

NASA Scientific and Technical Publications

A Catalog
of

*Special Publications,
Reference Publications,
Conference Publications, and
Technical Papers*

1989

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1989



National Aeronautics and Space Administration
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Washington, DC

1990

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PREFACE

The pursuit of human knowledge through scientific research and technical endeavor has vastly expanded understanding of our world and the universe we live in. The contributions of NASA through scientific and technical research and development affect not only our understanding and use of aeronautics and space but also touch our daily lives. Geologists, oceanographers, meteorologists, archaeologists, aircraft engineers, aerospace decision makers, land-use planners, historians, and rescue teams all make use of the results of NASA's research. The findings of this research and development are published in NASA's scientific and technical report series as a part of NASA's mandate to disseminate the results of the agency's far-reaching work.

This catalog provides a list of NASA publications from four report series entered into the NASA scientific and technical information database during accession year 1989. For previous lists, see *Records of Achievement: NASA Special Publications*, NASA SP-470 (accession number N83-33792), *NASA Scientific and Technical Publications: A Catalog of Special Publications, Reference Publications, Conference Publications, and Technical Papers, 1977-1986*, NASA SP-7063(01) (accession number N87-30218). Supplements 02 and 03 of this catalog list NASA publications announced in 1987 and 1988, respectively.

Two semimonthly abstract journals cover all aspects of aeronautics and space research, NASA and non-NASA, nationally and worldwide. *STAR (Scientific and Technical Aerospace Reports)*, focuses on scientific and technical reports, and *IAA (International Aerospace Abstracts)*, covers the open literature. These are available by subscription from, respectively, the U.S. Government Printing Office and the American Institute of Aeronautics and Astronautics, Inc., (see page vi).

This catalog includes publicly available reports from four NASA report series: Special Publications (SPs), Reference Publications (RPs), Conference Publications (CPs), and Technical Papers (TPs). The scope of each series is defined as follows:

Special Publications are often concerned with subjects of substantial public interest. They report scientific and technical information derived from NASA programs for audiences of diverse technical backgrounds.

Reference Publications contain compilations of scientific and technical data of continuing reference value.

Conference Publications record the proceedings of scientific and technical symposia and other professional meetings sponsored or cosponsored by NASA.

Technical Papers present the results of significant research conducted by NASA scientists and engineers.

Presented here are citations for reports from each of these series. An explanation of the elements in a typical citation follows. Accession numbers (N numbers) at the end of a citation are separate citations to articles within the report. Please use *STAR* to locate these citations.

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ACCESSION NUMBER → N89-26805*# National Aeronautics and Space Administration, ← CORPORATE SOURCE
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TITLE → ORDERS OF MAGNITUDE: A HISTORY OF THE NACA AND NASA, ← PUBLICATION DATE
1915-1990

AUTHORS → ROGER E. BILSTEIN Jul. 1989 171 p ERRATUM: Coauthored by
Frank W. Anderson, Jr.

REPORT NUMBERS → (NASA-SP-4406; NAS 1.21:4406) Avail: NTIS HC A08/MF A01 ← PRICE CODE

COSATI CODE → CSCL 05D ← AVAILABILITY SOURCE

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.

Author

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Marshall Space Flight Center, Huntsville, AL.

TITLE → PRACTICES IN ADEQUATE STRUCTURAL DESIGN ← PUBLICATION DATE

AUTHOR → ROBERT S. RYAN Jan. 1989 98 p

REPORT NUMBERS → (NASA-TP-2893; NAS 1.60:2893) Avail: NTIS HC A05/MF A01 ← PRICE CODE

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AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

01 AERONAUTICS (GENERAL) 1

02 AERODYNAMICS 1

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

For related information see also *34 Fluid Mechanics and Heat Transfer*.

03 AIR TRANSPORTATION AND SAFETY N.A.

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION 3

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

For related information see also *17 Space Communications*, *Spacecraft Communications*, *Command and Tracking* and *32 Communications and Radar*.

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE 3

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*. For land transportation vehicles see *85 Urban Technology and Transportation*.

06 AIRCRAFT INSTRUMENTATION 4

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

07 AIRCRAFT PROPULSION AND POWER 4

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and onboard auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power*, *28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

08 AIRCRAFT STABILITY AND CONTROL 4

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

For related information see also *05 Aircraft Design, Testing and Performance*.

09 RESEARCH AND SUPPORT FACILITIES (AIR) N.A.

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tubes; and aircraft engine test stands.

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

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*.

12 ASTRONAUTICS (GENERAL) 5

For extraterrestrial exploration see *91 Lunar and Planetary Exploration*.

13 ASTRODYNAMICS 5

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

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) 6

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)*.

15 LAUNCH VEHICLES AND SPACE VEHICLES 6

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

For related information see also *20 Spacecraft Propulsion and Power*.

16 SPACE TRANSPORTATION N.A.

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*.

17 SPACE COMMUNICATIONS, SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING N.A.

Includes telemetry; space communications networks; astronavigation 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 6
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 6
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.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

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 <i>45 Environment Pollution</i> .	
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 <i>93 Space Radiation</i> .	
74 OPTICS	N.A.
Includes light phenomena and optical devices.	
For lasers see <i>36 Lasers and Masers</i> .	
75 PLASMA PHYSICS	19
Includes magnetohydrodynamics and plasma fusion.	
For ionospheric plasmas see <i>46 Geophysics</i> . For space plasmas see <i>90 Astrophysics</i> .	
76 SOLID-STATE PHYSICS	N.A.
Includes superconductivity.	
For related information see also <i>33 Electronics and Electrical Engineering</i> and <i>36 Lasers and Masers</i> .	
77 THERMODYNAMICS AND STATISTICAL PHYSICS	N.A.
Includes quantum mechanics; theoretical physics; and Bose and Fermi statistics.	
For related information see also <i>25 Inorganic and Physical Chemistry</i> and <i>34 Fluid Mechanics and Heat Transfer</i> .	
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 <i>61 Computer Programming and Software</i> .	
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 <i>03 Air Transportation and Safety</i> , <i>16 Space Transportation</i> , and <i>44 Energy Production and Conversion</i> .	

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

90 ASTROPHYSICS	21
Includes cosmology; celestial mechanics; space plasmas; and interstellar and interplanetary gases and dust.	
For related information see also <i>75 Plasma Physics</i> .	

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

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

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

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
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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)

N89-19230*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
JOINT UNIVERSITY PROGRAM FOR AIR TRANSPORTATION RESEARCH, 1987

FREDERICK R. MORRELL, comp. Apr. 1989 118 p Presented at a conference held in Atlantic City, NJ, 14-15 Jan. 1988 (NASA-CP-3028; L-16547; NAS 1.55:3028) Avail: NTIS HC A06/MF A01 CSCL 01B

AVIONICS, COMPUTER TECHNIQUES, CONTROL THEORY, GUIDANCE (MOTION), SURFACE NAVIGATION

N89-22568*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

EVALUATION OF THE RIDE QUALITY OF A LIGHT TWIN ENGINE AIRPLANE USING A RIDE QUALITY METER

ERIC C. STEWART Jun. 1989 27 p (NASA-TP-2913; L-16524; NAS 1.60:2913) Avail: NTIS HC A03/MF A01 CSCL 01B

AIRCRAFT COMPARTMENTS, AIRCRAFT NOISE, NOISE TOLERANCE, SOUND TRANSMISSION, VIBRATION

N89-29304* National Aeronautics and Space Administration, Washington, DC.

AERONAUTICAL ENGINEERING: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 242)

Aug. 1989 132 p (NASA-SP-7037(242); NAS 1.21:7037(242)) Avail: NTIS HC A07; NTIS standing order as PB89-914100, \$10.50 domestic, \$21.00 foreign CSCL 01A

This bibliography lists 466 reports, articles, and other documents introduced into the NASA scientific and technical information system in July, 1989. Subject coverage includes: design, construction and testing of aircraft and aircraft engines; aircraft components, equipment and systems; ground support systems; and theoretical and applied aspects of aerodynamics and general fluid dynamics. Author

AERODYNAMICS

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

N89-10020*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

WEAK-WAVE ANALYSIS OF SHOCK INTERACTION WITH A SLIPSTREAM

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

N89-10024*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

VALIDATION OF A PAIR OF COMPUTER CODES FOR ESTIMATION AND OPTIMIZATION OF SUBSONIC AERODYNAMIC PERFORMANCE OF SIMPLE HINGED-FLAP SYSTEMS FOR THIN SWEEPED WINGS

HARRY W. CARLSON (PRC Systems Services Co., Hampton, Va.) and CHRISTINE M. DARDEN Washington Nov. 1988 118 p (NASA-TP-2828; L-16428; NAS 1.60:2828) Avail: NTIS HC A06/MF A01 CSCL 01A

AERODYNAMICS, COMPUTER PROGRAMS, FLAPPING HINGES, OPTIMIZATION, SUBSONIC FLOW, SWEEPED WINGS

N89-10844*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

THREE COMPONENT LASER ANEMOMETER MEASUREMENTS IN AN ANNULAR CASCADE OF CORE TURBINE VANES WITH CONTOURED END WALL

LOUIS J. GOLDMAN and RICHARD G. SEASHOLTZ Nov. 1988 44 p

(NASA-TP-2846; E-4183; NAS 1.60:2846) Avail: NTIS HC A03/MF A01 CSCL 20D

ANNULAR FLOW, CASCADE FLOW, FABRY-PEROT INTERFEROMETERS, FLOW MEASUREMENT, LASER ANEMOMETERS, STATOR BLADES, VELOCITY MEASUREMENT

N89-10849*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

THE 1987 GROUND VORTEX WORKSHOP

RICHARD J. MARGASON, ed. Feb. 1988 216 p Workshop held at Moffett Field, Calif., 22-23 Apr. 1987 (NASA-CP-10008; A-88008; NAS 1.55:10008) Avail: NTIS HC A10/MF A01 CSCL 01A

CONFERENCES, EXHAUST GASES, GROUND EFFECT (AERODYNAMICS), SHORT TAKEOFF AIRCRAFT, VERTICAL AIRCRAFT, VERTICAL TAKEOFF AIRCRAFT, VORTICES

N89-12543*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

A SPECTRAL COLLOCATION SOLUTION TO THE COMPRESSIBLE STABILITY EIGENVALUE PROBLEM

MICHELE G. MACARAEG, CRAIG L. STRETT, and M. YOUSUFF HUSSAINI Washington, D.C. Dec. 1988 42 p (NASA-TP-2858; L-16470; NAS 1.60:2858) Avail: NTIS HC A03/MF A01 CSCL 01A

BOUNDARY LAYER FLOW, COMPRESSIBLE FLOW, COMPUTATIONAL GRIDS, FLOW DISTRIBUTION, FLOW STABILITY, SHEAR FLOW

N89-14213*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

THRUST-REVERSER FLOW INVESTIGATION ON A TWIN-ENGINE TRANSPORT

02 AERODYNAMICS

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

N89-15888*# 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-16385; 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.
TIP AERODYNAMICS AND ACOUSTICS TEST: A REPORT AND DATA SURVEY
JEFFREY L. GROSS and MICHAEL E. WATTS Dec. 1988 463 p
(NASA-RP-1179; A-87128; NAS 1.61:1179) Avail: NTIS HC A20/MF A01 CSCL 01A

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.
TRANSONIC UNSTEADY AERODYNAMICS AND AEROELASTICITY 1987, PART 1
SAMUEL R. BLAND, comp. Washington, DC Feb. 1989 261 p Symposium held in Hampton, VA, 20-22 May 1987
(NASA-CP-3022-PT-1; L-16532-PT-1; NAS 1.55:3022-PT-1) Avail: NTIS HC A12/MF A01 CSCL 01A
AEROELASTICITY, AIRCRAFT CONFIGURATIONS, COMPUTATIONAL FLUID DYNAMICS, FLUTTER ANALYSIS, TRANSONIC FLOW, UNSTEADY AERODYNAMICS

N89-19247*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
TRANSONIC UNSTEADY AERODYNAMICS AND AEROELASTICITY 1987, PART 2
SAMUEL R. BLAND, comp. Washington, DC Feb. 1989 379 p Symposium held in Hampton, VA, 20-22 May 1987
(NASA-CP-3022-PT-2; L-16532-PT-2; NAS 1.55:3022-PT-2) Avail: NTIS HC A17/MF A01 CSCL 01A
AEROELASTICITY, AIRCRAFT STABILITY, FLOW DISTRIBUTION, TRANSONIC FLOW, UNSTEADY AERODYNAMICS, VISCOUS FLOW

N89-20925*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
TRANSONIC SYMPOSIUM: THEORY, APPLICATION, AND EXPERIMENT, VOLUME 1, PART 1
JEROME T. FOUGHNER, JR., comp. Mar. 1989 416 p Symposium held in Hampton, VA, 19-21 Apr. 1988; sponsored by NASA, Washington Original contains color illustrations
(NASA-CP-3020-VOL-1-PT-1; L-16501-VOL-1-PT-1; NAS 1.55:3020-VOL-1-PT-1) Avail: NTIS HC A18/MF A01 CSCL 01A
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.
TRANSONIC SYMPOSIUM: THEORY, APPLICATION, AND EXPERIMENT, VOLUME 1, PART 2
JEROME T. FOUGHNER, JR., comp. Mar. 1989 511 p Symposium held in Hampton, VA, 19-21 Apr. 1988; sponsored by NASA, Washington Original contains color illustrations
(NASA-CP-3020-VOL-1-PT-2; L-16501-VOL-1-PT-2; NAS 1.55:3020-VOL-1-PT-2) Avail: NTIS HC A22/MF A01 CSCL 01A
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.
STATUS OF SONIC BOOM METHODOLOGY AND UNDERSTANDING
CHRISTINE M. DARDEN, CLEMANS A. POWELL, WALLACE D. HAYES, ALBERT R. GEORGE, and ALLAN D. PIERCE (Pennsylvania State Univ., University Park.) Washington Jun. 1989 32 p Presented at the Sonic Boom Workshop, Hampton, VA, Jan. 1988
(NASA-CP-3027; L-16567; NAS 1.55:3027) Avail: NTIS HC A03/MF A01 CSCL 01A
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

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 SWEEP WING
CHRISTINE M. DARDEN Washington Aug. 1989 88 p
(NASA-TP-2918; L-16546; NAS 1.60:2918) Avail: NTIS HC A05/MF A01 CSCL 01A

DIHEDRAL ANGLE, LIFT DRAG RATIO, MILLING (MACHINING), SUPERSONIC SPEED, SURFACE ROUGHNESS EFFECTS, SWEEP WINGS

N89-25118*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

INTERACTIONS OF TOLLIEN-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, NON-LINEAR SYSTEMS, TOLLIEN-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 A05/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 SPLAY 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 A05/MF A01 CSCL 01A

DEFLECTORS, FLOW DEFLECTION, STATIC TESTS, THRUST REVERSER, 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 PILOTTED SIMULATION STUDY OF DATA LINK ATC MESSAGE EXCHANGE

MARVIN C. WALLER and GARY W. LOHR (Embry-Riddle Aeronautical Univ., Daytona Beach, FL.) 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.

SIMULATION EVALUATION OF TIMER, A TIME-BASED, TERMINAL AIR TRAFFIC, FLOW-MANAGEMENT CONCEPT
LEONARD CREDEUR and WILLIAM R. CAPRON (PRC Kentron, Inc., Hampton, VA.) Washington, DC Feb. 1989 69 p
(NASA-TP-2870; L-16386; 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

KEISUKE ASAI (National Aerospace Lab., Tokyo, Japan) Washington Jul. 1989 49 p
(NASA-RP-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

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

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.

Author

N89-25146*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

RECENT ADVANCES IN MULTIDISCIPLINARY ANALYSIS AND OPTIMIZATION, PART 1

JEAN-FRANCOIS M. BARTHELEMY, ed. Washington Apr. 1989 527 p Symposium held in Hampton, VA, 28-30 Sep. 1988; sponsored by NASA, Langley Research Center, NASA, LeResear Center, and Wright Research Development Center (NASA-CP-3031-PT-1; L-16568-PT-1; NAS 1.55:3031-PT-1) Avail: NTIS HC A23/MF A01 CSCL 01C

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

JEAN-FRANCOIS M. BARTHELEMY, ed. Washington Apr. 1989 501 p Symposium held in Hampton, VA, 28-30 Sep. 1988; sponsored by NASA, Langley Research Center, NASA, Lewis Research Center, and Wright Research Development Center (NASA-CP-3031-PT-2; L-16568-PT-2; NAS 1.55:3031-PT-2) Avail: NTIS HC A22/MF A01 CSCL 01C

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

JEAN-FRANCOIS M. BARTHELEMY, ed. Washington Apr. 1989 513 p Symposium held in Hampton, VA, 28-30 Sep. 1988; sponsored by NASA, Langley Research Center, NASA, Lewis Research Center, and Wright Research Development Center (NASA-CP-3031-PT-3; L-16568-PT-3; NAS 1.55:3031-PT-3) Avail: NTIS HC A22/MF A01 CSCL 01C

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

E. NISSIM (Technion - Israel Inst. of Tech., Haifa) and GLENN B. GILYARD Washington Jun. 1989 44 p Previously announced in IAA as A89-30801 (NASA-TP-2923; H-1510; NAS 1.60:2923) Avail: NTIS HC A03/MF A01 CSCL 01C

AEROELASTICITY, DYNAMIC PRESSURE, FLIGHT TESTS, FLUTTER, PARAMETER IDENTIFICATION

06

AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

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.

DAVID A. HINTON Washington, DC Mar. 1989 57 p Sponsored in part by FAA, Washington, DC (NASA-TP-2886; L-16498; NAS 1.60:2886; DOT/FAA/DS-89/06) Avail: NTIS HC A04/MF A01 CSCL 01D

FLIGHT HAZARDS, FLIGHT SIMULATION, MICROBURSTS (METEOROLOGY), PILOT PERFORMANCE, WIND SHEAR

07

AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and onboard auxiliary power plants for aircraft.

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

At the direction of Congress, a task force headed by NASA was organized in 1975 to identify potential fuel saving concepts for aviation. The result was the Aircraft Energy Efficiency (ACEE) Program implemented in 1976. An important part of the program was the development of advanced turboprop technology for Mach 0.65 to 0.85 applications having the potential fuel saving of 30 to 50 percent relative to existing turbofan engines. A historical perspective is presented of the development and the accomplishments that brought the turboprop to successful flight tests in 1986 and 1987.

Author

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

DESINENI S. NAIDU (Old Dominion Univ., Norfolk, Va.) and DOUGLAS B. PRICE Washington, D.C. Dec. 1988 30 p (NASA-TP-2844; L-16440; NAS 1.60:2844) Avail: NTIS HC A03/MF A01 CSCL 01C

DIGITAL SYSTEMS, FLIGHT CONTROL, OPTIMAL CONTROL, PERTURBATION THEORY

N89-15123*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, CA.

DERIVATION AND DEFINITION OF A LINEAR AIRCRAFT MODEL

EUGENE L. DUKE, ROBERT F. ANTONIEWICZ, and KEITH D. KRAMBEER Aug. 1988 106 p
(NASA-RP-1207; H-1391; NAS 1.61:1207) Avail: NTIS HC A06/MF A01 CSCL 01C

A linear aircraft model for a rigid aircraft of constant mass flying over a flat, nonrotating earth is derived and defined. The derivation makes no assumptions of reference trajectory or vehicle symmetry. The linear system equations are derived and evaluated along a general trajectory and include both aircraft dynamics and observation variables. Author

N89-15929*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Facility, Edwards, CA.

FLIGHT CONTROL SYSTEMS DEVELOPMENT AND FLIGHT TEST EXPERIENCE WITH THE HIMAT RESEARCH VEHICLES

ROBERT W. KEMPEL and MICHAEL R. EARLS Jun. 1988 88 p

(NASA-TP-2822; H-1428; NAS 1.60:2822) Avail: NTIS HC A05/MF A01 CSCL 01C

DIGITAL SYSTEMS, FLIGHT CONTROL, FLIGHT TESTS, HIGHLY MANEUVERABLE AIRCRAFT, REMOTELY PILOTED VEHICLES, RESEARCH AIRCRAFT, SCALE MODELS

N89-15930*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Facility, Edwards, CA.

A PILOTED EVALUATION OF AN OBLIQUE-WING RESEARCH AIRCRAFT MOTION SIMULATION WITH DECOUPLING CONTROL LAWS

ROBERT W. KEMPEL, WALTER E. MCNEILL, GLENN B. GILYARD, and TRINDEL A. MAINE Nov. 1988 52 p

(NASA-TP-2874; H-1430; NAS 1.60:2874) Avail: NTIS HC A04/MF A01 CSCL 01C

DECOUPLING, EVALUATION, FLIGHT SIMULATION, FLIGHT TESTS, OBLIQUE WINGS, PILOT PERFORMANCE

N89-16845*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

MODAL CONTROL OF AN OBLIQUE WING AIRCRAFT

JAMES D. PHILLIPS Jan. 1989 49 p
(NASA-TP-2898; A-88250; NAS 1.60:2898) Avail: NTIS HC A03/MF A01 CSCL 01C

FLIGHT CONTROL, MODAL RESPONSE, OBLIQUE WINGS, RESEARCH AIRCRAFT

N89-19309*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

INTEGRATED TOOLS FOR CONTROL-SYSTEM ANALYSIS

AARON J. OSTROFF, MELISSA S. PROFFITT, and DAVID R. CLARK (Planning Research Corp., Hampton, VA.) Washington

NASA Mar. 1989 61 p
(NASA-TP-2885; L-16482; NAS 1.60:2885) Avail: NTIS HC A04/MF A01 CSCL 01C

ACTUATORS, COMPUTER PROGRAMS, CONTROL SYSTEMS DESIGN, CONTROLLERS, LINEAR SYSTEMS, SOFTWARE TOOLS, SYSTEMS ANALYSIS

N89-23468*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

A CLOSED-FORM TRIM SOLUTION YIELDING MINIMUM TRIM DRAG FOR AIRPLANES WITH MULTIPLE LONGITUDINAL-CONTROL EFFECTORS

KENNETH H. GOODRICH, STEVEN M. SLIWA, and FREDERICK J. LALLMAN Washington May 1989 30 p

(NASA-TP-2907; L-16484; NAS 1.60:2907) Avail: NTIS HC A03/MF A01 CSCL 01C

AERODYNAMIC BALANCE, 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
(NASA-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
(NASA-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

12

ASTRONAUTICS (GENERAL)

N89-10902*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

THE 1988 GET AWAY SPECIAL EXPERIMENTER'S SYMPOSIUM

LAWRENCE R. THOMAS, ed. and FRANCES L. MOSIER, ed. (RMS Technologies, Inc., Landover, Md.) Sep. 1988 127 p
Symposium held in Cocoa Beach, Fla., 27-30 Sep. 1988
Sponsored by NASA, Washington

(NASA-CP-3008; REPT-88-158; NAS 1.55:3008) Avail: NTIS HC A07/MF A01 CSCL 22A

CONFERENCES, GET AWAY SPECIALS (STS), SPACE SHUTTLE PAYLOADS, SPACEBORNE EXPERIMENTS

N89-11760*# National Aeronautics and Space Administration, Washington, DC.

TECHNOLOGY FOR FUTURE NASA MISSIONS: CIVIL SPACE TECHNOLOGY INITIATIVE (CSTI) AND PATHFINDER

Sep. 1988 550 p Conference held in Washington, D.C., 12-13 Sep. 1988; sponsored in part by NASA and AIAA

(NASA-CP-3016; NAS 1.55:3016) Avail: NTIS HC A23/MF A01 CSCL 22A

AEROASSIST, CONFERENCES, NASA PROGRAMS, ORBIT TRANSFER VEHICLES, SPACEBORNE EXPERIMENTS, SPACECRAFT CONSTRUCTION MATERIALS, SPACECRAFT INSTRUMENTS, SPACECRAFT POWER SUPPLIES, SPACECRAFT PROPULSION

13

ASTRODYNAMICS

Includes powered 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

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Symposium held in Greenbelt, MD, 10-11 May 1988
(NASA-CP-3011; REPT-88B0224; NAS 1.55:3011) Avail: NTIS
HC A99/MF A01 CSCL 22A

ESTIMATES, FLIGHT MECHANICS, ORBITAL MECHANICS,
SPACECRAFT PERFORMANCE

14

GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

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

N89-28545*# National Aeronautics and Space Administration.
Lewis Research Center, Cleveland, OH.

DIGITALLY MODULATED BIT ERROR RATE MEASUREMENT SYSTEM FOR MICROWAVE COMPONENT EVALUATION

MARY JO W. SHALKHAUSER and JAMES M. BUDINGER
Washington Jul. 1989 20 p

(NASA-TP-2912; E-4456; NAS 1.60:2912) Avail: NTIS HC
A03/MF A01 CSCL 14B

BIT ERROR RATE, COMMUNICATION SATELLITES, DATA
TRANSMISSION, DIGITAL DATA, MICROWAVE EQUIPMENT,
MODULATION, TIME DIVISION MULTIPLE ACCESS

15

LAUNCH VEHICLES AND SPACE VEHICLES

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

N89-18504*# National Aeronautics and Space Administration.
Marshall Space Flight Center, Huntsville, AL.

PRACTICES IN ADEQUATE STRUCTURAL DESIGN

ROBERT S. RYAN Jan. 1989 98 p
(NASA-TP-2893; NAS 1.60:2893) Avail: NTIS HC A05/MF A01
CSCL 22B

FLIGHT SAFETY, MANAGEMENT METHODS, PROJECT
MANAGEMENT, REQUIREMENTS, SPACE SHUTTLES, STRESS
ANALYSIS, STRUCTURAL DESIGN

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.

N89-12580*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.

LIGHTWEIGHT STRUCTURAL DESIGN OF A BOLTED CASE JOINT FOR THE SPACE SHUTTLE SOLID ROCKET MOTOR

JOHN T. DORSEY, PETER A. STEIN (Coast Guard, Yorktown,
Va.), and HAROLD G. BUSH Washington, D.C. Nov. 1988
24 p

(NASA-TP-2851; L-16496; NAS 1.60:2851) Avail: NTIS HC
A03/MF A01 CSCL 22B

BOLTED JOINTS, ROCKET ENGINE CASES, SPACE SHUTTLE
MAIN ENGINE, STRUCTURAL ANALYSIS

N89-12582*# National Aeronautics and Space Administration.
Goddard Space Flight Center, Greenbelt, MD.

FIFTEENTH SPACE SIMULATION CONFERENCE: SUPPORT THE HIGHWAY TO SPACE THROUGH TESTING

JOSEPH STECHER, ed. 1988 492 p Conference held in
Williamsburg, Va., 31 Oct. - 3 Nov. 1988; sponsored by NASA,
Inst. of Environmental Sciences, AIAA, and the American Society
for Testing and Materials

(NASA-CP-3015; REPT-88B0253; NAS 1.55:3015) Avail: NTIS
HC A21/MF A01 CSCL 22B

COMMUNICATION SATELLITES, CONFERENCES, HEAT
TRANSFER, RADIATION DAMAGE, SOLAR SIMULATORS,
SPACE ENVIRONMENT SIMULATION, SPACE SIMULATORS,
SPACE STATIONS, SPACECRAFT CONTAMINATION, THERMAL
CONTROL COATINGS

N89-18522* National Aeronautics and Space Administration,
Washington, DC.

SPACE STATION SYSTEMS: A BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 7)

Dec. 1988 289 p

(NASA-SP-7056(07); NAS 1.21:7056(07)) Avail: NTIS HC A13
CSCL 22B

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

N89-26037* National Aeronautics and Space Administration,
Washington, DC.

TECHNOLOGY FOR LARGE SPACE SYSTEMS: A BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 20)

Jun. 1989 183 p

(NASA-SP-7046(20); NAS 1.21:7046(20)) Avail: NTIS HC A09
CSCL 22B

This bibliography lists 694 reports, articles, and other documents
introduced into the NASA Scientific and Technical Information
System between July, 1988 and December, 1988. Its purpose is
to provide helpful information to the researcher or manager
engaged in the development of technologies related to large space
systems. Subject areas include mission and program definition,
design techniques, structural and thermal analysis, structural
dynamics and control systems, electronics, advanced materials,
assembly concepts, and propulsion. Author

20

SPACECRAFT PROPULSION AND POWER

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

N89-12626*# National Aeronautics and Space Administration.
Marshall Space Flight Center, Huntsville, AL.

ADVANCED EARTH-TO-ORBIT PROPULSION TECHNOLOGY 1986, VOLUME 2

R. J. RICHMOND, ed. and S. T. WU, ed. (Alabama Univ.,
Huntsville.) Oct. 1986 775 p Conference held in Huntsville,
Ala., 13-15 May 1986

(NASA-CP-2437-VOL-2; M-541-VOL-2; NAS 1.55:2437-VOL-2)

Avail: NTIS HC A99/MF E03 CSCL 21H

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/MF A01 CSCL 21H

CALORIMETERS, COMBUSTION CHAMBERS, HIGH PRESSURE, KEROSENE, LIQUID OXYGEN, RP-1 ROCKET PROPELLANTS

23

CHEMISTRY AND MATERIALS (GENERAL)

N89-23528*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

NASA/SDIO SPACE ENVIRONMENTAL EFFECTS ON MATERIALS WORKSHOP, PART 1

LOUIS A. TEICHMAN, comp. and BLAND A. STEIN, comp. Washington May 1989 356 p Workshop held in Hampton, VA, 28 Jun. - 1 Jul. 1988

(NASA-CP-3035-PT-1; L-16575-PT-1; NAS 1.55:3035-PT-1)

Avail: NTIS HC A16/MF A01 CSCL 11G

CONFERENCES, EARTH ORBITAL ENVIRONMENTS, MICROMETEORIODS, OXYGEN ATOMS, RADIATION EFFECTS, SPACE DEBRIS, SPACECRAFT CHARGING, SPACECRAFT CONTAMINATION

N89-23547*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

NASA/SDIO SPACE ENVIRONMENTAL EFFECTS ON MATERIALS WORKSHOP, PART 2

LOUIS A. TEICHMAN, comp. and BLAND A. STEIN, comp. Washington May 1989 253 p Workshop held in Hampton, VA, 28 Jun. - 1 Jul. 1988

(NASA-CP-3035-PT-2; L-16575-PT-2; NAS 1.55:3035-PT-2)

Avail: NTIS HC A12/MF A01 CSCL 11G

EXTRATERRESTRIAL ENVIRONMENTS, MICRO-METEORIODS, OXYGEN ATOMS, RADIATION EFFECTS, THERMAL RADIATION

24

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 COMMERCIALY 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/MF A01 CSCL 11D

COMPOSITE MATERIALS, EARTH ORBITAL ENVIRONMENTS, FIBER COMPOSITES, RADIATION EFFECTS, SPACE ENVIRONMENT SIMULATION

N89-27796*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

TUNGSTEN FIBER REINFORCED COPPER MATRIX COMPOSITES: A REVIEW

DAVID L. MCDANELS Sep. 1989 24 p
(NASA-TP-2924; E-4318; NAS 1.60:2924) Avail: NTIS HC A03/MF A01 CSCL 11D

COPPER, FIBER COMPOSITES, METAL MATRIX COMPOSITES, STRESS-STRAIN RELATIONSHIPS, TUNGSTEN

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/MF A01 CSCL 11B

CRYSTAL DISLOCATIONS, DOPED CRYSTALS, FRACTURE STRENGTH, HARDNESS, PLASTIC PROPERTIES, SILICON, SINGLE CRYSTALS, TRANSITION TEMPERATURE

N89-17650*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

SECONDARY ELECTRON EMISSION CHARACTERISTICS OF UNTREATED AND ION-TEXTURED TITANIUM

ARTHUR N. CURREN, KENNETH A. JENSEN, and GARY A. BLACKFORD (Case Western Reserve Univ., Cleveland, OH.) Mar. 1989 16 p

(NASA-TP-2902; E-4495; NAS 1.60:2902) Avail: NTIS HC

A03/MF A01 CSCL 11F

ELECTRON EMISSION, ION PLATING, MACHINING, SECONDARY EMISSION, SURFACE FINISHING, TITANIUM

N89-19406*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

AN ELECTROCHEMICAL STUDY OF CORROSION PROTECTION BY PRIMER-TOPCOAT SYSTEMS ON 4130 STEEL WITH AC IMPEDANCE AND DC METHODS

M. J. MENDREK, R. H. HIGGINS, and M. D. DANFORD May 1988 56 p

(NASA-TP-2820; NAS 1.60:2820) Avail: NTIS HC A04/MF A01

CSCL 11F

ALTERNATING CURRENT, DIRECT CURRENT, ELECTROCHEMICAL CORROSION, IMPEDANCE, METAL SURFACES, PRIMERS (COATINGS), PROTECTIVE COATINGS, STAINLESS STEELS

N89-26976*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

STRESS CORROSION STUDY OF PH13-8MO STAINLESS STEEL USING THE SLOW STRAIN RATE TECHNIQUE

PABLO D. TORRES Washington Jul. 1989 32 p
(NASA-TP-2934; NAS 1.60:2934) Avail: NTIS HC A03/MF A01 CSCL 11F

AGING (METALLURGY), SALT SPRAY TESTS, STAINLESS STEELS, STRAIN RATE, STRESS CORROSION CRACKING

27 NONMETALLIC MATERIALS

27

NONMETALLIC MATERIALS

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

N89-13642*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

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

N89-21103*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

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

SHIGEYUKI MORI (National Academy of Sciences - National Research Council, Washington, DC.) 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

N89-25332*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

ABSORBED DOSE THRESHOLDS AND ABSORBED DOSE RATE LIMITATIONS FOR STUDIES OF ELECTRON RADIATION EFFECTS ON POLYETHERIMIDES

EDWARD R. LONG, JR., SHEILA ANN T. LONG, STEPHANIE L. GRAY, and WILLIAM D. COLLINS (Old Dominion Univ., Norfolk, VA.) Washington Aug. 1989 22 p

(NASA-TP-2928; L-16585; NAS 1.60:2928) Avail: NTIS HC A03/MF A01 CSCL 11C

ELECTRON RADIATION, POLYETHER RESINS, POLYIMIDE RESINS, RADIATION ABSORPTION, RADIATION DOSAGE, RADIATION EFFECTS

N89-26091*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

REACTION OF PERFLUOROALKYLPOLYETHERS (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

29

MATERIALS PROCESSING

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

N89-17682*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

MICROGRAVITY COMBUSTION DIAGNOSTICS WORKSHOP
GILBERT J. SANTORO, ed., PAUL S. GREENBERG, ed., and NANCY D. PILTCH, ed. 1988 47 p Workshop held in Cleveland, OH, 28-29 Jul. 1987

(NASA-CP-10017; E-4213; NAS 1.55:10017) Avail: NTIS HC A03/MF A01 CSCL 22A-

COMBUSTION PHYSICS, CONFERENCES, DIAGNOSIS, REDUCED GRAVITY

31

ENGINEERING (GENERAL)

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

N89-24507*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

FURTHER DEVELOPMENTS IN MODELING DIGITAL CONTROL SYSTEMS WITH MA-PREFILTERED MEASUREMENTS

MICHAEL E. POLITES Washington Mar. 1989 20 p (NASA-TP-2909; M-612; NAS 1.60:2909) Avail: NTIS HC A03/MF A01 CSCL 13B

ACCELEROMETERS, CONTROL SYSTEMS DESIGN, DIGITAL FILTERS, DIGITAL SYSTEMS, GYROSCOPES, STAR TRACKERS

N89-27039*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

A NEW STATE RECONSTRUCTOR FOR DIGITAL CONTROLS SYSTEMS USING WEIGHTED-AVERAGE MEASUREMENTS

MICHAEL E. POLITES Washington Aug. 1989 17 p (NASA-TP-2936; M-615; NAS 1.60:2936) Avail: NTIS HC A03/MF A01 CSCL 09B

CONTROL SYSTEMS DESIGN, DIGITAL TECHNIQUES, RECONSTRUCTION, STATE ESTIMATION

32

COMMUNICATIONS AND RADAR

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

N89-17060*# Westinghouse Electric Corp., Baltimore, MD.

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-1082(04); NAS 1.61:1082(04)) Avail: NTIS HC A23/MF A01 CSCL 20N

The NASA Propagation Effects Handbook for Satellite Systems Design provides a systematic compilation of the major propagation effects experienced on space-Earth paths in the 10 to 100 GHz

FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; 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

RAND DECKER, ed. and CHARLES F. SCHAFER, ed. Jul. 1988 191 p Workshop was held in Huntsville, Ala., 25-26 Feb. 1988; sponsored by NASA, Marshall Space Flight Center, Huntsville, Ala. and USRA, Huntsville, Ala. Sponsored by NASA, Washington, D.C.

