NASA Scientific and Technical Publications


1989
NASA Scientific and Technical Publications

A Catalog of
Special Publications,
Reference Publications,
Conference Publications, and
Technical Papers

1989

National Aeronautics and Space Administration
Office of Management
Scientific and Technical Information Division
Washington, DC 1990
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<td>Aerospace Medicine and Biology: A Continuing Bibliography with Indexes</td>
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(NASA-SP-4406; NAS 1.21:4406) Avail: NTIS HC A08/MF A01-

This edition brings up to date the history of U.S. agencies for space exploration, the NACA and NASA, from 1915 through 1990. Early aviation and aeronautics research are described, with particular emphasis on the impact of the two world wars on aeronautics development and the postwar exploitation of those technologies. The reorganization and expansion of the NACA into NASA is described in detail as well as NASA's relationship with industry, the university system, and international space agencies such as the ESA. The dramatic space race of the 1950 and 1960s is recounted through a detailed history of the Gemini and Apollo programs and followed by a discussion of the many valuable social/scientific application of aeronautics technologies, many of which were realized through the launching of successful satellite projects. The further solar system explorations of the Voyager missions are described, as is the Challenger tragedy and the 1988 return to space of the Shuttle program. Future plans are outlined for a cooperatively funded international space station to foster the ongoing study of space science.

PRACTICES IN ADEQUATE STRUCTURAL DESIGN

- ROBERT S. RYAN  Jan. '89  98 p
(NASA-TP-2893; NAS 1.60:2893) Avail: NTIS HC A05/MF A01-

FLIGHT SAFETY, MANAGEMENT METHODS, PROJECT MANAGEMENT, REQUIREMENTS, SPACE SHUTTLES, STRESS ANALYSIS, STRUCTURAL DESIGN
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For related information see also Astronautics.

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### ASTRONAUTICS
Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; space communications, spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.
For related information see also Aeronautics.

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For extraterrestrial exploration see 91 Lunar and Planetary Exploration.

For related information see also 14 Ground Support Systems and Facilities (Space).

For powered and free-flight trajectories; and orbital and launching dynamics.

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.
For related information see also 09 Research and Support Facilities (Air).

Includes boosters; operating problems of launch/space vehicle systems; and reusable vehicles.
For related information see also 20 Spacecraft Propulsion and Power.

Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques.
For related information see also 03 Air Transportation and Safety and 18 Spacecraft Design, Testing and Performance. For space suits see 54 Man/System Technology and Life Support.

Includes telemetry; space communications networks; aeronomy and guidance; and radio blackout.
For related information see also 04 Aircraft Communications and Navigation and 32 Communications and Radar.
18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE
Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls.
For life support systems see 54 Man/System Technology and Life Support. For related information see also 05 Aircraft Design, Testing and Performance, 39 Structural Mechanics, and 16 Space Transportation.

19 SPACECRAFT INSTRUMENTATION N.A.
For related information see also 06 Aircraft Instrumentation and 35 Instrumentation and Photography.

20 SPACECRAFT PROPULSION AND POWER
Includes main propulsion systems and components, e.g. rocket engines; and spacecraft auxiliary power sources.
For related information see also 07 Aircraft Propulsion and Power, 28 Propellants and Fuels, 44 Energy Production and Conversion, and 15 Launch Vehicles and Space Vehicles.

CHEMISTRY AND MATERIALS
Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; propellants and fuels; and materials processing.

23 CHEMISTRY AND MATERIALS (GENERAL) 7

24 COMPOSITE MATERIALS 7
Includes physical, chemical, and mechanical properties of laminates and other composite materials.
For ceramic materials see 27 Nonmetallic Materials.

25 INORGANIC AND PHYSICAL CHEMISTRY N.A.
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.
For related information see also 77 Thermodynamics and Statistical Physics.

26 METALLIC MATERIALS 7
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS 8
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.
For composite materials see 24 Composite Materials.

28 PROPELLANTS AND FUELS N.A.
Includes rocket propellants, igniters and oxidizers; their storage and handling procedures; and aircraft fuels.
For related information see also 07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, and 44 Energy Production and Conversion.

29 MATERIALS PROCESSING 8
Includes space-based development of products and processes for commercial application.
For biological materials see 55 Space Biology.

ENGINEERING
Includes engineering (general); communications and radar; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.
For related information see also Physics.

31 ENGINEERING (GENERAL) 8
Includes vacuum technology; control engineering; display engineering; cryogenics; and fire prevention.

32 COMMUNICATIONS AND RADAR 8
Includes radar; land and global communications; communications theory; and optical communications.
For related information see also 04 Aircraft Communications and Navigation and 17 Space Communications, Spacecraft Communications, Command and Tracking. For search and rescue see 03 Air Transportation and Safety, and 16 Space Transportation.

33 ELECTRONICS AND ELECTRICAL ENGINEERING 9
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.
For related information see also 60 Computer Operations and Hardware and 76 Solid-State Physics.

34 FLUID MECHANICS AND HEAT TRANSFER 9
Includes boundary layers; hydrodynamics; fluidics; mass transfer and ablation cooling.
For related information see also 02 Aerodynamics and 77 Thermodynamics and Statistical Physics.

35 INSTRUMENTATION AND PHOTOGRAPHY 10
Includes remote sensors; measuring instruments and gauges; detectors; cameras and photographic supplies; and holography.
For aerial photography see 43 Earth Resources and Remote Sensing. For related information see also 06 Aircraft Instrumentation and 19 Spacecraft Instrumentation.

36 LASERS AND MASERS 10
Includes parametric amplifiers.
For related information see also 76 Solid-State Physics.

37 MECHANICAL ENGINEERING 10
Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.

38 QUALITY ASSURANCE AND RELIABILITY N.A.
Includes product sampling procedures and techniques; and quality control.

39 STRUCTURAL MECHANICS 11
Includes structural element design and weight analysis; fatigue; and thermal stress.
GEOSCIENCES
Includes geosciences (general); earth resources and remote sensing; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also Space Sciences.

42 GEOSCIENCES (GENERAL) 13

43 EARTH RESOURCES AND REMOTE SENSING 13
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see 35 Instrumentation and Photography.

44 ENERGY PRODUCTION AND CONVERSION 14
Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower.
For related information see also 07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, and 28 Propellants and Fuels.

45 ENVIRONMENT POLLUTION 14
Includes atmospheric, noise, thermal, and water pollution.

46 GEOPHYSICS 14
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.
For space radiation see 93 Space Radiation.

47 METEOROLOGY AND CLIMATOLOGY 15
Includes weather forecasting and modification.

48 OCEANOGRAPHY N.A.
Includes biological, dynamic, and physical oceanography; and marine resources.
For related information see also 43 Earth Resources and Remote Sensing.

LIFE SCIENCES
Includes life sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and space biology.

51 LIFE SCIENCES (GENERAL) 16

52 AEROSPACE MEDICINE 17
Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

53 BEHAVIORAL SCIENCES N.A.
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT 17
Includes human engineering; biotechnology; and space suits and protective clothing.
For related information see also 16 Space Transportation.

55 SPACE BIOLOGY N.A.
Includes exobiology; planetary biology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES
Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) N.A.

60 COMPUTER OPERATIONS AND HARDWARE N.A.
Includes hardware for computer graphics, firmware, and data processing.
For components see 33 Electronics and Electrical Engineering.

61 COMPUTER PROGRAMMING AND SOFTWARE 17
Includes computer programs, routines, algorithms, and specific applications, e.g., CAD/CAM.

62 COMPUTER SYSTEMS 18
Includes computer networks and special application computer systems.

63 CYBERNETICS 18
Includes feedback and control theory, artificial intelligence, robotics and expert systems.
For related information see also 54 Man/System Technology and Life Support.

64 NUMERICAL ANALYSIS 18
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY N.A.
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS 18
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS 19
Includes topology and number theory.

PHYSICS
Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also Engineering.

70 PHYSICS (GENERAL) 19
For precision time and time interval (PTTI) see 35 Instrumentation and Photography; for geophysics, astrophysics or solar physics see 46 Geophysics, 90 Astrophysics, or 92 Solar Physics.
71  ACOUSTICS  19
Includes sound generation, transmission, and attenuation.
For noise pollution see 45 Environment Pollution.

72  ATOMIC AND MOLECULAR PHYSICS  19
Includes atomic structure, electron properties, and molecular spectra.

73  NUCLEAR AND HIGH-ENERGY PHYSICS  N.A.
Includes elementary and nuclear particles; and reactor theory.
For space radiation see 93 Space Radiation.

74  OPTICS  N.A.
Includes light phenomena and optical devices.
For lasers see 36 Lasers and Masers.

75  PLASMA PHYSICS  19
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see 46 Geophysics. For space plasmas see 90 Astrophysics.

76  SOLID-STATE PHYSICS  N.A.
Includes superconductivity.
For related information see also 33 Electronics and Electrical Engineering and 36 Lasers and Masers.

77  THERMODYNAMICS AND STATISTICAL PHYSICS  N.A.
Includes quantum mechanics; theoretical physics; and Bose and Fermi statistics.
For related information see also 25 Inorganic and Physical Chemistry and 34 Fluid Mechanics and Heat Transfer.

SOCIAL SCIENCES
Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law, political science, and space policy; and urban technology and transportation.

80  SOCIAL SCIENCES (GENERAL)  N.A.
Includes educational matters.

81  ADMINISTRATION AND MANAGEMENT  19
Includes management planning and research.

82  DOCUMENTATION AND INFORMATION SCIENCE  20
Includes information management; information storage and retrieval technology; technical writing; graphic arts; and micrography.
For computer documentation see 61 Computer Programming and Software.

83  ECONOMICS AND COST ANALYSIS  N.A.
Includes cost effectiveness studies.

84  LAW, POLITICAL SCIENCE AND SPACE POLICY  N.A.
Includes NASA appropriation hearings; aviation law; space law and policy; international law; international cooperation; and patent policy.

85  URBAN TECHNOLOGY AND TRANSPORTATION  N.A.
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see 03 Air Transportation and Safety, 16 Space Transportation, and 44 Energy Production and Conversion.

SPACE SCIENCES
Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also Geosciences.

88  SPACE SCIENCES (GENERAL)  20

89  ASTRONOMY  21
Includes radio, gamma-ray, and infrared astronomy; and astrometry.

90  ASTROPYHICS  21
Includes cosmology; celestial mechanics; space plasmas; and interstellar and interplanetary gases and dust.
For related information see also 75 Plasma Physics.

91  LUNAR AND PLANETARY EXPLORATION  22
Includes planetology; and manned and unmanned flights.
For spacecraft design or space stations see 18 Spacecraft Design, Testing and Performance.

92  SOLAR PHYSICS  23
Includes solar activity, solar flares, solar radiation and sunspots.
For related information see 93 Space Radiation.

93  SPACE RADIATION  23
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see 52 Aerospace Medicine. For theory see 73 Nuclear and High-Energy Physics.

GENERAL
Includes aeronautical, astronautical, and space science related histories, biographies, and pertinent reports too broad for categorization; histories or broad overviews of NASA programs.

99  GENERAL  24

Note: N.A. means that no abstracts were assigned to this category for this issue.

SUBJECT INDEX ................................................................. A-1
PERSONAL AUTHOR INDEX .............................................. B-1
REPORT NUMBER INDEX ................................................ C-1
AERONAUTICS (GENERAL)


AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.


