NASA Scientific and Technical Publications


1987

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National Aeronautics and Space Administration
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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, archeologists, 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 1987. \textit{Records of Achievement, NASA SP-470} (accession number N83-33792) and \textit{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) list previous NASA publications not covered by this catalog. Two semimonthly abstract journals cover all aspects of aeronautics and space research, NASA and non-NASA, nationally and worldwide: \textit{STAR (Scientific and Technical Aerospace Reports)}, which focuses on scientific and technical reports, and \textit{IAA (International Aerospace Abstracts)}, which 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 below).

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\textit{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.

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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 \textit{STAR} to locate these citations. Also note that some bibliographies in the NASA SP-7000 series are issued periodically. This catalog lists only the last accessioned report in each bibliography series. The periodicity of each bibliography is as follows:

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& \textit{Section 1: Abstracts; Section 2: Indexes} & Semiannual \\
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TYPICAL CITATION AND ABSTRACT

NASA SPONSORED

ACCESSION NUMBER N87-11916# National Aeronautics and Space Administration.
Wallops Flight Center, Wallops Island, Va.
TITLE PULSE CODE MODULATION (PCM) ENCODER HANDBOOK FOR AYDIN VECTOR MMP-600 SERIES SYSTEM
COSATI CODE CSCL 17B

The hardware and software characteristics of a time division multiplex system are described. The system is used to sample analog and digital data. The data is merged with synchronization information to produce a serial pulse coded modulation (PCM) bit stream. Information presented herein is required by users to design compatible interfaces and assure effective utilization of this encoder system. GSFC/Wallops Flight Facility has flown approximately 50 of these systems through 1984 on sounding rockets with no inflight failures. Aydin Vector manufactures all of the components for these systems. Author

TYPICAL CITATION AND SUBJECT TERMS

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ACCESSION NUMBER N87-22604# National Aeronautics and Space Administration.
TITLE JOINT UNIVERSITY PROGRAM FOR AIR TRANSPORTATION RESEARCH, 1984
AUTHOR FREDERICK R. MORRELL, comp. May 1987 165 p Meeting held in Hampton, Va., 18 Jan. 1985
REPORT NUMBERS (NASA-CP-2452; L-16255; NAS 1.55:2452) Avail: NTIS HC
PRICE CODE A06/MF A01 CSCL 018

AIR TRANSPORTATION, AIRCRAFT CONTROL, AIRCRAFT GUIDANCE, AVIONICS, CONTROL THEORY, SURFACE NAVIGATION
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TABLE OF CONTENTS

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 5

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 N.A.

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 5

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 7

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 7

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 8

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) 8

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) 9

For extraterrestrial exploration see 91 Lunar and Planetary Exploration.

13 ASTRODYNAMICS  N.A.

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

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) N.A.

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 9

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 10

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 16 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.
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<th>Section</th>
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| 18 | **SPACERCAFT DESIGN, TESTING AND PERFORMANCE**

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

For life support systems see 54 Man/System Technology and Life Support. For related information see also 05 Aircraft Design, Testing and Performance, 39 Structural Mechanics, and 16 Space Transportation.

| 19 | **SPACERCAFT INSTRUMENTATION**

N.A.

For related information see also 06 Aircraft Instrumentation and 35 Instrumentation and Photography.

| 20 | **SPACERCAFT PROPULSION AND POWER**

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

For related information see also 07 Aircraft Propulsion and Power, 28 Propellants and Fuels, 44 Energy Production and Conversion, and 15 Launch Vehicles and Space Vehicles.

| CHEMISTRY AND MATERIALS |

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

| 23 | **CHEMISTRY AND MATERIALS (GENERAL)**

| 24 | **COMPOSITE MATERIALS**

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

For ceramic materials see 27 Nonmetallic Materials.

| 25 | **INORGANIC AND PHYSICAL CHEMISTRY**

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also 77 Thermodynamics and Statistical Physics.

| 26 | **METALLIC MATERIALS**

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

| 27 | **NONMETALLIC MATERIALS**

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**

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)**

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

| 32 | **COMMUNICATIONS AND RADAR**

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**

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**

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**

Includes remote sensors; measuring instruments and gages; 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**

Includes parametric amplifiers.

For related information see also 76 Solid-State Physics.

| 37 | **MECHANICAL ENGINEERING**

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

| 38 | **QUALITY ASSURANCE AND RELIABILITY**

Includes product sampling procedures and techniques; and quality control.

| 39 | **STRUCTURAL MECHANICS**

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

GEOSCIENCES
Includes geosciences (general); earth resources and remote sensing; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also Space Sciences.

42 GEOSCIENCES (GENERAL) 18

43 EARTH RESOURCES AND REMOTE SENSING 18
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 19
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 N.A.
Includes atmospheric, noise, thermal, and water pollution.

46 GEOPHYSICS 19
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.
For space radiation see 93 Space Radiation.

47 METEOROLOGY AND CLIMATOLOGY 20
Includes weather forecasting and modification.

48 OCEANOGRAPHY 21
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) 21

52 AEROSPACE MEDICINE 21
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 N.A.
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 22
Includes computer programs, routines, algorithms, and specific applications, e.g., CAD/CAM.

62 COMPUTER SYSTEMS 22
Includes computer networks and special application computer systems.

63 CYBERNETICS N.A.
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 22
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY 23
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

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

67 THEORETICAL MATHEMATICS N.A.
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) N.A.
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 23
Includes sound generation, transmission, and attenuation.
For noise pollution see 45 Environment Pollution.

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

73 NUCLEAR AND HIGH-ENERGY PHYSICS 24
Includes elementary and nuclear particles; and reactor theory.
For space radiation see 93 Space Radiation.

74 OPTICS 24
Includes light phenomena and optical devices.
For lasers see 36 Lasers and Masers.

75 PLASMA PHYSICS 24
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see 46 Geophysics. For space plasmas see 90 Astrophysics.

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

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

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

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

81 ADMINISTRATION AND MANAGEMENT 24
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE 24
Includes information management; information storage and retrieval technology; technical writing; graphic arts; and micrography.
For computer documentation see 61 Computer Programming and Software.

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

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

85 URBAN TECHNOLOGY AND TRANSPORTATION 25
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see 03 Air Transportation and Safety, 16 Space Transportation, and 44 Energy Production and Conversion.

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

88 SPACE SCIENCES (GENERAL) 25

89 ASTRONOMY 25
Includes radio, gamma-ray, and infrared astronomy; and astrometry.

90 ASTROPHYSICS 26
Includes cosmology; celestial mechanics; space plasmas; and interstellar and interplanetary gases and dust.
For related information see also 75 Plasma Physics.

91 LUNAR AND PLANETARY EXPLORATION 26
Includes planetology; and manned and unmanned flights.
For spacecraft design or space stations see 18 Spacecraft Design, Testing and Performance.

92 SOLAR PHYSICS 26
Includes solar activity, solar flares, solar radiation and sunspots.
For related information see 93 Space Radiation.

93 SPACE RADIATION 27
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see 52 Aerospace Medicine. For theory see 73 Nuclear and High-Energy Physics.

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

99 GENERAL 27

Note: N.A. means that no abstracts were assigned to this category for this issue.
01

AERONAUTICS (GENERAL)

N87-18520*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, Va.
JOINT UNIVERSITY PROGRAM FOR AIR TRANSPORTATION
RESEARCH, 1983
held in Atlantic City, N.J., 16 Dec. 1983; sponsored by NASA and
FAA (NASA-CP-2451; L-16254; NAS 1.55:2451) Avail: NTIS HC
A05/MF A01 CSCL 01B
AIR NAVIGATION, AIR TRANSPORTATION, AIRCRAFT
GUIDANCE, AVIONICS, CONFERENCES, FLIGHT CONTROL

N87-22604*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, Va.
JOINT UNIVERSITY PROGRAM FOR AIR TRANSPORTATION
RESEARCH, 1984
FREDERICK R. MORRELL, comp. May 1987 165 p Meeting
A08/MF A01 CSCL 01B
AIR TRANSPORTATION, AIRCRAFT CONTROL, AIRCRAFT
GUIDANCE, AVIONICS, CONTROL THEORY, SURFACE
NAVIGATION

N87-25267*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, Va.
WIND SHEAR/TURBULENCE INPUTS TO FLIGHT SIMULATION
AND SYSTEMS CERTIFICATION
ROLAND L. BOWLES, ed. and WALTER FROST, ed. (FWG
held in Hampton, Va., 30 May - 1 Jun. 1984 (NASA-CP-2474; L-16329; NAS 1.55:2474) Avail: NTIS HC
A12/MF A01 CSCL 01B
AIRCRAFT PERFORMANCE, AVIONICS, FLIGHT SAFETY,
FLIGHT SIMULATION, PILOT PERFORMANCE, WIND SHEAR

N87-27596*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, Va.
JOINT UNIVERSITY PROGRAM FOR AIR TRANSPORTATION
RESEARCH, 1985
CSCL 01B
AIR TRAFFIC CONTROL, AIR TRANSPORTATION,
CONFERENCES, FAULT TOLERANCE, FLIGHT CONTROL,
GLOBAL POSITIONING SYSTEM, INERTIAL NAVIGATION

N87-27619* National Aeronautics and Space Administration,
Washington, D.C.
AERONAUTICAL ENGINEERING: A CONTINUING BIBLIO-
GRAPHY WITH INDEXES (SUPPLEMENT 217)
Sep. 1987 134 p (NASA-SP-7037(217); NAS 1.21:7037(217)) Avail: NTIS HC A07
CSCL 01B
This bibliography lists 450 reports, articles, and other documents
introduced into the NASA scientific and technical information

02

AERODYNAMICS

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

N87-10039*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, Va.
WIND-TUNNEL INVESTIGATION OF THE FLIGHT CHARACTERIS-
TICS OF A CANARD GENERAL-AVIATION AIRPLANE CONFIG-
URATION
J. D. SATRAN Oct. 1986 60 p (NASA-CP-2623; L-15929; NAS 1.60:2623) Avail: NTIS HC
A04/MF A01 CSCL 01A
CANARD CONFIGURATIONS, FLIGHT CHARACTERISTICS,
GENERAL AVIATION AIRCRAFT, WIND TUNNEL TESTS

N87-10042*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, Va.
SUPERSONIC, NONLINEAR, ATTACHED-FLOW WING DESIGN
FOR HIGH LIFT WITH EXPERIMENTAL VALIDATION
J. L. PITTMAN, D. S. MILLER, and W. H. MASON (Grumman
A10/MF A01 CSCL 01A
CAMBERED WINGS, REATTACHED FLOW, SUPERCRITICAL
FLOW, SUPERSONIC AIRFOILS, SUPERSONIC FLOW

N87-10838*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, Va.
AERODYNAMIC DRAG, AIRCRAFT CONFIGURATIONS, SKIN
FRICION, TAIL ASSEMBLIES, TRANSONIC SPEED
THREE-DIMENSIONAL, UNSTEADY, FULL-POTENTIAL CALCULATION

60 DEG CONTROL

AIRCRAFT, SWEPT FORWARD WINGS, TRANSONIC SPEED

RAMP NOZZLES WITH THRUST-VECTORING CAPABILITY UP TO

NONCIRCULAR CROSS SECTION

EFFICIENT SOLUTIONS TO THE EULER EQUATIONS FOR

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HIGH MANEUVERABILITY BY USE OF A TRANSONIC

WINGS, THIN WINGS, VORTEX FLAPS

SURFACES, LINEARITY, LOW SPEED, SHARP LEADING EDGES, SWEPt WINGS, THIN WINGS, VORTEX FLAPS

FORWARD-SWEPT WING CONFIGURATION DESIGNED FOR

HIGH MANEUVERABILITY BY USE OF A TRANSONIC

COMPUTATIONAL METHOD

AERODYNAMIC BALANCE, AUTOMATIC FLIGHT CONTROL,

ENGINE FAILURE, LIGHT AIRCRAFT

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PERFORMANCE OF A ROTATING-VANE-TYPE THRUST

REVERSER

CORNER FLOW, NOZZLE GEOMETRY, PORTS (OPENINGS),

ROTATING BODIES, THRUST REVERSAL, VANES, WIND TUNNEL TESTS

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EFFECT OF PORT CORNER GEOMETRY ON THE INTERNAL

PERFORMANCE OF A ROTATING-VANE-TYPE THRUST

REVERSER

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PERFORMANCE OF A ROTATING-VANE-TYPE THRUST

REVERSER

EFFECT OF PORT CORNER GEOMETRY ON THE INTERNAL

PERFORMANCE OF A ROTATING-VANE-TYPE THRUST

REVERSER
N87-17668# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WIND-TUNNEL INVESTIGATION AT SUPERSONIC SPEEDS OF A REMOTE-CONTROLLED CANARD MISSILE WITH A FREE-ROLLING-TAIL BRAKE TORQUE SYSTEM
A. B. BLAIR, JR. Mar. 1985 38 p
(NASA-TP-2401; L-15882; NAS 1.60:2401) Avail: NTIS HC A03/MF A01 CSCL 01A
BRAKING, CANARD CONFIGURATIONS, FINS, MISSILE CONFIGURATIONS, REMOTE CONTROL, ROLLING MOMENTS, SUPERSONIC SPEED, TAIL ASSEMBLIES, TORQUE, WIND TUNNEL TESTS