(NASA-CP-3006; M-591; NAS 1.55:3006) Avail: NTIS HC A09/MF A01 CSCL 20D

COMBUSTION PHYSICS, CONFERENCES, FLUID DYNAMICS, FUEL COMBUSTION, LAMINAR FLOW, MIXING, MULTIPHASE FLOW, PROPULSION, TURBULENT FLOW

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

L. ROANE HUNT Washington, D.C. Dec. 1988 85 p (NASA-TP-2855; L-16460; NAS 1.60:2855) Avail: NTIS HC

A05/MF A01 CSCL 20D

AERODYNAMIC HEATING, DYNAMIC PRESSURE, ELEVONS, HYPERSONIC FLIGHT, SPLIT FLAPS

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. GNOFFO, ROOP N. GUPTA (Scientific Research and Technology, Inc., Hampton, VA.), and JUDY L. SHINN Washington, DC Feb. 1989 62 p

(NASA-TP-2867; L-16477; NAS 1.60:2867) Avail: NTIS HC A04/MF A01 CSCL 20D

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

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

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

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

VALERIE J. LYONS and CARMEN M. GRACIA-SALCEDO (Army Aviation Systems Command, Cleveland, OH.) Feb. 1989 13 p (DA PROJ. 1L1-61102-AH-45)

(NASA-TP-2900; E-4446; NAS 1.60:2900; AVSCOM-TR-88-C-008; AD-A205373) Avail: NTIS HC A03/MF A01 CSCL 21/2

COMBUSTION TEMPERATURE, FLAME TEMPERATURE, GAS TEMPERATURE, INFRARED RADIOMETERS, PREMIXED

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

ROBERT R. ROMANOFSKY and KURT A. SHALKHAUSER Mar. 1989 42 p Presented at the 13th International Conference on Infrared and mm-Waves, Honolulu, Hawaii, 5-9 Dec. 1988 (NASA-TP-2875; E-3983; NAS 1.60:2875) Avail: NTIS HC

A03/MF A01 CSCL 09C

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-2904; E-4361; NAS 1.60:2904) 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

FLAMES, RADIATION PYROMETERS, SOOT, TEMPERATURE MEASUREMENT

N89-26184*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
WORKSHOP ON TWO-PHASE FLUID BEHAVIOR IN A SPACE ENVIRONMENT

THEODORE D. SWANSON, ed., AL JUHASZ, ed., W. RUSS LONG, ed. (National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.), and LAURA OTTENSTEIN, ed. 1989 45 p Workshop held in Ocean City, MD, 13-14 Jun. 1988

(NASA-CP-3043; REPT-89B00114; NAS 1.55:3043) Avail: NTIS HC A03/MF A01 CSCL 20D

AEROSPACE ENVIRONMENTS, FLUID MANAGEMENT, HEAT TRANSFER, LIQUID-VAPOR INTERFACES, TWO PHASE FLOW

N89-27116*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

A REVIEW OF HIGH-SPEED, CONVECTIVE, HEAT-TRANSFER COMPUTATION METHODS

MICHAEL E. TAUBER Washington Jul. 1989 38 p (NASA-TP-2914; A-89042; NAS 1.60:2914) Avail: NTIS HC A03/MF A01 CSCL 20D

AERODYNAMIC HEATING, COMPUTATION, CONVECTIVE HEAT TRANSFER, LAMINAR BOUNDARY LAYER, SEPARATED FLOW, SHOCK HEATING, TURBULENT BOUNDARY LAYER

35

INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

N89-13762*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

SPATIAL VISION PROCESSES: FROM THE OPTICAL IMAGE TO THE SYMBOLIC STRUCTURES OF CONTOUR INFORMATION

DANIEL J. JOBSON Nov. 1988 31 p Original contains color illustrations

(NASA-TP-2838; L-16479; NAS 1.60:2838) Avail: NTIS HC A03/MF A01 CSCL 14B

COMPUTER VISION, CONTOURS, EDGES, IMAGE PROCESSING, SPATIAL FILTERING, SYMBOLS, TEXTURES

N89-15380*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

TECHNIQUE FOR TEMPERATURE COMPENSATION OF EDDY-CURRENT PROXIMITY PROBES

ROBERT M. MASTERS Jan. 1989 10 p (NASA-TP-2880; E-4316; NAS 1.60:2880) Avail: NTIS HC A02/MF A01 CSCL 14B

EDDY CURRENTS, EVALUATION, PERFORMANCE TESTS, PROBES, PROXIMITY, TEMPERATURE COMPENSATION, TEMPERATURE MEASUREMENT, TURBOMACHINERY

N89-16139*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

RAMAN INTENSITY AS A PROBE OF CONCENTRATION NEAR A CRYSTAL GROWING IN SOLUTION

R. ALLEN WILKINSON Feb. 1989 12 p (NASA-TP-2865; E-4397; NAS 1.60:2865) Avail: NTIS HC A03/MF A01 CSCL 14B

CRYSTAL GROWTH, RAMAN SPECTRA, RAMAN SPECTROSCOPY, SOLUTIONS

N89-26209*# National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, VA.

MARA (MULTIMODE AIRBORNE RADAR ALTIMETER) SYSTEM DOCUMENTATION. VOLUME 1: MARA SYSTEM REQUIREMENTS DOCUMENT

C. L. PARSONS, ed. Jul. 1989 88 p (NASA-RP-1226; REPT-89-143; NAS 1.61:1226) Avail: NTIS HC A05/MF A01 CSCL 14B

The Multimode Airborne Radar Altimeter (MARA), a flexible airborne radar remote sensing facility developed by NASA's Goddard Space Flight Center, is discussed. This volume describes the scientific justification for the development of the instrument and the translation of these scientific requirements into instrument design goals. Values for key instrument parameters are derived to accommodate these goals, and simulations and analytical models are used to estimate the developed system's performance.

Author

36

LASERS AND MASERS

Includes parametric amplifiers.

N89-17855*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

ANALYSIS OF ND3+ :GLASS, SOLAR-PUMPED, HIGH-POWER LASER SYSTEMS

L. E. ZAPATA and M. D. WILLIAMS Feb. 1989 13 p (NASA-TP-2905; L-16085; NAS 1.60:2905) Avail: NTIS HC A03/MF A01 CSCL 20E

GLASS LASERS, HIGH POWER LASERS, NEODYMIUM LASERS, SOLAR COLLECTORS

37

MECHANICAL ENGINEERING

Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.

N89-21243*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

COMPARISON STUDY OF GEAR DYNAMIC COMPUTER PROGRAMS AT NASA LEWIS RESEARCH CENTER

JAMES J. ZAKRAJESEK Mar. 1989 31 p Prepared in cooperation with Army Aviation Research and Development Command, Cleveland, OH (DA PROJ. 1L1-62209-AH-76) (NASA-TP-2901; E-4144; NAS 1.60:2901; AVSCOM-TR-88-C-010) Avail: NTIS HC A03/MF A01 CSCL 13I

COMPUTER AIDED DESIGN, COMPUTER PROGRAMS, GEARS, MECHANICAL DRIVES

N89-22891*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

ROTORDYNAMIC INSTABILITY PROBLEMS IN HIGH-PERFORMANCE TURBOMACHINERY, 1988

Washington, DC Feb. 1989 454 p Workshop held in College Station, TX, 16-18 May 1988; sponsored by NASA, Lewis Research Center, Cleveland, OH, Texas A and M Univ., College Station, ARO, Durham, NC, and Aeropropulsion Lab., Wright-Patterson AFB, OH

(NASA-CP-3026; E-4227; NAS 1.55:3026) Avail: NTIS HC A20/MF A01 CSCL 13I

BEARINGS, COMPRESSORS, CONFERENCES, DAMPERS,

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

39

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), PYROTECHNICS, 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
AHMED K. NOOR and JEANNE M. PETERS (Joint Inst. for Advancement of Flight Sciences, Hampton, VA.) Washington, DC Jan. 1989 38 p Original contains color illustrations (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

N89-17298*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

TURBINE ENGINE HOT SECTION TECHNOLOGY, 1987
Oct. 1987 464 p Workshop held in Cleveland, OH, 20-21 Oct. 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

N89-17892*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

MEASURED AND PREDICTED ROOT-MEAN-SQUARE ERRORS IN SQUARE AND TRIANGULAR ANTENNA MESH FACETS
W. B. FICHTER Washington, DC Mar. 1989 17 p
(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
AHMED K. NOOR, JEANNE M. PETERS, and BYUNG-JIN MIN Feb. 1989 28 p Prepared in cooperation with Joint Inst. for Advancement of Flight Sciences, Hampton, VA
(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
AHMED K. NOOR and KYUN O. KIM 1989 26 p Prepared in cooperation with George Washington Univ., Hampton, VA and Joint Inst. for Advancement of Flight Sciences, Hampton, VA
(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

39 STRUCTURAL MECHANICS

Mar. 1989 400 p Colloquium held in San Antonio, TX, 24-28 Apr. 1989

(NASA-CP-3029; NAS 1.55:3029) Avail: NTIS HC A17/MF A01; also available from COSMIC, Athens, GA 30602 CSCL 20K
CONFERENCES, FINITE ELEMENT METHOD, NASTRAN, STRAIN ENERGY METHODS, STRUCTURAL ANALYSIS

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

THE 23RD AEROSPACE MECHANISMS SYMPOSIUM

Washington Mar. 1989 342 p Symposium held in Huntsville, AL, 3-5 May 1989; sponsored by NASA, Washington, California Inst. of Tech., Pasadena, and LMSC, Sunnyvale, CA
(NASA-CP-3032; M-611; NAS 1.55:3032) Avail: NTIS HC A15/MF A01 CSCL 20K

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

N89-24626*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

RESEARCH IN STRUCTURES, STRUCTURAL DYNAMICS AND MATERIALS, 1989

WILLIAM F. HUNTER, comp. and AHMED K. NOOR, comp. (George Washington Univ., Hampton, VA.) Apr. 1989 88 p Proceedings of the AIAA/ASME/ASCE/AHS/ASC 30th Structures, Structural Dynamics and Materials Conference, Mobile, AL, 3-5 Apr. 1989

(NASA-CP-10024; NAS 1.55:10024) Avail: NTIS HC A05/MF A01 CSCL 20K

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.

COMPUTATIONAL METHODS FOR STRUCTURAL MECHANICS AND DYNAMICS, PART 1

W. JEFFERSON STROUD, ed., JERROLD M. HOUSNER, ed., JOHN A. TANNER, ed., and ROBERT J. HAYDUK, ed. Washington May 1989 329 p Workshop held in Hampton, VA, 19-21 Jun. 1985

(NASA-CP-3034-PT-1; L-16560-PT-1; NAS 1.55:3034-PT-1) Avail: NTIS HC A15/MF A01 CSCL 20K

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

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

COMPUTATIONAL METHODS FOR STRUCTURAL MECHANICS AND DYNAMICS

W. JEFFERSON STROUD, ed., JERROLD M. HOUSNER, ed., JOHN A. TANNER, ed., and ROBERT J. HAYDUK, ed. Washington May 1989 256 p Workshop held in Hampton, VA, 19-21 Jun. 1985

(NASA-CP-3034-PT-2; L-16560-PT-2; NAS 1.55:3034-PT-2) Avail: NTIS HC A12/MF A01 CSCL 20K

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.

DERIVATION OF A TAPERED P-VERSION BEAM FINITE ELEMENT

HOWARD E. HINNANT (Army Aviation Systems Command, Hampton, VA.) Aug. 1989 45 p

(DA PROJ. 1L1-62211-A-47-AB)

(NASA-TP-2931; L-16577; NAS 1.60:2931; AVSCOM-TR-B-002) Avail: NTIS HC A03/MF A01 CSCL 20K

BEAMS, FINITE ELEMENT METHOD, MATHEMATICAL MODELS, TAPERING

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

WELD STRESSES BEYOND ELASTIC LIMIT: MATERIALS DISCONTINUITY

V. VERDERAIME Washington Aug. 1989 28 p

(NASA-TP-2935; NAS 1.60:2935) Avail: NTIS HC A03/MF A01 CSCL 20L

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

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

EVALUATION OF A STRAIN-GAGE LOAD CALIBRATION ON A LOW-ASPECT-RATIO WING STRUCTURE AT ELEVATED TEMPERATURE

LAWRENCE F. REARDON Jun. 1989 39 p

(NASA-TP-2921; H-1331; NAS 1.60:2921) Avail: NTIS HC A03/MF A01 CSCL 20K

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.

NASA WORKSHOP ON COMPUTATIONAL STRUCTURAL MECHANICS 1987, PART 1

NANCY P. SYKES, ed. (Analytical Services and Materials, Inc., Hampton, VA.) Feb. 1989 383 p Workshop held in Hampton, VA, 18-20 Nov. 1987; sponsored by NASA, Langley Research Center, Hampton, VA, and NASA, Lewis Research Center, Cleveland, OH

(NASA-CP-10012-PT-1; NAS 1.55:10012-PT-1) Avail: NTIS HC A17/MF A01 CSCL 20K

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.

NASA WORKSHOP ON COMPUTATIONAL STRUCTURAL MECHANICS 1987, PART 2

NANCY P. SYKES, ed. (Analytical Services and Materials, Inc., Hampton, VA.) Feb. 1989 374 p Workshop held in Hampton, VA, 18-20 Nov. 1987; sponsored by NASA, Langley Research Center, Hampton, VA, and NASA, Lewis Research Center, Cleveland, OH

(NASA-CP-10012-PT-2; NAS 1.55:10012-PT-2) Avail: NTIS HC A16/MF A01 CSCL 20K

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.

NASA WORKSHOP ON COMPUTATIONAL STRUCTURAL MECHANICS 1987, PART 3

NANCY P. SYKES, ed. (Analytical Services and Materials, Inc., Hampton, VA.) Feb. 1989 419 p Workshop held in Hampton, VA, 18-20 Nov. 1987; sponsored by NASA, Langley Research Center, Hampton, VA, and NASA, Lewis Research Center, Cleveland, OH

(NASA-CP-10012-PT-3; NAS 1.55:10012-PT-3) Avail: NTIS HC A18/MF A01 CSCL 20K

COMPUTER TECHNIQUES, CONFERENCES, FINITE ELEMENT METHOD, LARGE SPACE STRUCTURES, SOFTWARE ENGINEERING, STRUCTURAL ANALYSIS

N89-29811*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

APPLICATION OF NEWTON'S METHOD TO THE POSTBUCKLING OF RINGS UNDER PRESSURE LOADINGS

GAYLEN A. THURSTON Oct. 1989 26 p
(NASA-TP-2941; L-16578; NAS 1.60:2941) Avail: NTIS HC A03/MF A01 CSCL 20K

BUCKLING, CYLINDRICAL SHELLS, DEFORMATION, LOADS (FORCES), NEWTON METHODS, RING STRUCTURES, STRUCTURAL FAILURE

(NASA-RP-1223; REPT-89B00167; NAS 1.61:1223) Avail: NTIS HC A05/MF A01 CSCL 04A

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

42

GEOSCIENCES (GENERAL)

N89-22152*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

NIMBUS-7 DATA PRODUCT SUMMARY

ARNOLD G. OAKES, DAESOO 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

(NAS5-29386)
(NASA-RP-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 Humidity 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

N89-26274*# National Aeronautics and Space Administration, Washington, DC.

PLANETARY GEOSCIENCES, 1988

MARIA T. ZUBER, ed., JEFF L. PLESCIA, ed., ODETTE B. JAMES, ed., and GLENN MACPHERSON, ed. (Smithsonian Institution, Washington, DC.) Aug. 1989 113 p Original contains color illustrations

(NASA-SP-498; NAS 1.21:498; LC-88-600456) Avail: NTIS HC A06/MF A01 CSCL 08G

Research topics within the NASA Planetary Geosciences Program are presented. Activity in the fields of planetary geology, geophysics, materials, and geochemistry is covered. The investigator's current research efforts, the importance of that work in understanding a particular planetary geoscience problem, the context of that research, and the broader planetary geoscience effort is described. As an example, theoretical modelling of the stability of water ice within the Martian regolith, the applicability of that work to understanding Martian volatiles in general, and the geologic history of Mars is discussed. Author

N89-26275*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

POLAR MICROWAVE BRIGHTNESS TEMPERATURES FROM NIMBUS-7 SMMR: TIME SERIES OF DAILY AND MONTHLY MAPS FROM 1978 TO 1987

JOSEFINO C. COMISO and H. JAY ZWALLY Jul. 1989 89 p
(NAS5-29386)

43

EARTH RESOURCES AND REMOTE SENSING

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

N89-10401*# National Aeronautics and Space Administration, Washington, DC.

SAPPING FEATURES OF THE COLORADO PLATEAU: A COMPARATIVE PLANETARY GEOLOGY FIELD GUIDE

ALAN D. HOWARD, ed., R. CRAIG KOCHER, ed., and HENRY E. HOLT, ed. (Geological Survey, Flagstaff, Ariz.) 1987 115 p Original contains color illustrations

(NSG-7572)
(NASA-SP-491; NAS 1.21:491; LC-87-15305) Avail: NTIS HC A06/MF A01; also available SOD HC \$6.00 as 003-000-01027-3 CSCL 08H

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. Author

N89-12114*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

LANDSAT-4 AND LANDSAT-5 MULTISPECTRAL SCANNER COHERENT NOISE CHARACTERIZATION AND REMOVAL

JAMES C. TILTON and WILLIAM L. ALFORD (Defense Mapping Agency, Washington, D.C.) Feb. 1988 46 p

(NASA-TP-2595-REV; NAS 1.60:2595-REV; REPT-86B0040) Avail: NTIS HC A03/MF A01 CSCL 08B

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

44 ENERGY PRODUCTION AND CONVERSION

(NASA-SP-7041(62); NAS 1.21:7041(62)) Avail: NTIS HC A07; NTIS standing order as PB89-903800, \$15.50 domestic, \$31.00 foreign CSCL 08B

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, geodesy and cartography, geology and mineral resources, hydrology and water management, data processing and distribution systems, instrumentation and sensors, and economic analysis.

Author

44

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-4708; 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

Washington Apr. 1989 362 p Conference held in Cleveland, OH, 19-21 Apr. 1988

(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

ARTHUR C. AIKIN May 1988 306 p Workshop held in Snowmass, CO, 9-13 May 1988; sponsored by NASA, NOAA, NSF, Chemical Mfgs. Association, WMO, and the United Nations Environment Program Sponsored by NASA, Washington, DC (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.

COMPILATION OF METHODS IN ORBITAL MECHANICS AND SOLAR GEOMETRY

JAMES J. BUGLIA Washington Oct. 1988 81 p (NASA-RP-1204; L-16451; NAS 1.61:1204) Avail: NTIS HC A05/MF A01 CSCL 04A

This paper contains a collection of computational algorithms for determining geocentric ephemerides of Earth satellites, useful for both mission planning and data reduction applications. Special emphasis is placed on the computation of sidereal time, and on the determination of the geocentric coordinate of the center of the Sun, all to the accuracy found in the Astronomical Almanac. The report is completely self-contained in that no requirement is placed on any external source of information, and hence, these methods are ideal for computer application.

Author

N89-25540*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

COMPARISON OF SATELLITE-DERIVED DYNAMICAL QUANTITIES FOR THE STRATOSPHERE OF THE SOUTHERN HEMISPHERE

THOMAS MILES, ed. and ALAN ONEILL, ed. Washington Jul. 1989 39 p Presented at the Workshop on the Middle Atmosphere in the Southern Hemisphere, Williamsburg, VA, 14-17 Apr. 1986; sponsored by NASA, Washington, DC (NASA-CP-3044; L-16593; NAS 1.55:3044) Avail: NTIS HC A03/MF A01 CSCL 04A

ATMOSPHERIC CIRCULATION, GEOPOTENTIAL HEIGHT, SATELLITE OBSERVATION, STRATOSPHERE, ZONAL FLOW (METEOROLOGY)

N89-26304*# Oxford Univ. (England). Dept. of Atmospheric Physics.

NIMBUS-7 STRATOSPHERIC AND MESOSPHERIC SOUNDER (SAMS) EXPERIMENT DATA USER'S GUIDE

F. W. TAYLOR, C. D. RODGERS, S. T. NUTTER, and N. OSLIK (ST Systems Corp., Lanham, MD.) Washington May 1989 149 p

(NAS5-28063) (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

N89-28969*# 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 ATMOS 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
(NAS7-918)
(NASA-RP-1224-VOL-2; JPL-400-370-VOL-2; NAS 1.61:1224-VOL-2; LC-89-600203) Avail: NTIS HC A99/MF E03 CSCL 04A

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. Author

47

METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N89-14634*# National Aeronautics and Space Administration, Washington, DC.

SUMMARY OF ALONG-TRACK DATA FROM THE EARTH RADIATION BUDGET SATELLITE FOR SEVERAL REPRESENTATIVE OCEAN REGIONS

DAVID R. BROOKS and MARTA A. FENN (Planning Research Corp., Hampton, Va.) Nov. 1988 216 p
(NASA-RP-1206; L-16449; NAS 1.61:1206) Avail: NTIS HC A10/MF A01 CSCL 04B

For several days in January and August 1985, the Earth Radiation Budget Satellite, a component of the Earth Radiation Budget Experiment (ERBE), was operated in an along-track scanning mode. A survey of radiance measurements taken in this mode is given for five ocean regions: the north and south Atlantic, the Arabian Sea, the western Pacific north of the Equator, and part of the Intertropical Convergence Zone. Each overflight contains information about the clear scene and three cloud categories: partly cloudy, mostly cloudy, and overcast. The data presented include the variation of longwave and shortwave radiance in each scene classification as a function of viewing zenith angle during each overflight of one of the five target regions. Several features of interest in the development of anisotropic models are evident, including the azimuthal dependence of shortwave radiance that is an essential feature of shortwave bidirectional models. The data also demonstrate that the scene classification algorithm employed by the ERBE results in scene classifications that are a function of viewing geometry. Author

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

C. C. CU, D. HAN, S. T. KIM (ST Systems Corp., Lanham, Md.), and P. GLOERSEN Oct. 1988 152 p
(NAS5-29386)
(NASA-RP-1210; REPT-88-181; NAS 1.61:1210) Avail: NTIS HC A08/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. Author

N89-17374*# 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

G. LOUIS SMITH, NATIVIDAD MANALO, JOHN T. SUTTLES, and IRA WALKER (Planning Research Corp., Hampton, VA.) Washington, DC Mar. 1989 26 p
(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. Author

N89-20587*# National Aeronautics and Space Administration, Langley Research Center, Hampton, VA.

ANGULAR RADIATION MODELS FOR EARTH-ATMOSPHERE SYSTEM. VOLUME 2: LONGWAVE RADIATION

J. T. SUTTLES, R. N. GREEN, G. L. SMITH, B. A. WIELICKI, I. J. WALKER, V. R. TAYLOR, and L. L. STOWE (National Oceanic and Atmospheric Administration, Washington, DC.) Apr. 1989 88 p
(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. Author

N89-20588*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

AN ASSESSMENT MODEL FOR ATMOSPHERIC COMPOSITION

MICHAEL J. PRATHER, ed. Jan. 1988 56 p Proceedings of a workshop held at NASA Goddard Inst. for Space Studies, New York, NY, 10-13 Jan. 1988

(NASA-CP-3023; REPT-89-31; NAS 1.55:3023) Avail: NTIS HC A04/MF A01 CSCL 04B

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

ARLIN J. KRUEGER, LANNING M. PENN, DAVID E. LARKO, SCOTT D. DOIRON, and PATRICIA T. GUIMARAES (ST Systems Corp., Vienna, VA.) Washington Jul. 1989 154 p

(NAS5-29373)

(NASA-RP-1227; REPT-89B00188; NAS 1.61:1227) Avail: NTIS HC A08/MF A01 CSCL 04B

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. Author

N89-28983*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

THE 1988 ANTARCTIC OZONE MONITORING NIMBUS-7 TOMS DATA ATLAS

ARLIN J. KRUEGER, LANNING M. PENN, DAVID E. LARKO, SCOTT D. DOIRON, and PATRICIA T. GUIMARAES (ST Systems Corp., Vienna, VA.) Aug. 1989 153 p

(NAS5-29375)

(NASA-RP-1225; REPT-89B00176; NAS 1.61:1225) Avail: NTIS HC A08/MF A01 CSCL 04B

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 1988 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 1988 ozone distribution to that of other years. Author

LIFE SCIENCES (GENERAL)

N89-17997*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

PROCEEDINGS OF A CONFERENCE ON CARDIOVASCULAR BIOINSTRUMENTATION

RODNEY W. BALLARD, CHARLES A. FULLER, RICHARD MAINS, and HERBERT J. FINGER Dec. 1988 71 p Conference held at Moffett Field, CA, 21-22 Jul. 1987

(NASA-CP-10022; A-88120; NAS 1.55:10022) Avail: NTIS HC A04/MF A01 CSCL 06C

BIOINSTRUMENTATION, 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

GUY FOGLEMAN, ed., JUDITH L. HUNTINGTON, ed. (Search for Extraterrestrial Intelligence Inst., Los Altos, CA.), DEBORAH E. SCHWARTZ, ed., and MARK L. FONDA, ed. Mar. 1989 38 p Presented at the Gas-Grain Simulation Facility Experiments Workshop, Sunnyvale, CA, 31 Aug. - 1 Sep. 1987; sponsored by the Exobiology Flight Program

(NASA-CP-10026-VOL-1; A-88256-VOL-1; NAS

1.55:10026-VOL-1) Avail: NTIS HC A03/MF A01 CSCL 06C

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

GUY FOGLEMAN, ed., JUDITH L. HUNTINGTON, ed. (Search for Extraterrestrial Intelligence Inst., Los Altos, CA.), DEBORAH E. SCHWARTZ, ed., and MARK L. FONDA, ed. Mar. 1989 199 p Presented at the Gas-Grain Simulation Facility Experiments Workshop, Sunnyvale, CA, 31 Aug. - 1 Sep. 1987; sponsored by the Exobiology Flight Program

(NASA-CP-10026-VOL-2; A-88256-VOL-2; NAS

1.55:10026-VOL-2) Avail: NTIS HC A09/MF A01 CSCL 06C

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.

EXO BIOLOGY AND FUTURE MARS MISSIONS

CHRISTOPHER P. MCKAY, ed. and WANDA DAVIS, L., ed. Washington Mar. 1989 73 p Workshop held in Sunnyvale, CA, Mar. 1988

(NASA-CP-10027; A-89098; NAS 1.55:10027) Avail: NTIS HC A04/MF A01 CSCL 03B

BIOLOGICAL EVOLUTION, CHEMICAL EVOLUTION, CONFERENCES, ECOLOGY, EXO BIOLOGY, 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.

N89-13898*# National Aeronautics and Space Administration, Ames Research Center, Moffett Field, CA.

REPORT OF THE 1ST PLANNING WORKSHOP FOR CELSS FLIGHT EXPERIMENTATION

JOHN W. TREMOR and ROBERT D. MACELROY 1988 28 p
Workshop held at Moffett Field, Calif., 23-24 Mar. 1987
(NASA-CP-10020; A-88265; NAS 1.55:10020) Avail: NTIS HC A03/MF A01 CSCL 05H

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

N89-18039*# National Aeronautics and Space Administration, Ames Research Center, Moffett Field, CA.

INTERACTIVE ORBITAL PROXIMITY OPERATIONS PLANNING SYSTEM

ARTHUR J. GRUNWALD and STEPHEN R. ELLIS Nov. 1988 48 p

(NASA-TP-2839; A-88091; NAS 1.60:2839) Avail: NTIS HC A03/MF A01 CSCL 05H

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

59

MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

N89-19817*# National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, TX.

SECOND ANNUAL WORKSHOP ON SPACE OPERATIONS AUTOMATION AND ROBOTICS (SOAR 1988)

SANDY GRIFFIN, ed./comp. Washington, DC Nov. 1988

61 COMPUTER PROGRAMMING AND SOFTWARE

517 p Workshop held in Dayton, OH, 20-23 Jul. 1988; sponsored by NASA, Johnson Space Flight Center, USAF, Washington, DC, and Wright State Univ., Dayton, OH
(NASA-CP-3019; S-585; NAS 1.55:3019) Avail: NTIS HC A22/MF A01 CSCL 12A

COMPUTER ASSISTED INSTRUCTION, COMPUTER TECHNIQUES, EXPERT SYSTEMS, HUMAN FACTORS ENGINEERING, INFORMATION SYSTEMS, KNOWLEDGE BASES (ARTIFICIAL INTELLIGENCE), ROBOTICS, SYSTEMS INTEGRATION, TELEOPERATORS

61

COMPUTER PROGRAMMING AND SOFTWARE

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

N89-11407*# National Aeronautics and Space Administration, Langley Research Center, Hampton, VA.

OEXP ANALYSIS TOOLS WORKSHOP

L. BERNARD GARRETT, ROBERT L. WRIGHT, DEBORAH BADI, and JOHN T. FINDLAY (Flight Mechanics and Control, Inc., Hampton, Va.) Aug. 1988 146 p Workshop held in Hampton, Va., 21-22 Jun. 1988 Sponsored by NASA, Washington, D.C.
(NASA-CP-10013; NAS 1.55:10013) Avail: NTIS HC A07/MF A01 CSCL 09B

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

N89-12237*# National Aeronautics and Space Administration, Langley Research Center, Hampton, VA.

ANALYSIS OF POSITRON LIFETIME SPECTRA IN POLYMERS

JAG J. SINGH, GERALD H. MALL (Computer Sciences Corp., Hampton, Va.), and DANNY R. SPRINKLE Dec. 1988 61 p
(NASA-TP-2853; L-16468; NAS 1.60:2853) Avail: NTIS HC A04/MF A01 CSCL 09B

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

N89-13994*# National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, AL.

THE ESTIMATION ERROR COVARIANCE MATRIX FOR THE IDEAL STATE RECONSTRUCTOR WITH MEASUREMENT NOISE

MICHAEL E. POLITES Dec. 1988 19 p
(NASA-TP-2881; NAS 1.60:2881) Avail: NTIS HC A03/MF A01 CSCL 09B

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

N89-15549*# National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, AL.

FOURTH CONFERENCE ON ARTIFICIAL INTELLIGENCE FOR SPACE APPLICATIONS

STEPHEN L. ODELL, comp., JUDITH S. DENTON, comp., and MARY VEREEN, comp. Oct. 1988 485 p Conference held in Huntsville, AL, 15-16 Nov. 1988; sponsored by NASA and Alabama Univ., Huntsville
(NASA-CP-3013; M-599; NAS 1.55:3013) Avail: NTIS HC A21/MF A01 CSCL 09B

AEROSPACE SCIENCES, ARTIFICIAL INTELLIGENCE, EXPERT SYSTEMS, ROBOTICS

N89-22332*# National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, MD.

PROCEEDINGS OF THE SCIENTIFIC DATA COMPRESSION WORKSHOP

H. K. RAMAPRIYAN, ed. Washington, DC Feb. 1989 448 p
Workshop held in Snowbird, UT, 3-5 May 1988; sponsored by

17

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

RICKY W. BUTLER and ANNA L. MARTENSEN (PRC Kentron,
Inc., Hampton, VA.) Washington Jul. 1989 40 p
(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

R. A. GORDON Washington, D.C. Mar. 1988 46 p
(NASA-TP-2811; REPT-86B0451; 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-84-11009)

(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
(NASA-RP-1218; L-16528; NAS 1.61:1218) 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

72

ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure, electron properties, and molecular spectra.

N89-30022*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

AUGER ELECTRON INTENSITY VARIATIONS IN OXYGEN-EXPOSED LARGE GRAIN POLYCRYSTALLINE SILVER

W. S. LEE, R. A. OUTLAW, G. B. HOFLUND, and M. R. DAVIDSON (Florida Univ., Gainesville.) 1989 18 p
(NASA-TP-2930; L-16579; NAS 1.60:2930) Avail: NTIS HC A03/MF A01 CSCL 20H

AUGER SPECTROSCOPY, CRYSTALLOGRAPHY, ELECTRON FLUX DENSITY, OXYGEN RECOMBINATION, POLYCRYSTALS, SILVER

75

PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

N89-14842*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

LUNAR HELIUM-3 AND FUSION POWER

Washington, DC Sep. 1988 234 p Workshop held in Cleveland, Ohio, 25-26 Apr. 1988

(NASA-CP-10018; E-4254; NAS 1.55:10018) Avail: NTIS HC A11/MF A01 CSCL 20I

HELIUM ISOTOPES, LUNAR SOIL, MINING, NUCLEAR FUSION, REGOLITH

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

FRANCIS T. HOBAN, ed. Oct. 1988 51 p
(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 viewpoints 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

N89-26766* National Aeronautics and Space Administration, Washington, DC.

MANAGEMENT: A BIBLIOGRAPHY FOR NASA MANAGERS

Apr. 1989 198 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

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

N89-25775*# National Aeronautics and Space Administration, Washington, DC.

NASA PATENT ABSTRACTS BIBLIOGRAPHY: A CONTINUING BIBLIOGRAPHY. SECTION 1: ABSTRACTS (SUPPLEMENT 35)

Jun. 1989 38 p

(NASA-SP-7039(35)-SECT-1; NAS 1.21:7039(35)-SECT-1) Avail: NTIS HC A03; NTIS standing order as PB89-911100, \$13.75 domestic, \$27.50 foreign CSCL 05B

Abstracts are provided for 58 patents and patent applications entered into the NASA scientific and technical information systems during the period January 1989 through June 1989. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or patent application. 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

KYLE FAIRCHILD, ed. and WENDELL W. MENDELL, ed. Nov. 1988 85 p Workshop held in Lake Buena Vista, Fla., 28-30 Jan. 1987; sponsored by NASA, DOE, Large Scale Programs Inst., United Technologies Corp., Kraft Foods and Disney Imagineering (NASA-CP-3017; S-581; NAS 1.55:3017) Avail: NTIS HC A05/MF A01 CSCL 03B

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

VICTOR S. WHITEHEAD and KINSELL L. COULSON (California Univ., Davis.) Oct. 1988 40 p Proceedings of Workshop held in Houston, Tex., 3-5 Nov. 1987 (NASA-CP-3014; S-577; NAS 1.55:3014) Avail: NTIS HC A03/MF A01 CSCL 05B

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

RONALD GREELEY, ed. (Arizona State Univ., Tempe.) and RICHARD J. WILLIAMS, ed. Washington, DC Nov. 1987 188 p Workshop held in Tempe, AZ, 15-16 Sep. 1986 (NCC9-14; NAS9-17023)

(NASA-CP-2494; S-566; NAS 1.55:2494) Avail: NTIS HC A09/MF A01 CSCL 03B

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

JAMES F. SPANN, ed. and MARSHA R. TORR, ed. Washington, DC Nov. 1988 85 p Conference held in Huntsville, AL, 10-11 May 1988 Sponsored by NASA, Washington (NASA-CP-3021; M-602; NAS 1.55:3021) Avail: NTIS HC A05/MF A01 CSCL 22B

AEROSPACE ENVIRONMENTS, ENVIRONMENTAL MONITORING, SPACE STATIONS, SPACECRAFT CHARGING

89

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., and RICHARD THOMAS, 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 efforts 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 Cluster core that might be usefully resolved by the Hubble Space Telescope (HST). Because of crowding and high background-disk surface brightness, the choice of field position is crucial for programs involving resolution of particular galaxies into stars. The purpose of this atlas is to facilitate this choice. Enough information is given herein (coordinates of the galaxy centers and the scale of the photography) to allow optimum placement of the HST wide-field planetary camera format of approximately 150 arc-seconds on a side. Author

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

SECOND WORKSHOP ON IMPROVEMENTS TO PHOTOMETRY WILLIAM J. BORUCKI, ed. Sep. 1988 314 p Workshop held in Gaithersburg, Md., 5-6 Oct. 1987; sponsored by NASA, Ames Research Center, Moffett Field, Calif. and NBS, Gaithersburg, Md. (NASA-CP-10015; A-88125; NAS 1.55:10015) Avail: NTIS HC A14/MF A01 CSCL 03A

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

MARTHA S. HANNER, ed. (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) Sep. 1988 200 p Workshop held at Ithaca, N.Y., 10-12 Aug. 1987

(NASA-CP-3004; NAS 1.55:3004) Avail: NTIS HC A09/MF A01 CSCL 03A

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

JACK O. BURNS, ed. (New Mexico Univ., Albuquerque.) and WENDELL W. MENDELL, ed. Washington, DC Mar. 1988 129 p Workshop held in Houston, TX, 10 Jan. 1986; sponsored by NASA, Johnson Space Flight Center, Houston, TX and American Astronomical Society, Washington, DC

(NASA-CP-2489; S-569; NAS 1.55:2489) Avail: NTIS HC A07/MF A01 CSCL 03A

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

C. A. BEICHMAN, ed., G. NEUGEBAUER, ed., H. J. HABING, ed., P. E. CLEGG, ed., and THOMAS J. CHESTER, ed. (California Inst. of Tech., Pasadena.) Washington, D.C. 1988 455 p Prepared in cooperation with Netherlands Agency for Aerospace Programs, Delft, and Science Research Council, London, United Kingdom Sponsored by NASA, Washington

(NASA-RP-1190-VOL-1; NAS 1.61:1190-VOL-1) Avail: NTIS HC A20/MF A01; also available SOD CSCL 03B

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

Washington, D.C. 1988 410 p Prepared in cooperation with Netherlands Agency for Aerospace Programs, Delft, and Science Research Council, London, United Kingdom Sponsored by NASA, Washington

(NASA-RP-1190-VOL-5; NAS 1.61:1190-VOL-5) Avail: NTIS HC A18/MF A01; also available SOD CSCL 03B

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. Author

90 ASTROPHYSICS

N89-14196*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

INFRARED ASTRONOMICAL SATELLITE (IRAS) CATALOGS AND ATLASES. VOLUME 4: THE POINT SOURCE CATALOG DECLINATION RANGE 0 DEG GREATER THAN DELTA GREATER THAN -30 DEG

Washington, D.C. 1988 596 p Prepared in cooperation with Netherlands Agency for Aerospace Programs, Delft, and Science Research Council, London, United Kingdom Sponsored by NASA, Washington

(NASA-RP-1190-VOL-4; NAS 1.61:1190-VOL-4) Avail: NTIS HC A25/MF A01; also available SOD CSCL 03B

The Infrared Astronomical Satellite (IRAS) was launched 26 January 1983. During its 300-day mission, it surveyed over 96 pct 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

N89-14197*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

INFRARED ASTRONOMICAL SATELLITE (IRAS) CATALOGS AND ATLASES. VOLUME 2: THE POINT SOURCE CATALOG DECLINATION RANGE 90 DEG GREATER THAN DELTA GREATER THAN 30 DEG

Washington, D.C. 1988 555 p Prepared in cooperation with Netherlands Agency for Aerospace Programs, Delft, and Science Research Council, London, United Kingdom Sponsored by NASA, Washington

(NASA-RP-1190-VOL-2; NAS 1.61:1190-VOL-2) Avail: NTIS HC A24/MF A01; also available SOD CSCL 03B

The Infrared Astronomical Satellite (IRAS) was launched January 26, 1983. During its 300-day mission, IRAS surveyed 96 pct 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

N89-14198*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

INFRARED ASTRONOMICAL SATELLITE (IRAS) CATALOGS AND ATLASES. VOLUME 6: THE POINT SOURCE CATALOG DECLINATION RANGE -50 DEG GREATER THAN DELTA GREATER THAN -90 DEG

Washington, D.C. 1988 473 p Prepared in cooperation with Netherlands Agency for Aerospace Programs, Delft, and Science Research Council, London, United Kingdom Sponsored by NASA, Washington

(NASA-RP-1190-VOL-6; NAS 1.61:1190-VOL-6) Avail: NTIS HC A20/MF A01; also available SOD CSCL 03B

The Infrared Astronomical Satellite (IRAS) was launched January 26, 1983. During its 300-day mission, it surveyed over 96 pct of the celestial sphere at four infrared wavelengths, centered approximately at 12, 25, 60, and 100 microns. This is Volume 6, The Point Source Catalog Declination Range -50 deg greater than delta greater than -90 deg. Author

N89-14199*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

INFRARED ASTRONOMICAL SATELLITE (IRAS) CATALOGS AND ATLASES. VOLUME 7: THE SMALL SCALE STRUCTURE CATALOG

GEORGE HELOU, ed. and D. W. WALKER, ed. Washington, D.C. 1988 348 p Prepared in cooperation with Netherlands Agency for Aerospace Programs, Delft, and Science Research Council, London, United Kingdom Sponsored by NASA, Washington

(NASA-RP-1190-VOL-7; NAS 1.61:1190-VOL-7) Avail: NTIS HC A15/MF A01; also available SOD CSCL 03B

The Infrared Astronomical Satellite (IRAS) was launched January 26, 1983. During its 300-day mission, it 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 the data reduction process. Volumes 2 through 6 present the observations of the approximately 245,000 individual point sources detected by IRAS; each volume gives sources within a specified range of declination. Volume 7 gives the observations of the approximately 16,000 sources spatially resolved by IRAS and smaller than 8'. This is Volume 7, The Small Scale Structure Catalog. Author

N89-14201*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

INFRARED ASTRONOMICAL SATELLITE (IRAS) CATALOGS AND ATLASES. VOLUME 3: THE POINT SOURCE CATALOG DECLINATION RANGE 30 DEG GREATER THAN DELTA GREATER THAN 0 DEG

Washington, D.C. 1988 493 p Prepared in cooperation with Netherlands Agency for Aerospace Programs, Delft, and Science Research Council, London, United Kingdom Sponsored by NASA, Washington

(NASA-RP-1190-VOL-3; NAS 1.61:1190-VOL-3) Avail: NTIS HC A21/MF A01; also available SOD CSCL 03B

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 3, The Point Source Catalog Declination Range 30 deg greater than delta greater than 0 deg. Author

N89-27612*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

COMMENTARY ON INTERSTELLAR MATTER ASSOCIATED WITH 18 OPEN CLUSTERS

DAVID LEISAWITZ Washington Sep. 1989 20 p Sponsored by National Research Council

(R033-87; NSF AST-81-6403; NSF AST-83-12332)

(NASA-RP-1229; REPT-89B00238; NAS 1.61:1229) Avail: NTIS HC A03/MF A01 CSCL 03B

Information supplementary to that contained in Section 4 of an article entitled, A CO Survey of Regions Around 34 Open Clusters, (Leisawitz, Bash, and Thaddeus) published in the Astrophysical Journal Supplement Series, Volume 70, Number 4, August 1989 is summarized. The information presented here, which describes the interstellar environments of young clusters and some cluster physical characteristics, comes from observations published in the astronomical literature and the author's carbon monoxide (CO) emission line survey, and may help clarify our understanding of the interaction of massive stars with the interstellar medium. Author

91

LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

N89-16709*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

THE CASSINI MISSION: INFRARED AND MICROWAVE SPECTROSCOPIC MEASUREMENTS

V. G. KUNDE Jan. 1989 127 p

(NASA-RP-1213; NAS 1.61:1213; REPT-89B0006) Avail: NTIS HC A07/MF A01 CSCL 03B

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.

