NASA Aerospace Database
Subject Scope
... An Overview
The NASA Scientific and Technical Information (STI) Program manages the vast amount of information pertinent to aerospace research and development and makes this information available to NASA and the aerospace community worldwide. The main tool in carrying out this mission is the NASA Aerospace Database, a publicly available subset of the NASA STI Database. The NASA Aerospace Database contains over 2,000,000 citations to reports, journal articles, and other publications.

This booklet outlines the subject scope of the NASA Aerospace Database. It lists the topics of interest to NASA and places them within the framework of broad aerospace subject categories. For detailed explanations of the subjects themselves, see the NASA Scientific and Technical Information System ... Its Scope and Coverage, December 1988 (NASA SP-7065).
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## CHEMISTRY AND MATERIALS

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34 Fluid Mechanics and Heat Transfer
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   85-01 Urban Technology and Transportation

SPACE SCIENCES

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   89-02 Stellar Astronomy and Cosmology
   89-03 Meteors and Meteorites

90 Astrophysics
   90-01 Gravitation
   90-02 Astrophysical Plasmas

91 Lunar and Planetary Exploration
   91-01 The Moon
   91-02 Planetary Sciences and Exploration

92 Solar Physics

93 Space Radiation
   93-01 Cosmic Radiation
   93-02 Solar Radiation and Activity
   93-03 Radiation Belts

GENERAL

99 General
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).

01 Aeronautics (General)

Related Topics
84-01 World Space Programs and Aerospace Law.
NASA programs in general; foreign aerospace programs; international cooperation; law related to space and aeronautics; Congressional aerospace hearings.

02 Aerodynamics

02-01 Aerodynamic Characteristics
Lift, drag, stability, control, and balance; dynamic properties.

02-02 Aerodynamics of Bodies
Aerodynamics of cylindrical, conical, rotating, lifting, and symmetrical bodies; aerodynamic configurations.

02-03 Airfoil and Wing Aerodynamics
Aerodynamics of wings and airfoil shapes and forms; supercritical wings.

Related Topics
09-01 Wind Tunnels
Wind tunnel and shock tube installations, test programs, and technology.
34-01 Boundary Layer Technology
Flow characteristics and mechanics; boundary layer control; combustion control; separation; transition and turbulence; mathematical models; wind tunnel tests.

03 Air Transportation and Safety

03-01 Commercial and General Aviation
Design, operation, and maintenance of commercial and general aviation aircraft; air traffic control and safety factors.

03-02 Helicopters and Ground Effect Machines
Design, performance, and control of helicopters, hovercraft, and ground effect machines; rotor aerodynamics.

03-03 STOL/VTOL Aircraft
Design and stability control of short takeoff and landing aircraft and vertical takeoff and landing aircraft; aircraft configurations.

03-04 Supersonic Transport
Research and concepts in supersonic, transonic, and hypersonic transports; Concorde aircraft; aerospace planes.

03-05 Aircraft Noise and Sonic Boom
Effects and measurement of sound intensity of aircraft and sonic booms; noise prediction and reduction.

03-06 Aircraft Safety and Safety Devices
Aircraft safety studies; accident investigation; air piracy; safety techniques and safety devices.

03-07 Clear Air Turbulence
Atmospheric turbulence, diffusion, and counterflow; wind shear and microbursts.

04 Aircraft Communications and Navigation

Related Topics
17-02 Navigation Systems
Spacecraft and aircraft navigation systems including star trackers, inertial systems, doppler and stellar navigation; navigation instruments.
See also Subject Category 32 Communications and Radar.

05 Aircraft Design, Testing and Performance

05-01 Hydraulic and Pneumatic Systems
Hydraulic and pneumatic equipment and instrumentation; component reliability; hydraulic test tunnels.

05-02 Auxiliary Electrical Systems
Electrical and solar auxiliary power sources; performance tests and systems analysis; reliability engineering.

06 Aircraft Instrumentation

Related Topics
19-01 Spacecraft Instrumentation
Spacecraft instruments, gauges, indicators and instrumentation systems.