N87-17669# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMBINED AERODYNAMIC AND STRUCTURAL DYNAMIC PROBLEM EMULATING ROUTINES (CASEPER): THEORY AND IMPLEMENTATION
WILLIAM H. JONES Feb. 1985 75 p
(NASA-TP-2418; E-2278; NAS 1.60:2418) Avail: NTIS HC A04/MF A01 CSCL 01A
AERODYNAMIC COEFFICIENTS, COMPUTATIONAL FLUID DYNAMICS, COMPUTERIZED SIMULATION, DYNAMIC STRUCTURAL ANALYSIS

N87-18537# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DELTA AND DOUBLE-DELTA WINGS AT SUPERSONIC SPEEDS
(NASA-TP-2676; L-16221; NAS 1.60:2676) Avail: NTIS HC A03/MF A01 CSCL 01A
BOUNDARY LAYER STABILITY, BOUNDARY LAYER TRANSITION, BOUNDARY VALUE PROBLEMS, CHANNEL FLOW, COMPUTATIONAL FLUID DYNAMICS, SPECTRAL METHODS

N87-201811# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NEW METHODS AND RESULTS FOR QUANTIFICATION OF LIGHTNING-AIRCRAFT ELECTRODYNAMICS
(NASA-TP-2737; L-16281; NAS 1.60:2737) Avail: NTIS HC A04/MF A01 CSCL 01A
ELECTRODYNAMICS, F-106 AIRCRAFT, FLIGHT TESTS, LIGHTNING, RESEARCH AIRCRAFT

N87-22262# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EXPERIMENTAL CAVITY PRESSURE DISTRIBUTIONS AT SUPERSONIC SPEEDS
ROBERT L. STALLINGS, JR. and FLOYD J. WILCOX, JR. Jun. 1987 79 p
(NASA-TP-2683; L-16215; NAS 1.60:2683) Avail: NTIS HC A05/MF A01 CSCL 01A
CAVITIES, FLUID FLOW, PRESSURE DISTRIBUTION, SUPERSONIC SPEED

N87-23586# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ON MINIMIZING THE NUMBER OF CALCULATIONS IN DESIGN-BY-ANALYSIS CODES
RAYMOND L. BARGER and ANUTOSH MOITRA Jun. 1987 16 p
(NASA-TP-2706; L-16226; NAS 1.60:2706) Avail: NTIS HC A02/MF A01 CSCL 01A
AERODYNAMIC CONFIGURATIONS, APPROXIMATION, DESIGN ANALYSIS, NUMERICAL ANALYSIS, PRESSURE DISTRIBUTION

02 AERODYNAMICS
05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

N87-27622*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. CALCULATION OF VISCOS EFFECTS ON TRANSONIC FLOW FOR OSCILLATING AIRFOILS AND COMPARISONS WITH EXPERIMENT JAMES T. HOWLETT and SAMUEL R. BLAND Sep. 1987 77 p (NASA-TP-2731; L-16289; NAS 1.60:2731) Avail: NTIS HC A05/MF A01 CSCL 01A AIRFOILS, COMPARISON, INVISCID FLOW, OSCILLATIONS, TRANSONIC FLOW, VISCOS FLOW

N87-27626# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. DRAG MEASUREMENTS OF BLUNT STORES TANGENTIALLY MOUNTED ON A FLAT PLATE AT SUPersonic SPEEDS FLOYD J. WILCOX, JR. Sep. 1987 68 p (NASA-TP-2742; L-16284; NAS 1.60:2742) Avail: NTIS HC A04/MF A01 CSCL 01A AERODYNAMIC DRAG, BLUNT BODIES, EXTERNAL STORES, FLAT PLATES, MOUNTING, SUPersonic SPEED, TANGENTS


03 AIR TRANSPORTATION AND SAFETY

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


N87-29469# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. FLAT PLATES, MOUNTING, SUPERSONIC SPEED, TANGENTS

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

N87-11750*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RECENT EXPERIENCES IN MULTIDISCIPLINARY ANALYSIS AND OPTIMIZATION, PART 2
AIRCRAFT DESIGN, COMPUTER AIDED DESIGN, HELICOPTERS, OPTIMIZATION

N87-15959*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
LARGE-SCALE STATIC INVESTIGATION OF CIRCULATION-CONTROL-WING CONCEPTS APPLIED TO UPPER SURFACE-BLOWING AIRCRAFT
CIRCULATION CONTROL AIRFOILS, GROUND TESTS, LIFT AUGMENTATION, SHORT TAKEOFF AIRCRAFT, STATIC TESTS, THRUST CONTROL, TURBOFAN ENGINES, UPPER SURFACE BLOWING

N87-16815*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FLIGHT INVESTIGATION OF THE EFFECT OF TAIL CONFIGURATION ON STALL, SPIN, AND RECOVERY CHARACTERISTICS OF A LOW-WING GENERAL AVIATION RESEARCH AIRPLANE
H. PAUL STOUGH, III, JAMES M. PATTON, JR., and STEVEN M. SLIWA Feb. 1987 125 p (NASA-TP-2644; L-16194; NAS 1.60:2644) Avail: NTIS HC A06/4F A01 CSCL 01C
AERODYNAMIC CONFIGURATIONS, AERODYNAMIC STALLING, AIRCRAFT SPIN, GENERAL AVIATION AIRCRAFT, RESEARCH AIRCRAFT, TAIL ASSEMBLIES

N87-17690*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EXPLOITING SYMMETRIES IN THE MODELING AND ANALYSIS OF TIRES
AHMED K. NOOR (Joint Inst. for Advancement of Flight Sciences, Hampton, Va.), CARL M. ANDERSEN (College of William and Mary, Hampton, Va.), and JOHN A. TANNER Mar. 1987 63 p (NCCI-40) (NASA-TP-2648; L-16185; NAS 1.60:2648) Avail: NTIS HC A04/4F A01 CSCL 01C
FINITE ELEMENT METHOD, MATHEMATICAL MODELS, SYMMETRY, TIRES

N87-20990*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SUMMARY OF STUDIES TO REDUCE WING-MOUNTED PROPFAN INSTALLATION DRAG ON AN M = 0.8 TRANSPORT
RONALD C. SMITH, ALAN D. LEVIN, and RICHARD D. WOOD May 1987 29 p (NASA-TP-2678; A-86242; NAS 1.60:2678) Avail: NTIS HC A03/4F A01 CSCL 01C
DRAG REDUCTION, HIGH SPEED, PROP-FAN TECHNOLOGY, TRANSPORT AIRCRAFT, WIND TUNNEL TESTS

N87-23614*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FLIGHT INVESTIGATION OF THE EFFECTS OF AN OUTBOARD WING-LEADING-EDGE MODIFICATION ON STALL/SPIN CHARACTERISTICS OF A LOW-WING, SINGLE-ENGINE, T-TAIL LIGHT AIRPLANE
H. PAUL STOUGH, III, DANIEL J. DICARLO, and JAMES M. PATTON, JR. Jul. 1987 117 p (NASA-TP-2691; L-16243; NAS 1.60:2691) Avail: NTIS HC A06/4F A01 CSCL 01C
AERODYNAMIC STALLING, FLIGHT TESTS, INVESTIGATION, LEADING EDGES, REVISIONS, SPIN, WINGS

N87-24458*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MEASUREMENTS OF FLOW RATE AND TRAJECTORY OF AIRCRAFT TIRE-GENERATED WATER SPRAY
ROBERT H. DAUGHERTY and SANDY M. STUBBS Jul. 1987 118 p (NASA-TP-2718; L-16195; NAS 1.60:2718) Avail: NTIS HC A06/4F A01 CSCL 01C
AIRCRAFT TIRES, ENGINE INLETS, FLOW VELOCITY, INGESTION (ENGINES), SPLASHING, SPRAYING

N87-26041*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EVALUATION OF INSTALLED PERFORMANCE OF A WING-TIP-MOUNTED PUSHER TURBOPROP ON A SEMISPAN WING
JAMES C. PATTERSON, JR. and GLYNN R. BARTLETT Aug. 1987 30 p (NASA-TP-2739; L-16252; NAS 1.60:2739) Avail: NTIS HC A03/4F A01 CSCL 01C
INSTALLING, PROPELLERS, SEMISPAN MODELS, TURBOFAN ENGINES, TURBOPROP ENGINES, WING TIP VORTICES

N87-29497*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
QUALITATIVE EVALUATION OF A FLUSH AIR DATA SYSTEM AT TRANSONIC SPEEDS AND HIGH ANGLES OF ATTACK
AIR DATA SYSTEMS, ANGLE OF ATTACK, FLOW DISTRIBUTION, ORIFICE FLOW, PITOT TUBES, STAGNATION PRESSURE, TRANSONIC SPEED

N87-29499*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
APPLICATION OF PARAMETER ESTIMATION TO AIRCRAFT STABILITY AND CONTROL: THE OUTPUT-ERROR APPROACH
RICHARD E. MAINE and KENNETH W. ILIFF Jun. 1986 175 p Submitted for publication (NASA-RP-1168; H-1299; NAS 1.61:1168) Avail: NTIS HC A06/4F A01 CSCL 01C
The practical application of parameter estimation methodology to the problem of estimating aircraft stability and control derivatives from flight test data is examined. The primary purpose of the
document is to present a comprehensive and unified picture of the entire parameter estimation process and its integration into a flight test program. The document concentrates on the output-error the entire parameter estimation process and its integration into a
document is to present a comprehensive and unified picture of

equations to the limitations of analysis programs, using a specific
derivatives. It then discusses the issues that arise in adapting the
suitable for application to estimation of stability and control
encountered flight-test situations. Author

06

AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

N87-10864*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, Va.
GROUND-BASED TIME-GUIDANCE ALGORITHM FOR CON- TROL OF AIRPLANES IN A TIME-METERED AIR TRAFFIC CON- TROL ENVIRONMENT: A PILOTED SIMULATION STUDY
C. E. KNOX and N. IMBERT (Office National d'Etudes et de Recherches Aerospatiales, Toulouse, France); Nov. 1986 36 p
(NASA-TP-2616; L-16116; NAS 1.60:2616) Avail: NTIS HC
A03/MF A01 CSCL 01D
AIR TRAFFIC CONTROL, ENERGY CONSERVATION, FLIGHT MANAGEMENT SYSTEMS, FLIGHT SIMULATION, FUEL CONSUMPTION, PILOTS (PERSONNEL), TIMING DEVICES

N87-13438*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, Va.
DEVELOPMENT AND EVALUATION OF AN ELECTRONIC DISPLAY FORMAT ALIGNED WITH THE INERTIAL VELOCITY VECTOR
G. G. STEINMETZ Dec. 1986 23 p
(NASA-TP-2648; L-16168; NAS 1.60:2648) Avail: NTIS HC
A02/MF A01 CSCL 01D
ALIGNMENT, DIRECTIONAL CONTROL, DISPLAY DEVICES, ELECTRONIC EQUIPMENT, FLIGHT TESTS, INERTIAL NAVIGATION, PERFORMANCE TESTS, VELOCITY

N87-19393*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, Va.
A SIMULATION EVALUATION OF A PILOT INTERFACE WITH AN AUTOMATIC TERMINAL APPROACH SYSTEM
DAVID A. HINTON Apr. 1987 21 p
(NASA-TP-2699; L-16222; NAS 1.60:2699) Avail: NTIS HC
A02/MF A01 CSCL 17G
APPROACH CONTROL, AUTOMATIC CONTROL, AUTOMATIC PILOTS, GENERAL Aviation AIRCRAFT, MAN MACHINE SYSTEMS

N87-29533*# National Aeronautics and Space Administration.
Ames Research Center, Moffett Field, Calif.
ANALOG SIGNAL CONDITIONING FOR FLIGHT-TEST INSTRUMENTATION
(NASA-RP-1159; H-1191; NAS 1.61:1159) Avail: NTIS HC
A08/MF A01 CSCL 01D
THE APPLICATION OF ANALOG SIGNAL CONDITIONING TO FLIGHT-TESTS DATA-ACQUISITION SYSTEMS IS DISCUSSED. EMPHASIS IS PLACED ON PRACTICAL APPLICATIONS OF ANALOG SIGNAL CONDITIONING FOR THE MOST COMMON FLIGHT-TEST DATA-ACQUISITION SYSTEMS. A LIMITED AMOUNT OF THEORETICAL DISCUSSION IS INCLUDED TO ASSIST THE READER IN A MORE COMPLETE UNDERSTANDING OF THE SUBJECT MATTER. NONSPECIFIC SIGNAL CONDITIONING, SUCH AS AMPLIFICATION, FILTERING, AND MULTIPLEXING, IS DISCUSSED. SIGNAL CONDITIONING FOR VARIOUS SPECIFIC TRANSUCERS AND DATA TERMINAL DEVICES IS ALSO DISCUSSED TO ILLUSTRATE SIGNAL CONDITIONING THAT IS UNIQUE TO PARTICULAR TYPES OF TRANSUCERS. THE PURPOSE IS TO DELINEATE FOR THE READER THE VARIOUS SIGNAL-CONDITIONING TECHNIQUE OPTIONS, TOGETHER WITH TRADEOFF CONSIDERATIONS, FOR COMMONLY ENCOUNTERED FLIGHT-TEST SITUATIONS. Author

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.