Author

N89-18373*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

PROCEEDINGS OF THE POLAR PROCESSES ON MARS WORKSHOP

ROBERT M. HABERLE Dec. 1988 59 p Workshop held in Sunnyvale, CA, 12-13 May 1988 (NASA-CP-10021; A-89001; NAS 1.55:10021) Avail: NTIS HC A04/MF A01 CSCL 03B

CONFERENCES, MARS (PLANET), MARS ATMOSPHERE, POLAR REGIONS

N89-28474*# National Aeronautics and Space Administration, Washington, DC.

TIME-VARIABLE PHENOMENA IN THE JOVIAN SYSTEM

MICHAEL J. S. BELTON, ed., ROBERT A. WEST, ed. (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), JURGEN RAHE, ed., and MARGARITA PEREYDA 1989 406 p Workshop held in Flagstaff, AZ, 25-27 Aug. 1987 Original contains color illustrations

(NASA-SP-494; NAS 1.21:494; LC-88-25450) Avail: NTIS HC A18/MF A01 CSCL 03B

The current state of knowledge of dynamic processes in the Jovian system is assessed and summaries are provided of both theoretical and observational foundations upon which future research might be based. There are three sections: satellite phenomena and rings; magnetospheric phenomena, Io's torus, and aurorae; and atmospheric phenomena. Each chapter discusses time dependent theoretical framework for understanding and interpreting what is observed; others describe the evidence and nature of observed changes or their absence. A few chapters provide historical perspective and attempt to present a comprehensive synthesis of the current state of knowledge.

Author

92

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

EUGENE MAJOR, JOHN R. HICKEY, H. LEE KYLE, BRADLEY M. ALTON, and BRENDA J. VALLETTE (Research and Data Systems, Inc., Lanham, MD.) Nov. 1988 92 p (NASA-RP-1211; REPT-88-204; NAS 1.61:1211) Avail: NTIS HC A05/MF A01 CSCL 03B

Seven years and five months of Nimbus-7 Earth Radiation Budget (ERB) solar data are available on a single ERB Solar Analysis Tape (ESAT). The period covered is November 16, 1978 through March 31, 1986. The Nimbus-7 satellite performs approximately 14 orbits per day and the ERB solar telescope observes the sun once per orbit as the satellite crosses the southern terminator. The solar data were carefully calibrated and screened. Orbital and daily mean values are given for the total solar irradiance plus other spectral intervals (10 solar channels in all). In addition, selected solar activity indicators are included on the ESAT. The ESAT User's Guide is an update of the previous ESAT User's Guide (NASA TM 86143) and includes more detailed information on the solar data calibration, screening procedures,

updated solar data plots, and applications to solar variability. Details of the tape format, including source code to access ESAT, are included.

Author

93

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-16488; 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 Mar. 1989 31 p

(NASA-TP-2878; L-16519; NAS 1.60:2878) 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

JOHN W. WILSON, LAWRENCE W. TOWNSEND, JOHN E. NEALY, SANG Y. CHUN, B. S. HONG, WARREN W. BUCK, S. L. LAMKIN, BARRY D. GANAPOL, FERDOUS KHAN, and FRANCIS A. CUCINOTTA (Old Dominion Univ., Norfolk, VA.) Washington, DC Mar. 1989 84 p

(NASA-TP-2887; L-16512; NAS 1.60:2887) Avail: NTIS HC A05/MF A01 CSCL 03B

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, KHIN 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

GENERAL

N89-25946*# National Aeronautics and Space Administration, Washington, DC.

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.
Author

N89-26803*# National Aeronautics and Space Administration, Washington, DC.

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/MFA01; 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.
Author

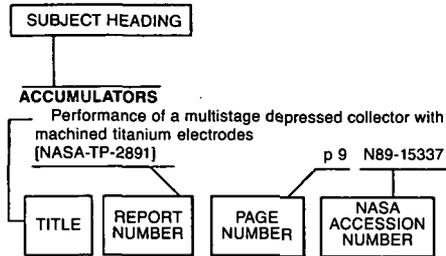
N89-26805*# National Aeronautics and Space Administration, Washington, DC.

ORDERS OF MAGNITUDE: A HISTORY OF THE NACA AND NASA, 1915-1990

ROGER E. BILSTEIN Jul. 1989 171 p ERRATUM: Coauthored by Frank W. Anderson, Jr.
(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.
Author

Typical Subject Index Listing



The subject heading is a key to the subject content of the document. The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of document content, a title extension is added, separated from the title by three hyphens. The (NASA or AIAA) accession number and the page number are included in each entry to assist the user in locating the abstract in the abstract section. If applicable, a report number is also included as an aid in identifying the document. Under any one subject heading, the accession numbers are arranged in sequence with the AIAA accession numbers appearing first.

A

A STARS

O stars and Wolf-Rayet stars
[NASA-SP-497] p 21 N89-11657

ABORTED MISSIONS

Simulator evaluation of a display for a Takeoff Performance Monitoring System
[NASA-TP-2908] p 5 N89-23469

ABSORPTION CROSS SECTIONS

Kaon-nucleus scattering
[NASA-TP-2920] p 23 N89-25103

ACCELEROMETERS

Further developments in modeling digital control systems with MA-prefiltered measurements
[NASA-TP-2909] p 8 N89-24507

ACCUMULATORS

Performance of a multistage depressed collector with machined titanium electrodes
[NASA-TP-2891] p 9 N89-15337

ACOUSTIC EMISSION

Research in structures, structural dynamics and materials, 1989
[NASA-CP-10024] p 12 N89-24626

ACOUSTIC MEASUREMENT

Tip aerodynamics and acoustics test: A report and data survey
[NASA-RP-1179] p 2 N89-17579

ACTIVE CONTROL

Control surface spanwise placement in active flutter suppression systems
[NASA-TP-2873] p 11 N89-16196

ACTUATORS

Integrated tools for control-system analysis
[NASA-TP-2885] p 5 N89-19309

AEROACOUSTICS

Airfoil self-noise and prediction
[NASA-RP-1218] p 19 N89-25673

AEROASSIST

Technology for Future NASA Missions: Civil Space Technology Initiative (CSTI) and Pathfinder
[NASA-CP-3016] p 5 N89-11760

AERODYNAMIC BALANCE

Drag measurements on a laminar-flow body of revolution in the 13-inch magnetic suspension and balance system
[NASA-TP-2895] p 2 N89-19232
A closed-form trim solution yielding minimum trim drag for airplanes with multiple longitudinal-control effectors
[NASA-TP-2907] p 5 N89-23468

AERODYNAMIC CHARACTERISTICS

Steady-state and transitional aerodynamic characteristics of a wing in simulated heavy rain
[NASA-TP-2932] p 3 N89-25951
A procedure for computing surface wave trajectories on an inhomogeneous surface
[NASA-TP-2929] p 3 N89-26811

AERODYNAMIC DRAG

An economical semi-analytical orbit theory for micro-computer applications
[NASA-TP-2811] p 19 N89-14052

AERODYNAMIC HEATING

Aerodynamic pressures and heating rates on surfaces between split elevons at Mach 6.6
[NASA-TP-2855] p 9 N89-12822
A review of high-speed, convective, heat-transfer computation methods
[NASA-TP-2914] p 10 N89-27116

AERODYNAMIC NOISE

Airfoil self-noise and prediction
[NASA-RP-1218] p 19 N89-25673

AERODYNAMIC STALLING

Steady-state and transitional aerodynamic characteristics of a wing in simulated heavy rain
[NASA-TP-2932] p 3 N89-25951

AERODYNAMICS

Validation of a pair of computer codes for estimation and optimization of subsonic aerodynamic performance of simple hinged-flap systems for thin swept wings
[NASA-TP-2828] p 1 N89-10024
Aeronautical engineering: A continuing bibliography with indexes (supplement 242)
[NASA-SP-7037(242)] p 1 N89-29304

AEROELASTICITY

Transonic Unsteady Aerodynamics and Aeroelasticity 1987, part 1
[NASA-CP-3022-PT-1] p 2 N89-19234
Transonic Unsteady Aerodynamics and Aeroelasticity 1987, part 2
[NASA-CP-3022-PT-2] p 2 N89-19247
Method for experimental determination of flutter speed by parameter identification
[NASA-TP-2923] p 4 N89-26844

AERONAUTICAL ENGINEERING

Aeronautical engineering: A continuing bibliography with indexes (supplement 242)
[NASA-SP-7037(242)] p 1 N89-29304

AERONAUTICS

Astronautics and aeronautics, 1985: A chronology
[NASA-SP-4025] p 24 N89-26803

AEROSOLS

Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
[NASA-CP-10026-VOL-1] p 16 N89-24022
Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 2: Abstracts, candidate experiments and feasibility study
[NASA-CP-10026-VOL-2] p 16 N89-24023

AEROSPACE ENGINEERING

NASA patent abstracts bibliography: A continuing bibliography. Section 1: Abstracts (supplement 35)
[NASA-SP-7039(35)-SECT-1] p 20 N89-25775
Patent abstracts bibliography: A continuing bibliography. Section 2: Indexes (supplement 35)
[NASA-SP-7039(35)-SECT-2] p 20 N89-29264

AEROSPACE ENVIRONMENTS

Space Station Induced Monitoring
[NASA-CP-3021] p 20 N89-15790

Workshop on Two-Phase Fluid Behavior in a Space Environment
[NASA-CP-3043] p 10 N89-26184

AEROSPACE MEDICINE

Aerospace medicine and biology: A continuing bibliography with indexes (supplement 327)
[NASA-SP-7011(327)] p 17 N89-29951

AEROSPACE SCIENCES

Fourth Conference on Artificial Intelligence for Space Applications
[NASA-CP-3013] p 17 N89-15549

AEROSPACE SYSTEMS

Space Electrochemical Research and Technology Conference: Abstracts
[NASA-CP-10029] p 14 N89-22982
The 23rd Aerospace Mechanisms Symposium
[NASA-CP-3032] p 12 N89-23892

AGING (METALLURGY)

Stress corrosion study of PH13-8Mo stainless steel using the Slow Strain Rate Technique
[NASA-TP-2934] p 7 N89-26976

AIR FLOW

Conservation equations and physical models for hypersonic air flows in thermal and chemical nonequilibrium
[NASA-TP-2867] p 9 N89-16115

AIR QUALITY

An assessment model for atmospheric composition
[NASA-CP-3023] p 16 N89-20588

AIR TRAFFIC CONTROL

A piloted simulation study of data link ATC message exchange
[NASA-TP-2859] p 3 N89-15900
Simulation evaluation of TIMER, a time-based, terminal air traffic, flow-management concept
[NASA-TP-2870] p 3 N89-15901

AIR WATER INTERACTIONS

Nimbus-7 data product summary
[NASA-RP-1215] p 13 N89-22152

AIRBORNE EQUIPMENT

MARA (Multimode Airborne Radar Altimeter) system documentation. Volume 1: MARA system requirements document
[NASA-RP-1226] p 10 N89-26209

AIRCRAFT COMPARTMENTS

Evaluation of the ride quality of a light twin engine airplane using a ride quality meter
[NASA-TP-2913] p 1 N89-22568

AIRCRAFT CONFIGURATIONS

Transonic Unsteady Aerodynamics and Aeroelasticity 1987, part 1
[NASA-CP-3022-PT-1] p 2 N89-19234
Evaluation of a strain-gage load calibration on a low-aspect-ratio wing structure at elevated temperature
[NASA-TP-2921] p 12 N89-28034

AIRCRAFT DESIGN

User's manual for interactive LINEAR: A FORTRAN program to derive linear aircraft models
[NASA-TP-2835] p 18 N89-16437
Transonic Symposium: Theory, Application, and Experiment, Volume 1, Part 1
[NASA-CP-3020-VOL-1-PT-1] p 2 N89-20925
A closed-form trim solution yielding minimum trim drag for airplanes with multiple longitudinal-control effectors
[NASA-TP-2907] p 5 N89-23468
Computational Methods for Structural Mechanics and Dynamics
[NASA-CP-3034-PT-2] p 12 N89-24654
Recent Advances in Multidisciplinary Analysis and Optimization, part 1
[NASA-CP-3031-PT-1] p 4 N89-25146
Recent Advances in Multidisciplinary Analysis and Optimization, part 2
[NASA-CP-3031-PT-2] p 4 N89-25173
Recent Advances in Multidisciplinary Analysis and Optimization, part 3
[NASA-CP-3031-PT-3] p 4 N89-25201

AIRCRAFT ENGINES
Turbine Engine Hot Section Technology, 1987
[NASA-CP-2493] p 11 N89-17298

SUBJECT

AIRCRAFT MODELS

- Derivation and definition of a linear aircraft model
[NASA-RP-1207] p 5 N89-15123
- AIRCRAFT NOISE**
Evaluation of the ride quality of a light twin engine airplane using a ride quality meter
[NASA-TP-2913] p 1 N89-22568
- AIRCRAFT PERFORMANCE**
Development and flight test experiences with a flight-critical digital control system
[NASA-TP-2857] p 5 N89-24327
- AIRCRAFT STABILITY**
Transonic Unsteady Aerodynamics and Aeroelasticity 1987, part 2
[NASA-CP-3022-PT-2] p 2 N89-19247
- AIRCRAFT STRUCTURES**
Evaluation of a strain-gage load calibration on a low-aspect-ratio wing structure at elevated temperature
[NASA-TP-2921] p 12 N89-28034
- AIRFOIL PROFILES**
Effect of advanced rotorcraft airfoil sections on the hover performance of a small-scale rotor model
[NASA-TP-2832] p 2 N89-24264
Airfoil self-noise and prediction
[NASA-RP-1218] p 19 N89-25673
- AIRFOILS**
Airfoil self-noise and prediction
[NASA-RP-1218] p 19 N89-25673
Steady-state and transitional aerodynamic characteristics of a wing in simulated heavy rain
[NASA-TP-2932] p 3 N89-25951
- ALGORITHMS**
Universal test fixture for monolithic mm-wave integrated circuits calibrated with an augmented TRD algorithm
[NASA-TP-2875] p 9 N89-17767
Nimbus-7 ERB Solar Analysis Tape (ESAT) user's guide
[NASA-RP-1211] p 23 N89-30151
- ALKYL COMPOUNDS**
Reaction of perfluoroalkylpolyethers (PFPE) with 440C steel in vacuum under sliding conditions at room temperature
[NASA-TP-2883] p 8 N89-26091
- ALL SKY PHOTOGRAPHY**
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 1: Explanatory supplement
[NASA-RP-1190-VOL-1] p 21 N89-14194
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 5: The point source catalog declination range -30 deg greater than delta greater than -50 deg
[NASA-RP-1190-VOL-5] p 21 N89-14195
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 4: The point source catalog declination range 0 deg greater than delta greater than -30 deg
[NASA-RP-1190-VOL-4] p 22 N89-14196
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 2: The point source catalog declination range 90 deg greater than delta greater than 30 deg
[NASA-RP-1190-VOL-2] p 22 N89-14197
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 6: The point source catalog declination range -50 deg greater than delta greater than -90 deg
[NASA-RP-1190-VOL-6] p 22 N89-14198
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 7: The small scale structure catalog
[NASA-RP-1190-VOL-7] p 22 N89-14199
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 3: The point source catalog declination range 30 deg greater than delta greater than 0 deg
[NASA-RP-1190-VOL-3] p 22 N89-14201
- ALTERNATING CURRENT**
An electrochemical study of corrosion protection by primer-topcoat systems on 4130 steel with ac impedance and dc methods
[NASA-TP-2820] p 7 N89-19406
- ALTITUDE**
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
[NASA-TP-2866] p 18 N89-16415
- ANNULAR FLOW**
Three component laser anemometer measurements in an annular cascade of core turbine vanes with contoured end wall
[NASA-TP-2846] p 1 N89-10844
- ANTARCTIC REGIONS**
Polar Ozone Workshop. Abstracts
[NASA-CP-10014] p 14 N89-14503
The 1988 Antarctic ozone monitoring Nimbus-7 TOMS data atlas
[NASA-RP-1225] p 16 N89-28983
- ANTENNA DESIGN**
Measured and predicted root-mean-square errors in square and triangular antenna mesh facets
[NASA-TP-2896] p 11 N89-17892

ANTENNA RADIATION PATTERNS

- Measured and predicted root-mean-square errors in square and triangular antenna mesh facets
[NASA-TP-2896] p 11 N89-17892
- APOLLO FLIGHTS**
Where no man has gone before: A history of Apollo lunar exploration missions
[NASA-SP-4214] p 24 N89-25946
- APOLLO PROJECT**
Where no man has gone before: A history of Apollo lunar exploration missions
[NASA-SP-4214] p 24 N89-25946
- APOLLO SPACECRAFT**
Where no man has gone before: A history of Apollo lunar exploration missions
[NASA-SP-4214] p 24 N89-25946
- APPROXIMATION**
Three-dimensional multigrid algorithms for the flux-split Euler equations
[NASA-TP-2829] p 18 N89-12316
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
[NASA-TP-2866] p 18 N89-16415
- ARCHITECTURE (COMPUTERS)**
NASA Workshop on Computational Structural Mechanics 1987, part 1
[NASA-CP-10012-PT-1] p 12 N89-29773
NASA Workshop on Computational Structural Mechanics 1987, part 2
[NASA-CP-10012-PT-2] p 12 N89-29789
- ARCTIC REGIONS**
The 1989 Airborne Arctic Stratospheric Expedition Nimbus-7 TOMS data atlas
[NASA-RP-1227] p 16 N89-27302
- ARTIFICIAL INTELLIGENCE**
Fourth Conference on Artificial Intelligence for Space Applications
[NASA-CP-3013] p 17 N89-15549
Recent Advances in Multidisciplinary Analysis and Optimization, part 2
[NASA-CP-3031-PT-2] p 4 N89-25173
The 1989 Goddard Conference on Space Applications of Artificial Intelligence
[NASA-CP-3033] p 18 N89-26578
- ARTIFICIAL SATELLITES**
Compilation of methods in orbital mechanics and solar geometry
[NASA-RP-1204] p 14 N89-10420
- ASTROMETRY**
Atlas of galaxies useful for measuring the cosmological distance scale
[NASA-SP-496] p 21 N89-12513
- ASTRONAUTICS**
Astronautics and aeronautics, 1985: A chronology
[NASA-SP-4025] p 24 N89-26803
- ASTRONOMICAL OBSERVATORIES**
Future Astronomical Observatories on the Moon
[NASA-CP-2489] p 21 N89-15810
- ASTRONOMICAL PHOTOGRAPHY**
Atlas of galaxies useful for measuring the cosmological distance scale
[NASA-SP-496] p 21 N89-12513
- ASTRONOMICAL PHOTOMETRY**
Second Workshop on Improvements to Photometry
[NASA-CP-10015] p 21 N89-13310
- ASTROPHYSICS**
Experiments in Planetary and Related Sciences and the Space Station
[NASA-CP-2494] p 20 N89-14998
- ATMOSPHERIC CHEMISTRY**
Polar Ozone Workshop. Abstracts
[NASA-CP-10014] p 14 N89-14503
- ATMOSPHERIC CIRCULATION**
Comparison of satellite-derived dynamical quantities for the stratosphere of the Southern Hemisphere
[NASA-CP-3044] p 14 N89-25540
- ATMOSPHERIC COMPOSITION**
Polar Ozone Workshop. Abstracts
[NASA-CP-10014] p 14 N89-14503
An assessment model for atmospheric composition
[NASA-CP-3023] p 16 N89-20588
Nimbus-7 data product summary
[NASA-RP-1215] p 13 N89-22152
A high-resolution atlas of the infrared spectrum of the sun and the earth atmosphere from space. A compilation of ATMOS 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
[NASA-RP-1224-VOL-2] p 15 N89-28969
- ATMOSPHERIC SOUNDING**
Nimbus-7 data product summary
[NASA-RP-1215] p 13 N89-22152

ATTENUATION

- Propagation effects handbook for satellite systems design. A summary of propagation impairments on 10 to 100 GHz satellite links with techniques for system design
[NASA-RP-1082(04)] p 8 N89-17060
- AUGER SPECTROSCOPY**
Auger electron intensity variations in oxygen-exposed large grain polycrystalline silver
[NASA-TP-2930] p 19 N89-30022
- AUTOMATIC CONTROL**
Simulation evaluation of TIMER, a time-based, terminal air traffic, flow-management concept
[NASA-TP-2870] p 3 N89-15901
- AVIONICS**
Joint University Program for Air Transportation Research, 1987
[NASA-CP-3028] p 1 N89-19230

B

BARRIER LAYERS

- Thermal Barrier Coatings. Abstracts and figures
[NASA-CP-10019] p 8 N89-13642
- BARYONS**
BRYNTRN: A baryon transport model
[NASA-TP-2887] p 23 N89-17562
- BEAMS**
Derivation of a tapered p-version beam finite element
[NASA-TP-2931] p 12 N89-26255
- BEAMS (SUPPORTS)**
Mixed finite element models for free vibrations of thin-walled beams
[NASA-TP-2868] p 11 N89-19579
- BEARINGS**
Advanced Earth-to-Orbit Propulsion Technology 1986, volume 2
[NASA-CP-2437-VOL-2] p 6 N89-12626
Rotordynamic Instability Problems in High-Performance Turbomachinery, 1988
[NASA-CP-3026] p 10 N89-22891
- BIBLIOGRAPHIES**
Space station systems: A bibliography with indexes (supplement 7)
[NASA-SP-7056(07)] p 6 N89-18522
NASA patent abstracts bibliography: A continuing bibliography. Section 1: Abstracts (supplement 35)
[NASA-SP-7039(35)-SECT-1] p 20 N89-25775
Technology for large space systems: A bibliography with indexes (supplement 20)
[NASA-SP-7046(20)] p 6 N89-26037
Management: A bibliography for NASA managers
[NASA-SP-7500(23)] p 19 N89-26766
Patent abstracts bibliography: A continuing bibliography. Section 2: Indexes (supplement 35)
[NASA-SP-7039(35)-SECT-2] p 20 N89-29264
Aeronautical engineering: A continuing bibliography with indexes (supplement 242)
[NASA-SP-7037(242)] p 1 N89-29304
Earth resources: A continuing bibliography with indexes (issue 62)
[NASA-SP-7041(62)] p 13 N89-29825
Aerospace medicine and biology: A continuing bibliography with indexes (supplement 327)
[NASA-SP-7011(327)] p 17 N89-29951
- BIDIRECTIONAL REFLECTANCE**
Summary of along-track data from the earth radiation budget satellite for several representative ocean regions
[NASA-RP-1206] p 15 N89-14634
- BIOASTRONAUTICS**
Report of the 1st Planning Workshop for CELSS Flight Experimentation
[NASA-CP-10020] p 17 N89-13898
Aerospace medicine and biology: A continuing bibliography with indexes (supplement 327)
[NASA-SP-7011(327)] p 17 N89-29951
- BIOINSTRUMENTATION**
Proceedings of a conference on Cardiovascular Bionstrumentation
[NASA-CP-10022] p 16 N89-17997
- BIOLOGICAL EFFECTS**
Aerospace medicine and biology: A continuing bibliography with indexes (supplement 327)
[NASA-SP-7011(327)] p 17 N89-29951
- BIOLOGICAL EVOLUTION**
Exobiology and Future Mars Missions
[NASA-CP-10027] p 16 N89-26334
- BIT ERROR RATE**
Digitally modulated bit error rate measurement system for microwave component evaluation
[NASA-TP-2912] p 6 N89-28545
- BLADE TIPS**
Tip aerodynamics and acoustics test: A report and data survey
[NASA-RP-1179] p 2 N89-17579

BLADE-VORTEX INTERACTION

Airfoil self-noise and prediction
[NASA-RP-1218] p 19 N89-25673

BODIES OF REVOLUTION

Drag measurements on a laminar-flow body of revolution in the 13-inch magnetic suspension and balance system
[NASA-TP-2895] p 2 N89-19232

BOLTED JOINTS

Lightweight structural design of a bolted case joint for the space shuttle solid rocket motor
[NASA-TP-2851] p 6 N89-12580

BOOSTER ROCKET ENGINES

Advanced Earth-to-Orbit Propulsion Technology 1986, volume 2
[NASA-CP-2437-VOL-2] p 6 N89-12626

BOUNDARY LAYER FLOW

A spectral collocation solution to the compressible stability eigenvalue problem
[NASA-TP-2858] p 1 N89-12543

BOUNDARY LAYER SEPARATION

Airfoil self-noise and prediction
[NASA-RP-1218] p 19 N89-25673

BOUNDARY LAYERS

NASA SC(2)-0714 airfoil data corrected for sidewall boundary-layer effects in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TP-2890] p 2 N89-17568

Airfoil self-noise and prediction
[NASA-RP-1218] p 19 N89-25673

BRAZING

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
[NASA-TP-2904] p 9 N89-21171

BRIGHTNESS

Atlas of galaxies useful for measuring the cosmological distance scale
[NASA-SP-496] p 21 N89-12513

BRIGHTNESS TEMPERATURE

Polar microwave brightness temperatures from Nimbus-7 SMMR: Time series of daily and monthly maps from 1978 to 1987
[NASA-RP-1223] p 13 N89-26275

BUCKLING

Research in structures, structural dynamics and materials, 1989
[NASA-CP-10024] p 12 N89-24626

Application of Newton's method to the postbuckling of rings under pressure loadings
[NASA-TP-2941] p 13 N89-29811

C**CALIBRATING**

Universal test fixture for monolithic mm-wave integrated circuits calibrated with an augmented TRD algorithm
[NASA-TP-2875] p 9 N89-17767

Evaluation of a strain-gage load calibration on a low-aspect-ratio wing structure at elevated temperature
[NASA-TP-2921] p 12 N89-28034

Nimbus-7 ERB Solar Analysis Tape (ESAT) user's guide
[NASA-RP-1211] p 23 N89-30151

CALORIMETERS

High-pressure calorimeter chamber tests for liquid oxygen/kerosene (LOX/RP-1) rocket combustion
[NASA-TP-2862] p 7 N89-15979

CAMERAS

Remote Sensing in Polarized Light
[NASA-CP-3014] p 20 N89-14189

CARBON DIOXIDE

Commentary on interstellar matter associated with 18 open clusters
[NASA-RP-1229] p 22 N89-27612

CARDIOVASCULAR SYSTEM

Proceedings of a conference on Cardiovascular Bioinstrumentation
[NASA-CP-10022] p 16 N89-17997

CASCADE FLOW

Three component laser anemometer measurements in an annular cascade of core turbine vanes with contoured end wall
[NASA-TP-2846] p 1 N89-10844

CATALOGS

Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 1: Explanatory supplement
[NASA-RP-1190-VOL-1] p 21 N89-14194

Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 5: The point source catalog declination range -30 deg greater than delta greater than -50 deg
[NASA-RP-1190-VOL-5] p 21 N89-14195

Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 4: The point source catalog declination range 0 deg greater than delta greater than -30 deg
[NASA-RP-1190-VOL-4] p 22 N89-14196

Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 2: The point source catalog declination range 90 deg greater than delta greater than 30 deg
[NASA-RP-1190-VOL-2] p 22 N89-14197

Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 6: The point source catalog declination range -50 deg greater than delta greater than -90 deg
[NASA-RP-1190-VOL-6] p 22 N89-14198

Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 7: The small scale structure catalog
[NASA-RP-1190-VOL-7] p 22 N89-14199

Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 3: The point source catalog declination range 30 deg greater than delta greater than 0 deg
[NASA-RP-1190-VOL-3] p 22 N89-14201

CHANNEL FLOW

Interactions of Tollmien-Schlichting waves and Dean vortices. Comparison of direct numerical simulation and a weakly nonlinear theory
[NASA-TP-2919] p 3 N89-25118

CHEMICAL EQUILIBRIUM

Conservation equations and physical models for hypersonic air flows in thermal and chemical nonequilibrium
[NASA-TP-2867] p 9 N89-16115

CHEMICAL EVOLUTION

Exobiology and Future Mars Missions
[NASA-CP-10027] p 16 N89-26334

CHRONOLOGY

Astronautics and aeronautics, 1985: A chronology
[NASA-SP-4025] p 24 N89-26803

CLOSED ECOLOGICAL SYSTEMS

Report of the 1st Planning Workshop for CELSS Flight Experimentation
[NASA-CP-10020] p 17 N89-13898

CLOUDS

Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
[NASA-CP-10026-VOL-1] p 16 N89-24022

Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 2: Abstracts, candidate experiments and feasibility study
[NASA-CP-10026-VOL-2] p 16 N89-24023

COHERENT ELECTROMAGNETIC RADIATION

LANDSAT-4 and LANDSAT-5 multispectral scanner coherent noise characterization and removal
[NASA-TP-2595-REV] p 13 N89-12114

COLORADO

Sapping features of the Colorado Plateau: A comparative planetary geology field guide
[NASA-SP-491] p 13 N89-10401

COMBUSTION

Turbine Engine Hot Section Technology, 1987
[NASA-CP-2493] p 11 N89-17298

COMBUSTION CHAMBERS

High-pressure calorimeter chamber tests for liquid oxygen/kerosene (LOX/RP-1) rocket combustion
[NASA-TP-2862] p 7 N89-15979

COMBUSTION PHYSICS

Mixing and Demixing Processes in Multiphase Flows With Application to Propulsion Systems
[NASA-CP-3006] p 9 N89-11153

Microgravity Combustion Diagnostics Workshop
[NASA-CP-10017] p 8 N89-17682

COMBUSTION TEMPERATURE

Determination of combustion gas temperatures by infrared radiometry in sooting and nonsooting flames
[NASA-TP-2900] p 9 N89-25409

COMETARY ATMOSPHERES

Infrared Observations of Comets Halley and Wilson and Properties of the Grains
[NASA-CP-3004] p 21 N89-13330

COMMUNICATION SATELLITES

Fifteenth Space Simulation Conference: Support the Highway to Space Through Testing
[NASA-CP-3015] p 6 N89-12582

Digitally modulated bit error rate measurement system for microwave component evaluation
[NASA-TP-2912] p 6 N89-28545

COMPARISON

Sapping features of the Colorado Plateau: A comparative planetary geology field guide
[NASA-SP-491] p 13 N89-10401

COMPONENT RELIABILITY

Effects of variables upon pyrotechnically induced shock response spectra, part 2
[NASA-TP-2872] p 11 N89-13814

COMPOSITE MATERIALS

The effects of simulated space environmental parameters on six commercially available composite materials
[NASA-TP-2906] p 7 N89-19385

COMPOSITE STRUCTURES

Research in structures, structural dynamics and materials, 1989
[NASA-CP-10024] p 12 N89-24626

COMPRESSIBLE FLOW

A spectral collocation solution to the compressible stability eigenvalue problem
[NASA-TP-2858] p 1 N89-12543

COMPRESSORS

Rotordynamic Instability Problems in High-Performance Turbomachinery, 1988
[NASA-CP-3026] p 10 N89-22891

COMPUTATION

A closed-form trim solution yielding minimum trim drag for airplanes with multiple longitudinal-control effectors
[NASA-TP-2907] p 5 N89-23468

Computational Methods for Structural Mechanics and Dynamics, part 1
[NASA-CP-3034-PT-1] p 12 N89-24638

A review of high-speed, convective, heat-transfer computation methods
[NASA-TP-2914] p 10 N89-27116

COMPUTATIONAL FLUID DYNAMICS

Three-dimensional multigrid algorithms for the flux-split Euler equations
[NASA-TP-2829] p 18 N89-12316

Transonic Unsteady Aerodynamics and Aeroelasticity 1987, part 1
[NASA-CP-3022-PT-1] p 2 N89-19234

Transonic Symposium: Theory, Application, and Experiment, Volume 1, Part 1
[NASA-CP-3020-VOL-1-PT-1] p 2 N89-20925

Transonic Symposium: Theory, Application, and Experiment, volume 1, part 2
[NASA-CP-3020-VOL-1-PT-2] p 2 N89-20942

Recent Advances in Multidisciplinary Analysis and Optimization, part 1
[NASA-CP-3031-PT-1] p 4 N89-25146

A procedure for computing surface wave trajectories on an inhomogeneous surface
[NASA-TP-2929] p 3 N89-26811

COMPUTATIONAL GRIDS

A spectral collocation solution to the compressible stability eigenvalue problem
[NASA-TP-2858] p 1 N89-12543

COMPUTER AIDED DESIGN

Comparison study of gear dynamic computer programs at NASA Lewis Research Center
[NASA-TP-2901] p 10 N89-21243

A knowledge-based tool for multilevel decomposition of a complex design problem
[NASA-TP-2903] p 18 N89-23181

Recent Advances in Multidisciplinary Analysis and Optimization, part 1
[NASA-CP-3031-PT-1] p 4 N89-25146

Recent Advances in Multidisciplinary Analysis and Optimization, part 2
[NASA-CP-3031-PT-2] p 4 N89-25173

Recent Advances in Multidisciplinary Analysis and Optimization, part 3
[NASA-CP-3031-PT-3] p 4 N89-25201

NASA Workshop on Computational Structural Mechanics 1987, part 2
[NASA-CP-10012-PT-2] p 12 N89-29789

COMPUTER ASSISTED INSTRUCTION

Second Annual Workshop on Space Operations Automation and Robotics (SOAR 1988)
[NASA-CP-3019] p 17 N89-19817

COMPUTER GRAPHICS

Interactive orbital proximity operations planning system
[NASA-TP-2839] p 17 N89-18039

COMPUTER PROGRAMS

Validation of a pair of computer codes for estimation and optimization of subsonic aerodynamic performance of simple hinged-flap systems for thin swept wings
[NASA-TP-2828] p 1 N89-10024

OEXP Analysis Tools Workshop
[NASA-CP-10013] p 17 N89-11407

Analysis of positron lifetime spectra in polymers
[NASA-TP-2853] p 17 N89-12237

BRYNTRN: A baryon transport model
[NASA-TP-2887] p 23 N89-17562

Integrated tools for control-system analysis
[NASA-TP-2885] p 5 N89-19309

Comparison study of gear dynamic computer programs at NASA Lewis Research Center
[NASA-TP-2901] p 10 N89-21243

The Fault Tree Compiler (FTC): Program and mathematics
[NASA-TP-2915] p 18 N89-24815

COMPUTER SYSTEMS PROGRAMS

NASA Workshop on Computational Structural Mechanics 1987, part 2
[NASA-CP-10012-PT-2] p 12 N89-29789

