual size.

Minimal Passageway

A minimal passageway is a translation path which is only large enough to permit passage of a space suited crewmember with his or her long axis in the direction of travel.

Mobility Aid

A device (such as a handle) or a surface (padding which facilitates translation in a microgravity environment.

Narcosis

A state of profound stupor, produced by toxic effect of certain substances, in diluent gas narcosis, by excessive partial pressure of diluent.

Narrow Band Noise

A simple or complex tone having intense and steady state frequency components, relative to wideband noise components, in a very narrow band (1, of the octave band or 5Hz, whichever is less) and is heard as a musical sound either harmonic or discordant.

Nausea

Discomfort in stomach with aversion to food and tendency to vomit.

Neurocirculatory System

Concerned with both nervous and vascular systems.

Neutral Body Posture

The characteristic posture that the relaxed human body assumes in microgravity.

No Sensation

The level of perception only perceived by a fractional percentage of the population.

Noise Cancelling

A technique to delete, neutralize, or counteract any unwanted electrical signal within a communication system that interferes with the sound or image being communicated.

Noise Shields

The physical coverings or shells used to protect or screen any unwanted electrical signal within a communication system that interferes with the sound or image being communicated.

Non-adaptive Response

Pathological response to a new environment which presents conditions beyond an organisms ability to adapt to.

Normoxic

Having a normal level of oxygen.

Nuerocirculatory collapse

R psychosomatic disorder characterized by dyspnea, palpitation, vertigo, faintness, fatigue. Tremor, caused by stress, fear, and violent exercise.

Octal Number System

A base 8 number system in which each digit represents a power of eight. For each digit of an octal number three digits (23 = 8 of binary logic are required.

Octave Band

The band of frequencies where the highest frequency is twice that of the lowest frequency

One-Third Octave Band

The band of frequencies In which the ratio of the extreme frequencies is equal to the cubic root of 2: i.e. fn/fe 1.260, where fn and fe are the highest and lowest cutoff frequencies of the band.

Orbital Replacement Unit (ORU)

A piece of equipment (a single item or module containing an assembly of components) which is designed for removal and replacement as a unit.

Ordinary Patient Connection

A direct patient contact that does not have the spacing, insulation, or protective impedance associated with an isolated patient connection (e.g., blood pressure cuff).

Orthostatic Intolerance

Difficulty in standing erect in a l-G environment. This could be due to any number of effects of exposure to microgravity (cardiovascular, muscular, skeletal, or coordination.

ORU Chassis Leakage Currents

Currents generated by such internal sources as filter capacitors terminated to accessible parts or ground, and capacitive and inductive coupling to accessible parts or ground. These currents can be conveyed from accessible parts to ground or other accessible parts and subsequently applied to a crewmember.

Overall SPL

Overall SPL (Sound Pressure Level) is interpreted as including all noise within the frequency range from 22.4 to 11,200 Hz.

Oxygen Atelectasis

Collapsed or airless state of all or part of a lung.

Oxygen Toxicity

Toxic effects of excess oxygen partial pressure.

Parallax Error

The perceived change in relative position of objects at different distances from an observer when viewed from different positions. Can cause errors in the reading of some instruments.

Paresthesias

A sensation of tingling, crawling, or burning of the skin.

Paroxysm

A sudden increase in the appearance or intensity of symptoms.

Pass-Through

A pass-through is a translation path which is only large enough to permit passage by an IVA clothed crewmember with his or her long axis in the direction of travel.

Passageway

A pass-through area between non-adjacent modules or spaces.

Patient

A crewmember instrumented with electrical/electronic equipment.

Patient Connection Leakage Current

Leakage currents measured between patient leads at the patient interface, or between patient leads at the patient interface and ground.

Pattern Coding

A perceptual indicator used to differentiate areas of interest to the observer, or reduce operator search time.

Peak Pressure Level

Peak sound pressure for any specified time interval is the maximum absolute value of the instantaneous sound pressure in that interval.

Percentile

A point on a scale indicating the percentage of persons within a population who have a body dimension of a certain size or smaller. The value of the statistical variable that marks the boundary between the consecutive intervals in a distribution of 100 intervals, each containing one percent of the total population.

Perception

A mild shock.

Perfusional changes

Changes in the flaw rate of blood in blood vessels 21

Petechial Hemorrhages

A minute, rounded spot of hemorrhage on a surf ace such as skin, mucous membrane, serous membrane, or on a cross-sectional surf ace of an organ.

Photokeraratoconjunctivitis

The action of light that causes an Inflammation of the conjuctiva of the cornea of the eye.

Photokeratitis

Inflammation of the cornea.

Physiologically Inert

Substance that does not Interact chemically with the body.

Physiology

The functions of living organisms.

Pixel Addressability

The capability to store or retrieve from, a specific location in memory, the basic unit or picture element that makes up the image displayed in a video screen.

Pleura

Membrane enveloping the lung and lining the thoracic cavity.

Pneumothorax

The presence of gas in a pleural cavity.

Postrun Headache

Headache that occurs after an event.

Predicted Four-hour Sweat Rate

Empirical index incorporating environment, work and clothing to predict sweat production.

Pre-Emphasis

The intentional alteration of the relative strengths of signals at different frequencies (as in radio and in disc recording) to reduce adverse effects (as noise) in the following parts of the system.

Primary Passageway

A primary passageway is a translation path which accommodates a space suited crewmember in an upright working position or neutral body posture.

Prompt

A message or other signal displayed on a computer generated display advising the operator that he or she is expected to provide some specific response.

Pronation

The rotation of the forearm so that the palm faces downward.

Proxemics

The study of the nature, degree, and effect of the spatial separation individuals naturally maintain (as in various social and interpersonal situations) and of how this separation relates to environmental and cultural factors.

Proximity Operations

Any space module related activity that is performed outside the space module and within a specified boundary.

R value

Ratio of initial nitrogen partial pressure to the final total pressure.

Rack

A structure into which equipment drawers or other types of equipment mounting hardware is installed. A rack generally has a built-in utility distribution system that provides interfaces far connecting the installed equipment's utilities.

Random Noise

A sound whose instantaneous amplitudes occur, as a function of time, according to a normal (Gaussian) distribution curve. Random noise need not have a uniform frequency spectrum.

Reaction Time

The time between the presentation of a stimulus and the beginning of a response to that stimulus.

Reduced Comfort Boundary

Acceleration boundaries as a function of vibration and exposure time for the preservation of comfort.

Remote Operation

An operation which permits personnel to send and receive information or commands to a distant environment.

Replacement Unit

General term that includes Orbital replacement units (ORU), Line replacement units (LRU), and Shop replacement units (SRU).

Respiration

The series of actions resulting in the supply of oxygen to tissues of the body.

Response Time

The time interval during which the actual response to the stimulus is accomplished.

Restraint

A mechanism for restricting unwanted movements of an object or a person in microgravity environments. Restraints can be mechanical (such as a strap) or non-mechanical (magnetism or vacuum.

Reverberation Time

Time required for the average sound energy density in an enclosure to decrease to -60 d B of the initial value after the source has stopped.

Roentgen Equivalents, Man

The absorbed dose of any ionizing radiation which produces the same biological effects in crewmembers as those resulting from the absorption of 1 roentgen of x-rays.

Rotational Acceleration

The rate of change of the direction of a mass, the velocity of which is kept constant. In this regard, the rotational acceleration is directly proportional to the square of the velocity and inversely proportional to the radius of the turn.

Sacrificial surfaces

A protective surf ace placed over a delicate surface which will absorb environmental damage.

Scrolling

An operation or facility of a VDT in which display elements make a continuous bottom-to-top vertical movement across the screen (or window) under control of the operator, with display lines appearing at the bottom edge and dropping off at the top.

Segment

A body segment is the largest dimensional mass which when moved will maintain a constant geometry.

Shock

Physical or emotional trauma; clinical manifestations of inadequate amount of circulating blood. (also see Impact Acceleration)

Shock - Electrical

See Electrical Shock

Shock Load

See Impulse Acceleration

Signal-To-Noise Ratio

The ratio of the amplitude of the signal transmitted through an instrumentation system to the amplitude of the noise generated within the system.

Somersaulting

Vernacular descriptive of inertial resultant of human body to rotational acceleration around the y-axis. (Refer to figure 5.3.1-1.)

Sonic

Sound at frequencies within the range of hearing 20 Hz 20KHz

Space Module

An inhabited establishment away from the earth.

Space Motion Sickness

A malady occurring in approximately 50, of people initially exposed to microgravity. Symptoms are similar to that of motion sickness and last 2-4 days. To date, susceptibility to space motion sickness has not been predictable from responses In a l-G environment. Only limited success has been achieved in controlling space motion sickness.

Specularar Glare

Glare which is created by the image of a light source reflecting off a surface within a person's field-of-view.

Specular Reflection

The reflected image of the light source corresponds very closely in size and shape to the original light source.

Speech Interference Level

The background or sound noise level in dB at frequencies between 150 and 7500 Hz that will result in the loss of intelligibility conversation.

Squeeze

Condition arising when gas pocket is compressed to a smaller size than its normal residual volume.

Standby

A high impedance state of an electronic device, usually to minimize the amount of energy consumed or supplied (e.g., the off state of an electronic switch).

Standard Passageway

A standard passageway is a translation path which accommodates an IVA clothed crewmember in an upright working position or neutral body posture.

Stroke

Common term for apoplexy; hemorrhage into the brain, causing sudden onset of coma and neurological signs.

Subcutaneous Emphysema

Accumulation of gas under the surface of the skin.

Suffusion

A spreading or flow of any fluid of the body into surrounding tissue; an extensive superficial extravasation of blood.

Supination

The rotation of the forearm so that the palm faces upward.

Symbol

A character or graphic that stands for or represents something else such as operations, quantities, elements, relations, or qualities.

Syncope

Sudden loss of strength, fainting.

Teleoperator

A remotely controlled mobility module which incorporates sensory and manipulative subsystems for the purpose of extending the human operator's skills and cognitive capabilities into hostile or remote environments.

Tether

A hook and lanyard which is used to attach a crewmember or a piece of hardware to a piece of hardware.

Thermal Comfort

That condition of mind which expresses satisfaction with the thermal environment. Specifically, when the core temperature is normal, and the rate of body heat storage is zero.

Thermogenesis

Muscular heat production by shivering.

Thermogenesis

Production of heat.

Thermoregulation

Regulation of temperature, particularly self-regulation of body temperature.

Thrombocytopenia

Lack of blood platelets

Tinnitus

Ringing in one or both ears.

Tissue

An aggregation of similar cells and associated with intercellular substance.

Touch Temperature

Temperature of objects in direct physical contact.

Toxicity

The quality of poison; the kind and amount of poison produced by a microorganism

Tracheal Pressure

Gas pressure existing within the trachea (wind pipe).

Translation

To move from one place to another by use of reaction power.

Transmissivity

The proportion of luminous flux which passes completely through a window to the eyes or sensor to the amount of luminous flux incident upon the outside of the window.

Troland

Retinal illuminance resulting from viewing a surface with a luminance of 1 cd/m^2 through an artificial pupil with an area of $1mm^2$.

Tunnel

A passageway which allows the crewmember to move only along his/her longitudinal axis.

Twist

Vernacular descriptive of inertial resultant of human body to rotational acceleration around the z-axis. (Refer to Figure 5.3.1-1.)

Ultrasonic

Sound at frequencies above the audio range, f 20 KHz.

Urethra

The canal that carries urine from the bladder.

Vasoconstriction

Decrease of size of blood vessels to decrease blood flow to the skin to preserve body heat

Vasodialation (Vasodilatation)

Increase of size of blood vessels to allow increased blood flow to the skin to promote heat loss.

Vestibular System

Located in the inner ear, the vestibular system is responsible for the sense of balance (and relative position of the body with respect to the environment). The vestibular system senses acceleration and direction of gravity.

Viewport

A transparency located such that an observer can see from one compartment into another.

Visual acuity

The smallest resolvable detail an observer can see.

Visual Angle

The angle formed at the eye by two imaginary lines drawn to either side of the object in question.

Visual Clutter

Visual clutter results when the quantity of information in a visual display becomes great enough so that it starts to result in information overload. Accuracy and speed of performance will decline as visual clutter increases.

Visual Display Terminal

An electronic device used to present visual information that is usually computer generated. They are used in conjunction width both the Input and output of information. Examples include: cathode ray tub (CRT), liquid crystal diode (LCD, light emitting diode (LED), plasma, and electro-luminescent (EL).

Wavefront Deviation

Any change in the reflected wavefront of a set of rays as compared with the incident wavefront of the same set.

Wet Bulb Glove Temperature

Calculated refinement of globe temperature by weighting dry bulb and wet bulb temperatures with the standard globe temperature.

Wet/Dry Index

Calculated prediction of human stress temperature accounting for wet and dry bulb temperatures.

Wing Tab Connector

An electrical utilities or other connector with two opposed radial tabs to facilitate EVA connect or disconnect.

X-axis

Pack to chest (anatomical)

Y-axis

Right to left side (anatomical)

Z-axis

Foot (or buttocks to head (anatomical).

APPENDIX D

ABBREVIATIONS AND ACRONYMS

USER'S GUIDE

This appendix contains an alphabetized listing of the abbreviations and acronyms used in the text and figures of Volumes I and IV. In the text, these were italicized the first time the abbreviation or acronym was used within a topical section. In most cases, the definition was shown adjacent to this first use.

Additional References for Abbreviations and Acronyms

Users are referred to the following references for official lists of abbreviations and acronyms that are used by NASA and the DOD:

34
MIL-STD-12D, Abbreviations for Use on Drawings, Specifications, and Standards

65
MSFC-STD-350A, Abbreviations for Use in Drawings

93
USAS Y1O.3-1968, Letter Symbols for Quantities Used in Mechanics

ACRONYM	DEFINITION
+Gx	Forward acceleration (see Figure 5.3.1-1)
+Gy	Right yaw acceleration (see Figure 5.3.1-1)
+Gz	Upward acceleration (see Figure 5.3.1-1)
+Rx	Left roll velocity (see Figure 5.3.1-1)
+Ry	Forward pitch down velocity (see Figure 5.3.1-1)
+Rz	Right yaw velocity
- Gx	Backward acceleration (see Figure 5.3.1-1)
- Gy	Left yaw acceleration (see Figure 5.3.1-1)
- Gz	Downward acceleration (&ee Figure 5.3.1-1)
- Rx	Right roll velocity (see Figure 5.3.1-1)
- Ry	Backward pitch up velocity (see Figure 5.3.1-1)
- Rz	Left yaw velocity
1/3 OB	One-third octave band
ACGIH	American Conference of Governmental Industrial Hygienists
ADS	Altitude decompression sickness
AFSC	Air Force Space Command
AI	Articulation index
ALARA	As low as reasonably achievable
AMU	Atomic Mass Unit
ANSI	American National Standards Institute
Ar	Argon
ASHRAE	Amer. Soc.of Heating, Refrig., and Air Conditioning Engrs
ATA	Atmospheres, absolute
a_x	x-axis acceleration
a_y	y-axis acceleration
a_z	z-axis acceleration
BHS	Body heat storage
BIB	Built-in breathing
BITE	Built-in test equipment
BTPS	Body temperature and pressure saturated with water
Btu	British thermal unit
CCTV	Closed circuit television
CFU	Colony forming units
CO_2	Carbon dioxide
CRS	Cosmic ray source
CRT	Cathode ray tube
CWS	Control and warning system
D	Absorbed dose
DACT	Disposable absorbent containment trunk
dB	Decibels
DO	Dry bulb temperature
DCS	Decompression sickness
DE	Dose equivalent
DIPS	Dynamic isotope power system
DOD	Department of Defense

ACRONYM	DEFINITION
e	Electron
ECG	Electrocardiogram
ECLSS	Environmental control and life support system
ED10	10% of pop. showing phsysiolgical response to ionizing rad.
EDK	Electric dynamic katathermometer
EEG	Electroencephalograph
EKG	Electrocardiogram
EL	Exposure limits
ELF	Extremely low frequencies
EM	Electromagnetic
EMU	Extravehicular mobility unit
ET	Effective temperature
ev	Electron volts
EVA	Extravehicular activity
FDA	Food and Drug Administration
FDP	Fatigue decreased proficiency
Fe	Iron
FMEA	Failure modes and effects analysis
FSW	Feet of seawater (33 FSW =1 Atmosphere)
G	Gravitational acceleration
GC/MS	Gas chromatograph/mass spectrometer
GCR	Galactic cosmic radiation
GEO	Geosyncronous Earth orbit
GIAG	Government Industry Advisory Group
GT	Globe temperature
g_x	Vibrational acceleration in the direction of the x-axis
g_y	Vibrational acceleration in the direction of the y-axis
Gy	Gray (radiation dosage unit of measure)
g_z	Vibrational acceleration in the direction of the z-axis
H	Hydrogen
He	Helium
HUT	Hard upper torso
Hx	Diatonic hydrogen
Hz	Hertz (cycles per second)
HZE	Ultra heavy nuclear particles
Icl	Insulation value of clothing
IDB	In-suit drink bag
IEEE	International Electronics and Electrical Engineers
INIRC	International Non-ionizing Radiation Committee
IR	Infrared
IRPA	International Radiation Protection Association
IS0	International Standards Organization
IVA	Intravehicular Activity
JSC	Johnson Space Center
kcal	Kilocalories (1000 calories)
kp	Kilo pascal

ACRONYM	DEFINITION
Kr	Krypton
KSC	Kennedy Space Center
LBNP	Lower body negative pressure
LCVG	Liquid cooling ventilation garment
LD50	Lethal dose of ionizing radiation for 50% of population
LED	Light emitting diode
LEO	Low Earth orbit
L_{eq}	Equivalent level in dB
LET	Linear energy transfer
LOS	Line of sight
LTA	Lower torso assembly
MeV	Millions of electron volts
MFR	Manipulator foot restraint
MIL	Military
mmHg	Millimeters of mercury - used to indicate pressure level
MMU	Manned maneuvering unit
MSFC	Marshall Space Flight Center
MSIS	Man-Systems Integration Standards
MTBF	Mean time between failure
MW	Microwave
N_2	Nitrogen
N/A	Not Applicable
NASA	National Aeronautics and Space Administration
Nc	Convective heat transfer coefficient
NC (Curve)	Noise criteria curve
NCRP	National Council on Radiation Protection and Measurements
Ne	Neon
NIR	Non-ionizing radiation
nm	Nanometer (1E-9 meters); (also) nautical miles
NTU	Nethlometric tubidity units
O_2	Diatonic oxygen
O_2	Oxygen
OASPL	Overall sound pressure level
OB	Octave band
OBS	Operational bioinstrumentation system
ORU	Orbital replacement unit
OSHA	Occupational Safety and Health Administration
OTC	Over the counter
p	Proton
P4SR	Predicted 4-hour sweat rate
PB	Phonetically Balanced
PEO	Polar Earth orbit
PFR	Portable foot restraint
pH	Measure of acidity
PLSS	Primary life support system
PSIL	Preferred speech interference level

ACRONYM	DEFINITION
Pt/Co	Platimun/cobalt color measurement
PTS	Permanent threshold shift
Q	Quality factor
qs	Body heat storage index
Ra	Radium
rads	Radiation dose absorbed by tissue
RBE	Relative biological effectiveness
Rcl	Total heat transfer resistance
RDA	Recommended dietary allowance
REM, rem	Roentgen equivalent man
RF	Radio frequency
RFPG	Radiofrequency protection guides
rms	Root -mean -square
RMS	Remote manipulator system
RTG	Radioisotope thermoelectric generator
SAA	South Atlantic anomaly
SAE	Society of Automotive Engineers
SAR	Specif ic absorption rate
SCR	Solar cosmic radiation
SDMS	Standards Database Management System
SEP	Solar energetic particles
SIL	Speech interference level
SMF	Space medical facility
SPE	Solar particle event
SPF	Specific pathogen free
SPL	Sound pressure level
Sr	Strontium
SSA	Space suit assembly
STD	Standard
STP	Standard temperature and pressure
STS	Space Transportation System
Sv	Sievert (radiation dose unit of measure)
tb	Weighted mean body temperatures
TBT	Total body temperature
tc	Core temperature
TLV	Threshold limit values
TMG	Thermal micrometeoroid garment
Tmrt	Mean radiant temperature
TOC	Total organic carbon
TON	Threshold odor number
tr	Skin temperature
TTN	Threshold taste number
TTS	Temporary threshold shift (hearing)
TTS2	Temporary threshold shift measured 2 minutes after exposure
UCD	Urine collection device
UV	Ultraviolet

ACRONYM	DEFINITION
UVR	Ultraviolet radiation
VDT	Visual display terminal
WB	Wet bulb temperature
WBGT	Wet bulb globe temperature
WD	Wet/dry index
WFI	Water for Injection
WYSIWYG	What you see is what you get
Xe	Xenon
Z	Ultra heavy nuclei

APPENDIX E

UNITS OF MEASURE AND CONVERSION FACTORS

This section presents definitions, physical constants and conversion factors that are used in the text and may be useful as reference data.

ATMOSPHERE (atm):

The pressure exerted by 76 cm mercury with a density of 13.5951 gm/cm^3 at 1g (the standard barometric pressure at sea level).

1 atm = 1.01325 x 10^6 dynes/cm^2
= 1033.2 gm/cm^2
= 760 mm Hg
= 14.696 psi
= 101.329 kPa (kilo Pascals)

BRITISH THERMAL UNIT (Btu):

1 Btu = 1.0559 x 10^{10} ergs
= 1055.9 joules
= 251.995 gm-cal
= 778.77 ft-lbs
= 0.25199 kcal

1 Btu/hr = 0.1667 Btu/min
= 0.04199 kcal/min
= 0.2932 watt

1 Btu/min = 0.25199 kcal\min
= 0.23599 hp
= 17.595 watts

1 Btu/ft^2, hr = 2.7125 kcal/m^2 hr

Btu/hr to joules, 1 Btu/hr = 1.05435 x 10^3 joule/hr

800 Btu/hr x 1054.35 = 843480 joule/hr

CANDELA (cd):

1 cd = 1.018 candle

CANDLE (c):

The unit of luminous intensity.

1 c = 1 lumen/steradian

CENTIMETER (cm):

1 cm = 0.03280 ft
= 0.3937 in
= 0.01 m
= 10mm
= $1 \times 10^4 \mu$ (micron)

(See also Square Centimeter, Cubic Centimeter).

CENTIMETER-CANDLE (phot):

1 *phot* = 1×10^4 *lux*

CENTIMETERS PER SECOND PER SECOND:

1 cm/sec^2 = 0.0328 ft/sec^2

CLO (clo):

The unit of insulation resistance for clothing.

1 clo = 0.18°C m^{2}hr/kcal
= 0.88°F ft^{2}hr/Btu

CUBIC CENTIMETER (cc or cm^3):

1 CC = 3.531×10^{-5} ft^3
= 0.061023 in^3
= 1×10^{-6} m^3
= 1000 mm^3
= 2.6417×10^{-4} gal (US fluid)
= 0.0338 oz (US fluid)

$= 2.113 \times 10^{-3}$ pint (US fluid)

1 cc/sec = 0.0021186 ft^3/min

CUBIC FOOT

1 ft^3 = 1728 in^3
= 28.32 liters
= 0.02832 m^3

1 ft^3/min = 472.0 cc/sec
= 0.4720 liter/sec
= 62.43 lbs H_2O/min

1 ft^3/sec = 1699.3 liters/min

CUBIC INCH:

1 in^3 = 5.787×10^{-4} ft^3
= 1.639×10^{2} liter
= 1.639×10^{-5} m^3

CUBIC METER:

1 m^3 = 35.3144 ft^3
= 6.1023×10^{4} in^3
= 999.973 liters

DECIBEL (db):

Used for comparing power levels, acoustical or electrical.

1 db = $10 \log_{10} P/PO$ where P is the power to be compared to a reference power PO
= 1 bel = increase in power (P) by a factor of 10

(See also Sound Pressure Level).

DEGREE (ANGULAR) (deg):

1 deg = 60 minutes
= 0.01745 radian
= 3600 seconds

1 deg = 3.0462×10^{-2} steradian

DEGREES TO RADIANS:

$1^{o} = \pi/180$ rad

$60^{o} \times \pi/180 = 1.0472 = 1$ rad

DEGREES CENTIGRADE (^{o}C):

$^{o}C = 5/9\ (^{o}F - 32)$

DEGREES FARENHEIT (^{o}F):

$^{o}F = (9/5 \times {}^{o}C) + 32$

DEGREES PER SECOND:

1 deg/sec = 0.017453 radian/sec
= 0.1667 rpm

DYNE (dyne):

1 dyne = 1.0197×10^{-6} kg
= 2.2481×10^{-6} lb

1 dyne-cm = 1 erg

DYNE PER SQUARE CENTIMETER

1 dyne/cm^2 = 9.8692×10^{-7} atm
= 0.0010197 gm/cm^2
= 4.0148×10^{-4} in H_2O
= 7.5006×10^{-4} mm Hg
= 1.4504×10^{-5} psi

ERG (erg):

1 erg = 9.4805×10^{-11} Btu
= 7.3756×10^{-8} ft-lb
= 2.3889×10^{-11} kcal
= 8.8510×10^{-7} lb-in
= 1 dyne-cm

FOOT (ft):

1 ft = 30.48 cm
= 12 in
= 0.3048 m
(See also Square Foot, Cubic Foot).

FOOT-CANDLE (fc):

1 ft-c = 1 lumen/ft^2
= 10.764 lumen/m^2
= 10.75 lux

FOOT-LAMBERT (ft-L):

1 ft-L = 1.0764 millilamberts
= 0.32 decibles with respect to 1 mL

FOOT PER MINUTE:

1 ft/min = 0.3048 m/min
= 0.005080 m/sec
= 0.011364 mph

FOOT PER SECOND:

1 ft/sec = 1.0973 km/hr
= 0.5921 knot
= 0.6818 mph

FOOT-POUND (ft-lb):

1 ft-lb = 0.001285 Btu
= 1.3558×10^{7} ergs
= 3.2389×10^{-4} kcal
1 ft-lb/min = 3.0303×10^{-5} hp
= 0.01667 ft-lb/sec
= 0.022597 watt
1 ft-lb/sec = 0.001818 hp
= 0.01943 kcal/min
= 1.3558 watts

G(g):

The acceleration of gravity (also the acceleration of a vehicle).

1 g = 32.174 ft/sec^2
= 980.665 cm/sec^2

GRAM (gm):

1 gm = 0.001 kg
= 1000 mg
= 0.03527 oz
= 0.0022046 lb
1 gm/cm^3 = 62.428 lbs/ft^3
1 gm/hr = 0.540 lb/day
= 0.0003757 lb/min
1 gm/liter = 0.062427 lb/ft^3
1 gm/cm^2 = 9.6784 x 10^{-4} atm
= 980.665 dynes/cm^2
= 0.9356 mm Hg
= 0.014223 psi
1 gm/m^2/hr = 2.78 x 10^{-5} gm/cm^2/sec
= 0.7448 lb/ft^2/hr

GRAM-CALORIE (gm-cal):

1 gm-cal = 30874 ft-lbs
= 0.001 kcal

GRAY (Gy)):

The SI unit for the amount of ionizing radiation energy absorbed by tissue.

1 Gy = 100 rads

HORSEPOWER (hp):

1 hp = 3.300 x 10^4 ft-lbs/min
= 550 ft-lbs/sec
= 10.688 kcal/min
= 745.7 watts

INCH (in):

1 in = 2.540 cm
= 0.0833 ft
= 25.40 mm
(See also Cubic Inch, Square Inch)

INCH OF WATER (in H_2O):

1 in H_2O = 0.002458 atm
(at 4°C) = 2490.82 dynes/cm^2
= 0.0361 psi
= 1.868 mm Hg

JOULE (joule):

1 joule = 1 watt-sec

KILOGRAM(kg):

1 kg = 1000 gm
= 2.205 lb
= 35.28 oz

KILOGRAM-CALORIE (kcal or large Calorie):

1 kcal = 3.9683 Btu
= 4.186×10^{10} ergs
= 1000 gm-cal
= 3087 ft-lbs
1 kcal/hr = 0.0661 Btu/min
= 0.857 ft-lbs/sec
= 0.1667 kcal/min
= 1.161 watts

1 kcal/m^{2}hr = 0.3687 Btu/ft^{2}hr
1 kcal/min = 3.9685 Btu/min
= 51.457 ft-lbs/sec
= 0.093557 hp
= 69.767 watts

KILOGRAM-CENTIMETER SQUARED:

1 kg-cm^2 = 0.3417 lb-in^2

KILOGRAM-METER PER SECOND:

1 kg-m/sec = 7.2330 ft-lb/sec
= 9.80665 watts

KILOMETER (km):

1 km = 10^5 cm
= 3281 ft
= 10^3 meters, m
= 0.6214 statute miles, mi
= 0.54 nautical miles, nm

KILOPASCAL:

1kPa = 6.895 psi
= 4.754 x 10^5 dynes/cm^2
1 psi = 0.145 kPa

KILOMETERS PER HOUR:

1 km/hr = 0.9113 ft/sec
= 0.5396 knot
= 0.6214 mph

KNOT (nautical mile per hour):

1 knot = 1.689 ft/sec
= 1.853 km/hr
= 1.1516 mph

LAMBERT (L):

Unit of surface brightness.

1L = 0.3183 c/cm^2
= 2.0536 c/in^2
= 1 lumen/cm^2

LITER (l):

1 liter = 0.03531 ft^3
= 61.02 in^3
= 1000 ml
1 liter/min = 5.886 x 10^{-4} ft^3/sec
1 liter/sec = 2.12 ft^3/min

LUMEN (lumen):

1 lumen = 0.001496 watt
= 0.07958 spherical candle power
1 lumen/ft^2 = 1 ft-c
= 10.764 lumen/m^2

LUMENS PER SQ. METER TO FT CANDLES

1 lumen/m^2 = 0.0929 ft. candle

LUX

1 lux = 0.093 ft-c (see meter-candle)

METER (m):

1m = 100 cm
= 3.281 ft

= 39.37 in

(See also Cubic Meter).

METER-CANDLE (lux):

1 lux = 1 lumen/m^2
= 0.092903 ft-c

METER PER SECOND (m/sec):

1 m/sec = 3.281 ft/sec
= 3.600 km/hr
= 2.2369 mph

MICRON (or mu):

A unit of length equal to one-millionth of a meter or one-thousandth of a millimeter, usually called micrometer.

1 μ = 10^{-6} meter
= 3.937×10^{-5} in
= 0.001 mm

MIL (mil):

1 mil = 0.001 in
= 0.0254 mm
= 25.40μ (microns)

MILES (statute) (mi):

1 mi = $1{,}609 \times 10^5$ cm
= 5,280 ft
= 1.609 km

MILES PER HOUR (mph)

1 mph = 88 ft/min
= 1.4667 ft/sec
= 1.6093 km/hr
= 0.8684 knot

MILLIGRAM (mg):

1 mg = 0.001 gm
= 3.5274×10^{-5} oz
= 2.2046×10^{-6} lb
1 mg/m^3 = 6.243×10^{-4} lb/ft^3

MILLILAMBERT (ml):

1 mL = 0.929 lumen/ft^2
(perfectly diffused light)

MILLILITER (ml):

1 ml = 1.000028 cc
= 0.061025 in^3
= 0.001 liter
= 0.0338 oz (US fluid)

MILLILITERS PER HOUR:

1 ml/hr = 0.06102 in^3/hr

MILLIMETER (mm):

1mm = 0.10 cm
= 0.03937 in
= 1000 μ
(See also Square Millimeter).

MILLIMETER OF MERCURY (mm Hg):

1mm Hg = 0.0013158 atm

(at 0^oC) = 1333.22 dyne/cm^2
= 1.3595 gm/cm^2
= 0.019337 psi
= 0.535 in H_2O
= 0.1333 kPa

MILLISECONDS (msec):

1 msec = 0.001 sec

NAUTICAL MILES (nm):

1 nm = 0.87 statute miles
= 1.85 kilometers

NEWTON (N):

The unit of force in the mks system equal to 0.2248 lbf.

NEWTONS TO POUNDS:

1 N = 0.22507 lbf

NEWTON CENTIMETERS TO INCH OUNCES:

1 N-cm = 1/.706 in oz
70N-cm x 1/.706 = 99.15 = 100 in oz

NEWTON METERS TO FOOT POUNDS:

1Nm = 1/1.356 ft lb
15Nm x 1/1.356 = 11.06 = 11 ft lb

NEWTON METERS TO INCH POUNDS:

1 Nm = 1/.11298 in lb
4 Nm x 1/.11298 = 35.4 = 3 5 in lb

NIT:

Unit of luminence equal to the luminence provided by one candle of radiant flux emited per square meter of surface
Candela per square meter (Cd m^2)

OUNCE (oz):

1 oz = 28.3495 gm
= 0.0625 lb

PASCALS (Pa)

Pa = 4.75389 dynes/cm^2
= 6.895×10^{-3} psi

PARTS PER MILLION (ppm).

1 ppm = 1.0 mg/liter of H_2O
= 8.345 lbs/million gallons

PHON (phon):

1 phon unit = SPL of a 1000 cycle/sec tone

PHOT:

(See Centimeter Candle).

POISE:

Unit of viscosity.
1 poise = 1 dyne/sec, cm^2
= 1 gm/cm, sec
= 0.067196 lb/ft, sec

POUND (lb):

1 lb = 453.5924 gm

= 0.45359 kg
= 16 oz
= 4.448 N

1 lb/day = 18.89 gm/hr
1 lb/hr = 0.7559 gm/min
= 10.886 kg/day

POUND-INCH (lb-in):

1 lb-in = 1.1298×10^6 dyne/cm

POUND-INCH SQUARED:

Unit of moment of inertia.
1 lb-in^2 = 2.9264 kg-cm^2

POUND OF WATER PER MINUTE (lb H_2O/min):

1 lb H_2O/min = 0.01603 ft^3/min
= 2.670×10^{-4} ft^3/sec

POUND PER CUBIC FOOT (lb/ft^3):

1 lb/ ft^3 = 0.01602 gm/ cm^3

POUNDS PER SQUARE INCH (psi):

1 psi = 0.06805 atm
= 6.8947×10^4 dyne/cm^2
= 70.307 gm/cm^2
= 51.715 mmHg
= 27.7 in H_2O
= 145.03 Pa

POUNDS PER SQUARE INCH ABSOLUTE (psia):

Absolute pressure, where 0 psia = vacuum
= 0.1449 kpascals

POUND WEIGHT (1 wt):

1 lb wt = 4.4482×10^5 dynes
= 453.59 gm wt
= 16 oz

RAD (rad):

Radiation absorbed dose.