N87-17699*# National Aeronautics and Space Administration.
Lewis Research Center, Cleveland, Ohio.
DESIGN OF 9.271-PRESSURE-RATIO 5-STAGE CORE COMPRESSOR AND OVERALL PERFORMANCE FOR FIRST 3 STAGES
RONALD J. STEINKE May 1986 35 p
(NASA-TP-2597; E-2589; NAS 1.60:2597) Avail: NTIS HC
A03/MF A01 CSCL 21E
COMPRESSORS, DESIGN ANALYSIS, FLOW DISTRIBUTION, PERFORMANCE TESTS, ROTOR BLADES (TURBOMACHINERY)

N87-20267*# National Aeronautics and Space Administration.
Lewis Research Center, Cleveland, Ohio.
(NASA-CP-2433; E-3033; NAS 1.55:2433) Avail: NTIS HC
A01/MF A01 CSCL 21E
COMBUSTION, FLUID DYNAMICS, THERMODYNAMICS

N87-24481*# National Aeronautics and Space Administration.
Lewis Research Center, Cleveland, Ohio.
LOW-Cost FM OSCILLATOR FOR CAPACITANCE TYPE OF BLADE TIP CLEARANCE MEASUREMENT SYSTEM
JOHN P. BARRANGER Jul. 1987 16 p
(NASA-TP-2746; E-3455; NAS 1.60:2746) Avail: NTIS HC
A02/MF A01 CSCL 21E
BLADE TIPS, ERROR ANALYSIS, FREQUENCY MODULATION, NONDESTRUCTIVE TESTS, OSCILLATORS, ROTOR BLADES (TURBOMACHINERY)
AEROELASTIC CHARACTERISTICS OF AN OBLIQUE-WING RESEARCH AIRPLANE

R. E. Cury and A. G. Sim  Oct. 1984  30 p
(NASA-TP-2224; H-1181; NAS 1.60:2224) Avail: NTIS HC
A03/MF A01 CSCL 01C
AEROELASTIC RESEARCH WINGS, AIRCRAFT DESIGN, FLIGHT TESTS, OBLIQUE WINGS, RESEARCH AIRCRAFT, STRUCTURAL DESIGN, WIND TUNNEL TESTS

FLIGHT-DETERMINED AERODYNAMIC DERIVATIVES OF THE AD-1 OBLIQUE-WING RESEARCH AIRCRAFT
(NASA-TP-2222; H-1179; NAS 1.60:2222) Avail: NTIS HC
A03/MF A01 CSCL 01C
AERODYNAMIC COEFFICIENTS, OBLIQUE WINGS, RESEARCH AIRCRAFT, VARIABLE SWEEP WINGS

PILOTED SIMULATOR STUDY OF ALLOWABLE TIME DELAYS IN LARGE-AIRPLANE RESPONSE
(NASA-TP-2652; L-16149; NAS 1.60:2652) Avail: NTIS HC
A04/MF A01 CSCL 01C
CONTROL SYSTEMS DESIGN, FLIGHT CHARACTERISTICS, FLIGHT SIMULATORS, LOW SPEED, TIME LAG, TRANSPORT AIRCRAFT

PILOTING SIMULATION STUDY OF EFFECTS OF VORTEX FLAPS ON LOW-SPEED HANDLING QUALITIES OF A DELTA-WING AIRPLANE
Jay M. Brandon, Philip W. Brown, and Alfred J. Wunschel  Sep. 1987  38 p
(NASA-TP-2747; L-16307; NAS 1.60:2747) Avail: NTIS HC
A03/MF A01 CSCL 01C
CONTROLLABILITY, DELTA WINGS, FLIGHT SIMULATION, LOW SPEED, PILOTS (PERSONNEL), VORTEX FLAPS

RESEARCH AND SUPPORT FACILITIES (AIR)

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

AERONAUTICAL FACILITIES ASSESSMENT
F. E. Penaranda, comp.  Nov. 1985  204 p
(NASA-TP-1146; NAS 1.61:1146) Avail: NTIS HC A10/MF A01 CSCL 14B
A survey of the free world’s aeronautical facilities was undertaken and an evaluation made on where the relative strengths and weaknesses exist. Special emphasis is given to NASA’s own capabilities and needs. The types of facilities surveyed are: Wind Tunnels; Airbreathing Propulsion Facilities; and Flight Simulators. 

EXPERIMENTAL EVALUATION OF WALL MACH NUMBER DISTRIBUTIONS OF THE OCTAGONAL TEST SECTION PROPOSED FOR NASA LEWIS RESEARCH CENTER’S ALTITUDE WIND TUNNEL
(NASA-TP-2666; E-3145; NAS 1.60:2666) Avail: NTIS HC A03/MF A01 CSCL 14B
FLOW VELOCITY, MACH NUMBER, WIND TUNNEL APPARATUS, WIND TUNNEL WALLS

EXPERIMENTAL EVALUATION OF TWO TURNING VANE DESIGNS FOR FAN DRIVE CORNER OF 0.1-SCALE MODEL OF NASA LEWIS RESEARCH CENTER’S PROPOSED ALTITUDE WIND TUNNEL
Donald R. Boldman, Royce D. Moore, and Rickey J. Shyne  Mar. 1987  146 p
(NASA-TP-2646; E-3175; NAS 1.60:2646) Avail: NTIS HC A07/MF A01 CSCL 14B
CORNER FLOW, VANES, WIND TUNNEL APPARATUS, WIND TUNNEL DRIVES
15 LAUNCH VEHICLES AND SPACE VEHICLES

12 ASTRONAUTICS (GENERAL)


CONFERENCES, GETAWAY SPECIALS (STS), GOVERNMENT/INDUSTRY RELATIONS, SPACE SHUTTLE PAYLOADS, UNIVERSITIES


This bibliography lists 512 reports, articles, and other documents introduced into the NASA scientific and technical information system between January 1, 1987 and June 30, 1987. Its purpose is to provide helpful information to the researcher, manager, and designer in technology development and mission design according to system, interactive analysis and design, structural and thermal analysis and design, structural concepts and control systems, electronics, advanced materials, assembly concepts, propulsion, and solar power satellite systems.

Author

15 LAUNCH VEHICLES AND SPACE VEHICLES

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


LARGE SPACE STRUCTURES, LASER APPLICATIONS, SOLAR ARRAYS, SPACE SHUTTLE PAYLOADS, TRACKING (POSITION)


ATMOSPHERIC COMPOSITION, CARBON DIOXIDE, REMOTE SENSING, SPACE PLATFORMS
### 15 LAUNCH VEHICLES AND SPACE VEHICLES

**N87-22702** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**STRUCTURAL DYNAMICS AND CONTROL INTERACTION OF FLEXIBLE STRUCTURES**


(NASA-CP-2467-PT-1; M-554-PT-1; NAS 1.55:2467-PT-1) Avail: NTIS HC A99/MF E03 CSCL 22B

- CONTROL SYSTEMS DESIGN, DYNAMIC STRUCTURAL ANALYSIS, FLEXIBLE BODIES, LARGE SPACE STRUCTURES, SPACECRAFT CONTROL

**N87-22729** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**STRUCTURAL DYNAMICS AND CONTROL INTERACTION OF FLEXIBLE STRUCTURES**


(NASA-CP-2467-PT-2; M-554-PT-2; NAS 1.55:2467-PT-2) Avail: NTIS HC A14/MF A01 CSCL 22B

- DESIGN ANALYSIS, DYNAMIC STRUCTURAL ANALYSIS, FLEXIBLE BODIES, JOINTS (JUNCTIONS), LARGE SPACE STRUCTURES, ORBITAL SPACE STATIONS

### 16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques.

**N87-12585** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**DEVELOPMENT TESTING OF LARGE VOLUME WATER SPRAYS FOR WARM FOG DISPERSAL**


(NASA-TP-2607; NAS 1.60:2607) Avail: NTIS HC A06/MF A01 CSCL 14B

- COALESCING, FOG DISPERSAL, SPACE SHUTTLES, SPACECRAFT LAUNCHING, SPRAY NOZZLES, WATER

### 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.

**N87-16014** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**NASA/DOD CONTROL/STRUCTURES INTERACTION TECHNOLOGY, 1986**

ROBERT L. WRIGHT, comp. Nov. 1986 549 p Conference held in Norfolk, Va., 18-21 Nov. 1986; sponsored by NASA Langley Research Center and AFWAL

(NASA-CP-2447-PT-1; L-16242-PT-1; NAS 1.55:2447-PT-1) Avail: NTIS HC A23/MF A01 CSCL 22B

- ANTENNAS, CONFERENCES, FLEXIBLE SPACECRAFT, LARGE SPACE STRUCTURES, SPACE STATIONS, SPACECRAFT CONTROL, SPACECRAFT DESIGN, SYSTEMS ENGINEERING, TRUSSES, VIBRATION DAMPING

**N87-24955** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**NASA/DOD CONTROL/STRUCTURES INTERACTION TECHNOLOGY, 1986**


(NASA-CP-2447-PT-2; L-16242-PT-2; NAS 1.55:2447-PT-2) Avail: NTIS HC A14/MF A01 CSCL 22B

- CONTROL STABILITY, CONTROL SYSTEMS DESIGN, INTERACTIVE CONTROL, ORBITAL SPACE STATIONS, SPACECRAFT CONTROL, VIBRATION DAMPING

**N87-26075** National Aeronautics and Space Administration, Washington, D.C.

**SPACE STATION SYSTEMS: A BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 4)**

May 1987 220 p

(NASA-SP-7056(04); NAS 1.21:7056(04)) Avail: NTIS HC A10 CSCL 22B

This bibliography lists 832 reports, articles, and other documents introduced into the NASA scientific and technical information system between July 1, 1986 and December 31, 1986. Its purpose is to provide helpful information to the researcher, manager, and designer in technology development and mission design according to system, interactive analysis and design, structural and thermal analysis and design, structural concepts and control systems, electronics, advanced materials, assembly concepts, propulsion, and solar power satellite systems. The coverage includes documents that define major systems and subsystems, servicing and support requirements, procedures and operations, and missions for the current and future space station.

### 20 SPACECRAFT PROPULSION AND POWER

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

**N87-20380** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**SOLAR ARRAY FLIGHT EXPERIMENT/DYNAMIC AUGMENTATION EXPERIMENT**

LEIGHTON E. YOUNG and HOMER C. PACK, JR. Feb. 1987 72 p

(NASA-TP-2690; NAS 1.60:2690) Avail: NTIS HC A04/MF A01 CSCL 10A

- LARGE SPACE STRUCTURES, SOLAR ARRAYS, SOLAR DYNAMIC POWER SYSTEMS, SPACE ERECTABLE STRUCTURES, SPACE SHUTTLE PAYLOADS

**N87-20381** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EXPERIMENTAL THRUST PERFORMANCE OF A HIGH-AREA-RATIO ROCKET NOZZLE**


(NASA-TP-2720; E-3236-1; NAS 1.60:2720) Avail: NTIS HC A02/MF A01 CSCL 21H

- AREA, NOZZLE GEOMETRY, ROCKET NOZZLES, ROCKET THRUST
24 COMPOSITE MATERIALS

N87-22766*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
STRUCTURAL INTEGRITY AND DURABILITY OF REUSABLE SPACE PROPULSION SYSTEMS 1987 205 p Conference held in Cleveland, Ohio, 12-13 May 1987 (NASA-CP-2471; E-3512; NAS 1.55:2471) Avail: NTIS HC A10/MF A01 CSCL 21H
AEROTHERMODYNAMICS, CONFERENCES, DURABILITY, DYNAMIC STRUCTURAL ANALYSIS, FATIGUE (MATERIALS), FRACTURE MECHANICS, SPACE SHUTTLE MAIN ENGINE, SPACECRAFT PROPULSION, STRUCTURAL RELIABILITY