07 Aircraft Propulsion and Power

07-01 Jet Propulsion
Propulsion system performance and configurations of turbojet, pulsejet, and ramjet aircraft engines; combustion physics.
08 Aircraft Stability and Control

Related Topics
02-01 Aerodynamic Characteristics
Lift, drag, stability, control, and balance; dynamic properties.
34-01 Boundary Layer Technology
Flow characteristics and mechanics; boundary layer control; combustion control; separation; transition and turbulence; mathematical models; wind tunnel tests.

09 Research and Support Facilities (Air)

09-01 Wind Tunnels
Wind tunnel and shock tube installations, test programs, and technology.

Related Topics
03-01 Commercial and General Aviation
Design, operation, and maintenance of commercial and general aviation aircraft; air traffic control and safety factors.
See also Subject Category 02 Aerodynamics.

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.

12 Astronautics (General)

Related Topics
84-01 World Space Programs and Aerospace Law
NASA programs in general; foreign aerospace programs; international cooperation; law related to space and aeronautics; Congressional aerospace hearings.

13 Astrodynamics

13-01 Celestial Mechanics and Orbital Calculations
Orbital calculations for celestial mechanics and spacecraft trajectories; applications of mathematics; space mechanics.

14 Ground Support Systems and Facilities (Space)

14-01 Spacecraft Ground Support
Spacecraft launch facilities and ground operational support systems; network control; logistics.

Related Topics
17-04 Tracking
Tracking installations, personnel, and equipment; systems using radio, radar, infrared, or optical techniques.
33-03 Antennas
Types of radar and radio antennas; properties, design, and applications.

14-02 Test Facilities
Rocket test facilities; test ranges and stands; reactor test facilities; engine test facilities.

14-03 Simulators and Simulation
Solar, space, and environment simulators; vacuum chambers; simulation programs, methods, and technology.

14-04 Sterilization
Spacecraft sterilization and contamination control; methods and effects; planetary quarantine.

Related Topics
09-01 Wind Tunnels
Wind tunnel and shock tube installations, test programs, technology.

17-04 Tracking
Tracking installations, personnel, and equipment; systems using radio, radar, infrared, or optical techniques.

32-02 Communication Equipment
Communication equipment including radio, microwave, infrared, light, laser, television, and fiber optic equipment.

15 Launch Vehicles and Space Vehicles

15-01 Launch Vehicles
Large, medium, recoverable, and reusable launch vehicles; spacecraft launching; launch vehicle configurations.

15-02 Sounding Rockets
Meteorological observations from the upper atmosphere by radiosondes; rocket-borne instruments; atmospheric physics.

15-03 Space Probes
Lunar and interplanetary deep space probes; unmanned, maneuverable spacecraft.
15-04 Scientific Satellites
Geophysical, astronomical, and environmental satellites; orbiting observatories; IRAS; SMM; LANDSAT; Explorer satellites.

15-05 Reentry Vehicles
Maneuverable and lifting reentry bodies entering planetary atmospheres; instrumentation; atmospheric entry simulation.
Related Topics
16-01 Space Transportation and Manned Spacecraft
All manned space vehicles; space shuttles; Apollo; Skylab; Spacelab; Apollo-Soyuz Test Program; orbiting laboratories and manned flights.

15-06 U.S.S.R. Spacecraft
Manned and unmanned Soviet spacecraft and space programs; Soviet satellites.
Related Topics
14-01 Spacecraft Ground Support
Spacecraft launch facilities and ground operational support systems; network control; logistics.
19-01 Spacecraft Instrumentation
Spacecraft instruments, gauges, indicators, and instrument systems.

16 Space Transportation
16-01 Space Transportation and Manned Spacecraft
All manned space vehicles; space shuttles; Apollo; Skylab; Spacelab; Apollo-Soyuz Test Program; orbiting laboratories and manned flights.
Related Topics
15-06 U.S.S.R. Spacecraft
Manned and unmanned Soviet spacecraft and space programs; Soviet satellites.

17 Space Communications, Spacecraft Communications, Command and Tracking
17-01 Space Communications
Reentry, lunar, interplanetary, satellite, and spacecraft communications, excluding communication satellites.

17-02 Navigation Systems
Spacecraft and aircraft navigation systems including star trackers, inertial systems, doppler and stellar navigation; navigation instruments.