1 rad = 100 ergs/gm of irradiated material

RADIAN (rad):

1 radian = $1/2\pi$ circumference revolution (0.15915)
= 57.296 deg

1 radian/sec = 57.296 deg/sec
= 9.549 rpm

1 radian/sec^2 = 572.96 rpm^2

REVOLUTIONS PER MINUTE (rpm):

1 rpm = 6 deg/sec
= 0.10472 radian/sec

1 rpm^2 = 0.001745 radian/sec^2

ROENTGEN (r):

1 r = ionization by x-rays or gamma-rays producing 1 electrostatic unit of charge in 1 cm^3 of air (STP)
= 83.0 ergs/gm

SIEVIERT (Sv):

Sv is the SI unit for ionizing radiation dose equivalent

1 Sv = 100 rem = (Gy) (Q)

(Refer to Figure 5.7.2.1.3.1-1 for definition of Q values)

SOUND PRESSURE LEVEL (SPL):

SPL is sound pressure related logarithmically to a reference level of pressure (P_0), which by convention is 0.0002 dynes/cm^2. The defining equation is:

$$SPL = 20 \log_{10} P/PO \text{ in decibels}$$

SQUARE CENTIMETER (cm^2):

$$1 \text{ cm}^2 = 1.076 \times 10^{-3} \text{ ft}^2$$
$$= 0.1550 \text{ in}^2$$
$$= 100 \text{ mm}^2$$

SQUARE FOOT (ft^2):

$$1 \text{ ft}^2 = 929.0 \text{ m}^2$$
$$= 144 \text{ in}^2$$

SQUARE INCH (in^2):

$$1 \text{ in}^2 = 6.4516 \text{ cm}^2$$
$$= 0.006944 \text{ ft}^2$$
$$= 645.1626 \text{ mm}^2$$

SQUARE MILLIMETER (mm^2):

$$1 \text{ mm}^2 = 0.01 \text{ cm}^2$$
$$= 0.001550 \text{ in}^2$$

STERADIAN:

The solid angle which encloses a surface on a sphere equal to the square of the radius.

USEFUL PHYSICAL CONSTANTS

Acceleration of gravity (g) = 32.17 ft/sec2
= 980.6 cm/sec^2

Velocity of sound in dry air @0°C = 33,136 cm/second

and 1 atmos. = 1,089 feet/second

Heat of fusion of water @1.0 atmos.	= 79.7 calories/gram = 144 Btu/pound
Heat of vaporization of water @ 1.0 atmos.	= 540 calories/gram = 970 Btu/pound
Specific heat of air	= Cp = 0.238 cal/gram (^{o}C)
Density of water @ 0°C	= .099984 grams/cm^{3}
Density of air @ 0°C and 760 mm Hg	= 0.0012929 grams/cm^{3}(0.0807 lb/ft^{3})
Velocity of light (c)	= 2.99792458 x 10^{10} cm/sec
Avogradro's number (N)	= 6.0221367 x 10^{23} molecules/gram-mole
Pi(π)	= 3.14159265
Naperian-logarithm base	= 2.71828183

APPENDIX F

UNRESOLVED DATA PROBLEMS AND ISSUES

(This appendix has been deleted from this volume)

APPENDIX G

ACCELERATION REGIME APPICABILITY

USER'S GUIDE

One of the unique features of the MSIS data base is that every paragraph has been coded as to the acceleration regimes that are applicable. Immediately following each paragraph number and title, a notation is made in brackets { } with one or two of the following codes:

O = Orbital

= the zero-g and near zero-g acceleration environments encountered in orbital and very low acceleration transorbital operations

L = Launch/Re-Entry

= the multi-g launch, re-entry, and abort acceleration environments.

P = Planetary

= the g-loads encountered on the moon and Mars. Long term, low-level accelerations encountered in some transorbital flight operations may also be applicable. An artificial gravity system may also fall into this regime.

A = All

=this regime includes all of the above plus the 1-g acceleration environment.

(blank)

=none of the above apply.

This appendix of a relational data base searching function in the Standards Relational Data base System (SDMS) can be used to locate all of the applicable MSIS data for a hardware program's specific acceleration regimes.

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
1.0	X			
1.1	X			
1.2	X			
1.3	X			
1.4	X			
1.4.1	X			
1.4.2	X			
1.4.3	X			
1.4.3.1	X			
1.4.3.2	X			
1.4.3.3	X			
1.4.3.4	X			
1.4.3.5	X			
1.4.4	X			
1.5	X			
2.0	X			
2.1	X			
2.2	X			
2.2.1	X			
2.2.2	X			
2.3	X			
2.3.1	X			
2.3.2	X			
3.0	X			
3.1	X			
3.1.1	X			
3.1.2	X			
3.2	X			
3.2.1	X			
3.2.2	X			
3.2.3	X			
3.2.3.1		X		
3.2.3.2	X			
3.2.3.3	X			
3.3	X			
3.3.1	X			
3.3.1.1	X			
3.3.1.2	X			
3.3.1.3	X			
3.3.2	X			
3.3.2.1	X			
3.3.2.2	X			
3.3.2.2.1	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
3.3.2.2.2	X			
3.3.2.2.3	X			
3.3.2.3	X			
3.3.2.3.1	X			
3.3.2.3.2	X			
3.3.3	X			
3.3.3.1	X			
3.3.3.2	X			
3.3.3.2.1	X			
3.3.3.2.2	X			
3.3.3.2.3	X			
3.3.3.2.4	X			
3.3.3.2.5	X			
3.3.3.2.6	X			
3.3.3.3	X			
3.3.3.3.1	X			
3.3.3.3.2			X	
3.3.4		X		
3.3.4.1		X		
3.3.4.2		X		
3.3.4.3	X			
3.3.5	X			
3.3.5.1	X			
3.3.5.2	X			
3.3.5.3	X			
3.3.6	X			
3.3.6.1	X			
3.3.6.2	X			
3.3.6.3	X			
3.3.6.3.1	X			
3.3.6.3.2	X			
3.3.7	X			
3.3.7.1	X			
3.3.7.2	X			
3.3.7.3	X			
3.3.7.3.1	X			
3.3.7.3.1.1	X			
3.3.7.3.1.2	X			
3.3.7.3.2	X			
3.3.7.3.2.1	X			
3.3.7.3.2.2	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
3.3.7.3.3	X			
3.3.7.3.3.1	X			
3.3.7.3.3.2	X			
4.0	X			
4.1	X			
4.2	X			
4.2.1	X			
4.2.2	X			
4.3	X			
4.3.1	X			
4.3.2	X			
4.3.2.1	X			
4.3.2.2	X			
4.4	X			
4.4.1	X			
4.4.2	X			
4.4.2.1	X			
4.4.2.2	X			
4.5	X			
4.5.1	X			
4.5.2		X		
4.5.2.1		X		
4.5.2.2		X		
4.6	X			
4.6.1	X			
4.6.2		X		
4.7	X			
4.7.1	X			
4.7.2		X		
4.8		X		
4.8.1		X		
4.8.2		X		
4.9	X			
4.9.1	X			
4.9.2		X		
4.9.3		X		
4.10	X			
4.10.2	X			
4.11	X			
4.11.1	X			
4.11.2	X			
4.11.3	X			
5.0	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
5.1	X			
5.1.1	X			
5.1.2	X			
5.1.2.1	X			
5.1.2.1.1	X			
5.1.2.1.2	X			
5.1.2.1.3	X			
5.1.2.1.4	X			
5.1.2.1.4.1	X			
5.1.2.1.4.2	X			
5.1.2.1.4.3	X			
5.1.2.2	X			
5.1.2.2.1	X			
5.1.2.2.1.1	X			
5.1.2.2.1.2	X			
5.1.2.2.1.3	X			
5.1.2.2.1.4	X			
5.1.2.2.1.5	X			
5.1.2.2.1.6	X			
5.1.2.2.1.7	X			
5.1.2.2.1.7.1	X			
5.1.2.2.1.7.2	X			
5.1.2.2.1.7.3	X			
5.1.2.3.	X			
5.1.2.3.1	X			
5.1.2 3.2	X			
5.1.2.3.3	X			
5.1.3	X			
5.1.3.1	X			
5.1.3.2	X			
5.1.3.3	X			
5.1.3.4	X			
5.1.3.4.1	X			
5.1.3.4.2	X			
5.1.3.4.3		X	X	X
5.2		X		
5.2.1		X		
5.2.2		X		
5.2.2.1		X		
5.2.2.2.		X		
5.2.3		X		
5.3	X			
5.3.1	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
5.3.2	X			
5.3.2.1	X			
5.3.2.1.1	X			
5.3.2.1.2	X			
5.3.2.1.3	X			
5.3.2.2	X			
5.3.2.2.1	X			
5.3.2.2.2	X			
5.3.2.2.3	X			
5.3.2.3	X			
5.3.2.4	X			
5.3.3	X			
5.3.3.1	X			
5.3.3.1.1	X			
5.3.3.2	X			
5.3.3.3	X			
5.4	X			
5.4.1	X			
5.4.2	X			
5.4.2.1	X			
5.4.2.1.1			X	
5.4.2.1.2		X		
5.4.2.1.3			X	
5.4.2.2	X			
5.4.2.3	X			
5.4.2.3.1	X			
5.4.2.3.2	X			
5.4.2.3.3	X			
5.4.2.4	X			
5.4.2.4.1	X			
5.4.2.4.1.1	X			
5.4.2.4.1.1.1	X			
5.4.2.4.1.1.2	X			
5.4.2.4.1.2	X			
5.4.2.4.2	X			
5.4.2.4.2.1	X			
5.4.2.4.2.2	X			
5.4.2.4.3	X			
5.4.2.4.3.1	X			
5.4.2.4.3.2	X			
5.4.3	X			
5.4.3.1	X			
5.4.3.2	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
5.4.3.2.1	X			
5.4.3.2.1.1	X			
5.4.3.2.1.2	X			
5.4.3.2.1.3	X			
5.4.3.2.1.4	X			
5.4.3.2.1.5	X			
5.4.3.2.2	X			
5.4.3.2.2.1	X			
5.4.3.2.2.2	X			
5.4.3.2.3	X			
5.4.3.2.3.1	X			
5.4.3.2.3.2	X			
5.4.3.2.3.3	X			
5.4.3.2.3.4	X			
5.4.3.2.4	X			
5.4.3.2.5	X			
5.4.4	X			
5.4.4.1	X			
5.4.4.2	X			
5.4.4.3	X			
5.5	X			
5.5.1	X			
5.5.2	X			
5.5.2.1	X			
5.5.2.1.1			X	
5.5.2.1.2		X		X
5.5.2.1.3			X	
5.5.2.2	X			
5.5.2.3	X			
5.5.2.3.1	X			
5.5.2.3.2	X			
5.5.2.3.3	X			
5.5.2.4	X			
5.5.2.4.1	X			
5.5.2.4.2	X			
5.5.2.4.3	X			
5.5.2.4.4	X			
5.5.3	X			
5.5.3.1	X			
5.5.3.2	X			
5.5.3.2.1	X			
5.5.3.2.2	X			
5.5.3.2.3	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
5.5.3.2.4	X			
5.5.3.2.5	X			
5.5.3.3	X			
5.5.3.3.1			X	
5.5.3.3.2	X			
5.5.3.3.3	X			
5.5.3.3.4	X			
5.5.4	X			
5.5.4.1	X			
5.5.4.2	X			
5.5.4.3	X			
5.6	X			
5.7	X			
5.7.1	X			
5.7.2	X			
5.7.2.1	X			
5.7.2.1.1	X			
5.7.2.1.2	X			
5.7.2.1.2.1	X			
5.7.2.1.2.2	X			
5.7.2.1.2.3	X			
5.7.2.1.2.4	X			
5.7.2.1.3	X			
5.7.2.1.3.1	X			
5.7.2.1.3.2	X			
5.7.2.1.3.3	X			
5.7.2.1.3.3.1	X			
5.7.2.1.3.3.2	X			
5.7.2.1.3.3.3	X			
5.7.2.1.3.3.4	X			
5.7.2.1.3.3.5	X			
5.7.3.1.3.3.6	X			
5.7.2.1.3.4	X			
5.7.2.1.4	X			
5.7.2.1.4.1	X			
5.7.2.1.4.2	X			
5.7.2.1.4.3	X			
5.7.2.1.4.4	X			
5.7.2.1.4.5	X			
5.7.2.1.4.6	X			
5.7.2.1.5	X			
5.7.2.2	X			
5.7.2.2.1	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
5.7.2.2.2	X			
5.7.2.2.3	X			
5.7.2.2.4	X			
5.7.3	X			
5.7.3.1	X			
5.7.3.1.1	X			
5.7.3.1.2	X			
5.7.3.1.3	X			
5.7.3.1.4	X			
5.7.3.2	X			
5.7.3.2.1	X			
5.7.3.2.2	X			
5.8	X			
5.8.1	X			
5.8.2	X			
5.8.2.1	X			
5.8.2.2	X			
5.8.2.2.1	X			
5.8.2.2.2	X			
5.8.2.2.2.1	X			
5.8.2.2.3	X			
5.8.2.2.4	X			
5.8.2.2.5	X			
5.8.3	X			
5.8.3.1	X			
5.8.3.2	X			
5.9	X			
5.9.1	X			
5.9.2	X			
6.0	X			
6.1	X			
6.2	X			
6.2.1	X			
6.2.2	X			
6.2.2.1	X			
6.2.2.2	X			
6.2.3	X			
6.3	X			
6.3.1	X			
6.3.2	X			
6.3.3	X			
6.3.3.1	X			
6.3.3.2	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
6.3.3.3	X			
6.3.3.4	X			
6.3.3.5	X			
6.3.3.6	X			
6.3.3.7	X			
6.3.3.8	X			
6.3.3.9	X			
6.3.3.10	X			
6.3.3.11	X			
6.3.4	X			
6.4	X			
6.4.1	X			
6.4.2	X			
6.4.2.1	X			
6.4.2.1.1	X			
6.4.2.2	X			
6.4.2.2.1	X			
6.4.2.3	X			
6.4.2.4	X			
6.4.3	X			
6.4.3.1	X			
6.4.3.1.1	X			
6.4.3.2	X			
6.4.3.3	X			
6.4.3.4	X			
6.4.3.5	X			
6.4.3.6	X			
6.4.3.7	X			
6.4.3.8	X			
6.4.3.9	X			
6.4.3.10	X			
6.4.3.11	X			
6.4.3.12	X			
6.4.3.13	X			
6.4.3.13.1	X			
6.4.3.14	X			
6.4.3.15	X			
6.4.3.15.1	X			
6.4.3.16	X			
6.4.3.17	X			
6.4.3.18	X			
6.4.3.18.1	X			
6.4.3.18.1.1	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
6.4.3.18.1.2	X			
6.4.3.18.2	X			
6.4.3.18.2.1	X			
6.4.3.18.2.2	X			
6.4.3.18.2.3	X			
6.4.3.18.2.4	X			
6.4.3.18.2.5	X			
6.4.3.19	X			
6.5	X			
6.5.1	X			
6.5.2	X			
6.5.3	X			
6.6	X			
6.6.1	X			
6.6.2	X			
6.6.3	X			
6.6.3.1	X			
6.6.3.1.1	X			
6.6.3.1.2	X			
6.6.3.2	X			
6.6.3.2.1	X			
6.6.3.2.2	X			
6.6.3.2.3	X			
6.6.3.3	X			
6.6.3.4	X			
6.7	X			
6.7.1	X			
6.7.2	X			
6.7.3	X			
6.7.4	X			
6.7.5	X			
7.0		X		X
7.1	X			
7.2	X			
7.2.1	X			
7.2.2	X			
7.2.2.1	X			
7.2.2.2	X			
7.2.2.2.1	X			
7.2.2.2.2	X			
7.2.2.2.3	X			
7.2.2.3	X			
7.2.2.3.1	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
7.2.2.3.2	X			
7.2.2.4		X		X
7.2.3		X		X
7.2.3.1		X		X
7.2.3.2		X		X
7.2.3.3		X		X
7.2.3.3.1		X		X
7.2.3.3.2		X		X
7.2.3.3.2.1		X		X
7.2.3.3.2.2		X		X
7.2.3.3.3		X		X
7.2.3.4		X		X
7.2.3.4.1		X		X
7.2.3.4.2		X		X
7.2.3.4.3		X		X
7.2.4	X			
7.2.4.1	X			
7.2.4.2	X			
7.2.4.3	X			
7.2.5	X			
7.2.5.1	X			
7.2.5.2	X			
7.2.5.1	X			
7.2.5.2	X			
7.2.5.3	X			
7.2.5.3.1	X			
7.2.5.3.2	X			
7.2.5.3.3	X			
7.2.5.3.4	X			
7.2.5.3.5	X			
7.2.5.3.6	X			
7.2.6	X			
7.2.6.1	X			
7.2.6.2	X			
7.2.6.3	X			
7.2.7	X			
7.2.7.1	X			
7.2.7.2	X			
7.2.7.2.1	X			
7.2.7.2.2	X			
7.2.7.2.2.1	X			
7.2.7.2.2.2	X			
7.2.7.2.2.3	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
7.2.7.3	X			
7.2.7.3.1	X			
7.2.7.3.2	X			
7.2.7.3.2.1	X			
7.2.7.3.2.2	X			
7.2.7.3.2.3	X			
7.2.7.3.2.4	X			
7.2.7.3.3	X			
7.2.8	X			
7.3	X			
7.3.1	X			
7.3.2	X			
7.3.2.1	X			
7.3.2.2	X			
7.3.2.3	X			
7.3.3	X			
7.3.3.1	X			
7.3.3.2	X			
7.3.3.3	X			
7.3.3.4	X			
7.4	X			
7.4.1	X			
7.4.2	X			
7.4.3	X			
7.4.3.1	X			
7.4.3.2	X			
8.0	X			
8.1	X			
8.2	X			
8.2.1	X			
8.2.2	X			
8.2.2.1		X		
8.2.2.2	X			
8.2.2.3	X			
8.2.2.4	X			
8.2.2.5	X			
8.2.2.6	X			
8.2.2.7	X			
8.2.2.8	X			
8.2.3	X			
8.2.3.1	X			
8.2.3.2	X			
8.3	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
8.3.1	X			
8.3.2	X			
8.3.2.1	X			
8.3.2.2	X			
8.3.3	X			
8.3.3.1	X			
8.3.3.2	X			
8.4		X		
8.4.1		X		
8.4.2		X		
8.4.3		X		
8.4.4		X		
8.5	X			
8.5.1	X			
8.5.2	X			
8.5.2.1	X			
8.5.2.2	X			
8.5.3	X			
8.5.3.1	X			
8.5.3.2	X			
8.5.3.3	X			
8.5.3.4	X			
8.6	X			
8.6.1	X			
8.6.2	X			
8.6.2.1	X			
8.6.2.2	X			
8.6.2.3	X			
8.6.2.4	X			
8.6.3	X			
8.6.3.1	X			
8.6.3.2	X			
8.6.4		X		
8.6.4.1		X		
8.6.4.2		X		
8.6.4.3		X		
8.7	X			
8.7.1	X			
8.7.2	X			
8.7.2.1	X			
8.7.2.2		X		
8.7.2.3		X		
8.7.3	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
8.7.3.1	X			
8.7.3.2	X			
8.7.3.3	X			
8.7.3.4	X			
8.8	X			
8.8.1		X		
8.8.2		X		
8.8.3	X			
8.8.3.1		X		
8.8.3.2		X		
8.8.3.3	X			
8.8.3.4	X			
8.9		X		
8.9.1		X		
8.9.2		X		
8.9.2.1		X		
8.9.2.2		X		
8.9.3		X		
8.9.3.1		X		
8.9.3.2		X		
8.9.4		X		
8.10	X			
8.10.1	X			
8.10.2	X			
8.10.3	X			
8.10.3.1	X			
8.10.3.2	X			
8.10.3.3	X			
8.10.3.4	X			
8.10.3.5	X			
8.10.3.6	X			
8.10.3.7	X			
8.10.4	X			
8.11	X			
8.11.1	X			
8.11.2	X			
8.11.2.1	X			
8.11.2.2	X			
8.11.3	X			
8.12	X			
8.12.1	X			
8.12.2	X			
8.12.2.1	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
8.12.2.2	X			
8.12.2.3	X			
8.12.2.4	X			
8.12.3	X			
8.12.3.1	X			
8.12.3.2	X			
8.12.3.4	X			
8.12.3.5	X			
8.12.3.6	X			
8.13	X			
8.13.1	X			
8.13.2	X			
8.13.2.1	X			
8.13.2.2	X			
8.13.2.3	X			
8.13.2.4	X			
8.13.2.5	X			
8.13.2.6	X			
8.13.2.7	X			
8.13.3	X			
8.13.3.1	X			
8.13.3.1.1	X			
8.13.3.1.2	X			
8.13.3.1.3	X			
8.13.3.1.4	X			
8.13.3.2	X			
8.13.3.2.1	X			
8.13.3.2.2	X			
8.13.3.2.3	X			
8.13.3.3	X			
8.13.3.4	X			
8.13.3.5	X			
8.13.3.6	X			
9.0	X			
9.1	X			
9.2	X			
9.2.1	X			
9.2.2	X			
9.2.2.1	X			
9.2.2.1.1	X			
9.2.2.1.2	X			
9.2.2.1.3	X			
9.2.2.2	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
9.2.2.2.1	X			
9.2.2.2.2	X			
9.2.2.2.3	X			
9.2.2.2.4	X			
9.2.2.2.5	X			
9.2.2.2.6	X			
9.2.3	X			
9.2.3.1	X			
9.2.3.2	X			
9.2.3.2.1.	X			
9.2.3.2.2	X			
9.2.3.2.3	X			
9.2.3.2.4.	X			
9.2.3.2.5	X			
9.2.3.2.6	X			
9.2.3.2.7	X			
9.2.3.2.8	X			
9.2.3.2.9	X			
9.2.3.2.10	X			
9.2.4	X			
9.2.4.1	X			
9.2.4.1.1	X			
9.2.4.2	X			
9.2.4.2.1	X			
9.2.4.2.2	X			
9.2.4.2.3	X			
9.2.5	X			
9.2.5.1	X			
9.2.5.1.1	X			
9.2.5.1.2	X			
9.2.5.2	X			
9.2.5.2.1	X			
9.2.5.2.2		X		X
9.2.6	X			
9.3	X			
9.3.1	X			
9.3.2	X			
9.3.2.1	X			
9.3.2.2	X			
9.3.3	X			
9.3.3.1	X			
9.3.3.2	X			
9.3.3.3	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
9.3.3.3.1	X			
9.3.3.3.2	X			
9.3.3.3.3	X			
9.3.3.3.4	X			
9.3.3.3.5	X			
9.3.3.3.6	X			
9.3.3.3.7	X			
9.3.3.3.8	X			
9.3.3.3.9	X			
9.3.3.3.10	X			
9.3.3.3.11	X			
9.3.3.3.12	X			
9.3.3.3.13	X			
9.3.3.3.14	X			
9.3.3.3.15	X			
9.3.3.3.16	X			
9.3.3.3.17	X			
9.3.3.4	X			
9.3.3.4.1	X			
9.3.3.4.1.1	X			
9.3.3.4.1.2	X			
9.3.3.4.2	X			
9.3.3.4.3	X			
9.3.3.4.4	X			
9.3.3.4.5	X			
9.3.3.4.6	X			
9.3.3.4.7	X			
9.3.3.4.8	X			
9.3.3.5	X			
9.3.3.6	X			
9.3.3.7	X			
9.3.4	X			
9.4	X			
9.4.1	X			
9.4.2	X			
9.4.2.1	X			
9.4.2.2	X			
9.4.2.3	X			
9.4.2.3.1	X			
9.4.2.3.1.1	X			
9.4.2.3.1.2	X			
9.4.2.3.1.3	X			
9.4.2.3.1.4	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
9.4.2.3.1.5	X			
9.4.2.3.2	X			
9.4.2.3.3	X			
9.4.2.3.3.1	X			
9.4.2.3.3.2	X			
9.4.2.3.3.3	X			
9.4.2.3.3.4	X			
9.4.2.3.3.5	X			
9.4.2.3.3.6	X			
9.4.2.3.3.7	X			
9.4.2.3.3.8	X			
9.4.2.3.3.9	X			
9.4.2.3.3.10	X			
9.4.2.3.4	X			
9.4.3	X			
9.4.3.1	X			
9.4.3.2	X			
9.4.3.3	X			
9.4.3.3.1	X			
9.4.3.3.2	X			
9.4.3.3.3	X			
9.4.3.3.4	X			
9.4.4	X			
9.4.4.1	X			
9.4.4.2	X			
9.4.4.3	X			
9.4.4.3.1	X			
9.4.4.3.1.1	X			
9.4.4.3.1.2	X			
9.4.4.3.1.3	X			
9.4.4.3.2	X			
9.4.4.3.3	X			
9.4.4.3.4	X			
9.4.4.3.4.1	X			
9.4.4.3.4.2	X			
9.4.4.3.4.3	X			
9.4.5	X			
9.4.5.1	X			
9.4.5.1.1	X			
9.4.5.1.2	X			
9.5	X			
9.5.1	X			
9.5.2	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
9.5.3	X			
9.5.3.1	X			
9.5.3.1.1	X			
9.5.3.1.2	X			
9.5.3.1.3	X			
9.5.3.1.4	X			
9.5.3.1.5	X			
9.5.3.1.6	X			
9.5.3.1.7	X			
9.5.3.1.8	X			
9.5.3.1.9	X			
9.5.3.1.10				
9.5.3.1.11	X			
9.5.3.1.12	X			
9.5.3.1.13	X			
9.5.3.1.14	X			
9.5.3.1.14.1	X			
9.5.3.1.14.2	X			
9.5.3.1.14.3	X			
9.5.3.1.14.4	X			
9.5.3.1.14.5	X			
9.5.3.1.14.6	X			
9.5.3.1.14.7	X			
9.5.3.1.14.8	X			
9.5.3.1.14.9	X			
9.5.3.1.14.10	X			
9.5.3.2	X			
9.6	X			
9.6.1	X			
9.6.2	X			
9.6.2.1	X			
9.6.2.2	X			
9.6.2.3	X			
9.6.2.3.1	X			
9.6.2.3.2	X			
9.6.2.4	X			
9.6.2.4.1	X			
9.6.2.4.2	X			
9.6.2.4.3	X			
9.6.2.4.3.1	X			
9.6.2.4.3.2	X			
9.6.2.4.4	X			
9.6.2.4.4.1	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
9.6.2.4.4.2	X			
9.6.2.5	X			
9.6.2.5.1	X			
9.6.2.5.2	X			
9.6.2.6	X			
9.6.2.6.1	X			
9.6.2.6.2	X			
9.6.2.7	X			
9.6.2.7.1	X			
9.6.2.7.2	X			
9.6.2.8	X			
9.6.2.8.1	X			
9.6.2.8.2	X			
9.6.2.9	X			
9.6.2.9.1	X			
9.6.2.9.2	X			
9.6.3	X			
9.6.3.1	X			
9.6.3.1.1	X			
9.6.3.1.2.	X			
9.6.3.1.3	X			
9.6.3.1.3.1	X			
9.6.3.1.3.2	X			
9.6.3.1.4	X			
9.6.3.1.5	X			
9.6.3.1.6	X			
9.6.3.1.6.1	X			
9.6.3.1.6.2	X			
9.6.3.1.6.3	X			
9.6.3.1.6.3.1	X			
9.6.3.1.6.3.2	X			
9.6.3.1.6.4	X			
9.6.3.1.6.4.1	X			
9.6.3.1.6.4.2	X			
9.6.3.1.7	X			
9.6.3.1.7.1	X			
9.6.3.1.7.2	X			
9.6.3.1.7.3	X			
9.6.3.1.7.3.1	X			
9.6.3.1.7.3.2	X			
9.6.3.1.7.4	X			
9.6.3.1.7.5	X			
9.6.3.1.7.5.1	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
9.6.3.1.7.5.2	X			
9.6.3.1.8	X			
9.6.3.1.8.1	X			
9.6.3.1.8.2	X			
9.6.3.2.8.3	X			
9.6.3.1.9	X			
9.6.3.1.9.1	X			
9.6.3.1.9.2	X			
9.6.3.1.10	X			
9.6.3.1.10.1	X			
9.6.3.1.10.2	X			
9.6.3.2	X			
9.6.3.2.1	X			
9.6.3.2.1.1	X			
9.6.3.2.1.2	X			
9.6.3.2.2	X			
9.6.3.2.3	X			
9.6.3.2.4	X			
9.6.3.2.5	X			
9.6.3.2.5.1	X			
9.6.3.2.5.2	X			
9.6.3.3	X			
9.6.3.3.1	X			
9.6.3.3.1.1	X			
9.6.3.3.1.2	X			
9.6.3.3.1.3	X			
9.6.3.3.2	X			
9.6.3.3.2.1	X			
9.6.3.3.2.2	X			
10.0	X			
10.1	X			
10.2	X			
10.2.1	X			
10.2.2	X			
10.2.3	X			
10.2.3.1	X			
10.2.3.2	X			
10.2.3.3	X			
10.2.3.4	X			
10.2.3.5	X			
10.3	X			
10.3.1	X			
10.3.2	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
10.3.3	X			
10.3.3.1	X			
10.3.3.2	X			
10.3.4		X		
10.4	X			
10.4.1	X			
10.4.2		X		
10.4.3	X			
10.5	X			
10.5.1	X			
10.5.2	X			
10.5.3	X			
10.5.3.1	X			
10.5.3.2	X			
10.5.3.3	X			
10.5.3.4	X			
10.6	X			
10.6.1	X			
10.6.2	X			
10.6.3	X			
10.6.4		X		
10.7	X			
10.7.1	X			
10.7.2	X			
10.7.3	X			
10.8		X		
10.8.1		X		
10.8.2		X		
10.8.3		X		
10.8.3.1		X		
10.8. 3.1.1		X		
10.8.3.1.2		X		
10.8.3.1.2.1		X		
10.8.3.1.2.2		X		
10.8.3.2		X		
10.8.3.2.1		X		
10.8.3.2.1.1		X		
10.8.3.2.1.2		X		
10.8.3.2.1.3		X		
10.8.3.3		X		
10.8.3.4		X		
10.8.3.5		X		
10.8.4		X		