N87-25423*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

N87-25424*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

N87-25425*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

23 CHEMISTRY AND MATERIALS (GENERAL)

N87-18611*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPECTROSCOPIC COMPARISON OF EFFECTS OF ELECTRON RADIATION ON MECHANICAL PROPERTIES OF TWO POLYIMIDES EDWARD R. LONG, JR. and SHEILA ANN T. LONG Apr. 1987 21 p (NASA-TP-2663; L-16200; NAS 1.60:2663) Avail: NTIS HC A02/MF A01 CSCL 11C DURABILITY, ELECTRON RADIATION, KAPTON (TRADE-MARK), RADIATION DAMAGE, TENSILE PROPERTIES

N87-10184*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

N87-25435*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

N87-29612*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE ACEE PROGRAM AND BASIC COMPOSITES RESEARCH AT LANGLEY RESEARCH CENTER (1975 TO 1986): SUMMARY AND BIBLIOGRAPHY MARVIN B. DOW Oct. 1987 147 p (NASA-CP-1177; L-16290; NAS 1.61:1177) Avail: NTIS HC A07/MF A01 CSCL 11D Composites research conducted at the Langley Research Center during the period from 1975 to 1986 is described, and an annotated bibliography of over 600 documents (with their abstracts) is presented. The research includes Langley basic technology and the composite primary structures element of the NASA Aircraft Energy Efficiency (ACEE) Program. The basic technology documents cited in the bibliography are grouped according to the research activity such as design and analysis, fatigue and fracture, and damage tolerance. The ACEE documents cover development of composite structures for transport aircraft.
25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

N87-18629* # National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. ELECTRON STIMULATED DESORPTION OF ATOMIC OXYGEN FROM SILVER
R. A. OUTLAW, W. K. PEREGOY, GAR B. HOFLUND (Florida Univ., Gainesville), and GREGORY R. CORALLO Apr. 1987 25 p
(NASA-TP-2668; L-16225; NAS 1.60:2668) Avail: NTIS HC A02/MF A01 CSCL 07D
ATOMIC BEAMS, DESORPTION, ELECTRON EMISSION, OXYGEN, SILVER, STIMULATED Emission

N87-18644* # National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. EFFECT OF LID (REGISTERED) PROCESSING ON THE MICROSTRUCTURE AND MECHANICAL PROPERTIES OF Ti-6Al-4V AND Ti-6Al-2Sn-4Zr-2Mo TITANIUM FOIL-GAUGE MATERIALS
LINDA B. BALKBURN Apr. 1987 27 p
(NASA-TP-2677; L-16098; NAS 1.60:2677) Avail: NTIS HC A03/MF A01 CSCL 11F
BONDING, DIFFUSION, INTERFACES, LIQUIDS, MECHANICAL PROPERTIES, MICROSTRUCTURE, PROTECTIVE COATINGS, TITANIUM ALLOYS

26 METALLIC MATERIALS

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

N87-16902* # National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio. CONVENTIONALLY CAST AND FORGED COPPER ALLOY FOR HIGH-HEAT-FLUX THRUST CHAMBERS
JOHN M. KAZAROFF and GEORGE A. REPAS Feb. 1986 12 p
(NASA-TP-2694; E-3304; NAS 1.60:2694) Avail: NTIS HC A02/MF A01 CSCL 07D
COMBUSTION CHAMBERS, COPPER ALLOYS, HEAT FLUX, HIGH TEMPERATURE, LININGS, SPACE SHUTTLE MAIN ENGINE

N87-21076* # National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala. THE CORROSION MECHANISMS FOR PRIMER COATED 2219-T87 ALUMINUM
MERLIN D. DANFORD and WARD W. KNOCKEMUS (Huntingdon Coll., Montgomery, Ala.) Jul. 1987 36 p
(NASA-TP-2744; NAS 1.60:2744) Avail: NTIS HC A03/MF A01 CSCL 11F
ALUMINUM ALLOYS, CORROSION RESISTANCE, PRIMERS (COATINGS), PROTECTIVE COATINGS

N87-27024* # National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. PERMEATION OF OXYGEN THROUGH HIGH PURITY, LARGE GRAIN SILVER
(NASA-TP-2755; L-16305; NAS 1.60:2755) Avail: NTIS HC A02/MF A01 CSCL 11F
SILVER

27 NONMETALLIC MATERIALS

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

N87-12680* # National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. INVESTIGATION OF THE EFFECTS OF COBALT IONS ON EPOXY PROPERTIES
J. J. SINGH and D. M. STOAKLEY Dec. 1986 16 p
(NASA-TP-2639; L-16196; NAS 1.60:2639) Avail: NTIS HC A02/MF A01 CSCL 11G
COBALT, EPOXY RESINS, INVESTIGATION, IONS, MECHANICAL PROPERTIES

N87-16666* # National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio. ESTER OXIDATION ON AN ALUMINUM SURFACE USING CHEMILUMINESCENCE
WILLIAM R. JONES, JR., MICHAEL A. MEADOR, and WILFREDO MORALES Jul. 1986 16 p
(NASA-TP-2611: E-2647; NAS 1.60:2611) Avail: NTIS HC A02/MF A01 CSCL 11B
ALUMINUM ALLOYS, CHEMILUMINESCENCE, ESTERS, METAL SURFACES, OXIDATION

29 MATERIALS PROCESSING

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

N87-21141*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio. MICROGRAVITY FLUID MANAGEMENT SYMPOSIUM Apr. 1987 225 p Symposium held in Cleveland, Ohio, 9-10 Sep. 1986 (NASA-CP-2465; E-3036; NAS 1.55:2465) Avail: NTIS HC A10/MF A01 CSL 22A AEROSPACE ENVIRONMENTS, CONFERENCES, FLUID MANAGEMENT, WEIGHTLESSNESS

31 ENGINEERING (GENERAL)

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


32 COMMUNICATIONS AND RADAR

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


The hardware and software characteristics of a time division multiplex system are described. The system is used to sample and digitize data. The data is merged with synchronizing information to produce a serial pulse coded modulation (PCM) bit stream. Information presented herein is required by users to design compatible interfaces and assure effective utilization of this encoder system. GSFC/Wallops Flight Facility has flown approximately 50 of these systems through 1984 on sounding rockets with no inflight failures. Aydin Vector manufactures all of the components for these systems. Author


N87-17971*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio. BIT-ERROR-RATE TESTING OF HIGH-POWER 30-GHZ TRAVELING WAVE TUBES FOR GROUND-TERMINAL APPLICATIONS KURT A. SHALKHAUSER and GENE FUJIKAWA Oct. 1986 16 p (NASA-TP-2635; E-2996; NAS 1.60:2635) Avail: NTIS HC A02/MF A01 CSL 17B BIT ERROR RATE, PERFORMANCE TESTS, TRANSMISSION EFFICIENCY, TRAVELING WAVE TUBES

N87-20448*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio. UNIQUE BIT-ERROR-RATE MEASUREMENT SYSTEM FOR SATELLITE COMMUNICATION SYSTEMS MARY JO WINDMILLER Mar. 1987 13 p (NASA-TP-2698; E-3222; NAS 1.60:2698) Avail: NTIS HC A02/MF A01 CSL 17B BIT ERROR RATE, COMMUNICATION NETWORKS, SATELLITE COMMUNICATION, SYSTEMS ANALYSIS

ELECTRONICS AND ELECTRICAL ENGINEERING

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

N87-11072*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE 1985 GODDARD SPACE FLIGHT CENTER BATTERY WORKSHOP
CONFERENCES, ENERGY STORAGE, LITHIUM SULFUR BATTERIES, NICKEL CADMIUM BATTERIES, NICKEL HYDROGEN BATTERIES

N87-17990*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PERFORMANCE OF TEXTURED CARBON ON COPPER ELECTRODE MULTISTAGE DEPRESSED COLLECTORS WITH MEDIUM-POWER TRAVELING WAVE TUBES
PETER RAMINS and ARTHUR N. CURREN Nov. 1986 12 p (NASA-TP-2665; E-3143; NAS 1.60:2665) Avail: NTIS HC A02/MF A01 CSCL 09A
ACCUMULATORS, CURRENT DENSITY, ELECTRODES, ELECTRON EMISSION, TRAVELING WAVE TUBES

N87-17991*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CALCULATION OF SECONDARY ELECTRON TRAJECTORIES IN MULTISTAGE DEPRESSED COLLECTORS FOR MICROWAVE AMPLIFIERS
DALE A. FORCE Nov. 1986 7 p (NASA-TP-2664; E-3198; NAS 1.60:2664) Avail: NTIS HC A02/MF A01 CSCL 09A
ACCUMULATORS, ELECTRON EMISSION, MICROWAVE AMPLIFIERS, PARTICLE TRAJECTORIES, TRAVELING WAVE TUBES

N87-20474*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DESIGN, FABRICATION AND PERFORMANCE OF SMALL GRAPHITE ELECTRODE, MULTISTAGE DEPRESSED COLLECTORS WITH 200-W, CW, 8-TO 18-GHZ TRAVELING-WAVE TUBES
BEN T. EBIHARA and PETER RAMINS Feb. 1987 22 p (NASA-TP-2693; E-3099; NAS 1.60:2693) Avail: NTIS HC A02/MF A01 CSCL 09A
ACCUMULATORS, DESIGN ANALYSIS, ELECTRODES, FABRICATION, PYROLYTIC GRAPHITE, TRAVELING WAVE TUBES

N87-21239*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TRAVELING-WAVE-TUBE EFFICIENCY IMPROVEMENT BY A LOW-COST TECHNIQUE FOR DEPOSITION OF CARBON ON MULTISTAGE DEPRESSED COLLECTOR
BEN T. EBIHARA, PETER RAMINS, and SHELLY PEET May 1987 14 p (NASA-TP-2719; E-3416; NAS 1.60:2719) Avail: NTIS HC A02/MF A01 CSCL 09A
CARBON, COPPER, DEPOSITION, ELECTRODES, THIN FILMS, TRAVELING WAVE TUBES

N87-22923*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
REVISED NASA AXIALLY SYMMETRIC RING MODEL FOR COUPLED-CAVITY TRAVELING-WAVE TUBES
JEFFREY D. WILSON Jan. 1987 17 p (NASA-TP-2675; E-3220; NAS 1.60:2675) Avail: NTIS HC A02/MF A01 CSCL 09A
AXISYMMETRIC BODIES, CAVITIES, COUPLED MODES, MODELS, RINGS, TRAVELING WAVE TUBES

N87-25532*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ANALYTICAL AND EXPERIMENTAL PERFORMANCE OF A DUAL-MODE TRAVELING WAVE TUBE AND MULTISTAGE DEPRESSED COLLECTOR
PETER RAMINS, DALE A. FORCE, and HENRY G. KOSMAHL Aug. 1987 29 p (NASA-TP-2752; E-3470; NAS 1.60:2752) Avail: NTIS HC A03/MF A01 CSCL 09A
ACCUMULATORS, ELECTRON BEAMS, TRAVELING WAVE TUBES

FLUID MECHANICS AND HEAT TRANSFER

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

N87-11963*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ON THE MAXWELLIAN DISTRIBUTION, SYMMETRIC FORM, AND ENTROPY CONSERVATION FOR THE EULER EQUATIONS
S. M. DESHPANDE Nov. 1986 30 p (NASA-TP-2583; L-16036; NAS 1.60:2583) Avail: NTIS HC A04/MF A01 CSCL 20D
ENTROPY, EULER EQUATIONS OF MOTION, MAXWELL-BOLTZMANN DENSITY FUNCTION

N87-13664*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AERO THERMAL TESTS OF SPHERICAL DOME PROTUBERANCES ON A FLAT PLATE AT A MACH NUMBER OF 6.5.
AEROTHERMODYNAMICS, HYPERSONIC VEHICLES, LAMINAR BOUNDARY LAYER, PREDICTION ANALYSIS TECHNIQUES, PROTUBERANCES, THERMAL PROTECTION, TILES, TURBULENT BOUNDARY LAYER

SPACE SHUTTLE MAIN ENGINE HIGH PRESSURE FUEL PUMP AFT PLATFORM SEAL CAVITY FLOW ANALYSIS
CAVITIES, FUEL PUMPS, HIGH PRESSURE, SEALS (STOPPERS), SPACE SHUTTLE MAIN ENGINE, TURBINE PUMPS
34 FLUID MECHANICS AND HEAT TRANSFER

N87-18034*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio. JET MODEL FOR SLOT FILM COOLING WITH EFFECT OF FREE-STREAM AND COOLANT TURBULENCE FREDERICK F. SIMON Oct. 1986 21 p (NASA-TP-2655; E-2879; NAS 1.60:2655) Avail: NTIS HC A02/MF A01 CSCL 20D FILM COOLING, FLOW VELOCITY, JET ENGINES, NUMERICAL ANALYSIS, TURBULENCE EFFECTS, WALL JETS

N87-18035*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio. VELOCITY PROFILES IN LAMINAR DIFFUSION FLAMES VALERIE J. LYONS and JANICE M. MARGLE (Pennsylvania State Univ., Abington) May 1986 13 p Presented at the Combustion Inst. Meeting, Cleveland, Ohio, 5-8 May 1986 (NASA-TP-2596; E-2879; NAS 1.60:2596) Avail: NTIS HC A02/MF A01 CSCL 20D CYCLOHEXANE, DIFFUSION FLAMES, ETHYL ALCOHOL, HEPTANES, LAMINAR FLOW, OCTANES, TEMPERATURE PROFILES, VELOCITY MEASUREMENT