17-03 Guidance Systems
Inertial, midcourse, and reentry guidance and control of spacecraft; instrumentation; space navigation.

17-04 Tracking
Tracking installations, personnel, and equipment; systems using radio, radar, infrared, or optical techniques.
Related Topics
33-01 Radar Equipment
Types of radar and implementation; equipment specifications; systems engineering.
33-03 Antennas
Types of radar and radio antennas; properties, design, and applications.
See also Subject Category 32 Communications and Radar.

18 Spacecraft Design, Testing and Performance
18-01 Spacecraft Attitude Control and Stabilization
Attitude and stability control of spacecraft; performance tests; systems stability.

18-02 Rendezvous and Docking
Rendezvous guidance; trajectories; docking of spacecraft; orbital mechanics.

18-03 Space Stations
Functions of and systems for a space station; analysis; control; maintenance; human factors engineering.

19 Spacecraft Instrumentation
19-01 Spacecraft Instrumentation
Spacecraft and aircraft instruments, gauges, indicators, systems.
19-02 Sensors and Transducers
Sensing instruments used for measuring pressure, temperature, and acoustics in space vehicles and aircraft.
Spacecraft Propulsion and Power

Related Topics
17-02 Navigation Systems
Spacecraft and aircraft navigation systems including star trackers, inertial systems, doppler and stellar navigation; navigation instruments.
32-04 Telemetry
Data transmission and measuring; biotelemetry; telephotometry; telepsychometry.
54-05 Bioinstrumentation
Instrumentation for measuring and recording biological parameters; biomedical data; medical electronics; bioengineering.
See also Subject Category 32 Communications and Radar.

20 Spacecraft Propulsion and Power
20-01 Rocket Engines, Nozzles and Thrust Chambers
Design, materials, and performance tests of rocket engines, nozzles, and thrust chambers; thrust measurement.
20-02 Auxiliary Propulsion
Spacecraft propulsion systems excluding main propulsion systems; auxiliary power sources; propulsion system performance.
20-03 Electric Propulsion
Electromagnetic and electrostatic propulsion; laser, plasma, and ion propulsion; nuclear electric propulsion.
Related Topics
07-01 Jet Propulsion
Propulsion system performance and configurations of turbojet, pulsejet, and ramjet aircraft engines; combustion physics.
See also Subject Category 44 Energy Production and Conversion.

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)
23-01 Chemical Analysis
Qualitative, quantitative, and analytical chemistry; chromatography; chemical composition.
23-02 Chemical Processes and Engineering
Chemical processes and specific chemical reactions such as oxidation, nitration, hydrogenation, polymerization, etc.
23-03 Luminescence
Chemiluminescence; photoluminescence; bioluminescence; phosphorescence; electroluminescence; fluorescence; optical properties.
23-04 Photochemistry
Photosynthesis, photolysis, photodecomposition, and photodissociation; photochemical reactions; radiation chemistry.
Related Topics
51-02 Biochemistry
Study of chemical substances in living organisms; physiochemistry; biological and chemical evolution; experimentation.

24 Composite Materials
24-01 Reinforced Materials and Fibers
Materials reinforced by inclusions; fiber reinforcement; whiskers; filament wound vessels; properties and uses.
24-02 Composite Materials
Types of composite materials including laminates, honeycomb cores, cerments, prepregs, and sandwich and matrix materials; properties and uses.

25 Inorganic and Physical Chemistry
25-01 Corrosion
Metal corrosion; stress corrosion; corrosion prevention; tests for corrosion.
25-02 Metal Crystals
Structure, defects, and technology of metal crystals.
25-03 Coatings
Types of coatings; properties and uses; coating techniques.
25-04 Electrochemistry
Electrochemical processes; electrolysis; electrocatalysts; electrolytic processes; reaction kinetics.
26 Metallic Materials
26-01 Aluminum
Aluminum; aluminum alloys; aluminum compounds; powdered aluminum; properties and uses.
26-02 Beryllium
Beryllium; beryllium alloys; beryllium compounds; properties and uses.
26-03 Liquid Metals
Types of liquid metals; properties and uses.
26-04 Steel
Types of steels and steel alloys; properties and uses.
26-05 Titanium
Titanium; titanium alloys; titanium compounds; properties and uses.
26-06 Refractory Metals
Refractory metals; refractory alloys; superalloys; properties and uses.
26-07 Metallurgy
Powder metallurgy; sintering; fractography; metallography.