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
10.9	X			
10.9.1	X			
10.9.2	X			
10.9.2.1	X			
10.9.2.2	X			
10.9.2.3	X			
10.9.3	X			
10.9.3.1	X			
10.9.3.2	X			
10.9.3.2.1	X			
10.9.3.2.2	X			
10.9.3.2.3	X			
10.9.3.2.4	X			
10.9.3.2.5	X			
10.9.3.2.6	X			
10.9.3.2.7	X			
10.9.3.2.8	X			
10.9.3.2.9	X			
10.9.3.2.10	X			
10.9.3.2.11	X			
10.9.3.2.12	X			
10.9.3.2.13	X			
10.9.3.2.14	X			
10.9.3.2.15	X			
10.9.3.2.15.1	X			
10.9.3.2.15.2	X			
10.9.3.2.16	X			
10.10	X			
10.10.1	X			
10.10.2	X			
10.10.3	X			
10.11	X			
10.11.1	X			
10.11.2	X			
10.11.3	X			
10.12	X			
10.12.1	X			
10.12.2	X			
10.12.3	X			
11.0	X			
11.1	X			
11.2	X			
11.2.1	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
11.2.2	X			
11.2.2.1	X			
11.2.2.2	X			
11.2.3	X			
11.2.3.1	X			
11.2.3.1.1	X			
11.2.3.1.2	X			
11.2.3.1.3	X			
11.2.3.2	X			
11.2.3.3	X			
11.2.3.4	X			
11.2.3.5	X			
11.2.3.6	X			
11.2.3.7	X			
11.2.4	X			
11.2.4.1	X			
11.2.4.2	X			
11.3	X			
11.3.1	X			
11.3.2	X			
11.3.3	X			
11.3.3.1	X			
11.3.3.2	X			
11.3.3.3	X			
11.3.3.4	X			
11.4	X			
11.4.1	X			
11.4.2	X			
11.4.3	X			
11.4.4	X			
11.5	X			
11.5.1	X			
11.5.2	X			
11.5.3.1	X			
11.5.3.2	X			
11.5.4	X			
11.6	X			
11.6.1	X			
11.6.2	X			
11.6.3	X			
11.6.3.1	X			
11.6.3.2	X			
11.6.3.3	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
11.6.3.4	X			
11.7	X			
11.7.1	X			
11.7.2	X			
11.7.2.1	X			
11.7.2.2	X			
11.7.2.3	X			
11.7.2.3.1	X			
11.7.2.3.2	X			
11.7.2.3.2.1	X			
11.7.2.3.2.2	X			
11.7.2.3.2.3	X			
11.7.2.3.2.4	X			
11.7.2.3.3	X			
11.7.2.3.3.1	X			
11.7.2.3.3.2		X		
11.7.2.3.3.3	X			
11.7.2.3.3.4	X			
11.7.2.3.4		X		X
11.7.2.4		X		
11.7.3	X			
11.7.3.1	X			
11.7.3.2	X			
11.7.3.3	X			
11.7.3.4		X		
11.8	X			
11.8.1	X			
11.8.2	X			
11.8.2.1	X			
11.8.2.2	X			
11.8.2.2.1	X			
11.8.2.2.2	X			
11.8.2.2.3	X			
11.8.2.2.4	X			
11.8.2.2.5	X			
11.8.2.2.6	X			
11.8.3	X			
11.8.3.1	X			
11.8.3.2	X			
11.8.3.3		X		
11.9	X			
11.9.1	X			
11.9.2	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
11.9.3	X			
11.9.3.1	X			
11.9.3.2	X			
11.9.3.3	X			
11.9.3.4	X			
11.9.4	X			
11.10	X			
11.10.1	X			
11.10.2	X			
11.10.3	X			
11.10.3.1	X			
11.10.3.2	X			
11.10.3.3	X			
11.10.3.4	X			
11.10.3.5	X			
11.10.3.6	X			
11.10.4	X			
11.11	X			
11.11.1	X			
11.11.2	X			
11.11.2.1	X			
11.11.2.2	X			
11.11.2.3	X			
11.11.2.4	X			
11.11.3	X			
11.11.3.1	X			
11.11.3.1.1	X			
11.11.3.1.2	X			
11.11.3.1.3	X			
11.11.3.1.4	X			
11.11.3.1.5	X			
11.11.3.1.6	X			
11.11.3.1.7	X			
11.11.3.1.8	X			
11.11.3.1.9	X			
11.11.3.2	X			
11.11.3.2.1	X			
11.11.3.2.1.1	X			
11.11.3.2.2	X			
11.11.3.2.3	X			
11.11.3.2.4	X			
11.11.3.3	X			
11.11.3.4	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
11.11.3.5	X			
11.11.3.6	X			
11.11.4	X			
11.12	X			
11.12.1	X			
11.12.2	X			
11.12.3	X			
11.13	X			
11.13.1	X			
11.13.1.1	X			
11.13.1.2	X			
11.13.1.2.1	X			
11.13.1.2.2	X			
11.13.1.2.3	X			
11.13.1.3	X			
11.13.1.3.1	X			
11.13.1.3.2	X			
11.13.1.4	X			
11.13.2	X			
11.13.2.1	X			
11.13.2.2	X			
11.13.2.3	X			
121.13.2.4	X			
11.14	X			
11.14.1	X			
11.14.2	X			
11.14.3	X			
11.14.4	X			
12.0	X			
12.1	X			
12.2	X			
12.3	X			
12.3.1	X			
12.3.1.1	X			
12.3.1.2	X			
12.3.1.3	X			
12.3.1.4	X			
12.3.2	X			
12.3.2.1	X			
12.3.2.2	X			
12.3.3	X			
13.0	X			
13.1	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
13.2	X			
13.2.1	X			
13.2.2	X			
13.2.3	X			
13.2.3.1	X			
13.2.3.2	X			
13.2.3.3	X			
13.2.3.4	X			
13.2.4	X			
13.3	X			
13.3.1	X			
13.3.2	X			
13.3.3	X			
13.3.3.1	X			
13.3.3.2	X			
13.4	X			
13.4.1	X			
13.4.2	X			
13.4.3	X			
13.4.3.1	X			
13.4.3.2	X			
13.4.3.3	X			
13.4.4	X			
14.0	X			
14.1	X			
14.1.1	X			
14.1.2	X			
14.1.2.1	X			
14.1.2.1.1	X			
14.1.2.1.2	X			
14.1.2.1.3	X			
14.1.2.1.4	X			
14.1.3	X			
14.1.4	X			
14.2	X			
14.2.1	X			
14.2.2	X			
14.2.2.1	X			
14.2.2.2	X			
14.2.2.3	X			
14.2.2.4	X			
14.2.2.5	X			
14.2.2.6	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
14.2 2.7	X			
14.2.2.8	X			
14.2.2.9	X			
14.2.3	X			
14.2.3.1	X			
14.2.3.2	X			
14.2.3.3	X			
14.2.3.4	X			
14.2.3.5	X			
14.2.3.6	X			
14.2.3.7	X			
14.2.3.8	X			
14.2.3.9	X			
14.2.4		X		X
14.2.4.1		X		X
14.2.4.2		X		X
14.2.4.3	X			
14.2.4.4	X			
14.2.4.5	X			
14.3.1	X			
14.3.2	X			
14.3.2.1	X			
14.3.2.1.1	X			
14.3.2.1.2	X			
14.3.2.1.3	X			
14.3.2.2	X			
14.3.2.3	X			
14.3.2.4	X			
14.3.2.5	X			
14.3.2.6	X			
14.3.2.7	X			
14.3.3	X			
14.3.4	X			
14.3.4.1	X			
14.3.4.2	X			
14.3.4.3	X			
14.3.4.4	X			
14.3.4.5	X			
14.4.1	X			
14.4.2	X			
14.4.2.1	X			
14.4.2.2	X			
14.4.2.3	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
14.4.2.4	X			
14.4.2.5	X			
14.4.3	X			
14.4.3.1	X			
14.4.3.2	X			
14.4.3.3	X			
14.4.3.4	X			
14.4.3.5	X			
14.4.4	X			
14.4.4.1	X			
14.4.4.2		X		X
14.4.4.3		X		X
14.5.1	X			
14.5.2	X			
14.5.2.1	X			
14.5.2.2	X			
14.5.2.3	X			
14.5.2.4	X			
14.5.2.5	X			
14.5.2.6	X			
14.5.3.1	X			
14.5.3.2	X			
14.5.3.3	X			
14.5.3.4	X			
14.5.3.5	X			
14.5.3.6	X			
14.6.1	X			
14.6.2.1	X			
14.6.2.2	X			
14.6.2.3	X			
14.6.2.4	X			
14.6.2.4.1	X			
14.6.2.4.2	X			
14.6.3.1	X			
14.6.3.2	X			
14..6.3.3	X			
14.6.4.1	X			
14.6.4.2	X			
14.6.4.3	X			
14.7.1	X			
14.7.2	X			
14.7.3	X			
14.7.4	X			

Paragraph No	All	Orbital	Launch/ReEntry	Planetary
14.7.4.1	X			
14.7.4.2		X		
14.7.4.3		X		

APPENDIX H

VIDEOTAPE USER'S GUIDE

What is this videotape and why is it useful?

A videotape entitled, "Living and Working in Space," has been prepared by the ex-Skylab astronauts, Bill Pogue and Jerry Carr, for the Boeing Aerospace Company. This videotape incorporates scenes from Gemini, Apollo, Skylab, and Shuttle. It is intended to provide a wide scope general introduction to microgravity human factors/human engineering issues.

This videotape is specifically designed to create awareness of the basic microgravity considerations for workers involved in planning, engineering, and design work who are new to space programs. The content is biased towards the specific requirements of the Space Station and other long-duration space flights.

How is this videotape to be used?

The 34 minute videotape has been divided into 37 scenes. An on-screen clock serves as a counter for locating these scenes. There are 2 sub-appendices that are to be used for locating MSIS informaiton on this videotape:

Appendix H1-Video Scenes Description

This sub-appendix lists the 37 video scenes in time sequence. A short description for each scene is provided. A listing of the MSIS paragraphs that pertain to each scene is provided.

Appendix H2-Video Scenes Pertaining to MSIS Paragraphs

This sub-appendix lists MSIS paragraphs and then provides the scene numbers where information pertinent to each paragraph will be found.

How do you obtain a copy of the videotape?

A copy of the videotape can be obtained from the following source:

MSIS Custodian/SP3
NASA - Johnson Space Center
Houston, TX 77058

APPENDIX H1

VIDEO SCENES DESCRIPTION

APPENDIX H1
VIDEOTAPE USER'S GUIDE
SCENE DESCRIPTIONS

APPENDIX H1

Living and Working in Space Video Scenes Descriptions		
Scene Description	**Time**	**MSIS Paragraphs***
1. Skylab in orbit	0:00-0:41	5.1, 5.2
2. Shuttle Orbiter in orbit	0:41-1:01	5.1, 5.2
3. Crew on Orbiter flight deck	1:01-1:23	3.3.4, 5.2, 8.4, 8.6, 8.12, 8.13, 9.2.4.2, 10.6
4. Graphic: space neutral posture	1:23-2:24	3.3.4, 5.2, 8.6, 9.2.4.2, 10.2.3.2, 10.4, 10.8.3.4, 10.9, 11.6, 11.7, 11.8, 12.3.1.2, 12.3.1.3
5. Crewman at Skylab wardroom window	2:24-2:33	3.3.4, 5.2, 8.11, 9.2.5.1.2, 11.7, 11.11
6. Spacelab crewmember holds arms	2:33-2:50	3.3.4, 4.6, 5.2, 8.6, 8.9.3.1, 8.9.3.2, 9.2.4.2, 11.6, 11.7
7. Skylab crewmember on exercise ergometer	2:50-3:13	3.3.4, 5.2, 7.2.3.3, 8.9.3.2, 10.8.3.4, 11.7
8. Skylab crewmen don suits	3:13-3:46	3.3.2, 3.3.3, 4.8, 5.2, 8.6, 11.7.2, 11.7.3, 11.9, 14.4.3.4
9. Space motion sickness experiments: crew participation	3:46-4:52	4.5, 5.2, 7.2.3, 11.7
10. Fluid shift: graphics & discussion	4:52-5:45	5.2, 7.2.3, 7.2.7
11. Sequence showing body rotations and rapid translations	5:45-6:44	3.3, 4.0, 5.2, 6.3, 8.2, 8.6, 8.7, 8.8, 8.9, 11.6, 11.7, 11.8
12. Contingency maintenance: poor restraint & bad lighting	6:44-7:51	3.3, 4.2, 4.8, 5.2, 6.3, 8.2, 8.4, 8.6, 8.9, 8.13, 9.2.2, 11.6, 11.8, 11.9, 12.3
13. Earth scene & scene showing docking-discussion of vision	7:51-8:34	4.2, 5.1, 10.7
14. Crewmember translates through Skylab-discussion of sense of orientation	8:34-9:04	4.2, 4.5, 4.6, 5.2, 6.3, 8.2, 8.3, 8.4, 8.6, 8.7, 8.8, 8.9, 8.10, 8.12, 8.13, 9.2.2, 9.2.4, 11.6, 11.7, 11.8
15. Wardroom table & eating scenes from Skylab; group meal on shuttle	9:04-11:51	3.3, 4.8, 5.2, 8.2, 8.6, 8.9.3, 8.12, 8.13, 10.5.3, 10.6, 11.7
16. Skylab & Orbiter sleep stations	11:51-13:02	3.3, 4.6, 4.10, 5.2, 7.2.4, 8.4, 8.6, 11.7
17. Exercise: scenes from Skylab & Shuttle showing different types of exercise	13:02-14:04	3.3, 4.6, 4.8, 4.9, 4.10, 5.2, 7.2.3.3, 7.2.7, 8.4, 8.6, 8.9.3, 10.7, 10.8, 11.7
18. Body cleansing scenes from Skylab & Shuttle	14:04-14:44	7.2.5, 8.6, 10.2.3, 11.3, 11.7

* Refer to Appendix H2 for listing of MSIS paragraphs cross matrixed to video scenes

APPENDIX H1
VIDEOTAPE USER'S GUIDE
SCENE DESCRIPTIONS

APPENDIX H1 (CONTINUED)

Living and Working in Space
Video Scenes Descriptions

Scene Description	Time	MSIS Paragraphs*
19. Space housekeeping: debris accumulation on filters/screens, vacuuming operations on Skylab & Shuttle, and housekeeping requirements, trash disposal and inventory management	14:44-16:02	5.2, 8.3, 8.6, 8.7, 8.8, 8.9, 8.10, 9.2.5.2, 10.11, 11.4, 11.6, 11.7, 12.3, 13.2, 13.3
20. Medical monitoring: Shuttle	16:02-16:20	7.2.7, 10.9
21. Body restraint illustrations: arresting/controlling body motion, handling equipment, use of tools and tool restraint during tasks	16:20-18:25	3.3, 5.2, 6.4, 8.7, 8.8, 8.9, 11.2, 11.6, 11.7, 11.8, 11.10, 12.3
22. Paper/hard copy/document management, document restraint	18:25-19:14	4.8, 5.2, 8.6, 8.9.2.2, 11.7.3, 13.4.3.2
23. Manual dexterity during task performance: tool restraint during tasks	19:14-19:44	3.3.2, 4.8, 8.6, 8.9.3, 9.2.2.2, 9.2.4.2, 11.2, 11.7, 12.3
24. Work bench innovations on Skylab: fan housing and filter screen	19:44-20:12	5.2, 8.4, 8.6, 9.2.2, 11.7, 12.3
25. Difficulty in handling small items	20:12-20:36	3.3.2, 3.3.3, 4.8, 5.2, 8.9, 9.2.2, 11.7, 11.13, 12.3
26. Work station/work area architecture and panel orientation considerations	20:36-21:23	4.2, 4.5, 5.2, 8.2, 8.3, 8.4, 8.6, 8.12, 9.2.2, 9.2.3, 12.3.1.3
27. Windows as work stations: crowding & interference issues	21:23-21:49	3.3, 5.2, 8.6, 8.11, 9.2.2, 11.7, 11.11, 11.14
28. Manipulation of hardware in microgravity and difficulty created by poorly restrained documents. Difficulty in freeing stuck mechanisms	21:49-23:01	3.3, 4.2, 4.8, 4.9, 4.10, 5.2, 6.3, 8.6, 9.2.2, 11.7, 12.3, 13.4.3
29. Cable & hose management: clutter, snag & interference potential	23:01-23:28	5.2, 6.3, 8.2, 8.7, 8.8, 11.14, 12.3
30. Body translation-equipment vulnerability/inadvertent control actuation or damage potential during crew translation	23:28-26:30	3.3, 4.8, 5.2, 6.3, 8.2, 8.6, 8.7, 8.8, 8.9, 9.2.2, 11.6, 11.7, 11.8

* Refer to Appendix H2 for listing of MSIS paragrapns cross matrixed to video scenes

APPENDIX H1
VIDEOTAPE USER'S GUIDE
SCENE DESCRIPTIONS

APPENDIX H1 (CONTINUED)

Living and Working in Space Video Scenes Descriptions		
Scene Description	**Time**	**MSIS Paragraphs***
31. Equipment translation illustrations, body restraint during equipment handling	26:30-26:56	3.3, 4.8, 5.2, 8.6, 8.7, 8.8, 8.9, 11.7, 11.8
32. Introduction to EVA-suited restrictions to dexterity/mobility and body/equipment restraints and mobility aids	26:56-27:27	14.1, 14.2, 14.3, 14.4, 14.5
33. Body and equipment restraints: EVA considerations and provisions Gemini to Shuttle	27:27-29:28	14.4
34. Equipment manipulation and translation - EVA	29:28-30:53	14.4, 14.5, 14.7
35. Manned maneuvering unit OPS: satellite retrieval operations	30:53-31:42	14.5, 14.7
36. EVA lighting consideration, vehicle external lighting considerations/ requirements	31:42-32:48	14.4
37. Summary Posture, restraints, access, single reference frame	32:48-33:40	

* Refer to Appendix H2 for listing of MSIS paragraphs cross matrixed to video scenes

APPENDIX H2

VIDEO SCENES PERTAINING TO MSIS PARAGRAPHS

APPENDIX H2
VIDEOTAPE USER'S GUIDE
MSIS PARAGRAPHS
VS. SCENES

APPENDIX H2

	Living and Working in Space Video Scenes Pertaining to MSIS Paragraphs*
3.3	**Anthropometrics and Biomechanics**
3.3.1	11, 12, 15, 16, 17, 21, 27, 28, 30, 31
3.3.2	8, 11, 12, 15, 16, 17, 21, 23, 25, 27, 28, 30, 31
3.3.3	8, 11, 12, 15, 16, 17, 21, 27, 28, 30, 31
3.3.4	3, 4, 5, 6, 7, 11, 12, 15, 16, 17, 21, 27, 28, 30, 31
4.0	**Human Performance Capabilities**
4.2	12, 13, 14, 26, 28
4.3	13
4.5	9, 13, 14, 26
4.6	13; 14, 16, 17
4.8	8, 13, 15, 17, 22, 23, 25, 28, 30, 31
4.9	13, 17, 28
4.10	13, 16, 17, 28
5.0	**Natural and Induced Environments**
5.1	1, 2, 18
5.2	Virtually all scenes
6.0	**Crew Safety**
6.3	11, 12, 14, 28, 29, 30
6.4	21
7.0	**Health Maintenance**
7.2.3	7, 9, 10, 17
7.2.4	16
7.2.5	18
7.2.7	10, 17, 20

* Refer to Appendix H1 for listing of video scenes and their description

APPENDIX H2
VIDEOTAPE USER'S GUIDE
MSIS PARAGRAPHS
VS. SCENES

APPENDIX H2 (CONTINUED)

Living and Working in Space Video Scenes Pertaining to MSIS Paragraphs*		
8.0	**Architecture**	
8.2		11, 12, 14, 26, 29, 30
8.3		14, 19, 26
8.4		3, 12, 14, 16, 17, 24, 26
8.6		3, 4, 6, 8, 11, 12, 14, 17, 18, 19, 22, 23, 24, 26, 27, 28, 30, 31
8.7		11, 14, 19, 21, 29, 30, 31
8.8		11, 14, 19, 21, 29, 30, 31
8.9		7, 7, 11, 12, 14, 17, 19, 21, 22, 23, 25, 30
8.10		14, 19
8.11		5, 27
8.12		3, 14, 26
8.13		3, 12, 14
9.0	**Work Stations**	
9.2.2		12, 14, 22, 24, 25, 26, 27, 28, 30
9.2.3		26
9.2.4		4, 6, 14, 23
9.2.5.1		5
9.2.5.2		19
10.0	**Personal Hygiene**	
10.2.3.1		18
10.2.3.2		4, 18
10.4		4
10.5		15
10.6		3, 15
10.7		17
10.8		4, 7, 17
10.9		4, 20
10.11		19

* Refer to Appendix H1 for listing of video scenes and their description

APPENDIX H2
VIDEOTAPE USER'S GUIDE
MSIS PARAGRAPHS
VS. SCENES

APPENDIX H2 (CONTINUED)

Living and Working in Space Video Scenes Pertaining to MSIS Paragraphs*	
11.0	**Hardware & Equipment**
11.2	21, 23
11.3	18
11.4	19
11.5	None
11.6	4, 5, 6, 11, 12, 14, 19, 21, 30
11.7	4, 5, 6, 7, 8, 9, 11, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 27, 28, 30, 31
11.8	4, 5, 11, 12, 14, 21, 30, 31
11.9	8, 12
11.10	21
11.11	6, 27
11.13	25
11.14	27, 29
12.0	**Design for Maintainability**
12.3	4, 12, 19, 21, 23, 24, 25, 26, 28, 29
13.0	**Facilities Management**
13.[illegible]	19
13.3	19
13.4	22, 28
14.0	**EVA**
14.1	32
14.2	32
14.3	32, 33
14.4	8, 32, 34, 36
14.5	32, 34, 35
14.6	None
14.7	34, 35

* Refer to Appendix H1 for listing of video scenes and their description

APPENDIX I

STANDARDS DATA MANAGEMENT SYSTEM (SDMS)

USER'S GUIDE

(This appendix has been deleted from this volume)

APPENDIX J

MSIS KEYWORD LIST

Apertures

5.7.3.1.4	Non-Ionizing Radiation Protection Design Considerations

Architectural integration

8.9	Mobility Aids and Restraints Architectural Integration

Architecture

8.0	Architecture
8.2	Overall Architectural Considerations and Requirements
8.2.3	Overall Architectural Design Requirements

Area windows

11.11.3.1.1	Window Size

Arm elevation

3.3.4.2	Neutral Body Posture Design Considerations

Arm float

11.7.2.3.4	Sleep Restraints Design Requirements

Articulation index

5.4.2.4.2.2	Indirect Voice Communications Criteria Considerations
5.4.3.2.2.2	Indirect Voice Communications Noise Exposure Requirements

Atmosphere

5.1	Atmosphere

Atmospheric composition

5.1.2.1	Safe Atmospheres - Design Considerations
5.1.2.1.1	Gas Composition and Pressure Design Considerations
5.1.2.1.2	Gas Pressure Design Considerations
5.1.2.1.4	Human Response to the Diluent Gas Environment Design Considerations
5.1.2.1.4.1	Metabolic Factors Design Considerations
5.1.2.1.4.2	Thermal Factors Design Considerations
5.1.2.2.1.4	Chronic CO_2 Toxicity Design Considerations
5.1.2.2.1.5	Acute CO_2 Toxicity Design Considerations
5.1.2.2.1.7	Dysbarism Sickness Design Considerations
5.1.3.1	Atmosphere Composition and Pressure Design Requirements

Atmospheric contamination

5.1.2.3.2	Atmosphere Microbiological Monitoring Design Considerations

Atmospheric control

5.1.3.1	Atmosphere Composition and Pressure Design Requirements

Atmospheric monitoring

5.1.2.3.3	Baro-Thermal Monitoring Design Considerations
5.1.3.2	Atmosphere Monitoring Design Requirements
5.1.3.4	Atmosphere Microbiological Monitoring & Control Design Considerations
7.2.7.3.3	Environmental Monitoring Design Requirements

Atmospheric parameters

5.8.3.1	Temperature, Humidity, and Ventilation Design Requirements

Atmospheric pressure

5.1.2.1	Safe Atmospheres - Design Considerations
5.1.2.1.1	Gas Composition and Pressure Design Considerations
5.1.2.2.1.7.2	Trapped Gas Dysbarism Design Considerations
5.1.3	Long Term Mission Atmosphere Design Requirements
5.1.3.1	Atmosphere Composition and Pressure Design Requirements

Atmospheric revitalization

5.1.3.1	Atmosphere Composition and Pressure Design Requirements

Atmospheric supply

5.1.3.1	Atmosphere Composition and Pressure Design Requirements

Atmospheric composition

5.1.3	Long -Term MissionAtmosphere Design Requirements

Attachable handles

11.6.3.3	Nonfixed Handles Design Requirements

Attachment instructions

11.5.4	Example Mounting Hardware Design Solutions

Body envelope

8.6.2	Envelope Geometry Design Considerations
8.6.2.3	Body Envelope Design Considerations

Body fluids

7.2.3.4.2	Nonexercise Countermeasures Design Considerations

Body grooming

7.2.5.3.1	Body Grooming Design Requirements

Body heat

3.3.5.2	Body Surface Area Design Considerations

Body mass

3.3.7	Body Mass Properties

Body motion envelope

8.6.2.3	Body Envelope Design Considerations

Body orientation

8.8.2	Translation Path Design Considerations

Body part weight

4.7.2	Reaction Time - Design Considerations

Body resonance

5.5.2.3.1	Physiological Effects of Vibration

Body restraint color

11.7.2.3.3.3	Body Restraint Finish and Color Design Requirements

Body restraint dimensions

11.7.2.3.3.4	Body Restraint Dimensional Design Requirements

Character height

9.5.3.1.14.6	Character Height Design Requirements

Character measurement

9.5.3.1.14.9	Character Measurement Design Requirements

Character size

9.4.2.2	Visual Display Design Considerations
9.5.3.1.14.6	Character Height Design Requirements

Character spaces

9.4.2.3.3.9	Visual Display Terminal (VDT) Design Requirements
9.5.3.1.14.10	Spacing Design Requirements
9.6.2.4.4.2	Design Requirements for Functional Area Tables

Character width

9.5.3.1.14.7	Character Width Design Requirements
9.6.2.4.2	Design Requirements for Tables

Characters

9.4.2.3.3.7	Digital Display Design Requirements
9.4.2.3.3.9	Visual Display Terminal (VDT) Design Requirements
9.5.3.1.14.1	Font Style Design Requirements
9.5.3.1.14.6	Character Height Design Requirements
9.5.3.1.14.7	Character Width Design Requirements

Charts

9.6.2.5.1	Design Considerations for Graphics

Chassis

12.3.1.2	Physical Accessibility Design Requirements

Chassis leakage current

6.4.3.18.1	Chassis Leakage Current
6.4.3.18.1.1	Chassis Leakage Current-Nonpatient Equipment
6.4.3.18.1.2	Chassis Leakage Current-Patient Equipment

Checklists

13.3.3.1 General Inventory Control Design Requirements

Chemical contaminant monitoring

7.2.7.3.3 Environmental Monitoring Design Requirements

Chemical contamination

5.1.3.3 Atmosphere Toxicological Monitoring & Control Design Requirements

Chemical radiation protectors

5.7.2.1.4.3 Chemical Protectors

Chilling

10.5.3.2 Food Selection Preparation Consumption-Design Requirements

Chokes

5.1.2.2.1.7.1 Evolved Gas Dysbarism Design Considerations

Circuit breaker dimensions

9.3.3.3.13 Circuit Breaker Design Requirements

Circuit breaker displacement

9.3.3.3.13 Circuit Breaker Design Requirements

Circuit breaker protection

9.3.3.2 Accidental Actuation Design Requirements

Circuit breaker resistance

9.3.3.3.13 Circuit Breaker Design Requirements

Circuit breakers

9.3.3.3.13 Circuit Breaker Design Requirements
12.3.1.2 Physical Accessibility Design Requirements

Cleansing

10.3.3.1	Defecation and Urination Facilities Design Requirements

Cleansing agents

10.2.3.2	Whole Body Cleansing Design Requirements
10.2.3.5	Grooming and Shaving Design Requirements

Cleanup supplies

10.3.4	Example Body Waste Management Facility Design

Clinical laboratory lighting

8.13.3.5	Medical Lighting Requirements

Clips

11.7.3.4	Example Equipment Restraint Design Solutions

Clock

9.4.2.3.3.5	Clock and Timer Design Requirements

Close window

9.6.3.1.7.5.2	Design Requirements for Interactions with Windows

Closures

11.4	Closures and Covers
13.2.3.1	General Housekeeping Design Requirements

Clothing

3.2.2	Application of Anthropometric Data - Design Considerations
3.3.3.2.5	Clothing Design Considerations
5.8.2	Thermal Environment Design Considerations
7.2.5.3.5	Personal Clothing & Equipment Cleansing Design Requirements
10.4.3	Individual Crew Quarters Design Requirements
10.10.2	Laundry Facility Design Considerations
11.13	Crew Personal Equipment
3.3.1.2	Body Size Design Considerations

Clothing comfort

11.13.1.3.1 General Clothing Design Requirements

Clothing considerations

11.13.1.2.1 Preliminary Clothing Design Considerations

Clothing design

11.13.1.2 Clothing Design Considerations
11.13.1.3 Clothing Design Requirements
11.13.1.4 Example Clothing Design Solutions

Clothing doffing

11.13.1.3.1 General Clothing Design Requirements
11.13.1.3.1 General Clothing Design Requirements

Clothing environmental protection

11.13.1.3.1 General Clothing Design Requirements

Clothing esthetics

11.13.1.3.1 General Clothing Design Requirements

Clothing identification

11.13.1.3.2 Clothing Packaging and Storage Design Requirements

Clothing material

11.13.1.3.1 General Clothing Design Requirements

Clothing packaging

11.13.1.3.2 Clothing Packaging and Storage Design Requirements

Clothing quantities

11.13.1.2.3 Frequency of Clothing Change

Clothing selection

11.13.1.3.1 General Clothing Design Requirements

Commands

9.6.2.1	Design Considerations for Data Display
9.6.3.1.3.2	Design Requirements for Command Language
9.6.3.4.2.1	Design Considerations for User Feedback

Common tools

11.2.3.2	Tool Commonality Design Requirements

Communication

4.3.2.2	Noise Design Considerations
9.2.5.2.1	Maintenance Workstation Design Considerations
10.4.3	Individual Crew Quarters Design Requirements
10.6.2	Meeting Facility Design Considerations
10.9.3.2.1	Data Base and Communications Capability

Communication equipment

9.4.3.3.3	Operator Comfort and Convenience Design Requirements

Compartment orientation

8.4	Compartment and Crew Station Orientation

Compression monitoring

5.1.3.3	Atmosphere Toxicological Monitoring & Control Design Requirements

Compression therapy

10.9.3.2.11	Hyperbaric Treatment Facilities

Computer access

9.2.5.2.1	Maintenance Workstation Design Considerations

Computer access device

9.3.3.4.8	Bar Code Reader Design Requirement

Computer failure

9.6.4.2	Design Requirements for User Input

Contamination

9.2.5.2.2	Maintenance Workstation Design Requirements
10.10.3	Laundry Facility Design Requirements
10.11.3	Trash Management Facility Design Requirements
11.9.3.4	IVA Fastener Design Requirements
14.2.3.7	EVA Body Waste Management Design Requirements

Contamination prevention

11.11.2.3	Physical Protection Design Considerations

Contingency labels

9.5.3.1.11	Contingency Labels and Marking Devices Design Requirements

Contingency system

10.3.3.1	Defecation and Urination Facilities Design Requirements

Continuous noise

5.4.2.1.2	On-Orbit Phase Acoustic Environment
5.4.2.4.1.1.1	Wide-Band Long-Term Hearing Conservation Considerations
5.4.3.2.3.1	Wide-Band Long-Term Annoyance Noise Exposure Requirements
5.4.3.2.3.2	Narrow-Band Annoyance Noise Exposure Requirements

Continuous type thumbwheel

9.3.3.3.2	Thumbwheel Control Design Requirements

Contrast

4.2.2	Vision - Design Considerations

Control buttons

9.5.3.1.13	Caution and Warning Labels Design Requirements

Control location

9.3.3.2	Accidental Actuation Design Requirements

Control modes

9.4.2.3.3.5	Clock and Timer Design Requirements

Control/display labels

9.2.3.2.8	Control/Display Movement Compatibility Design Requirements

Control/display location

9.2.3.2.4	Preferred Control/Display Location Design Requirements

Control/display maintenance

9.2.3.2.6	Maintenance Controls/Displays Design Requirements

Control/display movement compatibility

9.2.3.2.8	Control/Display Movement Compatibility Design Requirements

Control/display movement ratio

9.2.3.2.9	Control/Display Movement Ratio Design Requirements

Control/display placement

9.2.3	Control/Display Placement and Integration

Control/display relationship

9.2.3.2.4	Preferred Control/Display Location Design Requirements

Controls

6.3.3.8	Levers Cranks Hooks and Controls Requirements
9.2.2.2.4	Workstation Color Design Requirements
9.3	Controls
9.3.3	Control Design Requirements
9.3.4	Examples Control Design Solutions
9.5.3.1.12	Grouped Controls and Displays Design Requirements
11.2.3.1.1	Tool Handgrip Size and Shape Design Requirements

Convection

5.8.2.2.1	Modes of Heat Exchange - Design Considerations
5.8.2.2.2.1	Microgravity Effects on the Thermal Environment

Cooling

10.8.2	Microgravity Countermeasure Facility Design Considerations
10.8.3.4	Exercise Environment Design Requirements

EVA airlock volumes

14.5.2.4	EVA Airlock Design Considerations

EVA airlocks

14.5.2.4	EVA Airlock Design Considerations
14.5.3.4	EVA Airlock Design Requirements

EVA alternatives

14.1.2.1.4	Alternative Approaches to EVA

EVA anthropometry

14.3	EVA Anthropometry
14.3.2	EVA Anthropometric Design Considerations
14.3.3	EVA Anthropometry Design Requirements
14.3.4	Example EVA Anthropometric Design Solutions

EVA applications

14.1.2.1.1	Applications of EVA

EVA atmosphere

14.2.2.9	EVA Suit Pressure Design Considerations

EVA battery powered tools

14.6.2.3	EVA Tools Design Requirements

EVA body waste management

14.2.2.7	EVA Body Waste Management Design Considerations
14.2.3.7	EVA Body Waste Management Design Requirements
14.2.4.1	EVA Body Waste Management Example Design Solutions

EVA bolt fasteners

14.6.3.3	EVA Fasteners Design Requirements

EVA boots

14.3.2.1.2	Space Suit Boot Design Considerations and Dimensions
14.3.4.2	STS EMU Boot Dimensions

EVA corridors

14.5.3.1	EVA Translation Route Design Requirements

EVA criticality

14.1.2	General EVA Design Considerations

EVA displays

14.4.2	EVA Workstation and Restraint Design Considerations
14.4.2.3	EVA Controls and Displays Design Considerations
14.4.3.2	EVA Control and Display Design Requirements

EVA doors

14.5.2.1	EVA Translation Route Design Considerations
14.5.3.1	EVA Translation Route Design Requirements

EVA enhancement equipment

14.7.2	EVA Enhancement Systems Design Considerations

EVA enhancement systems

14.7	EVA enhancement systems

EVA equipment

14.5.3.1	EVA Translation Route Design Requirements

EVA equipment tethers

14.4.3.5	EVA Equipment Tether Design Requirements

EVA equipment transfer

14.5.2.6	EVA Equipment Transfer Design Considerations
14.5.3.6	EVA Equipment Transfer Design Requirements

EVA eye/hand coordination

14.2.2.2	EVA Eye/Hand Coordination Design Considerations
14.2.3.2	EVA Eye/Hand Coordination Design Requirements

EVA fastener size

14.6.3.3	EVA Fasteners Design Requirements

EVA fasteners

14.6	EVA Tools, Fasteners and Connectors
14.6.3.2	EVA Fasteners Design Considerations

EVA field of view

14.3.2.6	EVA Head Movement and Viewing Limits
14.4.3.1	EVA Work Envelope Design Requirements
14.4.3.3	EVA Workstation Lighting Design Requirements

EVA flashlights

14.4.4.1	EVA Workstation Lighting Example Design Solutions

EVA food

14.2.2.6	EVA Food and Drinking Water Design Considerations
14.2.3.6	EVA Food and Drinking Water Design Requirements
14.2.4.2	EVA Food and Drinking Water Example Design Solution

EVA foot restraints

14.4.2.5	EVA Crew Restraint Design Considerations
14.4.3.4	EVA Crew Restraint Design Requirements
14.4.4.2	EVA Crew Restraint Example Design Solutions

EVA glove

14.2.2.11	EVA Touch Temperature Considerations
14.2.3.11	EVA Touch Temperature and Pressure Design Requirements
14.2.4.5	EVA Glove Example Design Solutions
14.3.2.1	Space Suit Design Considerations and Dimensions
14.3.2.1.1	Space Suit Glove Design Considerations and Dimensions

EVA glove assembly

14.3.2.1.1	Space Suit Glove Design Considerations and Dimensions

EVA glove sections

14.2.4.5	EVA Glove Example Design Solutions

EVA handholds

14.4.2.5	EVA Crew Restraint Design Considerations
14.4.3.4	EVA Crew Restraint Design Requirements
14.5.3.1	EVA Translation Route Design Requirements
14.5.3.2	EVA Mobility Aids Design Requirements