COMPUTER TECHNIQUES

- An economical semi-analytical orbit theory for micro-computer applications
[NASA-TP-2811] p 19 N89-14052
Joint University Program for Air Transportation Research, 1987
[NASA-CP-3028] p 1 N89-19230
Second Annual Workshop on Space Operations Automation and Robotics (SOAR 1988)
[NASA-CP-3019] p 17 N89-19817
The Fault Tree Compiler (FTC): Program and mathematics
[NASA-TP-2915] p 18 N89-24815
NASA Workshop on Computational Structural Mechanics 1987, part 3
[NASA-CP-10012-PT-3] p 12 N89-29799
- COMPUTER VISION**
Spatial vision processes: From the optical image to the symbolic structures of contour information
[NASA-TP-2838] p 10 N89-13762
The 1989 Goddard Conference on Space Applications of Artificial Intelligence
[NASA-CP-3033] p 18 N89-26578
- COMPUTERIZED SIMULATION**
Transonic Symposium: Theory, Application, and Experiment, volume 1, part 2
[NASA-CP-3020-VOL-1-PT-2] p 2 N89-20942
Comparison of predicted and measured temperatures of UH-60A helicopter transmission
[NASA-TP-2911] p 11 N89-24607
Computational Methods for Structural Mechanics and Dynamics, part 1
[NASA-CP-3034-PT-1] p 12 N89-24638
Computational Methods for Structural Mechanics and Dynamics
[NASA-CP-3034-PT-2] p 12 N89-24654
Interactions of Tollmien-Schlichting waves and Dean vortices. Comparison of direct numerical simulation and a weakly nonlinear theory
[NASA-TP-2919] p 3 N89-25118
Recent Advances in Multidisciplinary Analysis and Optimization, part 3
[NASA-CP-3031-PT-3] p 4 N89-25201
The 1989 Goddard Conference on Space Applications of Artificial Intelligence
[NASA-CP-3033] p 18 N89-26578
NASA Workshop on Computational Structural Mechanics 1987, part 2
[NASA-CP-10012-PT-2] p 12 N89-29789
- CONFERENCES**
The 1987 Ground Vortex Workshop
[NASA-CP-10008] p 1 N89-10849
The 1988 Get Away Special Experimenter's Symposium
[NASA-CP-3008] p 5 N89-10902
Mixing and Demixing Processes in Multiphase Flows With Application to Propulsion Systems
[NASA-CP-3006] p 9 N89-11153
Technology for Future NASA Missions: Civil Space Technology Initiative (CSTI) and Pathfinder
[NASA-CP-3016] p 5 N89-11760
Fifteenth Space Simulation Conference: Support the Highway to Space Through Testing
[NASA-CP-3015] p 6 N89-12582
Advanced Earth-to-Orbit Propulsion Technology 1986, volume 2
[NASA-CP-2437-VOL-2] p 6 N89-12626
Turbine Engine Hot Section Technology 1986
[NASA-CP-2444] p 11 N89-12876
Second Workshop on Improvements to Photometry
[NASA-CP-10015] p 21 N89-13310
Thermal Barrier Coatings. Abstracts and figures
[NASA-CP-10019] p 8 N89-13642
Report of the 1st Planning Workshop for CELSS Flight Experimentation
[NASA-CP-10020] p 17 N89-13898
Polar Ozone Workshop. Abstracts
[NASA-CP-10014] p 14 N89-14503
Experiments in Planetary and Related Sciences and the Space Station
[NASA-CP-2494] p 20 N89-14998
Turbine Engine Hot Section Technology, 1987
[NASA-CP-2493] p 11 N89-17298
Microgravity Combustion Diagnostics Workshop
[NASA-CP-10017] p 8 N89-17682
Proceedings of a conference on Cardiovascular Biinstrumentation
[NASA-CP-10022] p 16 N89-17997
Proceedings of the Polar Processes on Mars Workshop
[NASA-CP-10021] p 23 N89-18373
Transonic Symposium: Theory, Application, and Experiment, Volume 1, Part 1
[NASA-CP-3020-VOL-1-PT-1] p 2 N89-20925

- Proceedings of the Scientific Data Compression Workshop
[NASA-CP-3025] p 17 N89-22332
Rotordynamic Instability Problems in High-Performance Turbomachinery, 1988
[NASA-CP-3026] p 10 N89-22891
Seventeenth NASTRAN (R) Users' Colloquium
[NASA-CP-3029] p 11 N89-22940
Space Electrochemical Research and Technology Conference: Abstracts
[NASA-CP-10029] p 14 N89-22982
NASA/SDIO Space Environmental Effects on Materials Workshop, part 1
[NASA-CP-3035-PT-1] p 7 N89-23528
The 23rd Aerospace Mechanisms Symposium
[NASA-CP-3032] p 12 N89-23892
Research in structures, structural dynamics and materials, 1989
[NASA-CP-10024] p 12 N89-24626
Computational Methods for Structural Mechanics and Dynamics, part 1
[NASA-CP-3034-PT-1] p 12 N89-24638
Computational Methods for Structural Mechanics and Dynamics
[NASA-CP-3034-PT-2] p 12 N89-24654
Space Photovoltaic Research and Technology, 1988. High Efficiency, Space Environment, and Array Technology
[NASA-CP-3030] p 14 N89-24704
Recent Advances in Multidisciplinary Analysis and Optimization, part 1
[NASA-CP-3031-PT-1] p 4 N89-25146
Recent Advances in Multidisciplinary Analysis and Optimization, part 2
[NASA-CP-3031-PT-2] p 4 N89-25173
Recent Advances in Multidisciplinary Analysis and Optimization, part 3
[NASA-CP-3031-PT-3] p 4 N89-25201
Exobiology and Future Mars Missions
[NASA-CP-10027] p 16 N89-26334
The 1989 Goddard Conference on Space Applications of Artificial Intelligence
[NASA-CP-3033] p 18 N89-26578
NASA Workshop on Computational Structural Mechanics 1987, part 1
[NASA-CP-10012-PT-1] p 12 N89-29773
NASA Workshop on Computational Structural Mechanics 1987, part 2
[NASA-CP-10012-PT-2] p 12 N89-29789
NASA Workshop on Computational Structural Mechanics 1987, part 3
[NASA-CP-10012-PT-3] p 12 N89-29799
- CONSERVATION EQUATIONS**
Conservation equations and physical models for hypersonic air flows in thermal and chemical nonequilibrium
[NASA-TP-2867] p 9 N89-16115
- CONTACT LOADS**
Mixed formulation for frictionless contact problems
[NASA-TP-2897] p 11 N89-19580
- CONTINUOUS RADIATION**
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
[NASA-TP-2904] p 9 N89-21171
- CONTOURS**
Spatial vision processes: From the optical image to the symbolic structures of contour information
[NASA-TP-2838] p 10 N89-13762
- CONTROL SURFACES**
Control surface spanwise placement in active flutter suppression systems
[NASA-TP-2873] p 11 N89-16196
- CONTROL SYSTEMS DESIGN**
Integrated tools for control-system analysis
[NASA-TP-2885] p 5 N89-19309
Development and flight test experiences with a flight-critical digital control system
[NASA-TP-2857] p 5 N89-24327
Further developments in modeling digital control systems with MA-prefiltered measurements
[NASA-TP-2909] p 8 N89-24507
Research in structures, structural dynamics and materials, 1989
[NASA-CP-10024] p 12 N89-24626
A new state reconstructor for digital controls systems using weighted-average measurements
[NASA-TP-2936] p 8 N89-27039
- CONTROL THEORY**
Joint University Program for Air Transportation Research, 1987
[NASA-CP-3028] p 1 N89-19230
Recent Advances in Multidisciplinary Analysis and Optimization, part 3
[NASA-CP-3031-PT-3] p 4 N89-25201

CONTROLLERS

- Integrated tools for control-system analysis
[NASA-TP-2885] p 5 N89-19309
- CONVECTIVE HEAT TRANSFER**
A review of high-speed, convective, heat-transfer computation methods
[NASA-TP-2914] p 10 N89-27116
- COPPER**
Thermoviscoplastic model with application to copper
[NASA-TP-2845] p 11 N89-16183
Tungsten fiber reinforced copper matrix composites: A review
[NASA-TP-2924] p 7 N89-27796
- COSMIC DUST**
Infrared Observations of Comets Halley and Wilson and Properties of the Grains
[NASA-CP-3004] p 21 N89-13330
Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
[NASA-CP-10026-VOL-1] p 16 N89-24022
Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 2: Abstracts, candidate experiments and feasibility study
[NASA-CP-10026-VOL-2] p 16 N89-24023
Planetary geosciences, 1988
[NASA-SP-498] p 13 N89-26274
- COSMOLOGY**
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 4: The point source catalog declination range 0 deg greater than delta greater than -30 deg
[NASA-RP-1190-VOL-4] p 22 N89-14196
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 7: The small scale structure catalog
[NASA-RP-1190-VOL-7] p 22 N89-14199
- COUNTERFLOW**
Weak-wave analysis of shock interaction with a slipstream
[NASA-TP-2848] p 1 N89-10020
- COVARIANCE**
The estimation error covariance matrix for the ideal state reconstructor with measurement noise
[NASA-TP-2881] p 17 N89-13994
- CROSSLINKING**
Degradation and crosslinking of perfluoroalkyl polyethers under X-ray irradiation in ultrahigh vacuum
[NASA-TP-2910] p 8 N89-21103
- CRYOGENIC WIND TUNNELS**
NASA SC(2)-0714 airfoil data corrected for sidewall boundary-layer effects in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TP-2890] p 2 N89-17568
Hot-jet simulation in cryogenic wind tunnels
[NASA-RP-1220] p 3 N89-23448
- CRYSTAL DISLOCATIONS**
Indenation plasticity and fracture in silicon
[NASA-TP-2863] p 7 N89-10996
- CRYSTAL GROWTH**
Raman intensity as a probe of concentration near a crystal growing in solution
[NASA-TP-2865] p 10 N89-16139
- CRYSTALLOGRAPHY**
Auger electron intensity variations in oxygen-exposed large grain polycrystalline silver
[NASA-TP-2930] p 19 N89-30022
- CURVED BEAMS**
Mixed formulation for frictionless contact problems
[NASA-TP-2897] p 11 N89-19580
- CYCLIC LOADS**
Cyclic loads tests of carbon involute solid rocket motor outer boot ring segments
[NASA-TP-2884] p 11 N89-16192
- CYLINDRICAL SHELLS**
Application of Newton's method to the postbuckling of rings under pressure loadings
[NASA-TP-2941] p 13 N89-29811

D

DAMPERS

- Rotordynamic Instability Problems in High-Performance Turbomachinery, 1988
[NASA-CP-3026] p 10 N89-22891
- DATA ACQUISITION**
The 1989 Airborne Arctic Stratospheric Expedition Nimbus-7 TOMS data atlas
[NASA-RP-1227] p 16 N89-27302
- DATA BASES**
The NASA scientific and technical information system: Its scope and coverage
[NASA-SP-7065] p 20 N89-15779
BRYNTRN: A baryon transport model
[NASA-TP-2887] p 23 N89-17562

DATA COMPRESSION

Proceedings of the Scientific Data Compression Workshop
[NASA-CP-3025] p 17 N89-22332

DATA LINKS

A piloted simulation study of data link ATC message exchange
[NASA-TP-2859] p 3 N89-15900

DATA MANAGEMENT

Proceedings of the Scientific Data Compression Workshop
[NASA-CP-3025] p 17 N89-22332
The 1989 Goddard Conference on Space Applications of Artificial Intelligence
[NASA-CP-3033] p 18 N89-26578

DATA PROCESSING

User's guide for the Nimbus 7 Scanning Multichannel Microwave Radiometer (SMMR) CELL-ALL tape
[NASA-RP-1210] p 15 N89-14648
Nimbus-7 ERB Solar Analysis Tape (ESAT) user's guide
[NASA-RP-1211] p 23 N89-30151

DATA TRANSMISSION

A simulator investigation of the use of digital data link for pilot/ATC communications in a single pilot operation
[NASA-TP-2837] p 3 N89-11726

Proceedings of the Scientific Data Compression Workshop
[NASA-CP-3025] p 17 N89-22332

Digitally modulated bit error rate measurement system for microwave component evaluation
[NASA-TP-2912] p 6 N89-28545

DECLINATION

Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 6: The point source catalog declination range -50 deg greater than delta greater than -90 deg
[NASA-RP-1190-VOL-6] p 22 N89-14198

DECOUPLING

A piloted evaluation of an oblique-wing research aircraft motion simulation with decoupling control laws
[NASA-TP-2874] p 5 N89-15930

DEFLECTORS

Static internal performance of a nonaxisymmetric vaned thrust reverser with flow splay capability
[NASA-TP-2933] p 3 N89-27634

DEFORMATION

Mixed formulation for frictionless contact problems
[NASA-TP-2897] p 11 N89-19580
Application of Newton's method to the postbuckling of rings under pressure loadings
[NASA-TP-2941] p 13 N89-29811

DEPLOYMENT

The 23rd Aerospace Mechanisms Symposium
[NASA-CP-3032] p 12 N89-23892

DESIGN ANALYSIS

Recent Advances in Multidisciplinary Analysis and Optimization, part 2
[NASA-CP-3031-PT-2] p 4 N89-25173
Recent Advances in Multidisciplinary Analysis and Optimization, part 3
[NASA-CP-3031-PT-3] p 4 N89-25201

DIAGNOSIS

Microgravity Combustion Diagnostics Workshop
[NASA-CP-10017] p 8 N89-17682

DICTIONARIES

NASA thesaurus. Volume 3: Definitions
[NASA-SP-7064-VOL-3] p 20 N89-13301

DIGITAL DATA

A simulator investigation of the use of digital data link for pilot/ATC communications in a single pilot operation
[NASA-TP-2837] p 3 N89-11726
Digitally modulated bit error rate measurement system for microwave component evaluation
[NASA-TP-2912] p 6 N89-28545

DIGITAL FILTERS

Further developments in modeling digital control systems with MA-prefiltered measurements
[NASA-TP-2909] p 8 N89-24507

DIGITAL SYSTEMS

Singular perturbations and time scales in the design of digital flight control systems
[NASA-TP-2844] p 4 N89-12569

Flight control systems development and flight test experience with the HiMAT research vehicles
[NASA-TP-2822] p 5 N89-15929

Development and flight test experiences with a flight-critical digital control system
[NASA-TP-2857] p 5 N89-24327

Further developments in modeling digital control systems with MA-prefiltered measurements
[NASA-TP-2909] p 8 N89-24507

DIGITAL TECHNIQUES

A new state reconstructor for digital controls systems using weighted-average measurements
[NASA-TP-2936] p 8 N89-27039

DIHEDRAL ANGLE

Effect of milling machine roughness and wing dihedral on the supersonic aerodynamic characteristics of a highly swept wing
[NASA-TP-2918] p 3 N89-25117

DIRECT CURRENT

An electrochemical study of corrosion protection by primer-topcoat systems on 4130 steel with ac impedance and dc methods
[NASA-TP-2820] p 7 N89-19406

DISPLACEMENT

Research in structures, structural dynamics and materials, 1989
[NASA-CP-10024] p 12 N89-24626

DISPLAY DEVICES

Simulator evaluation of a display for a Takeoff Performance Monitoring System
[NASA-TP-2908] p 5 N89-23469

DISTANCE

Atlas of galaxies useful for measuring the cosmological distance scale
[NASA-SP-496] p 21 N89-12513

DOCUMENTS

The NASA scientific and technical information system: Its scope and coverage
[NASA-SP-7065] p 20 N89-15779

DOPED CRYSTALS

Indentation plasticity and fracture in silicon
[NASA-TP-2863] p 7 N89-10996

DRAG MEASUREMENT

Drag measurements on a laminar-flow body of revolution in the 13-inch magnetic suspension and balance system
[NASA-TP-2895] p 2 N89-19232

DRAINAGE PATTERNS

Sapping features of the Colorado Plateau: A comparative planetary geology field guide
[NASA-SP-491] p 13 N89-10401

DYNAMIC CHARACTERISTICS

Time-Variation Phenomena in the Jovian System
[NASA-SP-494] p 23 N89-28474

DYNAMIC MODELS

Derivation and definition of a linear aircraft model
[NASA-RP-1207] p 5 N89-15123

DYNAMIC PRESSURE

Aerodynamic pressures and heating rates on surfaces between split elevons at Mach 6.6
[NASA-TP-2855] p 9 N89-12822

Method for experimental determination of flutter speed by parameter identification
[NASA-TP-2923] p 4 N89-26844

DYNAMIC STABILITY

Rotordynamic Instability Problems in High-Performance Turbomachinery, 1988
[NASA-CP-3026] p 10 N89-22891

DYNAMIC STRUCTURAL ANALYSIS

Partitioning strategy for efficient nonlinear finite element dynamic analysis on multiprocessor computers
[NASA-TP-2850] p 11 N89-16170

Research in structures, structural dynamics and materials, 1989
[NASA-CP-10024] p 12 N89-24626

Computational Methods for Structural Mechanics and Dynamics
[NASA-CP-3034-PT-2] p 12 N89-24654

E

EARTH ATMOSPHERE

An assessment model for atmospheric composition
[NASA-CP-3023] p 16 N89-20588

EARTH OBSERVATIONS (FROM SPACE)

Remote Sensing in Polarized Light
[NASA-CP-3014] p 20 N89-14189

Polar Ozone Workshop. Abstracts
[NASA-CP-10014] p 14 N89-14503

EARTH ORBITAL ENVIRONMENTS

The effects of simulated space environmental parameters on six commercially available composite materials
[NASA-TP-2906] p 7 N89-19385

NASA/SPIO Space Environmental Effects on Materials Workshop, part 1
[NASA-CP-3035-PT-1] p 7 N89-23528

EARTH RADIATION BUDGET

Limb-darkening functions as derived from along-track operation of the ERBE scanning radiometer for January 1985
[NASA-RP-1214] p 15 N89-17374

Angular radiation models for earth-atmosphere system. Volume 2: Longwave radiation
[NASA-RP-1184-VOL-2] p 15 N89-20587

Nimbus-7 data product summary
[NASA-RP-1215] p 13 N89-22152

Nimbus-7 ERB Solar Analysis Tape (ESAT) user's guide
[NASA-RP-1211] p 23 N89-30151

EARTH RADIATION BUDGET EXPERIMENT

Summary of along-track data from the earth radiation budget satellite for several representative ocean regions
[NASA-RP-1206] p 15 N89-14634

Angular radiation models for earth-atmosphere system. Volume 2: Longwave radiation
[NASA-RP-1184-VOL-2] p 15 N89-20587

EARTH RESOURCES

Earth resources: A continuing bibliography with indexes (issue 62)
[NASA-SP-7041(62)] p 13 N89-29825

ECOLOGY

Exobiology and Future Mars Missions
[NASA-CP-10027] p 16 N89-26334

EDDY CURRENTS

Technique for temperature compensation of eddy-current proximity probes
[NASA-TP-2880] p 10 N89-15380

EDGES

Spatial vision processes: From the optical image to the symbolic structures of contour information
[NASA-TP-2838] p 10 N89-13762

EIKONAL EQUATION

Kaon-nucleus scattering
[NASA-TP-2920] p 23 N89-25103

ELASTIC PROPERTIES

Weld stresses beyond elastic limit: Materials discontinuity
[NASA-TP-2935] p 12 N89-27214

ELECTROCATALYSTS

Space Electrochemical Research and Technology Conference: Abstracts
[NASA-CP-10029] p 14 N89-22982

ELECTROCHEMICAL CORROSION

An electrochemical study of corrosion protection by primer-topcoat systems on 4130 steel with ac impedance and dc methods
[NASA-TP-2820] p 7 N89-19406

ELECTROCHEMISTRY

Space Electrochemical Research and Technology Conference: Abstracts
[NASA-CP-10029] p 14 N89-22982

ELECTRODE MATERIALS

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
[NASA-TP-2904] p 9 N89-21171

ELECTRODES

Performance of a multistage depressed collector with machined titanium electrodes
[NASA-TP-2891] p 9 N89-15337

Space Electrochemical Research and Technology Conference: Abstracts
[NASA-CP-10029] p 14 N89-22982

ELECTROMAGNETIC NOISE

LANDSAT-4 and LANDSAT-5 multispectral scanner coherent noise characterization and removal
[NASA-TP-2595-REV] p 13 N89-12114

ELECTROMAGNETIC RADIATION

Analytical and experimental procedures for determining propagation characteristics of millimeter-wave gallium arsenide microstrip lines
[NASA-TP-2899] p 9 N89-21169

ELECTRON EMISSION

Secondary electron emission characteristics of untreated and ion-textured titanium
[NASA-TP-2902] p 7 N89-17650

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
[NASA-TP-2904] p 9 N89-21171

ELECTRON FLUX DENSITY

Auger electron intensity variations in oxygen-exposed large grain polycrystalline silver
[NASA-TP-2930] p 19 N89-30022

ELECTRON RADIATION

Absorbed dose thresholds and absorbed dose rate limitations for studies of electron radiation effects on polyetherimides
[NASA-TP-2928] p 8 N89-25332

ELEVONS

Aerodynamic pressures and heating rates on surfaces between split elevons at Mach 6.6
[NASA-TP-2855] p 9 N89-12822

EMISSION SPECTRA

Commentary on interstellar matter associated with 18 open clusters
[NASA-RP-1229] p 22 N89-27612

ENERGY CONSERVATION

Advanced turboprop project
[NASA-SP-495] p 4 N89-12565

ENERGY STORAGE

- Space Electrochemical Research and Technology Conference: Abstracts
[NASA-CP-10029] p 14 N89-22982
- ENERGY TRANSFER**
BRYNTR: A baryon transport model
[NASA-TP-2887] p 23 N89-17562
- ENGINE TESTS**
Thrust-reverser flow investigation on a twin-engine transport
[NASA-TP-2856] p 1 N89-14213
- ENVIRONMENTAL MONITORING**
Space Station Induced Monitoring
[NASA-CP-3021] p 20 N89-15790
An assessment model for atmospheric composition
[NASA-CP-3023] p 16 N89-20588
- EPHEMERIDES**
Compilation of methods in orbital mechanics and solar geometry
[NASA-RP-1204] p 14 N89-10420
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
[NASA-TP-2866] p 18 N89-16415
- EPOXY COMPOUNDS**
Analysis of positron lifetime spectra in polymers
[NASA-TP-2853] p 17 N89-12237
- EQUATIONS OF MOTION**
Benchmark solutions for the galactic ion transport equations: Energy and spatially dependent problems
[NASA-TP-2878] p 23 N89-16714
- EQUATIONS OF STATE**
Derivation and definition of a linear aircraft model
[NASA-RP-1207] p 5 N89-15123
- ERROR ANALYSIS**
The estimation error covariance matrix for the ideal state reconstructor with measurement noise
[NASA-TP-2881] p 17 N89-13994
- ESTIMATES**
Flight Mechanics/Estimation Theory Symposium 1988
[NASA-CP-3011] p 5 N89-15934
- EULER EQUATIONS OF MOTION**
Three-dimensional multigrid algorithms for the flux-split Euler equations
[NASA-TP-2829] p 18 N89-12316
- EVALUATION**
Technique for temperature compensation of eddy-current proximity probes
[NASA-TP-2880] p 10 N89-15380
Simulation evaluation of TIMER, a time-based, terminal air traffic, flow-management concept
[NASA-TP-2870] p 3 N89-15901
A piloted evaluation of an oblique-wing research aircraft motion simulation with decoupling control laws
[NASA-TP-2874] p 5 N89-15930
- EXHAUST FLOW SIMULATION**
Hot-jet simulation in cryogenic wind tunnels
[NASA-RP-1220] p 3 N89-23448
- EXHAUST GASES**
The 1987 Ground Vortex Workshop
[NASA-CP-10008] p 1 N89-10849
- EXOBIOLOGY**
Exobiology and Future Mars Missions
[NASA-CP-10027] p 16 N89-26334
Aerospace medicine and biology: A continuing bibliography with indexes (supplement 327)
[NASA-SP-7011(327)] p 17 N89-29951
- EXPERT SYSTEMS**
Fourth Conference on Artificial Intelligence for Space Applications
[NASA-CP-3013] p 17 N89-15549
Second Annual Workshop on Space Operations Automation and Robotics (SOAR 1988)
[NASA-CP-3019] p 17 N89-19817
Recent Advances in Multidisciplinary Analysis and Optimization, part 1
[NASA-CP-3031-PT-1] p 4 N89-25146
The 1989 Goddard Conference on Space Applications of Artificial Intelligence
[NASA-CP-3033] p 18 N89-26578
- EXTRATERRESTRIAL ENVIRONMENTS**
NASA/SOIO Space Environmental Effects on Materials Workshop, part 2
[NASA-CP-3035-PT-2] p 7 N89-23547

F

F-16 AIRCRAFT

- Development and flight test experiences with a flight-critical digital control system
[NASA-TP-2857] p 5 N89-24327

FABRICS

- Measured and predicted root-mean-square errors in square and triangular antenna mesh facets
[NASA-TP-2896] p 11 N89-17892
- FABRY-PEROT INTERFEROMETERS**
Three component laser anemometer measurements in an annular cascade of core turbine vanes with contoured end wall
[NASA-TP-2846] p 1 N89-10844
- FAILURE ANALYSIS**
Thermal Barrier Coatings. Abstracts and figures
[NASA-CP-10019] p 8 N89-13642
The 1989 Goddard Conference on Space Applications of Artificial Intelligence
[NASA-CP-3033] p 18 N89-26578
- FATIGUE (MATERIALS)**
Turbine Engine Hot Section Technology 1986
[NASA-CP-2444] p 11 N89-12876
- FAULT TOLERANCE**
The Fault Tree Compiler (FTC): Program and mathematics
[NASA-TP-2915] p 18 N89-24815
- FAULT TREES**
The Fault Tree Compiler (FTC): Program and mathematics
[NASA-TP-2915] p 18 N89-24815
- FIBER COMPOSITES**
Cyclic loads tests of carbon involute solid rocket motor outer boot ring segments
[NASA-TP-2884] p 11 N89-16192
The effects of simulated space environmental parameters on six commercially available composite materials
[NASA-TP-2906] p 7 N89-19385
Tungsten fiber reinforced copper matrix composites: A review
[NASA-TP-2924] p 7 N89-27796
- FIBER OPTICS**
Second Workshop on Improvements to Photometry.
[NASA-CP-10015] p 21 N89-13310
- FINITE ELEMENT METHOD**
Partitioning strategy for efficient nonlinear finite element dynamic analysis on multiprocessor computers
[NASA-TP-2850] p 11 N89-16170
Turbine Engine Hot Section Technology, 1987
[NASA-CP-2493] p 11 N89-17298
Mixed finite element models for free vibrations of thin-walled beams
[NASA-TP-2868] p 11 N89-19579
Mixed formulation for frictionless contact problems
[NASA-TP-2897] p 11 N89-19580
Seventeenth NASTRAN (R) Users' Colloquium
[NASA-CP-3029] p 11 N89-22940
Derivation of a tapered p-version beam finite element
[NASA-TP-2931] p 12 N89-26255
NASA Workshop on Computational Structural Mechanics 1987, part 1
[NASA-CP-10012-PT-1] p 12 N89-29773
NASA Workshop on Computational Structural Mechanics 1987, part 2
[NASA-CP-10012-PT-2] p 12 N89-29789
NASA Workshop on Computational Structural Mechanics 1987, part 3
[NASA-CP-10012-PT-3] p 12 N89-29799
- FLAME TEMPERATURE**
Determination of combustion gas temperatures by infrared radiometry in sooting and nonsooting flames
[NASA-TP-2900] p 9 N89-25409
- FLAPPING HINGES**
Validation of a pair of computer codes for estimation and optimization of subsonic aerodynamic performance of simple hinged-flap systems for thin swept wings
[NASA-TP-2828] p 1 N89-10024
- FLEXIBLE SPACECRAFT**
Recent Advances in Multidisciplinary Analysis and Optimization, part 3
[NASA-CP-3031-PT-3] p 4 N89-25201
- FLIGHT CONTROL**
Singular perturbations and time scales in the design of digital flight control systems
[NASA-TP-2844] p 4 N89-12569
Flight control systems development and flight test experience with the HiMAT research vehicles
[NASA-TP-2822] p 5 N89-15929
Modal control of an oblique wing aircraft
[NASA-TP-2898] p 5 N89-16845
Development and flight test experiences with a flight-critical digital control system
[NASA-TP-2857] p 5 N89-24327
- FLIGHT HAZARDS**
Piloted-simulation evaluation of escape guidance for microburst wind shear encounters
[NASA-TP-2886] p 4 N89-16820
- FLIGHT MECHANICS**
Derivation and definition of a linear aircraft model
[NASA-RP-1207] p 5 N89-15123

- Flight Mechanics/Estimation Theory Symposium 1988
[NASA-CP-3011] p 5 N89-15934
- FLIGHT SAFETY**
Practices in adequate structural design
[NASA-TP-2893] p 6 N89-18504
- FLIGHT SIMULATION**
A piloted simulation study of data link ATC message exchange
[NASA-TP-2859] p 3 N89-15900
A piloted evaluation of an oblique-wing research aircraft motion simulation with decoupling control laws
[NASA-TP-2874] p 5 N89-15930
Piloted-simulation evaluation of escape guidance for microburst wind shear encounters
[NASA-TP-2886] p 4 N89-16820
- FLIGHT TESTS**
Flight control systems development and flight test experience with the HiMAT research vehicles
[NASA-TP-2822] p 5 N89-15929
A piloted evaluation of an oblique-wing research aircraft motion simulation with decoupling control laws
[NASA-TP-2874] p 5 N89-15930
Tip aerodynamics and acoustics test: A report and data survey
[NASA-RP-1179] p 2 N89-17579
Transonic Symposium: Theory, Application, and Experiment, Volume 1, Part 1
[NASA-CP-3020-VOL-1-PT-1] p 2 N89-20925
Effect of advanced rotorcraft airfoil sections on the hover performance of a small-scale rotor model
[NASA-TP-2832] p 2 N89-24264
Method for experimental determination of flutter speed by parameter identification
[NASA-TP-2923] p 4 N89-26844
- FLOW DEFLECTION**
Static internal performance of a nonaxisymmetric vaned thrust reverser with flow splay capability
[NASA-TP-2933] p 3 N89-27634
- FLOW DISTRIBUTION**
A spectral collocation solution to the compressible stability eigenvalue problem
[NASA-TP-2858] p 1 N89-12543
Transonic Unsteady Aerodynamics and Aeroelasticity 1987, part 2
[NASA-CP-3022-PT-2] p 2 N89-19247
- FLOW MEASUREMENT**
Three component laser anemometer measurements in an annular cascade of core turbine vanes with contoured end wall
[NASA-TP-2846] p 1 N89-10844
- FLOW STABILITY**
A spectral collocation solution to the compressible stability eigenvalue problem
[NASA-TP-2858] p 1 N89-12543
- FLUID DYNAMICS**
Mixing and Demixing Processes in Multiphase Flows With Application to Propulsion Systems
[NASA-CP-3006] p 9 N89-11153
- FLUID MANAGEMENT**
Workshop on Two-Phase Fluid Behavior in a Space Environment
[NASA-CP-3043] p 10 N89-26184
- FLUTTER**
Method for experimental determination of flutter speed by parameter identification
[NASA-TP-2923] p 4 N89-26844
- FLUTTER ANALYSIS**
Control surface spanwise placement in active flutter suppression systems
[NASA-TP-2873] p 11 N89-16196
Transonic Unsteady Aerodynamics and Aeroelasticity 1987, part 1
[NASA-CP-3022-PT-1] p 2 N89-19234
- FLUX VECTOR SPLITTING**
Three-dimensional multigrid algorithms for the flux-split Euler equations
[NASA-TP-2829] p 18 N89-12316
- FORTRAN**
User's manual for interactive LINEAR: A FORTRAN program to derive linear aircraft models
[NASA-TP-2835] p 18 N89-16437
- FOSSILS**
Exobiology and Future Mars Missions
[NASA-CP-10027] p 16 N89-26334
- FRACTURE MECHANICS**
Advanced Earth-to-Orbit Propulsion Technology 1986, volume 2
[NASA-CP-2437-VOL-2] p 6 N89-12626
Turbine Engine Hot Section Technology 1986
[NASA-CP-2444] p 11 N89-12876
Turbine Engine Hot Section Technology, 1987
[NASA-CP-2493] p 11 N89-17298
- FRACTURE STRENGTH**
Indentation plasticity and fracture in silicon
[NASA-TP-2863] p 7 N89-10996

FREE FLOW

Thrust-reverser flow investigation on a twin-engine transport
[NASA-TP-2856] p 1 N89-14213

FREE VIBRATION

Mixed finite element models for free vibrations of thin-walled beams
[NASA-TP-2868] p 11 N89-19579

FRICTION FACTOR

Mixed formulation for frictionless contact problems
[NASA-TP-2897] p 11 N89-19580

FUEL COMBUSTION

Mixing and Demixing Processes in Multiphase Flows With Application to Propulsion Systems
[NASA-CP-3006] p 9 N89-11153
Advanced Earth-to-Orbit Propulsion Technology 1986, volume 2
[NASA-CP-2437-VOL-2] p 6 N89-12626

FUEL CONSUMPTION

Advanced turboprop project
[NASA-SP-495] p 4 N89-12565

FUEL CONTAMINATION

Contamination of liquid oxygen by pressurized gaseous nitrogen
[NASA-TP-2894] p 9 N89-19499

G**GALACTIC COSMIC RAYS**

A general formalism for phase space calculations
[NASA-TP-2843] p 19 N89-14053

GALACTIC RADIATION

Benchmark solutions for the galactic ion transport equations: Energy and spatially dependent problems
[NASA-TP-2878] p 23 N89-16714

GALAXIES

Atlas of galaxies useful for measuring the cosmological distance scale
[NASA-SP-496] p 21 N89-12513

GAS TEMPERATURE

Determination of combustion gas temperatures by infrared radiometry in sooting and nonsooting flames
[NASA-TP-2900] p 9 N89-25409

GAS TURBINE ENGINES

Turbine Engine Hot Section Technology 1986
[NASA-CP-2444] p 11 N89-12876
Turbine Engine Hot Section Technology, 1987
[NASA-CP-2493] p 11 N89-17298

GAS TURBINES

Thermal Barrier Coatings. Abstracts and figures
[NASA-CP-10019] p 8 N89-13642

GAS-GAS INTERACTIONS

Contamination of liquid oxygen by pressurized gaseous nitrogen
[NASA-TP-2894] p 9 N89-19499

GASEOUS DIFFUSION

Contamination of liquid oxygen by pressurized gaseous nitrogen
[NASA-TP-2894] p 9 N89-19499

GAUSSIAN ELIMINATION

Parallel Gaussian elimination of a block tridiagonal matrix using multiple microcomputers
[NASA-TP-2892] p 18 N89-17422

GEARS

Comparison study of gear dynamic computer programs at NASA Lewis Research Center
[NASA-TP-2901] p 10 N89-21243

GEOCENTRIC COORDINATES

Compilation of methods in orbital mechanics and solar geometry
[NASA-RP-1204] p 14 N89-10420

GEOCHEMISTRY

Planetary geosciences, 1988
[NASA-SP-498] p 13 N89-26274

GEOMORPHOLOGY

Sapping features of the Colorado Plateau: A comparative planetary geology field guide
[NASA-SP-491] p 13 N89-10401

GEOPHYSICS

Planetary geosciences, 1988
[NASA-SP-498] p 13 N89-26274

GEOPOTENTIAL HEIGHT

Comparison of satellite-derived dynamical quantities for the stratosphere of the Southern Hemisphere
[NASA-CP-3044] p 14 N89-25540

GET AWAY SPECIALS (STS)

The 1988 Get Away Special Experimenters' Symposium
[NASA-CP-3008] p 5 N89-10902

GLASS LASERS

Analysis of Nd³⁺-glass, solar-pumped, high-power laser systems
[NASA-TP-2905] p 10 N89-17855

GRAINS

Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
[NASA-CP-10026-VOL-1] p 16 N89-24022

Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 2: Abstracts, candidate experiments and feasibility study
[NASA-CP-10026-VOL-2] p 16 N89-24023

GRAVITATIONAL EFFECTS

Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
[NASA-CP-10026-VOL-1] p 16 N89-24022

GRID GENERATION (MATHEMATICS)

Transonic Symposium: Theory, Application, and Experiment, Volume 1, Part 1
[NASA-CP-3020-VOL-1-PT-1] p 2 N89-20925

Transonic Symposium: Theory, Application, and Experiment, volume 1, part 2
[NASA-CP-3020-VOL-1-PT-2] p 2 N89-20942

GROUND EFFECT (AERODYNAMICS)

The 1987 Ground Vortex Workshop
[NASA-CP-10008] p 1 N89-10849
Thrust-reverser flow investigation on a twin-engine transport
[NASA-TP-2856] p 1 N89-14213

GROUND SUPPORT SYSTEMS

Proceedings of a conference on Cardiovascular Biinstrumentation
[NASA-CP-10022] p 16 N89-17997

GROUND WATER

Sapping features of the Colorado Plateau: A comparative planetary geology field guide
[NASA-SP-491] p 13 N89-10401

GUIDANCE (MOTION)

Joint University Program for Air Transportation Research, 1987
[NASA-CP-3028] p 1 N89-19230

GYROSCOPES

Further developments in modeling digital control systems with MA-prefiltered measurements
[NASA-TP-2909] p 8 N89-24507

H**HALF LIFE**

Analysis of positron lifetime spectra in polymers
[NASA-TP-2853] p 17 N89-12237

HALLEY'S COMET

Infrared Observations of Comets Halley and Wilson and Properties of the Grains
[NASA-CP-3004] p 21 N89-13330

HANDBOOKS

Propagation effects handbook for satellite systems design. A summary of propagation impairments on 10 to 100 GHz satellite links with techniques for system design
[NASA-RP-1082(04)] p 8 N89-17060

HARDNESS

Indentation plasticity and fracture in silicon
[NASA-TP-2863] p 7 N89-10996

HEAT TRANSFER

Fifteenth Space Simulation Conference: Support the Highway to Space Through Testing
[NASA-CP-3015] p 6 N89-12582

Turbine Engine Hot Section Technology 1986
[NASA-CP-2444] p 11 N89-12876

Turbine Engine Hot Section Technology, 1987
[NASA-CP-2493] p 11 N89-17298

Workshop on Two-Phase Fluid Behavior in a Space Environment
[NASA-CP-3043] p 10 N89-26184

HEAVY IONS

Benchmark solutions for the galactic ion transport equations: Energy and spatially dependent problems
[NASA-TP-2878] p 23 N89-16714

HELICOPTER PROPELLER DRIVE

Comparison of predicted and measured temperatures of UH-60A helicopter transmission
[NASA-TP-2911] p 11 N89-24607