N87-18782*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. AERO THERMAL EVALUATION OF A SPHERICALLY BLUNTED BODY WITH A TRAPEZOIDAL CROSS SECTION IN THE LANGLEY 8-FOOT HIGH-TEMPERATURE TUNNEL CINDY W. ALBERTSON Apr. 1987 83 p (NASA-TP-2561; L-16096; NAS 1.60:2561) Avail: NTIS HC A05/MF A01 CSCL 20D BOUNDARY LAYERS, FLOW DISTRIBUTION, HEAT TRANSFER, PREDICTIONS, PRESSURE MEASUREMENT, THERMAL PROTECTION


N87-23921*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio. THREE-STEP LABYRINTH SEAL FOR HIGH-PERFORMANCE TURBOMACHINES ROBERT C. HENDRICKS Jun. 1987 75 p (NASA-TP-1849; E-3185; NAS 1.60:1849) Avail: NTIS HC A05/MF A01 CSCL 20D FUEL PUMPS, LABYRINTH SEALS, SPACE SHUTTLE MAIN ENGINE, STATIC TESTS, TURBOMACHINERY

N87-23936*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio. STRAIGHT CYLINDRICAL SEAL FOR HIGH-PERFORMANCE TURBOMACHINES ROBERT C. HENDRICKS Jun. 1987 76 p (NASA-TP-1850; E-3186; NAS 1.60:1850) Avail: NTIS HC A05/MF A01 CSCL 20D CYLINDRICAL BODIES, FUEL PUMPS, SEALS (STOPPERS), SPACE SHUTTLE MAIN ENGINE, TURBINE PUMPS, TURBOMACHINERY

N87-24639*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio. THREE-STEP CYLINDRICAL SEAL FOR HIGH-PERFORMANCE TURBOMACHINES ROBERT C. HENDRICKS Jun. 1987 79 p (NASA-TP-1849; E-3185; NAS 1.60:1849) Avail: NTIS HC A05/MF A01 CSCL 20D DYNAMIC STABILITY, FUEL PUMPS, LEAKAGE, PUMP SEALS, SPACE SHUTTLE MAIN ENGINE, TURBINE PUMPS


N87-26309*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. SIMPLIFIED CURVE FITS FOR THE THERMODYNAMIC PROPERTIES OF EQUILIBRIUM AIR S. SRINIVASAN, J. C. TANNEHILL (Iowa State Univ. of Science and Technology, Ames.), and K. J. WEILMUENSTER Aug. 1987 48 p (NAG 1-3 1-3) Avail: NTIS HC A03/MF A01 CSCL 20D New, improved curve fits for the thermodynamic properties of equilibrium air have been developed. The curve fits are for pressure, speed of sound, temperature, entropy, enthalpy, density, and internal energy. These curve fits can be readily incorporated into new or existing computational fluid dynamics codes if real gas effects are desired. The curve fits are constructed from Grabau-type transition functions to model the thermodynamic surfaces in a piecewise manner. The accuracies and continuity of these curve fits are substantially improved over those of previous curve fits. These improvements are due to the incorporation of a small number of additional terms in the approximating polynomials and careful choices of the transition functions. The ranges of validity of the new curve fits are temperatures up to 25,000 K and densities from 10 to the -7 to 10 to the 3d power amagats. Author

N87-27161*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio. APPLICATION OF TURBULENCE MODELING TO PREDICT SURFACE HEAT TRANSFER IN STAGNATION FLOW REGION OF CIRCULAR CYLINDER CHI R. WANG and FREDERICK C. YEH Sep. 1987 25 p (NASA-TP-2758; E-3418; NAS 1.60:2758) Avail: NTIS HC A02/MF A01 CSCL 20D CIRCULAR CYLINDERS, HEAT TRANSFER, MODELS, STAGNATION FLOW, SURFACE PROPERTIES, TURBULENCE
34 FLUID MECHANICS AND HEAT TRANSFER

N87-29778*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DESCRIPTION AND CALIBRATION OF THE LANGLEY HYPERSONIC CF4 TUNNEL: A FACILITY FOR SIMULATING LOW GAMMA FLOW AS OCCURS FOR A REAL GAS
RAYMOND E. MIDDEN and CHARLES G. MILLER, III Mar. 1985 78 p
(NASA-TP-2384; L-15798; NAS 1.60:2384) Avail: NTIS HC A05/MF A01 CSCL 300
CALIBRATING, CARBON TETRAFLUORIDE, HYPERSONIC WIND TUNNELS, MACH NUMBER, REAL GASES, TEST FACILITIES

N87-29795*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FINITE-ELEMENT REENTRY HEAT-TRANSFER ANALYSIS OF SPACE SHUTTLE ORBITER
WILLIAM L. KO, ROBERT D. QUINN, and LESLIE GONG Dec. 1986 59 p
(NASA-TP-2657; H-1236; NAS 1.60:2657) Avail: NTIS HC A04/MF A01 CSCL 20E
AERODYNAMIC HEATING, FINITE ELEMENT METHOD, HEAT TRANSFER COEFFICIENTS, REENTRY SHIELDING, SPACE SHUTTLE ORBITERS, THERMAL ANALYSIS

35 INSTRUMENTATION AND PHOTOGRAPHY

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

N87-10263*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THIRTEENTH INTERNATIONAL LASER RADAR CONFERENCE
(NASA-CP-2431; L-16201; NAS 1.55:2431) Avail: NTIS HC A15/MF A01 CSCL 14E
CONFERENCE, LASER APPLICATIONS, LASERS, METEOROLOGICAL PARAMETERS, MIDDLE ATMOSPHERE, OPTICAL RADAR, RADAR EQUIPMENT

N87-10371*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EVALUATION OF DIFFUSE-ILLUMINATION HOLOGRAPHIC CINEMATOGRAPHY IN A FLUTTER CASCADE
A. J. DECKER Jul. 1986 33 p
(NASA-TP-2593; E-2937; NAS 1.60:2593) Avail: NTIS HC A03/MF A01 CSCL 141
CINEMATOGRAPHY, FLOW VISUALIZATION, HOLOGRAPHIC INTERFEROMETRY, HOLOGRAPHY, LASER OUTPUTS, THREE DIMENSIONAL FLOW

N87-20514*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A SIMPLIFIED METHOD FOR DETERMINING HEAT OF COMBUSTION OF NATURAL GAS
JAG J. SINGH, HOSHANG CHEGNI (Old Dominion Univ., Norfolk, Va.), and GERALD H. MALL (Computer Sciences Corp., Hampton, Va.) Apr. 1987 15 p
(NASA-TP-2682; L-16261; NAS 1.60:2682) Avail: NTIS HC A02/MF A01 CSCL 148
GAS DETECTORS, HEAT OF COMBUSTION, NATURAL GAS, OXYGEN SUPPLY EQUIPMENT

36 LASERS AND MASERS

Includes parametric amplifiers.

N87-20522*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CLOSED-CYCLE, FREQUENCY-STABLE CO2 LASER TECHNOLOGY
(NASA-CP-2456; L-16271; NAS 1.55:2456) Avail: NTIS HC A13/MF A01 CSCL 20E
CARBON DIOXIDE LASERS, CLOSED CYCLES, FREQUENCY STABILITY, RESEARCH MANAGEMENT

N87-27994*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FREQUENCY DOMAIN LASER VELOCIMETER SIGNAL PROCESSOR: A NEW SIGNAL PROCESSING SCHEME
JAMES F. MEYERS and JAMES I. CLEMMONS, JR. Sep. 1987 38 p
(NASA-TP-2735; L-16209; NAS 1.60:2735) Avail: NTIS HC A03/MF A01 CSCL 20E
DOMAINS, FREQUENCIES, LASER DOPPLER VELOCIMETERS, SIGNAL PROCESSING

37 MECHANICAL ENGINEERING

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

N87-10391*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TESTING OF UH-60A HELICOPTER TRANSMISSION IN NASA LEWIS 2240-KW (3000-HP) FACILITY
A. M. MITCHELL, F. B. OSWALD, and H. H. COE Aug. 1986 30 p
(NASA-TP-2626; E-2941; NAS 1.60:2626) Avail: NTIS HC A03/MF A01 CSCL 131
HELICOPTERS, TRANSMISSIONS (MACHINE ELEMENTS), VIBRATION MEASUREMENT

N87-18821*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PREDICTED EFFECT OF DYNAMIC LOAD ON PITTING FATIGUE LIFE FOR LOW-CONTACT-RATIO SPUR GEARS
DAVID G. LEWICKI Jun. 1986 19 p
(NASA-TP-2610; E-2989; NAS 1.60:2610; AD-A170906; AVS/COM-TR-86-C-21) Avail: NTIS HC A02/MF A01 CSCL 131
APPLICATIONS PROGRAMS (COMPUTERS), DYNAMIC LOADS, FATIGUE (MATERIALS), GEARS, LIFE (DURABILITY), PITTING

N87-18821*# National Aeronautics and Space Administration, Washington, D.C.
TETHER DYNAMICS SIMULATION
(NASA-CP-2458; NAS 1.55:2458) Avail: NTIS HC A15/MF A01 CSCL 22B
COMPUTERIZED SIMULATION, ELECTRODYNAMICS, TETHERED SATELLITES, TETHERLINES
39 STRUCTURAL MECHANICS

VIBRATION CHARACTERISTICS OF OH-58A HELICOPTER MAIN ROTOR TRANSMISSION
DAVID G. LEWICKI and JOHN J. COY Apr. 1987 18 p (NASA-TP-2705; E-3368; NAS 1.60:2705; AVMC-TR-86-C-42; AD-A180364) Avail: NTIS HC A01/MF A01 CSCL 01C HELICOPTERS, ROTOR AERODYNAMICS, TRANSMISSIONS (MACHINE ELEMENTS), VIBRATION MEASUREMENT

ROTOR DYNAMIC INSTABILITY PROBLEMS IN HIGH-PERFORMANCE TURBOMACHINERY, 1986

GEAR TOOTH STRESS MEASUREMENTS ON THE UH-60A HELICOPTER TRANSMISSION
FRED B. OSWALD Mar. 1987 17 p (NASA-TP-2698; E-3357; NAS 1.60:2698) Avail: NTIS HC A02/MF A01 CSCL 13I

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

EFFECTS OF WINGLET ON TRANSONIC FLUTTER CHARACTERISTICS OF A CANTILEVERED TWIN-ENGINE-TRANSPORT WING MODEL

THE 20TH AEROSPACE MECHANICS SYMPOSIUM
May 1986 316 p Symposium held in Cleveland, Ohio, 7-9 May 1986; sponsored by NASA, the California Inst. of Tech. and LMSC (NASA-CP-2423-REV; E-2904; NAS 1.55:2423-REV) Avail: NTIS HC A14/MF A01 CSCL 20K

SENSITIVITY ANALYSIS IN ENGINEERING

AERODYNAMIC CONFIGURATIONS, FLUTTER, PREDICTION ANALYSIS TECHNIQUES, TRANSONIC FLOW, WIND TUNNEL TESTS, WINGLETS, WINGS

Includes structural element design and weight analysis; fatigue; and thermal stress.
GLASS WAFERS, MICROSOFT, MICROSOFT OPERATING SYSTEMS, MICROSOFT VISUAL BASIC, SOFTWARE ENGINEERING, SYSTEMS ARCHITECTURE, USER INTERFACE

N87-23015* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE 21ST AEROSPACE MECHANISMS SYMPOSIUM May 1987 256 p Symposium held in Houston, Tex., 29 Apr. - 1 May 1987; sponsored by NASA, California Inst. of Tech., and LMSc
(NASA-CP-2470; S-560; NAS 1.55:2470) Avail: NTIS HC A16/MF A01 CSCL 20K
ACTUATORS, DEPLOYMENT, LARGE SPACE STRUCTURES, ROBOTICS, SPACE ERECTABLE STRUCTURES

N87-23016* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SURFACE BIDIRECTIONAL REFLECTANCE PROPERTIES OF TWO SOUTHWESTERN ARIZONA DESERTS FOR WAVELENGTHS BETWEEN 0.4 AND 2.2 MICRONS CHARLES H. WHITLOCK, G. CARLTON PURGOLD, and STUART R. LECROY (PRC Kentron, Inc., Hampton, Va.) May 1987 48 p
(NASA-TP-2643; L-16159; NAS 1.60:2643) Avail: NTIS HC A03/MF A01 CSCL 20K
DIRECTIVITY, SOLAR POSITION, ZENITH ALBEDO, BIDIRECTIONAL REFLECTANCE, DESERTS, N87-27321* Computer Software Management and Information Center, Athens, Ga.
FIFTEENTH NASTRAN USERS' COLLOQUIUM Aug. 1987 312 p Colloquium held in Kansas City, Mo., 4-8 May 1987
(NASA-CP-2481; NAS 1.55:2481) Avail: NTIS HC A14/MF A01; also available from COSMIC, Athens, Ga. 30602 CSCL 20K
COMPUTER AIDED DESIGN, COMPUTER TECHNIQUES, CONFERENCES, FINITE ELEMENT METHOD, NASTRAN, STRUCTURAL ANALYSIS, STRUCTURAL VIBRATION