RAYMOND L. BARGER Nov. 1988 20 p (NASA-TP-2848; L-16469; NAS 1.60:2848) Avail: NTIS HC A03/MF A01 CSCL 01A COUNTERFLOW, SHOCK WAVE INTERACTION, SLIPSTREAMS

N89-14213*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA. THRUST-REVERSER FLOW INVESTIGATION ON A TWIN-ENGINE TRANSPORT
GREGORY M. GATLIN and P. FRANK QUINTO Washington, DC Dec. 1988 156 p
(NASA-TP-2856; L-16426; NAS 1.60:2856) Avail: NTIS HC A08/MF A01 CSCL 01A
ENGINE TESTS, FREE FLOW, GROUND EFFECT (AERODYNAMICS), REVERSED FLOW, THRUST REVERSAL, TRANSPORT AIRCRAFT

N89-15868# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
INTEGRATION EFFECTS OF PYLON GEOMETRY ON A HIGH-WING TRANSPORT AIRPLANE JOHN R. CARLSON and MILTON LAMB Washington, DC Feb. 1989 78 p (NASA-TP-2877; L-16489; NAS 1.60:2877) Avail: NTIS HC A05/MF A01 CSCL 01A
INSTALLING, NACELLES, PYLONS, TRANSPORT AIRCRAFT, WINGS

N89-17568# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
NASA SC(2)-0714 AIRFOIL DATA CORRECTED FOR SIDEWALL BOUNDARY-LAYER EFFECTS IN THE LANGLEY 0.3-METER TRANSONIC CRYOGENIC TUNNEL RENALDO V. JENKINS Washington, DC Mar. 1989 58 p (NASA-TP-2890; L-16585; NAS 1.60:2890) Avail: NTIS HC A04/MF A01 CSCL 01A
BOUNDARY LAYERS, CRYOGENIC WIND TUNNELS, SUPERCRITICAL AIRFOILS, WIND TUNNEL WALLS

N89-17579# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
In a continuing effort to understand helicopter rotor tip aerodynamics and acoustics, a flight test was conducted by NASA Ames Research Center. The test was performed using the NASA White Cobra and a set of highly instrumented blades. All aspects of the flight test instrumentation and test procedures are explained. Additionally, complete data sets for selected test points are presented and analyzed. Because of the high volume of data acquired, only selected data points are presented. However, access to the entire data set is available to the researcher on request. Author

N89-19232# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
DRAG MEASUREMENTS ON A LAMINAR-FLOW BODY OF REVOLUTION IN THE 13-INCH MAGNETIC SUSPENSION AND BALANCE SYSTEM DAVID A. DRESS 1989 37 p (NASA-TP-2895; L-16483; NAS 1.60:2895) Avail: NTIS HC A03/MF A01 CSCL 01A
AERODYNAMIC BALANCE, BODIES OF REVOLUTION, DRAG MEASUREMENT, LAMINAR FLOW, MAGNETIC SUSPENSION

N89-19234# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
AEROELASTICITY, AIRCRAFT CONFIGURATIONS, COMPUTATIONAL FLUID DYNAMICS, FLUTTER ANALYSIS, TRANSONIC FLOW, UNSTEADY AERODYNAMICS

N89-19247# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
AEROELASTICITY, AIRCRAFT STABILITY, FLOW DISTRIBUTION, TRANSONIC FLOW, UNSTEADY AERODYNAMICS, VISCOUS FLOW

N89-20925# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
AIRCRAFT DESIGN, COMPUTATIONAL FLUID DYNAMICS, CONFERENCES, FLIGHT TESTS, GRID GENERATION (MATHEMATICS), WIND TUNNEL TESTS

N89-20942# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
COMPUTATIONAL FLUID DYNAMICS, COMPUTERIZED SIMULATION, GRID GENERATION (MATHEMATICS), INTERACTIONAL AERODYNAMICS, TRANSONIC FLOW, WIND TUNNEL TESTS

N89-23415# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
NOISE PREDICTION (AIRCRAFT), SONIC BOOMS, SUPERSONIC FLIGHT

N89-24264# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
EFFECT OF ADVANCED ROTORCRAFT AIRFOIL SECTIONS ON THE HOVER PERFORMANCE OF A SMALL-SCALE ROTOR MODEL SUSAN L. ALTHOFF (Army Aviation Systems Command, Hampton, VA.) Sep. 1988 35 p (DA PROJ. 1L1-61102-AH-45-A) (NASA-TP-2832; L-16407; NAS 1.60:2832; AVSCOM-TP-88-B-001) Avail: NTIS HC A03/MF A01 CSCL 01A
AIRFOIL PROFILES, FLIGHT TESTS, HOVERING, ROTARY WINGS, ROTORCRAFT AIRCRAFT
AIRCRAFT DESIGN, TESTING AND PERFORMANCE

N89-25117** National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
EFFECT OF MILLING MACHINE ROUGHNESS AND WING DIHEDRAL ON THE SUPERSONIC AERODYNAMIC CHARACTERISTICS OF A HIGHLY SWEPT WING
CHRISTINE M. DARDEN Washington Aug. 1989 88 p
(NASA-TP-2918; L-16546; NAS 1.60:2918) Avail: NTIS HC A03/MF A01 CSCL 01A
DIHEDRAL ANGLE, LIFT DRAG RATIO, MILLING (MACHINING), SUPERSONIC SPEED, SURFACE ROUGHNESS EFFECTS, SWEPT WINGS

N89-25118** National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
INTERACTIONS OF TOLLMIEN-SCHLICHTING WAVES AND DEAN VORTICES: COMPARISON OF DIRECT NUMERICAL SIMULATION AND A WEAKLY NONLINEAR THEORY
BART A. SINGER (High Technology Corp., Hampton, VA) and THOMAS A. ZANG Washington Aug. 1989 21 p
(NASA-TP-2919; L-16559; NAS 1.60:2919) Avail: NTIS HC A03/MF A01 CSCL 01A
CHANNEL FLOW, COMPUTERIZED SIMULATION, NONLINEAR SYSTEMS, TOLLMIEN-SCHLICHTING WAVES, VORTICES, WAVE INTERACTION

N89-25951** National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
STEADY-STATE AND TRANSITIONAL AERODYNAMIC CHARACTERISTICS OF A WING IN SIMULATED HEAVY RAIN
BRYAN A. CAMPBELL and GAUDY M. BEZOS Washington Aug. 1989 95 p
(NASA-TP-2932; L-16576; NAS 1.60:2932) Avail: NTIS HC A03/MF A01 CSCL 01A
AERODYNAMIC CHARACTERISTICS, AERODYNAMIC STALLING, AIRFOILS, RAIN, STEADY STATE, TRANSIENT RESPONSE, WINGS

N89-26811** National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
A PROCEDURE FOR COMPUTING SURFACE WAVE TRAJECTORIES ON AN INHOMOGENEOUS SURFACE
RAYMOND L. BARGER Washington Aug. 1989 14 p
(NASA-TP-2929; L-16558; NAS 1.60:2929) Avail: NTIS HC A03/MF A01 CSCL 01A
AERODYNAMIC CHARACTERISTICS, COMPUTATIONAL FLUID DYNAMICS, HYDRODYNAMICS, INHOMOGENEITY, MATHEMATICAL MODELS, SURFACE WAVES

N89-27634** National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
STATIC INTERNAL PERFORMANCE OF A NONAXISYMMETRIC VANED THRUST REVERSER WITH FLOW SPLAEY CAPABILITY
LINDA S. BANGERT and LAURENCE D. LEAVITT Washington Sep. 1989 89 p
(NASA-TP-2933; L-16552; NAS 1.60:2933) Avail: NTIS HC A03/MF A01 CSCL 01A
DEFLECTORS, FLOW DEFLECTION, STATIC TESTS, THRUST REVERSAL, THRUST VECTOR CONTROL, WIND TUNNEL TESTS

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

N89-11726** National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
A SIMULATOR INVESTIGATION OF THE USE OF DIGITAL DATA LINK FOR PILOT/ATC COMMUNICATIONS IN A SINGLE PILOT OPERATION
DAVID A. HINTON and GARY W. LOHR (Embry-Riddle Aeronautical Univ., Daytona Beach, Fla.) Jun. 1988 41 p
(NASA-TP-2837; L-16457; NAS 1.60:2837) Avail: NTIS HC A03/MF A01 CSCL 17B
DATA TRANSMISSION, DIGITAL DATA, PILOT PERFORMANCE, RADIO COMMUNICATION, SIMULATION, VOICE COMMUNICATION

N89-15900** National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
A PILOTED SIMULATION STUDY OF DATA LINK ATC MESSAGE EXCHANGE
MARVIN C. WALLER and GARY W. LOHR (Embry-Riddle Aeronautical Univ., Daytona Beach, Fla.) Washington, DC Feb. 1989 38 p
(NASA-TP-2859; L-16450; NAS 1.60:2859) Avail: NTIS HC A03/MF A01 CSCL 17B
AIR TRAFFIC CONTROL, DATA LINKS, FLIGHT SIMULATION, MESSAGE PROCESSING

N89-15901** National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
(NASA-TP-2870; L-16388; NAS 1.60:2870) Avail: NTIS HC A04/MF A01 CSCL 17G
AIR TRAFFIC CONTROL, AUTOMATIC CONTROL, EVALUATION, MANAGEMENT PLANNING, SCHEDULING, SIMULATION, TERMINAL FACILITIES

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

N89-23448** National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
HOT-JET SIMULATION IN CRYOGENIC WIND TUNNELS
(NASA-REP-1220; L-16564; NAS 1.61:1220) Avail: NTIS HC A03/MF A01 CSCL 01C
In order to evaluate hot jet simulation capability in cryogenic wind tunnel testing, simple theoretical calculations were performed. The similarity parameters, isentropic flow properties, and normal shock relations were calculated for a variety of jet simulation techniques. The results were compared with those estimated for a full scale flight condition. It was shown that the cryogenic wind tunnel testing provides an opportunity for the most accurate hot jet simulation technique. By using a compressed nitrogen gas at ambient or moderately elevated temperatures as a jet gas, most all of the relevant similarity parameters including the jet temperature
and velocity ratios and the Reynolds numbers, can be set to the full scale flight values. The only exception is the ratio of specific heats for jet flow. In an attempt to match the ratio of specific heats for the turbojet flow, gases other than pure nitrogen were considered. It was found that a nitrogen/methane mixture at moderately elevated temperature behaves like the real combustion gas. Using this mixture as a jet gas, complete simulation of the full scale turbojet exhaust becomes possible in cryogenic wind tunnels.