HELICOPTERS

Tip aerodynamics and acoustics test: A report and data survey
[NASA-RP-1179] p 2 N89-17579

HELIUM ISOTOPES

Lunar Helium-3 and Fusion Power
[NASA-CP-10018] p 19 N89-14842

HIGH POWER LASERS

Analysis of Nd³⁺-glass, solar-pumped, high-power laser systems
[NASA-TP-2905] p 10 N89-17855

HIGH PRESSURE

High-pressure calorimeter chamber tests for liquid oxygen/kerosene (LOX/RP-1) rocket combustion
[NASA-TP-2862] p 7 N89-15979

HIGH TEMPERATURE ENVIRONMENTS

Evaluation of a strain-gage load calibration on a low-aspect-ratio wing structure at elevated temperature
[NASA-TP-2921] p 12 N89-28034

HIGHLY MANEUVERABLE AIRCRAFT

Flight control systems development and flight test experience with the HiMAT research vehicles
[NASA-TP-2822] p 5 N89-15929

HISTORIES

Where no man has gone before: A history of Apollo lunar exploration missions
[NASA-SP-4214] p 24 N89-25946
Astronautics and aeronautics, 1985: A chronology
[NASA-SP-4025] p 24 N89-26803
Orders of magnitude: A history of the NACA and NASA, 1915-1990
[NASA-SP-4406] p 24 N89-26805

HOVERING

Effect of advanced rotorcraft airfoil sections on the hover performance of a small-scale rotor model
[NASA-TP-2832] p 2 N89-24264

HUMAN FACTORS ENGINEERING

Second Annual Workshop on Space Operations Automation and Robotics (SOAR 1988)
[NASA-CP-3019] p 17 N89-19817

HYDRODYNAMICS

A procedure for computing surface wave trajectories on an inhomogeneous surface
[NASA-TP-2929] p 3 N89-26811

HYDROGEN EMBRITTLMENT

Advanced Earth-to-Orbit Propulsion Technology 1986, volume 2
[NASA-CP-2437-VOL-2] p 6 N89-12626

HYDROGEN OXYGEN ENGINES

Advanced Earth-to-Orbit Propulsion Technology 1986, volume 2
[NASA-CP-2437-VOL-2] p 6 N89-12626

HYDROGEN OXYGEN FUEL CELLS

Space Electrochemical Research and Technology Conference: Abstracts
[NASA-CP-10029] p 14 N89-22982

HYPERSONIC FLIGHT

Aerodynamic pressures and heating rates on surfaces between split elevons at Mach 6.6
[NASA-TP-2855] p 9 N89-12822

HYPERSONIC FLOW

Conservation equations and physical models for hypersonic air flows in thermal and chemical nonequilibrium
[NASA-TP-2867] p 9 N89-16115

HYPERSONIC WIND TUNNELS

Contamination of liquid oxygen by pressurized gaseous nitrogen
[NASA-TP-2894] p 9 N89-19499

I**ICE MAPPING**

Polar microwave brightness temperatures from Nimbus-7 SMMR: Time series of daily and monthly maps from 1978 to 1987
[NASA-RP-1223] p 13 N89-26275

IMAGE PROCESSING

Spatial vision processes: From the optical image to the symbolic structures of contour information
[NASA-TP-2838] p 10 N89-13762

Proceedings of the Scientific Data Compression Workshop
[NASA-CP-3025] p 17 N89-22332

The 1989 Goddard Conference on Space Applications of Artificial Intelligence
[NASA-CP-3033] p 18 N89-26578

IMAGING TECHNIQUES

Remote Sensing in Polarized Light
[NASA-CP-3014] p 20 N89-14189

Proceedings of the Scientific Data Compression Workshop
[NASA-CP-3025] p 17 N89-22332

IMPEDANCE

An electrochemical study of corrosion protection by primer-topcoat systems on 4130 steel with ac impedance and dc methods
[NASA-TP-2820] p 7 N89-19406

IMPELLERS

Rotordynamic Instability Problems in High-Performance Turbomachinery, 1988
[NASA-CP-3026] p 10 N89-22891

INDEXES (DOCUMENTATION)

Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 1: Explanatory supplement
[NASA-RP-1190-VOL-1] p 21 N89-14194

- Space station systems: A bibliography with indexes (supplement 7)
[NASA-SP-7056(07)] p 6 N89-18522
- Aeronautical engineering: A continuing bibliography with indexes (supplement 242)
[NASA-SP-7037(242)] p 1 N89-29304
- Earth resources: A continuing bibliography with indexes (issue 62)
[NASA-SP-7041(62)] p 13 N89-29825
- Aerospace medicine and biology: A continuing bibliography with indexes (supplement 327)
[NASA-SP-7011(327)] p 17 N89-29951
- INDUSTRIES**
Orders of magnitude: A history of the NACA and NASA, 1915-1990
[NASA-SP-4406] p 24 N89-26805
- INFORMATION RETRIEVAL**
NASA thesaurus. Volume 3: Definitions
[NASA-SP-7064-VOL-3] p 20 N89-13301
- INFORMATION SYSTEMS**
The NASA scientific and technical information system: Its scope and coverage
[NASA-SP-7065] p 20 N89-15779
Second Annual Workshop on Space Operations Automation and Robotics (SOAR 1988)
[NASA-CP-3019] p 17 N89-19817
- INFRARED ASTRONOMY SATELLITE**
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 1: Explanatory supplement
[NASA-RP-1190-VOL-1] p 21 N89-14194
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 5: The point source catalog declination range -30 deg greater than delta greater than -50 deg
[NASA-RP-1190-VOL-5] p 21 N89-14195
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 4: The point source catalog declination range 0 deg greater than delta greater than -30 deg
[NASA-RP-1190-VOL-4] p 22 N89-14196
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 2: The point source catalog declination range 90 deg greater than delta greater than 30 deg
[NASA-RP-1190-VOL-2] p 22 N89-14197
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 6: The point source catalog declination range -50 deg greater than delta greater than -90 deg
[NASA-RP-1190-VOL-6] p 22 N89-14198
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 7: The small scale structure catalog
[NASA-RP-1190-VOL-7] p 22 N89-14199
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 3: The point source catalog declination range 30 deg greater than delta greater than 0 deg
[NASA-RP-1190-VOL-3] p 22 N89-14201
- INFRARED RADIATION**
The Cassini mission: Infrared and microwave spectroscopic measurements
[NASA-RP-1213] p 22 N89-16709
Nimbus-7 Stratospheric and Mesospheric Sounder (SAMS) experiment data user's guide
[NASA-RP-1221] p 14 N89-26304
- INFRARED RADIOMETERS**
Determination of combustion gas temperatures by infrared radiometry in sooting and nonsooting flames
[NASA-TP-2900] p 9 N89-25409
- INFRARED SPECTRA**
Infrared Observations of Comets Halley and Wilson and Properties of the Grains
[NASA-CP-3004] p 21 N89-13330
A high-resolution atlas of the infrared spectrum of the sun and the earth atmosphere from space. A compilation of ATMOS 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
[NASA-RP-1224-VOL-2] p 15 N89-28969
- INFRARED SPECTROSCOPY**
A high-resolution atlas of the infrared spectrum of the sun and the earth atmosphere from space. A compilation of ATMOS 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
[NASA-RP-1224-VOL-2] p 15 N89-28969
- INHOMOGENEITY**
A procedure for computing surface wave trajectories on an inhomogeneous surface
[NASA-TP-2929] p 3 N89-26811
- INSTALLING**
Integration effects of pylon geometry on a high-wing transport airplane
[NASA-TP-2877] p 2 N89-15888
- INTEGRATED CIRCUITS**
Universal test fixture for monolithic mm-wave integrated circuits calibrated with an augmented TRD algorithm
[NASA-TP-2875] p 9 N89-17767
- INTERACTIONAL AERODYNAMICS**
Transonic Symposium: Theory, Application, and Experiment, volume 1, part 2
[NASA-CP-3020-VOL-1-PT-2] p 2 N89-20942
- INTERACTIVE CONTROL**
User's manual for interactive LINEAR: A FORTRAN program to derive linear aircraft models
[NASA-TP-2835] p 18 N89-16437
- INTERNATIONAL COOPERATION**
Orders of magnitude: A history of the NACA and NASA, 1915-1990
[NASA-SP-4406] p 24 N89-26805
- INTERSTELLAR CHEMISTRY**
Experiments in Planetary and Related Sciences and the Space Station
[NASA-CP-2494] p 20 N89-14998
- INTERSTELLAR MATTER**
Commentary on interstellar matter associated with 18 open clusters
[NASA-RP-1229] p 22 N89-27612
- ION BEAMS**
Benchmark solutions for the galactic ion transport equations: Energy and spatially dependent problems
[NASA-TP-2878] p 23 N89-16714
- ION PLATING**
Secondary electron emission characteristics of untreated and ion-textured titanium
[NASA-TP-2902] p 7 N89-17650
- IONIC MOBILITY**
Benchmark solutions for the galactic ion transport equations: Energy and spatially dependent problems
[NASA-TP-2878] p 23 N89-16714
- J**
- JET FLOW**
Hot-jet simulation in cryogenic wind tunnels
[NASA-RP-1220] p 3 N89-23448
- JOINTS (JUNCTIONS)**
Effects of variables upon pyrotechnically induced shock response spectra, part 2
[NASA-TP-2872] p 11 N89-13814
- JUPITER ATMOSPHERE**
Time-Variable Phenomena in the Jovian System
[NASA-SP-494] p 23 N89-28474
- JUPITER RINGS**
Time-Variable Phenomena in the Jovian System
[NASA-SP-494] p 23 N89-28474
- JUPITER SATELLITES**
Time-Variable Phenomena in the Jovian System
[NASA-SP-494] p 23 N89-28474
- K**
- KAONS**
Kaon-nucleus scattering
[NASA-TP-2920] p 23 N89-25103
- KEROSENE**
High-pressure calorimeter chamber tests for liquid oxygen/kerosene (LOX/RP-1) rocket combustion
[NASA-TP-2862] p 7 N89-15979
- KNOWLEDGE BASES (ARTIFICIAL INTELLIGENCE)**
Second Annual Workshop on Space Operations Automation and Robotics (SOAR 1988)
[NASA-CP-3019] p 17 N89-19817
A knowledge-based tool for multilevel decomposition of a complex design problem
[NASA-TP-2903] p 18 N89-23181
- L**
- LAMINAR BOUNDARY LAYER**
A review of high-speed, convective, heat-transfer computation methods
[NASA-TP-2914] p 10 N89-27116
- LAMINAR FLOW**
Mixing and Demixing Processes in Multiphase Flows With Application to Propulsion Systems
[NASA-CP-3006] p 9 N89-11153
Drag measurements on a laminar-flow body of revolution in the 13-inch magnetic suspension and balance system
[NASA-TP-2895] p 2 N89-19232
- LANDSAT 4**
LANDSAT-4 and LANDSAT-5 multispectral scanner coherent noise characterization and removal
[NASA-TP-2595-REV] p 13 N89-12114
- LANDSAT 5**
LANDSAT-4 and LANDSAT-5 multispectral scanner coherent noise characterization and removal
[NASA-TP-2595-REV] p 13 N89-12114
- LARGE SPACE STRUCTURES**
Recent Advances in Multidisciplinary Analysis and Optimization, part 3
[NASA-CP-3031-PT-3] p 4 N89-25201
- Technology for large space systems: A bibliography with indexes (supplement 20)
[NASA-SP-7046(20)] p 6 N89-26037
NASA Workshop on Computational Structural Mechanics 1987, part 3
[NASA-CP-10012-PT-3] p 12 N89-29799
- LASER ANEMOMETERS**
Three component laser anemometer measurements in an annular cascade of core turbine vanes with contoured end wall
[NASA-TP-2846] p 1 N89-10844
- LIFE (DURABILITY)**
Thermal Barrier Coatings. Abstracts and figures
[NASA-CP-10019] p 8 N89-13642
- LIFT DEVICES**
A closed-form trim solution yielding minimum trim drag for airplanes with multiple longitudinal-control effectors
[NASA-TP-2907] p 5 N89-23468
- LIFT DRAG RATIO**
Effect of milling machine roughness and wing dihedral on the supersonic aerodynamic characteristics of a highly swept wing
[NASA-TP-2918] p 3 N89-25117
- LIMB DARKENING**
Summary of along-track data from the earth radiation budget satellite for several representative ocean regions
[NASA-RP-1206] p 15 N89-14634
Limb-darkening functions as derived from along-track operation of the ERBE scanning radiometer for January 1985
[NASA-RP-1214] p 15 N89-17374
Angular radiation models for earth-atmosphere system. Volume 2: Longwave radiation
[NASA-RP-1184-VOL-2] p 15 N89-20587
- LINEAR SYSTEMS**
Derivation and definition of a linear aircraft model
[NASA-RP-1207] p 5 N89-15123
User's manual for interactive LINEAR: A FORTRAN program to derive linear aircraft models
[NASA-TP-2835] p 18 N89-16437
Integrated tools for control-system analysis
[NASA-TP-2885] p 5 N89-19309
- LIQUID NITROGEN**
Contamination of liquid oxygen by pressurized gaseous nitrogen
[NASA-TP-2894] p 9 N89-19499
- LIQUID OXYGEN**
High-pressure calorimeter chamber tests for liquid oxygen/kerosene (LOX/RP-1) rocket combustion
[NASA-TP-2862] p 7 N89-15979
Contamination of liquid oxygen by pressurized gaseous nitrogen
[NASA-TP-2894] p 9 N89-19499
- LIQUID-VAPOR INTERFACES**
Workshop on Two-Phase Fluid Behavior in a Space Environment
[NASA-CP-3043] p 10 N89-26184
- LOAD TESTS**
Cyclic loads tests of carbon involute solid rocket motor outer boot ring segments
[NASA-TP-2884] p 11 N89-16192
Evaluation of a strain-gage load calibration on a low-aspect-ratio wing structure at elevated temperature
[NASA-TP-2921] p 12 N89-28034
- LOADS (FORCES)**
Application of Newton's method to the postbuckling of rings under pressure loadings
[NASA-TP-2941] p 13 N89-29811
- LONG WAVE RADIATION**
Angular radiation models for earth-atmosphere system. Volume 2: Longwave radiation
[NASA-RP-1184-VOL-2] p 15 N89-20587
- LOW ASPECT RATIO WINGS**
Evaluation of a strain-gage load calibration on a low-aspect-ratio wing structure at elevated temperature
[NASA-TP-2921] p 12 N89-28034
- LUBRICANTS**
The 23rd Aerospace Mechanisms Symposium
[NASA-CP-3032] p 12 N89-23892
- LUNAR BASES**
Solar-flare shielding with Regolith at a lunar-base site
[NASA-TP-2869] p 23 N89-14210
Future Astronomical Observatories on the Moon
[NASA-CP-2489] p 21 N89-15810
- LUNAR EXPLORATION**
OEX Analysis Tools Workshop
[NASA-CP-10013] p 17 N89-11407
Report of the In Situ Resources Utilization Workshop
[NASA-CP-3017] p 20 N89-14188
Where no man has gone before: A history of Apollo lunar exploration missions
[NASA-SP-4214] p 24 N89-25946
- LUNAR OBSERVATORIES**
Future Astronomical Observatories on the Moon
[NASA-CP-2489] p 21 N89-15810

LUNAR SOIL
Lunar Helium-3 and Fusion Power
[NASA-CP-10018] p 19 N89-14842

LUNAR SURFACE
Solar-flare shielding with Regolith at a lunar-base site
[NASA-TP-2869] p 23 N89-14210

M

MACHINING
Performance of a multistage depressed collector with machined titanium electrodes
[NASA-TP-2891] p 9 N89-15337
Secondary electron emission characteristics of untreated and ion-textured titanium
[NASA-TP-2902] p 7 N89-17650

MAGNETIC SUSPENSION
Drag measurements on a laminar-flow body of revolution in the 13-inch magnetic suspension and balance system
[NASA-TP-2895] p 2 N89-19232

MAGNETIC TAPES
User's guide for the Nimbus 7 Scanning Multichannel Microwave Radiometer (SMMR) CELL-ALL tape
[NASA-RP-1210] p 15 N89-14648

MAGNETOHYDRODYNAMICS
O stars and Wolf-Rayet stars
[NASA-SP-497] p 21 N89-11657

MANAGEMENT
Management: A bibliography for NASA managers
[NASA-SP-7500(23)] p 19 N89-26766

MANAGEMENT METHODS
Practices in adequate structural design
[NASA-TP-2893] p 6 N89-18504
Management: A bibliography for NASA managers
[NASA-SP-7500(23)] p 19 N89-26766

MANAGEMENT PLANNING
Simulation evaluation of TIMER, a time-based, terminal air traffic, flow-management concept
[NASA-TP-2870] p 3 N89-15901
Management: A bibliography for NASA managers
[NASA-SP-7500(23)] p 19 N89-26766

MANIPULATORS
The 23rd Aerospace Mechanisms Symposium
[NASA-CP-3032] p 12 N89-23892

MANNED SPACE FLIGHT
Proceedings of a conference on Cardiovascular Biinstrumentation
[NASA-CP-10022] p 16 N89-17997
Where no man has gone before: A history of Apollo lunar exploration missions
[NASA-SP-4214] p 24 N89-25946
Orders of magnitude: A history of the NACA and NASA, 1915-1990
[NASA-SP-4406] p 24 N89-26805

MANY BODY PROBLEM
Computational Methods for Structural Mechanics and Dynamics
[NASA-CP-3034-PT-2] p 12 N89-24654

MAPS
The 1989 Airborne Arctic Stratospheric Expedition Nimbus-7 TOMS data atlas
[NASA-RP-1227] p 16 N89-27302

MARINE RESOURCES
Nimbus-7 data product summary
[NASA-RP-1215] p 13 N89-22152

MARS (PLANET)
Proceedings of the Polar Processes on Mars Workshop
[NASA-CP-10021] p 23 N89-18373

MARS ATMOSPHERE
Proceedings of the Polar Processes on Mars Workshop
[NASA-CP-10021] p 23 N89-18373

MARS LANDING
OEXP Analysis Tools Workshop
[NASA-CP-10013] p 17 N89-11407

MARS SAMPLE RETURN MISSIONS
Exobiology and Future Mars Missions
[NASA-CP-10027] p 16 N89-26334

MARS SURFACE
Sapping features of the Colorado Plateau: A comparative planetary geology field guide
[NASA-SP-491] p 13 N89-10401

MATHEMATICAL MODELS
Thermal Barrier Coatings. Abstracts and figures
[NASA-CP-10019] p 8 N89-13642
Derivation and definition of a linear aircraft model
[NASA-RP-1207] p 5 N89-15123
Conservation equations and physical models for hypersonic air flows in thermal and chemical nonequilibrium
[NASA-TP-2867] p 9 N89-16115
Rotordynamic Instability Problems in High-Performance Turbomachinery, 1988
[NASA-CP-3026] p 10 N89-22891

Research in structures, structural dynamics and materials, 1989
[NASA-CP-10024] p 12 N89-24626
Derivation of a tapered p-version beam finite element
[NASA-TP-2931] p 12 N89-26255
A procedure for computing surface wave trajectories on an inhomogeneous surface
[NASA-TP-2929] p 3 N89-26811

MATRICES (MATHEMATICS)
The estimation error covariance matrix for the ideal state reconstructor with measurement noise
[NASA-TP-2881] p 17 N89-13994
Parallel Gaussian elimination of a block tridiagonal matrix using multiple microcomputers
[NASA-TP-2892] p 18 N89-17422

MEASURING INSTRUMENTS
Turbine Engine Hot Section Technology 1986
[NASA-CP-2444] p 11 N89-12876

MECHANICAL DRIVES
Comparison study of gear dynamic computer programs at NASA Lewis Research Center
[NASA-TP-2901] p 10 N89-21243

MESON-NUCLEON INTERACTIONS
Kaon-nucleus scattering
[NASA-TP-2920] p 23 N89-25103

MESOSPHERE
Nimbus-7 Stratospheric and Mesospheric Sounder (SAMS) experiment data user's guide
[NASA-RP-1221] p 14 N89-26304
A high-resolution atlas of the infrared spectrum of the sun and the earth atmosphere from space. A compilation of ATMOS 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
[NASA-RP-1224-VOL-2] p 15 N89-28969

MESSAGE PROCESSING
A piloted simulation study of data link ATC message exchange
[NASA-TP-2859] p 3 N89-15900

METAL FATIGUE
Advanced Earth-to-Orbit Propulsion Technology 1986, volume 2
[NASA-CP-2437-VOL-2] p 6 N89-12626

METAL MATRIX COMPOSITES
Tungsten fiber reinforced copper matrix composites: A review
[NASA-TP-2924] p 7 N89-27796

METAL SURFACES
An electrochemical study of corrosion protection by primer-topcoat systems on 4130 steel with ac impedance and dc methods
[NASA-TP-2820] p 7 N89-19406

METEORITES
Planetary geosciences, 1988
[NASA-SP-498] p 13 N89-26274

MICROBURSTS (METEOROLOGY)
Piloted-simulation evaluation of escape guidance for microburst wind shear encounters
[NASA-TP-2886] p 4 N89-16820

MICROCOMPUTERS
Parallel Gaussian elimination of a block tridiagonal matrix using multiple microcomputers
[NASA-TP-2892] p 18 N89-17422

MICROMETEORIODS
NASA/SPIO Space Environmental Effects on Materials Workshop, part 1
[NASA-CP-3035-PT-1] p 7 N89-23528
NASA/SPIO Space Environmental Effects on Materials Workshop, part 2
[NASA-CP-3035-PT-2] p 7 N89-23547

MICROSTRIP TRANSMISSION LINES
Analytical and experimental procedures for determining propagation characteristics of millimeter-wave gallium arsenide microstrip lines
[NASA-TP-2899] p 9 N89-21169

MICROWAVE CIRCUITS
Universal test fixture for monolithic mm-wave integrated circuits calibrated with an augmented TRD algorithm
[NASA-TP-2875] p 9 N89-17767

MICROWAVE EMISSION
Propagation effects handbook for satellite systems design. A summary of propagation impairments on 10 to 100 GHz satellite links with techniques for system design
[NASA-RP-1082(04)] p 8 N89-17060

MICROWAVE EQUIPMENT
Digitally modulated bit error rate measurement system for microwave component evaluation
[NASA-TP-2912] p 6 N89-28545

MICROWAVE RADIOMETERS
User's guide for the Nimbus 7 Scanning Multichannel Microwave Radiometer (SMMR) CELL-ALL tape
[NASA-RP-1210] p 15 N89-14648

Polar microwave brightness temperatures from Nimbus-7 SMMR: Time series of daily and monthly maps from 1978 to 1987
[NASA-RP-1223] p 13 N89-26275

MICROWAVE TRANSMISSION
Analytical and experimental procedures for determining propagation characteristics of millimeter-wave gallium arsenide microstrip lines
[NASA-TP-2899] p 9 N89-21169

MILLIMETER WAVES
Universal test fixture for monolithic mm-wave integrated circuits calibrated with an augmented TRD algorithm
[NASA-TP-2875] p 9 N89-17767

MILLING (MACHINING)
Effect of milling machine roughness and wing dihedral on the supersonic aerodynamic characteristics of a highly swept wing
[NASA-TP-2918] p 3 N89-25117

MINING
Lunar Helium-3 and Fusion Power
[NASA-CP-10018] p 19 N89-14842

MISSION PLANNING
OEXP Analysis Tools Workshop
[NASA-CP-10013] p 17 N89-11407
The 1989 Goddard Conference on Space Applications of Artificial Intelligence
[NASA-CP-3033] p 18 N89-26578

MIXING
Mixing and Demixing Processes in Multiphase Flows With Application to Propulsion Systems
[NASA-CP-3006] p 9 N89-11153

MODAL RESPONSE
Modal control of an oblique wing aircraft
[NASA-TP-2898] p 5 N89-16845

MODELS
Thermoviscoplastic model with application to copper
[NASA-TP-2845] p 11 N89-16183

MODULATION
Digitally modulated bit error rate measurement system for microwave component evaluation
[NASA-TP-2912] p 6 N89-28545

MODULUS OF ELASTICITY
Cyclic loads tests of carbon involute solid rocket motor outer boot ring segments
[NASA-TP-2884] p 11 N89-16192

MONITORS
Simulator evaluation of a display for a Takeoff Performance Monitoring System
[NASA-TP-2908] p 5 N89-23469

MULTIPHASE FLOW
Mixing and Demixing Processes in Multiphase Flows With Application to Propulsion Systems
[NASA-CP-3006] p 9 N89-11153

MULTIPROCESSING (COMPUTERS)
Partitioning strategy for efficient nonlinear finite element dynamic analysis on multiprocessor computers
[NASA-TP-2850] p 11 N89-16170
Parallel Gaussian elimination of a block tridiagonal matrix using multiple microcomputers
[NASA-TP-2892] p 18 N89-17422
NASA Workshop on Computational Structural Mechanics 1987, part 1
[NASA-CP-10012-PT-1] p 12 N89-29773

MULTISPECTRAL BAND SCANNERS
LANDSAT-4 and LANDSAT-5 multispectral scanner coherent noise characterization and removal
[NASA-TP-2595-REV] p 13 N89-12114
User's guide for the Nimbus 7 Scanning Multichannel Microwave Radiometer (SMMR) CELL-ALL tape
[NASA-RP-1210] p 15 N89-14648

N

NACELLES
Integration effects of pylon geometry on a high-wing transport airplane
[NASA-TP-2877] p 2 N89-15888

NASA PROGRAMS
Technology for Future NASA Missions: Civil Space Technology Initiative (CSTI) and Pathfinder
[NASA-CP-3016] p 5 N89-11760
Issues in NASA program and project management
[NASA-SP-6101] p 19 N89-12479
NASA patent abstracts bibliography: A continuing bibliography. Section 1: Abstracts (supplement 35)
[NASA-SP-7039(35)-SECT-1] p 20 N89-25775
Orders of magnitude: A history of the NACA and NASA, 1915-1990
[NASA-SP-4406] p 24 N89-26805
Patent abstracts bibliography: A continuing bibliography. Section 2: Indexes (supplement 35)
[NASA-SP-7039(35)-SECT-2] p 20 N89-29264

NASTRAN
Seventeenth NASTRAN (R) Users' Colloquium
[NASA-CP-3029] p 11 N89-22940

NEODYMIUM LASERS

NEODYMIUM LASERS
 Analysis of Nd3+ :glass, solar-pumped, high-powr laser systems
 [NASA-TP-2905] p 10 N89-17855

NEWTON METHODS
 Application of Newton's method to the postbuckling of rings under pressure loadings
 [NASA-TP-2941] p 13 N89-29811

NIMBUS 7 SATELLITE
 User's guide for the Nimbus 7 Scanning Multichannel Microwave Radiometer (SMMR) CELL-ALL tape
 [NASA-RP-1210] p 15 N89-14648
 Nimbus-7 data product summary
 [NASA-RP-1215] p 13 N89-22152

NOISE PREDICTION (AIRCRAFT)
 Status of sonic boom methodology and understanding
 [NASA-CP-3027] p 2 N89-23415
 Airfoil self-noise and prediction
 [NASA-RP-1218] p 19 N89-25673

NOISE REDUCTION
 LANDSAT-4 and LANDSAT-5 multispectral scanner coherent noise characterization and removal
 [NASA-TP-2595-REV] p 13 N89-12114

NOISE TOLERANCE
 Evaluation of the ride quality of a light twin engine airplane using a ride quality meter
 [NASA-TP-2913] p 1 N89-22568

NONDESTRUCTIVE TESTS
 Thermal Barrier Coatings. Abstracts and figures
 [NASA-CP-10019] p 8 N89-13642

NONEQUILIBRIUM FLOW
 Conservation equations and physical models for hypersonic air flows in thermal and chemical nonequilibrium
 [NASA-TP-2867] p 9 N89-16115

NONEQUILIBRIUM THERMODYNAMICS
 Conservation equations and physical models for hypersonic air flows in thermal and chemical nonequilibrium
 [NASA-TP-2867] p 9 N89-16115

NONLINEAR SYSTEMS
 Interactions of Tollmien-Schlichting waves and Dean vortices. Comparison of direct numerical simulation and a weakly nonlinear theory
 [NASA-TP-2919] p 3 N89-25118

NORMALITY
 A general formalism for phase space calculations
 [NASA-TP-2843] p 19 N89-14053

NUCLEAR FUSION
 Lunar Helium-3 and Fusion Power
 [NASA-CP-10018] p 19 N89-14842

NUCLEAR SCATTERING
 Kaon-nucleus scattering
 [NASA-TP-2920] p 23 N89-25103

NUCLEATION
 Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
 [NASA-CP-10026-VOL-1] p 16 N89-24022

NUCLEONS
 Kaon-nucleus scattering
 [NASA-TP-2920] p 23 N89-25103

O

OBLIQUE WINGS
 A piloted evaluation of an oblique-wing research aircraft motion simulation with decoupling control laws
 [NASA-TP-2874] p 5 N89-15930
 Modal control of an oblique wing aircraft
 [NASA-TP-2898] p 5 N89-16845

OCEAN SURFACE
 Summary of along-track data from the earth radiation budget satellite for several representative ocean regions
 [NASA-RP-1206] p 15 N89-14634

OPEN CLUSTERS
 Commentary on interstellar matter associated with 18 open clusters
 [NASA-RP-1229] p 22 N89-27612

OPERATING TEMPERATURE
 Comparison of predicted and measured temperatures of UH-60A helicopter transmission
 [NASA-TP-2911] p 11 N89-24607

OPTIMAL CONTROL
 Singular perturbations and time scales in the design of digital flight control systems
 [NASA-TP-2844] p 4 N89-12569

OPTIMIZATION
 Validation of a pair of computer codes for estimation and optimization of subsonic aerodynamic performance of simple hinged-flap systems for thin swept wings
 [NASA-TP-2828] p 1 N89-10024
 A closed-form trim solution yielding minimum trim drag for airplanes with multiple longitudinal-control effectors
 [NASA-TP-2907] p 5 N89-23468

Recent Advances in Multidisciplinary Analysis and Optimization, part 1
 [NASA-CP-3031-PT-1] p 4 N89-25146

Recent Advances in Multidisciplinary Analysis and Optimization, part 2
 [NASA-CP-3031-PT-2] p 4 N89-25173

Recent Advances in Multidisciplinary Analysis and Optimization, part 3
 [NASA-CP-3031-PT-3] p 4 N89-25201

ORBIT CALCULATION
 An economical semi-analytical orbit theory for micro-computer applications
 [NASA-TP-2811] p 19 N89-14052

ORBIT PERTURBATION
 An economical semi-analytical orbit theory for micro-computer applications
 [NASA-TP-2811] p 19 N89-14052

ORBIT TRANSFER VEHICLES
 Technology for Future NASA Missions: Civil Space Technology Initiative (CSTI) and Pathfinder
 [NASA-CP-3016] p 5 N89-11760

ORBITAL MANEUVERS
 Interactive orbital proximity operations planning system
 [NASA-TP-2839] p 17 N89-18039

ORBITAL MECHANICS
 Compilation of methods in orbital mechanics and solar geometry
 [NASA-RP-1204] p 14 N89-10420
 Flight Mechanics/Estimation Theory Symposium 1988
 [NASA-CP-3011] p 5 N89-15934

OXYGEN ATOMS
 NASA/SDIO Space Environmental Effects on Materials Workshop, part 1
 [NASA-CP-3035-PT-1] p 7 N89-23528
 NASA/SDIO Space Environmental Effects on Materials Workshop, part 2
 [NASA-CP-3035-PT-2] p 7 N89-23547

OXYGEN RECOMBINATION
 Auger electron intensity variations in oxygen-exposed large grain polycrystalline silver
 [NASA-TP-2930] p 19 N89-30022

OZONE
 Polar Ozone Workshop. Abstracts
 [NASA-CP-10014] p 14 N89-14503

OZONE DEPLETION
 Polar Ozone Workshop. Abstracts
 [NASA-CP-10014] p 14 N89-14503
 The 1988 Antarctic ozone monitoring Nimbus-7 TOMS data atlas
 [NASA-RP-1225] p 16 N89-28983

OZONOMETRY
 Polar Ozone Workshop. Abstracts
 [NASA-CP-10014] p 14 N89-14503
 The 1988 Antarctic ozone monitoring Nimbus-7 TOMS data atlas
 [NASA-RP-1225] p 16 N89-28983

OZONOSPHERE
 Nimbus-7 data product summary
 [NASA-RP-1215] p 13 N89-22152

P

PARALLEL PROCESSING (COMPUTERS)
 Partitioning strategy for efficient nonlinear finite element dynamic analysis on multiprocessor computers
 [NASA-TP-2850] p 11 N89-16170
 NASA Workshop on Computational Structural Mechanics 1987, part 1
 [NASA-CP-10012-PT-1] p 12 N89-29773

PARALLEL PROGRAMMING
 Parallel Gaussian elimination of a block tridiagonal matrix using multiple microcomputers
 [NASA-TP-2892] p 18 N89-17422

PARAMETER IDENTIFICATION
 Method for experimental determination of flutter speed by parameter identification
 [NASA-TP-2923] p 4 N89-26844

PARTICLE COLLISIONS
 Kaon-nucleus scattering
 [NASA-TP-2920] p 23 N89-25103

PARTICLE INTERACTIONS
 Experiments in Planetary and Related Sciences and the Space Station
 [NASA-CP-2494] p 20 N89-14998
 Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
 [NASA-CP-10026-VOL-1] p 16 N89-24022
 Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 2: Abstracts, candidate experiments and feasibility study
 [NASA-CP-10026-VOL-2] p 16 N89-24023
 Kaon-nucleus scattering
 [NASA-TP-2920] p 23 N89-25103

PARTICLES
 Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
 [NASA-CP-10026-VOL-1] p 16 N89-24022
 Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 2: Abstracts, candidate experiments and feasibility study
 [NASA-CP-10026-VOL-2] p 16 N89-24023

PARTICULATES
 Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
 [NASA-CP-10026-VOL-1] p 16 N89-24022
 Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 2: Abstracts, candidate experiments and feasibility study
 [NASA-CP-10026-VOL-2] p 16 N89-24023

PARTITIONS (MATHEMATICS)
 Partitioning strategy for efficient nonlinear finite element dynamic analysis on multiprocessor computers
 [NASA-TP-2850] p 11 N89-16170

PATENT POLICY
 NASA patent abstracts bibliography: A continuing bibliography. Section 1: Abstracts (supplement 35)
 [NASA-SP-7039(35)-SECT-1] p 20 N89-25775
 Patent abstracts bibliography: A continuing bibliography. Section 2: Indexes (supplement 35)
 [NASA-SP-7039(35)-SECT-2] p 20 N89-29264

PERFLUORO COMPOUNDS
 Reaction of perfluoroalkylpolyethers (PFPE) with 440C steel in vacuum under sliding conditions at room temperature
 [NASA-TP-2883] p 8 N89-26091

PERFORMANCE TESTS
 Performance of a multistage depressed collector with machined titanium electrodes
 [NASA-TP-2891] p 9 N89-15337
 Technique for temperature compensation of eddy-current proximity probes
 [NASA-TP-2880] p 10 N89-15380
 Comparison of predicted and measured temperatures of UH-60A helicopter transmission
 [NASA-TP-2911] p 11 N89-24607

PERTURBATION THEORY
 Singular perturbations and time scales in the design of digital flight control systems
 [NASA-TP-2844] p 4 N89-12569

PHASE SPACE INTEGRAL
 A general formalism for phase space calculations
 [NASA-TP-2843] p 19 N89-14053

PHOTOCHEMICAL OXIDANTS
 An assessment model for atmospheric composition
 [NASA-CP-3023] p 16 N89-20588

PHOTOELECTRON SPECTROSCOPY
 Degradation and crosslinking of perfluoroalkyl polyethers under X-ray irradiation in ultrahigh vacuum
 [NASA-TP-2910] p 8 N89-21103

PHOTOMETERS
 Second Workshop on Improvements to Photometry
 [NASA-CP-10015] p 21 N89-13310

PHOTOVOLTAIC EFFECT
 Space Photovoltaic Research and Technology, 1988. High Efficiency, Space Environment, and Array Technology
 [NASA-CP-3030] p 14 N89-24704

PILOT PERFORMANCE
 A simulator investigation of the use of digital data link for pilot/ATC communications in a single pilot operation
 [NASA-TP-2837] p 3 N89-11726
 A piloted evaluation of an oblique-wing research aircraft motion simulation with decoupling control laws
 [NASA-TP-2874] p 5 N89-15930
 Piloted-simulation evaluation of escape guidance for microburst wind shear encounters
 [NASA-TP-2886] p 4 N89-16820

PLANETARY ATMOSPHERES
 The Cassini mission: Infrared and microwave spectroscopic measurements
 [NASA-RP-1213] p 22 N89-16709

PLANETARY SURFACES
 Planetary geosciences, 1988
 [NASA-SP-498] p 13 N89-26274

PLANETOLOGY
 Planetary geosciences, 1988
 [NASA-SP-498] p 13 N89-26274

PLANTS (BOTANY)
 Report of the 1st Planning Workshop for CELSS Flight Experimentation
 [NASA-CP-10020] p 17 N89-13898

PLASMA SPRAYING
 Thermal Barrier Coatings. Abstracts and figures
 [NASA-CP-10019] p 8 N89-13642

PLASTIC PROPERTIES
 Indentation plasticity and fracture in silicon
 [NASA-TP-2863] p 7 N89-10996