N87-23027* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
EARTH RESOURCES AND REMOTE SENSING Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

N87-23028* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SURFACE BIDIRECTIONAL REFLECTANCE PROPERTIES OF TWO SOUTHWESTERN ARIZONA DESERTS FOR WAVELENGTHS BETWEEN 0.4 AND 2.2 MICRONS CHARLES H. WHITLOCK, G. CARLTON PURGOLD, and STUART R. LECROY (PRC Kentron, Inc., Hampton, Va.) May 1987 48 p
(NASA-TP-2643; L-16159; NAS 1.60:2643) Avail: NTIS HC A03/MF A01 CSCL 20K
ALBEDO, BIDIRECTIONAL REFLECTANCE, DESERTS, DIRECTIVITY, SOLAR POSITION, ZENITH

N87-23029* National Aeronautics and Space Administration, Washington, D.C.
EARTH RESOURCES: A CONTINUING BIBLIOGRAPHY WITH INDEXES (ISSUE 54) Apr. 1987 164 p
(NASA-SP-7041(54); NAS 1.21:7041(54)) Avail: NTIS HC A08 CSCL 05B
This bibliography lists 562 reports, articles, and other documents introduced into the NASA scientific and technical information system between April 1 and June 30, 1987. 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
44 GEOPHYSICS

44 ENERGY PRODUCTION AND CONVERSION

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

N87-26413*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

SPACE PHOTOVOLTAIC RESEARCH AND TECHNOLOGY 1986. HIGH EFFICIENCY, SPACE ENVIRONMENT, AND ARRAY TECHNOLOGY

Jun. 1987 375 p Conference held in Cleveland, Ohio, 7-9 Oct. 1986
(NASA-CP-2475; E-3450; NAS 1.55:2475) Avail: NTIS HC
A16/MF A01 CSCL 10B

CONFERENCES, ENERGY CONVERSION EFFICIENCY, PHOTOVOLTAIC CONVERSION, SOLAR CELLS, SPACECRAFT POWER SUPPLIES

N87-29914*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

SPACE ELECTROCHEMICAL RESEARCH AND TECHNOLOGY (SERT) Sep. 1987 364 p Conference held in Cleveland, Ohio, 14-15 Apr. 1987
(NASA-CP-2484; E-3506; NAS 1.55:2484) Avail: NTIS HC
A16/MF A01 CSCL 10C

ELECTRIC BATTERIES, ELECTROCATALYSTS, ELECTROCHEMISTRY, MATHEMATICAL MODELS, REGENERATIVE FUEL CELLS
aerosol extinction of 1.00 micron and 0.45 micron, ratios of aerosol extinction to molecular extinction at 1.00 micron and ratios of aerosol extinction at 0.45 micron to aerosol extinction at 1.00 micron. Averages for 1981 are shown in tables, and in profile and contour plots (as a function of altitude and latitude). In addition, temperature data provided by NOAA for the time and location of each SAGE measurement are averaged and shown in a similar format. The stratospheric aerosol distribution for 1981 shows effects of volcanically injected material from eruptions of Llavan, Alaid, and Pagan. Peak values of aerosol extinction at 0.45 micron and 1.00 micron were 2 to 4 times higher than typical peak values observed during near background conditions. Stratospheric aerosol optical depth values at 1.00 microns increased by a factor of about 2 from near background levels in regions of volcanic activity. During the year, these values ranged from between 0.001 and 0.006. The largest were near the location of a recent eruption. The distribution of the ratio of aerosol to molecular extinction at 1.00 microns also showed that maximum values are found in the vicinity of an eruption. These maximums varied in altitude, but remained below a height of about 25 km. No attempt has been made to give detailed explanations or interpretations of these data. The report is provided in a ready-to-use visual format, representative zonal and seasonal averages of aerosol extinction data for the third calendar year of the SAGE data set to facilitate atmospheric and climatic studies.

Author

N87-18248* # National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

SPACE OPPORTUNITIES FOR TROPOSPHERIC CHEMISTRY RESEARCH


(NASA-CP-2450; L-16250; NAS 1.55:2450) Avail: NTIS HC
A05/MF A01 CSCL 04A

AEROSOLS, AIR POLLUTION, ATMOSPHERIC CHEMISTRY, ATMOSPHERIC COMPOSITION, CONFERENCES, GASES, REMOTE SENSING, TROPOSPHERE

N87-20663* # National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

AIRBORNE LIDAR MEASUREMENTS OF EL CHICHON STRATOSPHERIC AEROSOL, JANUARY 1984


(NASA-RP-1175; L-16234; NAS 1.61:1175) Avail: NTIS HC
A03/MF A01 CSCL 04A

A lidar-equipped NASA Electra aircraft was flown in January 1984 between the latitude of 38 and 90 deg N. One of the primary purposes of this mission was to determine the spatial distribution and aerosol characteristics of El Chichon produced stratospheric material. Lidar data from that portion of the flight mission between 38 deg N and 77 deg N is presented. Representative profiles of lidar backscatter ratio, a plot of the integral backscattering function versus latitude, and contours of backscatter mixing ratio versus altitude and latitude are given. In addition, tables containing numerical values of the backscatter ratio and backscattering function versus altitude are applied for each profile. These data clearly show that material produced by the El Chichon eruptions of late March-early April 1982 had spread throughout the latitudes covered by this mission, and that the most massive portion of the material resided north of 55 deg N and was concentrated below 17 km in a layer that peaked at 13 to 15 km. In this latitude region, peak backscatter ratios at a wavelength of 0.6943 microns were approximately 3 and the peak integrated backscattering function was about 15 X 10 to the -4/sr corresponding to a peak optical depth of approximately 0.07. This report presents the results of this mission in a ready-to-use format for atmospheric and climatic studies.

Author

N87-20665* # National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

UPPER AND MIDDLE ATMOSPHERIC DENSITY MODELING REQUIREMENTS FOR SPACECRAFT DESIGN AND OPERATIONS


A13/MF A01 CSCL 04A

AEROSPACE ENVIRONMENTS, ATMOSPHERIC DENSITY, ATMOSPHERIC MODELS, SPACECRAFT DESIGN, THERMOSPHERE

47

METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N87-12086* # National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.

PRELIMINARY ESTIMATES OF RADIOSONDE THERMISTOR ERRORS


(NASA-TP-2637; NAS 1.60:2637) Avail: NTIS HC
A02/MF A01 CSCL 04B

ERROR ANALYSIS, RADIOSONDES, THERMISTORS

N87-13043* # National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

NASS/MSPC FY-85 ATMOSPHERIC PROCESSES RESEARCH REVIEW


(NASA-CP-2402; M-503; NAS 1.55:2402) Avail: NTIS HC
A07/MF A01 CSCL 04B

ATMOSPHERIC ELECTRICITY, ATMOSPHERIC SOUNDING, DATA PROCESSING, DOPPLER RADAR, GEOPHYSICS, MESOSCALE PHENOMENA, OPTICAL RADAR, SATELLITE IMAGERY, THUNDERSTORMS, WIND (METEOROLOGY)

N87-20701* # National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ON REQUIREMENTS FOR A SATELLITE MISSION TO MEASURE TROPICAL RAINFALL

OTTO W. THIELE, ed. Apr. 1987 67 p

(NASA-RP-1183; NAS 1.61:1183) Avail: NTIS HC
A04/MF A01 CSCL 04B

Tropical rainfall data are crucial in determining the role of tropical latent heating in driving the circulation of the global atmosphere. Also, the data are particularly important for testing the realism of climate models, and their ability to simulate and predict climate accurately on the seasonal time scale. Other scientific issues such as the effects of El Nino on climate could be addressed with a reliable, extended time series of tropical rainfall observations. A passive microwave sensor is planned to provide information on the integrated column precipitation content, its areal distribution, and its intensity. An active microwave sensor (radar) will define the layer depth of the precipitation and provide information about the intensity of rain reaching the surface, the key to determining the latent heat input to the atmosphere. A visible/infrared sensor will provide very high resolution information on cloud coverage, type, and top temperatures and also serve as the link between these data and the long and virtually continuous coverage by the geosynchronous meteorological satellites. The unique combination of sensor wavelengths, coverages, and resolving capabilities
together with the low-altitude, non-Sun synchronous orbit provide
a sampling capability that should yield monthly precipitation
amounts to a reasonable accuracy over a 500- by 500-km grid.

N87-22341*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, Va.
ATMOSPHERIC TURBULENCE RELATIVE TO AVIATION,
MISSILE, AND SPACE PROGRAMS
DENNIS W. CAMP, ed. and WALTER FROST, ed. (FWG
held in Hampton, Va., 2-4 Apr. 1986
(NASA-CP-2468; L-16296; NAS 1.55:2468) Avail: NTIS HC
A12/MF A01 CSCL 04B
AIRCRAFT SAFETY, ATMOSPHERIC MODELS, ATMOSPHERIC
TURBULENCE, CONFERENCES, MISSILES, SPACE PROGRAMS,
WEATHER FORECASTING

N87-26489*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, Va.
ATLAS OF WIDE-FIELD-OF-VIEW OUTGOING LONGWAVE
RADIATION DERIVED FROM NIMBUS 6 EARTH RADIATION
BUDGET DATA SET, JULY 1975 TO JUNE 1978
T. DALE BESS and G. LOUIS SMITH Aug. 1987 80 p
(NASA-RP-1185; L-16325; NAS 1.61:1185) Avail: NTIS HC
A05/MF A01 CSCL 04B
An atlas of monthly mean outgoing longwave radiation global
contour maps and associated spherical harmonic coefficients is
presented. The atlas contains 36 months of continuous data from
July 1975 to June 1978. The data were derived from the first
Earth radiation budget experiment, which was flown on the
Nimbus-6 Sun-synchronous satellite in 1975. Only the
wide-field-of-view longwave measurements are cataloged in this
atlas. The contour maps along with the associated sets of spherical
harmonic coefficients form a valuable data set for studying different
aspects of our changing climate over monthly, annual, and
interannual scales in the time domain, and over regional, zonal,
and global scales in the spatial domain.

N87-26491*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, Va.
CALIBRATION OF THE SPIN-SCAN OZONE IMAGER ABOARD
THE DYNAMICS EXPLORER 1 SATELLITE
WALTER E. BRESSETTE, GERALD M. KEATING, and DAVID F.
YOUNG (ST Systems Corp., Hampton, Va.) Aug. 1987 44 p
(NASA-TP-2722; L-16190; NAS 1.60:2722) Avail: NTIS HC
A03/MF A01 CSCL 04B
ALGORITHMS, CALIBRATING, DYNAMICS EXPLORER 1
SATELLITE, OZONE, REGRESSION ANALYSIS, ULTRAVIOLET
SPECTROMETERS

N87-29996*# National Aeronautics and Space Administration.
Goddard Space Flight Center, Greenbelt, Md.
FIVE YEAR GLOBAL DATASET: NMC OPERATIONAL
ANALYSES (1978 TO 1982)
DAVID STRAUS and JOSEPH ARIDIZZON Sep. 1987 50 p
Prepared in cooperation with Sigma Data Services Corp., Rockville,
Md.
(NASA-RP-1194; REPT-87B0273; NAS 1.61:1194) Avail: NTIS HC
A03/MF A01 CSCL 04B
This document describes procedures used in assembling a five
year dataset (1978 to 1982) using NMC Operational Analysis data.
These procedures entailed replacing missing and unacceptable
data in order to arrive at a complete dataset that is continuous in
time. In addition, a subjective assessment on the integrity of all
data (both preliminary and final) is presented. Documentation on
tapes comprising the Five Year Global Dataset is also included.

N87-24870* National Aeronautics and Space Administration.
Goddard Space Flight Center, Greenbelt, Md.
ARCTIC SEA ICE, 1973-1976: SATELLITE PASSIVE-MICROWAVE
OBSERVATIONS
CLAIRE L. PARKINSON, JOSEFINO C. COMISO, H. JAY ZWALLY,
DONALD J. CAVALIERI, PER GLOERSEN, and WILLIAM J.
CAMPBELL (Puget Sound Univ., Tacoma, Wash.) Jan. 1987
301 p Original contains color illustrations
(NASA-SP-489; NAS 1.21:489; LC-86-23876) Avail: NTIS HC
A14 CSCL 08L
The Arctic region plays a key role in the climate of the earth.
The sea ice cover affects the radiative balance of the earth and
radically changes the fluxes of heat between the atmosphere and
the ocean. The observations of the Arctic made by the Electrically
Scanning Microwave Radiometer (ESMR) on board the Nimbus 5
research satellite are summarized for the period 1973 through
1976.