27 Nonmetallic Materials
27-01 Plastics
Types of plastics; properties and uses.
27-02 Adhesives
Types of adhesives; properties and uses.
27-03 Ceramics
Types of ceramics; properties and uses.
27-04 Elastomers
Types of elastomers; properties and uses.
27-05 Graphite
Graphite; pyrolytic graphite; graphite composites; properties and uses
27-06 Polymers
Types of polymers; polymer chemistry and polymer physics; properties and uses.

28 Propellants and Fuels
28-01 Liquid Propellants
Types of liquid propellants; storability, handling, and manufacture; properties and uses.
28-02 Solid Propellants
Types of solid propellants; properties and uses; manufacture; combustion efficiency and stability; storage and handling; propellant grain studies; oxidizers and igniters used with solid propellants.

29 Materials Processing
Related Topics
37-09 Vacuum Technology
Vacuum systems, techniques, and processes; vacuum testing, measurement, and material fabrication; application to space commercialization.
84-02 Space Commercialization
Policies, incentives and techniques for commercial ventures in space by private industry.

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; structural mechanics.

31 Engineering (General)
Related Topics
See Subject Categories 32 through 39.

32 Communications and Radar
32-01 Communication Satellites
Domestic and foreign communications satellites.
32-02 Communication Equipment
Communication equipment including radio, microwave, infrared, light, laser, television, and fiber optic equipment.
32-03 Communication Systems
Types of communication systems including television, digital, fiber optic, etc., and specific systems; Defense Communication Systems; Deep Space Network; Local Area Networks, etc.
32-04 Telemetry
Data transmission and measuring; biotelemetry; telephotometry; telepsychometry.

32-05 Radio Noise
Noise spectra; intensity, reduction, and measurement of radio noise sources; amplitude distribution analysis.

32-06 Communication Theory
Information theory; coding automata theory; signal processing; decision theory; probability theory.

Related Topics
33-01 Radar Equipment
Types of radar and implementation; equipment specification; systems engineering.

33-03 Antennas
Types of radar and radio antennas; properties, design, and applications.

33 Electronics and Electrical Engineering

33-01 Radar Equipment
Types of radar and implementation; equipment specifications; systems engineering.

33-02 Semiconductors and Transistors
Types of semiconductors and transistors; devices, materials, and applications.

Related Topics
76-01 Solid State Devices
Devices using solid state components, diodes, and rectifiers.

33-03 Antennas
Types of radar and radio antennas; properties, design, and applications.

33-04 Electronic Components
Types of electronic components; design, properties, packaging, and manufacturing; component reliability; equipment tests.

33-05 Circuitry
Circuit theory; production techniques; reliability; protection; applications.

Related Topics
33-10 Microelectronics

33-06 Electrical Equipment
Types of electrical equipment; design, properties, and uses; tests and reliability.

33-07 Amplifiers
Types of electronic amplifiers; design, properties, and applications.

Related Topics
34-03 Fluidics
Fluid amplification; fluid logic circuits; fluid devices; fluid mechanics.

33-08 Feedback and Control Theory
Systems, techniques, and designs.

33-09 Electromagnetic Radiation
Electromagnetic wave propagation; radiation effects; properties, detection, and applications.

33-10 Microelectronics
Microcircuits; microelectronic devices and components; microminiaturized electronic devices; microinstrumentation.

33-11 Microwave and Submillimeter Wave Technology
Microwave research; properties; measuring techniques; applications.

33-12 Magnetism
Theory and research; aeromagnetism; electromagnetism; ferromagnetism; hydromagnetism; paramagnetism; thermomagnetism.

Related Topics
05-02 Auxiliary Electrical Systems
Electrical and solar auxiliary power sources; performance tests and systems analysis; reliability engineering.