- Cyclic loads tests of carbon involute solid rocket motor outer boot ring segments
[NASA-TP-2884] p 11 N89-16192
- PLATEAUS**
Sapping features of the Colorado Plateau: A comparative planetary geology field guide
[NASA-SP-491] p 13 N89-10401
- POINT SOURCES**
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 4: The point source catalog declination range 0 deg greater than delta greater than -30 deg
[NASA-RP-1190-VOL-4] p 22 N89-14196
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 6: The point source catalog declination range -50 deg greater than delta greater than -90 deg
[NASA-RP-1190-VOL-6] p 22 N89-14198
- POLAR METEOROLOGY**
Polar Ozone Workshop. Abstracts
[NASA-CP-10014] p 14 N89-14503
- POLAR REGIONS**
Proceedings of the Polar Processes on Mars Workshop
[NASA-CP-10021] p 23 N89-18373
Polar microwave brightness temperatures from Nimbus-7 SMMR: Time series of daily and monthly maps from 1978 to 1987
[NASA-RP-1223] p 13 N89-26275
- POLARIZATION (WAVES)**
Remote Sensing in Polarized Light
[NASA-CP-3014] p 20 N89-14189
- POLYCRYSTALS**
Auger electron intensity variations in oxygen-exposed large grain polycrystalline silver
[NASA-TP-2930] p 19 N89-30022
- POLYETHER RESINS**
Degradation and crosslinking of perfluoroalkyl polyethers under X-ray irradiation in ultrahigh vacuum
[NASA-TP-2910] p 8 N89-21103
Absorbed dose thresholds and absorbed dose rate limitations for studies of electron radiation effects on polyetherimides
[NASA-TP-2928] p 8 N89-25332
Reaction of perfluoroalkylpolyethers (PFPE) with 440C steel in vacuum under sliding conditions at room temperature
[NASA-TP-2883] p 8 N89-26091
- POLYIMIDE RESINS**
Absorbed dose thresholds and absorbed dose rate limitations for studies of electron radiation effects on polyetherimides
[NASA-TP-2928] p 8 N89-25332
- POSITION ERRORS**
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
[NASA-TP-2866] p 18 N89-16415
- POSITRONS**
Analysis of positron lifetime spectra in polymers
[NASA-TP-2853] p 17 N89-12237
- PREMIXED FLAMES**
Determination of combustion gas temperatures by infrared radiometry in sooting and nonsooting flames
[NASA-TP-2900] p 9 N89-25409
- PRESSURE EFFECTS**
Contamination of liquid oxygen by pressurized gaseous nitrogen
[NASA-TP-2894] p 9 N89-19499
- PRIMERS (COATINGS)**
An electrochemical study of corrosion protection by primer-topcoat systems on 4130 steel with ac impedance and dc methods
[NASA-TP-2820] p 7 N89-19406
- PROBABILITY THEORY**
The Fault Tree Compiler (FTC): Program and mathematics
[NASA-TP-2915] p 18 N89-24815
- PROBES**
Technique for temperature compensation of eddy-current proximity probes
[NASA-TP-2880] p 10 N89-15380
- PROJECT MANAGEMENT**
Issues in NASA program and project management
[NASA-SP-6101] p 19 N89-12479
Practices in adequate structural design
[NASA-TP-2893] p 6 N89-18504
Orders of magnitude: A history of the NACA and NASA, 1915-1990
[NASA-SP-4406] p 24 N89-26805
- PROP-FAN TECHNOLOGY**
Advanced turboprop project
[NASA-SP-495] p 4 N89-12565
- PROPELLANT COMBUSTION**
Turbine Engine Hot Section Technology 1986
[NASA-CP-2444] p 11 N89-12876
- PROPULSION**
Mixing and Demixing Processes in Multiphase Flows With Application to Propulsion Systems
[NASA-CP-3006] p 9 N89-11153
- PROPULSION SYSTEM CONFIGURATIONS**
Advanced Earth-to-Orbit Propulsion Technology 1986, volume 2
[NASA-CP-2437-VOL-2] p 6 N89-12626
- PROTECTIVE COATINGS**
An electrochemical study of corrosion protection by primer-topcoat systems on 4130 steel with ac impedance and dc methods
[NASA-TP-2820] p 7 N89-19406
- PROTON SCATTERING**
Kaon-nucleus scattering
[NASA-TP-2920] p 23 N89-25103
- PROXIMITY**
Technique for temperature compensation of eddy-current proximity probes
[NASA-TP-2880] p 10 N89-15380
Interactive orbital proximity operations planning system
[NASA-TP-2839] p 17 N89-18039
- PYLONS**
Integration effects of pylon geometry on a high-wing transport airplane
[NASA-TP-2877] p 2 N89-15888
- PYROTECHNICS**
Effects of variables upon pyrotechnically induced shock response spectra, part 2
[NASA-TP-2872] p 11 N89-13814

R

RADAR

- MARA (Multimode Airborne Radar Altimeter) system documentation. Volume 1: MARA system requirements document
[NASA-RP-1226] p 10 N89-26209

RADIANCE

- Summary of along-track data from the earth radiation budget satellite for several representative ocean regions
[NASA-RP-1206] p 15 N89-14634

RADIATION ABSORPTION

- Absorbed dose thresholds and absorbed dose rate limitations for studies of electron radiation effects on polyetherimides
[NASA-TP-2928] p 8 N89-25332

RADIATION DAMAGE

- Fifteenth Space Simulation Conference: Support the Highway to Space Through Testing
[NASA-CP-3015] p 6 N89-12582

RADIATION DOSAGE

- Solar-flare shielding with Regolith at a lunar-base site
[NASA-TP-2869] p 23 N89-14210
Absorbed dose thresholds and absorbed dose rate limitations for studies of electron radiation effects on polyetherimides
[NASA-TP-2928] p 8 N89-25332

RADIATION EFFECTS

- The effects of simulated space environmental parameters on six commercially available composite materials
[NASA-TP-2906] p 7 N89-19385

- Degradation and crosslinking of perfluoroalkyl polyethers under X-ray irradiation in ultrahigh vacuum
[NASA-TP-2910] p 8 N89-21103

- NASA/SPIO Space Environmental Effects on Materials Workshop, part 1
[NASA-CP-3035-PT-1] p 7 N89-23528

- NASA/SPIO Space Environmental Effects on Materials Workshop, part 2
[NASA-CP-3035-PT-2] p 7 N89-23547

- Absorbed dose thresholds and absorbed dose rate limitations for studies of electron radiation effects on polyetherimides
[NASA-TP-2928] p 8 N89-25332

RADIATION HAZARDS

- Benchmark solutions for the galactic ion transport equations: Energy and spatially dependent problems
[NASA-TP-2878] p 23 N89-16714

RADIATION PYROMETERS

- Determination of combustion gas temperatures by infrared radiometry in sooting and nonsooting flames
[NASA-TP-2900] p 9 N89-25409

RADIATION SHIELDING

- Solar-flare shielding with Regolith at a lunar-base site
[NASA-TP-2869] p 23 N89-14210

RADIATION SPECTRA

- Analysis of positron lifetime spectra in polymers
[NASA-TP-2853] p 17 N89-12237

RADIATIVE TRANSFER

- Remote Sensing in Polarized Light
[NASA-CP-3014] p 20 N89-14189

RADIO ALTIMETERS

- MARA (Multimode Airborne Radar Altimeter) system documentation. Volume 1: MARA system requirements document
[NASA-RP-1226] p 10 N89-26209

RADIO ASTRONOMY

- Future Astronomical Observatories on the Moon
[NASA-CP-2489] p 21 N89-15810

RADIO COMMUNICATION

- A simulator investigation of the use of digital data link for pilot/ATC communications in a single pilot operation
[NASA-TP-2837] p 3 N89-11726

RADIO TELESCOPES

- Future Astronomical Observatories on the Moon
[NASA-CP-2489] p 21 N89-15810

RADIOMETERS

- Limb-darkening functions as derived from along-track operation of the ERBE scanning radiometer for January 1985
[NASA-RP-1214] p 15 N89-17374

RAIN

- Propagation effects handbook for satellite systems design. A summary of propagation impairments on 10 to 100 GHz satellite links with techniques for system design
[NASA-RP-1082(04)] p 8 N89-17060

- Steady-state and transitional aerodynamic characteristics of a wing in simulated heavy rain
[NASA-TP-2932] p 3 N89-25951

RAMAN SPECTRA

- Raman intensity as a probe of concentration near a crystal growing in solution
[NASA-TP-2865] p 10 N89-16139

RAMAN SPECTROSCOPY

- Raman intensity as a probe of concentration near a crystal growing in solution
[NASA-TP-2865] p 10 N89-16139

RATINGS

- Simulator evaluation of a display for a Takeoff Performance Monitoring System
[NASA-TP-2908] p 5 N89-23469

RECONSTRUCTION

- The estimation error covariance matrix for the ideal state reconstructor with measurement noise
[NASA-TP-2881] p 17 N89-13994

- A new state reconstructor for digital controls systems using weighted-average measurements
[NASA-TP-2936] p 8 N89-27039

REDUCED GRAVITY

- Microgravity Combustion Diagnostics Workshop
[NASA-CP-10017] p 8 N89-17682
Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
[NASA-CP-10026-VOL-1] p 16 N89-24022

- Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 2: Abstracts, candidate experiments and feasibility study
[NASA-CP-10026-VOL-2] p 16 N89-24023

REDUNDANCY

- A closed-form trim solution yielding minimum trim drag for airplanes with multiple longitudinal-control effectors
[NASA-TP-2907] p 5 N89-23468

REFLECTANCE

- Analytical and experimental procedures for determining propagation characteristics of millimeter-wave gallium arsenide microstrip lines
[NASA-TP-2899] p 9 N89-21169

REFLECTORS

- Measured and predicted root-mean-square errors in square and triangular antenna mesh facets
[NASA-TP-2896] p 11 N89-17892

REGOLITH

- Lunar Helium-3 and Fusion Power
[NASA-CP-10018] p 19 N89-14842

RELIABILITY ANALYSIS

- The Fault Tree Compiler (FTC): Program and mathematics
[NASA-TP-2915] p 18 N89-24815

REMOTE SENSING

- Limb-darkening functions as derived from along-track operation of the ERBE scanning radiometer for January 1985
[NASA-RP-1214] p 15 N89-17374

- Earth resources: A continuing bibliography with indexes (issue 62)
[NASA-SP-7041(62)] p 13 N89-29825

REMOTE SENSORS

- Earth resources: A continuing bibliography with indexes (issue 62)
[NASA-SP-7041(62)] p 13 N89-29825

REMOTELY PILOTED VEHICLES

- Flight control systems development and flight test experience with the HiMAT research vehicles
[NASA-TP-2822] p 5 N89-15929

REQUIREMENTS

Practices in adequate structural design
[NASA-TP-2893] p 6 N89-18504
MARA (Multimode Airborne Radar Altimeter) system documentation. Volume 1: MARA system requirements document
[NASA-RP-1226] p 10 N89-26209

RESEARCH AIRCRAFT

Flight control systems development and flight test experience with the HiMAT research vehicles
[NASA-TP-2822] p 5 N89-15929
Modal control of an oblique wing aircraft
[NASA-TP-2898] p 5 N89-16845

RESIN MATRIX COMPOSITES

Cyclic loads tests of carbon involute solid rocket motor outer boot ring segments
[NASA-TP-2884] p 11 N89-16192

RESOURCES MANAGEMENT

Issues in NASA program and project management
[NASA-SP-6101] p 19 N89-12479

REVERSED FLOW

Thrust-reverser flow investigation on a twin-engine transport
[NASA-TP-2856] p 1 N89-14213

RING STRUCTURES

Application of Newton's method to the postbuckling of rings under pressure loadings
[NASA-TP-2941] p 13 N89-29811

RIVERS

Sapping features of the Colorado Plateau: A comparative planetary geology field guide
[NASA-SP-491] p 13 N89-10401

ROBOTICS

Experiments in Planetary and Related Sciences and the Space Station
[NASA-CP-2494] p 20 N89-14998
Fourth Conference on Artificial Intelligence for Space Applications
[NASA-CP-3013] p 17 N89-15549
Second Annual Workshop on Space Operations Automation and Robotics (SOAR 1988)
[NASA-CP-3019] p 17 N89-19817

ROCKET ENGINE CASES

Lightweight structural design of a bolted case joint for the space shuttle solid rocket motor
[NASA-TP-2851] p 6 N89-12580

ROCKET ENGINE DESIGN

Advanced Earth-to-Orbit Propulsion Technology 1986, volume 2
[NASA-CP-2437-VOL-2] p 6 N89-12626

ROLLER BEARINGS

Comparison of predicted and measured temperatures of UH-60A helicopter transmission
[NASA-TP-2911] p 11 N89-24607

ROOT-MEAN-SQUARE ERRORS

Measured and predicted root-mean-square errors in square and triangular antenna mesh facets
[NASA-TP-2896] p 11 N89-17892

ROTARY WINGS

Effect of advanced rotorcraft airfoil sections on the hover performance of a small-scale rotor model
[NASA-TP-2832] p 2 N89-24264

ROTOR AERODYNAMICS

Tip aerodynamics and acoustics test: A report and data survey
[NASA-RP-1179] p 2 N89-17579
Rotordynamic Instability Problems in High-Performance Turbomachinery, 1988
[NASA-CP-3026] p 10 N89-22891

ROTORCRAFT AIRCRAFT

Effect of advanced rotorcraft airfoil sections on the hover performance of a small-scale rotor model
[NASA-TP-2832] p 2 N89-24264

RP-1 ROCKET PROPELLANTS

High-pressure calorimeter chamber tests for liquid oxygen/kerosene (LOX/RP-1) rocket combustion
[NASA-TP-2862] p 7 N89-15979

S

SAGE SATELLITE

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
[NASA-TP-2866] p 18 N89-16415

SALT SPRAY TESTS

Stress corrosion study of PH13-8Mo stainless steel using the Slow Strain Rate Technique
[NASA-TP-2934] p 7 N89-26976

SATELLITE COMMUNICATION

Propagation effects handbook for satellite systems design. A summary of propagation impairments on 10 to 100 GHz satellite links with techniques for system design
[NASA-RP-1082(04)] p 8 N89-17060

SATELLITE OBSERVATION

Limb-darkening functions as derived from along-track operation of the ERBE scanning radiometer for January 1985
[NASA-RP-1214] p 15 N89-17374
Comparison of satellite-derived dynamical quantities for the stratosphere of the Southern Hemisphere
[NASA-CP-3044] p 14 N89-25540

SATELLITE SOUNDING

Nimbus-7 Stratospheric and Mesospheric Sounder (SAMS) experiment data user's guide
[NASA-RP-1221] p 14 N89-26304

SATURN

The Cassini mission: Infrared and microwave spectroscopic measurements
[NASA-RP-1213] p 22 N89-16709

SCALE MODELS

Flight control systems development and flight test experience with the HiMAT research vehicles
[NASA-TP-2822] p 5 N89-15929

SCANNERS

Limb-darkening functions as derived from along-track operation of the ERBE scanning radiometer for January 1985
[NASA-RP-1214] p 15 N89-17374

SCANNING

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
[NASA-TP-2866] p 18 N89-16415

SCATTERING CROSS SECTIONS

Kaon-nucleus scattering
[NASA-TP-2920] p 23 N89-25103

SCHEDULING

Simulation evaluation of TIMER, a time-based, terminal air traffic, flow-management concept
[NASA-TP-2870] p 3 N89-15901
A knowledge-based tool for multilevel decomposition of a complex design problem
[NASA-TP-2903] p 18 N89-23181

SCHROEDINGER EQUATION

Kaon-nucleus scattering
[NASA-TP-2920] p 23 N89-25103

SEALS (STOPPERS)

Rotordynamic Instability Problems in High-Performance Turbomachinery, 1988
[NASA-CP-3026] p 10 N89-22891

SECONDARY EMISSION

Secondary electron emission characteristics of untreated and ion-textured titanium
[NASA-TP-2902] p 7 N89-17650

SEEPAGE

Sapping features of the Colorado Plateau: A comparative planetary geology field guide
[NASA-SP-491] p 13 N89-10401

SEPARATED FLOW

A review of high-speed, convective, heat-transfer computation methods
[NASA-TP-2914] p 10 N89-27116

SHAPED CHARGES

Effects of variables upon pyrotechnically induced shock response spectra, part 2
[NASA-TP-2872] p 11 N89-13814

SHEAR FLOW

A spectral collocation solution to the compressible stability eigenvalue problem
[NASA-TP-2858] p 1 N89-12543

SHELLS (STRUCTURAL FORMS)

Computational Methods for Structural Mechanics and Dynamics, part 1
[NASA-CP-3034-PT-1] p 12 N89-24638

SHOCK HEATING

A review of high-speed, convective, heat-transfer computation methods
[NASA-TP-2914] p 10 N89-27116

SHOCK WAVE INTERACTION

Weak-wave analysis of shock interaction with a slipstream
[NASA-TP-2848] p 1 N89-10020

SHORT TAKEOFF AIRCRAFT

The 1987 Ground Vortex Workshop
[NASA-CP-10008] p 1 N89-10849

SIGNAL PROCESSING

Proceedings of the Scientific Data Compression Workshop
[NASA-CP-3025] p 17 N89-22332

SILICON

Indentation plasticity and fracture in silicon
[NASA-TP-2863] p 7 N89-10996

SILVER

Auger electron intensity variations in oxygen-exposed large grain polycrystalline silver
[NASA-TP-2930] p 19 N89-30022

SIMULATION

A simulator investigation of the use of digital data link for pilot/ATC communications in a single pilot operation
[NASA-TP-2837] p 3 N89-11726
Simulation evaluation of TIMER, a time-based, terminal air traffic, flow-management concept
[NASA-TP-2870] p 3 N89-15901

SIMULATORS

Simulator evaluation of a display for a Takeoff Performance Monitoring System
[NASA-TP-2908] p 5 N89-23469

SINGLE CRYSTALS

Indentation plasticity and fracture in silicon
[NASA-TP-2863] p 7 N89-10996

SLIDING FRICTION

Reaction of perfluoroalkylpolyethers (PFPE) with 440C steel in vacuum under sliding conditions at room temperature
[NASA-TP-2883] p 8 N89-26091

SLIPSTREAMS

Weak-wave analysis of shock interaction with a slipstream
[NASA-TP-2848] p 1 N89-10020

SOFTWARE ENGINEERING

NASA Workshop on Computational Structural Mechanics 1987, part 1
[NASA-CP-10012-PT-1] p 12 N89-29773
NASA Workshop on Computational Structural Mechanics 1987, part 3
[NASA-CP-10012-PT-3] p 12 N89-29799

SOFTWARE TOOLS

OEXP Analysis Tools Workshop
[NASA-CP-10013] p 17 N89-11407
Integrated tools for control-system analysis
[NASA-TP-2885] p 5 N89-19309
A knowledge-based tool for multilevel decomposition of a complex design problem
[NASA-TP-2903] p 18 N89-23181

SOILS

Exobiology and Future Mars Missions
[NASA-CP-10027] p 16 N89-26334

SOLAR ARRAYS

Space Photovoltaic Research and Technology, 1988. High Efficiency, Space Environment, and Array Technology
[NASA-CP-3030] p 14 N89-24704

SOLAR CELLS

Space Photovoltaic Research and Technology, 1988. High Efficiency, Space Environment, and Array Technology
[NASA-CP-3030] p 14 N89-24704

SOLAR COLLECTORS

Analysis of Nd3+ glass, solar-pumped, high-power laser systems
[NASA-TP-2905] p 10 N89-17855

SOLAR CONSTANT

Nimbus-7 ERB Solar Analysis Tape (ESAT) user's guide
[NASA-RP-1211] p 23 N89-30151

SOLAR ENERGY

Nimbus-7 data product summary
[NASA-RP-1215] p 13 N89-22152

SOLAR FLARES

Solar-flare shielding with Regolith at a lunar-base site
[NASA-TP-2869] p 23 N89-14210

SOLAR RADIATION

Nimbus-7 data product summary
[NASA-RP-1215] p 13 N89-22152

SOLAR SIMULATORS

Fifteenth Space Simulation Conference: Support the Highway to Space Through Testing
[NASA-CP-3015] p 6 N89-12582

SOLAR SPECTRA

A high-resolution atlas of the infrared spectrum of the sun and the earth atmosphere from space. A compilation of ATMOS 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
[NASA-RP-1224-VOL-2] p 15 N89-28969
Nimbus-7 ERB Solar Analysis Tape (ESAT) user's guide
[NASA-RP-1211] p 23 N89-30151

SOLID ELECTRODES

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
[NASA-TP-2904] p 9 N89-21171

SOLID STATE DEVICES

Universal test fixture for monolithic mm-wave integrated circuits calibrated with an augmented TRD algorithm
[NASA-TP-2875] p 9 N89-17767

SOLUTIONS

Raman intensity as a probe of concentration near a crystal growing in solution
[NASA-TP-2865] p 10 N89-16139

SONIC BOOMS

Status of sonic boom methodology and understanding
[NASA-CP-3027] p 2 N89-23415

SOOT

Determination of combustion gas temperatures by infrared radiometry in sooting and nonsooting flames
[NASA-TP-2900] p 9 N89-25409

SOUND TRANSMISSION

Evaluation of the ride quality of a light twin engine airplane using a ride quality meter
[NASA-TP-2913] p 1 N89-22568

SOUTHERN HEMISPHERE

The 1988 Antarctic ozone monitoring Nimbus-7 TOMS data atlas
[NASA-RP-1225] p 16 N89-28983

SPACE COMMERCIALIZATION

Report of the In Situ Resources Utilization Workshop
[NASA-CP-3017] p 20 N89-14188

SPACE DEBRIS

NASA/SDIO Space Environmental Effects on Materials Workshop, part 1
[NASA-CP-3035-PT-1] p 7 N89-23528

SPACE ENVIRONMENT SIMULATION

Fifteenth Space Simulation Conference: Support the Highway to Space Through Testing
[NASA-CP-3015] p 6 N89-12582

The effects of simulated space environmental parameters on six commercially available composite materials
[NASA-TP-2906] p 7 N89-19385

SPACE EXPLORATION

Orders of magnitude: A history of the NACA and NASA, 1915-1990
[NASA-SP-4406] p 24 N89-26805

SPACE HABITATS

Report of the In Situ Resources Utilization Workshop
[NASA-CP-3017] p 20 N89-14188

SPACE LABORATORIES

Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
[NASA-CP-10026-VOL-1] p 16 N89-24022

SPACE SHUTTLE BOOSTERS

Cyclic loads tests of carbon involute solid rocket motor outer boot ring segments
[NASA-TP-2884] p 11 N89-16192

SPACE SHUTTLE MAIN ENGINE

Lightweight structural design of a bolted case joint for the space shuttle solid rocket motor
[NASA-TP-2851] p 6 N89-12580

Advanced Earth-to-Orbit Propulsion Technology 1986, volume 2
[NASA-CP-2437-VOL-2] p 6 N89-12626

SPACE SHUTTLE PAYLOADS

The 1988 Get Away Special Experimenter's Symposium
[NASA-CP-3008] p 5 N89-10902

Remote Sensing in Polarized Light
[NASA-CP-3014] p 20 N89-14189

SPACE SHUTTLES

Practices in adequate structural design
[NASA-TP-2893] p 6 N89-18504

SPACE SIMULATORS

Fifteenth Space Simulation Conference: Support the Highway to Space Through Testing
[NASA-CP-3015] p 6 N89-12582

SPACE STATION PAYLOADS

Experiments in Planetary and Related Sciences and the Space Station
[NASA-CP-2494] p 20 N89-14998

Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
[NASA-CP-10026-VOL-1] p 16 N89-24022

SPACE STATION POWER SUPPLIES

Space station systems: A bibliography with indexes (supplement 7)
[NASA-SP-7056(07)] p 6 N89-18522

SPACE STATION PROPULSION

Space station systems: A bibliography with indexes (supplement 7)
[NASA-SP-7056(07)] p 6 N89-18522

SPACE STATION STRUCTURES

Space station systems: A bibliography with indexes (supplement 7)
[NASA-SP-7056(07)] p 6 N89-18522

SPACE STATIONS

Fifteenth Space Simulation Conference: Support the Highway to Space Through Testing
[NASA-CP-3015] p 6 N89-12582

Space Station Induced Monitoring
[NASA-CP-3021] p 20 N89-15790

Interactive orbital proximity operations planning system
[NASA-TP-2839] p 17 N89-18039

Space station systems: A bibliography with indexes (supplement 7)
[NASA-SP-7056(07)] p 6 N89-18522

The 23rd Aerospace Mechanisms Symposium
[NASA-CP-3032] p 12 N89-23892

Technology for large space systems: A bibliography with indexes (supplement 20)
[NASA-SP-7046(20)] p 6 N89-26037

SPACEBORNE EXPERIMENTS

The 1988 Get Away Special Experimenter's Symposium
[NASA-CP-3008] p 5 N89-10902

Technology for Future NASA Missions: Civil Space Technology Initiative (CSTI) and Pathfinder
[NASA-CP-3016] p 5 N89-11760

Experiments in Planetary and Related Sciences and the Space Station
[NASA-CP-2494] p 20 N89-14998

Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
[NASA-CP-10026-VOL-1] p 16 N89-24022

Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 2: Abstracts, candidate experiments and feasibility study
[NASA-CP-10026-VOL-2] p 16 N89-24023

SPACECRAFT CHARGING

Space Station Induced Monitoring
[NASA-CP-3021] p 20 N89-15790

NASA/SDIO Space Environmental Effects on Materials Workshop, part 1
[NASA-CP-3035-PT-1] p 7 N89-23528

SPACECRAFT CONSTRUCTION MATERIALS

Technology for Future NASA Missions: Civil Space Technology Initiative (CSTI) and Pathfinder
[NASA-CP-3016] p 5 N89-11760

SPACECRAFT CONTAMINATION

Fifteenth Space Simulation Conference: Support the Highway to Space Through Testing
[NASA-CP-3015] p 6 N89-12582

NASA/SDIO Space Environmental Effects on Materials Workshop, part 1
[NASA-CP-3035-PT-1] p 7 N89-23528

SPACECRAFT DESIGN

Recent Advances in Multidisciplinary Analysis and Optimization, part 3
[NASA-CP-3031-PT-3] p 4 N89-25201

SPACECRAFT DOCKING

The 23rd Aerospace Mechanisms Symposium
[NASA-CP-3032] p 12 N89-23892

SPACECRAFT ENVIRONMENTS

Report of the 1st Planning Workshop for CELSS Flight Experimentation
[NASA-CP-10020] p 17 N89-13898

SPACECRAFT INSTRUMENTS

Technology for Future NASA Missions: Civil Space Technology Initiative (CSTI) and Pathfinder
[NASA-CP-3016] p 5 N89-11760

The Cassini mission: Infrared and microwave spectroscopic measurements
[NASA-RP-1213] p 22 N89-16709

SPACECRAFT ORBITS

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
[NASA-TP-2866] p 18 N89-16415

SPACECRAFT PERFORMANCE

Flight Mechanics/Estimation Theory Symposium 1988
[NASA-CP-3011] p 5 N89-15934

SPACECRAFT POWER SUPPLIES

Technology for Future NASA Missions: Civil Space Technology Initiative (CSTI) and Pathfinder
[NASA-CP-3016] p 5 N89-11760

Space Photovoltaic Research and Technology, 1988. High Efficiency, Space Environment, and Array Technology
[NASA-CP-3030] p 14 N89-24704

SPACECRAFT PROPULSION

Technology for Future NASA Missions: Civil Space Technology Initiative (CSTI) and Pathfinder
[NASA-CP-3016] p 5 N89-11760

Advanced Earth-to-Orbit Propulsion Technology 1986, volume 2
[NASA-CP-2437-VOL-2] p 6 N89-12626

SPACECRAFT STRUCTURES

Effects of variables upon pyrotechnically induced shock response spectra, part 2
[NASA-TP-2872] p 11 N89-13814

SPACECRAFT TRAJECTORIES

Interactive orbital proximity operations planning system
[NASA-TP-2839] p 17 N89-18039

SPATIAL FILTERING

Spatial vision processes: From the optical image to the symbolic structures of contour information
[NASA-TP-2838] p 10 N89-13762

SPHERICAL COORDINATES

Compilation of methods in orbital mechanics and solar geometry
[NASA-RP-1204] p 14 N89-10420

SPLIT FLAPS

Aerodynamic pressures and heating rates on surfaces between split elevons at Mach 6.6
[NASA-TP-2855] p 9 N89-12822

STAINLESS STEELS

An electrochemical study of corrosion protection by primer-topcoat systems on 4130 steel with ac impedance and dc methods
[NASA-TP-2820] p 7 N89-19406

Reaction of perfluoroalkylpolyethers (PFPE) with 440C steel in vacuum under sliding conditions at room temperature
[NASA-TP-2883] p 8 N89-26091

Stress corrosion study of PH13-8Mo stainless steel using the Slow Strain Rate Technique
[NASA-TP-2934] p 7 N89-26976

STAR DISTRIBUTION

Atlas of galaxies useful for measuring the cosmological distance scale
[NASA-SP-496] p 21 N89-12513

STAR TRACKERS

Further developments in modeling digital control systems with MA-prefiltered measurements
[NASA-TP-2909] p 8 N89-24507

STARS

Infrared astronomical satellite (IRAS) catalogs and atlases, Volume 5: The point source catalog declination range -30 deg greater than delta greater than -50 deg
[NASA-RP-1190-VOL-5] p 21 N89-14195

Infrared astronomical satellite (IRAS) catalogs and atlases, Volume 2: The point source catalog declination range 90 deg greater than delta greater than 30 deg
[NASA-RP-1190-VOL-2] p 22 N89-14197

Infrared astronomical satellite (IRAS) catalogs and atlases, Volume 6: The point source catalog declination range -50 deg greater than delta greater than -90 deg
[NASA-RP-1190-VOL-6] p 22 N89-14198

Infrared astronomical satellite (IRAS) catalogs and atlases, Volume 7: The small scale structure catalog
[NASA-RP-1190-VOL-7] p 22 N89-14199

Infrared astronomical satellite (IRAS) catalogs and atlases, Volume 3: The point source catalog declination range 30 deg greater than delta greater than 0 deg
[NASA-RP-1190-VOL-3] p 22 N89-14201

STATE ESTIMATION

The estimation error covariance matrix for the ideal state reconstructor with measurement noise
[NASA-TP-2881] p 17 N89-13994

A new state reconstructor for digital controls systems using weighted-average measurements
[NASA-TP-2936] p 8 N89-27039

STATIC TESTS

Static internal performance of a nonaxisymmetric vaned thrust reverser with flow splay capability
[NASA-TP-2933] p 3 N89-27634

STATOR BLADES

Three component laser anemometer measurements in an annular cascade of core turbine vanes with contoured end wall
[NASA-TP-2846] p 1 N89-10844

STEADY STATE

Steady-state and transitional aerodynamic characteristics of a wing in simulated heavy rain
[NASA-TP-2932] p 3 N89-25951

STELLAR ATMOSPHERES

Commentary on interstellar matter associated with 18 open clusters
[NASA-RP-1229] p 22 N89-27612

STELLAR COLOR

O stars and Wolf-Rayet stars
[NASA-SP-497] p 21 N89-11657

STELLAR COMPOSITION

O stars and Wolf-Rayet stars
[NASA-SP-497] p 21 N89-11657

STELLAR LUMINOSITY

O stars and Wolf-Rayet stars
[NASA-SP-497] p 21 N89-11657

STORAGE BATTERIES

Space Electrochemical Research and Technology Conference: Abstracts
[NASA-CP-10029] p 14 N89-22982

STRAIN ENERGY METHODS

Seventeenth NASTRAN (R) Users' Colloquium
[NASA-CP-3029] p 11 N89-22940

STRAIN GAGES

Evaluation of a strain-gage load calibration on a low-aspect-ratio wing structure at elevated temperature
[NASA-TP-2921] p 12 N89-28034

STRAIN HARDENING

- Weld stresses beyond elastic limit: Materials discontinuity
[NASA-TP-2935] p 12 N89-27214
- STRAIN RATE**
Stress corrosion study of PH13-8Mo stainless steel using the Slow Strain Rate Technique
[NASA-TP-2934] p 7 N89-26976
- STRATOSPHERE**
Polar Ozone Workshop. Abstracts
[NASA-CP-10014] p 14 N89-14503
Comparison of satellite-derived dynamical quantities for the stratosphere of the Southern Hemisphere
[NASA-CP-3044] p 14 N89-25540
Nimbus-7 Stratospheric and Mesospheric Sounder (SAMS) experiment data user's guide
[NASA-RP-1221] p 14 N89-26304
A high-resolution atlas of the infrared spectrum of the sun and the earth atmosphere from space. A compilation of ATMOS 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
[NASA-RP-1224-VOL-2] p 15 N89-28969
- STRESS ANALYSIS**
Practices in adequate structural design
[NASA-TP-2893] p 6 N89-18504
Mixed formulation for frictionless contact problems
[NASA-TP-2897] p 11 N89-19580
Computational Methods for Structural Mechanics and Dynamics, part 1
[NASA-CP-3034-PT-1] p 12 N89-24638
Computational Methods for Structural Mechanics and Dynamics
[NASA-CP-3034-PT-2] p 12 N89-24654
- STRESS CONCENTRATION**
Weld stresses beyond elastic limit: Materials discontinuity
[NASA-TP-2935] p 12 N89-27214
- STRESS CORROSION CRACKING**
Stress corrosion study of PH13-8Mo stainless steel using the Slow Strain Rate Technique
[NASA-TP-2934] p 7 N89-26976
- STRESS-STRAIN RELATIONSHIPS**
Cyclic loads tests of carbon involute solid rocket motor outer boot ring segments
[NASA-TP-2884] p 11 N89-16192
Tungsten fiber reinforced copper matrix composites: A review
[NASA-TP-2924] p 7 N89-27796
- STRESSES**
Weld stresses beyond elastic limit: Materials discontinuity
[NASA-TP-2935] p 12 N89-27214
- STRUCTURAL ANALYSIS**
Lightweight structural design of a bolted case joint for the space shuttle solid rocket motor
[NASA-TP-2851] p 6 N89-12580
Turbine Engine Hot Section Technology 1986
[NASA-CP-2444] p 11 N89-12876
Turbine Engine Hot Section Technology, 1987
[NASA-CP-2493] p 11 N89-17298
Measured and predicted root-mean-square errors in square and triangular antenna mesh facets
[NASA-TP-2896] p 11 N89-17892
Seventeenth NASTRAN (R) Users' Colloquium
[NASA-CP-3029] p 11 N89-22940
Computational Methods for Structural Mechanics and Dynamics, part 1
[NASA-CP-3034-PT-1] p 12 N89-24638
Recent Advances in Multidisciplinary Analysis and Optimization, part 2
[NASA-CP-3031-PT-2] p 4 N89-25173
NASA Workshop on Computational Structural Mechanics 1987, part 1
[NASA-CP-10012-PT-1] p 12 N89-29773
NASA Workshop on Computational Structural Mechanics 1987, part 2
[NASA-CP-10012-PT-2] p 12 N89-29789
NASA Workshop on Computational Structural Mechanics 1987, part 3
[NASA-CP-10012-PT-3] p 12 N89-29799
- STRUCTURAL DESIGN**
Practices in adequate structural design
[NASA-TP-2893] p 6 N89-18504
Recent Advances in Multidisciplinary Analysis and Optimization, part 2
[NASA-CP-3031-PT-2] p 4 N89-25173
Recent Advances in Multidisciplinary Analysis and Optimization, part 3
[NASA-CP-3031-PT-3] p 4 N89-25201
- STRUCTURAL ENGINEERING**
Recent Advances in Multidisciplinary Analysis and Optimization, part 1
[NASA-CP-3031-PT-1] p 4 N89-25146

- Recent Advances in Multidisciplinary Analysis and Optimization, part 3
[NASA-CP-3031-PT-3] p 4 N89-25201
Technology for large space systems: A bibliography with indexes (supplement 20)
[NASA-SP-7046(20)] p 6 N89-26037
NASA Workshop on Computational Structural Mechanics 1987, part 2
[NASA-CP-10012-PT-2] p 12 N89-29789
- STRUCTURAL FAILURE**
Application of Newton's method to the postbuckling of rings under pressure loadings
[NASA-TP-2941] p 13 N89-29811
- SUBJECTS**
The NASA scientific and technical information system: Its scope and coverage
[NASA-SP-7065] p 20 N89-15779
- SUBSONIC FLOW**
Validation of a pair of computer codes for estimation and optimization of subsonic aerodynamic performance of simple hinged-flap systems for thin swept wings
[NASA-TP-2828] p 1 N89-10024
- SUN**
Compilation of methods in orbital mechanics and solar geometry
[NASA-RP-1204] p 14 N89-10420
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
[NASA-TP-2866] p 18 N89-16415
- SUPERCRITICAL AIRFOILS**
NASA SC(2)-0714 airfoil data corrected for sidewall boundary-layer effects in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TP-2890] p 2 N89-17568
- SUPERSONIC FLIGHT**
Status of sonic boom methodology and understanding
[NASA-CP-3027] p 2 N89-23415
- SUPERSONIC SPEED**
Effect of milling machine roughness and wing dihedral on the supersonic aerodynamic characteristics of a highly swept wing
[NASA-TP-2918] p 3 N89-25117
- SURFACE FINISHING**
Secondary electron emission characteristics of untreated and ion-textured titanium
[NASA-TP-2902] p 7 N89-17650
- SURFACE NAVIGATION**
Joint University Program for Air Transportation Research, 1987
[NASA-CP-3028] p 1 N89-19230
- SURFACE ROUGHNESS EFFECTS**
Effect of milling machine roughness and wing dihedral on the supersonic aerodynamic characteristics of a highly swept wing
[NASA-TP-2918] p 3 N89-25117
- SURFACE WAVES**
A procedure for computing surface wave trajectories on an inhomogeneous surface
[NASA-TP-2929] p 3 N89-26811
- SWEEP WINGS**
Validation of a pair of computer codes for estimation and optimization of subsonic aerodynamic performance of simple hinged-flap systems for thin swept wings
[NASA-TP-2828] p 1 N89-10024
Effect of milling machine roughness and wing dihedral on the supersonic aerodynamic characteristics of a highly swept wing
[NASA-TP-2918] p 3 N89-25117
- SYMBOLS**
Spatial vision processes: From the optical image to the symbolic structures of contour information
[NASA-TP-2838] p 10 N89-13762
- SYSTEMS ANALYSIS**
Integrated tools for control-system analysis
[NASA-TP-2885] p 5 N89-19309
- SYSTEMS ENGINEERING**
A knowledge-based tool for multilevel decomposition of a complex design problem
[NASA-TP-2903] p 18 N89-23181
Recent Advances in Multidisciplinary Analysis and Optimization, part 3
[NASA-CP-3031-PT-3] p 4 N89-25201
- SYSTEMS INTEGRATION**
Second Annual Workshop on Space Operations Automation and Robotics (SOAR 1988)
[NASA-CP-3019] p 17 N89-19817
Development and flight test experiences with a flight-crucial digital control system
[NASA-TP-2857] p 5 N89-24327