EVA handrails

14.5.3.2	EVA Mobility Aids Design Requirements

EVA hardware

14.4.2	EVA Workstation and Restraint Design Considerations
14.4.2.2	Hardware Design Considerations for EVA Access

EVA hatches

14.5.2.1	EVA Translation Route Design Considerations
14.5.3.1	EVA Translation Route Design Requirements

EVA hazards

14.1.3	General EVA Safety Design Requirements
14.6.4.3	EVA Connectors Design Requirements

EVA helmet

14.2.3.7	EVA Body Waste Management Design Requirements
14.3.2.1.3	Space Suit Helmet Design Considerations and Dimensions

EVA joint mobility ranges

14.3.4.3	Example Pressure Suit Joint Mobility

EVA labels

14.4.2.3	EVA Controls and Displays Design Considerations
14.4.3.2	EVA Control and Display Design Requirements

EVA light beam

14.4.3.3	EVA Workstation Lighting Design Requirements

EVA lighting

14.4.2	EVA Workstation and Restraint Design Considerations
14.4.2.4	EVA Workstation Lighting Design Considerations
14.4.3.3	EVA Workstation Lighting Design Requirements
14.4.4	Example EVA Workstation and Restraint Design Solutions
14.4.4.1	EVA Workstation Lighting Example Design Solutions

EVA luminance ratio

14.4.2.4	EVA Workstation Lighting Design Considerations

EVA maintenance

12.3.1.1	General Maintainability Design Requirements

EVA medical monitoring

14.2.2.8	EVA Medical Monitoring Design Considerations
14.2.4.3	EVA Example Medical Monitoring Design Solutions

EVA metabolic workload

14.2.3.5	EVA Metabolic Workload Design Requirements

EVA mobility aids

14.2.3.8	EVA Medical Monitoring Design Requirements
14.5	EVA Mobility and Translation
14.5.2.2	EVA Mobility Aids Design Considerations
14.5.3	EVA Mobility and Translation Design Requirements
14.5.3.2	EVA Mobility Aids Design Requirements

EVA movement range

14.3.2.3	EVA Movement Ranges
14.3.4.3	Example Pressure Suit Joint Mobility

EVA neutral body posture

14.3.2.4	EVA Neutral Body Posture
14.4.3.1	EVA Work Envelope Design Requirements

EVA operations

14.1.2	General EVA Design Considerations

EVA space suit

14.3.2.1	Space Suit Design Considerations and Dimensions
14.3.2.2	Space Suit Joint Motion Design Considerations
14.3.2.7	EVA Space Suit Measurement Considerations

EVA strength

14.2.2.4	EVA Strength-Related Design Considerations
14.2.3.4	EVA Strength-Related Design Requirements

EVA suit measurements

14.3.2.7	EVA Space Suit Measurement Considerations

EVA suit pressure

14.2.2.9	EVA Suit Pressure Design Considerations
14.2.3.9	EVA Suit Pressure Design Requirements

EVA system designs

14.1.3	General EVA Safety Design Requirements

EVA tether attachment points

14.4.3.5	EVA Equipment Tether Design Requirements

EVA tether hooks

14.4.4.3	EVA Equipment Tether Hook Example Design Solution
14.5.3.3	EVA Translation Restraints Design Requirements

EVA tether locks

14.4.3.5	EVA Equipment Tether Design Requirements

EVA tethers

14.4.3.4	EVA Crew Restraint Design Requirements
14.5.2.3	EVA Translation Restraints Design Considerations
14.5.3.3	EVA Translation Restraints Design Requirements
14.7.3	EVA Enhancement Systems Design Requirements

EVA tool access

14.3.2.5	EVA Working Envelopes

EVA tunnels

14.5.2.5	EVA Passageway Design Considerations

EVA vision

14.2.3.1	EVA Vision Design Requirements
14.2.2.3	EVA Reaction Time Design Considerations
14.2.2.1	EVA Vision Design Considerations

EVA vision cone

14.3.2.6	EVA Head Movement and Viewing Limits

EVA waist tethers

14.4.4.2	EVA Crew Restraint Example Design Solutions

EVA water

14.2.2.6	EVA Food and Drinking Water Design Considerations
14.2.3.6	EVA Food and Drinking Water Design Requirements
14.2.4.2	EVA Food and Drinking Water Example Design Solution

EVA wing connectors

14.6.4.3	EVA Connectors Design Requirements

EVA work envelopes

14.3.2.5	EVA Working Envelopes
14.4.2	EVA Workstation and Restraint Design Considerations
14.4.2.1	EVA Work Envelope Design Considerations

EVA workload

14.2.2.5	EVA Workload Design Considerations
14.2.3.5	EVA Metabolic Workload Design Requirements
14.6.2.2	EVA Tools Design Considerations

EVA workstations

14.4	EVA Workstations and Restraints
14.4.4	Example EVA Workstation and Restraint Design Solutions

Effects of noise

5.4.2.3	Human Responses to Noise - Design Considerations

Effects of vibration

5.5.2.3.3	Discomfort/Annoyance Effects of Vibration

Electrical connector plugs

11.10.3.2	Electrical Connectors Design Requirements

Electrical connectors

11.10.2	Connector Design Considerations
11.10.3.2	Electrical Connectors Design Requirements
14.6.4.3	EVA Connectors Design Requirements

Electrical hazards

6.4	Electrical hazards
6.4.1	Introduction
6.4.2	Electrical Hazards Design Considerations
6.4.3	Electrical Hazards Design Requirements
14.1.4	Space Suit Electrical Hazards Reduction Design Example

Electrical protection

6.4.3	Electrical Hazard Design Requirements

Electrical shock

6.4.2.	Electrical Hazard Design Considerations
6.4.3	Electrical Hazard Design Requirements
6.4.3.2	Electrical Bonding
6.4.3.19	Bioinstrumentation System Microshock Protection Requirements

Electrical shock protection

6.4.3	Electrical Hazard Design Requirements
6.4.3.12	Overload Protection

Electrocardiograph

10.8.3.4	Countermeasure Monitoring Design Requirements

Endurance

4.9.2	Strength - Design Considerations
4.10.2	Workload Design Considerations

Engravings

9.5.3.1.14.9	Character Measurement Design Requirements

Entertainment

10.8.3.5	Display Capabilities for Exercising Crewmembers Design Requirements

Entry

10.4.3	Individual Crew Quarters Design Requirements

Entry phase noise

5.4.2.1.3	Entry Phase Acoustic Environment

Entry to 1-g

7.2.3.2	Reduced Gravity Countermeasures Design Considerations

Envelope geometry

8.6	Envelope Geometry for Crew Functions

Environment

7.2.2.2.3	Food and Water Quality and Quantity - Design Considerations

Environmental control

5.1.2	Atmosphere Design Considerations
5.1.2.1	Safe Atmospheres - Design Considerations
5.1.2.1.1	Gas Composition and Pressure Design Considerations
5.1.2.3.1	Atmosphere Toxicological Monitoring Design Considerations
10.4.3	Individual Crew Quarters Design Requirements

Environmental effects

5.9	Combined Environmental Effects

Equipment drawers

11.3.2	Drawer and Rack Design Considerations
11.3.3.2	Design Requirements Common to Both Stowage & Equipment Drawers
11.3.3.4	Equipment Drawer Design Requirements
11.5.3.1	General Mounting Design Requirements

Equipment hazards

6.2.2.2	Crew Induced Accidents

Equipment identification

9.5.3.1.6	Equipment Identification Design Requirements

Equipment layout

11.3.3.4	Equipment Drawer Design Requirements
11.5.3.1	General Mounting Design Requirements

Equipment location

8.8.3.3	Translation Path Obstructions and Hazards-Design Requirement

Equipment maintenance

11.4.3	Closures and Covers Design Requirements

Equipment marking

9.5.3.1.6	Equipment Identification Design Requirements

Equipment mobility aids

11.8.3	Equipment Mobility Aids

Equipment name

9.5.3.1.8	Operating Instruction Design Requirements

Equipment noise

5.4.2.2	Propagation of Noise - Design Considerations
5.4.3.1	General Acoustic Design Goals

Fabrics

11.13.1.3.1	General Clothing Design Requirements

Facilities

13.0	Facility Management

Facility management

13.0	Facility management

Fail-safe design

6.2.3	General Safety Design Requirements

Failed items

9.5.3.1.10	Failed/Expendable Item Design Requirements

False alarms

9.4.3.3.1	General Design Requirements

Fans

5.8.3.2	Thermal Monitoring and Control Design Requirements

Fastener design

11.9.3	Fastener Design Requirements

Fastener heads

11.9.3.3	Tool-Actuated Fastener Design Requirements
11.9.3.4	IVA Fastener Design Requirements

Fastener knobs

11.9.3.2	Hand-Actuated Fastener Design Requirements

Fastener location

11.9.3.1	General Fastener Design Requirements

Fastener locks

11.9.3.3	Tool-Actuated Fastener Design Requirements

Fastener lubrication

11.9.3.4	IVA Fastener Design Requirements

Fasteners

11.2.3.2	Tool Commonality Design Requirements
11.2.3.6	Tool Access Design Requirements
11.5.3.1	General Mounting Design Requirements
11.9	Fasteners
12.3.1.1	General Maintainability Design Requirement
12.3.1.4	Removal Replacement and Modularity Design Requirements

Fatigue

4.10.2	Workload Design Considerations
5.2.2.1	Physiological Effects of Microgravity

Fatigue decreased proficiency boundary

5.5.2.4.3	Vibration Exposure Criteria Design Consideration(1 to 80 Hz)

Fault detection

12.3.2.1	Fault Detection and Isolation Design Requirements

Fault detection

12.3.3	Maintenance Information Management Systems Design Requirements

Fault isolation

12.3.2.1	Fault Detection and Isolation Design Requirements

Feedback

9.6.2.1	Design Considerations for Data Display
9.6.3.1.2	Design Requirements for User-Computer Dialogues
9.6.3.4.2.2	Design Requirements for User Feedback

Feedback noise

9.4.3.3.2	Audio Input/Output Equipment Design Requirements

Food packaging

10.5.3.3	Food Packaging and Stowage Design Requirements
11.12	Packaging

Food packaging design

11.12.2	Packaging Design Considerations

Food rehydration

7.2.2.2.3	Food and Water Quality and Quantity - Design Considerations
10.5.3.3	Food Packaging and Stowage Design Requirements

Food stowage

11.12.3	Packaging Design Requirements

Foot angle

3.3.4.2	Neutral Body Posture Design Considerations

Foot operated switch activation

9.3.3.3.9	Foot-Operated Switch Design Requirements

Foot operated switch location

9.3.3.3.9	Foot-Operated Switch Design Requirements

Foot operated switch use

9.3.3.3.9	Foot-Operated Switch Design Requirements

Foot operated switches

9.3.3.3.9	Foot-Operated Switch Design Requirements

Foot restraint

3.3.3.2.3	Restraint Design Considerations
3.3.3.3.1	Functional Reach Design Requirements

Foot restraint attachments

11.7.2.3.2.1	General Foot Restraint Design Requirements

Hazard

9.5.3.1.13	Caution and Warning Labels Design Requirements

Hazard identification labels

9.5.3.1.13	Caution and Warning Labels Design Requirements

Hazards

6.2.3	General Safety Design Requirements
8.10.3.1	Location Design Requirements
11.2.3.7	Special Tool Features Design Requirements
11.12.3	Packaging Design Requirements
12.3.1.2	Physical Accessibility Design Requirements

Head tilt

3.3.4.2	Neutral Body Posture Design Considerations

Headphones

9.4.3.3.3	Operator Comfort and Convenience Design Requirements

Headsets

9.4.3.3.2	Audio Input/Output Equipment Design Requirements
9.4.4.3.4.1	Audio Alarm Characteristics Design Requirements

Health

7.0	Health Management
8.3.3.2	Non-Adjacent Crew Stations - Design Requirements
13.2.2	Housekeeping Design Considerations

Health care system

10.9.3.2.15.2	Contingency Operation Design Requirements

Health criteria

7.2.6.2	Pre/Post-Mission Health Management - Design Considerations

Health management

7.2.6	Pre/Post-Mission Health Management

Health monitoring

7.2.6.2	Pre/Post-Mission Health Management - Design Considerations
7.2.7	Health Monitoring
7.2.7.2.1	Routine Crew Health Monitoring Design Considerations
7.2.7.3.1	Routine Crew Health Monitoring Design Requirements

Health records

10.9.3.2.1	Data Base and Communications Capability

Health stabilization

7.2.6.2	Pre/Post-Mission Health Management - Design Considerations

Health training

7.2.6.2	Pre/Post-Mission Health Management - Design Considerations

Hearing conservation

5.4.2.4.1	Hearing Conservation Criteria Considerations
5.4.3.2.1	Hearing Conservation Noise Exposure Requirements
5.4.3.2.1.5	Infrasonic Long-Term Annoyance Noise Exposure Requirements

Hearing protection

5.4.3.2.1	Hearing Conservation Noise Exposure Requirement
5.4.3.2.1.1	Wide-Band Long-Term Hearing Conservation Noise Exposure Requirements
5.4.3.2.1.3	Impulse Hearing Conservation Noise Exposure Requirements
5.4.3.2.1.4	Infrasonic Long-Term Annoyance Noise Exposure Requirements
5.4.3.2.1.5	Ultrasonic Long-Term Annoyance Noise Exposure Requirements
5.4.3.2.3.1	Wide-Band Long-Term Annoyance Noise Exposure Requirements
5.4.4.3	Hearing Protection

Heart rate

10.8.3.2	Countermeasure Monitoring Design Requirements

Heat dissipation

5.8.2.2.2	Thermoregulation by the Body - Design Considerations

Heat exchange

5.8.2.2.1	Modes of Heat Exchange - Design Considerations

Illumination

9.4.2.3.1.1	Illumination Design Requirements
9.4.2.3.3.7	Digital Display Design Requirements
13.2.3.2	Surface Cleaning Design Requirements
13.4.3.2	Hardcopy Information Management Design Requirements

Illumination levels

8.13.3.1.3	Illumination Levels of Sleeping Areas Design Requirements

Imaging lighting

8.13.3.5	Medical Lighting Requirements

Impact acceleration

5.3.2.1	Acceleration Environments
5.3.2.1.3	Impact Acceleration Environments
5.3.2.4	Human Responses to Impact Accelerations
5.3.3.3	Impact Acceleration Design Requirements

Impact acceleration factors

5.3.2.4	Human Responses to Impact Accelerations

Impact acceleration limits

5.3.3.3	Impact Acceleration Design Requirements

Impact loads

11.11.3.4	Physical Protection Design Requirements

Impact noise

5.4.2.4.1.2	Short-Term Hearing Conservation Criteria Considerations

Impact survival

5.3.2.4	Human Responses to Impact Accelerations

Impulse noise

5.4.3.2.3.4	Impulse Annoyance Noise Exposure Requirements

Labels

9.6.2.4.1	Design Considerations for Tables
9.6.2.4.2	Design Requirements for Tables
9.6.2.4.3.2	Design Requirements for Matrix Tables
9.6.2.8	Design Requirements for Format
11.2.3.5	Tool Labeling and Identification Design Requirements
11.3.3.3	Stowage Drawer Design Requirements
11.6.3.1	General Handle and Grasp Area Design Requirements
11.9.3.1	General Fastener Design Requirements
11.9.3.3	Tool-Actuated Fastener Design Requirements
11.10.3.5	Connector Identification/Alignment Design Requirements
11.10.4	Example Connector Design Solutions
11.12.3	Packaging Design Requirements
11.14.3	Cable Management Design Requirements
12.3.1.3	Visual Access Design Requirements
12.3.1.4	Removal Replacement and Modularity Design Requirements
12.3.2.2	Test Point Design Requirements

Lamp replacement

9.4.2.3.4	Display Maintenance Design Requirements

Lamp safety

9.4.2.3.4	Display Maintenance Design Requirements

Lamp testing

9.4.2.3.3.8	Light Emitting Diode (LED) Design Requirements

Lamp tests

9.4.2.3.4	Display Maintenance Design Requirements

Large screen display

9.4.2.3.3.2	Large Screen Display Design Requirements

Laser exposure limits

5.7.3.2.1	Non-Ionizing Radiation Exposure Limits

Laser light

11.11.2.2	Visual Protection Design Considerations

Line spacing

9.5.3.1.14.10	Spacing Design Requirements
9.6.3.2.1	Design Requirements for Position Designation (Cursor)

Linear acceleration

5.3.2.1	Acceleration Environments
5.3.2.1.1	Linear Acceleration Environments
5.3.2.2	Human Responses to Linear Acceleration
5.3.2.2.2	Subjective Effects of Linear Accelerations
5.3.2.2.3	Specific Effects of Linear Accelerations
5.3.3.1	Linear Acceleration Design Requirements

Linear acceleration factors

5.3.2.2.1	Factors Affecting Human Acceleration Tolerance

Linear acceleration limits

5.3.3.1	Linear Acceleration Design Requirements

Linear acceleration tolerance

5.3.2.2.1	Factors Affecting Human Acceleration Tolerance

Linear energy transfer

5.7.2.1.3.1	Units of Measure Used to Describe Human Responses to IO

Linear scale

9.4.2.3.3.4	Scales and Pointers Design Requirements

Liquid connectors

11.10.3.1	Fluid Connectors Design Requirements

Liquid lines

11.10.3.1	Fluid Connectors Design Requirements

Loads

11.7.3.3	Equipment Restraint Design Requirements
11.9.3.2	Hand-Actuated Fastener Design Requirements

Luminance

9.4.2.2	Visual Display Design Considerations
9.4.2.3.1.1	Illumination Design Requirements
9.4.2.3.3.2	Large Screen Display Design Requirements
9.4.2.3.3.9	Visual Display Terminal (VDT) Design Requirements

Luminance contrast

9.4.2.3.3.6	Flag Display Design Requirements

Luminance control

9.2.5.1.2	Window Workstation Design Requirements

Luminance ratio

8.13.3.2.1	Glare From Light Sources Design Requirements
8.13.3.2.3	Brightness Ratio Design Requirements
9.4.2.3.3.2	Large Screen Display Design Requirements
14.4.3.3	EVA Workstation Lighting Design Requirements

Luminous displays

8.13.2.4	Light Distribution Design Considerations

MSIS relational database

1.5	Standards Database (TBD)

Macros

9.6.3.1.10.1	Design Considerations for User-definable Macros
9.6.3.1.10.2	Design Requirements for User-definable Macros

Magnetic fields

5.7.3.1.2	Sources of Non-Ionizing Radiation

Maintainability

12.0	Design for Maintainability

Maintainability design

12.3	Design for Maintainability - Design Requirements

Muscle strength

10.8.3.1	Microgravity Countermeasures Equipment/Supplies Design Requirements
10.8.3.2	Countermeasure Monitoring Design Requirements

Muscular tension

11.7.2.3.1	General Personnel Restraints Design Requirements

Nails

7.2.5.3.1	Body Grooming Design Requirements

Name plates

9.5.3.1.6	Equipment Identification Design Requirements

Narrow band hearing

5.4.3.2.1.2	Narrow-Band, Long-Term Hearing Conservation Noise Exposure Requirement

Narrow band noise

5.4.2.4.1.1.2	Narrow-Band, Long-Term Hearing Conservation Considerations
5.4.3.2.3.2	Narrow-Band, Annoyance Noise Exposure Requirements

Nasal congestion

4.4.2.1	Olfaction

Neutral body posture

3.2.3.1	Microgravity Effects Design Considerations
3.3.3.2.2	Body Posture Design Considerations
3.3.4	Neutral Body Posture
8.11.2.2	Window Configuration Design Considerations
9.2.4.2.3	Workstation Restraints and Mobility Aid Design Requirements

Night vision

5.1.2.2.1.2	Night Vision Abnormalities Design Considerations

No hands input/output

9.2.5.2.1	Maintenance Workstation Design Considerations

Noise

4.3.2.2	Noise Design Considerations
8.3.2.1	General Adjacency Design Considerations
8.3.2.2	Specific Adjacency Design Considerations
10.4.3	Individual Crew Quarters Design Requirements
10.5.3.1	Overall Galley and Wardroom Layout - Design Requirements
10.6.2	Meeting Facility Design Considerations
10.8.3.4	Exercise Environment Design Requirements
10.9.3.1	Medical Communications/Computing Design Requirements
10.10.2	Laundry Facility Design Considerations
13.2.2	Housekeeping Design Considerations
13.2.3.3	Vacuum Cleaning Design Requirements

Noise annoyance

5.4.2.3.3	Annoyance Effects of Noise
5.4.2.4.3	Annoyance Criteria Considerations
5.4.2.4.3.2	Short-Term Annoyance Noise Criteria Considerations
5.4.2.4.3.1	Long-Term Annoyance Noise Criteria Considerations

Noise cancelling microphones

9.3.3.5	Speech Transmission Equipment Design Requirements

Noise control

5.4.4	Example Acoustics Design Solutions
5.4.4.1	Noise Control at the Source

Noise damage

4.3.2.2	Noise Design Considerations
5.4.2.3	Human Responses to Noise - Design Considerations

Noise environment

5.4.3	Acoustics Design Requirements

Noise exposure

5.4.2.4.1	Hearing Conservation Criteria Considerations

Noise exposure limits

5.4.2	Acoustics Design Considerations
5.4.2.3.1	Physiological Effects of Noise

Radiation damage

5.7.2.1.3.3.4	Skin Tissue Effects

Radiation detectors

5.7.2.2.3	Ionizing Radiation Monitoring and Dosimetry Design Requirements

Radiation dosage

3.3.5.2	Body Surface Area Design Considerations

Radiation dose

5.7.2.2.2	Ionizing Radiation Protection Design Requirements
5.7.2.2.3	Ionizing Radiation Monitoring and Dosimetry Design Requirements

Radiation dose prognosis

5.7.2.1.3.3.3	Hematological Effects

Radiation effects

5.7.2.1.3.3.5	Reproductive Cell Effects
5.7.2.1.3.3.6	Performance Degradation Effects

Radiation exposure

5.7.2.1.3.3.3	Hematological Effects

Radiation exposure effects

5.7.2.1.3.3	Acute Effects of Ionizing Radiation
5.7.2.1.3.3.1	Whole-Body Irradiation Effects
5.7.2.1.3.3.2	Gastrointestinal or Precursor Effects

Radiation exposure limits

5.7.2.1.3.2	Late Effects of Ionizing Radiation
5.7.3.1.3	Human Responses to Non-Ionizing Radiation
5.7.3.2.1	Non-Ionizing Radiation Exposure Limits

Radiation fields

5.7.2.1.4.5	Radiation Fields in Polar and Geosynchronous Orbit

Radiation measurements

5.7.2.1.3.1 Units of Measure Used to Describe Human Responses to IO

Radiation monitoring

5.7.2.1.4.6 Radiation Monitoring
5.7.2.2.2 Ionizing Radiation Protection Design Requirements
5.7.2.2.3 Ionizing Radiation Monitoring and Dosimetry Design Requirements
5.7.3.2.2 Non-Ionizing Radiation Protection Design Requirements
7.2.7.3.3 Environmental Monitoring Design Requirements

Radiation performance degradation

5.7.2.1.3.3.6 Performance Degradation Effects

Radiation protection

5.7.2.1.4 Ionizing Radiation Protection Design Considerations
5.7.2.1.4.1 Mass Shielding
5.7.2.1.4.4 Avoidance of High Radiation Fluxes
5.7.2.1.4.5 Radiation Fields in Polar and Geosynchronous Orbit
5.7.2.2.2 Ionizing Radiation Protection Design Requirements
5.7.2.2.4 Ionizing Radiation Personnel Protective Equipment Design Requirements
5.7.3.1.4 Non-Ionizing Radiation Protection Design Considerations
11.11.3.3 Visual Protection Design Requirements

Radiation protection devices

5.7.3.2.2 Non-Ionizing Radiation Protection Design Requirements

Radiation protective garments

5.7.2.2.4 Ionizing Radiation Personnel Protective Equipment Design Requirements

Radiation protectors

5.7.2.1.4.3 Chemical Protectors

Radiation safety

5.7.3.2.2 Non-Ionizing Radiation Protection Design Requirements

Radiation skin reactions

5.7.2.1.3.3.4 Skin Tissue Effects

Radiation time scheduling

5.7.2.1.4.4	Avoidance of High Radiation Fluxes

Radioactive contamination control

5.7.2.2.4	Ionizing Radiation Personnel Protective Equipment Design Requirements

Radiofrequency protection

5.7.3.2.1	Non-Ionizing Radiation Exposure Limits

Radiofrequency radiation

5.7.3.1.1	Types of Non-Ionizing Radiation
5.7.3.1.3	Human Responses to Non-Ionizing Radiation
5.7.3.1.4	Non-Ionizing Radiation Protection Design Considerations
5.7.3.2.2	Non-Ionizing Radiation Protection Design Requirements

Radiographic imaging

10.9.3.2.6	Diagnostic Imaging

Radiological monitoring

7.2.7.3.3	Environmental Monitoring Design Requirements

Rags

13.2.2	Housekeeping Design Considerations

Ratcheting tools

11.2.3.1.3	Tool Actuation Forces and Direction of Action Design Requirements

Re-entry phase vibration

5.5.2.1.3	Entry Phase Vibration Environment

Reach

3.3.3	Reach

Reach envelope

3.3.3.2.2	Body Posture Design Considerations

Reflections

Relational Database

Relative biological effectiveness

Remote grids

Remote manipulator system

Removable items

Repair

Replaceable fasteners

Replaceable units

Repressurization

Stylus

9.3.2.2	Computer Input Devices - Design Considerations
9.3.3.4.6	Stylus and Grid Design Requirements

Subdivided containers

9.5.3.1.9	Stowage Container Labeling Design Requirements

Subscript

9.5.3.1.14.5	Special Character Design Requirements

Subtasks

9.2.2.1.1	Human/Machine Task Division Design Considerations

Sun shades

11.11.3.3	Visual Protection Design Requirements

Sun shields

11.11.3.3	Visual Protection Design Requirements

Sunglasses

11.13.2.3	Personal Ancillary Equipment Design Requirements

Superscript

9.5.3.1.14.5	Special Character Design Requirements

Supplemental lighting

8.13.2.3	Placement of Sources Design Considerations
8.13.2.4	Light Distribution Design Considerations
8.13.3.6	Workstation Illumination Design Requirements

Surface contamination

13.2.2	Housekeeping Design Considerations

Surface parallelism

11.11.3.1.3	Optical Characteristics

Surface reflection

8.13.3.2.2	Reflected Glare Design Requirements
11.11.3.1.2	Surface Reflections

Surface temperatures

6.5.3	Thermal Hazards Design Requirements

Surface touch temperature limits

6.5.2	Thermal Hazards Design Considerations
6.5.3	Thermal Hazards Design Requirements

Surfaces

6.3.3.9	Burrs Requirements
8.4.2	Orientation Design Considerations
8.13.3.2.2	Reflected Glare Design Requirements

Surgery

10.9.3.2.8	Surgery/Anesthesia Equipment

Surgical lighting

8.13.3.5	Medical Lighting Requirements

Sweat rate

5.8.2	Thermal Environment Design Considerations

Switch activation

9.3.3.3.7	Toggle Switch Design Requirements
9.3.3.3.7	Toggle Switch Design Requirements

Switch operation speed

4.7.2	Reaction Time - Design Considerations

Switches

9.3.3.4.1.2	General

Threads

6.3.3.6	Screws and Bolts Requirements

Throw-away restraints

11.7.3.3	Equipment Restraint Design Requirements

Thumbwheel coding

9.3.3.3.2	Thumbwheel Control Design Requirements

Thumbwheel control

9.3.3.3.2	Thumbwheel Control Design Requirements

Tiled windows

9.6.3.1.7.5.1	Design Considerations for Interactions with Windows

Timer

9.4.2.3.3.5	Clock and Timer Design Requirements

Titles

9.5.3.1.14.4	Titles Design Requirements
9.6.2.4.1	Design Considerations for Tables
9.6.2.4.1	Design Considerations for Tables
9.6.2.4.2	Design Requirements for Tables
9.6.2.8	Design Requirements for Format

Toggle switch operating force

9.3.3.3.7	Toggle Switch Design Requirements

Toggle switch orientation

9.3.3.3.7	Toggle Switch Design Requirements

Toggle switches

9.3.3.3.7	Toggle Switch Design Requirements

Tone

5.4.3.2.3.2	Narrow-Band Annoyance Noise Exposure Requirements

Tool use

11.2.2.2	Body Stabilization When Using Tool Design Considerations

Tools

11.2	Tools
11.2.4	Example Tool Design Solutions
11.5.3.1	General Mounting Design Requirements
11.7.3.3	Equipment Restraint Design Requirements
11.9.2	Fastener Design Considerations
11.9.3.3	Tool-Actuated Fastener Design Requirements
11.10.3.6	Connector Arrangement Design Requirements
12.3.1.1	General Maintainability Design Requirements
13.2.3.2	Surface Cleaning Design Requirements

Toothache

5.1.2.2.1.7.2	Trapped Gas Dysbarism Design Considerations

Torque

4.9.3	Strength - Design Requirements

Torquing

11.9.3.3	Tool-Actuated Fastener Design Requirements

Torsion loads

11.7.2.3.2.3	Foot Restraint Loads Design Requirements

Torso restraint

3.3.3.3.1	Functional Reach Design Requirements
11.7.2.3.4	Sleep Restraints Design Requirements

Total visual field

8.11.2.2	Window Configuration Design Considerations

Touch sensitive display

9.3.3.4.7	Touch-Sensitive Display Design Requirements

Ultraviolet

Unambiguous signals

Uncoated window panes

Underlining

Unplanned EVA

Unsafe atmosphere

Updating information

Upper case letters

Upward acceleration

Urine

Van Allen Belts

5.7.2.1.2.1	Trapped Radiation Belts

Vaporization

5.8.2.2.1	Modes of Heat Exchange - Design Considerations
6.7.5	Vaporization of Tissue Fluids

Variable amplitude vibration

5.5.3.3.4	Vibration Duration

Vehicle axis orientation

9.5.3.1.7	Location and Orientation Coding Design Requirements

Velcro

11.7.3.3	Equipment Restraint Design Requirements
11.7.3.4	Example Equipment Restraint Design Solutions

Ventilation

5.8.2.2.2.1	Microgravity Effects on the Thermal Environment
5.8.2.2.5	Special Ventilation & Metabolic Heat Removal Design Considerations
10.6.2	Meeting Facility Design Considerations
10.7.2	Recreation Facility Design Considerations
10.8.3.4	Exercise Environment Design Requirements

Ventilator

10.9.3.2.4	Medical Life Support

Venting

6.6.2	Fire Protection and Control Design Considerations

Verbal alarm criteria

9.4.4.3.4.3	Verbal Alarm Signal Design Requirements

Verbal alarm intensity

9.4.4.3.4.3	Verbal Alarm Signal Design Requirements

Vibration control

5.5.4	Example Vibration Design Solutions
5.5.4.2	Control of Vibration - Path Transmission

Vibration design

5.5.3.1	General Vibration Design Requirements

Vibration discomfort symptoms

5.5.2.3.3	Discomfort/Annoyance Effects of Vibration

Vibration duration

5.5.2.1	Vibration Environments Design Considerations
5.5.3.2.4	Vibration Duration
5.5.3.3.4	Vibration Duration

Vibration effects

5.5.2.3	Human Responses to Vibration - Design Considerations

Vibration environment

5.5.2	Vibration Design Considerations
5.5.2.1	Vibration Environments Design Considerations
5.5.2.1.1	Launch Phase Vibration Environment

Vibration environmental parameters

5.5.3	Vibration Design Requirements

Vibration exposure

5.5.2.4.2	Vibration Exposure Criteria Design Considerations (0.1 to 1 Hz)
5.5.3.3	Vibration Exposure (1 to 80 Hz) Design Requirements

Vibration exposure limits

5.5.2.4.3	Vibration Exposure Criteria Design Considerations (1 to 80 Hz)

Vibration exposure times

5.5.2.4.4	Vibration Duration Criteria Design Considerations

Visibility

11.5.3.1	General Mounting Design Requirements

Visible wavelengths

11.11.3.1.4	Optical Density

Vision

4.2	Vision
5.1.2.2.1.2	Night Vision Abnormalities Design Considerations
8.6.2	Envelope Geometry Design Considerations
9.2.4.2.2	Visual Space Design Requirements

Visual access

12.3.1.3	Visual Access Design Requirements

Visual acuity

5.5.3.2.2	Decreased Proficiency Boundary
5.5.3.3.1	Vibration Exposure Limit

Visual caution and warning displays

9.4.4.3.3	Visual Caution and Warning Display Design Requirements

Visual display terminal

9.4.2.2	Visual Display Design Considerations
9.4.2.3.3.9	Visual Display Terminal (VDT) Design Requirements

Visual displays

9.4.2	Visual Displays

Visual distractions

9.2.4.2.2	Visual Space Design Requirements

Visual indicator absence

9.4.2.3.2	Information Presentation Design Requirements

Wet wipes

13.2.3.2	Surface Cleaning Design Requirements
13.2.4	Example Housekeeping Design Solutions

Wet/Dry index

5.8.2	Thermal Environment Design Considerations

White level

8.13.3.1.4	Illumination Levels for Dark Adaptation Design Requirements

White light

8.13.2.1	Color of Light Source Design Considerations
8.13.3.1.1	General Interior Illumination Levels Design Requirements
8.13.3.3	Light Color Design Requirements

Whole body center of mass

3.3.7.3.2.1	Whole-Body Center of Mass Data Design Requirements

Whole body cleansing

10.2.3.2	Whole Body Cleansing Design Requirements

Whole body washing

10.2.3.2	Whole Body Cleansing Design Requirements

Wide band annoyance noise

5.4.3.2.3.1	Wide-Band Long-Term Annoyance Noise Exposure Requirements

Wide band hearing

5.4.3.2.1.1	Wide-Band Long-Term Hearing Conservation Noise Exposure Requirements

Wide band noise

5.4.2.4.1.1.1	Wide-Band Long-Term Hearing Conservation Considerations
5.4.3.2.1.1	Wide-Band Long-Term Hearing Conservation Noise Exposure Requirements
5.4.3.2.3.3	Wide-Band Short-Term Annoyance Noise Exposure Requirements

Window cleaning

11.11.2.4	Window Maintenance Design Considerations
11.11.3.5	Window Maintenance Design Requirements

Window configuration

8.11.2.2	Window Configuration Design Considerations

Window contamination

11.11.2.3	Physical Protection Design Considerations

Window covers

11.11.2.4	Window Maintenance Design Considerations
11.11.3.5	Window Maintenance Design Requirements

Window design

9.2.5..1.1	Window Workstation Design Considerations
11.11.2	Window Design Considerations
11.11.3	Window Design Requirements
11.11.3.3	Visual Protection Design Requirements
11.11.4	Example Window Design Solutions

Window dimensions

9.6.3.1.7.5.2	Design Requirements for Interactions with Windows

Window glazing

11.11.3.2.1	Material

Window inspections

11.11.2.3	Physical Protection Design Considerations

Window integration

8.11.3	Window Integration Design Requirements

Window location

8.11.2.1	Location of Windows Within Space Module-Design Consideration
8.11.3	Window Integration Design Requirements
9.6.3.1.7.5.2	Design Requirements for Interactions with Windows

Window maintenance

11.11.2.4	Window Maintenance Design Considerations
11.11.3.5	Window Maintenance Design Requirements

Window pane coatings

11.11.3.4	Physical Protection Design Requirements

Window pane surface

11.11.3.1.5	Surface Quality

Window panes

11.11.2.3	Physical Protection Design Considerations
11.11.3.1.3	Optical Characteristics
11.11.3.2	Scientific Window Design Requirements

Window protection

8.11.2.2	Window Configuration Design Considerations

Window replacement

11.11.3.4	Physical Protection Design Requirements
11.11.3.5	Window Maintenance Design Requirements

Window shape

8.11.2.2	Window Configuration Design Considerations
8.11.2.2	Window Configuration Design Considerations
9.2.5.1.2	Window Workstation Design Requirements
9.6.2.7.1	Design Considerations for Windows

Window size

9.6.2.7.1	Design Considerations for Windows
11.11.3.1.1	Window Size

Window space

8.11.3	Window Integration Design Requirements

Window surface

11.11.2.3	Physical Protection Design Considerations

APPENDIX K
MSIS RECIPIENTS

Abbott, Hawks
Mail Code: C99
Company: Lockheed Martin

Aberg, John
Mail Code: EL02
Company: NASA Marshall Space Flight Center

Accola, A.
Mail Code: IB
Company: NASA Headquarters

Acres, W. R.
Mail Code: ES5
Company: NASA Johnson Space Center

Adams, Ken
Mail Code: 501-4
Company: NASA Lewis Research Center

Adams, Richard H.
Mail Code:
Company: Central Research Laboratories

Adams, Bob
Mail Code: DF-42/RSO
Company: NASA Johnson Space Center

Adams, Ann
Mail Code: 111113-ABA
Company: Jet Propulsion Laboratory

Adlis, L.
Mail Code: KM31
Company:

Adolf, Jurine
Mail Code: C81
Company: Lockheed Martin

Agena Bldg, MIC Library/
Mail Code:
Company: Martin Marietta Services

Aghili, Reza
Mail Code: B14
Company: Lockheed Martin

Ahmad, Taseer
Mail Code:
Company: Oxford Polytechnic

Ahmad, Taseer
Mail Code:
Company: Oxford Polytechnic

Ahmad, Taz
Mail Code:
Company: Oxford School of Architecture

Albjerg, Mariann
Mail Code: MT3
Company: NASA Johnson Space Center

Allgeier, Robert
Mail Code: ND513
Company: NASA Johnson Space Center

Allton, Charles
Mail Code: EC7
Company: NASA Johnson Space Center

Allton, John
Mail Code: EC 2
Company: NASA Johnson Space Center

Almedo, Chris
Mail Code:
Company: US Army Space Command

Alvarez, Manuel
Mail Code: AC 09
Company: Rockwell International

Amacher, Roy
Mail Code:
Company:

Ammerman, David
Mail Code:
Company: Fairchild Space

Amsbury, David L.
Mail Code: SN5
Company: NASA Johnson Space Center

Andean, J.D.
Mail Code:
Company: Communications Research Center

Anderson, Loy
Mail Code: C-95
Company: Rice Faculty (LESC Contractor)

Anderson, Charles D.
Mail Code: 33-HH
Company: Boeing Aerospace

Anderson, Charles R.
Mail Code:
Company: NASA Aerospace Education Services Project

Anderson, Sandy
Mail Code: EC/HAM
Company: NASA Johnson Space Center

Andino, Aureo F.
Mail Code:
Company:

Andino, Aureo F.
Mail Code:
Company: Universidad de Puerto Rico

Andrejak, Cathy
Mail Code:
Company: WSMC/PMET

Anselevicius, George
Mail Code:
Company: University of New Mexico

Anthes, Virginia
Mail Code: NS4
Company:

Anzalond, Jo
Mail Code:
Company: Life Systems, Inc.