32-02 Communication Equipment
Communication equipment including radio, microwave, infrared, light, laser, television, and fiber optic equipment.

34 Fluid Mechanics and Heat Transfer

34-01 Boundary Layer Technology
Flow characteristics and mechanics; boundary layer control; combustion control; separation;
transition and turbulence; mathematical models; wind tunnel tests.

34-02 Gas Dynamics

Applied and theoretical gas dynamics; problem solving; hypersonic and rarefied gas dynamics; gas dynamic lasers.

34-03 Fluidics

Fluid amplification; fluid logic circuits; fluid devices; fluid mechanics.

34-04 Fluid Flow

Types of liquid flow excluding gas and air flow; properties; measuring instruments; fluid mechanics.

34-05 Combustion Physics

Combustion phenomena; kinetics; instability; detonation; theory.

34-06 Heat Transfer, Basic

Types of heat transfer, heat dissipation, and heat resistance; measuring devices; thermodynamic properties.

34-07 Reentry Heat Transfer

Heat transfer problems on reentry and their solutions; hyperbolic reentry; hypersonic reentry.

34-08 Thermal Protection

Materials used in thermal insulation; thermal control coatings; temperature control; materials tests.

34-09 Ablation

Ablation studies; ablating materials; application to reentry vehicles; rocket nozzles; ablative nose cones.

34-10 Cryogenics

Low temperature research; cryogenic fluids and equipment; cryochemistry.

Related Topics
28-01 Liquid Propellants
Types of liquid propellants; storability, handling, and manufacture; properties and uses.

02-01 Aerodynamic Characteristics
Lift, drag, stability control, and balance; dynamic properties.

35 Instrumentation and Photography

35-01 Photography
Methods of photography; cameras and photographic equipment; applications and uses.

35-02 Infrared Technology
Radiation measuring devices; infrared instruments; applications and methodologies.

35-03 Instrument Standards and Calibration Techniques
Calibration standards for measuring instruments; techniques; test equipment.

35-04 Temperature Measurement
Heat and temperature measuring devices; applications; systems.

35-05 Pressure Measurement
Pressure measuring devices; applications; systems.

35-06 Display Systems
Cathode ray tubes and display devices; display techniques and principles; helmet mounted displays; head-up displays.

35-07 Data Recording
Data recorders and recording systems and techniques; laser-holographic data recording systems.

35-08 Gas Flow Measurement
Devices, applications, and systems for measuring gas flow including optical measuring instruments; laser measurement techniques.

Related Topics
17-02 Navigation Systems
Spacecraft and aircraft navigation systems including star trackers, inertial systems, doppler and stellar navigation; navigation instruments.

32-04 Telemetry
Data transmission and measuring; biotelemetry; telephotometry; telepsychometry.

47-05 Meteorological Instruments
Types of meteorological instruments; uses and specifications; measuring and recording instruments; meteorological parameters.

54-05 Bioinstrumentation
Instrumentation for measuring and recording biological parameters; biomedical data; medical electronics; bioengineering.

See also Subject Category 19 Spacecraft Instrumentation.
Lasers and Masers

36 Lasers and Masers

36-01 Lasers and Masers
References to lasers and masers in general; laser theory; types of lasers and masers.

36-02 Laser Applications
Design, types, and uses; materials; optical properties.

37 Mechanical Engineering

37-01 Bearings and Gears
Types of bearings and gears; uses and applications; materials; product development; mechanical properties.

37-02 Lubrication and Lubricants
Lubrication materials; systems; applications; high temperature; solid lubricants; squeeze films.

37-03 Machining
Machining techniques and processes; machine tools; automation and production engineering.

37-04 Friction and Wear
Types, measurement, and effects of friction and wear; frictionless environment; mechanical and surface properties.

37-05 Seals
Sealants; gaskets; packing; leakage; self-sealing materials; sealing techniques including O-ring and labyrinth seals.

37-06 Welding
Types of brazing, bonding, and soldering; techniques and processes; weld properties.

37-07 Metal Forming
Forming techniques and processes; metal working; malleability.
Related Topics
37-03 Machining
Machining techniques and processes; machine tools; automation and production engineering.

37-08 Pumps
Types of pumps; design and uses; performance tests; equipment specifications.