T

TAKEOFF

- Simulator evaluation of a display for a Takeoff Performance Monitoring System
[NASA-TP-2908] p 5 N89-23469

TANGENTS

- 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
[NASA-TP-2866] p 18 N89-16415

TAPERING

- Derivation of a tapered p-version beam finite element
[NASA-TP-2931] p 12 N89-26255

TECHNICAL WRITING

- The NASA scientific and technical information system: Its scope and coverage
[NASA-SP-7065] p 20 N89-15779

TECHNOLOGY ASSESSMENT

- Report of the In Situ Resources Utilization Workshop
[NASA-CP-3017] p 20 N89-14188

TELEMETRY

- Proceedings of the Scientific Data Compression Workshop
[NASA-CP-3025] p 17 N89-22332

TELEOPERATORS

- Second Annual Workshop on Space Operations Automation and Robotics (SOAR 1988)
[NASA-CP-3019] p 17 N89-19817
The 23rd Aerospace Mechanisms Symposium
[NASA-CP-3032] p 12 N89-23892

TEMPERATURE COMPENSATION

- Technique for temperature compensation of eddy-current proximity probes
[NASA-TP-2880] p 10 N89-15380

TEMPERATURE MEASUREMENT

- Technique for temperature compensation of eddy-current proximity probes
[NASA-TP-2880] p 10 N89-15380
Determination of combustion gas temperatures by infrared radiometry in sooting and nonsooting flames
[NASA-TP-2900] p 9 N89-25409

TEMPERATURE PROFILES

- Nimbus-7 Stratospheric and Mesospheric Sounder (SAMS) experiment data user's guide
[NASA-RP-1221] p 14 N89-26304

TERMINAL FACILITIES

- Simulation evaluation of TIMER, a time-based, terminal air traffic flow-management concept
[NASA-TP-2870] p 3 N89-15901

TERRESTRIAL RADIATION

- Summary of along-track data from the earth radiation budget satellite for several representative ocean regions
[NASA-RP-1206] p 15 N89-14634

TEXTURES

- Spatial vision processes: From the optical image to the symbolic structures of contour information
[NASA-TP-2838] p 10 N89-13762

THERMAL ANALYSIS

- Comparison of predicted and measured temperatures of UH-60A helicopter transmission
[NASA-TP-2911] p 11 N89-24607

THERMAL CONTROL COATINGS

- Fifteenth Space Simulation Conference: Support the Highway to Space Through Testing
[NASA-CP-3015] p 6 N89-12582
Turbine Engine Hot Section Technology 1986
[NASA-CP-2444] p 11 N89-12876
Thermal Barrier Coatings. Abstracts and figures
[NASA-CP-10019] p 8 N89-13642
Turbine Engine Hot Section Technology, 1987
[NASA-CP-2493] p 11 N89-17298

THERMAL FATIGUE

- Turbine Engine Hot Section Technology, 1987
[NASA-CP-2493] p 11 N89-17298

THERMAL RADIATION

- NASA/SDIO Space Environmental Effects on Materials Workshop, part 2
[NASA-CP-3035-PT-2] p 7 N89-23547

THERMOVISCOELASTICITY

- Thermoviscoelastic model with application to copper
[NASA-TP-2845] p 11 N89-16183

THESAURI

- NASA thesaurus. Volume 3: Definitions
[NASA-SP-7064-VOL-3] p 20 N89-13301

THIN WALLS

- Mixed finite element models for free vibrations of thin-walled beams
[NASA-TP-2868] p 11 N89-19579

THREE DIMENSIONAL FLOW

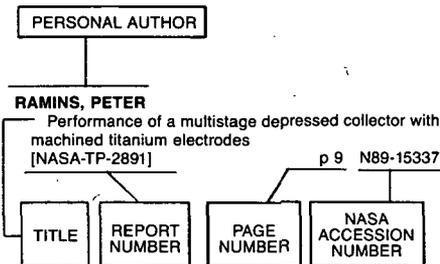
- Three-dimensional multigrid algorithms for the flux-split Euler equations
[NASA-TP-2829] p 18 N89-12316

- THRUST REVERSAL**
Thrust-reverser flow investigation on a twin-engine transport
[NASA-TP-2856] p 1 N89-14213
Static internal performance of a nonaxisymmetric vaned thrust reverser with flow splay capability
[NASA-TP-2933] p 3 N89-27634
- THRUST VECTOR CONTROL**
A closed-form trim solution yielding minimum trim drag for airplanes with multiple longitudinal-control effectors
[NASA-TP-2907] p 5 N89-23468
Static internal performance of a nonaxisymmetric vaned thrust reverser with flow splay capability
[NASA-TP-2933] p 3 N89-27634
- TIME DIVISION MULTIPLE ACCESS**
Digitally modulated bit error rate measurement system for microwave component evaluation
[NASA-TP-2912] p 6 N89-28545
- TIME SERIES ANALYSIS**
Polar microwave brightness temperatures from Nimbus-7 SMMR: Time series of daily and monthly maps from 1978 to 1987
[NASA-RP-1223] p 13 N89-26275
- TIRES**
Computational Methods for Structural Mechanics and Dynamics, part 1
[NASA-CP-3034-PT-1] p 12 N89-24638
- TITAN**
The Cassini mission: Infrared and microwave spectroscopic measurements
[NASA-RP-1213] p 22 N89-16709
- TITANIUM**
Performance of a multistage depressed collector with machined titanium electrodes
[NASA-TP-2891] p 9 N89-15337
Secondary electron emission characteristics of untreated and ion-textured titanium
[NASA-TP-2902] p 7 N89-17650
- TOLLMIE-SCHLICHTING WAVES**
Interactions of Tollmien-Schlichting waves and Dean vortices. Comparison of direct numerical simulation and a weakly nonlinear theory
[NASA-TP-2919] p 3 N89-25118
- TOTAL OZONE MAPPING SPECTROMETER**
The 1989 Airborne Arctic Stratospheric Expedition Nimbus-7 TOMS data atlas
[NASA-RP-1227] p 16 N89-27302
- TRANSIENT RESPONSE**
Steady-state and transitional aerodynamic characteristics of a wing in simulated heavy rain
[NASA-TP-2932] p 3 N89-25951
- TRANSITION TEMPERATURE**
Indentation plasticity and fracture in silicon
[NASA-TP-2863] p 7 N89-10996
- TRANSMISSIONS (MACHINE ELEMENTS)**
Comparison of predicted and measured temperatures of UH-60A helicopter transmission
[NASA-TP-2911] p 11 N89-24607
- TRANSONIC FLOW**
Transonic Unsteady Aerodynamics and Aeroelasticity 1987, part 1
[NASA-CP-3022-PT-1] p 2 N89-19234
Transonic Unsteady Aerodynamics and Aeroelasticity 1987, part 2
[NASA-CP-3022-PT-2] p 2 N89-19247
Transonic Symposium: Theory, Application, and Experiment, volume 1, part 2
[NASA-CP-3020-VOL-1-PT-2] p 2 N89-20942
- TRANSPORT AIRCRAFT**
Thrust-reverser flow investigation on a twin-engine transport
[NASA-TP-2856] p 1 N89-14213
Integration effects of pylon geometry on a high-wing transport airplane
[NASA-TP-2877] p 2 N89-15888
- TRANSPORT PROPERTIES**
BRYNTRN: A baryon transport model
[NASA-TP-2887] p 23 N89-17562
- TRANSPORT THEORY**
Benchmark solutions for the galactic ion transport equations: Energy and spatially dependent problems
[NASA-TP-2878] p 23 N89-16714
- TRAVELING WAVE TUBES**
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
[NASA-TP-2904] p 9 N89-21171
- TUNGSTEN**
Tungsten fiber reinforced copper matrix composites: A review
[NASA-TP-2924] p 7 N89-27796
- TURBINE BLADES**
Turbine Engine Hot Section Technology, 1987
[NASA-CP-2493] p 11 N89-17298
- TURBOMACHINERY**
Technique for temperature compensation of eddy-current proximity probes
[NASA-TP-2880] p 10 N89-15380
Rotordynamic Instability Problems in High-Performance Turbomachinery, 1988
[NASA-CP-3026] p 10 N89-22891
- TURBOPROP AIRCRAFT**
Advanced turboprop project
[NASA-SP-495] p 4 N89-12565
- TURBULENT BOUNDARY LAYER**
A review of high-speed, convective, heat-transfer computation methods
[NASA-TP-2914] p 10 N89-27116
- TURBULENT FLOW**
Mixing and Demixing Processes in Multiphase Flows With Application to Propulsion Systems
[NASA-CP-3006] p 9 N89-11153
- TWO PHASE FLOW**
Workshop on Two-Phase Fluid Behavior in a Space Environment
[NASA-CP-3043] p 10 N89-26184
- U**
- UH-60A HELICOPTER**
Comparison of predicted and measured temperatures of UH-60A helicopter transmission
[NASA-TP-2911] p 11 N89-24607
- UNIVERSITIES**
Orders of magnitude: A history of the NACA and NASA, 1915-1990
[NASA-SP-4406] p 24 N89-26805
- UNSTEADY AERODYNAMICS**
Transonic Unsteady Aerodynamics and Aeroelasticity 1987, part 1
[NASA-CP-3022-PT-1] p 2 N89-19234
Transonic Unsteady Aerodynamics and Aeroelasticity 1987, part 2
[NASA-CP-3022-PT-2] p 2 N89-19247
- USER MANUALS (COMPUTER PROGRAMS)**
User's guide for the Nimbus 7 Scanning Multichannel Microwave Radiometer (SMMR) CELL-ALL tape
[NASA-RP-1210] p 15 N89-14648
User's manual for interactive LINEAR: A FORTRAN program to derive linear aircraft models
[NASA-TP-2835] p 18 N89-16437
Nimbus-7 Stratospheric and Mesospheric Sounder (SAMS) experiment data user's guide
[NASA-RP-1221] p 14 N89-26304
Nimbus-7 ERB Solar Analysis Tape (ESAT) user's guide
[NASA-RP-1211] p 23 N89-30151
- V**
- VACUUM EFFECTS**
Reaction of perfluoroalkylpolyethers (PFPE) with 440C steel in vacuum under sliding conditions at room temperature
[NASA-TP-2883] p 8 N89-26091
- VATOL AIRCRAFT**
The 1987 Ground Vortex Workshop
[NASA-CP-10008] p 1 N89-10849
- VECTORS (MATHEMATICS)**
Proceedings of the Scientific Data Compression Workshop
[NASA-CP-3025] p 17 N89-22332
- VELOCITY MEASUREMENT**
Three component laser anemometer measurements in an annular cascade of core turbine vanes with contoured end wall
[NASA-TP-2846] p 1 N89-10844
- VERTICAL TAKEOFF AIRCRAFT**
The 1987 Ground Vortex Workshop
[NASA-CP-10008] p 1 N89-10849
- VIBRATION**
Evaluation of the ride quality of a light twin engine airplane using a ride quality meter
[NASA-TP-2913] p 1 N89-22568
- VISCOPLASTICITY**
Thermoviscoplastic model with application to copper
[NASA-TP-2845] p 11 N89-16183
- VISCOUS FLOW**
Transonic Unsteady Aerodynamics and Aeroelasticity 1987, part 2
[NASA-CP-3022-PT-2] p 2 N89-19247
- VOICE COMMUNICATION**
A simulator investigation of the use of digital data link for pilot/ATC communications in a single pilot operation
[NASA-TP-2837] p 3 N89-11726
- VORTEX SHEDDING**
Airfoil self-noise and prediction
[NASA-RP-1218] p 19 N89-25673
- VORTICES**
The 1987 Ground Vortex Workshop
[NASA-CP-10008] p 1 N89-10849
Interactions of Tollmien-Schlichting waves and Dean vortices. Comparison of direct numerical simulation and a weakly nonlinear theory
[NASA-TP-2919] p 3 N89-25118
- W**
- WATER COLOR**
Nimbus-7 data product summary
[NASA-RP-1215] p 13 N89-22152
- WAVE INTERACTION**
Interactions of Tollmien-Schlichting waves and Dean vortices. Comparison of direct numerical simulation and a weakly nonlinear theory
[NASA-TP-2919] p 3 N89-25118
- WAVE PROPAGATION**
Propagation effects handbook for satellite systems design. A summary of propagation impairments on 10 to 100 GHz satellite links with techniques for system design
[NASA-RP-1082(04)] p 8 N89-17060
- WELDING**
Weld stresses beyond elastic limit: Materials discontinuity
[NASA-TP-2935] p 12 N89-27214
- WIND SHEAR**
Piloted-simulation evaluation of escape guidance for microburst wind shear encounters
[NASA-TP-2886] p 4 N89-16820
- WIND TUNNEL TESTS**
Transonic Symposium: Theory, Application, and Experiment, Volume 1, Part 1
[NASA-CP-3020-VOL-1-PT-1] p 2 N89-20925
Transonic Symposium: Theory, Application, and Experiment, volume 1, part 2
[NASA-CP-3020-VOL-1-PT-2] p 2 N89-20942
Hot-jet simulation in cryogenic wind tunnels
[NASA-RP-1220] p 3 N89-23448
Static internal performance of a nonaxisymmetric vaned thrust reverser with flow splay capability
[NASA-TP-2933] p 3 N89-27634
- WIND TUNNEL WALLS**
NASA SC(2)-0714 airfoil data corrected for sidewall boundary-layer effects in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TP-2890] p 2 N89-17568
- WING LOADING**
Evaluation of a strain-gage load calibration on a low-aspect-ratio wing structure at elevated temperature
[NASA-TP-2921] p 12 N89-28034
- WINGS**
Integration effects of pylon geometry on a high-wing transport airplane
[NASA-TP-2877] p 2 N89-15888
Steady-state and transitional aerodynamic characteristics of a wing in simulated heavy rain
[NASA-TP-2932] p 3 N89-25951
- WOLF-RAYET STARS**
O stars and Wolf-Rayet stars
[NASA-SP-497] p 21 N89-11657
- Z**
- ZONAL FLOW (METEOROLOGY)**
Comparison of satellite-derived dynamical quantities for the stratosphere of the Southern Hemisphere
[NASA-CP-3044] p 14 N89-25540
- ZONAL HARMONICS**
An economical semi-analytical orbit theory for micro-computer applications
[NASA-TP-2811] p 19 N89-14052

PERSONAL AUTHOR INDEX

NASA Scientific and Technical Publications 1989

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document listed (e.g., NASA report, translation, NASA contractor report). The page and accession numbers are located beneath and to the right of the title. Under any one author's name the accession numbers are arranged in sequence with the AIAA accession numbers appearing first.

A

- AHMED, RAFIQ**
Cyclic loads tests of carbon involute solid rocket motor outer boot ring segments
[NASA-TP-2884] p 11 N89-16192
- AIKIN, ARTHUR C.**
Polar Ozone Workshop. Abstracts
[NASA-CP-10014] p 14 N89-14503
- ALFORD, WILLIAM L.**
LANDSAT-4 and LANDSAT-5 multispectral scanner coherent noise characterization and removal
[NASA-TP-2595-REV] p 13 N89-12114
- ALTHOFF, SUSAN L.**
Effect of advanced rotorcraft airfoil sections on the hover performance of a small-scale rotor model
[NASA-TP-2832] p 2 N89-24264
- ALTON, BRADLEY M.**
Nimbus-7 ERB Solar Analysis Tape (ESAT) user's guide
[NASA-RP-1211] p 23 N89-30151
- ANDERSON, W. KYLE**
Three-dimensional multigrid algorithms for the flux-split Euler equations
[NASA-TP-2829] p 18 N89-12316
- ANTONIEWICZ, ROBERT F.**
Derivation and definition of a linear aircraft model
[NASA-RP-1207] p 5 N89-15123
User's manual for interactive LINEAR: A FORTRAN program to derive linear aircraft models
[NASA-TP-2835] p 18 N89-16437
- ARMSTRONG, ELIZABETH S.**
High-pressure calorimeter chamber tests for liquid oxygen/kerosene (LOX/RP-1) rocket combustion
[NASA-TP-2862] p 7 N89-15979
- ASAI, KEISUKE**
Hot-jet simulation in cryogenic wind tunnels
[NASA-RP-1220] p 3 N89-23448

B

- BADI, DEBORAH**
OEXP Analysis Tools Workshop
[NASA-CP-10013] p 17 N89-11407

- BALLARD, RODNEY W.**
Proceedings of a conference on Cardiovascular Bioinstrumentation
[NASA-CP-10022] p 16 N89-17997
- BANGERT, LINDA S.**
Static internal performance of a nonaxisymmetric vaned thrust reverser with flow splay capability
[NASA-TP-2933] p 3 N89-27634
- BARGER, RAYMOND L.**
Weak-wave analysis of shock interaction with a slipstream
[NASA-TP-2848] p 1 N89-10020
A procedure for computing surface wave trajectories on an inhomogeneous surface
[NASA-TP-2929] p 3 N89-26811
- BARTHELEMY, JEAN-FRANCOIS M.**
Recent Advances in Multidisciplinary Analysis and Optimization, part 1
[NASA-CP-3031-PT-1] p 4 N89-25146
Recent Advances in Multidisciplinary Analysis and Optimization, part 2
[NASA-CP-3031-PT-2] p 4 N89-25173
Recent Advances in Multidisciplinary Analysis and Optimization, part 3
[NASA-CP-3031-PT-3] p 4 N89-25201
- BEDKE, JOHN**
Atlas of galaxies useful for measuring the cosmological distance scale
[NASA-SP-496] p 21 N89-12513
- BEICHMAN, C. A.**
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 1: Explanatory supplement
[NASA-RP-1190-VOL-1] p 21 N89-14194
- BELTON, MICHAEL J. S.**
Time-Variable Phenomena in the Jovian System
[NASA-SP-494] p 23 N89-28474
- BEZOS, GAUDY M.**
Steady-state and transitional aerodynamic characteristics of a wing in simulated heavy rain
[NASA-TP-2932] p 3 N89-25951
- BILSTEIN, ROGER E.**
Orders of magnitude: A history of the NACA and NASA, 1915-1990
[NASA-SP-4406] p 24 N89-26805
- BLACKFORD, GARY A.**
Secondary electron emission characteristics of untreated and ion-textured titanium
[NASA-TP-2902] p 7 N89-17650
- BLAND, SAMUEL R.**
Transonic Unsteady Aerodynamics and Aeroelasticity 1987, part 1
[NASA-CP-3022-PT-1] p 2 N89-19234
Transonic Unsteady Aerodynamics and Aeroelasticity 1987, part 2
[NASA-CP-3022-PT-2] p 2 N89-19247
- BLECH, RICHARD A.**
Parallel Gaussian elimination of a block tridiagonal matrix using multiple microcomputers
[NASA-TP-2892] p 18 N89-17422
- BORUCKI, WILLIAM J.**
Second Workshop on Improvements to Photometry
[NASA-CP-10015] p 21 N89-13310
- BROOKS, DAVID R.**
Summary of along-track data from the earth radiation budget satellite for several representative ocean regions
[NASA-RP-1206] p 15 N89-14634
- BROOKS, THOMAS F.**
Airfoil self-noise and prediction
[NASA-RP-1218] p 19 N89-25673
- BUCK, WARREN W.**
BRYNTRN: A baryon transport model
[NASA-TP-2887] p 23 N89-17562
Kaon-nucleus scattering
[NASA-TP-2920] p 23 N89-25103
- BUDINGER, JAMES M.**
Digitally modulated bit error rate measurement system for microwave component evaluation
[NASA-TP-2912] p 6 N89-28545
- BUGLIA, JAMES J.**
Compilation of methods in orbital mechanics and solar geometry
[NASA-RP-1204] p 14 N89-10420
- 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
[NASA-TP-2866] p 18 N89-16415
- BURKEN, JOHN J.**
Control surface spanwise placement in active flutter suppression systems
[NASA-TP-2873] p 11 N89-16196
- BURNS, JACK O.**
Future Astronomical Observatories on the Moon
[NASA-CP-2489] p 21 N89-15810
- BUSH, HAROLD G.**
Lightweight structural design of a bolted case joint for the space shuttle solid rocket motor
[NASA-TP-2851] p 6 N89-12580
- BUTLER, RICKY W.**
The Fault Tree Compiler (FTC): Program and mathematics
[NASA-TP-2915] p 18 N89-24815

C

- CAMPBELL, BRYAN A.**
Steady-state and transitional aerodynamic characteristics of a wing in simulated heavy rain
[NASA-TP-2932] p 3 N89-25951
- CAPRON, WILLIAM R.**
Simulation evaluation of TIMER, a time-based, terminal air traffic, flow-management concept
[NASA-TP-2870] p 3 N89-15901
- CARLSON, HARRY W.**
Validation of a pair of computer codes for estimation and optimization of subsonic aerodynamic performance of simple hinged-flap systems for thin swept wings
[NASA-TP-2828] p 1 N89-10024
- CARLSON, JOHN R.**
Integration effects of pylon geometry on a high-wing transport airplane
[NASA-TP-2877] p 2 N89-15888
- CHESTER, THOMAS J.**
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 1: Explanatory supplement
[NASA-RP-1190-VOL-1] p 21 N89-14194
- CHUN, SANG Y.**
BRYNTRN: A baryon transport model
[NASA-TP-2887] p 23 N89-17562
- CLARK, DAVID R.**
Integrated tools for control-system analysis
[NASA-TP-2885] p 5 N89-19309
- CLEGG, P. E.**
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 1: Explanatory supplement
[NASA-RP-1190-VOL-1] p 21 N89-14194
- COE, HAROLD H.**
Comparison of predicted and measured temperatures of UH-60A helicopter transmission
[NASA-TP-2911] p 11 N89-24607
- COLLINS, WILLIAM D.**
Absorbed dose thresholds and absorbed dose rate limitations for studies of electron radiation effects on polyetherimides
[NASA-TP-2928] p 8 N89-25332
- COMISO, JOSEFINO C.**
Polar microwave brightness temperatures from Nimbus-7 SMMR: Time series of daily and monthly maps from 1978 to 1987
[NASA-RP-1223] p 13 N89-26275
- COMPTON, WILLIAM DAVID**
Where no man has gone before: A history of Apollo lunar exploration missions
[NASA-SP-4214] p 24 N89-25946
- CONTI, PETER S.**
O stars and Wolf-Rayet stars
[NASA-SP-497] p 21 N89-11657
- COULSON, KINSELL L.**
Remote Sensing in Polarized Light
[NASA-CP-3014] p 20 N89-14189

CREDEUR, LEONARD

Simulation evaluation of TIMER, a time-based, terminal air traffic, flow-management concept
[NASA-TP-2870] p 3 N89-15901

CROSS, JEFFREY L.

Tip aerodynamics and acoustics test: A report and data survey
[NASA-RP-1179] p 2 N89-17579

CU, C. C.

User's guide for the Nimbus 7 Scanning Multichannel Microwave Radiometer (SMMR) CELL-ALL tape
[NASA-RP-1210] p 15 N89-14648

CUCINOTTA, FRANCIS A.

A general formalism for phase space calculations
[NASA-TP-2843] p 19 N89-14053

BRYNTRN: A baryon transport model
[NASA-TP-2887] p 23 N89-17562

CURRENT, ARTHUR N.

Secondary electron emission characteristics of untreated and ion-textured titanium
[NASA-TP-2902] p 7 N89-17650

D

DANFORD, M. D.

An electrochemical study of corrosion protection by primer-topcoat systems on 4130 steel with ac impedance and dc methods
[NASA-TP-2820] p 7 N89-19406

DARDEN, CHRISTINE M.

Validation of a pair of computer codes for estimation and optimization of subsonic aerodynamic performance of simple hinged-flap systems for thin swept wings
[NASA-TP-2828] p 1 N89-10024

Status of sonic boom methodology and understanding
[NASA-CP-3027] p 2 N89-23415

Effect of milling machine roughness and wing dihedral on the supersonic aerodynamic characteristics of a highly swept wing
[NASA-TP-2918] p 3 N89-25117

DAVIDSON, M. R.

Auger electron intensity variations in oxygen-exposed large grain polycrystalline silver
[NASA-TP-2930] p 19 N89-30022

DAVIS, WANDA, L.

Exobiology and Future Mars Missions
[NASA-CP-10027] p 16 N89-26334

DECKER, RAND

Mixing and Demixing Processes in Multiphase Flows With Application to Propulsion Systems
[NASA-CP-3006] p 9 N89-11153

DENTON, JUDITH S.

Fourth Conference on Artificial Intelligence for Space Applications
[NASA-CP-3013] p 17 N89-15549

DEUTCHMAN, PHILIP A.

A general formalism for phase space calculations
[NASA-TP-2843] p 19 N89-14053

DOIRON, SCOTT D.

The 1989 Airborne Arctic Stratospheric Expedition Nimbus-7 TOMS data atlas
[NASA-RP-1227] p 16 N89-27302

The 1988 Antarctic ozone monitoring Nimbus-7 TOMS data atlas
[NASA-RP-1225] p 16 N89-28983

DORSEY, JOHN T.

Lightweight structural design of a bolted case joint for the space shuttle solid rocket motor
[NASA-TP-2851] p 6 N89-12580

DRESS, DAVID A.

Drag measurements on a laminar-flow body of revolution in the 13-inch magnetic suspension and balance system
[NASA-TP-2895] p 2 N89-19232

DUKE, EUGENE L.

Derivation and definition of a linear aircraft model
[NASA-RP-1207] p 5 N89-15123

User's manual for interactive LINEAR: A FORTRAN program to derive linear aircraft models
[NASA-TP-2835] p 18 N89-16437

E

EARLS, MICHAEL R.

Flight control systems development and flight test experience with the HiMAT research vehicles
[NASA-TP-2822] p 5 N89-15929

EBIHARA, BEN

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
[NASA-TP-2904] p 9 N89-21171

EBIHARA, BEN T.

Performance of a multistage depressed collector with machined-titanium electrodes
[NASA-TP-2891] p 9 N89-15337

ELLIS, STEPHEN R.

Interactive orbital proximity operations planning system
[NASA-TP-2839] p 17 N89-18039

F

FAIRCHILD, KYLE

Report of the In Situ Resources Utilization Workshop
[NASA-CP-3017] p 20 N89-14188

FARMER, CROFTON B.

A high-resolution atlas of the infrared spectrum of the sun and the earth atmosphere from space. A compilation of ATMOS 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
[NASA-RP-1224-VOL-2] p 15 N89-28969

FELDMAN, GENE CARL

Nimbus-7 data product summary
[NASA-RP-1215] p 13 N89-22152

FENN, MARTA A.

Summary of along-track data from the earth radiation budget satellite for several representative ocean regions
[NASA-RP-1206] p 15 N89-14634

FICHTER, W. B.

Measured and predicted root-mean-square errors in square and triangular antenna mesh facets
[NASA-TP-2896] p 11 N89-17892

FINDLAY, JOHN T.

OEXP Analysis Tools Workshop
[NASA-CP-10013] p 17 N89-11407

FINGER, HERBERT J.

Proceedings of a conference on Cardiovascular Bioinstrumentation
[NASA-CP-10022] p 16 N89-17997

FLEIG, ALBERT J.

Nimbus-7 data product summary
[NASA-RP-1215] p 13 N89-22152

FOGLEMAN, GUY

Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
[NASA-CP-10026-VOL-1] p 16 N89-24022

Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 2: Abstracts, candidate experiments and feasibility study
[NASA-CP-10026-VOL-2] p 16 N89-24023

FONDA, MARK L.

Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
[NASA-CP-10026-VOL-1] p 16 N89-24022

Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 2: Abstracts, candidate experiments and feasibility study
[NASA-CP-10026-VOL-2] p 16 N89-24023

FOUGHNER, JEROME T., JR.

Transonic Symposium: Theory, Application, and Experiment, Volume 1, Part 1
[NASA-CP-3020-VOL-1-PT-1] p 2 N89-20925

Transonic Symposium: Theory, Application, and Experiment, volume 1, part 2
[NASA-CP-3020-VOL-1-PT-2] p 2 N89-20942

FREED, ALAN D.

Thermoviscoplastic model with application to copper
[NASA-TP-2845] p 11 N89-16183

FULLER, CHARLES A.

Proceedings of a conference on Cardiovascular Bioinstrumentation
[NASA-CP-10022] p 16 N89-17997

FUNK, JOAN G.

The effects of simulated space environmental parameters on six commercially available composite materials
[NASA-TP-2906] p 7 N89-19385

G

GANAPOL, BARRY D.

Benchmark solutions for the galactic ion transport equations: Energy and spatially dependent problems
[NASA-TP-2878] p 23 N89-16714

BRYNTRN: A baryon transport model
[NASA-TP-2887] p 23 N89-17562

GARRETT, L. BERNARD

OEXP Analysis Tools Workshop
[NASA-CP-10013] p 17 N89-11407

GATLIN, GREGORY M.

Thrust-reverser flow investigation on a twin-engine transport
[NASA-TP-2856] p 1 N89-14213

GEORGE, ALBERT R.

Status of sonic boom methodology and understanding
[NASA-CP-3027] p 2 N89-23415

GILYARD, GLENN B.

A piloted evaluation of an oblique-wing research aircraft motion simulation with decoupling control laws
[NASA-TP-2874] p 5 N89-15930

Method for experimental determination of flutter speed by parameter identification
[NASA-TP-2923] p 4 N89-26844

GLOERSEN, P.

User's guide for the Nimbus 7 Scanning Multichannel Microwave Radiometer (SMMR) CELL-ALL tape
[NASA-RP-1210] p 15 N89-14648

GNOFFO, PETER A.

Conservation equations and physical models for hypersonic air flows in thermal and chemical nonequilibrium
[NASA-TP-2867] p 9 N89-16115

GOLDMAN, LOUIS J.

Three component laser anemometer measurements in an annular cascade of core turbine vanes with contoured end wall
[NASA-TP-2846] p 1 N89-10844

GOODRICH, KENNETH H.

A closed-form trim solution yielding minimum trim drag for airplanes with multiple longitudinal-control effectors
[NASA-TP-2907] p 5 N89-23468

GORDON, R. A.

An economical semi-analytical orbit theory for micro-computer applications
[NASA-TP-2811] p 19 N89-14052

GRACIA-SALCEDO, CARMEN M.

Determination of combustion gas temperatures by infrared radiometry in sooting and nonsooting flames
[NASA-TP-2900] p 9 N89-25409

GRAY, STEPHANIE L.

Absorbed dose thresholds and absorbed dose rate limitations for studies of electron radiation effects on polyetherimides
[NASA-TP-2928] p 8 N89-25332

GREELEY, RONALD

Experiments in Planetary and Related Sciences and the Space Station
[NASA-CP-2494] p 20 N89-14998

GREEN, R. N.

Angular radiation models for earth-atmosphere system. Volume 2: Longwave radiation
[NASA-RP-1184-VOL-2] p 15 N89-20587

GREENBERG, PAUL S.

Microgravity Combustion Diagnostics Workshop
[NASA-CP-10017] p 8 N89-17682

GRIFFIN, SANDY

Second Annual Workshop on Space Operations Automation and Robotics (SOAR 1988)
[NASA-CP-3019] p 17 N89-19817

GRUNWALD, ARTHUR J.

Interactive orbital proximity operations planning system
[NASA-TP-2839] p 17 N89-18039

GUIMARAES, PATRICIA T.

The 1989 Airborne Arctic Stratospheric Expedition Nimbus-7 TOMS data atlas
[NASA-RP-1227] p 16 N89-27302

The 1988 Antarctic ozone monitoring Nimbus-7 TOMS data atlas
[NASA-RP-1225] p 16 N89-28983

GUPTA, ROOP N.

Conservation equations and physical models for hypersonic air flows in thermal and chemical nonequilibrium
[NASA-TP-2867] p 9 N89-16115

H

HABERLE, ROBERT M.

Proceedings of the Polar Processes on Mars Workshop
[NASA-CP-10021] p 23 N89-18373

HABING, H. J.

Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 1: Explanatory supplement
[NASA-RP-1190-VOL-1] p 21 N89-14194

HAGER, ROY D.

Advanced turboprop project
[NASA-SP-495] p 4 N89-12565

HAN, D.

User's guide for the Nimbus 7 Scanning Multichannel Microwave Radiometer (SMMR) CELL-ALL tape
[NASA-RP-1210] p 15 N89-14648

HAN, DAESOO
Nimbus-7 data product summary
[NASA-RP-1215] p 13 N89-22152

HANNER, MARTHA S.
Infrared Observations of Comets Halley and Wilson and Properties of the Grains
[NASA-CP-3004] p 21 N89-13330

HAYDUK, ROBERT J.
Computational Methods for Structural Mechanics and Dynamics, part 1
[NASA-CP-3034-PT-1] p 12 N89-24638
Computational Methods for Structural Mechanics and Dynamics
[NASA-CP-3034-PT-2] p 12 N89-24654

HAYES, WALLACE D.
Status of sonic boom methodology and understanding
[NASA-CP-3027] p 2 N89-23415

HELOU, GEORGE
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 7: The small scale structure catalog
[NASA-RP-1190-VOL-7] p 22 N89-14199

HICKEY, JOHN R.
Nimbus-7 ERB Solar Analysis Tape (ESAT) user's guide
[NASA-RP-1211] p 23 N89-30151

HIGGINS, R. H.
An electrochemical study of corrosion protection by primer-topcoat systems on 4130 steel with ac impedance and dc methods
[NASA-TP-2820] p 7 N89-19406

HINNANT, HOWARD E.
Derivation of a tapered p-version beam finite element
[NASA-TP-2931] p 12 N89-26255

HINTON, DAVID A.
A simulator investigation of the use of digital data link for pilot/ATC communications in a single pilot operation
[NASA-TP-2837] p 3 N89-11726
Piloted-simulation evaluation of escape guidance for microburst wind shear encounters
[NASA-TP-2886] p 4 N89-16820

HOBAN, FRANCIS T.
Issues in NASA program and project management
[NASA-SP-6101] p 19 N89-12479

HOFLUND, G. B.
Auger electron intensity variations in oxygen-exposed large grain polycrystalline silver
[NASA-TP-2930] p 19 N89-30022

HOLT, HENRY E.
Sapping features of the Colorado Plateau: A comparative planetary geology field guide
[NASA-SP-491] p 13 N89-10401

HONG, B. S.
BRYNTRN: A baryon transport model
[NASA-TP-2887] p 23 N89-17562

HONG, BYUNGSIK
Kaon-nucleus scattering
[NASA-TP-2920] p 23 N89-25103

HOUSNER, JERROLD M.
Computational Methods for Structural Mechanics and Dynamics, part 1
[NASA-CP-3034-PT-1] p 12 N89-24638
Computational Methods for Structural Mechanics and Dynamics
[NASA-CP-3034-PT-2] p 12 N89-24654

HOWARD, ALAN D.
Sapping features of the Colorado Plateau: A comparative planetary geology field guide
[NASA-SP-491] p 13 N89-10401

HUNT, L. ROANE
Aerodynamic pressures and heating rates on surfaces between split elevons at Mach 6.6
[NASA-TP-2855] p 9 N89-12822

HUNTER, WILLIAM F.
Research in structures, structural dynamics and materials, 1989
[NASA-CP-10024] p 12 N89-24626

HUNTINGTON, JUDITH L.
Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
[NASA-CP-10026-VOL-1] p 16 N89-24022
Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 2: Abstracts, candidate experiments and feasibility study
[NASA-CP-10026-VOL-2] p 16 N89-24023

HURLEY, EDWARD J.
Nimbus-7 data product summary
[NASA-RP-1215] p 13 N89-22152

HUSSAINI, M. YOUSUFF
A spectral collocation solution to the compressible stability eigenvalue problem
[NASA-TP-2858] p 1 N89-12543

I

IPPOLITO, LOUIS J.
Propagation effects handbook for satellite systems design. A summary of propagation impairments on 10 to 100 GHz satellite links with techniques for system design
[NASA-RP-1082(04)] p 8 N89-17060

J

JAMES, ODETT B.
Planetary geosciences, 1988
[NASA-SP-498] p 13 N89-26274

JANSON, BETTE R.
Astronautics and aeronautics, 1985: A chronology
[NASA-SP-4025] p 24 N89-26803

JENKINS, RENALDO V.
NASA SC(2)-0714 airfoil data corrected for sidewall boundary-layer effects in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TP-2890] p 2 N89-17568

JENSEN, KENNETH A.
Secondary electron emission characteristics of untreated and ion-textured titanium
[NASA-TP-2902] p 7 N89-17650

JOBSON, DANIEL J.
Spatial vision processes: From the optical image to the symbolic structures of contour information
[NASA-TP-2836] p 10 N89-13762

JORDAN, STUART
O stars and Wolf-Rayet stars
[NASA-SP-497] p 21 N89-11657

JUHASZ, AL
Workshop on Two-Phase Fluid Behavior in a Space Environment
[NASA-CP-3043] p 10 N89-26184

K

KAUFMAN, BARBARA A.
Nimbus-7 data product summary
[NASA-RP-1215] p 13 N89-22152

KEMPEL, ROBERT W.
Flight control systems development and flight test experience with the HiMAT research vehicles
[NASA-TP-2822] p 5 N89-15929
A piloted evaluation of an oblique-wing research aircraft motion simulation with decoupling control laws
[NASA-TP-2874] p 5 N89-15930

KHAN, FERDOUS
BRYNTRN: A baryon transport model
[NASA-TP-2887] p 23 N89-17562

KIM, KYUN O.
Mixed formulation for frictionless contact problems
[NASA-TP-2897] p 11 N89-19580

KIM, S. T.
User's guide for the Nimbus 7 Scanning Multichannel Microwave Radiometer (SMMR) CELL-ALL tape
[NASA-RP-1210] p 15 N89-14648

KING, TRACY K.
Contamination of liquid oxygen by pressurized gaseous nitrogen
[NASA-TP-2894] p 9 N89-19499

KOCHEL, R. CRAIG
Sapping features of the Colorado Plateau: A comparative planetary geology field guide
[NASA-SP-491] p 13 N89-10401

KRAMBEER, KEITH D.
Derivation and definition of a linear aircraft model
[NASA-RP-1207] p 5 N89-15123