51
LIFE SCIENCES (GENERAL)

N87-20727*# National Aeronautics and Space Administration.
Marshall Space Flight Center, Huntsville, Ala.
LIQUID DROP STABILITY FOR PROTEIN CRYSTAL GROWTH
IN MICROGRAVITY
ROBERT B. OWEN, BETH H. BROOM, ROBERT S. SNYDER,
and RON DANIEL Apr. 1987 17 p
(NASA-TP-2722; NAS 1.60:2722) Avail: NTIS HC A02/MF A01
CSCL 06B
CRYSTAL GROWTH, DROPS (LIQUIDS), MICROGRAVITY
APPLICATIONS, PROTEIN SYNTHESIS, STABILITY

52
AEROSPACE MEDICINE

N87-18976* National Aeronautics and Space Administration.
Goddard Space Flight Center, Greenbelt, Md.
AEROSPACE MEDICINE AND BIOLOGY: A CUMULATIVE INDEX
TO THE 1986 ISSUES (SUPPLEMENT 293)
Jan. 1987 251 p
(NASA-SP-7011(293); NAS 1.21:7011(293)) Avail: NTIS HC A12
CSCL 06E
This publication is a cumulative index to the abstracts contained
in the Supplements 261 through 292 of Aerospace Medicine and
Biology: A Continuing Bibliography. It includes seven indexes -
subject, personal author, corporate source, foreign technology,
contract number, report number, and accession number.

Author
This bibliography lists 131 reports, articles, and other documents introduced into the NASA scientific and technical information system in September, 1987.

N87-10720
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PROCEEDINGS OF THE 5TH ANNUAL USERS' CONFERENCE
M. SZCZUR, ed. and E. HARRIS, ed. 1985 400 p Conference held at Greenbelt, Md., 4-6 Jun. 1985
(NASA-CP-2399; NAS 1.55:2399) Avail: NTIS HC A17/MF A01 CSCL 09B
ACCESS CONTROL, COMPUTER NETWORKS, FORMAT, IMAGE PROCESSING, ORBITAL SPACE STATIONS, SOFTWARE ENGINEERING, SOFTWARE TOOLS

N87-19932
National Aeronautics and Space Administration, Washington, D.C.
COMPUTER SCIENCES AND DATA SYSTEMS, VOLUME 2
(NASA-CP-2459-VOL-2; NAS 1.55:2459-VOL-2) Avail: NTIS HC A15/MF A01 CSCL 09B
CONFERENCES, DATA STORAGE, DISTRIBUTED PROCESSING, FIBER OPTICS, OPTICAL DATA PROCESSING, PARALLEL PROCESSING (COMPUTERS), VHSIC (CIRCUITS)

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

N87-23202
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
APPLICATIONS AND REQUIREMENTS FOR REAL-TIME SIMULATORS IN GROUND-TEST FACILITIES
DALE J. ARPASI and RICHARD A. BLECH Dec. 1986 26 p
(NASA-TP-2672; E-3189; NAS 1.60:2672) Avail: NTIS HC A03/MF A01 CSCL 12A
TEST FACILITIES
GROUND TESTS, REAL TIME OPERATION, SIMULATORS, TEST FACILITIES

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

N87-14054
National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SOME PATH-FOLLOWING TECHNIQUES FOR SOLUTION OF NONLINEAR EQUATIONS AND COMPARISON WITH PARAMETRIC DIFFERENTIATION
(NASA-TP-2654; L-16199; NAS 1.60:2654) Avail: NTIS HC A02/MF A01 CSCL 12A
COMPUTER PROGRAMMING, CRITICAL PATH METHOD, DIFFERENTIAL EQUATIONS, NONLINEAR EQUATIONS, PARAMETER IDENTIFICATION

N87-14918
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SOLUTION OF ELLIPTIC PARTIAL DIFFERENTIAL EQUATIONS BY FAST POISSON SOLVERS USING A LOCAL RELAXATION FACTOR 2: TWO-STEP METHOD
S. C. CHANG May 1986 17 p
(NASA-TP-2530; E-2528-1; NAS 1.60:2530) Avail: NTIS HC A02/MF A01 CSCL 12A
ELLIPITIC DIFFERENTIAL EQUATIONS, ELLIPTIC FUNCTIONS, PARTIAL DIFFERENTIAL EQUATIONS, PROBLEM SOLVING
71 ACOUSTICS

N87-22441*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
QUANTITATIVE ANALYSIS OF THE RECONSTRUCTION PERFORMANCE OF INTERPOLANTS
DONALD L. LANSING and STEPHEN K. PARK (College of William and Mary, Williamsburg, Va.) May 1987 35 p
(NASA-TP-2688; L-16164; NAS 1.60:2688) Avail: NTIS HC
A03/MF A01 CSCL 12A
INTERPOLATION, QUANTITATIVE ANALYSIS, RECONSTRUCTION

N87-22447*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN ALGORITHM FOR SURFACE SMOOTHING WITH RATIONAL SPLINES
JAMES R. SCHIESS Jun. 1987 17 p
(NASA-TP-2708; L-16272; NAS 1.60:2708) Avail: NTIS HC
A02/MF A01 CSCL 12A
ALGORITHMS, RATIONAL FUNCTIONS, SMOOTHING, SPLINE FUNCTIONS, SURFACE ROUGHNESS

N87-28367*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EXPERIMENTS IN ENCODING MULTILEVEL IMAGES AS QUADTREES
DONALD L. LANSING Sep. 1987 60 p
(NASA-TP-2722; L-16292; NAS 1.60:2722) Avail: NTIS HC
A04/MF A01 CSCL 12A
CODING, DATA COMPRESSION, DATA STORAGE, GRAY SCALE, IMAGE PROCESSING

65

STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N87-23244*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DEVELOPMENT OF CONFINENCE LIMITS BY PIVOTAL FUNCTIONS FOR ESTIMATING SOFTWARE RELIABILITY
KELLY J. DOTSON Jun. 1987 12 p
(NASA-TP-2709; L-16254; NAS 1.60:2709) Avail: NTIS HC
A02/MF A01 CSCL 12A
CONFIDENCE LIMITS, FAILURE ANALYSIS, PREDICTIONS, RELIABILITY ANALYSIS, SOFTWARE ENGINEERING

N87-27474*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PROBABILISTIC RISK ANALYSIS OF FLYING THE SPACE SHUTTLE WITH AND WITHOUT FUEL TURBINE DISCHARGE TEMPERATURE REDLINE PROTECTION
LEONARD HOWELL Aug. 1987 22 p
(NASA-TP-2759; NAS 1.60:2759) Avail: NTIS HC A02/MF A01 CSCL 12A
ENGINE FAILURE, MATHEMATICAL MODELS, SPACE SHUTTLE MAIN ENGINE, SPACECRAFT RELIABILITY, STOCHASTIC PROCESSES, TEMPERATURE SENSORS

71 ACOUSTICS

Includes sound generation, transmission, and attenuation.

N87-14120*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECTS OF BACKGROUND NOISE ON TOTAL NOISE ANNOYANCE
K. F. WILLSHIRE Jan. 1987 59 p
(NASA-TP-2630; L-16153; NAS 1.60:2630) Avail: NTIS HC
A04/MF A01 CSCL 46A
BACKGROUND NOISE, EFFECTIVE PERCEIVED NOISE LEVELS, NOISE INTENSITY, NOISE POLLUTION, NOISE TOLERANCE

N87-17479*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
POWER CEPSTRUM TECHNIQUE WITH APPLICATION TO MODEL HELICOPTER ACOUSTIC DATA
(NASA-TP-2586; L-16070; NAS 1.60:2586) Avail: NTIS HC
A02/MF A01 CSCL 20A
ACOUSTIC MEASUREMENT, CEPSTRAL ANALYSIS, HELICOPTERS, MODELS, SIGNAL REFLECTION

N87-18399*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CORRELATION OF HELICOPTER IMPULSIVE NOISE FROM BLADE-VORTEX INTERACTION WITH ROTOR MEAN INFLOW
ANDREW B. CONNOR and R. M. MARTIN Mar. 1987 23 p
(NASA-TP-2650; L-16145; NAS 1.60:2650) Avail: NTIS HC
A02/MF A01 CSCL 20A
BLADE SLAP NOISE, BLADE-VORTEX INTERACTION, ROTOR BLADES (TURBOMACHINERY), VORTICES, WIND TUNNEL TESTS

N87-20798*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EXPERIMENTAL VALIDATION OF A TWO-DIMENSIONAL SHEAR-FLOW MODEL FOR DETERMINING ACOUSTIC IMPEDANCE
TONY L. PARROTT, WILLIE R. WATSON, and MICHAEL G. JONES (PRC Kentron, Inc., Hampton, Va.) May 1987 50 p
(NASA-TP-2679; L-16203; NAS 1.60:2679) Avail: NTIS HC
A03/MF A01 CSCL 20A
ACOUSTIC IMPEDANCE, MODELS, SHEAR FLOW, TWO DIMENSIONAL FLOW

N87-24161*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ANOYANCE RESPONSE TO SIMULATED ADVANCED TURBOPROP AIRCRAFT INTERIOR NOISE CONTAINING TONAL BEATS
JACK D. LEATHERWOOD Jul. 1987 28 p
(NASA-TP-2669; L-16184; NAS 1.60:2669) Avail: NTIS HC
A03/MF A01 CSCL 20A
AIRCRAFT COMPARTMENTS, AIRCRAFT NOISE, HUMAN TOLERANCES, PSYCHOLOGICAL EFFECTS, RESPONSES

23
NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

Doubly Differential Cross Sections for Galactic Heavy-Ion Fragmentation
Francis A. Cucinotta (Old Dominion Univ., Norfolk, Va.), John W. Norbury, Govind S. Khandelwal, and Lawrence W. Townsend
Feb. 1987 23 p
(NASA-TP-2659; L-16187; NAS 1.60:2659) Avail: NTIS HC A02/MF A01 CSCL 20H

Collision Parameters, Galaxies, Heavy Ions, Particle Collisions, Scattering Cross Sections

Doubly Differential Cross Sections for Galactic Heavy-Ion Fragmentation
Francis A. Cucinotta (Old Dominion Univ., Norfolk, Va.), John W. Norbury, Govind S. Khandelwal, and Lawrence W. Townsend
Feb. 1987 23 p
(NASA-TP-2659; L-16187; NAS 1.60:2659) Avail: NTIS HC A02/MF A01 CSCL 20H

Collision Parameters, Galaxies, Heavy Ions, Particle Collisions, Scattering Cross Sections

Particulate Collisions, Scattering Cross Sections

Collision Parameters, Galaxies, Heavy Ions, Particle Collisions, Scattering Cross Sections

Asymptotic Analysis of Corona Discharge from Thin Electrodes
P. A. Durbin
Sep. 1986 7 p
(NASA-TP-2645; E-3151; NAS 1.60:2645) Avail: NTIS HC A02/MF A01 CSCL 20H

Asymptotic Methods, Electric Corona, Electric Discharges, Electrodes

Administration and Management

Includes management planning and research.

Possible Complementary Cosmic-Ray Systems: Nuclei and Antinuclei
Warren W. Buck, John W. Wilson, Lawrence W. Townsend, and John W. Norbury (Idaho Univ., Moscow)
Jul. 1987 47 p
(NASA-TP-2741; L-16275; NAS 1.60:2741) Avail: NTIS HC A03/MF A01 CSCL 20H

Antimatter, Antiparticles, Galactic Cosmic Rays, Heavy Ions, Nuclei (Nuclear Physics)

Optics

Includes light phenomena; and optical devices.

Theory for Computing the Field Scattered from a Smooth Inflected Surface
R. L. Barger and A. K. Dominek
1986 23 p
(NASA-TP-2632; L-16157; NAS 1.60:2632) Avail: NTIS HC A01/MF A01 CSCL 20F

Bodies of Revolution, Electromagnetic Radiation, Microwaves, Reflectance, Surface Properties, Wave Scattering

Plasma Physics

Includes magnetohydrodynamics and plasma fusion.

Laser-Powered MHD Generators for Space Application
N. W. Jalufka
Oct. 1986 15 p
(NASA-TP-2621; NAS 1.60:2621) Avail: NTIS HC A02/MF A01 CSCL 20H

Energy Conversion Efficiency, Laser Plasma Interactions, Magnetohydrodynamic Generators

Documentary and Information Science

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

Jul. 1987 45 p
(NASA-SP-7039(31); NAS 1.21:7039(31)) Avail: NTIS HC A03; NTIS standing order as PB86-911100, $11.50 domestic, $23.00 foreign CSCL 05B

Abstracts are provided for 85 patents and patent applications entered into the NASA scientific and technical information system during the period January 1987 through June 1987. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or patent application.