N89-2514-025\# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
RECENT ADVANCES IN MULTIDISCIPLINARY ANALYSIS AND OPTIMIZATION, PART 1
AIRCRAFT DESIGN, COMPUTATIONAL FLUID DYNAMICS, COMPUTER AIDED DESIGN, CONFERENCES, EXPERT SYSTEMS, OPTIMIZATION, STRUCTURAL ENGINEERING

N89-25173\# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
RECENT ADVANCES IN MULTIDISCIPLINARY ANALYSIS AND OPTIMIZATION, PART 2
AIRCRAFT DESIGN, ARTIFICIAL INTELLIGENCE, COMPUTER AIDED DESIGN, CONFERENCES, DESIGN ANALYSIS, OPTIMIZATION, STRUCTURAL ANALYSIS, STRUCTURAL DESIGN

N89-25201\# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
RECENT ADVANCES IN MULTIDISCIPLINARY ANALYSIS AND OPTIMIZATION, PART 3
AIRCRAFT DESIGN, COMPUTER AIDED DESIGN, COMPUTERIZED SIMULATION, CONFERENCES, CONTROL THEORY, DESIGN ANALYSIS, FLEXIBLE SPACECRAFT, LARGE SPACE STRUCTURES, OPTIMIZATION, SPACECRAFT DESIGN, STRUCTURAL DESIGN, STRUCTURAL ENGINEERING, SYSTEMS ENGINEERING

N89-26844\# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
METHOD FOR EXPERIMENTAL DETERMINATION OF FLUTTER SPEED BY PARAMETER IDENTIFICATION
AEREOELASTICITY, DYNAMIC PRESSURE, FLIGHT TESTS, FLUTTER, PARAMETER IDENTIFICATION

N89-16820\# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
PILOTED-SIMULATION EVALUATION OF ESCAPE GUIDANCE FOR MICROBURST WIND SHEAR ENCOUNTERS M.S. Thesis - George Washington Univ.
FLIGHT HAZARDS, FLIGHT SIMULATION, MICROBURSTS (METEOROLOGY), PILOT PERFORMANCE, WIND SHEAR

N89-12565\# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
ADVANCED TURBOPROP PROJECT
ROY D. HAGER and DEBORAH VRABEL (Sverdrup Technology, Inc., Cleveland, Ohio.) 1988 130 p Original contains color illustrations (NASA-SP-495; NAS 1.21:495; LC88-1690) Avail: NTIS HC A07/MF A01 CSCL 21E

AIRCRAFT PROPULSION AND POWER

N89-12569\# National Aeronautics and Space Administration. Langley Research Center, Cleveland, OH.
DESIGNENI S. NAIDU (Old Dominion Univ., Norfolk, Va.) and DOUGLAS B. PRICE Washington, D.C. Dec. 1988 30 p (NASA-SP-2844; L-16450; NAS 1.60:2844) Avail: NTIS HC A03/MF A01 CSCL 01C
DIGITAL SYSTEMS, FLIGHT CONTROL, OPTIMAL CONTROL, PERTURBATION THEORY

AIRCRAFT STABILITY AND CONTROL

08

AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N89-12569\# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
SINGULAR PERTURBATIONS AND TIME SCALES IN THE DESIGN OF DIGITAL FLIGHT CONTROL SYSTEMS
DESIGNENI S. NAIDU (Old Dominion Univ., Norfolk, Va.) and DOUGLAS B. PRICE Washington, D.C. Dec. 1988 30 p (NASA-TP-2844; L-16444; NAS 1.60:2844) Avail: NTIS HC A03/MF A01 CSCL 01C
DIGITAL SYSTEMS, FLIGHT CONTROL, OPTIMAL CONTROL, PERTURBATION THEORY
A CLOSED-FORM TRIM SOLUTION YIELDING MINIMUM TRIM DRAG FOR AIRPLANES WITH MULTIPLE LONGITUDINAL-CONTROL EFECTORS
KENNETH H. GOODRICH, STEVEN M. SLIWA, and FREDERICK J. LALLMAN Washington May 1989 30 p
(ANASA-TP-2907; L-16510; NAS 1.60:2908) Avail: NTIS HC
A03/MF A01 CSCL 01C
AERODYNAMIC BALANCE, AERONAUTICS, AIRCRAFT DESIGN, COMPUTATION, LIFT DEVICES, OPTIMIZATION, REDUNDANCY, THRUST VECTOR CONTROL

N89-23469*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
SIMULATOR EVALUATION OF A DISPLAY FOR A TAKEOFF PERFORMANCE MONITORING SYSTEM
DAVID B. MIDDLETON, RAGHAVACHARI SRIVATSAN, and LEE H. PERSON, JR. Washington May 1989 29 p
(ANASA-TP-2908; L-16510; NAS 1.60:2908) Avail: NTIS HC
A03/MF A01 CSCL 01C
ABORTED MISSIONS, DISPLAY DEVICES, MONITORS, RATINGS, SIMULATORS, TAKEOFF

N89-24327*# National Aeronautics and Space Administration.
Flight Research Center, Edwards, CA.
DEVELOPMENT AND FLIGHT TEST EXPERIENCES WITH A FLIGHT-CRUCIAL DIGITAL CONTROL SYSTEM
DALE A. MACKALL Washington Nov. 1988 116 p
(ANASA-TP-2857; H-1344; NAS 1.60:2857) Avail: NTIS HC
A06/MF A01 CSCL 01C
AIRCRAFT PERFORMANCE, CONTROL SYSTEMS DESIGN, DIGITAL SYSTEMS, F-16 AIRCRAFT, FLIGHT CONTROL, SYSTEMS INTEGRATION

AERODYNAMICS

Included provides and free-flight trajectories; and orbital and launching dynamics.

N89-15934*# National Aeronautics and Space Administration.
Goddard Space Flight Center, Greenbelt, MD.
FLIGHT MECHANICS/ESTIMATION THEORY SYMPOSIUM 1988
THOMAS STENGLE, ed. Washington, DC Sep. 1988 611 p

Underway investigations were conducted on the flight mechanics of arrays of flexible beams, with emphasis on the analysis of the coupled motion of a beam and a rigid body.
14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; operating problems of launch/space vehicle systems; and reusable vehicles.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.


This bibliography lists 1,158 reports, articles, and other documents introduced into the NASA scientific and technical information system between January 1, 1988 and June 30, 1988. Its purpose is to provide helpful information to researchers, designers, and managers engaged in Space Station technology development and mission design. Coverage includes documents that define major systems and subsystems related to structures and dynamic control, electronics and power supplies, propulsion, and payload integration. In addition, orbital construction methods, servicing and support requirements, procedures and operations, and missions for the current and future Space Station are included.

Author


BEARINGS, BOOSTER ROCKET ENGINES, CONFERENCES,
FRACTURE MECHANICS, FUEL COMBUSTION, HYDROGEN EMBRITTLEMENT, HYDROGEN OXYGEN ENGINES, METAL FATIGUE, PROPULSION SYSTEM CONFIGURATIONS, ROCKET ENGINE DESIGN, SPACE SHUTTLE MAIN ENGINE, SPACECRAFT PROPULSION

N89-15979*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH. HIGH-PRESSURE CALORIMETER CHAMBER TESTS FOR LIQUID OXYGEN/KEROSENE (LOX/RP-1) ROCKET COMBUSTION PHILIP A. MASTERS, ELIZABETH S. ARMSTRONG, and HAROLD G. PRICE Dec. 1988 18 p (NASA-TP-2862; E-2645; NAS 1.60:2862) Avail: NTIS HC A03/MFA01 CSCL21H CALORIMETERS, COMBUSTION CHAMBERS, HIGH PRESSURE, KEROSENE, LIQUID OXYGEN, RP-1 ROCKET PROPELLANTS

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N89-10996*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH. INDENTATION PLASTICITY AND FRACTURE IN SILICON GEORGE C. RYBICKI and P. PIROUZ (Case Western Reserve Univ., Cleveland, Ohio.) Nov. 1988 30 p (NASA-TP-2863; E-4184; NAS 1.60:2863) Avail: NTIS HC A03/MFA01 CSCL11B CRYSTAL DISLOCATIONS, DOPED CRYSTALS, FRACTURE STRENGTH, HARDNESS, PLASTIC PROPERTIES, SILICON, SINGLE CRYSTALS, TRANSITION TEMPERATURE

26 COMPOSITE MATERIALS

Includes physical, chemical, and mechanical properties of laminates and other composite materials.

N89-19385*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA. THE EFFECTS OF SIMULATED SPACE ENVIRONMENTAL PARAMETERS ON SIX COMMERCIALLY AVAILABLE COMPOSITE MATERIALS JOAN G. FUNK and GEORGE F. SYKES, JR. Apr. 1989 34 p (NASA-TP-2906; L-16549; NAS 1.60:2906) Avail: NTIS HC A03/MFA01 CSCL11D EXTRATERRESTRIAL ENVIRONMENTS, MICROMETEOROIDS, OXYGEN ATOMS, RADIATION EFFECTS, THERMAL RADIATION

23 CHEMISTRY AND MATERIALS (GENERAL)


NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

THERMAL BARRIER COATINGS. ABSTRACTS AND FIGURES

1985 220 p Workshop held in Cleveland, Ohio, 21-22 May 1985
(NASA-CP-10019; E-4425; NAS 1.55:10019) Avail: NTIS HC
A10/MF A01 CSCL 11C
BARRIER LAYERS, CONFERENCES, FAILURE ANALYSIS, GAS TURBINES, LIFE (DURABILITY), MATHEMATICAL MODELS, NONDESTRUCTIVE TESTS, PLASMA SPRAYING, THERMAL CONTROL COATINGS

DEGRADATION AND CROSSLINKING OF PERFLUOROALKYL POLYETHERS UNDER X-RAY IRRADIATION IN ULTRAHIGH VACUUM

SHIGEYUKI MORI (Iwate Univ., Morioka, Japan) and WILFREDO MORALES Mar. 1989 15 p Prepared in cooperation with Iwate Univ., Morioka (Japan)
(NASA-TP-2910; E-4500; NAS 1.60:2910) Avail: NTIS HC
A03/MF A01 CSCL 11B
CROSSLINKING, PHOTOELECTRON SPECTROSCOPY, POLYETHER RESINS, RADIATION EFFECTS

REACTION OF PERFLUOROALKYL POLYETHERS (PFPE) WITH 440C STEEL IN VACUUM UNDER SLIDING CONDITIONS AT ROOM TEMPERATURE

SHIGEYUKI MORI (Iwate Univ., Morioka, Japan) and WILFREDO MORALES Jan. 1989 12 p
(NASA-TP-2883; E-4209; NAS 1.60:2883) Avail: NTIS HC
A03/MF A01 CSCL 07D
ALKYL COMPOUNDS, PERFLUORO COMPOUNDS, POLYETHER RESINS, SLIDING FRICTION, STAINLESS STEELS, VACUUM EFFECTS

COMMUNICATIONS AND RADAR

Includes radar; land and global communications; communications theory; and optical communications.

PROPRIETARY RIGHTS AND COMMUNICATIONS PROJECTS

29 MATERIALS PROCESSING

Includes space-based development of products and processes for commercial applications.

ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; cryogenics; and fire prevention.

SOFTWARE AND ELECTRONIC SYSTEMS

COMMUNICATIONS AND RADAR

30 COMMUNICATIONS AND RADAR

Includes radar; land and global communications; communications theory; and optical communications.