KRUEGER, ARLIN J.
The 1989 Airborne Arctic Stratospheric Expedition Nimbus-7 TOMS data atlas
[NASA-RP-1227] p 16 N89-27302
The 1988 Antarctic ozone monitoring Nimbus-7 TOMS data atlas
[NASA-RP-1225] p 16 N89-28983

KUNDE, V. G.
The Cassini mission: Infrared and microwave spectroscopic measurements
[NASA-RP-1213] p 22 N89-16709

KYLE, H. LEE
Nimbus-7 data product summary
[NASA-RP-1215] p 13 N89-22152
Nimbus-7 ERB Solar Analysis Tape (ESAT) user's guide
[NASA-RP-1211] p 23 N89-30151

L

LALLMAN, FREDERICK J.
A closed-form trim solution yielding minimum trim drag for airplanes with multiple longitudinal-control effectors
[NASA-TP-2907] p 5 N89-23468

LAMB, MILTON
Integration effects of pylon geometry on a high-wing transport airplane
[NASA-TP-2877] p 2 N89-15888

LAMKIN, S. L.
BRYNTRN: A baryon transport model
[NASA-TP-2887] p 23 N89-17562

LARKO, DAVID E.
The 1989 Airborne Arctic Stratospheric Expedition Nimbus-7 TOMS data atlas
[NASA-RP-1227] p 16 N89-27302
The 1988 Antarctic ozone monitoring Nimbus-7 TOMS data atlas
[NASA-RP-1225] p 16 N89-28983

LEAVITT, LAURENCE D.
Static internal performance of a nonaxisymmetric vaned thrust reverser with flow splay capability
[NASA-TP-2933] p 3 N89-27634

LEE, W. S.
Auger electron intensity variations in oxygen-exposed large grain polycrystalline silver
[NASA-TP-2930] p 19 N89-30022

LEISAWITZ, DAVID
Commentary on interstellar matter associated with 18 open clusters
[NASA-RP-1229] p 22 N89-27612

LOHR, GARY W.
A simulator investigation of the use of digital data link for pilot/ATC communications in a single pilot operation
[NASA-TP-2837] p 3 N89-11726
A piloted simulation study of data link ATC message exchange
[NASA-TP-2859] p 3 N89-15900

LONG, EDWARD R., JR.
Absorbed dose thresholds and absorbed dose rate limitations for studies of electron radiation effects on polyetherimides
[NASA-TP-2928] p 8 N89-25332

LONG, SHEILA ANN T.
Absorbed dose thresholds and absorbed dose rate limitations for studies of electron radiation effects on polyetherimides
[NASA-TP-2928] p 8 N89-25332

LONG, W. RUSS
Workshop on Two-Phase Fluid Behavior in a Space Environment
[NASA-CP-3043] p 10 N89-26184

LYONS, VALERIE J.
Determination of combustion gas temperatures by infrared radiometry in sooting and nonsooting flames
[NASA-TP-2900] p 9 N89-25409

M

MACARAEG, MICHELE G.
A spectral collocation solution to the compressible stability eigenvalue problem
[NASA-TP-2858] p 1 N89-12543

MACELROY, ROBERT D.
Report of the 1st Planning Workshop for CELSS Flight Experimentation
[NASA-CP-10020] p 17 N89-13898

MACKALL, DALE A.
Development and flight test experiences with a flight-critical digital control system
[NASA-TP-2857] p 5 N89-24327

MACPHERSON, GLENN
Planetary geosciences, 1988
[NASA-SP-498] p 13 N89-26274

MAINE, TRINDEL A.
A piloted evaluation of an oblique-wing research aircraft motion simulation with decoupling control laws
[NASA-TP-2874] p 5 N89-15930

MAINS, RICHARD
Proceedings of a conference on Cardiovascular Bioinstrumentation
[NASA-CP-10022] p 16 N89-17997

MAJOR, EUGENE
Nimbus-7 ERB Solar Analysis Tape (ESAT) user's guide
[NASA-RP-1211] p 23 N89-30151

MALL, GERALD H.
Analysis of positron lifetime spectra in polymers
[NASA-TP-2853] p 17 N89-12237

MANALO, NATIVIDAD
Limb-darkening functions as derived from along-track operation of the ERBE scanning radiometer for January 1985
[NASA-RP-1214] p 15 N89-17374

MARCOLINI, MICHAEL A.
Airfoil self-noise and prediction
[NASA-RP-1218] p 19 N89-25673

MARGASON, RICHARD J.
The 1987 Ground Vortex Workshop
[NASA-CP-10008] p 1 N89-10849

MARTENSEN, ANNA L.
The Fault Tree Compiler (FTC): Program and mathematics
[NASA-TP-2915] p 18 N89-24815

MASTERS, PHILIP A.
High-pressure calorimeter chamber tests for liquid oxygen/kerosene (LOX/RP-1) rocket combustion
[NASA-TP-2862] p 7 N89-15979

MASTERS, ROBERT M.
Technique for temperature compensation of eddy-current proximity probes
[NASA-TP-2880] p 10 N89-15380

MAUNG, KHIN MAUNG
Kaon-nucleus scattering
[NASA-TP-2920] p 23 N89-25103

MCDANIELS, DAVID L.
Tungsten fiber reinforced copper matrix composites: A review
[NASA-TP-2924] p 7 N89-27796

MCKAY, CHRISTOPHER P.
Exobiology and Future Mars Missions
[NASA-CP-10027] p 16 N89-26334

MCNEILL, WALTER E.
A piloted evaluation of an oblique-wing research aircraft motion simulation with decoupling control laws
[NASA-TP-2874] p 5 N89-15930

MENDELL, WENDELL W.
Report of the In Situ Resources Utilization Workshop
[NASA-CP-3017] p 20 N89-14188
Future Astronomical Observatories on the Moon
[NASA-CP-2489] p 21 N89-15810

MENDREK, M. J.
An electrochemical study of corrosion protection by primer-topcoat systems on 4130 steel with ac impedance and dc methods
[NASA-TP-2820] p 7 N89-19406

MIDDLETON, DAVID B.
Simulator evaluation of a display for a Takeoff Performance Monitoring System
[NASA-TP-2908] p 5 N89-23469

MILES, THOMAS
Comparison of satellite-derived dynamical quantities for the stratosphere of the Southern Hemisphere
[NASA-CP-3044] p 14 N89-25540

MIN, BYUNG-JIN
Mixed finite element models for free vibrations of thin-walled beams
[NASA-TP-2868] p 11 N89-19579

MORALES, WILFREDO
Degradation and crosslinking of perfluoroalkyl polyethers under X-ray irradiation in ultrahigh vacuum
[NASA-TP-2910] p 8 N89-21103
Reaction of perfluoroalkylpolyethers (PFPE) with 440C steel in vacuum under sliding conditions at room temperature
[NASA-TP-2883] p 8 N89-26091

MORI, SHIGEYUKI
Degradation and crosslinking of perfluoroalkyl polyethers under X-ray irradiation in ultrahigh vacuum
[NASA-TP-2910] p 8 N89-21103
Reaction of perfluoroalkylpolyethers (PFPE) with 440C steel in vacuum under sliding conditions at room temperature
[NASA-TP-2883] p 8 N89-26091

MORRELL, FREDERICK R.
Joint University Program for Air Transportation Research, 1987
[NASA-CP-3028] p 1 N89-19230

MOSIER, FRANCES L.
The 1988 Get Away Special Experimenter's Symposium
[NASA-CP-3008] p 5 N89-10902

N

NAIDU, DESININI S.
Singular perturbations and time scales in the design of digital flight control systems
[NASA-TP-2844] p 4 N89-12569

NEALY, JOHN E.
Solar-flare shielding with Regolith at a lunar-base site
[NASA-TP-2869] p 23 N89-14210
BRYNTRN: A baryon transport model
[NASA-TP-2887] p 23 N89-17562

NEUGEBAUER, G.
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 1: Explanatory supplement
[NASA-RP-1190-VOL-1] p 21 N89-14194

NGO, KIM CHI
Contamination of liquid oxygen by pressurized gaseous nitrogen
[NASA-TP-2894] p 9 N89-19499

NISSIM, E.
Control surface spanwise placement in active flutter suppression systems
[NASA-TP-2873] p 11 N89-16196
Method for experimental determination of flutter speed by parameter identification
[NASA-TP-2923] p 4 N89-26844

NOOR, AHMED K.
Partitioning strategy for efficient nonlinear finite element dynamic analysis on multiprocessor computers
[NASA-TP-2850] p 11 N89-16170
Mixed finite element models for free vibrations of thin-walled beams
[NASA-TP-2868] p 11 N89-19579
Mixed formulation for frictionless contact problems
[NASA-TP-2897] p 11 N89-19580
Research in structures, structural dynamics and materials, 1989
[NASA-CP-10024] p 12 N89-24626

NORBURY, JOHN W.
A general formalism for phase space calculations
[NASA-TP-2843] p 19 N89-14053

NORTON, ROBERT H.
A high-resolution atlas of the infrared spectrum of the sun and the earth atmosphere from space. A compilation of ATMOS 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
[NASA-RP-1224-VOL-2] p 15 N89-28969

NUTTER, S. T.
Nimbus-7 Stratospheric and Mesospheric Sounder (SAMS) experiment data user's guide
[NASA-RP-1221] p 14 N89-26304

O

OAKES, ARNOLD G.
Nimbus-7 data product summary
[NASA-RP-1215] p 13 N89-22152

ODELL, STEPHEN L.
Fourth Conference on Artificial Intelligence for Space Applications
[NASA-CP-3013] p 17 N89-15549

ONEILL, ALAN
Comparison of satellite-derived dynamical quantities for the stratosphere of the Southern Hemisphere
[NASA-CP-3044] p 14 N89-25540

OSLIK, N.
Nimbus-7 Stratospheric and Mesospheric Sounder (SAMS) experiment data user's guide
[NASA-RP-1221] p 14 N89-26304

OSTROFF, AARON J.
Integrated tools for control-system analysis
[NASA-TP-2885] p 5 N89-19309

OTTENSTEIN, LAURA
Workshop on Two-Phase Fluid Behavior in a Space Environment
[NASA-CP-3043] p 10 N89-26184

OUTLAW, R. A.
Auger electron intensity variations in oxygen-exposed large grain polycrystalline silver
[NASA-TP-2930] p 19 N89-30022

P

PARSONS, C. L.
MARA (Multimode Airborne Radar Altimeter) system documentation. Volume 1: MARA system requirements document
[NASA-RP-1226] p 10 N89-26209

PATTERSON, BRIAN P.
User's manual for interactive LINEAR: A FORTRAN program to derive linear aircraft models
[NASA-TP-2835] p 18 N89-16437

PENN, LANNING M.
The 1989 Airborne Arctic Stratospheric Expedition
Nimbus-7 TOMS data atlas
[NASA-RP-1227] p 16 N89-27302
The 1988 Antarctic ozone monitoring Nimbus-7 TOMS data atlas
[NASA-RP-1225] p 16 N89-28983

PEREYDA, MARGARITA
Time-Variable Phenomena in the Jovian System
[NASA-SP-494] p 23 N89-28474

PERSON, LEE H., JR.
Simulator evaluation of a display for a Takeoff Performance Monitoring System
[NASA-TP-2908] p 5 N89-23469

PETERS, JEANNE M.
Partitioning strategy for efficient nonlinear finite element dynamic analysis on multiprocessor computers
[NASA-TP-2850] p 11 N89-16170
Mixed finite element models for free vibrations of thin-walled beams
[NASA-TP-2868] p 11 N89-19579

PHILLIPS, JAMES D.
Modal control of an oblique wing aircraft
[NASA-TP-2898] p 5 N89-16845

PIERCE, ALLAN D.
Status of sonic boom methodology and understanding
[NASA-CP-3027] p 2 N89-23415

PILTCH, NANCY D.
Microgravity Combustion Diagnostics Workshop
[NASA-CP-10017] p 8 N89-17682

PIROUZ, P.
Indentation plasticity and fracture in silicon
[NASA-CP-3027] p 7 N89-10996

PLESCIA, JEFF L.
Planetary geosciences, 1988
[NASA-SP-498] p 13 N89-26274

POLITES, MICHAEL E.
The estimation error covariance matrix for the ideal state reconstructor with measurement noise
[NASA-TP-2881] p 17 N89-13994
Further developments in modeling digital control systems with MA-prefiltered measurements
[NASA-TP-2909] p 8 N89-24507
A new state reconstructor for digital controls systems using weighted-average measurements
[NASA-TP-2936] p 8 N89-27039

POPE, D. STUART
Airfoil self-noise and prediction
[NASA-TP-2848] p 19 N89-25673

POWELL, CLEMANS A.
Status of sonic boom methodology and understanding
[NASA-CP-3027] p 2 N89-23415

PRATHER, MICHAEL J.
An assessment model for atmospheric composition
[NASA-CP-3023] p 16 N89-20588

PRICE, DOUGLAS B.
Singular perturbations and time scales in the design of digital flight control systems
[NASA-TP-2844] p 4 N89-12569

PRICE, HAROLD G.
High-pressure calorimeter chamber tests for liquid oxygen/kerosene (LOX/RP-1) rocket combustion
[NASA-TP-2862] p 7 N89-15979

PROFFITT, MELISSA S.
Integrated tools for control-system analysis
[NASA-TP-2885] p 5 N89-19309

Q

QUINTO, P. FRANK
Thrust-reverser flow investigation on a twin-engine transport
[NASA-TP-2856] p 1 N89-14213

R

RAHE, JURGEN
Time-Variable Phenomena in the Jovian System
[NASA-SP-494] p 23 N89-28474

RAMAPRIYAN, H. K.
Proceedings of the Scientific Data Compression Workshop
[NASA-CP-3025] p 17 N89-22332

RAMINS, PETER
Performance of a multistage depressed collector with machined titanium electrodes
[NASA-TP-2891] p 9 N89-15337
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
[NASA-TP-2904] p 9 N89-21171

RASH, JAMES
The 1989 Goddard Conference on Space Applications of Artificial Intelligence
[NASA-CP-3033] p 18 N89-26578

REARDON, LAWRENCE F.
Evaluation of a strain-gage load calibration on a low-aspect-ratio wing structure at elevated temperature
[NASA-TP-2921] p 12 N89-28034

RICHMOND, R. J.
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[NASA-CP-2437-VOL-2] p 6 N89-12626

RODGERS, C. D.
Nimbus-7 Stratospheric and Mesospheric Sounder (SAMS) experiment data user's guide
[NASA-RP-1221] p 14 N89-26304

- ROGERS, JAMES L.**
A knowledge-based tool for multilevel decomposition of a complex design problem
[NASA-TP-2903] p 18 N89-23181
- ROMANOVSKY, ROBERT R.**
Universal test fixture for monolithic mm-wave integrated circuits calibrated with an augmented TRD algorithm
[NASA-TP-2875] p 9 N89-17767
Analytical and experimental procedures for determining propagation characteristics of millimeter-wave gallium arsenide microstrip lines
[NASA-TP-2899] p 9 N89-21169
- RYAN, ROBERT S.**
Practices in adequate structural design
[NASA-TP-2893] p 6 N89-18504
- RYBICKI, GEORGE C.**
Indentation plasticity and fracture in silicon
[NASA-TP-2863] p 7 N89-10996
- S**
- SANDAGE, ALLAN**
Atlas of galaxies useful for measuring the cosmological distance scale
[NASA-SP-496] p 21 N89-12513
- SANTORO, GILBERT J.**
Microgravity Combustion Diagnostics Workshop
[NASA-CP-10017] p 8 N89-17682
- SCHAFFER, CHARLES F.**
Mixing and Demixing Processes in Multiphase Flows With Application to Propulsion Systems
[NASA-CP-3006] p 9 N89-11153
- SCHWARTZ, DEBORAH E.**
Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 1: Executive summary and overview
[NASA-CP-10026-VOL-1] p 16 N89-24022
Gas-Grain Simulation Facility: Fundamental studies of particle formation and interactions. Volume 2: Abstracts, candidate experiments and feasibility study
[NASA-CP-10026-VOL-2] p 16 N89-24023
- SEASHOLTZ, RICHARD G.**
Three component laser anemometer measurements in an annular cascade of core turbine vanes with contoured end wall
[NASA-TP-2846] p 1 N89-10844
- SHALKHAUSER, KURT A.**
Universal test fixture for monolithic mm-wave integrated circuits calibrated with an augmented TRD algorithm
[NASA-TP-2875] p 9 N89-17767
- SHALKHAUSER, MARY JO W.**
Digitally modulated bit error rate measurement system for microwave component evaluation
[NASA-TP-2912] p 6 N89-28545
- SHINN, JUDY L.**
Conservation equations and physical models for hypersonic air flows in thermal and chemical nonequilibrium
[NASA-TP-2867] p 9 N89-16115
- SINGER, BART A.**
Interactions of Tollmien-Schlichting waves and Dean vortices. Comparison of direct numerical simulation and a weakly nonlinear theory
[NASA-TP-2919] p 3 N89-25118
- SINGH, JAG J.**
Analysis of positron lifetime spectra in polymers
[NASA-TP-2853] p 17 N89-12237
- SLIWA, STEVEN M.**
A closed-form trim solution yielding minimum trim drag for airplanes with multiple longitudinal-control effectors
[NASA-TP-2907] p 5 N89-23468
- SMITH, G. L.**
Angular radiation models for earth-atmosphere system. Volume 2: Longwave radiation
[NASA-RP-1184-VOL-2] p 15 N89-20587
- SMITH, G. LOUIS**
Limb-darkening functions as derived from along-track operation of the ERBE scanning radiometer for January 1985
[NASA-RP-1214] p 15 N89-17374
- SMITH, JAMES LEE**
Effects of variables upon pyrotechnically induced shock response spectra, part 2
[NASA-TP-2872] p 11 N89-13814
- SPANN, JAMES F.**
Space Station Induced Monitoring
[NASA-CP-3021] p 20 N89-15790
- SPRINKLE, DANNY R.**
Analysis of positron lifetime spectra in polymers
[NASA-TP-2853] p 17 N89-12237
- SRIVATSAN, RAGHAVACHARI**
Simulator evaluation of a display for a Takeoff Performance Monitoring System
[NASA-TP-2908] p 5 N89-23469
- STECHEER, JOSEPH**
Fifteenth Space Simulation Conference: Support the Highway to Space Through Testing
[NASA-CP-3015] p 6 N89-12582
- STEIN, BLAND A.**
NASA/SDIO Space Environmental Effects on Materials Workshop, part 1
[NASA-CP-3035-PT-1] p 7 N89-23528
NASA/SDIO Space Environmental Effects on Materials Workshop, part 2
[NASA-CP-3035-PT-2] p 7 N89-23547
- STEIN, PETER A.**
Lightweight structural design of a bolted case joint for the space shuttle solid rocket motor
[NASA-TP-2851] p 6 N89-12580
- STENGLE, THOMAS**
Flight Mechanics/Estimation Theory Symposium 1988
[NASA-CP-3011] p 5 N89-15934
- STEWART, ERIC C.**
Evaluation of the ride quality of a light twin engine airplane using a ride quality meter
[NASA-TP-2913] p 1 N89-22568
- STOWE, L. L.**
Angular radiation models for earth-atmosphere system. Volume 2: Longwave radiation
[NASA-RP-1184-VOL-2] p 15 N89-20587
- STREETT, CRAIG L.**
A spectral collocation solution to the compressible stability eigenvalue problem
[NASA-TP-2858] p 1 N89-12543
- STROUD, W. JEFFERSON**
Computational Methods for Structural Mechanics and Dynamics, part 1
[NASA-CP-3034-PT-1] p 12 N89-24638
Computational Methods for Structural Mechanics and Dynamics
[NASA-CP-3034-PT-2] p 12 N89-24654
- SUTTLES, J. T.**
Angular radiation models for earth-atmosphere system. Volume 2: Longwave radiation
[NASA-RP-1184-VOL-2] p 15 N89-20587
- SUTTLES, JOHN T.**
Limb-darkening functions as derived from along-track operation of the ERBE scanning radiometer for January 1985
[NASA-RP-1214] p 15 N89-17374
- SWANSON, THEODORE D.**
Workshop on Two-Phase Fluid Behavior in a Space Environment
[NASA-CP-3043] p 10 N89-26184
- SYKES, GEORGE F., JR.**
The effects of simulated space environmental parameters on six commercially available composite materials
[NASA-TP-2906] p 7 N89-19385
- SYKES, NANCY P.**
NASA Workshop on Computational Structural Mechanics 1987, part 1
[NASA-CP-10012-PT-1] p 12 N89-29773
NASA Workshop on Computational Structural Mechanics 1987, part 2
[NASA-CP-10012-PT-2] p 12 N89-29789
NASA Workshop on Computational Structural Mechanics 1987, part 3
[NASA-CP-10012-PT-3] p 12 N89-29799
- T**
- TANNER, JOHN A.**
Computational Methods for Structural Mechanics and Dynamics, part 1
[NASA-CP-3034-PT-1] p 12 N89-24638
Computational Methods for Structural Mechanics and Dynamics
[NASA-CP-3034-PT-2] p 12 N89-24654
- TAUBER, MICHAEL E.**
A review of high-speed, convective, heat-transfer computation methods
[NASA-TP-2914] p 10 N89-27116
- TAYLOR, F. W.**
Nimbus-7 Stratospheric and Mesospheric Sounder (SAMS) experiment data user's guide
[NASA-RP-1221] p 14 N89-26304
- TAYLOR, V. R.**
Angular radiation models for earth-atmosphere system. Volume 2: Longwave radiation
[NASA-RP-1184-VOL-2] p 15 N89-20587
- TEICHMAN, LOUIS A.**
NASA/SDIO Space Environmental Effects on Materials Workshop, part 1
[NASA-CP-3035-PT-1] p 7 N89-23528
NASA/SDIO Space Environmental Effects on Materials Workshop, part 2
[NASA-CP-3035-PT-2] p 7 N89-23547
- THOMAS, JAMES L.**
Three-dimensional multigrid algorithms for the flux-split Euler equations
[NASA-TP-2829] p 18 N89-12316
- THOMAS, LAWRENCE R.**
The 1988 Get Away Special Experimenter's Symposium
[NASA-CP-3008] p 5 N89-10902
- THOMAS, RICHARD**
O stars and Wolf-Rayet stars
[NASA-SP-497] p 21 N89-11657
- THURSTON, GAYLEN A.**
Application of Newton's method to the postbuckling of rings under pressure loadings
[NASA-TP-2941] p 13 N89-29811
- TILTON, JAMES C.**
LANDSAT-4 and LANDSAT-5 multispectral scanner coherent noise characterization and removal
[NASA-TP-2595-REV] p 13 N89-12114
- TORR, MARSHA R.**
Space Station Induced Monitoring
[NASA-CP-3021] p 20 N89-15790
- TORRES, PABLO D.**
Stress corrosion study of PH13-8Mo stainless steel using the Slow Strain Rate Technique
[NASA-TP-2934] p 7 N89-26976
- TOWNSEND, LAWRENCE W.**
A general formalism for phase space calculations
[NASA-TP-2843] p 19 N89-14053
Solar-flare shielding with Regolith at a lunar-base site
[NASA-TP-2869] p 23 N89-14210
Benchmark solutions for the galactic ion transport equations: Energy and spatially dependent problems
[NASA-TP-2878] p 23 N89-16714
BRYNTRN: A baryon transport model
[NASA-TP-2887] p 23 N89-17562
- TREMOR, JOHN W.**
Report of the 1st Planning Workshop for CELSS Flight Experimentation
[NASA-CP-10020] p 17 N89-13898
- U**
- UNDERHILL, ANNE B.**
O stars and Wolf-Rayet stars
[NASA-SP-497] p 21 N89-11657
- V**
- VALLETTE, BRENDA J.**
Nimbus-7 ERB Solar Analysis Tape (ESAT) user's guide
[NASA-RP-1211] p 23 N89-30151
- VERDERAIME, V. I.**
Weld stresses beyond elastic limit: Materials discontinuity
[NASA-TP-2935] p 12 N89-27214
- VEREEN, MARY**
Fourth Conference on Artificial Intelligence for Space Applications
[NASA-CP-3013] p 17 N89-15549
- VRABEL, DEBORAH**
Advanced turboprop project
[NASA-SP-495] p 4 N89-12565
- W**
- WALKER, D. W.**
Infrared astronomical satellite (IRAS) catalogs and atlases. Volume 7: The small scale structure catalog
[NASA-RP-1190-VOL-7] p 22 N89-14199
- WALKER, I. J.**
Angular radiation models for earth-atmosphere system. Volume 2: Longwave radiation
[NASA-RP-1184-VOL-2] p 15 N89-20587
- WALKER, IRA**
Limb-darkening functions as derived from along-track operation of the ERBE scanning radiometer for January 1985
[NASA-RP-1214] p 15 N89-17374
- WALLER, MARVIN C.**
A piloted simulation study of data link ATC message exchange
[NASA-TP-2859] p 3 N89-15900
- WATTS, MICHAEL E.**
Tip aerodynamics and acoustics test: A report and data survey
[NASA-RP-1179] p 2 N89-17579
- WEST, ROBERT A.**
Time-Variable Phenomena in the Jovian System
[NASA-SP-494] p 23 N89-28474
- WHITEHEAD, VICTOR S.**
Remote Sensing in Polarized Light
[NASA-CP-3014] p 20 N89-14189

WHITFIELD, DAVID L.

Three-dimensional multigrid algorithms for the flux-split Euler equations
 [NASA-TP-2829] p 18 N89-12316

WIELICKI, B. A.

Angular radiation models for earth-atmosphere system. Volume 2: Longwave radiation
 [NASA-RP-1184-VOL-2] p 15 N89-20587

WILKINSON, R. ALLEN

Raman intensity as a probe of concentration near a crystal growing in solution
 [NASA-TP-2865] p 10 N89-16139

WILLIAMS, M. D.

Analysis of Nd³⁺:glass, solar-pumped, high-power laser systems
 [NASA-TP-2905] p 10 N89-17855

WILLIAMS, RICHARD J.

Experiments in Planetary and Related Sciences and the Space Station
 [NASA-CP-2494] p 20 N89-14998

WILSON, JOHN W.

Solar-flare shielding with Regolith at a lunar-base site
 [NASA-TP-2869] p 23 N89-14210

Benchmark solutions for the galactic ion transport equations: Energy and spatially dependent problems

[NASA-TP-2878] p 23 N89-16714

BRYNTRN: A baryon transport model

[NASA-TP-2887] p 23 N89-17562

Kaon-nucleus scattering

[NASA-TP-2920] p 23 N89-25103

WRIGHT, ROBERT L.

OEXP Analysis Tools Workshop
 [NASA-CP-10013] p 17 N89-11407

WU, S. T.

Advanced Earth-to-Orbit Propulsion Technology 1986, volume 2
 [NASA-CP-2437-VOL-2] p 6 N89-12626

Z**ZAKRAJESEK, JAMES J.**

Comparison study of gear dynamic computer programs at NASA Lewis Research Center
 [NASA-TP-2901] p 10 N89-21243

ZANG, THOMAS A.

Interactions of Tollmien-Schlichting waves and Dean vortices. Comparison of direct numerical simulation and a weakly nonlinear theory

[NASA-TP-2919] p 3 N89-25118

ZAPATA, L. E.

Analysis of Nd³⁺:glass, solar-pumped, high-power laser systems
 [NASA-TP-2905] p 10 N89-17855

ZUBER, MARIA T.

Planetary geosciences, 1988
 [NASA-SP-498] p 13 N89-26274

ZUCKERWAR, ALLAN J.

Contamination of liquid oxygen by pressurized gaseous nitrogen
 [NASA-TP-2894] p 9 N89-19499

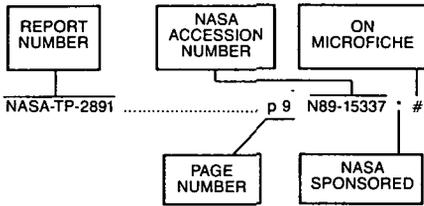
ZWALLY, H. JAY

Polar microwave brightness temperatures from Nimbus-7 SMMR: Time series of daily and monthly maps from 1978 to 1987
 [NASA-RP-1223] p 13 N89-26275

REPORT NUMBER INDEX

NASA Scientific and Technical Publications 1989

Typical Report Number Index Listing



Listings in this index are arranged alphabetically by report number. The page number indicates the page on which the citation is located. The accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

NASA-CP-10008	p 1	N89-10849	NASA-TP-2872	p 11	N89-13814
NASA-CP-10012-PT-1	p 12	N89-29773	NASA-TP-2873	p 11	N89-16196
NASA-CP-10012-PT-2	p 12	N89-29789	NASA-TP-2874	p 5	N89-15930
NASA-CP-10012-PT-3	p 12	N89-29799	NASA-TP-2875	p 9	N89-17767
NASA-CP-10013	p 17	N89-11407	NASA-TP-2877	p 2	N89-15888
NASA-CP-10014	p 14	N89-14503	NASA-TP-2878	p 23	N89-16714
NASA-CP-10015	p 21	N89-13310	NASA-TP-2880	p 10	N89-15380
NASA-CP-10017	p 8	N89-17682	NASA-TP-2881	p 17	N89-13994
NASA-CP-10018	p 19	N89-14842	NASA-TP-2883	p 8	N89-26091
NASA-CP-10019	p 8	N89-13642	NASA-TP-2884	p 11	N89-16192
NASA-CP-10020	p 17	N89-13898	NASA-TP-2885	p 5	N89-19309
NASA-CP-10021	p 23	N89-18373	NASA-TP-2886	p 4	N89-16820
NASA-CP-10022	p 16	N89-17997	NASA-TP-2887	p 23	N89-17562
NASA-CP-10024	p 12	N89-24626	NASA-TP-2890	p 2	N89-17568
NASA-CP-10026-VOL-1	p 16	N89-24022	NASA-TP-2891	p 9	N89-15337
NASA-CP-10026-VOL-2	p 16	N89-24023	NASA-TP-2892	p 18	N89-17422
NASA-CP-10027	p 16	N89-26334	NASA-TP-2893	p 6	N89-18504
NASA-CP-10029	p 14	N89-22982	NASA-TP-2894	p 9	N89-19499
NASA-CP-2437-VOL-2	p 6	N89-12626	NASA-TP-2895	p 2	N89-19232
NASA-CP-2444	p 11	N89-12876	NASA-TP-2896	p 11	N89-17892
NASA-CP-2489	p 21	N89-15810	NASA-TP-2897	p 11	N89-19580
NASA-CP-2493	p 11	N89-17298	NASA-TP-2898	p 5	N89-16845
NASA-CP-2494	p 20	N89-14998	NASA-TP-2899	p 9	N89-21169
NASA-CP-3004	p 21	N89-13330	NASA-TP-2900	p 9	N89-25409
NASA-CP-3006	p 9	N89-11153	NASA-TP-2901	p 10	N89-21243
NASA-CP-3008	p 5	N89-10902	NASA-TP-2902	p 7	N89-17650
NASA-CP-3011	p 5	N89-15934	NASA-TP-2903	p 18	N89-23181
NASA-CP-3013	p 17	N89-15549	NASA-TP-2904	p 9	N89-21171
NASA-CP-3014	p 20	N89-14189	NASA-TP-2905	p 10	N89-17855
NASA-CP-3015	p 6	N89-12582	NASA-TP-2906	p 7	N89-19385
NASA-CP-3016	p 5	N89-11760	NASA-TP-2907	p 5	N89-23468
NASA-CP-3017	p 20	N89-14188	NASA-TP-2908	p 5	N89-23469
NASA-CP-3019	p 17	N89-19817	NASA-TP-2909	p 8	N89-24507
NASA-CP-3020-VOL-1-PT-1	p 2	N89-20925	NASA-TP-2910	p 8	N89-21103
NASA-CP-3020-VOL-1-PT-2	p 2	N89-20942	NASA-TP-2911	p 11	N89-24607
NASA-CP-3021	p 20	N89-15790	NASA-TP-2912	p 6	N89-25103
NASA-CP-3022-PT-1	p 2	N89-19234	NASA-TP-2913	p 1	N89-22568
NASA-CP-3022-PT-2	p 2	N89-19247	NASA-TP-2914	p 10	N89-27116
NASA-CP-3023	p 16	N89-20588	NASA-TP-2915	p 18	N89-24815
NASA-CP-3025	p 17	N89-22332	NASA-TP-2918	p 3	N89-25117
NASA-CP-3026	p 10	N89-22891	NASA-TP-2919	p 3	N89-25118
NASA-CP-3027	p 2	N89-23415	NASA-TP-2920	p 23	N89-25103
NASA-CP-3028	p 1	N89-19230	NASA-TP-2921	p 12	N89-28034
NASA-CP-3029	p 11	N89-22940	NASA-TP-2923	p 4	N89-26844
NASA-CP-3030	p 14	N89-24704	NASA-TP-2924	p 7	N89-27796
NASA-CP-3031-PT-1	p 4	N89-25146	NASA-TP-2928	p 8	N89-28545
NASA-CP-3031-PT-2	p 4	N89-25173	NASA-TP-2929	p 3	N89-26811
NASA-CP-3031-PT-3	p 4	N89-25201	NASA-TP-2930	p 19	N89-30022
NASA-CP-3032	p 12	N89-23892	NASA-TP-2931	p 12	N89-26255
NASA-CP-3033	p 18	N89-26578	NASA-TP-2932	p 3	N89-25951
NASA-CP-3034-PT-1	p 12	N89-24638	NASA-TP-2933	p 3	N89-27634
NASA-CP-3034-PT-2	p 12	N89-24654	NASA-TP-2934	p 7	N89-26976
NASA-CP-3035-PT-1	p 7	N89-23528	NASA-TP-2935	p 12	N89-27214
NASA-CP-3035-PT-2	p 7	N89-23547	NASA-TP-2936	p 8	N89-27039
NASA-CP-3043	p 10	N89-26184	NASA-TP-2941	p 13	N89-29811
NASA-CP-3044	p 14	N89-25540			
NASA-RP-1082(04)	p 8	N89-17060			
NASA-RP-1179	p 2	N89-17579			
NASA-RP-1184-VOL-2	p 15	N89-20587			
NASA-RP-1190-VOL-1	p 21	N89-14194			
NASA-RP-1190-VOL-2	p 22	N89-14197			
NASA-RP-1190-VOL-3	p 22	N89-14201			
NASA-RP-1190-VOL-4	p 22	N89-14196			
NASA-RP-1190-VOL-5	p 21	N89-14195			
NASA-RP-1190-VOL-6	p 22	N89-14198			
NASA-RP-1190-VOL-7	p 22	N89-14199			
NASA-RP-1204	p 14	N89-10420			
NASA-RP-1206	p 15	N89-14634			
NASA-RP-1207	p 5	N89-15123			
NASA-RP-1210	p 15	N89-14648			
NASA-RP-1211	p 23	N89-30151			
NASA-RP-1213	p 22	N89-16709			
NASA-RP-1214	p 15	N89-17374			
NASA-RP-1215	p 13	N89-22152			
NASA-RP-1218	p 19	N89-25673			
NASA-RP-1220	p 3	N89-23448			
NASA-RP-1221	p 14	N89-26304			
NASA-RP-1223	p 13	N89-26275			
NASA-RP-1224-VOL-2	p 15	N89-28969			
NASA-RP-1225	p 16	N89-28983			
NASA-RP-1226	p 10	N89-26209			
NASA-RP-1227	p 16	N89-27302			
NASA-RP-1229	p 22	N89-27612			
NASA-SP-4025	p 24	N89-26803			
NASA-SP-4214	p 24	N89-25946			
NASA-SP-4406	p 24	N89-26805			
NASA-SP-491	p 13	N89-10401			
NASA-SP-494	p 23	N89-28474			
NASA-SP-495	p 4	N89-12565			
NASA-SP-496	p 21	N89-12513			
NASA-SP-497	p 21	N89-11657			
NASA-SP-498	p 13	N89-26274			
NASA-SP-6101	p 19	N89-12479			
NASA-SP-7011(327)	p 17	N89-29951			
NASA-SP-7037(242)	p 1	N89-29304			
NASA-SP-7039(35)-SECT-1	p 20	N89-25775			
NASA-SP-7039(35)-SECT-2	p 20	N89-29264			
NASA-SP-7041(62)	p 13	N89-29825			
NASA-SP-7046(20)	p 6	N89-26037			
NASA-SP-7056(07)	p 6	N89-18522			
NASA-SP-7064-VOL-3	p 20	N89-13301			
NASA-SP-7065	p 20	N89-15779			
NASA-SP-7500(23)	p 19	N89-26766			
NASA-TP-2595-REV	p 13	N89-12114			
NASA-TP-2811	p 19	N89-14052			
NASA-TP-2820	p 7	N89-19406			
NASA-TP-2822	p 5	N89-15929			
NASA-TP-2828	p 1	N89-10024			
NASA-TP-2829	p 18	N89-12316			
NASA-TP-2832	p 2	N89-24264			
NASA-TP-2835	p 18	N89-16437			
NASA-TP-2837	p 3	N89-11726			
NASA-TP-2838	p 10	N89-13762			
NASA-TP-2839	p 17	N89-18039			
NASA-TP-2843	p 19	N89-14053			
NASA-TP-2844	p 4	N89-12569			
NASA-TP-2845	p 11	N89-16183			
NASA-TP-2846	p 1	N89-10844			
NASA-TP-2848	p 1	N89-10020			
NASA-TP-2850	p 11	N89-16170			
NASA-TP-2851	p 6	N89-12580			
NASA-TP-2853	p 17	N89-12237			
NASA-TP-2855	p 9	N89-12822			
NASA-TP-2856	p 1	N89-14213			
NASA-TP-2857	p 5	N89-24327			
NASA-TP-2858	p 1	N89-12543			
NASA-TP-2859	p 3	N89-15900			
NASA-TP-2862	p 7	N89-15979			
NASA-TP-2863	p 7	N89-10996			
NASA-TP-2865	p 10	N89-16139			
NASA-TP-2866	p 18	N89-16415			
NASA-TP-2867	p 9	N89-16115			
NASA-TP-2868	p 11	N89-19579			
NASA-TP-2869	p 23	N89-14210			
NASA-TP-2870	p 3	N89-15901			

REPORT

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