Jul. 1987 493 p
(NASA-SP-7039(31)-SECT-2; NAS 1.21:7039(31)-SECT-2) Avail: NTIS HC A21 CSCL 05B

A subject index is provided for over 4600 patents and patent applications for the period May 1969 through June 1987. Additional indexes list personal authors, corporate authors, contract numbers, NASA case numbers, U.S. patent class numbers, and NASA accession numbers.
N87-27557* National Aeronautics and Space Administration, Washington, D.C.

NASA THESAURUS SUPPLEMENT (SUPPLEMENT 3)

Jul. 1987 325 p
(NASA-SP-7053(SUPP-3); NAS 1.21:7053(SUPP-3)) Avail: NTIS HC A14 CSCL 05B

The four part cumulative NASA Thesaurus Supplement to the 1985 edition of the NASA Thesaurus includes Part 1; Hierarchical Listing, Part 2; Access Vocabulary, Part 3; NASA Thesaurus Definitions, and Part 4; Changes. The semiannual supplement gives complete hierarchies for new terms.

Author

N87-30218* National Aeronautics and Space Administration, Washington, D.C.

NASA SCIENTIFIC AND TECHNICAL PUBLICATIONS: A CATALOG OF SPECIAL PUBLICATIONS, REFERENCE PUBLICATIONS, CONFERENCE PUBLICATIONS, AND TECHNICAL PAPERS, 1977-1986

Sep. 1987 390 p
(NASA-SP-7063; NAS 1.21:7063) Avail: NTIS HC free as

This catalog lists 2311 citations of all NASA Special Publications, NASA Reference Publications, NASA Conference Publications, and NASA Technical Papers that were entered into the NASA scientific and technical database during the decade 1977 through 1986. The entries are grouped by subject category. Indexes of subject terms, personal authors, and NASA report numbers are provided.

Author

85

URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

N87-70425* National Aeronautics and Space Administration, Washington, D.C.

SIGNIFICANT NASA INVENTIONS. AVAILABLE FOR LICENSING IN FOREIGN COUNTRIES

1977 103 p
(NASA-SP-7038(04); NAS 1.21:7038(04)) Avail: SOD HC $5.00 as 003-000-00966-1; NTIS MF A01

space sciences (general)

N87-23313* National Aeronautics and Space Administration.

Marshall Space Flight Center, Huntsville, Ala.

DOUBBLE LAYERS IN ASTROPHYSICS

(NASA-CP-2469; M-560; NAS 1.55:2469) Avail: NTIS HC A14/ MF A01 CSCL 03B

CONFERENCES, ELECTRIC FIELDS, ENERGY TRANSFER, MATHEMATICAL MODELS, PLASMA LAYERS, PLASMA PHYSICS, SPACE PLASMAS

N87-24247* National Aeronautics and Space Administration.

Goddard Space Flight Center, Greenbelt, Md.

ESSAYS IN SPACE SCIENCE

(NASA-CP-2464; REPT-87B0055; NAS 1.55:2464) Avail: NTIS HC A18/MF A01 CSCL 03B

ASTROPHYSICS, CONFERENCES, COSMIC RAYS, GAMMA RAY ASTRONOMY, INFRARED ASTRONOMY, X RAY ASTRONOMY

N87-28471* National Aeronautics and Space Administration.

Langley Research Center, Hampton, Va.

CALCULATION AND ACCURACY OF ERBE SCANNER MEASUREMENT LOCATIONS

LAWRENCE H. HOFFMAN, WILLIAM L. WEAVER, and JAMES F. KIBLER Sep. 1987 34 p
(NASA-TP-2670; L-16216; NAS 1.60:2670) Avail: NTIS HC A03/MF A01 CSCL 03B

COMPUTATION, EARTH ATMOSPHERE, EARTH RADIATION BUDGET EXPERIMENT, POSITION (LOCATION), REMOTE SENSING, SCANNING

89

ASTRONOMY

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

N87-14219* National Aeronautics and Space Administration.

Goddard Space Flight Center, Greenbelt, Md.

TEN YEAR PLANETARY EPHEMERIS: 1986-1995

F. ESPENAK Nov. 1986 249 p
(NASA-RP-1176; NAS 1.61:1176; REPT-86B0471) Avail: NTIS HC A11/MF A01 CSCL 03A

Accurate geocentric positions are tabulated at five day intervals for the Sun, Mercury, Venus, Mars, Jupiter, Saturn, Uranus and Neptune during the ten year period 1986 through 1995. The apparent angular diameters, radial velocities, declinations and mean times of meridian transit of the seven planets and the Sun are graphically depicted for each year in the interval. Appendices are included which discuss the theory of planetary orbits and a FORTRAN program for calculating planetary ephemerides.

Author

N87-22573* National Aeronautics and Space Administration.

Goddard Space Flight Center, Greenbelt, Md.

INFRARED SOURCE CROSS-INDEX, FIRST EDITION

MARIAN SCHMITZ (Computer Sciences Corp., Beltsville, Md.), JAYLEE M. MEAD, and DANIEL Y. GEZARI Apr. 1987 323 p
(NASA-CP-1182; REPT-87B0058; NAS 1.61:1182) Avail: NTIS HC A14/MF A01 CSCL 03A

The Infrared Source Cross-Index is a listing of correlated infrared source names (and positions) for astronomical objects observed at 1-1000 microns. The source names have been obtained from the database of the first edition of the Catalog of Infrared Observations (CIO NASA RP 1182), covering observations published through 1982. Additional identifications were located by correlating these names with identifications contained in other machine-readable astronomical catalogs in the NASA National Space Science Data Center (NSSDC). There are some 80,000 different source names in the Cross-Index, corresponding to over 27,000 unique infrared sources.

Author
N87-24266*# National Aeronautics and Space Administration, Washington, D.C.

STAR FORMATION IN GALAXIES
(NASA-CP-2466; NAS 1.55:2466) Avail: NTIS HC A99/MF E03 CSCL 02A

CONFERENCES, GALACTIC STRUCTURE, GALAXIES, INFRARED ASTRONOMY, MOLECULAR CLOUDS, RADIO ASTRONOMY, STAR FORMATION, STELLAR LUMINOSITY

N87-25906*# National Aeronautics and Space Administration.

FIFTY YEAR CANON OF SOLAR ECLIPSES: 1986 - 2035
FRED ESPENAK Jul. 1987 272 p
(NASA-IP-1178-REV; REPT-87B0252; NAS 161:1178-REV) Avail: NTIS HC A12/MF A01 CSCL 03A

A complete catalog is presented, listing the general characteristics of every solar eclipse from 1901 through 2100. To complement this catalog, a detailed set of cylindrical projection world maps shows the umbral paths of every solar eclipse over the 200 year interval. Focusing in on the next 50 years, accurate geodetic path coordinates and local circumstances for the 71 central eclipses from 1987 through 2035 are tabulated. Finally, the geodetic paths of the umbral and penumbral shadows of all 109 solar eclipses in this period are plotted on orthographic projection maps of the Earth. Appendices are included which discuss eclipse geometry, eclipse frequency and occurrence, modern eclipse prediction and time determination. Finally, code for a simple Fortran program is given to predict the occurrence and characteristics of solar eclipses. Author

90

ASTROPHYSICS

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

N87-30235*# National Aeronautics and Space Administration.

ATLAS OF COMET HALLEY 1910 II
BERTRAM DONN, JUERGEN RAHE, and JOHN C. BRANDT 1986 597 p
(NASA-SP-488; NAS 1.21:488; LC-86-16341) Avail: NASA SP 488
$48.00 as 033-000-00997-6; NTIS MF A01 CSCL 03B

With the impending return of Halley's Comet in 1986, a major effort began to collect the material obtained at its last appearance in 1910. This material displays the evolving coma and tail phenomena, and is useful for comparison with the present quantitative studies of spectroscopic and structural phenomena. Images in the atlas are arranged in chronological order by day. Days that have multiple images with varying scale are arranged in two sequences. Photographs showing tail phenomena are first, followed by photographs obtained with longer focus instruments showing the head or near-nuclear region. Drawings of Comet Halley, made from visual observations in 1835 and 1910, also are included.

91

LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

N87-17598*# National Aeronautics and Space Administration.

THE JOVIAN ATMOSPHERES
Conference held in New York, N.Y., 6-8 May 1985 Submitted for publication
(NASA-CP-2441; NAS 1.55:2441) Copyright Avail: NTIS HC A07/MF A01 CSCL 84B

ATMOSPHERIC CHEMISTRY, CLOUDS (METEOROLOGY), GAS DYNAMICS, GAS GIANT PLANETS, HYDROGEN, JUPITER ATMOSPHERE, NEPTUNE ATMOSPHERE, SATURN ATMOSPHERE, SPACE EXPLORATION, SYNOPTIC METEOROLOGY, THERMODYNAMICS, URANUS ATMOSPHERE

N87-19322*# National Aeronautics and Space Administration, Washington, D.C.

STATUS AND FUTURE OF LUNAR GEOSCIENCE
1986 63 p
(NASA-SP-484; NAS 1.21:484) Avail: NASA SP 484
$4.25 as 033-000-00997-6; NTIS MF A01 CSCL 03B

The Moon is of special interest among the many and diverse bodies of the solar system because it serves as a scientific baseline for understanding the terrestrial planets, its origin is closely tied to the early history of the Earth, and its proximity permits a variety of space applications such as mining and establishment of bases and colonies. Data acquisition and analysis have enabled advances to be made and the remaining questions in many fields of lunar geoscience to be identified. The status and unresolved problems of lunar science are discussed. Immediate needs, new unmanned missions, and a return to the Moon (a lunar base) are examined.

B.G.

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SOLAR PHYSICS

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

N87-19328*# National Aeronautics and Space Administration.

ENERGETIC PHENOMENA ON THE SUN: THE SOLAR MAXIMUM MISSION FLARE WORKSHOP. PROCEEDINGS
(NASA-CP-2439; NAS 1.55:2439) Avail: NTIS HC A18/MF A01 CSCL 03B

CONFERENCES, MAGNETOHYDRODYNAMIC STABILITY, SOLAR CORONA, SOLAR FLARES, SOLAR MAGNETIC FIELD, SOLAR MAXIMUM MISSION, SOLAR PHYSICS, SOLAR PROMINENCES, SUN, SUNSPOTS

N87-20871*# National Aeronautics and Space Administration.

CORONAL AND PROMINENCE PLASMAS
(NASA-CP-2442; REPT-8680536; NAS 1.55:2442) Avail: NTIS HC A19/MF A01 CSCL 03B

CONFERENCES, MAGNETIC FIELD CONFIGURATIONS, MAGNETOHYDRODYNAMIC STABILITY, MAGNETOSTATICS, PLASMAS (PHYSICS), RADIO ASTRONOMY, SOLAR
ATMOSPHERE, SOLAR CORONA, SOLAR MAGNETIC FIELD, SOLAR PHYSICS, SOLAR PROMINENCES, SUN


STATISTICAL ASPECTS OF SOLAR FLARES
ROBERT M. WILSON Apr. 1987 41 p (NASA-TP-2714; NAS 1.60:2714) Avail: NTIS HC A03/MF A01 CSCL 03B
SOLAR FLARES, SOLAR PROMINENCES, STATISTICAL ANALYSIS

N87-21785"# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

RAPID FLUCTUATIONS IN SOLAR FLARES
CONFERENCES, MICROWAVES, OSCILLATIONS, PLASMA PHYSICS, RADIO WAVES, SOLAR FLARES, X RAYS

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SPACE RADIATION

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

N87-25984"# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

COSMIC RAY HEAVY ION LET MAPPING FOR ALUMINUM, SILICON, AND TISSUE TARGETS
Linear energy transfer (LET) values in aluminum, silicon, and tissue targets have been calculated for 31 galactic cosmic ray ion species in eight different units. The values are described for single event upset (SEU) effect assessments or radiobiological evaluations. The data are presented in graphical and tabular form.

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GENERAL

N87-24390"# National Aeronautics and Space Administration.

ENGINEER IN CHARGE: A HISTORY OF THE LANGLEY AERONAUTICAL LABORATORY, 1917-1958
JAMES R. HANSEN (Maine Univ., Orono.) Washington, D.C. 1986 643 p NASA History Series (NASW-3502) (NASA-SP-4305; NAS 1.21:4305) Avail: SOD HC $30.00 as 033-000-00999-2; NTIS MF A01 CSCL 05B
A history is presented by using the most technologically significant research programs associated with the Langley Aeronautical Laboratory from 1917 to 1958 and those programs that, after preliminary research, seemed best to illustrate how the laboratory was organized, how it works, and how it cooperated with industry and the military.

B.G.
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 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.

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ABSORPTION CROSS SECTIONS
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ACREDO YN DYNAMIC DRAG
Effects of tail plan and empennage arrangement on drag of a typical single-engine fighter aircraft [NASA-TP-2592]

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