PROPAGATION EFFECTS HANDBOOK FOR SATELLITE SYSTEMS DESIGN. A SUMMARY OF PROPAGATION IMPAIRMENTS ON 10 TO 100 GHZ SATELLITE LINKS WITH TECHNIQUES FOR SYSTEM DESIGN

LOUIS J. IPPOLITO Washington, DC Feb. 1989 531 p
(NAS7-100; JPL-958178) (NASA-RP-f082(04); NAS 1.61:1082(04)) Avail: NTIS HC
A29/MF A01 CSCL 09N
CONTROL SYSTEMS DESIGN, DIGITAL TECHNIQUES, RECONSTRUCTION, STATE ESTIMATION
frequency band region. It provides both a detailed description of the propagation phenomenon and a summary of the impact of the effect on the communications system design and performance. Chapter 2 through 5 describe the propagation effects, prediction models, and available experimental data bases. In Chapter 6, design techniques and prediction methods available for evaluating propagation effects on space-Earth communication systems are presented. Chapter 7 addresses the system design process and how the effects of propagation on system design and performance should be considered and how that can be mitigated. Examples of operational and planned Ku, Ka, and EHF satellite communications systems are given. Author

N89-17767*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

UNIVERSAL TEST FIXTURE FOR MONOLITHIC MM-WAVE INTEGRATED CIRCUITS CALIBRATED WITH AN AUGMENTED TRD ALGORITHM

ALGORITHMS, CALIBRATING, INTEGRATED CIRCUITS, MICROWAVE CIRCUITS, MILLIMETER WAVES, SOLID STATE DEVICES

33

ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

N89-15337*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

PERFORMANCE OF A MULTISTAGE DEPRESSED COLLECTOR WITH MACHINED TITANIUM ELECTRODES
PETER RAMINS and BEN T. EBIHARA Jan. 1989 10 p (NASA-TP-2891; E-4400; NAS 1.60:2891) Avail: NTIS HC A02/MF A01 CSCL 09A

ACCUMULATORS, ELECTRODES, Machining, Performance Tests, Titanium

N89-21169*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

ANALYTICAL AND EXPERIMENTAL PROCEDURES FOR DETERMINING PROPAGATION CHARACTERISTICS OF MILLIMETER-WAVE GALLIUM ARSENIDE MICROSTRIP LINES
ROBERT R. ROMANOFSKY Mar. 1989 21 p (NASA-TP-2899; E-4273; NAS 1.60:2899) Avail: NTIS HC A03/MF A01 CSCL 20N

ELECTROMAGNETIC RADIATION, MICROSTRIP TRANSMISSION LINES, MICROWAVE TRANSMISSION, REFLECTANCE

N89-21171*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

DESIGN, FABRICATION, AND PERFORMANCE OF BRAZED, GRAPHITE ELECTRODE, MULTISTAGE DEPRESSED COLLECTORS WITH 500-W, CONTINUOUS WAVE, 4.8- TO 9.6-GHZ TRAVELING-WAVE TUBES
PETER RAMINS and BEN EBIHARA Mar. 1989 18 p (NASA-TP-2894; E-4961; NAS 1.60:2894) Avail: NTIS HC A03/MF A01 CSCL 09A

BRAZING, CONTINUOUS RADIATION, ELECTRODE MATERIALS, ELECTRON EMISSION, SOLID ELECTRODES, TRAVELING WAVE TUBES

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluids; mass transfer; and ablation cooling.

N89-11153# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

MIXING AND DEMIXING PROCESSES IN MULTIPHASE FLOWS WITH APPLICATION TO PROPULSION SYSTEMS

AERODYNAMIC HEATING, Dynamic Pressure, ELEOVENS, HYPERSONIC FLIGHT, SPLIT FLAPS

N89-12822*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

AERODYNAMIC PRESSURES AND HEATING RATES ON SURFACES BETWEEN SPLIT ELEVONS AT MACH 6.6

AIR FLOW, CHEMICAL EQUILIBRIUM, CONSERVATION EQUATIONS, HYPERSONIC FLOW, MATHEMATICAL MODELS, NONEQUILIBRIUM FLOW, NONEQUILIBRIUM THERMODYNAMICS

N89-16115*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

CONSERVATION EQUATIONS AND PHYSICAL MODELS FOR HYPERSONIC AIR FLOWS IN THERMAL AND CHEMICAL NONEQUILIBRIUM
PETER A. GNOSOFO, ROOP N. GUPTA (Scientific Research and Technology, Inc., Hampton, VA.), and JUDY L. SHINK Washington, DC Feb. 1989 62 p (NASA-TP-2667; L-16477; NAS 1.60:2667) Avail: NTIS HC A04/MF A01 CSCL 20D

FUEL CONTAMINATION, GAS-GAS INTERACTIONS, GASEOUS DIFFUSION, HYPERSONIC WIND TUNNELS, LIQUID NITROGEN, LIQUID OXYGEN, PRESSURE EFFECTS

N89-19499*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

CONTAMINATION OF LIQUID OXYGEN BY PRESSURIZED GASEOUS NITROGEN
ALLAN J. ZUCKERWAR, TRACY K. KING, and KIM CHI NGO (Old Dominion Univ., Norfolk, VA.) Apr. 1989 26 p (NASA-TP-2894; L-16526; NAS 1.60:2894) Avail: NTIS HC A03/MF A01 CSCL 20D

FLUID MECHANICS AND HEAT TRANSFER

N89-25409*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

DETERMINATION OF COMBUSTION GAS TEMPERATURES BY INFRARED RADIOMETRY IN Sooting AND NONSOOTING FLAMES

COMBUSTION TEMPERATURE, FLAME TEMPERATURE, GAS TEMPERATURE, INFRARED RADIOMETERS, PREMIXED
DYNAMIC STABILITY, IMPELLERS, MATHEMATICAL MODELS, ROTOR AERODYNAMICS, SEALS (STOPPERS), TURBO-MACHINERY

**N89-24607** # National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

**COMPARISON OF PREDICTED AND MEASURED TEMPERATURES OF UH-60A HELICOPTER TRANSMISSION**

Harold H. COE Washington Apr. 1989 15 p
(NASA-TP-2911; NAS 1.60:2911; E-4588; AVSCOM-TR-89-C-010)
Avail: NTIS HC A03/MF A01 CSCL 131

COMPUTERIZED SIMULATION, HELICOPTER PROPELLER DRIVE, OPERATING TEMPERATURE, PERFORMANCE TESTS, ROLLER BEARINGS, THERMAL ANALYSIS, TRANSMISSIONS (MACHINE ELEMENTS), UH-60A HELICOPTER

### STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

**N89-12876** # National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

**TURBINE ENGINE HOT SECTION TECHNOLOGY 1986**

Oct. 1986 488 p Workshop held in Cleveland, Ohio, 21-22 Oct. 1986
(NASA-CP-2444; E-3205; NAS 1.55:2444)
Avail: NTIS HC A21/MF A01 CSCL 20K

CONFERENCES, FATIGUE (MATERIALS), FRACTURE MECHANICS, GAS TURBINE ENGINES, HEAT TRANSFER, MEASURING INSTRUMENTS, PROPELLANT COMBUSTION, STRUCTURAL ANALYSIS, THERMAL CONTROL COATINGS

**N89-13814** # National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

**EFFECTS OF VARIABLES UPON PYROTECHNICALLY INDUCED SHOCK RESPONSE SPECTRA, PART 2**

James Lee Smith Nov. 1988 106 p
(NASA-TP-2872; NAS 1.60:2872)
Avail: NTIS HC A06/MF A01 CSCL 20K

COMPONENT RELIABILITY, JOINTS (JUNCTIONS), PYROTECHNIQUES, SHAPED CHARGES, SPACECRAFT STRUCTURES

**N89-16170** # National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

**PARTITIONING STRATEGY FOR EFFICIENT NONLINEAR FINITE ELEMENT DYNAMIC ANALYSIS ON MULTIPROCESSOR COMPUTERS**

(NAG1-730; AF-AFOSR-0136-88)
(NASA-TP-2850; L-16476; NAS 1.60:2850)
Avail: NTIS HC A03/MF A01 CSCL 20K

DYNAMIC STRUCTURAL ANALYSIS, FINITE ELEMENT METHOD, MULTIPROCESSING (COMPUTERS), PARALLEL PROCESSING (COMPUTERS), PARTITIONS (MATHEMATICS)

**N89-16183** # National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

**THERMOVISCOPLASTIC MODEL WITH APPLICATION TO COPPER**

Alan D. Freed Dec. 1988 18 p
(NASA-TP-2845; E-4280; NAS 1.60:2845)
Avail: NTIS HC A03/MF A01 CSCL 20K

COPPER, MODELS, THERMOVISCOELASTICITY, VISCOPLASTICITY

**N89-16192** # National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

**CYCLIC LOADS TESTS OF CARBON INVOLUTE SOLID ROCKET MOTOR OUTER BOOT RING SEGMENTS**

Rafiq Ahmed Dec. 1988 28 p
(NASA-TP-2884; M-605; NAS 1.60:2884)
Avail: NTIS HC A03/MF A01 CSCL 20K

CYCLIC LOADS, FIBER COMPOSITES, LOAD TESTS, MODULUS OF ELASTICITY, PLASTIC PROPERTIES, RESIN MATRIX COMPOSITES, SPACE SHUTTLE BOOSTERS, STRESS-STRAIN RELATIONSHIPS

**N89-16196** # National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Facility, Edwards, CA.

**CONTROL SURFACE SPANWISE PLACEMENT IN ACTIVE FLUTTER SUPPRESSION SYSTEMS**

E. NiSSIM and John J. Burken Nov. 1988 19 p Prepared in cooperation with Technion - Israel Inst. of Tech., Haifa
(NASA-TP-2873; H-1492; NAS 1.60:2873)
Avail: NTIS HC A03/MF A01 CSCL 20K

ACTIVE CONTROL, CONTROL SURFACES, FLUTTER ANALYSIS

**N89-17290** # National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

**TURBINE ENGINE HOT SECTION TECHNOLOGY, 1987**

(NASA-CP-2493; E-3745; NAS 1.55:2493)
Avail: NTIS HC A20/MF A01 CSCL 20K

AIRCRAFT ENGINES, COMBUSTION, CONFERENCES, FINITE ELEMENT METHOD, FRACTURE MECHANICS, GAS TURBINE ENGINES, HEAT TRANSFER, STRUCTURAL ANALYSIS, THERMAL CONTROL COATINGS, THERMAL FATIGUE, TURBINE BLADES

**N89-17992** # National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

**MEASURED AND PREDICTED ROOT-MEAN-SQUARE ERRORS IN SQUARE AND TRIANGULAR ANTENNA MESH FACETS**

(NASA-TP-2896; L-16525; NAS 1.60:2896)
Avail: NTIS HC A03/MF A01 CSCL 20K

ANTENNA DESIGN, ANTENNA RADIATION PATTERNS, FABRICS, REFLECTORS, ROOT-MEAN-SQUARE ERRORS, STRUCTURAL ANALYSIS

**N89-19579** # National Aeronautics and Space Administration. Washington, DC.

**MIXED FINITE ELEMENT MODELS FOR FREE VIBRATIONS OF THIN-WALLED BEAMS**

(NASA-TP-2868; L-16506; NAS 1.60:2868)
Avail: NTIS HC A03/MF A01 CSCL 20K

BEAMS (SUPPORTS), FINITE ELEMENT METHOD, FREE VIBRATION, THIN WALLS

**N89-19580** # National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

**MIXED FORMULATION FOR FRICTIONLESS CONTACT PROBLEMS**

(NASA-TP-2897; L-16513; NAS 1.60:2897)
Avail: NTIS HC A03/MF A01 CSCL 20K

CONTACT LOADS, CURVED BEAMS, DEFORMATION, FINITE ELEMENT METHOD, FRICTION FACTOR, STRESS ANALYSIS

**N89-22940** # Computer Software Management and Information Center, Athens, GA.

**SEVENTEENTH NASTRAN (R) USERS’ COLLOQUIUM**

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39 STRUCTURAL MECHANICS


CONFERENCES, FINITE ELEMENT METHOD, STRAIN ENERGY METHODS, STRUCTURAL ANALYSIS

N89-23892*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.


AEROSPACE SYSTEMS, CONFERENCES, DEPLOYMENT, LUBRICANTS, MANIPULATORS, SPACE STATIONS, SPACE-CRAFT DOCKING, TELEOPERATORS

N89-24636*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.


ACOUSTIC EMISSION, BUCKLING, COMPOSITE STRUCTURES, CONFERENCES, CONTROL SYSTEMS DESIGN, DISPLACEMENT, DYNAMIC STRUCTURAL ANALYSIS, MATHEMATICAL MODELS

N89-24638*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.