Appleby, Matthew
Mail Code:
Company: Boeing Defense and Space

Arine, Robert
Mail Code: A3J051
Company: McDonnell Douglas Corporation

Armberter, G.
Mail Code: LESC/B-15
Company: NASA Johnson Space Center

Armstrong, Bob
Mail Code: KA21
Company: NASA Marshall Space Flight Center

Armstrong, Richard N.
Mail Code:
Company: U.S. Army Laboratory Command

Armstrong, Joan
Mail Code: FA53
Company: Rockwell International

Armstrong, C. H.
Mail Code: DF42
Company: NASA Johnson Space Center

Arno, Roger
Mail Code: 244-14
Company: NASA Ames Research Center

Aubin, Jeremy
Mail Code:
Company: University of Massachusetts-Boston

Aucoin, Pat
Mail Code: C19
Company: Lockheed

Austin, Foster
Mail Code: MSFC/EJ-12
Company: Johnson Engineering Corporation

Avans, Sherman
Mail Code: SA31
Company: NASA Marshall Space Flight Center

Avila, Manval
Mail Code: SE2
Company: NASA Johnson Space Center

Bach, Claudia
Mail Code:
Company: Document Center

Bachik, Rich
Mail Code: 9F-12
Company: Boeing Aerospace

Bacon, Pam
Mail Code: XE
Company: NASA Aerospace Education Services Project

Bacon, J. B.
Mail Code: ER2
Company: NASA Johnson Space Center

Badilla, Gloria
Mail Code: 301-456
Company: Jet Propulsion Laboratory

Badler, Norman I.
Mail Code: D2
Company: University of Pennsylvania

Bahr, Jeff
Mail Code:
Company: Martin Marietta Services

Bahr, Patricia A.
Mail Code: SM4
Company: NASA Johnson Space Center

Baiamonte, Frank
Mail Code: EP5
Company: NASA Johnson Space Center

Baird, R. S.
Mail Code: EP4
Company: NASA Johnson Space Center

Baisden, Denise
Mail Code: SD2
Company: NASA Johnson Space Center

Baker, A. W.
Mail Code: PT5
Company: NASA Johnson Space Center

Balke, John
Mail Code:
Company:

Ball, Edward W.
Mail Code:
Company: Micro Craft, Inc.

Bankaitis, H.
Mail Code: 501-4
Company: NASA Lewis Research Center

Barbe, Lewis C.
Mail Code:
Company: Safety Engineer

Barbour, Chuck
Mail Code: SP52
Company: NASA Johnson Space Center

Barfield, Woodrow
Mail Code: FU-20
Company: University of Washington

Barg, Michael
Mail Code:
Company: Payload Systems, Inc.

Barnett, James H.
Mail Code: SE
Company: NASA Johnson Space Center

Barrett, R.
Mail Code: 86-10
Company: NASA Lewis Research Center

Barron, D. A.
Mail Code: ER3
Company: NASA Johnson Space Center

Barrow, Kirk
Mail Code: 301-375
Company: Jet Propulsion Laboratory

Barry, T. D.
Mail Code: EV12
Company: NASA Johnson Space Center

Barry, Dan
Mail Code: CB
Company: NASA Johnson Space Center

Bartos, Linda
Mail Code: 6-2
Company: NASA Lewis Research Center

Bartz, Christopher
Mail Code:
Company: University of Houston

Bateman, R.P.
Mail Code:
Company: VEDA

Bates, J.R.
Mail Code: 6411
Company: Naval Weapons Center

Bates, William
Mail Code: OA
Company: NASA Johnson Space Center

Bates, Charles
Mail Code: HE 6570
Company: Aerospace Medical Research Laboratory

Bauer, Liz
Mail Code: SE2
Company: NASA Johnson Space Center

Beasley, B. A.
Mail Code: PR
Company: NASA Johnson Space Center

Bedini, Daniele
Mail Code:
Company: Futuro

Beecken, Julie
Mail Code: MA-203.42/
Company: U.S. Department of Energy

Beers, Kenneth
Mail Code:
Company: Wright State University

Belanger, D.
Mail Code: EP5
Company: NASA Johnson Space Center

Bell, Larry
Mail Code:
Company: University of Houston

Bell, Frank
Mail Code: NP/20
Company: General Electric

Bell, Larry
Mail Code:
Company: University of Houston

Bellardo, Karen
Mail Code: SP4 45102
Company: NASA Johnson Space Center

Beller, Arthur E.
Mail Code: TV-PEO-12
Company: NASA Kennedy Space Center

Beltran, Joe
Mail Code: RD6
Company:

Bendini, Daniele
Mail Code:
Company: FUTURO srl Think Tank & Marketing

Bennett, Greg
Mail Code: A96J18332
Company: McDonnell Douglas Corporation

Bentall, R.H.
Mail Code:
Company: European Space Agency

Benton, Sue
Mail Code:
Company: University of South Dakota

Bergey, Karl
Mail Code:
Company: AMI

Berki, J.
Mail Code: AOS-C
Company: NASA Lewis Research Center

Berkowitz, Jack
Mail Code:
Company: CTA, Inc.

Berman, Andrea
Mail Code: C81
Company: Lockheed Martin

Bermea, Edward A.
Mail Code: E023
Company: NASA Marshall Space Flight Center

Bernabeo, Alberto
Mail Code:
Company: Universita Di Bologna

Berner, Samuel
Mail Code:
Company:

Berryman, Don
Mail Code: DP4
Company: NASA Johnson Space Center

Berson, Barry L.
Mail Code:
Company: Lockheed California Company

Bertrand, Reinhold
Mail Code:
Company: University of Stuttgart

Best, Susan L.
Mail Code: EB44
Company: NASA Marshall Space Flight Center

Betts, Vicki
Mail Code: DA8/HEI
Company: NASA Johnson Space Center

Bick, Frank
Mail Code:
Company: U.S. Army Aviation Systems Command

Bifano, W.
Mail Code: 500-217
Company: NASA Lewis Research Center

Biggs, R. J. (Dick)
Mail Code: MSD/47-02
Company: LMSC/CA

Biggs, Patterson B.
Mail Code:
Company: NASA Aerospace Education Services Project

Bilbrough, Larry
Mail Code: XEE
Company: NASA Aerospace Education Services Project

Billica, Roger
Mail Code: SD2
Company: NASA Johnson Space Center

Billmayer, Hanns
Mail Code:
Company: Teledyne Brown Engineering

Bini, Dante N.
Mail Code:
Company: Binistar Incorporated

Birt, Joseph A.
Mail Code:
Company:

Bishop, Peter
Mail Code:
Company: Space Business Information Center

Bjorn, Valerie
Mail Code: SL/FIV
Company: Wright-Patterson Air Force Base

Blackburn, G. C.
Mail Code: EV12
Company: NASA Johnson Space Center

Blackwell, Janet
Mail Code:
Company: Tufts University

Blais, Thierry
Mail Code:
Company: SA MATRA - Space Branch

Blalock, J. D.
Mail Code: NB3
Company: NASA Johnson Space Center

Bleisath, Scott
Mail Code: DF42
Company: NASA Johnson Space Center

Blevins, D. R.
Mail Code: EA4
Company: NASA Johnson Space Center

Bloch, Marie Pierre
Mail Code:
Company: National Center of Special Studies

Blount, Robert
Mail Code: MA3/RSO
Company: Rockwell International

Blucker, T. J.
Mail Code: EG
Company: NASA Johnson Space Center

Bluth, B.J.
Mail Code: SSE
Company: NASA Headquarters

Boatman, Wayne
Mail Code: DJ2/LOR
Company: NASA Johnson Space Center

Bock, Otmar
Mail Code:
Company: Institute for Space and Terrestrial Science

Boeing Library, Acquisitions
Mail Code: HF50
Company: Boeing Support Services Tech. Library Catalog

Boff, Kenneth R.
Mail Code:
Company: A.F. Aerospace Medical Research Laboratory

Boggiatto, Dario
Mail Code:
Company: Aeritalia

Boggs, Helen
Mail Code:
Company: U.S. Army Missile Command

Bond, Robert L.
Mail Code: SP2
Company: NASA Johnson Space Center

Booher, Clete
Mail Code: SP2
Company: NASA Johnson Space Center

Booher, Harold H.
Mail Code:
Company: Department of the Army

Bordano, A. J.
Mail Code: EG11
Company: NASA Johnson Space Center

Borge, Greg
Mail Code: C34
Company: Lockheed

Boucek, George
Mail Code: 6H-PK
Company: Boeing Aerospace

Boucek, Jr., George P.
Mail Code: MS 156A
Company: NASA Langley Research Center

Boudreault, Richard
Mail Code:
Company: Oerlikon Aerospace

Bourland, Charles
Mail Code: SP44
Company: NASA Johnson Space Center

Bourland, Deborah
Mail Code: SP4
Company: NASA Johnson Space Center

Boutros, Ramsey
Mail Code: 6H-TX
Company: Boeing Aerospace

Bowman, Mark
Mail Code: SD5
Company: KRUG Life Sciences International

Bowman, Robert
Mail Code: 500-216
Company: NASA Lewis Research Center

Box, John
Mail Code: BT-37
Company: KRUG Life Sciences International

Boyce, J. B.
Mail Code: SD2
Company: NASA Johnson Space Center

Boyd, Max
Mail Code: SA31
Company: NASA Marshall Space Flight Center

Boyd, Susan
Mail Code: EL15
Company: NASA Marshall Space Flight Center

Boyles, Lawrence
Mail Code: B25
Company: Lockheed

Braak, Laurent
Mail Code:
Company: Centre National D' Estudes Spatiales

Bradford, Casie
Mail Code: 36-2
Company: Martin Marietta Services

Brady, S.
Mail Code: D150-11
Company: Lockheed Missiles & Space Co.

Bragg, Bobby J.
Mail Code: EP-5
Company: NASA Johnson Space Center

Brandli, A. E.
Mail Code: ER22
Company: NASA Johnson Space Center

Brantley, Kyle R.
Mail Code: HMF/P2
Company: KRUG Life Sciences International

Brauer, Mark M.
Mail Code:
Company: Lockheed (LADC)

Brauer, Mark M.
Mail Code:
Company: Texas A & M University

Braune, Jr., Rolf
Mail Code: 14-HC
Company: Boeing Aerospace

Bray, Juanita
Mail Code: C42
Company: Lockheed

Brazell, James W.
Mail Code:
Company: Georgia Tech

Bremmer, Dale A.
Mail Code:
Company: NASA Aerospace Education Services Project

Bremner, Patricia
Mail Code:
Company: Department of the Army

Brennan, Maggie
Mail Code:
Company:

Brewer, Dana
Mail Code: CD
Company: NASA Headquarters

Brisby, John
Mail Code:
Company: Science Application International Corporation

Brody, Adam
Mail Code: 244-19
Company: NASA Ames Research Center

Brogmus, George
Mail Code:
Company: Liberty Mutual Research Center for Safety/Heal

Broom, Julie
Mail Code: KL
Company: NASA Johnson Space Center

Brower, Tommy
Mail Code: T 7 K
Company: McDonnell Douglas Corporation

Brown, Jeri
Mail Code: SL
Company: NASA Johnson Space Center

Brown, Jeffery
Mail Code:
Company: University of Houston

Brown, George
Mail Code: T6G
Company: McDonnell Douglas Corporation

Brown, Tony
Mail Code:
Company: Tufts University

Brown, Helen
Mail Code: A3-135
Company: McDonnell Douglas Corporation

Brunk, S.
Mail Code: 351-4
Company: Honeywell

Bryan, Thomas
Mail Code: EB62
Company: NASA Marshall Space Flight Center

Bryan, F. L.
Mail Code: KG21
Company: NASA Johnson Space Center

Bryant, Tom
Mail Code:
Company: Bryant Research

Buchanan, Charles D.
Mail Code: TC2
Company: Rockwell Space Operations Company

Buck, Scott
Mail Code:
Company: U.S. Army

Buck, Courtney
Mail Code:
Company: McDonnell Douglass Aerospace Company

Buckenmaier, Chet
Mail Code:
Company: Computer Technology Associates

Bueker, Rick
Mail Code: SD-2
Company: NASA Johnson Space Center

Bullen, Steve
Mail Code: F6F4S
Company: Loral/Calspan

Bullock, R. L.
Mail Code: EC
Company: NASA Johnson Space Center

Buning, Harm
Mail Code:
Company: University of Michigan

Burns, Frederick T.
Mail Code: MH
Company: NASA Johnson Space Center

Burov, Alexander
Mail Code:
Company: Head of the Dept. of Ergonomics

Burtzlaff, I. J.
Mail Code: EK11
Company: NASA Johnson Space Center

Butler, Keith
Mail Code: 7L-40
Company: Boeing Aerospace

Cacioppo, Anthony J.
Mail Code:
Company: Wright State University

Calcaterra, Lori
Mail Code:
Company: St. Louis University

Campbell, Wendy
Mail Code: LRG
Company: A.F. Human Research Laboratory

Campbell, Paul D.
Mail Code: C44
Company: Lockheed

Cannon, Robert
Mail Code:
Company: Stanford University

Cantu (Library), P.
Mail Code: Link I-1s2
Company: NASA Johnson Space Center

Caradec, Paul
Mail Code: C42
Company: Lockheed

Cardo, Elizabeth
Mail Code:
Company: AIL Systems, Inc.

Carney, Mary
Mail Code: 235
Company: Loral Electro-Optical Systems

Carr, Gerald
Mail Code:
Company: CAMUS, Inc.

Carr, Nellie
Mail Code: DH64
Company: NASA Johnson Space Center

Carter, Richard
Mail Code:
Company: Oak Ridge National Laboratories

Cartwright, Tim
Mail Code:
Company: British Aerospace Public Limited Co.

Casaburri, Angelo A.
Mail Code:
Company: NASA Aerospace Education Services Project

Casey, Steve
Mail Code:
Company: Ergonomics Systems Design, Inc.

Cash, Martha
Mail Code: EO23
Company: NASA Marshall Space Flight Center

Cassano, Anthony
Mail Code: MS 875
Company: Perkin-Elmer Corporation

Casserly, Terry
Mail Code:
Company: Honeywell

Casteel, Mike
Mail Code: SD4/KI
Company: KRUG Life Sciences

Castle, Daniel
Mail Code:
Company: University of Idaho

Chaffee, Norman H.
Mail Code: OC
Company: NASA Johnson Space Center

Chafin, Roy L.
Mail Code:
Company: Jet Propulsion Laboratory

Chaikin, Jerry
Mail Code:
Company:

Chaikin, Gerald
Mail Code:
Company: Ergonomics Standards and Applications

Chambers, Randall M.
Mail Code:
Company: Wichita State University

Chambliss, J. P.
Mail Code: OB
Company: NASA Johnson Space Center

Chapanis, Alphonse
Mail Code:
Company: Industrial & Human Factors Consulting Services

Charles, John
Mail Code: SD-5
Company: NASA Johnson Space Center

Charpentier, Gary
Mail Code: HS-30
Company: Grumman Aerospace Corporation

Chassay, Charles E.
Mail Code: MT2
Company: NASA Johnson Space Center

Cheli, Marianne
Mail Code: SP34
Company: European Space Agency

Chen, Jen-Gwo
Mail Code:
Company: University of Houston

Chen, Alexander
Mail Code:
Company: Scientific Research Associates

Chen, Chen
Mail Code: C33
Company: Lockheed

Cheng, Leida
Mail Code:
Company: Mechanical Technology Incorporated

Chittenden, Connie
Mail Code:
Company: SRI, International

Choi, Janet
Mail Code: 244-19
Company: NASA Ames Research Center

Chrisman, Steve
Mail Code: C81
Company: Lockheed

Christensen, Julien M.
Mail Code:
Company: Universal Energy Systems

Christman, Linda
Mail Code:
Company: Martin Marietta Services

Chu, Yee Yeen
Mail Code:
Company: Perceptronics Inc.

Chucker, Steve
Mail Code: 11-3
Company: McDonnell Douglas Corporation

Ciarrocci, Carl
Mail Code:
Company:

Ciciora, John
Mail Code:
Company: Johnson Engineering Corporation

Cirillo, William M.
Mail Code: 288
Company: NASA Langley Research Center

Cisneros, Christie
Mail Code:
Company: Global Engineering Documents

Clark, Porter
Mail Code: EB33
Company: NASA Marshall Space Flight Center

Clark, Eric
Mail Code: F6F6S
Company: Loral/Calspan

Clarkin, Teresa
Mail Code:
Company: Honeywell

Claude, Poher
Mail Code: CNES/RA/AF
Company: Centre National D' Estudes Spatiales

Clearwater, Yvonne
Mail Code: 262-1
Company: NASA Ames Research Center

Cleland, John
Mail Code:
Company: Research Triangle Institute

Clement, Warren F.
Mail Code:
Company: Systems Technology, Inc.

Clement, Darrell
Mail Code: 27/LOR
Company: Loral Space Information Systems

Cliffton, Ethan
Mail Code:
Company: Architect

Clifton, Ethan Wilson
Mail Code:
Company: Ethan Wilson Clifton Architect

Coblentz, Alex
Mail Code:
Company: University Rene Descartes

Coblentz, R. E.
Mail Code: EV5
Company: NASA Johnson Space Center

Cohen, Marc M.
Mail Code: 240-10
Company: NASA Ames Research Center

Cohen, Jack
Mail Code: B90
Company: Lockheed

Cole, Robert E.
Mail Code:
Company: University of Hawaii

Cole, C. R.
Mail Code: 342 DA19
Company: Rockwell International

Cole, Chris
Mail Code: EC4
Company: NASA Johnson Space Center

Cole, Christine
Mail Code: EC 4
Company: NASA Johnson Space Center

Coleman, Bill
Mail Code:
Company: Computer Technology Associates

Coleman, Dick
Mail Code: T3J
Company: McDonnell Douglas Corporation

Coleman, Gene
Mail Code:
Company: University of Houston at Clear Lake

Colford, Nicholas
Mail Code:
Company:

Colgan, Kathleen
Mail Code: CB
Company: NASA Johnson Space Center

Comer, Melodie
Mail Code:
Company: Software Productivity Solutions

Companion, Michael
Mail Code:
Company: University of Central Fl. Research Center

Comstock, Ray
Mail Code: LaRC/152D
Company: NASA Langley Research Center

Congleton, J.
Mail Code:
Company: Texas A & M University

Conley, James
Mail Code:
Company: Presearch Inc.

Connolly, Jim
Mail Code: 240A-3
Company: NASA Ames Research Center

Connolly, John
Mail Code: SN2
Company: NASA Johnson Space Center

Connor, Bill
Mail Code:
Company: Delta Air Lines, Inc.

Connors, Mary
Mail Code: ARC/262-1
Company: NASA Ames Research Center

Coody, M.C.
Mail Code: EA44
Company: NASA Johnson Space Center

Coogler, Kathie
Mail Code:
Company: Georgia Tech Research Institute

Cook, John
Mail Code:
Company: Morris Architects

Cooke, John
Mail Code:
Company: University of Houston

Cooper, Frank W.
Mail Code: 8510
Company: Westinghouse Electric Corp.-COMET Program

Cooper, N. R.
Mail Code: BF11
Company: NASA Johnson Space Center

Cope, Jamie
Mail Code:
Company: Texas Chriopractic College Library

Copper, Susan
Mail Code: HEI
Company: Hernandez Engineering

Cordes, Ed
Mail Code: T-6
Company: McDonnell Douglas Corporation

Costello, Carl
Mail Code:
Company: AIAS

Costello, T. A.
Mail Code: EE4
Company: NASA Johnson Space Center

Cothran, Charlie
Mail Code: EJ12
Company: NASA Marshall Space Flight Center

Cothren, Charles
Mail Code: EL83
Company: NASA Marshall Space Flight Center

Cotter, Susan
Mail Code: HS-50
Company: McDonnell Douglas Corporation

Counter, Doug
Mail Code: ED33
Company: NASA Marshall Space Flight Center

Counts, Barbara
Mail Code: EC6
Company: Hamilton Standard Div. UTC

Cousineau, Jacky
Mail Code: DPSCU4349
Company: National Defense Headquarters

Covington, Clarke
Mail Code: JA
Company: NASA Johnson Space Center

Covitch, Sandy
Mail Code:
Company: The Information Specialists

Cowings, Patricia S.
Mail Code: 239A-2
Company: NASA Ames Research Center

Cowings, Keith
Mail Code:
Company: AIBS

Cox, William J.
Mail Code:
Company: Aviation Systems Concepts, Inc.

Coyle, S. D.
Mail Code: Grumman/B1
Company: NASA Johnson Space Center

Craig, Mark K.
Mail Code: KA
Company: NASA Johnson Space Center

Cranford, Theodore
Mail Code: AJ01
Company: Rockwell International

Crawford, Eric
Mail Code: ASD/YFEE
Company: U.S. Air Force

Crenshaw, Mark A.
Mail Code: M.Z. 5969
Company: General Dynamics

Crevier, Roger P.
Mail Code:
Company: Central Connecticut State University

Cristol, Sam
Mail Code: DF62/BAR
Company: Barrios Technology

Croomes, Scott
Mail Code: EJ13
Company: NASA Marshall Space Flight Center

Crosier, William G.
Mail Code: SD5/KI
Company: KRUG Life Sciences International

Crosson, Dudley
Mail Code:
Company: Delta P

Crowley, Bill
Mail Code:
Company: Reimer's Engineering Inc.

Crowley, S.
Mail Code: 50-3
Company: NASA Lewis Research Center

Croxall, Richard A.
Mail Code:
Company: TRW

Crumbley, Bob
Mail Code: EJ13
Company: NASA Marshall Space Flight Center

Cruz, Santana
Mail Code: ES22
Company: NASA Johnson Space Center

Cuhlman, Joey
Mail Code: JM12
Company: NASA Johnson Space Center

Cullingford, Hatice
Mail Code: XE
Company: NASA Johnson Space Center

Culpepper, W. X.
Mail Code: EV13
Company: NASA Johnson Space Center

Curtain, James
Mail Code:
Company: McDonnell Astronautics Co.

Cuta, Frank
Mail Code:
Company: Battelle Northwest

Czerwinski, Barbara Shelden
Mail Code:
Company: University of Texas Health Science Center

Czerwinski, Barbara
Mail Code:
Company: University of Texas Health Science Center

Dadabo, Cheryl
Mail Code:
Company: Embry-Riddle Aeronautical University

Daga, Andrew W.
Mail Code:
Company: Integrated SpaceSystems Corporation

Dagen, James
Mail Code: ES4
Company: NASA Johnson Space Center

Daily, Dick
Mail Code: 213-15
Company: NASA Ames Research Center

Daniel, Chuck
Mail Code: EJ12
Company: NASA Marshall Space Flight Center

Darney, Bob
Mail Code: C44
Company: Lockheed

Data Bank, IBM/SS
Mail Code: IBM 1204
Company: NASA Johnson Space Center

Daues, Kathy
Mail Code: FA3
Company: NASA Johnson Space Center

Daughtery, S.
Mail Code: OA/BOE
Company: NASA Johnson Space Center

Daves, Kathy
Mail Code: IE
Company: NASA Johnson Space Center

David, Leonard
Mail Code:
Company: Space World Magazine

Davis, Bonnie
Mail Code:
Company: Navy Experimental Diving Unit

Davis, Jerry
Mail Code:
Company: Lovelace Scientific Resources

Davis, Peter
Mail Code:
Company: Bell and Trotti

Davis, Jennifer
Mail Code: DP4
Company: NASA Johnson Space Center

Davis, Sara
Mail Code: M1-199
Company: Aerospace Corporation

Dawson, Ann
Mail Code:
Company: NSCA Queensland Division

Day, LeRoy
Mail Code:
Company: Leroy E. Day and Associates

De Pontbriand, Rene J.
Mail Code:
Company: US Army Research Laboratory

DeLeon, Pablo
Mail Code:
Company: Argentine Association For Space Technology

DeRooy, Carolyn R.
Mail Code:
Company: General Electric

DeVos, Francis J.
Mail Code: ER
Company: NASA Johnson Space Center

Dean, Bunny
Mail Code: AP2
Company: NASA Johnson Space Center

Deardorff, Don
Mail Code:
Company: General Dynamics

Delerich, Billie
Mail Code:
Company: General Motors Technical Center

Delgado, R. D.
Mail Code: OG-5
Company: NASA Johnson Space Center

Demel, Kenneth
Mail Code: SP34
Company: NASA Johnson Space Center

Demosthenes, Ted A.
Mail Code:
Company:

Deres, Joe
Mail Code:
Company: Southwest Research Institute

Desai, Arun
Mail Code: B22
Company: Lockheed

Deuser, Mark
Mail Code:
Company:

Devitt, Clint
Mail Code: X11P15
Company: Hercules, Inc.

Dews, Peter
Mail Code:
Company: Harvard Medical School

Dezio, Joe
Mail Code: 406.0
Company: NASA Goddard Space Flight Center

Dhangavelu, Madhu
Mail Code: RRB-101
Company: Institute of Aerospace Architecture

DiRaimo, Luigi
Mail Code:
Company: General Motors of Canada Limited

Diaz, Manny
Mail Code: C81
Company: Lockheed

Dick, David
Mail Code: I-2S1
Company: Link

Dickerson, Otho T.
Mail Code: ND25
Company: NASA Johnson Space Center

Dickson, Kathy
Mail Code:
Company: Science Communcations Studies

Dietz, R. H.
Mail Code: EV
Company: NASA Johnson Space Center

Dillard, Scott
Mail Code:
Company: ILC Space Systems

Dingee, Judy
Mail Code:
Company: Moller Manufacturing

Director,
Mail Code: CC-LHD
Company: U.S. Army Laboratory Command

Director,
Mail Code: SP
Company: U.S. Army Laboratory Command

Director,
Mail Code: AMSAA
Company: NASA Johnson Space Center

Director,
Mail Code: ARDEC
Company: U.S. Army Laboratory Command

Director,
Mail Code: AVSCOM
Company: U.S. Army

Director,
Mail Code: ML
Company: U.S. Army Laboratory Command

Director,
Mail Code: ER
Company: U.S. Army Laboratory Command

Director,
Mail Code: MICOM
Company: U.S. Army HEL Detachment

Director,
Mail Code: TACOM
Company: U.S. Army

Director,
Mail Code:
Company: Global Engineering Documents

Dischinger, Charles
Mail Code: EO23
Company: NASA Marshall Space Flight Center

Disher, John
Mail Code:
Company: Avanti Systems

Dixon, Jeff
Mail Code: T6H
Company: McDonnell Douglas Corporation

Dlhopolsky, Joe
Mail Code: T25-07
Company: Grumman Aerospace Corporation

Dobbins, Melva
Mail Code: C44
Company: Lockheed

Doeling, Tom
Mail Code: DF-42/RSO
Company: NASA Johnson Space Center

Doerr, Joan L.
Mail Code: 1204
Company: Westinghouse Electric Corporation

Dolgin, Don
Mail Code:
Company: Naval Bio-Dynamics Facility

Doll, Susan
Mail Code: JW-21
Company: Boeing Aerospace

Dominguez, Javier
Mail Code:
Company: DPTO. DE INGENIERIA MECANICA

Dotts, R. L.
Mail Code: HA
Company: NASA Johnson Space Center

Doty, Laura
Mail Code: 218-7
Company: NASA Ames Research Center

Douglas, Freddie
Mail Code: FA-30
Company: NASA Stennis Space Center

Douglas, William K.
Mail Code:
Company: Consultant

Douglas, Helen
Mail Code: 2151
Company: Naval Underwater Systems Center

Down, Robert
Mail Code:
Company:

Downey, Juan
Mail Code:
Company:

Doyle, Marge
Mail Code:
Company:

Dragg, James
Mail Code: C109
Company: Lockheed

Dreesbach, Don
Mail Code: AL/CFH/CER
Company: Cseriac

Drewry, Doug
Mail Code: OB
Company: NASA Johnson Space Center

Drysdale, Alan
Mail Code: F516
Company: McDonnell Douglas Corporation

Duarte, Deborah
Mail Code:
Company: Futron Corporation

Dubel, Joe
Mail Code: A3J02417-4
Company: McDonnell Douglas-HB

Duchein, Derek
Mail Code:
Company: Lockheed Aircraft Service Co.

Ducote, G. J.
Mail Code: OB
Company: NASA Johnson Space Center

Duerk, Donna
Mail Code:
Company: Cal Poly

Duggan, Margaret
Mail Code:
Company: Arthur D. Little Company

Duke, Michael B.
Mail Code: SA
Company: NASA Johnson Space Center

Duke, Henry
Mail Code: 7
Company: Martin Marietta Services

Dumain, Carol
Mail Code: 301-422
Company: Jet Propulsion Laboratory

Dunbar, Bonnie J.
Mail Code: CB
Company: NASA Johnson Space Center

Duncan, Jerry
Mail Code:
Company: Deere and Co.