37-09 Vacuum Technology
Vacuum systems, techniques, and processes; vacuum testing, measurement, and material fabrication; application to space commercialization.

37-10 Nondestructive Testing
Types and techniques; materials tests; automatic test equipment.

37-11 Turbomachinery
Types of turbomachinery; design and uses; equipment specifications; performance tests; aerodynamic characteristics.

38 Quality Assurance and Reliability

38-01 Quality Control and Reliability
Product development; qualitative testing; analysis of materials and structures; reliability criteria for components and structures.

39 Structural Mechanics

39-01 Shells
Shell structures; stresses; loads; buckling and vibration.

39-02 Stresses and Loads
Stresses and loads on launch vehicles, spacecraft, and aerospace structures.

39-03 Structure Vibration and Damping
Vibration and damping in aerospace structures, spacecraft, and airframes; panel flutter.

39-04 Impact Phenomena
Studies of impact phenomena in aerospace structures and components; micrometeoroid impact damage.

39-05 Structural Fatigue
Fatigue studies and analysis; techniques for aerospace structures and components.

39-06 Sandwich Construction
Honeycomb, multilayer, and laminated fabrication; techniques and structures.

39-07 Stress Analysis
Stress calculation; analysis of structures.
39-08 Structural Tests and Reliability
Destructive and nondestructive testing and reliability of aerospace structures, spacecraft, airframes, and large space structures.

GEOSCIENCES
Includes geosciences (general); earth resources and remote sensing; environment pollution; geophysics; meteorology and climatology; and oceanography.

42 Geosciences (General)
Related Topics
See Subject Categories 43 through 48.

43 Earth Resources and Remote Sensing

43-01 Earth Resources
Earth resources studies; the role of satellites in natural resource development, geology, agriculture, and forestry.

43-02 Geodesy and Cartography
Geodetic positions; satellite surveying; geodetic applications; mapping techniques; analyzing methods; mapping systems.
Related Topics
48-01 Water Resources and Oceanography
Water conservation and development; hydrology; remote sensing of floods, snow cover, ice; oceanography; other hydrospheric studies.

46 Geophysics

46-01 Upper Earth Atmosphere
Earth atmosphere above the troposphere; ionospheric composition, phenomena, chemical reactions, and satellite measurement.

46-02 Geology and Seismology
Earth geology, petrography, and orography; earthquake detection; measuring and recording instruments; theoretical models.

46-03 Geomagnetism
Geomagnetic anomaly, fields, latitudes, pulsations, and storms; measuring and data transmitting instruments.
Related Topics
15-02 Sounding Rockets
Meteorological observations from the upper atmosphere by radiosondes; rocket-borne instruments; atmospheric physics.

44-02 Fuel Cells and Chemical Batteries
Types of fuel cells and chemical batteries; properties and uses; energy storage; chemical auxiliary power units; electrochemistry.

44-03 Solar Space Power
Solar power technology; conversion and efficiency; solar dynamic power systems; auxiliary power sources.

44-04 Nuclear Auxiliary Power
Nuclear auxiliary reactors; isotopic space power; specific SNAP systems.

45 Environment Pollution

45-01 Environmental Pollution Control
Control applications of aerospace techniques including remote sensing, to all aspects of air, water, thermal, and environmental pollution; specific pollutants; noise; noise injuries; noise meters; atmospheric composition; water quality.

44 Energy Production and Conversion

44-01 Energy Resources
Production, conversion, transmission, conservation of energy; solar energy conversion; wind power; remote survey of energy resources; hydrogen economy.
93-03 Radiation Belts
Inner and outer radiation belts; Van Allen Belt; artificial radiation belts; geomagnetically trapped particles; proton belts; trapped radiation.

47 Meteorology and Climatology

47-01 Meteorological Satellites
Meteosat; NOAA; Nimbus; Tiros; meteorological data from satellites.

47-02 Weather Forecasting
Methods and instruments of weather data acquisition and processing; theory and methods of weather prediction.

47-03 Micrometeorology
Smallest scale observation of physical and dynamic occurrences within the surface boundary layer of the atmosphere including turbulence, air pollution, and launch conditions.