COMPUTATION, COMPUTERIZED SIMULATION, CONFERENCES, SHELLS (STRUCTURAL FORMS), STRESS ANALYSIS, STRUCTURAL ANALYSIS, TIRES

N89-24654*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.


AIRCRAFT DESIGN, COMPUTERIZED SIMULATION, CONFERENCES, DYNAMIC STRUCTURAL ANALYSIS, MANY BODY PROBLEM, STRESS ANALYSIS

N89-26255*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.


BEAMS, FINITE ELEMENT METHOD, MATHEMATICAL MODELS, TAPERING

N89-27214*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.


ELASTIC PROPERTIES, STRAIN HARDENING, STRESS CONCENTRATION, STRESSES, WELDING

N89-28034*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.


AIRCRAFT CONFIGURATIONS, AIRCRAFT STRUCTURES, CALIBRATING, HIGH TEMPERATURE ENVIRONMENTS, LOAD TESTS, LOW ASPECT RATIO WINGS, STRAIN GAGES, WING LOADING

N89-29773*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.


ARCHITECTURE (COMPUTERS), CONFERENCES, FINITE ELEMENT METHOD, MULTIPROCESSING (COMPUTERS), PARALLEL PROCESSING (COMPUTERS), SOFTWARE ENGINEERING, STRUCTURAL ANALYSIS

N89-29789*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.


ARCHITECTURE (COMPUTERS), COMPUTER AIDED DESIGN, COMPUTER SYSTEMS PROGRAMS, COMPUTERIZED SIMULATION, CONFERENCES, FINITE ELEMENT METHOD, STRUCTURAL ANALYSIS, STRUCTURAL ENGINEERING

N89-29799*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.


COMPUTER TECHNIQUES, CONFERENCES, FINITE ELEMENT METHOD, LARGE SPACE STRUCTURES, SOFTWARE ENGINEERING, STRUCTURAL ANALYSIS
that work to understanding Martian volatiles in general, and the effort is described. As an example, theoretical modelling of the context of that research, and the broader planetary geoscience investigator's current research efforts, the importance of that work geophysics, materials, and geochemistry is covered. The

Illustrations


Author


Author


Buckling, Cylindrical Shells, Deformation, Loads (forces), Newton Methods, Ring Structures, Structural Failure

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GEOSCIENCES (GENERAL)

Indexes (Issue 62)

N89-22152*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD. NIMBUS-7 DATA PRODUCT SUMMARY ARNOLD G. OAKES, DAESSO HAN, H. LEE KYLE, GENE CARL FELDMAN, ALBERT J. FLEIG, EDWARD J. HURLEY, and BARBARA A. KAUFMAN (General Sciences Corp., Laurel, MD.) Feb. 1989 103 p (NASS-29386) (NASA-SP-1215; REPT-89B00074; NAS 1.61:1215) Avail: NTIS HC A06/MF A01 CSCL 04A Data sets resulting from the first nine years of operations of the Nimbus-7 Satellite are briefly described. After a brief description of the Nimbus-7 Mission, each of the eight experiments on-board the satellite (Coastal Zone Color Scanner (CZCS), Earth Radiation Budget (ERB), Limb Infrared Monitor of the Stratosphere (MIMS), Stratospheric Aerosol Measurement II (SAM II), Stratospheric and Mesospheric Sounder (SAMS), Solar Backscatter Ultraviolet/Total Ozone Mapping Spectrometer (SBUV/TOMS), Scanning Multichannel Microwave Radiometer (SMMR) and the Temperature Humidly Infrared Radiometer (THIR) are introduced and their respective data products are described in terms of media, general format, and suggested applications. Extensive references are provided. Instructions for obtaining further information, and for ordering data products are given. Author

43 EARTH RESOURCES AND REMOTE SENSING

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.


This book is an attempt to determine geomorphic criteria to be used to distinguish between channels formed predominantly by sapping and seepage erosion and those formed principally by surface runoff processes. The geologic nature of the Colorado Plateau has resulted in geomorphic features that show similarities to some areas on Mars, especially certain valley networks within thick sandstone formations. Where spring sapping is an effective process, the valleys that develop are unique in terms of their morphology and network pattern.


COHERENT ELECTROMAGNETIC RADIATION, ELECTROMAGNETIC NOISE, LANDSAT 4, LANDSAT 5, MULTISPECTRAL BAND SCANNERS, NOISE REDUCTION

N89-29825*# National Aeronautics and Space Administration, Washington, DC. EARTH RESOURCES: A CONTINUING BIBLIOGRAPHY WITH INDEXES (ISSUE 62) Nov. 1988 146 p

43 EARTH RESOURCES AND REMOTE SENSING

A time series of daily brightness temperature gridded maps (October 25, 1978 through August 15, 1987) were generated from all ten channels of the Nimbus-7 Scanning Multichannel Microwave Radiometer orbital data. This unique data set can be utilized in a wide range of applications including heat flux, ocean circulation, ice edge productivity, and climate studies. Two sets of data in polar stereographic format are created for the Arctic region: one with a grid size of about 30 km on a 293 by 293 array similar to that previously utilized for the Nimbus-5 Electrically Scanning Microwave Radiometer, while the other has a grid size of about 25 km on a 448 by 304 array identical to what is now being used for the DMSP Scanning Multichannel Microwave Imager. Data generated for the Antarctic region are mapped using the 293 by 293 grid only. The general technique for mapping, and a quality assessment of the data set are presented. Monthly and yearly averages are also generated from the daily data and sample geophysical ice images and products derived from the data are given. Contour plots of monthly ice concentrations derived from the data for October 1978 through August 1987 are presented to demonstrate spatial and temporal detail which this data set can offer, and to show potential research applications. Author
This bibliography lists 544 reports, articles, and other documents introduced into the NASA scientific and technical information system between April 1 and June 30, 1989. Emphasis is placed on the use of remote sensing and geophysical instrumentation in spacecraft and aircraft to survey and inventory natural resources and urban areas. Subject matter is grouped according to agriculture and forestry, environmental changes and cultural resources, geodey and cartography, geology and mineral resources, hydrology and water management, data processing and distribution systems, instrumentation and sensors, and economic analysis.

Author

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ENERGY PRODUCTION AND CONVERSION
Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower.

N89-22982*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
SPACE ELECTROCHEMICAL RESEARCH AND TECHNOLOGY CONFERENCE: ABSTRACTS Abstracts Only
Washington 1989 49 p Conference held in Cleveland, OH, 11-13 Apr. 1989
(NASA-CP-10029; E-4706; NAS 1.55:10029) Avail: NTIS HC A03/MF A01 CSCL 10A
AEROSPACE SYSTEMS, CONFERENCES, ELECTROCATALYSTS, ELECTROCHEMISTRY, ELECTRODES, ENERGY STORAGE, HYDROGEN OXYGEN FUEL CELLS, STORAGE BATTERIES

N89-24704*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
SPACE PHOTOVOLTAIC RESEARCH AND TECHNOLOGY, 1988. HIGH EFFICIENCY, SPACE ENVIRONMENT, AND ARRAY TECHNOLOGY
(NASA-CP-3030; E-4587; NAS 1.55:3030) Avail: NTIS HC A16/MF A01 CSCL 10A
CONFERENCES, PHOTOVOLTAIC EFFECT, SOLAR ARRAYS, SOLAR CELLS, SPACECRAFT POWER SUPPLIES

45
ENVIRONMENT POLLUTION
Includes atmospheric, noise, thermal, and water pollution.

N89-14503*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
POLAR OZONE WORKSHOP. ABSTRACTS
(NASA-CP-10014; REPT-88B0234; NAS 1.55:10014) Avail: NTIS HC A14/MF A01 CSCL 13B
ANTARCTIC REGIONS, ATMOSPHERIC CHEMISTRY, ATMOSPHERIC COMPOSITION, CONFERENCES, EARTH OBSERVATIONS (FROM SPACE), OZONE, OZONE DEPLETION, OZONOMETRY, POLAR METEOROLOGY, STRATOSPHERE

46
GEOPHYSICS
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

N89-10420*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
COMPARISON OF SATELLITE-DERIVED DYNAMICAL QUANTITIES FOR THE STRATOSPHERE OF THE SOUTHERN HEMISPHERE
(NASA-CP-3044; L-16593; NAS 1.55:3044) Avail: NTIS HC A05/MF A01 CSCL 04A
ATMOSPHERIC CIRCULATION, GEOPOTENTIAL HEIGHT, SATELLITE OBSERVATION, STRATOSPHERE, ZONAL FLOW (METEOROLOGY)

NIMBUS-7 STRATOSPHERIC AND MESOSPHERIC SOUNDER (SAMS) EXPERIMENT DATA USER'S GUIDE
(NASS-28063)
(NASA-RP-1221; NAS 1.61:1221; REPT-89B00074) Avail: NTIS HC A07/MF A01 CSCL 08G
The Stratospheric and Mesospheric Sounder (SAMS) aboard Nimbus-7 observes infrared radiation from the atmospheric limb. Global upper atmosphere temperature profiles and vertical concentrations of H2O, NO, N2O, CH4 and CO2 are derived from these measurements. The status of all channels was carefully monitored. Temperature and composition were retrieved from the measurements by linearizing the direct equation about an a priori profile and using an optimum statistical estimator to find the most likely solution. The derived temperature and composition profiles are archived on two tape products whose file structure and record formats are described in detail. The gridded retrieved temperature tape (GRID-T) contains daily day and night average temperatures at 62 pressure levels in a 2.5 degree latitude by 10 degree longitude grid extending from 67.5 degrees N to 50 degrees S. The zonal mean methane and nitrous oxide composition tape (ZMT-G) contains zonal mean day and night average CH4 and N2O mixing ratios at 31 pressure levels for 2.5 degrees latitude zones extending from 67.5 degrees N to 50 degrees S. Author
47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N89-28596*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A HIGH-RESOLUTION ATLAS OF THE INFRARED SPECTRUM OF THE SUN AND THE EARTH ATMOSPHERE FROM SPACE. A COMPILATION OF ATOMS SPECTRA OF THE REGION FROM 650 TO 4800 CM-1 (2.3 TO 16 MICRONS). VOLUME 2: STRATOSPHERE AND MESOSPHERE, 650 TO 3350 CM-1
CROFTON B. FARMER and ROBERT H. NORTON Washington 1989 688 p
(NASA-RP-1224-VOL-2; JPL-400-370-VOL-2; NAS 1.61:1224-VOL-2; LC-89-600203) Avail: NTIS HC A09/MF E03

During the period April 29 to May 2, 1985, the Atmospheric Trace Molecule Spectroscopy (ATMOS) experiment was operated for the first time, as part of the Spacelab-3 payload of the shuttle Challenger. The principal purpose of this experiment was to study the distributions of the atmosphere's minor and trace molecular constituents. The instrument, a modified Michelson interferometer covering the frequency range from 600 to 5000/cm-1 at a spectral resolution of 0.01/cm-1, recorded infrared absorption spectra of the sun and of the earth's atmosphere at times close to entry into and exit from occultation by the earth's limb. Spectra were obtained that are free from absorptions due to constituents of the atmosphere (i.e., they are pure solar spectra), as well as spectra of the atmosphere itself, covering line-of-sight tangent altitudes that span the range from the lower thermosphere to the bottom of the troposphere. This atlas presents a compilation of these spectra arranged in a hardcopy format suitable for quick-look reference purposes. Volume 2 covers the stratosphere and mesosphere (i.e., tangent altitudes from 20 to 80 km) for frequencies from 650 to 3350/cm-1.