Duncan, R. P. (Ray)
Mail Code:
Company: Lockheed Aeronautical Systems Company

Duncan, Ann
Mail Code:
Company: BioTechnology

Dundas, Jim
Mail Code:
Company: Hamilton Standard Div. UTC

Dungan, Marylan
Mail Code: F8M2A
Company: Loral Space Information Systems

Dunn, T. W.
Mail Code: MS-1
Company: NASA Johnson Space Center

Dunn, Bob
Mail Code: CA42
Company: NASA Johnson Space Center

Durrett, Robert H.
Mail Code: EL45
Company: NASA Marshall Space Flight Center

Dutta, Sourin P.
Mail Code:
Company: University of Windsor

Dutton, Helen
Mail Code: DO62
Company: NASA Johnson Space Center

Duvall, Laura
Mail Code: C44
Company: Lockheed

Dwyer, W. K.
Mail Code: EV13
Company: NASA Johnson Space Center

ESA,
Mail Code:
Company:

Eades, Frank
Mail Code: SP52
Company: Johnson Engineering Corporation

Early, T. W.
Mail Code: EV3
Company: NASA Johnson Space Center

Eberhard, E.
Mail Code: A3J02117-7
Company: McDonnell Douglas-HB

Eckelcamp, R. E.
Mail Code: ER2
Company: NASA Johnson Space Center

Eckenrode, Richard J.
Mail Code:
Company: U.S. Nuclear Regulatory Commission

Edeen, Mary Beth
Mail Code: EC-7
Company: NASA Johnson Space Center

Egusquiza, R. M.
Mail Code: M70/CSC
Company: NASA Johnson Space Center

Ehl, Kami
Mail Code:
Company: Rockwell Space Operations Company

Ehrlich, Nelson J.
Mail Code:
Company: NASA Aerospace Education Services Project

Eisenberg, Martin
Mail Code:
Company: University of Florida

Elder, Ruth
Mail Code: BV4
Company: NASA Johnson Space Center

Elias, Bart
Mail Code:
Company: Georgia Institute of Technology

Ellis, J. L.
Mail Code: SP
Company: NASA Johnson Space Center

Ellison, June
Mail Code: HQ/ULS
Company: NASA Headquarters

Elmer, Steve
Mail Code:
Company: Umpqua Research Co.

Elrod, Steve
Mail Code: AB37
Company: NASA Marshall Space Flight Center

Embach, Jim
Mail Code:
Company: Consultant

Englehart, John
Mail Code:
Company: General Electric

English, Jim
Mail Code: AE87
Company: Rockwell International

Epright, Charles
Mail Code: A23
Company: Lockheed

Erb, R.B.
Mail Code: KT
Company: Caset

Erickson, J. D.
Mail Code: ER11
Company: NASA Johnson Space Center

Ernest, Bill
Mail Code:
Company: Hamilton Standard Management Services

Eskridge, Gordon W.
Mail Code:
Company: NASA Aerospace Education Services Project

Ess, Kim
Mail Code: SP43
Company: NASA Johnson Space Center

Eubanks, Michael
Mail Code: ES2
Company: NASA Johnson Space Center

Ezenson, E. E.
Mail Code: ES63
Company: NASA Johnson Space Center

Fadden, Delmar M.
Mail Code: MS 7Y 91
Company: Boeing Commercial Airplane Co.

Fagler, Mary Alice
Mail Code: K.P.
Company: Eastman Kodak Company

Fahnstrom, Dale
Mail Code:
Company: IIT&ID

Fairchild, Kyle
Mail Code: HA
Company: NASA Johnson Space Center

Fallo,
Mail Code:
Company:

Falvo, Frank
Mail Code:
Company:

Farkas, Andy
Mail Code: EF2
Company: NASA Johnson Space Center

Farrell, Rich
Mail Code: 6X-KJ
Company: Boeing Aerospace

Farris, Ron
Mail Code: SP5
Company: NASA Johnson Space Center

Fauver, Marge
Mail Code: SE/STI
Company: NASA Johnson Space Center

Fecht, Barbara
Mail Code:
Company: Battelle Northwest

Fehin, Patrick
Mail Code:
Company: Digital Equipment International B.V.

Feng, Pi-Lien S.
Mail Code:
Company: PL and Associates

Ferguson, John
Mail Code: B80A
Company: Bendix Field Engineering

Fernandez, Kathy
Mail Code: Code: 423
Company: NRAD

Fettig, Jim
Mail Code: C09
Company: Lockheed

Finger, Herb
Mail Code: 219-1
Company: NASA Ames Research Center

Fisher, H.T.
Mail Code:
Company: Lockheed Missiles & Space Co.

Fisher, Tom
Mail Code:
Company: Lockheed Missiles & Space Co.

Fisher, Craig
Mail Code:
Company:

Fisher, V. G.
Mail Code: PS/MITRE
Company: NASA Johnson Space Center

Fitzgerald, James B.
Mail Code:
Company: NASA Aerospace Education Services Project

Fitzkee, Archie
Mail Code: 421.0
Company: NASA Goddard Space Flight Center

Fleming, Terrance
Mail Code: C81
Company: Lockheed

Flippen, Alexis
Mail Code: 218-7
Company: NASA Johnson Space Center

Flohr, Stuart
Mail Code:
Company: Lockheed

Flynn, Glenda
Mail Code: SE
Company: NASA Johnson Space Center

Flynt, David W.
Mail Code:
Company: WRDC/FIVR

Foley, Tico
Mail Code: DT67
Company: NASA Johnson Space Center

Foley, Dennis
Mail Code:
Company: Lockheed

Fong, Kenneth
Mail Code:
Company: Wright State University

Fongheiser, John
Mail Code:
Company:

Fontenot, Sonia
Mail Code: WMA-B1 225
Company: Webb, Murray and Associates

Fontenot, Sonita
Mail Code: WMA 225
Company: Webb, Murray and Associates

Ford, Marie
Mail Code:
Company: Dynamics Research Corporation

Ford, Don
Mail Code: ED52
Company: NASA Marshall Space Flight Center

Forsythe, Randy
Mail Code: EE24
Company: NASA Marshall Space Flight Center

Forsythe, D. L.
Mail Code: ND35
Company: NASA Johnson Space Center

Fort, Burke
Mail Code:
Company:

Fossum, Mike
Mail Code: D07
Company: NASA Johnson Space Center

Foster, Janet
Mail Code: 0906
Company: IBM

Foster, Maryland
Mail Code: EG/BAR
Company: NASA Johnson Space Center

Foy, Doris
Mail Code: ECI
Company: NASA Johnson Space Center

Franchi, S. B.
Mail Code:
Company: General Electric

Frassanito, John
Mail Code:
Company:

Freivalos, Andy
Mail Code:
Company: Pennsylvania State University

French, James
Mail Code:
Company: American Institute of Aeronautics and Astronau

Friend, Edwin Vic
Mail Code:
Company: Airline Pilots Association

Frost, Wade
Mail Code: EC5
Company: NASA Johnson Space Center

Fry, Clarence A.
Mail Code:
Company: CHI Systems, Inc.

Fry, Mary
Mail Code:
Company: American University

Fuchs, Karola
Mail Code:
Company: Software Engineering Institute

Fulgham, Do
Mail Code:
Company: Southwest Research Institute

Furr, Paul
Mail Code: HS-30
Company: Grumman Space Station, PSD

GSFC Library,
Mail Code: 252
Company: NASA Goddard Space Flight Center

Gallant, Bill
Mail Code: A23
Company: Lockheed

Gallo, Michael J.
Mail Code:
Company: Rupprecht Patashnich

Garcia, Rafael
Mail Code: SD4
Company: NASA Johnson Space Center

Gardner, Vickie
Mail Code: 213-15
Company: NASA Ames Research Center

Gardner, Vickie
Mail Code: 213-15
Company: NASA Johnson Space Center

Gardner-Bonneau, Daryle J.
Mail Code:
Company: CTA, Inc.

Gary,
Mail Code:
Company: Arthur D. Little Company

Garza T., Jesus S.
Mail Code:
Company: ITESM

Gates, Tom M.
Mail Code:
Company: NASA Aerospace Education Services Project

Geddie, James C.
Mail Code: TCATA
Company: U.S. Army Laboratory Command

Geer, Charles W.
Mail Code: 8H-25
Company: Boeing Aerospace

Geisel, W. A.
Mail Code: DT34
Company: NASA Johnson Space Center

Gerlach, Ron
Mail Code: EA65
Company: NASA Johnson Space Center

Gilad, Issachar
Mail Code:
Company: Technion-Israel Institute of Technology

Gilbert, Lawrence J.
Mail Code:
Company: NASA Aerospace Education Services Project

Gillespie, Mary
Mail Code: A3G44110-2
Company: McDonnell Douglas-HB

Gillies, C.L.
Mail Code:
Company: McDonnell Douglas Corporation

Gilmour, Bob
Mail Code: 231-15
Company: NASA Johnson Space Center

Gitelman, Joe
Mail Code: 505.0
Company: NASA Goddard Space Flight Center

Glanville, Roy
Mail Code: NA2/MA9
Company: NASA Johnson Space Center

Gleason, Stephen D.
Mail Code:
Company: Aerospace Medical Sciences, Inc.

Gleerup, Richard
Mail Code: D254
Company: Hughes Aircraft Company

Glovin, Debbie
Mail Code:
Company: KCET

Godfrey, Sandy
Mail Code:
Company: Rice University

Godwin, James
Mail Code: 213-15
Company: NASA Johnson Space Center

Gold, Leslie J.
Mail Code:
Company: NASA Aerospace Education Services Project

Goldberg, Joseph H.
Mail Code:
Company: Pennsylvania State College of Engineering

Golden, Connie
Mail Code:
Company: Loral Space and Range Systems

Goldsberry, Betty
Mail Code: C44
Company: Lockheed

Gonzales, Wayne
Mail Code:
Company: Lockheed

Gonzalez, Gail
Mail Code: GTS653
Company: NASA Kennedy Space Center

Gonzalez, S.
Mail Code: DJ
Company: NASA Johnson Space Center

Goodin, Ronnie
Mail Code: SOE-1
Company: NASA Kennedy Space Center

Goodman, Jerry
Mail Code: EA42
Company: NASA Johnson Space Center

Goodwin, Sharon
Mail Code:
Company: OHMS, Division of Workplace Health & Safety

Gouti, Tom
Mail Code: C75
Company: Lockheed

Graafmans, Jan A.M.
Mail Code:
Company: Eindhoven University of Technology

Grace, Tom
Mail Code: EA65
Company: NASA Johnson Space Center

Granahan, John
Mail Code: EC6
Company: Hamilton Standard Management Services

Granseuer, Peter
Mail Code: MTC
Company: European Space Agency

Grasse, Karen
Mail Code: 7-3
Company: NASA Lewis Research Center

Graves, Claude E.
Mail Code: EA6
Company: NASA Johnson Space Center

Gray, Robert J.
Mail Code:
Company: ILC Dover

Green, J.A.
Mail Code: FB-81
Company: Rockwell International

Green, Paul
Mail Code:
Company: University of Michigan

Greenberg, Barry
Mail Code: F6F4S
Company: Calspan

Greenisen, Michael C.
Mail Code: SD5
Company: NASA Johnson Space Center

Greenstein, Joel
Mail Code:
Company: Clemson University

Greenwood, Fred
Mail Code:
Company:

Gregg, Larry
Mail Code:
Company: Webb, Murray and Associates

Gremillion, Wayne
Mail Code: ND4
Company: NASA Johnson Space Center

Grick-Agrella, Shelly
Mail Code: HF60
Company: Boeing Aerospace

Griffin, T. R.
Mail Code: Grumman/B1
Company: NASA Johnson Space Center

Griggs, Charlotte
Mail Code: 17-4B56
Company: McDonnell Douglas Corporation

Griggs, Carla
Mail Code: 17-4B-56
Company: McDonnell Douglas Corporation

Grimm, Ann
Mail Code:
Company: University of Michigan

Griner, Carolyn
Mail Code: JA01
Company: NASA Marshall Space Flight Center

Grissom, Fred
Mail Code: B08
Company: Lockheed

Grissom, L. W.
Mail Code: EV12
Company: NASA Johnson Space Center

Groo, Bob
Mail Code: ZC-20
Company: Rockwell International

Groskreutz, Alan
Mail Code: R21M
Company: Rockwell Space Operations Company

Gross, Richard
Mail Code:
Company: Aircraft Accident Investigation

Gross, Pamela
Mail Code: A105
Company: Global Engineering Documents

Grossberg, Mitch
Mail Code: ATR-304
Company: Federal Aviation Administration

Grounds, Phyllis
Mail Code: SP44
Company: NASA Johnson Space Center

Grounds, Dennis
Mail Code: SE 57
Company: NASA Johnson Space Center

Grunsfeld, John
Mail Code: CB
Company: NASA Johnson Space Center

Grzeskowiak, Cecelia
Mail Code: 185(ILL)
Company: NASA Langley Research Center

Guerra, Raul
Mail Code: A3J05121-2
Company: McDonnell Douglas-HB

Guiard, Michel
Mail Code:
Company: Embassy of France

Guignard, John
Mail Code:
Company: Guignard Biodynamics Associates

Gunnett, James
Mail Code: MDC T322
Company: McDonnell Douglas Corporation

Guthrie, Greg
Mail Code:
Company: SRS Technology

Haag, Gary
Mail Code:
Company:

Hackler, I. M.
Mail Code: ET13
Company: NASA Johnson Space Center

Haddad, Albert
Mail Code:
Company: Lockheed MSC, R&DD

Hagford, Carolyn
Mail Code:
Company: Rosemont, Inc.

Haines, Richard F.
Mail Code: 269-4
Company: NASA Ames Research Center

Hale, Joseph
Mail Code: EO23
Company: NASA Marshall Space Flight Center

Hall, J.B.
Mail Code: 364
Company: NASA Langley Research Center

Hall, Stephen
Mail Code: EO23
Company: NASA Marshall Space Flight Center

Hall, Patty
Mail Code: A16
Company: Lockheed

Hall, Trey
Mail Code: C75
Company: Lockheed

Hall, Jennie
Mail Code:
Company: Lockheed

Hamilton, George S.
Mail Code: EO23
Company: NASA Marshall Space Flight Center

Hammersley, Vern C.
Mail Code: EM
Company: NASA Johnson Space Center

Hanes, Kevin
Mail Code: EH6
Company: NASA Johnson Space Center

Hanley, Jeff
Mail Code: D0641
Company: NASA Johnson Space Center

Hanley, Robert
Mail Code: CA3
Company: NASA Johnson Space Center

Hannemann, Ernest
Mail Code:
Company: Utility Power Corporation

Hanson, Kim
Mail Code:
Company: Tech-Time

Harbury, Al
Mail Code: 244-19
Company: NASA Johnson Space Center

Harding, Kimberly
Mail Code:
Company:

Hardy, Alva
Mail Code: SN3
Company: NASA Johnson Space Center

Harm, Deborah
Mail Code: SD5
Company: NASA Johnson Space Center

Harper, Steven
Mail Code:
Company: AL/CFH/CSERIAC

Harrington, Tom
Mail Code:
Company: University of Nevada

Harris, Randy
Mail Code: 152E
Company: NASA Langley Research Center

Harris, Bob
Mail Code: SP
Company: Johnson Engineering Corporation

Harris, M. D.
Mail Code: EV3
Company: NASA Johnson Space Center

Harris, Bernard
Mail Code: CB
Company: NASA Johnson Space Center

Harris, Nina
Mail Code:
Company: Environmental Research Institute of Michigan

Harris, Philip R.
Mail Code:
Company: Netrologic

Harris, Bob
Mail Code: C44
Company: NASA Johnson Space Center

Harrison, C. Felicity
Mail Code:
Company: Pardyne Research and Development Corp.

Harrison, Chuck
Mail Code: MMS
Company:

Hart, Sandra
Mail Code: 262-3
Company: NASA Ames Research Center

Haskell, Ian D.
Mail Code:
Company: University of Illinois

Haven, Cindy
Mail Code: SE3
Company: NASA Johnson Space Center

Hawkins, James S.
Mail Code: JC-61
Company: Boeing Aerospace

Hayes, Benita
Mail Code: LA20
Company: NASA Marshall Space Flight Center

Hazel, F. J.
Mail Code:
Company: General Electric

Heard, Walter L.
Mail Code: MS190
Company: NASA Langley Research Center

Heath, Gloria W.
Mail Code:
Company: SAR-ASSIST

Heath, D. W.
Mail Code: ER2
Company: NASA Johnson Space Center

Heath, David
Mail Code: EC
Company: NASA Johnson Space Center

Hebenstreit, Wolf
Mail Code: 4C-69
Company: Boeing Aerospace

Heckart, Steve A.
Mail Code: HED
Company: U.S. Air Force

Heffernan, Mary Ann
Mail Code:
Company: Physiotherapy Industria

Heilig, Leesa
Mail Code: DG-53
Company: NASA Johnson Space Center

Hein, Jeff
Mail Code: ER3
Company: NASA Johnson Space Center

Helfert, Mike
Mail Code: SN4
Company: NASA Johnson Space Center

Helm, Barb
Mail Code: 2761200
Company: McDonnell Douglas Aerospace

Henderson, J. B.
Mail Code: EP42
Company: NASA Johnson Space Center

Hendrick, Hal
Mail Code:
Company: University of Southern California

Henison, Ken
Mail Code: 1553
Company: General Dynamics

Henninger, Don
Mail Code: EC3
Company: NASA Johnson Space Center

Herbella, Gary
Mail Code: 22-8740
Company: General Dynamics Space Systems Division

Hermling, Richard
Mail Code: MH
Company: NASA Johnson Space Center

Hernandez, Jorge
Mail Code: HEI
Company: Hernandez Engineering

Hernandez, Karen
Mail Code: CB
Company: NASA Johnson Space Center

Herring, Christine R.
Mail Code: 1-331
Company: Lockheed Aircraft Services Co.

Herron, Robin
Mail Code:
Company: Colorado State University

Herzer, Harry B.
Mail Code:
Company: NASA Aerospace Education Services Project

Hewitt, Glen
Mail Code: FAA AXD-4
Company:

Heyn, Karen
Mail Code:
Company: Whirlpool Corporation

Heywood, John
Mail Code:
Company: Department of Veterans Affairs

Higgins, Gary
Mail Code: EL82
Company: NASA Marshall Space Flight Center

Hill, Susan D.
Mail Code: C09
Company: Lockheed

Hill, Earl E.
Mail Code: T
Company: MITRE Corporation Headquarters

Hill, William
Mail Code:
Company: Vitro Corporation

Hill, Leland
Mail Code: F6F57
Company: Loral Space Information Systems

Hines, Mike
Mail Code: 244-19
Company: NASA Johnson Space Center

Hines, Kim
Mail Code: M/S 213-15
Company:

Hinman, Elaine
Mail Code: EB62
Company: NASA Marshall Space Flight Center

History Office,
Mail Code: JM12
Company: NASA Johnson Space Center

Hoch, Jr., R. G.
Mail Code:
Company: Allied Pilots Assoc.

Hodge, Philip
Mail Code: MZB
Company: NASA Headquarters

Hoffman, Mark A.
Mail Code:
Company: U.S. Army Laboratory Command

Hoffman, Stephen J.
Mail Code:
Company: Science Application International Corporation

Hoffman, K. R.
Mail Code: MDCS2024
Company: McDonnell Douglas Corporation

Hoffman, Ronald B.
Mail Code:
Company: MITRE Corporation

Hoffman-Pinther, Peter
Mail Code:
Company: University of Houston

Hogan, J.
Mail Code: COR-TEZ
Company: NASA Lewis Research Center

Holden, Tina
Mail Code: C81
Company: Lockheed

Holland, Al
Mail Code: SD-5
Company: NASA Johnson Space Center

Holley, L.
Mail Code: CG-GSD-2
Company: NASA Kennedy Space Center

Holloway, Chalmer V.
Mail Code: 612
Company: NASA Johnson Space Center

Holmes, Gladys
Mail Code:
Company: University of Florida

Holmes, Wilma
Mail Code: EC/GHG
Company: NASA Johnson Space Center

Holt, J. D.
Mail Code: MA3
Company: NASA Johnson Space Center

Holt, James
Mail Code: C75
Company: Lockheed

Homick, Ph.D., Jerry L.
Mail Code: SD
Company: NASA Johnson Space Center

Hoodless, Ralph
Mail Code: PD01
Company: NASA Marshall Space Flight Center

Hook, R.W.
Mail Code: 288
Company: NASA Langley Research Center

Hord, Ed
Mail Code:
Company: Johnson Engineering Corporation

Horn, Joe
Mail Code: N18B5
Company: Ontario Hydro

Horn, Joe
Mail Code: 2723
Company: IAI MALAT

Horrigan, Ken
Mail Code:
Company: NSCA Queensland Division

Horsman, Paul
Mail Code: SP33
Company: NASA Johnson Space Center

Hosler, William W.
Mail Code: OB
Company: NASA Johnson Space Center

Howard, Anita
Mail Code: EB24
Company: NASA Marshall Space Flight Center

Howard, Glen
Mail Code:
Company:

Howard, Mindy
Mail Code:
Company: Bachmanstraat 56B

Howell, Joe
Mail Code: PR41
Company: NASA Marshall Space Flight Center

Hoyt, Reed
Mail Code:
Company: USARIEM Altitude and Medical Division

Hsu, Grace
Mail Code:
Company: Freeway American Sino Trading Company

Hu, Svlvia
Mail Code: PS336
Company: NASA Johnson Space Center

Hubbard, Robert P.
Mail Code:
Company: Michigan State University

Hudgins, Charlotte
Mail Code: SP4
Company: NASA Johnson Space Center

Hudson, Wayne
Mail Code: C
Company: NASA Headquarters

Hughes, Lawrence M.
Mail Code: D330
Company: Hughes Aircraft Company

Hughes, Kim
Mail Code: 22D2
Company: McDonnell Douglas-HB

Hughes, Frank
Mail Code: DT
Company: NASA Johnson Space Center

Humayun, Sarwat
Mail Code:
Company: NRCC

Humes, John
Mail Code:
Company: Rockwell International

Humphries, Randy
Mail Code: ED62
Company: NASA Marshall Space Flight Center

Hungerford, John C.
Mail Code:
Company: University of Tennessee

Hunt, Liza
Mail Code:
Company: Global Engineering Documents

Hunter, J.
Mail Code: 86-10
Company: NASA Lewis Research Center

Hunter, Thomas A.
Mail Code:
Company:

Huntley, D.
Mail Code: JR-26
Company: Boeing Aerospace

Huntley, M. Stephen
Mail Code: DTS 45
Company: Department of Transportation

Hutchins, Nancy
Mail Code: PS33
Company: NASA Johnson Space Center

Huttenbach, R. C.
Mail Code:
Company: Nelson Space Services Limited

Hwang, Erica
Mail Code: C81
Company: Lockheed Martin

Hwoschinsky, Peter V.
Mail Code: ARD-30
Company: Federal Aviation Administration

Hyde, G. E.
Mail Code: FA/BP
Company: NASA Johnson Space Center

Iannetti, F.
Mail Code:
Company: North Carolina State University

Info File, SS Trng
Mail Code: DT2
Company: NASA Johnson Space Center

Info Files, SSR MOD
Mail Code: DE32
Company: NASA Johnson Space Center

Iwagoshi, Atsushi
Mail Code:
Company: Lockheed Missiles & Space Co.

Jaax, J. R.
Mail Code: EC11
Company: NASA Johnson Space Center

Jackson, John
Mail Code: SP2
Company: NASA Johnson Space Center

Jackson, Bruce
Mail Code:
Company: Bruce G. Jackson & Associates

Jackson, J. B.
Mail Code: MSO-4
Company: NASA Space Station Program Office

Jackson, Mary
Mail Code: SD
Company: NASA Johnson Space Center

Jacobus, Heidi
Mail Code:
Company: Cybernet Systems Corp.

Jacobus, Charles
Mail Code:
Company: Cybernet Systems Corporation

James, John
Mail Code: SD4
Company: NASA Johnson Space Center

Janousek, Jim
Mail Code:
Company: ESL

Jaremko, Annette
Mail Code:
Company: Veterans Administration Medical Center

Jaster, Mark
Mail Code: 442.0
Company: NASA Goddard Space Flight Center

Jenkins, James
Mail Code: RR
Company: NASA Headquarters

Jenner, Jeff
Mail Code: 240-A3
Company: NASA Ames Research Center

Jennings, Richard
Mail Code: SD2
Company: NASA Johnson Space Center

Jensen, Kermit
Mail Code:
Company: PRC Kentron

Jensen, Warren
Mail Code:
Company: Wright State University

Jensen, Warren
Mail Code:
Company:

Jeris, Ed
Mail Code: AOS
Company: NASA Lewis Research Center

Jewel, Wayne
Mail Code:
Company: Systems Technology, Inc.

Jodoin, L.
Mail Code:
Company: Dechief Information & Documentation Centre

Johanson, William
Mail Code: MS 244-19
Company: NASA Ames Research Center

Johnson, Dale
Mail Code: JSC/SP
Company: Johnson Engineering Corporation

Johnson, Gary A.
Mail Code: A3G21T43
Company: McDonnell Douglas-HB

Johnson, Malcolm L.
Mail Code: SP3
Company: NASA Johnson Space Center

Johnson, Jerry
Mail Code: SSU-3
Company: NASA Headquarters

Johnson, James W.
Mail Code: NRC/CSA
Company: Canadian Space Agency

Johnson, D. H.
Mail Code: MDC604
Company: McDonnell Douglas Corporation

Johnson, J. D.
Mail Code:
Company: Astro Aerospace Corp.

Johnson, Gaylen
Mail Code:
Company: Wright State University

Johnson, Carol
Mail Code: SP74
Company: LTV Aerospace and Defense Company

Johnson, Dirk
Mail Code: ER6
Company: NASA Johnson Space Center

Johnson, Carol
Mail Code: SP-74
Company: Loral-Vaught Systems

Johnson, Steve
Mail Code: SD4
Company: KRUG Life Sciences

Johnston, Richard
Mail Code:
Company: Richard Johnston & Associates, Inc.

Johnston, Karen
Mail Code:
Company:

Jones, William R.
Mail Code: OB
Company: NASA Johnson Space Center

Jones, J. J.
Mail Code: EE2
Company: NASA Johnson Space Center

Jones, J. Colin
Mail Code: FTB
Company: European Space Agency

Jones, Todd
Mail Code: PMA 205-42
Company: Naval Air Systems Command

Jones, Scott
Mail Code: T-6-G
Company: McDonnell Douglas Corporation

Jones, B. Sherwood
Mail Code:
Company: YARD Limited

Jones, Rod
Mail Code: OB
Company: NASA Johnson Space Center

Jones, Howard
Mail Code: JR-18
Company: Boeing Aerospace

Jones, Frank
Mail Code: DSS-2
Company: NASA Space Station Freedom Program Office

Jones, William
Mail Code: OB
Company: NASA Johnson Space Center

Joyce, Joseph P.
Mail Code: 333-1
Company: NASA Lewis Research Center

Joyce, Geoffrey A.
Mail Code: FPC 301
Company: British Aerospace Public Limited Co.

Joyce, Lillie
Mail Code: 60-3 Rm120
Company: NASA Lewis Research Center

Julian, Ron
Mail Code: AL/CFBA
Company: U.S. Air Force Wright-Patterson AFB

Jungers, N. J. (Nick)
Mail Code: MSD/84-42
Company: LMSC/CA

Justice, John
Mail Code:
Company: FMC Corporation

Kahn, Mike
Mail Code: CEC
Company: Ball Aerospace

Kain, Robert
Mail Code: MC
Company: NASA Johnson Space Center

Kamm, Brian H.
Mail Code: 36-72
Company: Douglas Aircraft

Kan, Edwin
Mail Code: 264-805
Company: Jet Propulsion Laboratory

Kapell, M. H.
Mail Code: EV13
Company: NASA Johnson Space Center

Keller, Andrew D.
Mail Code:
Company: Human Factors Engineer

Kelly, Sean
Mail Code: DT48
Company: NASA Johnson Space Center

Kelly, Richard T.
Mail Code:
Company: Pacific Science & Engineering Group Inc.

Ken, Voska
Mail Code:
Company: Lockheed Missiles & Space Co.

Kendall, Kate
Mail Code:
Company: Global Engineering Documents

Kennedy, Kriss J.
Mail Code: ED-22
Company: NASA Johnson Space Center

Kenney, G.P.
Mail Code: TC2
Company: NASA Johnson Space Center

Kenney, Patrick
Mail Code: MDCB2PG
Company: McDonnell Douglas Corporation

Kent, Elijah
Mail Code: 429
Company: NASA Langley Research Center

Kent, J.
Mail Code: PT4
Company: NASA Johnson Space Center

Kenton, Odis W.
Mail Code:
Company: Virto Corporation

Kenyon, E. J.
Mail Code: PA21
Company: NASA Johnson Space Center

Kerk, Carter J.
Mail Code:
Company: Texas A & M University

Kerm, Beth
Mail Code: NI-25
Company: University Of Washington

Kerns, Karol
Mail Code: MS W376
Company: MITRE Corporation

Kerwin, Joseph P.
Mail Code: A04
Company: Lockheed

Kessler, Joan
Mail Code: D5
Company: Fairchild Space and Defense

Khanna, S.
Mail Code: F631H
Company: Loral Space Information Systems

Khorsandi, Mehrzad
Mail Code:
Company: Texas A & M University

Kiely, Tim
Mail Code: AD75
Company: Rockwell International

Killingsworth, W. W.
Mail Code: 0B
Company: NASA Johnson Space Center

Kim, Youngjoun
Mail Code:
Company:

Kimm, Vicky
Mail Code:
Company: National Standards Association

Kinder, Jim
Mail Code: PNA 20541B
Company: Department of the Navy

King, David M.
Mail Code:
Company: King Business Systems

King-Icenogle, D. M.
Mail Code: MDSSC-F658
Company: NASA Kennedy Space Center

Kirby, Ryborn (Rip)
Mail Code: MT3
Company: NASA Johnson Space Center

Kirby, Ray
Mail Code:
Company: Old Dominion University

Kirk, A. L.
Mail Code: EV5
Company: NASA Johnson Space Center

Kisco, Ken
Mail Code: AC59
Company: Rockwell International Space Systems Division

Kissinger, Dave
Mail Code: KB3
Company: NASA Johnson Space Center

Kitmacher, Gary H.
Mail Code: SM4
Company: NASA Johnson Space Center

Kleeman, Walt
Mail Code:
Company:

Klein, Bill
Mail Code:
Company: Florida Power and Light

Kline, Alan
Mail Code: 13-6-1
Company: Government Communilation Systems Division

Knight, N.L.
Mail Code:
Company: General Physics

Knudson, Lyle
Mail Code:
Company: University Of Denver

Koch, Linda
Mail Code: DL-DSD-24
Company: NASA Kennedy Space Center

Kodzis, Tony
Mail Code:
Company: Tufts University

Kohl, F.
Mail Code: 500-115
Company: NASA Lewis Research Center

Konradi, Andrei
Mail Code: SN3
Company: NASA Johnson Space Center

Konz, Stephan
Mail Code:
Company: Kansas State University

Koppa, Rodger
Mail Code:
Company: Texas A & M University

Korbakes, Vonda
Mail Code:
Company: General Electric

Kosmo, Joseph J.
Mail Code: EC5
Company: NASA Johnson Space Center

Kraft, Conrad
Mail Code:
Company:

Kraiss, Frederic
Mail Code:
Company: FGAN/FAT

Kramer, Cathy
Mail Code: SE
Company: NASA Johnson Space Center

Krebs, Christopher
Mail Code:
Company: Payload Systems, Inc.

Kreider, George
Mail Code: 244-19
Company: NASA Ames Research Center

Kreifeldt, John
Mail Code:
Company: Tufts University

Krishen, Vijay
Mail Code: EG
Company: NASA Johnson Space Center

Kroemer, K.H.E.
Mail Code:
Company: Virginia Polytechnical Institute

Krohn, Gregory
Mail Code:
Company: Lockheed Aeronautical Systems Company

Krolak, Pat
Mail Code:
Company: University of Lowell

Kross, Denny
Mail Code: E11/SSEIO
Company: NASA Marshall Space Flight Center

Kruger, Gerald
Mail Code:
Company: U.S. Army Research Institute of Env. Medicine

Kruger, Carl
Mail Code: 213-15
Company: NASA Ames Research Center

Kruger, Carl
Mail Code: M/S 213-15
Company:

Kruk, Ronald V.
Mail Code:
Company: CAE Electronics Ltd.

Kruse, Kenneth
Mail Code: SP3
Company: Johnson Engineering Corporation

Kukla, Jim
Mail Code: C70
Company: Lockheed

Kulpa, Vygantas P.
Mail Code: CR20
Company: NASA Marshall Space Flight Center

Kulwicki, P.U.
Mail Code:
Company: U.S. Army

Kumar, K. Vasantha
Mail Code: SD5/KI
Company: KRUG Life Sciences

Kumar, Shrawan
Mail Code:
Company: University of Alberta

Kuminecz, Jerry
Mail Code: EM2
Company: NASA Johnson Space Center

Kupla, Vega
Mail Code: CS01
Company: NASA Marshall Space Flight Center

LaPinta, Charles K.
Mail Code: SD25
Company: NASA Johnson Space Center

LaVigna, Tom
Mail Code: 490.0
Company: NASA Goddard Space Flight Center

Laine, Rudolph L.
Mail Code: DAPE-MRP
Company: HQDA ODCSPER

Lam, Clement
Mail Code:
Company: North Harris County College, South Campus

Lam, S.
Mail Code:
Company:

Lamar, David
Mail Code: XE
Company: NASA Lunar & Mars Exploration Program Office

Lamb, Joe Laine
Mail Code:
Company: Air Force Flight Test Center

Lammers, D.
Mail Code: KN/ESA
Company: European Space Agency

Lancaster, E. Mason
Mail Code: EG
Company: NASA Johnson Space Center

Lance, Nick
Mail Code: EA65
Company: NASA Johnson Space Center

Land, B.
Mail Code: CN22D
Company: NASA Marshall Space Flight Center

Landoux, Paul
Mail Code: T7A
Company: NASA Johnson Space Center

Lane, Helen
Mail Code: SD4
Company: NASA Johnson Space Center

Lang, Greg A.
Mail Code:
Company: McDonnell Douglas-HB

Langdoc, William A.
Mail Code: SP5
Company: NASA Johnson Space Center

Langley, Linda
Mail Code:
Company: Tech-U-Fit Corporation

Lansing, James B.
Mail Code: ASSI
Company: NASA Kennedy Space Center

Larsen, Bruce
Mail Code: DE-FLS
Company: NASA Kennedy Space Center

Larson, Skip
Mail Code: TA
Company: NASA Johnson Space Center

Lauffer, John
Mail Code:
Company: Rocketdyne Corp.

Laux, Lila
Mail Code:
Company: Rice University

Laux, Nan
Mail Code:
Company: ILC Space Systems

Laveson, Jack
Mail Code:
Company: Integrated Systems Research

Lawrence, J. T.
Mail Code: EA43
Company: NASA Johnson Space Center

Lawson, M. B.
Mail Code: EC6
Company: NASA Johnson Space Center

Lazaroff, Scott
Mail Code: EP-5
Company: NASA Johnson Space Center

Le, Michael
Mail Code: EP5
Company: NASA Johnson Space Center

LeBlanc, Stanford
Mail Code: 0E
Company: NASA Johnson Space Center

LeDonne, Fred
Mail Code: ZC-01
Company: Rockwell Space Operations Company

Lee, Louise
Mail Code: LIBRARY-5
Company: NASA Kennedy Space Center

Lee, Mary
Mail Code: 36-84
Company: McDonnell Douglas Corporation

Lee, R.
Mail Code: TRW
Company: NASA Johnson Space Center

Lee, Kevin
Mail Code: SE
Company: General Electric

Lee, Dan
Mail Code: 240A-3
Company: NASA Johnson Space Center

Leger, Lubert
Mail Code: EM
Company: NASA Johnson Space Center

Lehnkuhler, Larry
Mail Code:
Company: ARAC

Lehrer, Beverly
Mail Code: JOB-1
Company: NASA Headquarters Library

Lehtonen, Timo
Mail Code:
Company: Datex Instrumentatiom Corp.

Leitzel, Lindsey
Mail Code:
Company: Harrison Radiator Division, GMC

Lengel, Robert C.
Mail Code: 1-7
Company: Tracor Applied Science

Levesque, Ray
Mail Code: A95J853174
Company: McDonnell Douglas Corporation

Leveton, Lauren
Mail Code: T-6-6
Company: Science Application International Corporation

Lew, L.W.
Mail Code: SP53
Company: NASA Johnson Space Center

Lewin, Ian
Mail Code:
Company: Lighting Science, Inc.

Lewis, Charles M.
Mail Code: E021
Company: NASA Marshall Space Flight Center

Lewis, James L.
Mail Code: SP
Company: NASA Johnson Space Center

Lewis, D. W.
Mail Code: D032
Company: NASA Johnson Space Center

Lewis, Ruth Ann
Mail Code: GSFC/442
Company: NASA Goddard Space Flight Center

Lewis, Jr., James L.
Mail Code: SP
Company: NASA Johnson Space Center

Li, Xin Xu
Mail Code:
Company: Freeway American Sino Trading, Inc.

Li, Zhang
Mail Code:
Company:

Librarian,
Mail Code: 239-13
Company: NASA Ames Research Center

Library, U.T.
Mail Code:
Company: U.T. Design Library

Library, HEL
Mail Code:
Company: U.S. Army

Library, Space Station
Mail Code: CA3
Company: NASA Johnson Space Center

Library, SSGSD
Mail Code: DJ12
Company: NASA Johnson Space Center

Library, A&RD
Mail Code: ER12
Company: NASA Johnson Space Center

Library, SED
Mail Code: ET
Company: NASA Johnson Space Center

Library, Technical
Mail Code: PS3
Company: NASA Johnson Space Center

Library, SSEDF
Mail Code: LMSC/A-22
Company: NASA Johnson Space Center

Library, HMF
Mail Code: SD2
Company: NASA Johnson Space Center

Library, Life Sciences
Mail Code: SE
Company: NASA Johnson Space Center

Library, TCD
Mail Code: EE/MRI
Company: NASA Johnson Space Center

Library, FDSD
Mail Code: EK
Company: NASA Johnson Space Center

Library, S S
Mail Code: KL
Company: NASA Johnson Space Center

Library,
Mail Code:
Company: Rockwell International

Library, MOD SS
Mail Code: DA14
Company: NASA Johnson Space Center

Library, LeRC
Mail Code: 60-3
Company: NASA Lewis Research Center

Library, Judy Joba -
Mail Code:
Company: Canadian Space Agency

Library, Technical
Mail Code: T40
Company: Allied Signal Aerospace

Library, Technical
Mail Code: PS33
Company: NASA Johnson Space Center

Library, Technical
Mail Code:
Company: Boeing Defense & Space Group

Likens, William
Mail Code: 239-4
Company: NASA Ames Research Center

Lilly, Annette
Mail Code: 60-1
Company: NASA Lewis Research Center

Lineberry, Edgar C.
Mail Code: IZ-4
Company: NASA Johnson Space Center

Linsley, Jerald
Mail Code:
Company: Florida Institute of Technology

Lippert, Buddy
Mail Code: C25
Company: Lockheed

Liput, J. J.
Mail Code: EK11
Company: NASA Johnson Space Center

Livingston, John M.
Mail Code: CT-22
Company: NASA Marshall Space Flight Center

Lloyd, J.
Mail Code: MS-8
Company: NASA Space Station Program Office

Lloyd, C.
Mail Code: SE
Company: NASA Johnson Space Center

Lo, John
Mail Code: EP5
Company: Lockheed

Lockwood, M.
Mail Code:
Company: ERA Technology

Loftus, Joseph P.
Mail Code: SA
Company: NASA Johnson Space Center

Logan, James S.
Mail Code: SD12
Company: NASA Johnson Space Center

Logan, Cory
Mail Code: SP-52
Company: NASA Johnson Space Center

Loman, Marty
Mail Code: T6I
Company: McDonnell Douglas Corporation

Lomax, Piper
Mail Code: T20-G-2
Company: NASA Ames Research Center

Loo, David
Mail Code: AD60
Company: Rockwell International

Lopresti, Sam
Mail Code:
Company: Blackwell North America Inc.

Lounge, John M.
Mail Code: CB
Company: NASA Johnson Space Center

Love, Alton K.
Mail Code: ND335
Company: NASA Johnson Space Center

Low, G. David
Mail Code: GA22
Company: NASA Johnson Space Center

Lowerison, John C.
Mail Code:
Company: NASA Aerospace Education Services Project

Lowrey, Gerry
Mail Code: MDC-2 6211
Company: McDonnell Douglas Corporation

Lozano, Anselmo
Mail Code: EA42
Company: NASA Johnson Space Center

Lozar, Charles C.
Mail Code:
Company: Architects Equaties

Luckstead, John
Mail Code: PS 33
Company: NASA Johnson Space Center

Luczkowski, Gay
Mail Code: NA
Company: NASA Johnson Space Center

Luczkowski, Stanley M.
Mail Code: NS2
Company: NASA Johnson Space Center

Lufkin, Ann
Mail Code: ET22
Company: NASA Johnson Space Center

Lund, Jim
Mail Code: R11-1337
Company: TRW

Luse, M. B.
Mail Code: EE
Company: NASA Johnson Space Center

Luttges, Marvin
Mail Code:
Company: University of Colorado at Boulder

Lynch, Lettie
Mail Code: EC1
Company: CTSD Library

MOD Library,
Mail Code: DG46
Company: NASA Johnson Space Center

MSFC Doc. Rpos.,
Mail Code: CN22D
Company: NASA Marshall Space Flight Center

MSFC Library,
Mail Code: CN-24L
Company: NASA Marshall Space Flight Center

Mac Donald, Edward
Mail Code:
Company: CAE Electronics Ltd.

MacDonald, Kathy
Mail Code:
Company: Tufts University

Mackey, Christy
Mail Code:
Company: Honeywell

Maclise, Dougal
Mail Code: 213-2
Company: NASA Ames Research Center

Mah, Frank
Mail Code: AE-11
Company: Rockwell International

Mahla, Gary
Mail Code: 5W-5825
Company: Harris Corporation

Majors, Cindy
Mail Code: DA2
Company: NASA Johnson Space Center

Mallary, W. E.
Mail Code: EK53
Company: NASA Johnson Space Center

Mallory, Ken
Mail Code:
Company: Performance Mastery Company

Malone, Ray C
Mail Code: SP33
Company: NASA Johnson Space Center

Maloy, Joe
Mail Code: 65
Company: NASA Johnson Space Center

Malpass, Al
Mail Code:
Company: Space Industries Inc.

Management, OSC Data
Mail Code: O56A-130
Company: NASA Johnson Space Center

Mancuso, T. G.
Mail Code: ZA
Company: NASA Johnson Space Center

Mann, Harriette
Mail Code:
Company: McDonnell Douglas Corporation

Manteuffel, J.
Mail Code: JR-10
Company: Boeing Aerospace

Marette, D.
Mail Code:
Company: Aerospatiale, Incorporated

Marr, Phil
Mail Code: C18
Company: Lockheed

Marriott, Rich
Mail Code: 313
Company: NASA Goddard Space Flight Center

Marshall, Paul
Mail Code: BC
Company: NASA Headquarters

Marshall, Louis B.
Mail Code:
Company: NASA Aerospace Education Services Project

Marshall, Andrew
Mail Code:
Company: Marshall Associates

Martin, John
Mail Code:
Company: Lockheed Missiles & Space Co.

Martin, Joyce
Mail Code: CN22
Company: NASA Marshall Space Flight Center

Martinez, Oscar
Mail Code:
Company: U.S. Air Force

Martinez, P. A.
Mail Code: EV12
Company: NASA Johnson Space Center

Marton, Ed
Mail Code:
Company: Dynamics Research Corporation

Martwick, Fred
Mail Code: 213-4
Company: NASA Ames Research Center

Maryniak, Gregg
Mail Code:
Company: Space Studies Institute

Mason, John A.
Mail Code:
Company: Arthur D. Little Company

Masterson, Hugh
Mail Code:
Company: Display Tech, Inc.

Masubuchi, Koichi
Mail Code:
Company: Massachusetts Institute of Technology

Mathes, Karen
Mail Code: SD-24
Company: NASA Johnson Space Center

Matsumoto, Shinji
Mail Code:
Company: SEAVANS SOUTH

Matterson, Joan
Mail Code: DTIC-DMA
Company: Defense Technical Information Center

Mattheaus, Julie
Mail Code: ML
Company: NASA Johnson Space Center

Matthew, Bill
Mail Code:
Company: U.S. Army RIEM

May, Rich
Mail Code: SP33
Company: NASA Johnson Space Center

Mayfield, James A.
Mail Code:
Company: GE Government Services

McAllister, Donna
Mail Code: PS3
Company: KRUG Life Sciences International

McAllister, Fred A.
Mail Code: SP
Company: NASA Johnson Space Center

McBarron, James W.
Mail Code: EC
Company: NASA Johnson Space Center

McCandless, Bruce
Mail Code: CB
Company: NASA Johnson Space Center

McCarthy, Kristen
Mail Code: AD38
Company: Rockwell International

McCaul, Ray
Mail Code:
Company: University of Colorado Boulder

McCauley, Nan
Mail Code:
Company: Monterey Technologies

McCauley, Lisa A.
Mail Code:
Company: Battelle Laboratories

McClean, Marty
Mail Code: EP5
Company: NASA Johnson Space Center

McCline, Carole
Mail Code: MD
Company: NASA Kennedy Space Center

McColl, Ray
Mail Code:
Company: University of Colorado at Boulder

McConville, John T.
Mail Code:
Company: Anthropology Research Project, Inc.

McCullough, John
Mail Code: D064
Company: NASA Johnson Space Center

McDaniel, Joe
Mail Code: AL/CFHW
Company: U.S. Air Force Wright-Patterson AFB

McDonald, Sue
Mail Code:
Company: NASA Science & Technology Info. Center

McDonald, David
Mail Code:
Company: Tufts University

McDonald, Shawn
Mail Code: 213-15
Company: NASA Johnson Space Center

McDonnell, Rob
Mail Code:
Company: Johnson Engineering Corporation

McEwen, W.W.
Mail Code: F194
Company: McDonnell Douglas Corporation

McFeron, L. O. (Lou)
Mail Code:
Company: Lockheed Aeronautical Systems Co.

McGuffey, Douglas
Mail Code:
Company: Swales and Associates

McHenry, E. N.
Mail Code: EA6
Company: NASA Johnson Space Center

McKay, Tim
Mail Code: C81
Company: Lockheed

McKee, Sandra
Mail Code: T-6-I
Company: McDonnell Douglas Corporation

McKee, Charlene
Mail Code: EV/MRI
Company: NASA Johnson Space Center

McLean, Ged
Mail Code:
Company: Department of Mechnical Engineering

McLeroy, J.C.
Mail Code: ZR
Company: NASA Johnson Space Center

McManigell, R. H. (Dick)
Mail Code:
Company: LADC

McMillion, James
Mail Code: PA01
Company: NASA Marshall Space Flight Center

McMurtray, James W.
Mail Code:
Company: NASA Aerospace Education Services Project

McRuer, Duane
Mail Code:
Company: Systems Technology, Inc.

McSweeney, Josephine
Mail Code:
Company: Pratt Institute Library

McTamaney, Lou
Mail Code:
Company: FMC Corporation Technical Center

McVicker, J. P.
Mail Code: AOV 300
Company: Federal Aviation Administration

Mehta, Nishad
Mail Code: F853N
Company: Loral/Calspan

Menard, Stacy
Mail Code: NS-4
Company: NASA Johnson Space Center

Menchaca, A. A.
Mail Code: ER2
Company: NASA Johnson Space Center

Merchant, Howard C.
Mail Code:
Company: Merenco Inc.

Merhav, Ilana
Mail Code:
Company: University of Haifa

Merriken, Michael
Mail Code:
Company: Honeywell

Merriman, Steve C.
Mail Code: 1066157
Company: McDonnell Douglas Aerospace

Mertz, David
Mail Code: AE46
Company: Rockwell International

Meshkati, Najmedin
Mail Code:
Company: USC-Institute of Safety & Systems Managment

Messinger, Mark
Mail Code: A23
Company: Lockheed

Metcalf, Therese
Mail Code:
Company: MITRE Corporation

Metcalf, Janet
Mail Code: SP33
Company: NASA Johnson Space Center

Meyers, Stew
Mail Code: 741
Company: NASA Goddard Space Flight Center

Mezzacappa, Elizabeth
Mail Code:
Company: SUNY Stony Brook Department of Psychology

Michaels, Kurt
Mail Code:
Company:

Milam, Linda
Mail Code:
Company: EG&G Idaho

Milburn, Ian
Mail Code:
Company: Telecom Australia

Milgram, Paul
Mail Code:
Company: University of Toronto

Millen, K.
Mail Code: MS-288
Company: NASA Langley Research Center

Miller, B.
Mail Code: 142-2
Company: NASA Lewis Research Center

Miller, Douglas
Mail Code:
Company: U.S. Air Force Headquarters

Miller, Jerry
Mail Code: DF42/RS0
Company: Rockwell Space Operations Company

Miller, Keith
Mail Code: 33-HH
Company: Boeing Commercial Airplane Co.

Miller, Ron
Mail Code: 705
Company: NASA Goddard Space Flight Center

Miller, Richard
Mail Code:
Company: Virginia Polytechnical Institute

Miller, Gerry
Mail Code:
Company:

Miller, Chris
Mail Code: 262-1
Company: NASA Ames Research Center

Miller, K. M.
Mail Code: SP52
Company: NASA Johnson Space Center

Miller, Barbara
Mail Code:
Company: Global Engineering Documents

Mills, T. C.
Mail Code: SE/MMA
Company: NASA Johnson Space Center

Minchew, Marsha
Mail Code:
Company:

Ming, Douglas W.
Mail Code: SN-2
Company: NASA Johnson Space Center

Minicky, Michael S.
Mail Code:
Company: U.S. Army Laboratory Command

Mitchell, Ray
Mail Code: JSC/SP52
Company: Johnson Engineering Corporation

Mitchell, Doyce
Mail Code: E063
Company: NASA Marshall Space Flight Center

Mitchell, Dawn
Mail Code:
Company: Cryovac

Mixon, Randolph W.
Mail Code: 152D
Company: NASA Langley Research Center

Mobley, Dave
Mail Code: DA01
Company: NASA Marshall Space Flight Center

Moe, Karen
Mail Code: 522
Company: NASA Goddard Space Flight Center

Moffitt, H. A.
Mail Code: D064
Company: NASA Johnson Space Center

Mogford, Richard
Mail Code:
Company: CTA, Inc.

Molesworth, Cecilia
Mail Code: 240-3
Company: NASA Johnson Space Center

Molgard, Don
Mail Code: MDC-1 6404
Company: McDonnell Douglas Corporation

Moll, Stephen W.
Mail Code: 641 A
Company: Naval Weapons Center

Monchak, A.
Mail Code: 0F
Company: NASA Johnson Space Center

Moncrief, James D.
Mail Code: SE2
Company: NASA Johnson Space Center

Mond, Carla
Mail Code:
Company: ADL Company, Inc.

Mongan, Philip T.
Mail Code: SM4
Company: NASA Johnson Space Center

Monson, Conrad
Mail Code: SX45
Company: Rockwell International

Montague, R. A.
Mail Code: ND4
Company: NASA Johnson Space Center

Montemayor, Maria
Mail Code: DS 31
Company: NASA Johnson Space Center

Monterio, Katie
Mail Code: A23
Company: Lockheed

Montigny, Marian
Mail Code:
Company: Stanford Telecommunications

Moon, C.
Mail Code: ADF
Company: NASA Lewis Research Center

Moon, Bill
Mail Code: MT3
Company: NASA Johnson Space Center

Moore, C.W.
Mail Code: B24
Company: Lockheed

Moore, Rhonda
Mail Code: EV12
Company: NASA Johnson Space Center

Moore, Nathan
Mail Code: SP33
Company: NASA Johnson Space Center

Moore, Philip
Mail Code:
Company: ATC

Moore, Arlene
Mail Code: 430
Company: NASA Langley Research Center

Moore, Gary
Mail Code:
Company: University of Wisconsin

Moore, Jerry
Mail Code:
Company: University of Wisconsin

Moore, Gil
Mail Code:
Company: Headquarters USAFA/DFA

Moran, Pat
Mail Code: 5670
Company: Aerospace Corporation

Morello, A. Samuel
Mail Code: 156A
Company: NASA Langley Research Center

Morgan, Tom
Mail Code:
Company: U.S. Air Force

Morgan, Barbara
Mail Code:
Company: NASA Aerospace Education Services Project

Morgan, G.
Mail Code: SP3/JEC
Company: NASA Johnson Space Center

Morris, Don B.
Mail Code: AE06
Company: Rockwell International

Morris, Charlie
Mail Code: EB32
Company: NASA Marshall Space Flight Center

Morrison, Dennis
Mail Code: SD4
Company: NASA Johnson Space Center

Mossman, Daryl
Mail Code:
Company: ILC Technology Inc.

Moths, Janis
Mail Code:
Company: University of Wisconsin-Milwaukee

Motil, Sue
Mail Code: 500-115
Company: NASA Lewis Research Center

Moule, I.A.
Mail Code:
Company: Raunds

Moullid, Mohamed
Mail Code: NS-522
Company: NASA Johnson Space Center

Mount, Frances
Mail Code: SP34
Company: NASA Johnson Space Center

Mowatt, Marilyn
Mail Code:
Company: Washington State University

Moyer, Michael J.
Mail Code: HSR-30
Company: Fairbanks Highway Research Center

Mueller, Karl L.
Mail Code:
Company: German Aerospace Establishment

Muise, Arlene
Mail Code:
Company: Systems Technology, Inc.

Muller, Mark V.
Mail Code:
Company: Southwest Research Institute

Mullins, Jeff
Mail Code: E023
Company: NASA Marshall Space Flight Center

Munies, Martha
Mail Code: SD
Company: NASA Johnson Space Center

Munoz, Nancy
Mail Code: EP4
Company: NASA Johnson Space Center

Muratore, Debra A.
Mail Code: CA3
Company: NASA Johnson Space Center

Muratore, John F.
Mail Code: DJ
Company: NASA Johnson Space Center

Murphy, Elizabeth
Mail Code:
Company: Computer Technology Associates

Murphy, George
Mail Code: 17-4
Company: McDonnell Douglas Corporation

Murphy, D.
Mail Code: MT3
Company: NASA Johnson Space Center

Myamoto, Akira
Mail Code:
Company: NASDA

Myers, Jay D.
Mail Code:
Company: SAE

Myers, Larry
Mail Code: WC
Company: NASA Johnson Space Center

Myers, Dean
Mail Code: SD2
Company: NASA Johnson Space Center

Myhre, Loran
Mail Code: SAM/UNC
Company: U.S. Air Force

Mykityshyn, Mark
Mail Code:
Company: MIT

Nace, Kevin
Mail Code:
Company: Naval Air Engineering Center

Nachtwey, D. Stuart
Mail Code: SD12
Company: NASA Johnson Space Center

Naderi, Melinda H.
Mail Code: E022
Company: NASA Marshall Space Flight Center

Nagel, Stephen R.
Mail Code: CB
Company: NASA Johnson Space Center

Nagy, Kornel
Mail Code: ES5
Company: NASA Johnson Space Center

Nakata, Steve
Mail Code:
Company: Space Industries Inc.

Nataupsky, Mark
Mail Code: 152-E
Company: NASA Langley Research Center

Nations, Jim
Mail Code:
Company: NASA Aerospace Education Services Project

Navarro, Bob
Mail Code: 218-7
Company: NASA Johnson Space Center

Neal, Terry
Mail Code: DF4
Company: NASA Johnson Space Center

Neal, Valerie
Mail Code:
Company: ESSEX Corporation

Nealis, Gary
Mail Code: DJ
Company: NASA Johnson Space Center

Nelson, Eric
Mail Code:
Company: U.S. Air Force Headquarters

Nerault, M.
Mail Code:
Company: Centre Spatial de Toulouse

Nesthus, Thomas E.
Mail Code:
Company: Federal Aviation Administration

Nevill, G.E.
Mail Code:
Company: University of Florida

Newbill, Lynn
Mail Code: DB 12
Company: NASA Headquarters

Newton, Steve
Mail Code: JA41
Company: NASA Marshall Space Flight Center

Ngo, Ken
Mail Code: C70
Company: Lockheed

Nguyen, Viet
Mail Code: DT67/RSO
Company: NASA Johnson Space Center

Nichols, Bob
Mail Code:
Company: STV Magazine

Nicholson, L.S.
Mail Code: EA
Company: NASA Johnson Space Center

Nicholson, Todd
Mail Code: JA26
Company: Boeing Aerospace

Nicodemus, Clarence L.
Mail Code: C75
Company: Lockheed

Nicols, Carol
Mail Code:
Company: Hose Engineering

Nilsson, Tomy
Mail Code:
Company: University of Prince Edward Island

Nixon, David
Mail Code:
Company: Southern California Institute of Architecture

Noble, Jacqueline A.
Mail Code: T6G
Company: McDonnell Douglas Corporation

Normand, Eugene
Mail Code: 2T-50
Company: Boeing Aerospace

North, Regina
Mail Code: SD5
Company: USRA

North, Debra
Mail Code:
Company:

Notaro, Joe
Mail Code: 6022
Company: Naval Air Development

Notestine, Hadyn E.
Mail Code:
Company: Ford Motor Company

Novara, Mauro
Mail Code:
Company: European Space Agency

Nuckols, Len
Mail Code: 11-0
Company: U.S. Navy

O'Brian, Erica
Mail Code:
Company: Paradigm

O'Connor, Brian
Mail Code: GA
Company: NASA Johnson Space Center

O'Donoghue, Timothy K.
Mail Code: T-6-6
Company: Science Application International Corporation

O'Handley, Doug
Mail Code: 245.1
Company: NASA Ames Research Center

O'Hearn, Brian
Mail Code:
Company: GEO-CENTERS, Inc.

O'Kane, Jim
Mail Code: EC5
Company: NASA Johnson Space Center

O'Neil, Harold F.
Mail Code:
Company: Advance Design Information

O'Neil, Graham
Mail Code: C106
Company: Lockheed

OSD Document Con,
Mail Code: B33B-555
Company: RSOC/Bendix

Oberright, John
Mail Code: 402
Company: NASA Goddard Space Flight Center

Office, Field
Mail Code: USAFACTR
Company: U.S. Army Human Engineering Laboratory

Office, Field
Mail Code: USAIC
Company: U.S. Army Human Engineering Laboratory

Office, Field
Mail Code: ADEA
Company: U.S. Army Human Engineering Laboratory

Office, Field
Mail Code: OMMCS
Company: U.S. Army Human Engineering Lab.

Office, Field
Mail Code: PM TRADE
Company: U.S. Army Human Engineering Laboratory

Ogburn, Ivan
Mail Code: C33
Company: Lockheed

Okushi, Jun
Mail Code:
Company: Space Project Group

Oleson, Mel
Mail Code: 7E-ER
Company: Boeing Aerospace

Olsen, Kolleen
Mail Code:
Company: Onan Corporation

Olsm, Richard
Mail Code: 8H-25
Company: Boeing Aerospace

Olson, Pam
Mail Code: AP5
Company: Space Center Houston

Oman, Charles
Mail Code:
Company: Acting Director, MVL

Onizuka, Lorna
Mail Code: Japan
Company: Natn'l Aeronautics & Space Development Admin.,

Ontiveros, Melanie
Mail Code: BF62
Company: NASA Marshall Space Flight Center

Ornelas, Tony
Mail Code: SM3
Company: NASA Johnson Space Center

Ortiz, James
Mail Code: DT3
Company: NASA Johnson Space Center

Ostrom, Lee
Mail Code: 2405
Company: EF&G, Idaho

Otoshi, Jason
Mail Code: T041-2
Company: General Electric

Ouellette, Michael
Mail Code:
Company: National Research Council Canada

Overmyer, Scott
Mail Code:
Company:

Owen, R. W.
Mail Code: DA3
Company: NASA Johnson Space Center

PMO SS Library,
Mail Code: EE4
Company: NASA Johnson Space Center

Palladini, R.
Mail Code: R21D
Company: Rockwell Space Operations Company

Palmer, Everett
Mail Code: 262-4
Company: NASA Ames Research Center

Palmer, Bob
Mail Code: TC-3
Company: NASA Johnson Space Center

Pappas, Dan
Mail Code: 202-3
Company: NASA Ames Research Center

Paque, J.
Mail Code: MSC
Company: European Space Agency

Paquette, Steve
Mail Code: STRNC-YBF
Company: U.S. Army

Parker, Nelson
Mail Code: EL41
Company: NASA Marshall Space Flight Center

Parker, Robert
Mail Code: CB
Company: NASA Johnson Space Center

Parker, Michael
Mail Code: DT47
Company: NASA Johnson Space Center

Parker, Minot H.
Mail Code:
Company: NASA Aerospace Education Services Project

Parker, Gordon
Mail Code: MSX
Company: NASA Space Station Program Office

Parmet, Alan J.
Mail Code: SAM/EDK
Company: U.S. Air Force

Parmet, Norman R.
Mail Code:
Company:

Parra, C. G.
Mail Code: PR
Company: NASA Johnson Space Center

Parrish, Joe
Mail Code:
Company: Ocean Systems Engineering

Parsons, Stuart
Mail Code:
Company: Lockheed Missiles & Space Co.

Parsons, Carmen
Mail Code: SP2
Company: NASA Johnson Space Center

Parsons, Stuart O.
Mail Code:
Company: Parsons and Associates

Patlach, Bob
Mail Code: TC2
Company: NASA Johnson Space Center

Patrican, Richard
Mail Code: 8
Company: NASA Space Station Program Office

Patton, Jeff
Mail Code:
Company: General Dynamics

Pausback, Nick
Mail Code:
Company: SYD Mead, Inc.

Payne, L. H.
Mail Code: DJ34
Company: NASA Johnson Space Center

Pearson, Richard G.
Mail Code:
Company: North Carolina State University

Peck, David
Mail Code:
Company:

Peebles, Bob
Mail Code: TC2
Company: NASA Johnson Space Center

Peeler, Elizabeth
Mail Code: 1207-3M
Company: Allied Signal Aerospace Company

Pellosie, John C.
Mail Code:
Company: U.S. Air Force AAMRL/HEG

Pennington, Jack
Mail Code: 152D
Company: NASA Langley Research Center

Peppered, Lynn
Mail Code: TC-12
Company: NASA Johnson Space Center

Peppersack, Margaret
Mail Code: MMA
Company: Martin Marietta - Manned Space Systems

Percipalle, Piergiorgio
Mail Code:
Company:

Perera, S.T.
Mail Code:
Company: Commercial Space Technologies

Perino, M.A.
Mail Code:
Company: Alenia Spazio S.p.A.

Perkins, Richard
Mail Code:
Company: Honeywell

Perner, Chris D.
Mail Code: SP
Company: NASA Johnson Space Center

Perotta, Ray
Mail Code: A23
Company: Lockheed

Perranova, Michele
Mail Code:
Company: Oak Ridge National Laboratory

Perrett, Linda
Mail Code:
Company: Ebasco Services, Inc.

Perry, R. (Bob)
Mail Code: LAS-0/1343
Company: Lockheed Aircraft Service Co.

Perschbacher, Peggy
Mail Code: MN65-2000
Company: Honeywell

Peters, Joseph I.
Mail Code: T-6-6
Company: Science Application International Corporation

Peterson, James R. (Bob)
Mail Code:
Company: Honeywell

Peterson, Don
Mail Code:
Company: AOC, Inc.

Peterson, Larry
Mail Code:
Company: U.S. Army Laboratory Command

Peterson, Wayne
Mail Code: EA63
Company: NASA Johnson Space Center

Peterson, D. D.
Mail Code: EA44
Company: NASA Johnson Space Center

Peterson, M. L.
Mail Code: NS23
Company: NASA Johnson Space Center

Peterson, Leif
Mail Code: SD23/KS
Company: NASA Johnson Space Center

Petri, Dave
Mail Code: EG
Company: NASA Johnson Space Center

Petty, Brian
Mail Code:
Company: Johnson Engineering Corporation

Pfoutz, Ray
Mail Code:
Company: Lockheed Missiles & Space Co.

Pham, Jacqueline
Mail Code:
Company: Herman Miller Inc.

Phillips, Robert W.
Mail Code:
Company:

Phillips, J. C.
Mail Code: NB53
Company: NASA Johnson Space Center

Pierre, Lizanna
Mail Code: SD4/BL37
Company: NASA Johnson Space Center

Pierson, Duane
Mail Code: SD4
Company: NASA Johnson Space Center

Pinckney, Ronald
Mail Code:
Company: Cairos Company

Pinkas, G.
Mail Code: ADF
Company: NASA Lewis Research Center

Platoff, Anne
Mail Code: AP4/HEI
Company: NASA Johnson Space Center

Plaza, Angel
Mail Code: SE-3
Company: NASA Johnson Space Center

Podrigus, Hector
Mail Code: SP3
Company: NASA Johnson Space Center

Poehlmann, Karin
Mail Code: bldg 225
Company: Webb, Murray and Associates

Poff, Norman O.
Mail Code:
Company: NASA Aerospace Education Services Project

Pogue, William R.
Mail Code:
Company: CAMUS, Inc.

Polette, Thomas M.
Mail Code: B18
Company: Lockheed

Pollack, Martin
Mail Code: DO4-40
Company: Grumman Aerospace Corporation

Pollard, Susie
Mail Code: C75
Company: Lockheed

Pond, Dan
Mail Code:
Company: Florida Institute of Technology

Pool, Sam L.
Mail Code: SD
Company: NASA Johnson Space Center

Poston, Alan
Mail Code:
Company: U.S. Army Human Engineering Laboratory

Potzel, Gerda
Mail Code:
Company: Ontario Hydro Library

Powell, Charles Lee
Mail Code:
Company: Stanford University

Poydar, Henry
Mail Code:
Company: Axyz, Inc.

Prescott, Stephanie
Mail Code: EP2/SCD
Company: NASA Johnson Space Center

Prevas, Chris
Mail Code:
Company: General Electric

Price, Charles R.
Mail Code: ER2
Company: NASA Johnson Space Center

Price, Lonnie
Mail Code: DJ41
Company: NASA Johnson Space Center

Pridgen, Paul
Mail Code: M.Z. 2480
Company: General Dynamics

Prince, R. N.
Mail Code: EC
Company: NASA Johnson Space Center

Pringle, Scott
Mail Code:
Company: Kaman Aerospace

Proctor, David
Mail Code: JJ
Company: NASA Johnson Space Center

Prucha, Stephen
Mail Code:
Company: University of Houston

Quine, Dick
Mail Code: DW-223
Company: University of Denver

Racheli, Ugo
Mail Code:
Company: University of Colorado at Boulder

Radley, Charles
Mail Code:
Company: Astro Aerospace Corp.

Radziwon, John J.
Mail Code: RT-SAF-1
Company: NASA Kennedy Space Center

Ragan, James H.
Mail Code: SP43
Company: NASA Johnson Space Center

Rahn, Debbi
Mail Code: IR
Company: NASA Headquarters

Rains, Ed
Mail Code: DE42
Company: NASA Johnson Space Center

Raleigh, Janice
Mail Code:
Company: Life Systems

Ramos, Fernando
Mail Code: MDC-2 5156
Company: McDonnell Douglas Corporation

Rankin, J. G.
Mail Code: EC21
Company: NASA Johnson Space Center

Rathjen, Thomas
Mail Code: SP4
Company: NASA Johnson Space Center

Ray, C.
Mail Code: CP
Company: NASA Headquarters

Ray, A. M. Lex
Mail Code:
Company: Martin Marietta Civil Space and Communications

Reaves, John H.
Mail Code: EJ44
Company: NASA Marshall Space Flight Center

Redding, T. E.
Mail Code: 0B
Company: NASA Johnson Space Center

Reen, Ellen
Mail Code:
Company: Bell Aerospace Textron

Reeves, J.
Mail Code: SD5
Company: NASA Johnson Space Center

Reeves, Jackie
Mail Code: PL/P2
Company: KRUG Life Sciences

Regal, David
Mail Code: 96-06
Company: Boeing Commercial Airplane Co.

Reid, Don
Mail Code: 3X-PE
Company: Boeing Aerospace

Reimers, Harold
Mail Code: SP43
Company: NASA Johnson Space Center

Reising, John M.
Mail Code: WRDC/KTC
Company: Aerospace Group at HFS

Reismann, Barbara
Mail Code: 20-336
Company: Arthur D. Little Company

Remington, Roger
Mail Code: 262-2
Company: NASA Ames Research Center

Remp, Kerry L.
Mail Code: 501-4
Company: NASA Lewis Research Center

Remp, Kerry
Mail Code: 501-4
Company: NASA Lewis Research Center

Rendell-Baker, Leslie
Mail Code:
Company: Loma Linda University

Resnick, Mark
Mail Code:
Company: Florida International University

Reumont, Reese
Mail Code: ET33
Company: NASA Johnson Space Center

Reynolds, Mike A.
Mail Code: 4S/HS-30
Company: NASA Johnson Space Center

Reynolds, Herbert M.
Mail Code:
Company: Michigan State University

Reysa, Dick
Mail Code: HS-30
Company: Boeing Aerospace

Rezner, Clare
Mail Code: A3JO7217-6
Company: McDonnell Douglas Corporation

Rhodes, Wayne
Mail Code:
Company: Rhodes and Associates, Inc.