N89-14648*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD. USER'S GUIDE FOR THE NIMBUS 7 SCANNING MULTICHANNEL MICROWAVE RADIOMETER (SMMR) CELL-ALL TAPE
(NASS-29386)
(NASA-RP-1210; REPT-88-181; NAS 1.61:1210) Avail: NTIS HC A06/MF A01 CSCL 04B

The SMMR instrument onboard the Nimbus-7 satellite has been in operation since October 1978. It provided global coverage of passive microwave observations at 6.6, 10.7, 18, 21, and 37 GHz. The observed brightness temperature can be used to retrieve geophysical parameters, principally sea surface temperature, atmospheric water vapor and liquid water content over oceans, sea ice concentration, and snow cover over land. The SMME CELL-ALL Tape contains earth-located calibrated brightness temperature data which have been appropriately binned into cells of various grid sizes, allowing intercomparisons of observations made at different frequencies (with corresponding different footprint sizes). This user's guide describes the operation of the instrument, the flow of the data processing the calibration procedure, and the characteristics of the calibrated brightness temperatures and how they are binned. Detailed tape specifications and lists of available data are also provided.

N89-17134*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA. LIMB-DARKENING FUNCTIONS AS DERIVED FROM ALONG-TRACK OPERATION OF THE ERBE SCANNING RADIOMETER FOR JANUARY 1985
(NASA-RP-1214; L-16487; NAS 1.61:1214) Avail: NTIS HC A03/MF A01 CSCL 04B

During January 1985, the scanning radiometer aboard the Earth Radiation Budget Satellite was operated to scan along-track. These data have been analyzed to produce limb-darkening functions for Earth emitted radiation, which relate the radiance in any given direction to the radiant exitance. Limb-darkening functions are presented in tabular form and shown as figures for 10 day cases and 12 night cases, corresponding to various scene types and latitude zones. The scene types were computed using measurements within 10 deg of zenith. The limb-darkening functions have values of 1.03 to 1.09 at zenith, with 1.06 being typical. It is found that latitude causes a variation on the order of 1 percent, except for zenith angles greater than 70 deg. These limb-darkening models are about 2 percent higher at zenith than the models derived from Nimbus 7 data.

N89-20587*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA. ANGULAR RADIATION MODELS FOR EARTH-ATMOSPHERE SYSTEM. VOLUME 2: LONGWAVE RADIATION
(NASA-RP-1184-VOL-2; L-16503; NAS 1.61:1184-VOL-2) Avail: NTIS HC A05/MF A01 CSCL 04B

The longwave angular radiation models that are required for analysis of satellite measurements of Earth radiation, such as those from the Earth Radiation Budget Experiment (ERBE) are presented. The models contain limb-darkening characteristics and mean fluxes. Limb-darkening characteristics are the longwave anisotropic factor and the standard deviation of the longwave radiance. Derivation of these models from the Nimbus 7 ERB (Earth Radiation Budget) data set is described. Tabulated values and computer-generated plots are included for the limb-darkening and mean-flux models.
N89-20588*^# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
AN ASSESSMENT MODEL FOR ATMOSPHERIC COMPOSITION
AIR QUALITY, ATMOSPHERIC COMPOSITION, EARTH ATMOSPHERE, ENVIRONMENTAL MONITORING, PHOTO-CHEMICAL OXIDANTS

N89-27302*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
THE 1989 AIRBORNE ARCTIC STRATOSPHERIC EXPEDITION NIMBUS-7 TOMS DATA ATLAS
Over the past several years, world scientific attention was focused on the rapid and unanticipated decrease in the abundance of ozone over Antarctica during the Austral spring. A major aircraft campaign was conducted from December 1988 to February 1989 in response to the recently published Ozone Trends Panel Report which found that the largest decreases in Arctic ozone occurred during January to February at latitudes near the edge of the Arctic vortex. This atlas provides a complete set of TOMS ozone measurements over Europe and the North Atlantic for the duration of the experiment. These were the orbital TOMS measurements provided to the experimenters in near-real-time. In addition, a set of Northern Hemisphere TOMS ozone measurements for the period December 26, 1988 to March 20, 1989 is presented. A comparison of January and February 1989 mean ozone values to prior years is also presented.

N89-28983*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
THE 1988 ANTARCTIC OZONE MONITORING NIMBUS-7 TOMS DATA ATLAS
Because of the great environmental significance of ozone and to support continuing research at McMurdo, Syowa, and other Southern Hemisphere stations, the development of the 1988 ozone hole was monitored using data from the Nimbus-7 Total Ozone Mapping Spectrometer (TOMS) instrument, produced in near-real-time. This Atlas provides a complete set of daily polar orthographic projections of the TOMS total ozone measurements over the Southern Hemisphere for the period August 1 through November 17, 1988. Although total ozone in mini-holes briefly dropped below 150 DU in late August, the main ozone hole is seen to be much less pronounced than in 1987. Minimum values, observed in late September and early October 1988, were seldom less than 175 DU. Compared with the same period in 1987, when a pronounced ozone hole whose minimum value of 109 Dobson Units (DU) was the lowest total ozone ever observed, the 1998 ozone hole is displaced from the South Pole, opposing a persistent maximum with values consistently above 500 DU. Daily ozone values above selected Southern Hemisphere stations are presented, along with comparisons of the 1998 ozone distribution to that of other years.

N89-17997*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
CARDIOVASCULAR SYSTEM, CONFERENCES, GROUND SUPPORT SYSTEMS, MANNED SPACE FLIGHT

N89-24022*^# General Electric Co., Moffett Field, CA.
GAS-GRAIN SIMULATION FACILITY: FUNDAMENTAL STUDIES OF PARTICLE FORMATION AND INTERACTIONS. VOLUME 1: EXECUTIVE SUMMARY AND OVERVIEW
AEROSOLS, CLOUDS, COSMIC DUST, GRAINS, GRAVITATIONAL EFFECTS, NUCLEATION, PARTICLE INTERACTIONS, PARTICLES, PARTICULATES, REDUCED GRAVITY, SPACE LABORATORIES, SPACE STATION Payloads, SPACEBORNE EXPERIMENTS

N89-24023*# General Electric Co., Moffett Field, CA.
GAS-GRAIN SIMULATION FACILITY: FUNDAMENTAL STUDIES OF PARTICLE FORMATION AND INTERACTIONS. VOLUME 2: ABSTRACTS, CANDIDATE EXPERIMENTS AND FEASIBILITY STUDY
AEROSOLS, CLOUDS, COSMIC DUST, GRAINS, PARTICLE INTERACTIONS, PARTICLES, PARTICULATES, REDUCED GRAVITY, SPACEBORNE EXPERIMENTS

N89-26334*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
EXOBIOLOGY AND FUTURE MARS MISSIONS
BIOLICAL EVOLUTION, CHEMICAL EVOLUTION, CONFERENCES, ECOLOGY, EXOBIOLOGY, FOSSILS, MARS SAMPLE RETURN MISSIONS, SOILS
52

AEROSPACE MEDICINE

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

N89-29951* National Aeronautics and Space Administration, Washington, DC. AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 327) Feb. 1989 53 p (NASA-SP-7011(327); NAS 1.21:7011(327)) Avail: NTIS HC A03; NTIS standing order as PB89-912300, $10.50 domestic, $21.00 foreign CSCL 06E

This bibliography lists 127 reports, articles and other documents introduced into the NASA Scientific and Technical Information System during August, 1989. Subject coverage includes: aerospace medicine and psychology, life support systems and controlled environments, safety equipment, exobiology and extraterrestrial life, and flight crew behavior and performance. Author

54

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.


BIOASTRONAUTICS, CLOSED ECOSYSTEM SYSTEMS, CONFERENCES, PLANTS (BOTANY), SPACECRAFT ENVIRONMENTS


COMPUTER GRAPHICS, ORBITAL MANEUVERS, PROXIMITY, SPACE STATIONS, SPACECRAFT TRAJECTORIES

59

MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)


61

COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms, and specific applications, e.g., CAD/CAM.


COMPUTER PROGRAMS, LUNAR EXPLORATION, MARS LANDING, MISSION PLANNING, SOFTWARE TOOLS


COMPUTER PROGRAMS, EPOXY COMPOUNDS, HALF LIFE, POSITRONS, RADIATION SPECTRA


COVARIANCE, ERROR ANALYSIS, MATRICES (MATHEMATICS), RECONSTRUCTION, STATE ESTIMATION


AEROSPACE SCIENCES, ARTIFICIAL INTELLIGENCE, EXPERT SYSTEMS, ROBOTICS


61
61 COMPUTER PROGRAMMING AND SOFTWARE

NASA, Washington
(NASA-CP-3025; REPT-89B0038; NAS 1.55:3025) Avail: NTIS
HC A19/MF A01 CSCL 09B

CONFERENCES, DATA COMPRESSION, DATA MANAGEMENT, DATA TRANSMISSION, IMAGE PROCESSING, IMAGING TECHNIQUES, SIGNAL PROCESSING, TELEMETRY, VECTORS (MATHEMATICS)

N89-23181*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
A KNOWLEDGE-BASED TOOL FOR MULTILEVEL DECOMPOSITION OF A COMPLEX DESIGN PROBLEM
JAMES L. ROGERS Washington May 1989 23 p
(NASA-TP-2903; L-16557; NAS 1.60:2903) Avail: NTIS HC A03/MF A01 CSCL 09B

COMPUTER AIDED DESIGN, KNOWLEDGE BASES (ARTIFICIAL INTELLIGENCE), SCHEDULING, SOFTWARE TOOLS, SYSTEMS ENGINEERING

62 COMPUTER SYSTEMS

Includes computer networks and special application computer systems.

N89-17422*# National Aeronautics and Space Administration.
Lewis Research Center, Cleveland, OH.
PARALLEL GAUSSIAN ELIMINATION OF A BLOCK TRIDIAGONAL MATRIX USING MULTIPLE MICROCOMPUTERS
RICHARD A. BLECH Washington, DC Feb. 1989 35 p
(NASA-TP-2892; E-4199; NAS 1.60:2892) Avail: NTIS HC A03/MF A01 CSCL 09B

GAUSSIAN ELIMINATION, MATRICES (MATHEMATICS), MICROCOMPUTERS, MULTIPROCESSING (COMPUTERS), PARALLEL PROGRAMMING

N89-24815*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
THE FAULT TREE COMPILER (FTC): PROGRAM AND MATHEMATICS
(NASA-TP-2915; L-16529; NAS 1.60:2915) Avail: NTIS HC A03/MF A01 CSCL 09B

COMPUTER PROGRAMS, COMPUTER TECHNIQUES, FAULT TOLERANCE, FAULT TREES, PROBABILITY THEORY, RELIABILITY ANALYSIS

63 CYBERNETICS

Includes feedback and control theory, artificial intelligence, robotics and expert systems.