Ricco, Gary E.
Mail Code:
Company: U.S. Air Force AAMRL/HEF

Rice, Robert R.
Mail Code: EA43
Company: NASA Johnson Space Center

Richard, Brian
Mail Code: CF
Company: McDonnell Douglass Aerospace Company

Richards, B. L.
Mail Code:
Company: Webb, Murray and Associates

Richardson, O.
Mail Code: MDSSC/14-1
Company: DCASPRO

Richichi, J. F.
Mail Code: Grumman/B1
Company: NASA Johnson Space Center

Richman, Ed
Mail Code: C81
Company: Lockheed

Riggle, Darren
Mail Code: C44
Company: Lockheed Martin

Riley, Victor
Mail Code: MN65-2500
Company: Honeywell

Rinehart, Mitzi M.
Mail Code:
Company: Allied Signal Aerospace Company

Rios, Sylvester
Mail Code: 1E
Company: CA Link Corp

Ripley, Grady
Mail Code: FP/P2
Company: KRUG Life Sciences

Ritter, Ransom S.
Mail Code:
Company: NASA Aerospace Education Services Project

Ritterhouse, C. L.
Mail Code: EE4
Company: NASA Johnson Space Center

Robbins, H. C. (Robbie)
Mail Code: B90
Company: Lockheed

Robbins, Malcolm
Mail Code:
Company:

Roberts, Floyd E.
Mail Code: EH34
Company: NASA Marshall Space Flight Center

Robertson, Ken
Mail Code:
Company: ESSEX Corporation

Robertson, William O.
Mail Code:
Company: NASA Aerospace Education Services Project

Robinson, Judith
Mail Code: SL
Company: NASA Johnson Space Center

Robinson, J.
Mail Code: KA01CM
Company: NASA Marshall Space Flight Center

Rocha, Carlos J.
Mail Code:
Company: Telesis Design Science International, Inc.

Rodriguez, Daphne
Mail Code: 505.0
Company: NASA Goddard Space Flight Center

Rodriguez, M.
Mail Code: EA43
Company: NASA Johnson Space Center

Rodriguez, H. I.
Mail Code: KM31
Company: NASA Johnson Space Center

Rodriquez, Pedro
Mail Code: ED54
Company: NASA Marshall Space Flight Center

Rodriquez, Richard
Mail Code: 0B
Company: NASA Marshall Space Flight Center

Roebuck, John A.
Mail Code:
Company: Roebuck

Roesch, J. Richard
Mail Code: 2410
Company: Naval Coastal Systems Center

Rogers, Tom
Mail Code:
Company: Texas A & M University

Rogers, Stephen
Mail Code:
Company: Anacapa Sciences, Inc.

Rosa, Kathy
Mail Code:
Company: Space Industries Inc.

Roscoe, Alan H.
Mail Code:
Company: Britannia Airways Ltd

Rose, David A.
Mail Code: 6022
Company: U.S. Naval Air Development Center

Rose, Judy
Mail Code:
Company: Marubeni America Corp.

Rosette, K.
Mail Code: 750.5
Company: NASA Goddard Space Flight Center

Roth, Axel
Mail Code: PA01
Company: NASA Marshall Space Flight Center

Rowe, Ray
Mail Code:
Company: CTA, Inc.

Rowson, David
Mail Code:
Company: PSC International

Ruder, Albert
Mail Code: ND313
Company: Loral Space Information Systems

Rudisill, Marianne
Mail Code: SP33
Company: NASA Johnson Space Center

Ruiz, M. A.
Mail Code: EG4
Company: NASA Johnson Space Center

Rummel, John
Mail Code: SL
Company: NASA Johnson Space Center

Rupani, Murli
Mail Code: C44
Company: Lockheed

Rupe, Linda
Mail Code: F8M2A
Company: Loral Space Information Systems

Rush, J. D.
Mail Code: NB53
Company: NASA Johnson Space Center

Rusimijeamdekwwe, Jeanluc
Mail Code:
Company: University of Houston

Russel, Joe
Mail Code: NCA-1-6210
Company: Lockheed Sanders

Russo, Dane
Mail Code: SD
Company: NASA Johnson Space Center

Rust, Donna
Mail Code:
Company: ILC - Dover

Rutherford, Joe F.
Mail Code:
Company: KMS Fusion, Inc.

Ryan, Suzanne
Mail Code: DTS-930
Company: U.S. Department of Transportation

Sadao, Sugiyama
Mail Code:
Company: Kwansei Gakuin University

Sadeh, Willy
Mail Code:
Company: Colorado State University

Sadler, Jack
Mail Code: 7E-HJ
Company: Boeing Aerospace

Saenz, Ericia
Mail Code:
Company:

Sahiar, Farhad
Mail Code:
Company: Wright State University

Sakamoto, Louise
Mail Code: T40
Company: Air Research L.A. Division

Salafia, Ronald
Mail Code:
Company: Fairfield University

Saleh, Samira
Mail Code: U2M28
Company: Parmax

Salnitski, V.
Mail Code:
Company: Institute for Biomedical Problems

Samen, Robert
Mail Code: B12
Company: Lockheed

Samonski, Frank H.
Mail Code: EC2/SIM
Company: NASA Johnson Space Center

Sampaio, Carlos
Mail Code: C81
Company: Lockheed

Sampaio, Carlos
Mail Code: C81
Company: NASA Johnson Space Center

Samuelson, John
Mail Code: A23
Company: Lockheed

Sanchez, Robert
Mail Code:
Company: Global Ergonomic Technologies, Inc.

Sanders, Fred
Mail Code: EJ23
Company: NASA Marshall Space Flight Center

Sanford, J.
Mail Code:
Company: University of Texas Health Science Center

Sang, A. C.
Mail Code: DE43
Company: NASA Johnson Space Center

Sangal, Sayta P.
Mail Code:
Company: Wright State University

Sanger, E.L.
Mail Code:
Company: McDonnell Douglas Corporation

Sanger, George
Mail Code: B25
Company: Lockheed

Sanland, Kimberly
Mail Code: E063
Company: NASA Marshall Space Flight Center

Santos, Beatrice
Mail Code: SE3
Company: NASA Johnson Space Center

Sauer, Richard L.
Mail Code: SD4
Company: NASA Johnson Space Center

Sauer, Kevin
Mail Code:
Company: Building Research Council

Sauerwein, Tim
Mail Code: 733.5
Company: NASA Goddard Space Flight Center

Saunders, P. E.
Mail Code: EE6
Company: NASA Johnson Space Center

Sawaya, George
Mail Code: EV12
Company: SD/ALI

Sayer, James
Mail Code:
Company: Univ. of MI. Transportation Research Institute

Scarborough, George
Mail Code: 3064244
Company: McDonnell Douglas Missile Systems Company

Schafer, Bernd
Mail Code:
Company: German Aerospace Research Est.

Schaffner, Grant
Mail Code:
Company: Payload Systems, Inc.

Schiemann, J. D.
Mail Code: MSC
Company: European Space Agency

Schiffler, Richard
Mail Code:
Company: U.S. Air Force

Schiflett, Sam G.
Mail Code: VN
Company: U.S. Air Force School of Aerospace Medicine

Schiller, Craig
Mail Code: C56B
Company: Rockwell International

Schlegel, Robert
Mail Code:
Company: School of Industrial Eng., Univ. of Oklahoma

Schlosser, James
Mail Code: A96J183513
Company: McDonnell Douglas-HB

Schlosser, Jim
Mail Code: MDC-2 5170
Company: McDonnell Douglas Corporation

Schmidt, Ruthann
Mail Code:
Company: Carnegie-Mellon University

Schmitt, Karen
Mail Code:
Company: BTI Consultant

Schmitt, Robert Lee
Mail Code: R351
Company: National Security Agency

Schneider, Lawrence C.
Mail Code:
Company: SAE

Schneider, W. C.
Mail Code: EA
Company: NASA Johnson Space Center

Scholle, Kim
Mail Code:
Company:

Schopper, Ron
Mail Code:
Company: AL/CFH/CSERIAC

Schornick, James L.
Mail Code: 0B/ETS
Company: NASA Johnson Space Center

Schroeder, Lothar
Mail Code:
Company: Axiom Technology Corp.

Schultz, Larry L
Mail Code: DF-PMO
Company: NASA Kennedy Space Center

Schultz, John
Mail Code: BL37/SD4
Company: NASA Johnson Space Center

Schulze, Lawrence J.H.
Mail Code:
Company: Texas A & M University

Schur, Anne
Mail Code:
Company: RCA Aerospace Defense

Seaman, Calvin
Mail Code: MG
Company: NASA Johnson Space Center

Sedej, Melaine
Mail Code:
Company: Hydrogen Consultants, Inc.

Sedej, Dan
Mail Code: DE33
Company: NASA Johnson Space Center

See, M. J.
Mail Code: DA6/0G
Company: NASA Johnson Space Center

Seitz, William W.
Mail Code: SL
Company: NASA Johnson Space Center

Selle, Don
Mail Code:
Company: Ocean Systems Engineering

Seminara, Joseph L.
Mail Code:
Company: Human Factors Consultant

Serig, Dennis I.
Mail Code:
Company: U.S. Nuclear Regulatory Commission

Setzer, Kristen
Mail Code: FC88
Company: Rockwell International

Sexton, Jeffrey
Mail Code: EO23
Company: NASA Marshall Space Flight Center

Seyl, J. W.
Mail Code: DA3
Company: NASA Johnson Space Center

Shaffner, Richard
Mail Code:
Company: ILC Technology

Shafto, Michael
Mail Code: ARC/262-1
Company: NASA Ames Research Center

Shaker, F.
Mail Code: 500-203
Company: NASA Lewis Research Center

Shamblee, Lee
Mail Code: DJ41
Company: NASA Johnson Space Center

Shanguan, Chen
Mail Code:
Company: Institute of Space Medico-Engineering

Sharpe, Tim
Mail Code: C71
Company: Lockheed

Shaughnessy, R. W.
Mail Code: 0C
Company: NASA Johnson Space Center

Shayler, David J.
Mail Code:
Company: Astro Info Services

Sheegog, Bill R.
Mail Code: SP4
Company: NASA Johnson Space Center

Shehad, Nagy
Mail Code: MITRE/FS
Company: MITRE Corporation

Shepherd, William
Mail Code: CB
Company: NASA Johnson Space Center

Shepherd, William T.
Mail Code: AAM-550
Company: Federal Aviation Administration

Sheppard, R. R.
Mail Code: ND216
Company: NASA Johnson Space Center

Sherwin, Herb
Mail Code:
Company: General Electric

Shimamoto, Suzie
Mail Code: BL/P2
Company: KRUG Life Sciences

Shinar, David
Mail Code:
Company: Ben Gurion University of the Negev

Shinkle, Gerald L.
Mail Code: D032
Company: NASA Johnson Space Center

Shinkman, Alan
Mail Code: C44
Company: Lockheed

Shostack, Steve
Mail Code: B15/C44
Company: Lockheed Martin

Silverman, Gerald
Mail Code:
Company: U.S. Army

Silverman, Howard
Mail Code: A23
Company: Lockheed

Simanonok, Karl
Mail Code: SD5
Company: NASA Johnson Space Center

Simard, Sylvian
Mail Code:
Company: MPB Technologies Inc.

Simmons, John
Mail Code:
Company:

Simmons, Scott
Mail Code: MO/P2
Company: KRUG Life Sciences

Simonds, Chuck
Mail Code: A24
Company: Lockheed Martin (FA)

Simpson, Carol A.
Mail Code:
Company: Psycho-Linguistic Research Associates

Singer, Michael J.
Mail Code:
Company: U.S. Army

Skoog, Ingmar
Mail Code:
Company: Dornier GMBH

Slavin, Tom
Mail Code: 84-15
Company: Boeing Defense and Space Group

Slavin, Tom
Mail Code: 84-15
Company: Boeing Defense & Space Group

Sledd, Annette
Mail Code: EJ44
Company: NASA Marshall Space Flight Center

Smerke, Robert
Mail Code:
Company: Northrop Corp.

Smith, Antoine F.
Mail Code: SP4
Company: NASA Johnson Space Center

Smith, E.C.
Mail Code: EB01
Company: NASA Marshall Space Flight Center

Smith, Kenneth
Mail Code: EL15
Company: NASA Marshall Space Flight Center

Smith, Norman
Mail Code:
Company: GSTA

Smith, Rick
Mail Code:
Company: Lockheed Corporation

Smith, Jeff
Mail Code:
Company: Northern Kentucky University

Smith, Kim
Mail Code: FB96
Company: Rockwell International

Smith, Bret
Mail Code:
Company: Auburn University

Smith, Benjamin O.
Mail Code:
Company: NASA Aerospace Education Services Project

Smith, J. A.
Mail Code: ES
Company: NASA Johnson Space Center

Smith, S. A.
Mail Code: SD5
Company: NASA Johnson Space Center

Smith, Scott
Mail Code: PL/P2
Company: KRUG Life Sciences

Smith, G.
Mail Code:
Company:

Smolenski, Mark
Mail Code:
Company: Embry Riddle Aeronautical University

Smothermon, Jim
Mail Code: 0B
Company: NASA Johnson Space Center

Smythe, John
Mail Code:
Company: Symbiotic Systems

Snaufer, Mark
Mail Code:
Company: Eagle Engineering

Snook, S.H.
Mail Code:
Company: Loss Prevention Research Center

Snyder, Tim
Mail Code: M/S 213-15
Company:

Sommers, Marc
Mail Code: C22
Company: Lockheed

Sova, Viljar
Mail Code: SP3
Company: NASA Johnson Space Center

Spainhour, J.T.
Mail Code: JJ20
Company: Boeing Aerospace

Sparks, Rhonda
Mail Code: 056-V-30F
Company:

Spector, Eve
Mail Code: 269-6
Company: NASA Ames Research Center

Spencer, John
Mail Code:
Company: Exploration Design Studios

Spoor, Dan
Mail Code:
Company: McDonnell Douglas Corporation

Spradlin, Amye
Mail Code: ND4/WMA
Company: NASA Johnson Space Center

St. Clair, Geneva
Mail Code: 74-60
Company: Boeing Aerospace

Stacy, R.J.
Mail Code:
Company: Australian Army

Stager, Paul
Mail Code:
Company: York University

Stagg, Skip
Mail Code: AD 60
Company: Rockwell International

Stanford, Mike
Mail Code: SD 12
Company: NASA Johnson Space Center

Stankus, Mike
Mail Code: S300A
Company: Sikorsky Aircraft

Stapleton, Christine
Mail Code:
Company: University of Birmingham

Starchville, Thomas
Mail Code:
Company: Penn State University

Starns, Larry
Mail Code: ND312
Company: NASA Johnson Space Center

Staubitz, W.D.
Mail Code:
Company: GTE Products Corp.

Steers, Sherry
Mail Code:
Company: ILI - Quick

Stegemoeller, C. M.
Mail Code: SE3
Company: NASA Johnson Space Center

Steincamp, James
Mail Code: PD31
Company: NASA Marshall Space Flight Center

Stell, Nancy
Mail Code:
Company: Southwest Research Institute

Stempson, Richard
Mail Code:
Company: Lockheed Missiles & Space Company, Inc.

Stephens, John A.
Mail Code:
Company: U.S. Army Laboratory Command

Stevenson, Robert W.
Mail Code: C50
Company: Lockheed Engineering & Sciences Co.

Stewart, John
Mail Code:
Company: Computer Sciences Corporation

Stewart, Suzanne
Mail Code: JM2
Company: NASA Johnson Space Center

Stewart (SD Lib), S.
Mail Code: SD
Company: NASA Johnson Space Center

Stiller, Susan
Mail Code: AFHRL/LRX-
Company: U.S. Air Force

Stilson, Nancy
Mail Code:
Company: Redstone Science Information Center

Stipp, Wade
Mail Code:
Company: Wichita State University

Stokes, Jack
Mail Code: EJ-12
Company: NASA Marshall Space Flight Center

Stoklosa, Janis
Mail Code: U0
Company: NASA Headquarters

Stone, Robert J.
Mail Code:
Company: Advanced Robotics Research Ltd.

Stone, Howard
Mail Code: 365
Company: NASA Langley Research Center

Stonestreet, Robert W.
Mail Code: B20
Company: Lockheed

Stramler, Jim
Mail Code: D07/BAR
Company: Barrios Technology

Strauss, Alvin M.
Mail Code:
Company: Vanderbilt University

Stueber, Matt
Mail Code: C87
Company: Lockheed

Sturman, Brenda
Mail Code: PA
Company: NASA Johnson Space Center

Stuster, Jack
Mail Code:
Company: Anacapa Sciences, Inc.

Stytle, Leo
Mail Code:
Company: TRW

Sullivan, T.
Mail Code: A0S-C
Company: NASA Lewis Research Center

Svedin, Lynn
Mail Code: DL-DSD-24
Company: NASA Kennedy Space Center

Swannack, Dan
Mail Code:
Company:

Swartz, Milton
Mail Code:
Company:

Sweetnam, Don
Mail Code: 301-280
Company: Jet Propulsion Laboratory

Swindells, B. R.
Mail Code: F6E1S
Company: Loral Space Information Systems

Switzer, Kerry
Mail Code: A3J07117-4
Company: McDonnell Douglas-HB

Symons, E.
Mail Code: 500
Company: NASA Lewis Research Center

Tabibian, Hamid
Mail Code: SP44
Company: NASA Johnson Space Center

Takita, Mark
Mail Code:
Company: Lockheed Missiles & Space Co.

Tamasi, G.
Mail Code: P32-06
Company: Boeing Aerospace

Tamblyn, Dell
Mail Code: SP43
Company: NASA Johnson Space Center

Tansley, Brian
Mail Code:
Company: Carleton University

Tarbox, Peg
Mail Code:
Company: Rockwell International

Tarricone, Louis G.
Mail Code:
Company: Barrett Technology Incorporated

Tate, Melissa
Mail Code: A23
Company: Lockheed

Taylor, James A.
Mail Code: SP
Company: NASA Johnson Space Center

Taylor, Nancy
Mail Code:
Company: University of Nevada

Taylor, Mark
Mail Code: MP-21-4-3
Company: Corning, Inc.

Taylor, R.M.
Mail Code:
Company: Royal Air Force

Taylor, Cheryl
Mail Code: 364-BARR
Company: Grumman Space Systems

Taylor, E. C.
Mail Code: ER3
Company: NASA Johnson Space Center

Taylor, J. H.
Mail Code: NS5
Company: NASA Johnson Space Center

Taylor, Cheryl
Mail Code:
Company: Grumman Space Station Technical Library

Technical Libr.,
Mail Code:
Company: Eagle Engineering

Teleki, Charles
Mail Code:
Company: Swales and Associates

Temple, John
Mail Code: MT4
Company: NASA Johnson Space Center

Terlaje, Maria K.
Mail Code:
Company: Law Offices

Thagard, Norm
Mail Code: CB
Company: NASA Johnson Space Center

Thedy, Louis
Mail Code:
Company: Teacher - Junior High School

Theis, Ron
Mail Code: 239-8
Company: NASA Ames Research Center

Thietje, Allen
Mail Code: DF42
Company: NASA Johnson Space Center

Thirsk, Bob
Mail Code:
Company: National Research Council of Canada

Thomas, Ed
Mail Code: 410
Company: NASA Goddard Space Flight Center

Thomas, Frank P.
Mail Code: ED55
Company: NASA Marshall Space Flight Center

Thomas, Richard
Mail Code:
Company: Ratcom, Inc.

Thomas, Ike
Mail Code: B22
Company: Lockheed Engineering and Sciences Company

Thomas, Michael
Mail Code: EP5
Company: NASA Johnson Space Center

Thompson, Brenda
Mail Code: EA131
Company: NASA Johnson Space Center

Thompson, Bob
Mail Code: PT31
Company: NASA Marshall Space Flight Center

Thompson, Brenda
Mail Code: MDC-2 5293
Company: McDonnell Douglas Corporation

Thompson, Clark
Mail Code: MDC-4 2446
Company: McDonnell Douglas Space Systems Company

Thorne, Barbara
Mail Code: ASSI-CompC
Company: NASA Kennedy Space Center

Thornton, Coleen
Mail Code:
Company: Oak Ridge National Laboratory

Thornton, William
Mail Code: SD-5
Company: NASA Johnson Space Center

Thorson, R.H.
Mail Code: PC
Company: NASA Johnson Space Center

Thurman, Tim
Mail Code:
Company: Auburn Engineering

Tichvon, Michael T.
Mail Code:
Company: TRW

Tiedt, E. W.
Mail Code: SM3
Company: NASA Johnson Space Center

Tillman, Barry
Mail Code:
Company: Tillman Ergonomics Co.

Tinius, Richard
Mail Code: E001
Company: NASA Marshall Space Flight Center

Tinsler, Thomas R.
Mail Code: C42
Company: Lockheed

Tolbert, D.
Mail Code: F096
Company: NASA Kennedy Space Center

Toledo, Sue
Mail Code:
Company: Netrologic

Toney, Dennis B.
Mail Code: A90A32332B
Company: McDonnell Douglas Corporation

Tormo-Intravia, Josefa
Mail Code: 240A
Company: NASA Johnson Space Center

Toups, Larry
Mail Code: C03
Company: Lockheed

Traybar, Joseph J.
Mail Code: ACD-230
Company: c/o FAA Technical Center

Trevino, Robert C.
Mail Code: MG
Company: NASA Johnson Space Center

Tripp, Tim
Mail Code:
Company: SPAR Aerospace Limited

Trotter, John
Mail Code:
Company: University of California Los Angeles

Truelock, Steve
Mail Code: SP3
Company: NASA Johnson Space Center

Tsuya, Naoki
Mail Code:
Company: Mitsubishi Electric Corporation

Turner, Josie
Mail Code: SE/MMA
Company: NASA Johnson Space Center

Turner, Larry
Mail Code: ED65
Company: NASA Marshall Space Flight Center

Ueno, S.
Mail Code:
Company: National Space Development Agency of Japan

Ulibarri, V. Dianne
Mail Code:
Company: Michigan State University

Ulrich, George
Mail Code: DF
Company: NASA Johnson Space Center

Ulrich, George
Mail Code: AS
Company: NASA Headquarters

Underwood, Leroy
Mail Code: WMA-225
Company: Webb, Murray and Associates

Univ. Library, Embry-Riddle
Mail Code:
Company: Embry-Riddle Aeronautical University

Upshaw, Kathy
Mail Code: EJ11
Company: NASA Marshall Space Flight Center

Urban, Tim
Mail Code: C87
Company: Lockheed

Urie, Thomas R.
Mail Code:
Company: U.S. Air Force

Valle, Gerard
Mail Code: ES-2
Company: NASA Johnson Space Center

Van Colen, Peter
Mail Code:
Company: ILC Space Systems

Van Cott, Harold P.
Mail Code:
Company: National Research Council

Van Valkenburgh, Charles
Mail Code:
Company: ESSEX Corporation

Vander Ark, Steve
Mail Code: HMF/P2
Company: KRUG Life Sciences

Vanderwarker, Don
Mail Code: NB2
Company: NASA Johnson Space Center

Vargas-Alfaro, Lorenzo M.
Mail Code:
Company:

Varma, Suneet
Mail Code:
Company: Tufts University

Varnon, Dake
Mail Code: C44
Company: Lockheed Martin

Varshine, Alice
Mail Code: B-12
Company: Fairchild Defense

Vasilik, Brian
Mail Code:
Company: University of the Arts

Vaughan, C. A.
Mail Code: EA11
Company: NASA Johnson Space Center

Vaughn, Robert D.
Mail Code: EK52
Company: NASA Johnson Space Center

Vazquez, Luis
Mail Code: EK24
Company: NASA Johnson Space Center

Veach, Bill
Mail Code: A96J122447
Company: McDonnell Douglas Corporation

Venson, Wade
Mail Code:
Company: Johnson Engineering Corporation

Verinder, Irene
Mail Code: ES2
Company: NASA Johnson Space Center

Vickery, Andrew F.
Mail Code:
Company: British Aerospace Public Limited Co.

Vickery, Chris
Mail Code: K78-08
Company: Boeing Military Airplane Co.

Vickery, A.P.
Mail Code: FPC 320
Company: British Aerospace Public Limited Co.

Vicolle, Sharon
Mail Code: JM33
Company: NASA Johnson Space Center

Vincent, James P.
Mail Code: SP31
Company: NASA Johnson Space Center

Vining, Ross F.
Mail Code:
Company: Garvan Institute of Medical Research

Vinopel, Tim
Mail Code: 8C-09
Company: Boeing Aerospace

Vinson, James E.
Mail Code: B08
Company: Lockheed

Vitcenda, Angela
Mail Code:
Company: Astronautics Corporation Technical Center

Voecks, Gerald
Mail Code: 125-224
Company: Jet Propulsion Laboratory

Vogt, R. A.
Mail Code: ES3
Company: NASA Johnson Space Center

Voss, Susan
Mail Code: MS K557
Company: Los Alamos National Laboratory

Voyt, Gregory
Mail Code: CA461
Company: NASA Johnson Space Center

Walden, Elizabeth
Mail Code: 5313
Company: Naval Air Systems Command

Waligora, James M.
Mail Code: SD5
Company: NASA Johnson Space Center

Walker, Michael J.
Mail Code:
Company: Clemson University

Walker, Danna
Mail Code:
Company:

Walker, Bruce
Mail Code:
Company: Rice University

Wallace, Robert J.
Mail Code:
Company: Research Triangle Institute

Ward, Bob
Mail Code: T-623
Company: McDonnell Douglas Corporation

Ward, Tex
Mail Code: C18
Company: Lockheed

Ward, Lynn
Mail Code: C12
Company: Lockheed

Ward, Brenda
Mail Code: 0B
Company: NASA Johnson Space Center

Warnix, Jim
Mail Code: C60
Company: Lockheed

Waters, Patrick
Mail Code:
Company: U.S. Army Human Engineering Laboratory

Watlington, Joyce
Mail Code:
Company: U.S. Army Laboratory Command

Weaver, Lee
Mail Code:
Company: Weaver Enterprizes

Weaver, Laurie A.
Mail Code: SP-33
Company: NASA Johnson Space Center

Webb, Ruth
Mail Code: DH6
Company: Omniplan Corporation

Webb, David
Mail Code:
Company: University of North Dakota

Webbon, Bruce
Mail Code: 239-15
Company: NASA Ames Research Center

Weeter, Director
Mail Code: BR
Company: U.S. Army Laboratory Command

Wei, Jinhe
Mail Code: EB
Company: NASA Headquarters c/o Ron White

Weidemann, Anne
Mail Code:
Company: SINTEF UNIMED

Weiss, Sue
Mail Code:
Company: E-Systems, ECI Division

Weiss, Scott
Mail Code: F8M2A
Company: Loral/Calspan

Weisskopf, George A.
Mail Code: EV5
Company: NASA Johnson Space Center

Weisz, John D.
Mail Code:
Company: U.S. Army Laboratory Command

Welman, Frank
Mail Code:
Company: Arinc Research Corp.

Wendeln, Marcy C.
Mail Code:
Company: Space Tech Ventures

Wenke, Betty
Mail Code:
Company: Pneu Devices

Werlin, Stanley
Mail Code:
Company: Arthur D. Little Company

Werneth, Russell
Mail Code: 442
Company: NASA Goddard Space Flight Center

West, Philip
Mail Code: EC5
Company: NASA Johnson Space Center

Weyandt, Charles
Mail Code:
Company: Ford Aerospace and Commercial Corp., WDL

Wheeler, Garry
Mail Code: SP331
Company: Johnson Engineering Corporation

Whitbeck, B.
Mail Code:
Company: Eagle Engineering

White, David R.
Mail Code: SE3
Company: NASA Johnson Space Center

White, David M.
Mail Code:
Company:

White, Tim
Mail Code: SA
Company: NASA Johnson Space Center

White, Steven
Mail Code:
Company: Australia Post

White, Paul
Mail Code:
Company: Professional & Specialized Services

Whitehurst, Troy
Mail Code: 4S/HS-30
Company: Boeing Aerospace

Whitelaw, V. A.
Mail Code: MS2
Company: NASA Johnson Space Center

Whiteman, Chris
Mail Code: C33
Company: Lockheed

Whiting, B.
Mail Code: MC 5420
Company: IBM-Federal Sector Div.

Whitlock, Patricia
Mail Code:
Company:

Whitmore, Mihriban
Mail Code: C81
Company: Lockheed

Whitsett, Ed
Mail Code: ER1
Company: NASA Johnson Space Center

Widdel, Heino
Mail Code:
Company: Forschungsinstitut fur Anthropotechnik

Wiegmann, Sharon
Mail Code: EL55
Company: NASA Marshall Space Flight Center

Wiegrefe, Don
Mail Code: BIO-3
Company: Bionetics Corp.

Wiggins, Ken
Mail Code:
Company: NASA Aerospace Education Services Project

Wilde, Richard C.
Mail Code: 1A-2-X65
Company: Hamilton Standard Div. UTC

Wiley, D. L.
Mail Code: NB5
Company: NASA Johnson Space Center

Wilhelm, Horst
Mail Code: OT-112
Company: MBB/ERNO

Wilkes, Lee
Mail Code: ZR-12
Company: Aerospace Corporation

Williams, Herm
Mail Code:
Company: Navy Personnel Research & Development Center

Williams, Marshall
Mail Code: 4L26
Company: Boeing Advanced Systems

Williams, David R.
Mail Code: FB-81
Company: Rockwell International

Williams, Bob
Mail Code:
Company: System Engineering Consultants

Williams, J.
Mail Code: SD
Company: NASA Johnson Space Center

Williams, Kyle
Mail Code:
Company: BRW

Williams, Joyce
Mail Code: CR1
Company: Air Force Tech Library

Williams, Jeff
Mail Code:
Company: Grumman Space Systems

Williams, Henry L.
Mail Code:
Company: Eagle Engineering

Williams, Trevor
Mail Code:
Company: University of Cincinnati

Williges, Bob
Mail Code:
Company: Virginia Tech

Willshire, Kelli
Mail Code: 152-D
Company: NASA Langley Research Center

Willstadter, Bob
Mail Code: 7F-73
Company: Boeing Aerospace

Wilmington, Robert
Mail Code: C81
Company: Lockheed

Wilson, Nancy
Mail Code: C44
Company: Lockheed

Wineman, Dave
Mail Code:
Company: IDAB Incorporated

Winisdoerffer, Francis
Mail Code: MU/TEH
Company: Aerospatiale, Incorporated

Winkler, Edward R.
Mail Code:
Company: McDonnell Douglas Corporation

Winkler, H. Eugene
Mail Code: EC3
Company: NASA Johnson Space Center

Wise, John
Mail Code:
Company: Embry-Riddle Aeronautical University

Wise, Dennis V.
Mail Code: C44
Company: Lockheed

Wolfer, B. M.
Mail Code: KC21
Company: NASA Johnson Space Center

Womack, W.D.
Mail Code: ID2
Company: General Electric

Wong, Clifford
Mail Code:
Company:

Wood, Daniel
Mail Code: B10-1
Company: NASA Kennedy Space Center

Woodard, Daniel
Mail Code: BIO-1
Company: Bionetics Corp.

Woods, Tom
Mail Code: MDC-2 5175
Company: McDonnell Douglas Corporation

Woods, Ronnie
Mail Code: VK2
Company: NASA Kennedy Space Center

Woodson, Wesley E.
Mail Code:
Company: Man Factors, Inc.

Woolard, Lynn
Mail Code:
Company: U.S. Air Force Support Office

Woolford, Barbara J.
Mail Code: SP3
Company: NASA Johnson Space Center

Wright, Michael R.
Mail Code: 743
Company: NASA Goddard Space Flight Center

Wright, Don
Mail Code:
Company: Vitro Corporation

Ximenes, Sam
Mail Code:
Company: Grumman S.S Pro. Support Div.

Yan Chau, Mike
Mail Code: FR-321
Company: NASA Johnson Space Center

Yang, Tracy
Mail Code: SD4
Company: NASA Johnson Space Center

Yarbrough, Leonard
Mail Code: EB133
Company: University of Alabama Huntsville

Yastrop, Gloria
Mail Code:
Company: Raytheon Services

Yasutake, Taizo
Mail Code:
Company: ITU Research

Yates, Rusty
Mail Code: EV
Company: NASA Johnson Space Center

Yeary, D. W.
Mail Code: BN4
Company: NASA Johnson Space Center

Yee, Andrew
Mail Code: SD-5
Company: NASA Johnson Space Center

Yeo, J. E.
Mail Code: EG41
Company: NASA Johnson Space Center

Yeung, Simon
Mail Code:
Company: Hong Kong Polytechnic University

York, M. M.
Mail Code: F6LOS
Company: Loral Space Information Systems

Yoshimura, Yoshi
Mail Code: KN
Company: NASDA

Young, Freddie
Mail Code: OB/ETS
Company: NASA Johnson Space Center

Zachary, Wayne W.
Mail Code:
Company: CHI Systems Inc.

Zahler, P. A.
Mail Code: BJ21
Company: NASA Johnson Space Center

Zakharov, Alexander V.
Mail Code:
Company: USSR Academy of Sciences, Space Research Inst

Zakharova, Olga N.
Mail Code:
Company: USSR Union of Architecture

Zavala, Ruben
Mail Code: SM3
Company: NASA Johnson Space Center

Zetka, E. F.
Mail Code: EA43
Company: NASA Johnson Space Center

Zivley, Mark
Mail Code: C44
Company: NASA Johnson Space Center

Zrowka, Peter
Mail Code:
Company: Life Support Services Inc.

Zumbahlen, R. W.
Mail Code: LESC/A-23
Company: NASA Johnson Space Center

Zuraski, Theresa C.
Mail Code:
Company: AAMI

Zuschlag, Bodi
Mail Code: 172
Company: Teledyne-Brown Engineering