N89-26578*# National Aeronautics and Space Administration.
Goddard Space Flight Center, Greenbelt, MD.
THE 1989 GODDARD CONFERENCE ON SPACE APPLICATIONS OF ARTIFICIAL INTELLIGENCE
JAMES RASH, ed. Washington Apr. 1989 385 p Conference held in Greenbelt, MD, 16-17 May 1989
(NASA-CP-3033; REPT-89B00099; NAS 1.55:3033) Avail: NTIS HC A17/MF A01 CSCL 09B

ARTIFICIAL INTELLIGENCE, COMPUTER VISION, COMPUTERIZED SIMULATION, CONFERENCES, DATA MANAGEMENT, EXPERT SYSTEMS, FAILURE ANALYSIS, IMAGE PROCESSING, MISSION PLANNING

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N89-12316*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
THREE-DIMENSIONAL MULTIGRID ALGORITHMS FOR THE FLUX-SPLIT EULER EQUATIONS
W. KYLE ANDERSON, JAMES L. THOMAS, and DAVID L. WHITFIELD (Mississippi State Univ., Mississippi State.) Nov. 1988 41 p
(NASA-TP-2829; L-16416; NAS 1.60:2829) Avail: NTIS HC A03/MF A01 CSCL 12A

APPROXIMATION, COMPUTATIONAL FLUID DYNAMICS, EULER EQUATIONS OF MOTION, FLUX VECTOR SPLITTING, THREE DIMENSIONAL FLOW

N89-16415*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
EFFECT OF EPHEMERIS ERRORS ON THE ACCURACY OF THE COMPUTATION OF THE TANGENT POINT ALTITUDE OF A SOLAR SCANNING RAY AS MEASURED BY THE SAGE 1 AND 2 INSTRUMENTS
JAMES J. BUGLIA Washington, DC Feb. 1989 29 p
(NASA-TP-2866; L-16485; NAS 1.60:2866) Avail: NTIS HC A03/MF A01 CSCL 12A

ALTITUDE, APPROXIMATION, EPHEMERIDES, POSITION ERRORS, SAGE SATELLITE, SCANNING, SPACECRAFT ORBITS, SUN, TANGENTS

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N89-16437*# National Aeronautics and Space Administration.
Hugh L. Dryden Flight Research Facility, Edwards, CA.
USER'S MANUAL FOR INTERACTIVE LINEAR: A FORTRAN PROGRAM TO DERIVE LINEAR AIRCRAFT MODELS
ROBERT F. ANTONIEWICZ, EUGENE L. DUKE, and BRIAN P. PATTERSON Sep. 1988 126 p
(NASA-TP-2835; H-1443; NAS 1.60:2835) Avail: NTIS HC A07/MF A01 CSCL 12B

AIRCRAFT DESIGN, FORTRAN, INTERACTIVE CONTROL, LINEAR SYSTEMS, USER MANUALS (COMPUTER PROGRAMS)
67
THEORETICAL MATHEMATICS
Includes topology and number theory.

N89-14052*# National Aeronautics and Space Administration.
Goddard Space Flight Center, Greenbelt, MD.
AN ECONOMICAL SEMI-ANALYTICAL ORBIT THEORY FOR
MICRO-COMPUTER APPLICATIONS
(NASA-TP-2811; REPT-8603451; NAS 1.60:2811) Avail: NTIS
HC A03/MF A01 CSCL 12A
AERODYNAMIC DRAG, COMPUTER TECHNIQUES, ORBIT
CALCULATION, ORBIT PERTURBATION, ZONAL HARMONICS

70
PHYSICS (GENERAL)

N89-14053*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
A GENERAL FORMALISM FOR PHASE SPACE
CALCULATIONS
JOHN W. NORBURY, PHILIP A. DEUTCHMAN, LAWRENCE W.
TOWNSEND, and FRANCIS A. CUCINOTTA (Old Dominion Univ.,
Norfolk, Va.) Nov. 1988 23 p
(NSF PHY-84-12109)
(NASA-TP-2843; L-16463; NAS 1.60:2843) Avail: NTIS HC
A03/MF A01 CSCL 20C
GALACTIC COSMIC RAYS, NORMALITY, PHASE-SPACE
INTEGRAL

71
ACOUSTICS
Includes sound generation, transmission, and attenuation.

N89-25673*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
AIRFOIL SELF-NOISE AND PREDICTION
THOMAS F. BROOKS, D. STUART POPE (PRC Kentron, Inc.,
Hampton, VA.), and MICHAEL A. MARCOLINI Jul. 1989 145 p
(NSF PHY-84-11009)
(NASA-TP-2843; L-16463; NAS 1.60:2843) Avail: NTIS HC
A07/MF A01 CSCL 20A
A prediction method is developed for the self-generated noise
of an airfoil blade encountering smooth flow. The prediction
methods for the individual self-noise mechanisms are semiempirical
and are based on previous theoretical studies and data obtained
from tests of two- and three-dimensional airfoil blade sections.
The self-noise mechanisms are due to specific boundary-layer
phenomena, that is, the boundary-layer turbulence passing the
trailing edge, separated-boundary-layer and stalled flow over an
airfoil, vortex shedding due to laminar boundary layer instabilities,
vortex shedding from blunt trailing edges, and the turbulent vortex
flow existing near the tip of lifting blades. The predictions are
compared successfully with published data from three self-noise
studies of different airfoil shapes. An application of the prediction
method is reported for a large scale-model helicopter rotor, and
the predictions compared well with experimental broadband noise
measurements. A computer code of the method is given. Author

81
ADMINISTRATION AND MANAGEMENT
Includes management planning and research.

N89-12479*# National Aeronautics and Space Administration,
Washington, DC.
ISSUES IN NASA PROGRAM AND PROJECT MANAGEMENT
(NASA-SP-6101; NAS 1.21:6101) Avail: NTIS HC A04/MF A01
CSCL 05A
This collection of papers and resources on aerospace
management issues is inspired by a desire to benefit from the
lessons learned from past projects and programs. Inherent in the
NASA culture is a respect for divergent viewpoint's and innovative
ways of doing things. This publication presents a wide variety of
views and opinions. Good management is enhanced when program
and project managers examine the methods of veteran managers,
considering the lessons they have learned and reflected on their
own guiding principles. Author

N89-12479*# National Aeronautics and Space Administration,
Washington, DC.
ADMINISTRATION AND MANAGEMENT
Includes management planning and research.

N89-12479*# National Aeronautics and Space Administration,
Washington, DC.
ISSUES IN NASA PROGRAM AND PROJECT MANAGEMENT
(NASA-SP-6101; NAS 1.21:6101) Avail: NTIS HC A04/MF A01
CSCL 05A
This collection of papers and resources on aerospace
management issues is inspired by a desire to benefit from the
lessons learned from past projects and programs. Inherent in the
NASA culture is a respect for divergent viewpoint's and innovative
ways of doing things. This publication presents a wide variety of
views and opinions. Good management is enhanced when program
and project managers examine the methods of veteran managers,
considering the lessons they have learned and reflected on their
own guiding principles. Author

81
ADMINISTRATION AND MANAGEMENT
Includes management planning and research.

N89-12479*# National Aeronautics and Space Administration,
Washington, DC.
MANAGEMENT: A BIBLIOGRAPHY FOR NASA MANAGERS
Apr. 1989 188 p
(NASA-SP-7500(23); NAS 1.21:7500(23)) Avail: NTIS HC A09
CSCL 05A
This bibliography lists 822 reports, articles and other documents
introduced into the NASA Scientific and Technical Information

19
82 DOCUMENTATION AND INFORMATION SCIENCE

System in 1988. Items are selected and grouped according to their usefulness to the manager as manager. Citations are grouped into ten subject categories: human factors and personnel issues; management theory and techniques; industrial management and manufacturing; robotics and expert systems; computers and information management; research and development; economics, costs and markets; logistics and operations management; reliability and quality control; and legality, legislation, and policy. Author

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information management; information storage and retrieval technology; technical writing; graphic arts; and micrography.

N89-13301*# National Aeronautics and Space Administration, Washington, DC.
NASA THESAURUS. VOLUME 3: DEFINITIONS
Jul. 1988 148 p
(NASA-SP-7064-VOL-3; NAS 1.21:7064-VOL-3) Avail: NTIS HC A07 CSCL 05B
Publication of NASA Thesaurus definitions began with Supplement 1 to the 1985 NASA Thesaurus. The definitions given here represent the complete file of over 3,200 definitions, complimented by nearly 1,000 use references. Definitions of more common or general scientific terms are given a NASA slant if one exists. Certain terms are not defined as a matter of policy: common names, chemical elements, specific models of computers, and nontechnical terms. The NASA Thesaurus predates by a number of years the systematic effort to define terms, therefore not all Thesaurus terms have been defined. Nevertheless, definitions of older terms are continually being added. The following data are provided for each entry: term in uppercase/lowercase form, definition, source, and year the term (not the definition) was added to the NASA Thesaurus. The NASA History Office is the authority for capitalization in satellite and spacecraft names. Definitions with no source given were constructed by lexicographers at the NASA Scientific and Technical Information (STI) Facility who rely on the following sources for their information: experts in the field, literature searches from the NASA STI database, and specialized references. Author

N89-15779*# National Aeronautics and Space Administration, Washington, DC.
THE NASA SCIENTIFIC AND TECHNICAL INFORMATION SYSTEM: ITS SCOPE AND COVERAGE
Dec. 1988 216 p
(NASA-SP-7065; NAS 1.21:7065) Avail: NTIS HC A10/MF A01 CSCL 05B
A general description of the subject areas covered in the NASA scientific and technical information system is presented. In addition, it establishes subject-based selection criteria for guiding decisions related to the addition of new documents to the NASA collection. Author

N89-29264* National Aeronautics and Space Administration, Washington, DC.
PATENT ABSTRACTS BIBLIOGRAPHY: A CONTINUING BIBLIOGRAPHY. SECTION 2: INDEXES (SUPPLEMENT 35)
Jan. 1989 512 p
(NASA-SP-7039(35)-SECT-2; NAS 1.21:7039(35)-SECT-2) Avail: NTIS HC A22; NTIS standing order as PB89-911100, $29.00 domestic, $58.00 foreign CSCL 05B
A subject index is provided for over 4600 patents and patent applications for the period May 1969 through June 1989. Additional indexes list personal authors, corporate authors, contract numbers, NASA case numbers, U.S. patent class numbers, U.S. patent numbers, and NASA accession numbers. Author

88 SPACE SCIENCES (GENERAL)

N89-14188*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
REPORT OF THE IN SITU RESOURCES UTILIZATION WORKSHOP
LUNAR EXPLORATION, SPACE COMMERCIALIZATION, SPACE HABITATS, TECHNOLOGY ASSESSMENT

N89-14189*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
REMOTE SENSING IN POLARIZED LIGHT
CAMERAS, EARTH OBSERVATIONS (FROM SPACE), IMAGING TECHNIQUES, POLARIZATION (WAVES), RADIATIVE TRANSFER, SPACE SHUTTLE PAYLOADS

N89-14998*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
EXPERIMENTS IN PLANETARY AND RELATED SCIENCES AND THE SPACE STATION
ASTROPHYSICS, CONFERENCES, INTERSTELLAR CHEMISTRY, PARTICLE INTERACTIONS, ROBOTICS, SPACE STATION PAYLOADS, SPACEBORNE EXPERIMENTS

N89-15790*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
SPACE STATION INDUCED MONITORING
AEROSPACE ENVIRONMENTS, ENVIRONMENTAL MONITORING, SPACE STATIONS, SPACECRAFT CHARGING
ASTRONOMY

includes radio, gamma-ray, and infrared astronomy; and astrometry.

N89-11657*# National Aeronautics and Space Administration, Washington, DC.

O STARS AND WOLF-RAYET STARS

PETER S. CONTI, ANNE B. UNDERHILL, STUART JORDAN, ed., 1988 508 p Prepared in cooperation with Centre National de la Recherche Scientifique, Paris (France) (NASA-SP-497; NAS 1.21:497) Avail: SOD HC $24.00 as 033-000-01021-4; NTIS A01 CSCL 03A

Basic information is given about O and Wolf-Rayet stars indicating how these stars are defined and what their chief observable properties are. Part 2 of the volume discussed four related themes pertaining to the hottest and most luminous stars. Presented are: an observational overview of the spectroscopic classification and extrinsic properties of O and Wolf-Rayet stars; the intrinsic parameters of luminosity, effective temperature, mass, and composition of the stars, and a discussion of their viability; stellar wind properties; and the related issues concerning the effects of stellar radiation and wind on the immediate interstellar environment are presented. B.G.

N89-12513* National Aeronautics and Space Administration, Washington, DC.

ATLAS OF GALAXIES USEFUL FOR MEASURING THE COSMOLOGICAL DISTANCE SCALE

ALLAN SANDAGE and JOHN BEDKE (Space Telescope Science Inst., Baltimore, Md.) 1988 462 p Prepared for Computer Sciences Corp., Baltimore, Md. Prepared in cooperation with Johns Hopkins Univ., Baltimore, Md. (NASA-SP-496; NAS 1.21:496; LC-88-600056) Avail: NTIS HC A20; also available SOD HC $80.00 as 033-000-01020-6 CSCL 03A

A critical first step in determining distances to galaxies is to measure some property of primary objects such as stars of specific types, H II regions, and supernovae remnants that are resolved out of the general galactic star content. With the completion of the Mount Wilson/Palomar/Las Campanas survey of bright galaxies in 1985, excellent large-scale photographs of the complete Shapley-Ames sample were on hand. Most of the galaxies useful for distance scale calibration are in this collection. This atlas contains photographs of 322 galaxies including the majority of all Shapley-Ames bright galaxies, plus cluster members in the Virgo environment are presented. B.G.

N89-13310*# National Aeronautics and Space Administration, Ames Research Center, Moffett Field, CA.

SECOND WORKSHOP ON IMPROVEMENTS TO PHOTOMETRY


ASTRONOMICAL PHOTOMETRY, CONFERENCES, FIBER OPTICS, PHOTOMETERS

N89-13330*# National Aeronautics and Space Administration, Washington, DC.

INFRARED OBSERVATIONS OF COMETS HALLEY AND WILSON AND PROPERTIES OF THE GRAINS


COMETARY ATMOSPHERES, COSMIC DUST, HALLEY'S COMET, INFRARED SPECTRA

N89-15810*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

FUTURE ASTRONOMICAL OBSERVATORIES ON THE MOON


ASTRONOMICAL OBSERVATORIES, LUNAR BASES, LUNAR OBSERVATORIES, RADIO ASTRONOMY, RADIO TELESCOPES

90 ASTROPHYSICS

Includes cosmology; celestial mechanics; space plasmas; and interstellar and interplanetary gases and dust.

N89-14194*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

INFRARED ASTRONOMICAL SATELLITE (IRAS) CATALOGS AND ATLASES. VOLUME 1: EXPLANATORY SUPPLEMENT


The Infrared Astronomical Satellite (IRAS) was launched on January 26, 1983. During its 300-day mission, IRAS surveyed over 96 pct of the celestial sphere at four infrared wavelengths, centered approximately at 12, 25, 60, and 100 microns. Volume 1 describes the instrument, the mission, and data reduction. Author

N89-14195*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

INFRARED ASTRONOMICAL SATELLITE (IRAS) CATALOGS AND ATLASES. VOLUME 5: THE POINT SOURCE CATALOG DECLINATION RANGE -30 DEG GREATER THAN DELTA GREATER THAN -50 DEG


The Infrared Astronomical Satellite (IRAS) was launched January 26, 1983. During its 300-day mission, IRAS surveyed over 96 pct of the celestial sphere at four infrared wavelengths, centered approximately at 12, 25, 60, and 100 microns. This is Volume 5, The Point Source Catalog Declination Range -30 deg greater than delta greater than -50 deg.
The Infrared Astronomical Satellite (IRAS) was launched January 26, 1983. During its 300-day mission, it surveyed over 96 percent of the celestial sphere at four infrared wavelengths, centered approximately at 12, 25, 60, and 100 microns. This is Volume 4, The Point Source Catalog Declination Range 0 deg greater than delta greater than -30 deg. Author

The Infrared Astronomical Satellite (IRAS) was launched January 26, 1983. During its 300-day mission, IRAS surveyed over 96 percent of the celestial sphere at four infrared wavelengths, centered approximately at 12, 25, 60, and 100 microns. This is Volume 3, The Point Source Catalog Declination Range 30 deg greater than delta greater than 0 deg. Author

The Infrared Astronomical Satellite (IRAS) was launched January 26, 1983. During its 300-day mission, IRAS surveyed over 96 percent of the celestial sphere at four infrared wavelengths, centered approximately at 12, 25, 60, and 100 microns. This is Volume 2, The Point Source Catalog Declination Range 90 deg greater than delta greater than 30 deg. Author

The Infrared Astronomical Satellite (IRAS) was launched January 26, 1983. During its 300-day mission, IRAS surveyed over 96 percent of the celestial sphere at four infrared wavelengths, centered approximately at 12, 25, 60, and 100 microns. This is Volume 1, The Point Source Catalog Declination Range 120 deg greater than delta greater than 90 deg. Author

The Infrared Astronomical Satellite (IRAS) was launched January 26, 1983. During its 300-day mission, IRAS surveyed over 96 percent of the celestial sphere at four infrared wavelengths, centered approximately at 12, 25, 60, and 100 microns. This is Volume 7, The Small Scale Structure Catalog. Author

The Cassini Orbiter and Titan Probe model payloads include a number of infrared and microwave instruments. This document describes: (1) the fundamental scientific objectives for Saturn and Titan which can be addressed by infrared and microwave instrumentation, (2) the instrument requirements and the accompanying instruments, and (3) the synergism resulting from the comprehensive coverage of the total infrared and microwave spectrum by the complement of individual instruments. The baseline consists of four instruments on the orbiter and two on the Titan
probe. The orbiter infrared instruments are: (1) a microwave spectrometer and radiometer; (2) a far to mid-infrared spectrometer; (3) a pressure modulation gas correlation spectrometer, and (4) a near-infrared grating spectrometer. The two Titan probe infrared instruments are: (1) a near-infrared instrument, and (2) a tunable diode laser infrared absorption spectrometer and nephelometer.

**SPACE RADIATION**

Includes cosmic radiation; and inner and outer earth's radiation belts.

**N89-14210** National Aeronautics and Space Administration, Langley Research Center, Hampton, VA.

**SOLAR-FLARE SHIELDING WITH REGOLITH AT A LUNAR-BASE SITE**

JOHN E. NEALY, JOHN W. WILSON, and LAWRENCE W. TOWNSEND Dec. 1988 21 p (NASA-TP-2869; L-16468; NAS 1.60:2869) Avail: NTIS HC A03/MF A01 CSCL 03B

LUNAR BASES, LUNAR SURFACE, RADIATION DOSAGE, RADIATION SHIELDING, SOLAR FLARES

**N89-16714** National Aeronautics and Space Administration, Langley Research Center, Hampton, VA.

**BENCHMARK SOLUTIONS FOR THE GALACTIC ION TRANSPORT EQUATIONS: ENERGY AND SPATIALLY DEPENDENT PROBLEMS**

BARRY D. GANAPOL (Arizona Univ., Tucson.), LAWRENCE W. TOWNSEND, and JOHN W. WILSON Washington, DC March 1989 84 p (NASA-TP-2887; L-16519; NAS 1.60:2887) Avail: NTIS HC A03/MF A01 CSCL 03B

EQUATIONS OF MOTION, GALACTIC RADIATION, HEAVY IONS, ION BEAMS, IONIC MOBILITY, RADIATION HAZARDS, TRANSPORT THEORY

**N89-17562** National Aeronautics and Space Administration, Langley Research Center, Hampton, VA.

**BRYNTRN: A BARYON TRANSPORT MODEL**


BARYONS, COMPUTER PROGRAMS, DATA BASES, ENERGY TRANSFER, TRANSPORT PROPERTIES

**N89-25103** National Aeronautics and Space Administration, Langley Research Center, Hampton, VA.

**KAON-NUCLEUS SCATTERING**

BYUNGSIK HONG, KIM MAUNG MAUNG, JOHN W. WILSON, and WARREN W. BUCK (Hampton Inst., VA.) 1989 30 p (NASA-TP-2920; L-16583; NAS 1.60:2920) Avail: NTIS HC A03/MF A01 CSCL 03A

ABSORPTION CROSS SECTIONS, EIKONAL EQUATION, KAONS, MESON-NUCLEON INTERACTIONS, NUCLEAR SCATTERING, NUCLEONS, PARTICLE COLLISIONS, PARTICLE INTERACTIONS, PROTON SCATTERING, SCATTERING CROSS SECTIONS, SCHROEDINGER EQUATION

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**SOLAR PHYSICS**

Includes solar activity, solar flares, solar radiation and sunspots.

**N89-30151** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, MD.

**NIMBUS-7 ERB SOLAR ANALYSIS TAPE (ESAT) USER'S GUIDE**


SOLAR PHYSICS includes solar activity, solar flares, solar radiation and sunspots.

**92**

**SPACE RADIATION**

Includes cosmic radiation; and inner and outer earth's radiation belts.

**93**

93 SPACE RADIATION
WHERE NO MAN HAS GONE BEFORE: A HISTORY OF APOLLO LUNAR EXPLORATION MISSIONS
WILLIAM DAVID COMPTON  1988  420 p  Original contains color illustrations
(NASA-SP-4214; NAS 1.21:4214)  Avail: NTIS HC A18/MF A01
CSCL 05D
This book is a narrative account of the development of the science program for the Apollo lunar landing missions. It focuses on the interaction between scientific interests and operational considerations in such matters as landing site selection and training of crews, quarantine and back contamination control, and presentation of results from scientific investigations. Scientific exploration of the moon on later flights, Apollo 12 through Apollo 17 is emphasized.

ASTRONAUTICS AND AERONAUTICS, 1985: A CHRONOLOGY
BETTE R. JANSON Mar. 1988  545 p
(NASA-SP-4025; NAS 1.21:4025; LC-65-60308)  Avail: NTIS HC A23/MF A01; also available SOD HC $22.00 as 033-000-01022-2
CSCL 05B
This book is part of a series of annual chronologies of significant events in the fields of astronautics and aeronautics. Events covered are international as well as national, in political as well as scientific and technical areas. This series is an important reference work used by historians, NASA personnel, government agencies, and congressional staffs, as well as the media.

(NASA-SP-4406; NAS 1.21:4406)  Avail: NTIS HC A08/MF A01
CSCL 05D
This edition brings up to date the history of U.S. agencies for space exploration, the NACA and NASA, from 1915 through 1990. Early aviation and aeronautics research are described, with particular emphasis on the impact of the two world wars on aeronautics development and the postwar exploitation of those technologies. The reorganization and expansion of the NACA into NASA is described in detail as well as NASA's relationship with industry, the university system, and international space agencies such as the ESA. The dramatic space race of the 1950 and 1960s is recounted through a detailed history of the Gemini and Apollo programs and followed by a discussion of the many valuable social/scientific application of aeronautics technologies, many of which were realized through the launching of successful satellite projects. The further solar system explorations of the Voyager missions are described, as is the Challenger tragedy and the 1988 return to space of the Shuttle program. Future plans are outlined for a cooperatively funded international space station to foster the ongoing study of space science.
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