47-04 Cloud Research
Types of cloud formation; cloud physics; nephanalysis; cloud seeding.

47-05 Meteorological Instruments
Types of meteorological instruments; uses and specifications; measuring and recording instruments; meteorological parameters.

Related Topics
15-02 Sounding Rockets
Meteorological observation from the upper atmosphere by radiosondes; rocket-borne instruments; atmospheric physics.

46-01 Upper Earth Atmosphere
Earth atmosphere above the troposphere; ionospheric composition, phenomena, chemical reaction, and satellite measurement.

48 Oceanography

48-01 Water Resources and Oceanography
Water conservation and development; hydrology; remote sensing of floods, snow cover, ice, oceanography; other hydrosphere studies.

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

51 Life Sciences (General)

51-01 Biology (Generals)
Microbiology; ecology; botany; genetics; cytology.

51-02 Biochemistry
Study of chemical substances in living organisms; physiochemistry; biological and chemical evolution; experimentation.

52 Aerospace Medicine

52-01 Aerospace Medicine
Aerospace medical problems and studies, e.g., toxicity and weightlessness; medical aspects of astronaut performance reaction; neurophysiology.

52-02 Clinical Medicine
General medicine; body systems and functions; diseases; drugs.

52-03 Physiological Factors
Functions related to body composition, physical performance reaction; neurophysiology.

52-04 Biological Radiation Effects
Effects of radiation on human beings, animals, and plants; physiological tests; radiation therapy; health physics.

53 Behavioral Sciences

53-01 Psychological Factors
Psychological aspects of human behavior; psychiatry; psychophysiology; group dynamics; flight crews; tests.

54 Man/System Technology and Life Support

54-01 Life Support Systems
Life survival equipment and support systems used in spacecraft environments and habitats; space flight feeding; sanitation and waste disposal; closed ecological systems.

54-02 Crew Safety and Protective Clothing
Survival techniques for flight crews; escape and rescue operations; safety devices; space suits and protective clothing; emergency life sustaining systems.
54-03 Human Engineering
Design and engineering of devices, equipment, and artificial environments to the requirements of man.

54-04 Man-Machine Systems
Interrelated technologies and systems of man and machine; man-computer interface; automata theory; systems engineering.

54-05 Bioinstrumentation
Instrumentation for measuring and recording biological parameters; biomedical data; medical electronics; bioengineering.

54-06 Robotics
Development and demonstration of automatically controlled devices that can perform humanlike functions including decision making.

55 Space Biology

55-01 Extraterrestrial Life
Exobiology and detection; simulation; genesis of life outside Earth.

59 Mathematical and Computer Sciences

59-01 Applied Mathematics
Mathematical applications in physical, biological, and aerospace sciences.

59-02 Data Processing
Automatic processing of data; data handling, conversion, correlation, transfer, and compression; retrieval and storage; batch processing; processing terminals and equipment; data management.

60 Computer Operations and Hardware

60-01 Digital and Analog Computers
Computer hardware; structure; peripheral equipment; applications; hybrid computers.

60-02 Airborne or Spaceborne Computers
Computer design for onboard spacecraft or aircraft flight control; automatic flight and landing control.

61 Computer Programming and Software

61-01 Computer Software
Computer and language programming; computer systems programs; software tools; software engineering.

61-02 CAD/CAM
Application of technical advances in computers to engineering design, analysis, and production in the aerospace industry.

62 Computer Systems

63 Cybernetics

63-01 Cybernetics and Bionics
Methods of control and communications common to living organisms and machines; those systems that function in the manner of or resembling human systems.

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.
63-02 Artificial Intelligence
Development of algorithms; sensors, actuators, software, and systems for expanding automation to task planning, decision making, generation of computer codes, multiple system coordination, monitoring and diagnosing systems and subsystems. Related Topics
54-06 Robotics
Development and demonstration of automatically-controlled devices that can perform humanlike functions including decision making.

64 Numerical Analysis
64-01 Numerical Analysis
Approximation techniques; mathematical analysis and theory; applications of mathematics; mathematical models.

65 Statistics and Probability
65-01 Probability and Statistics
Statistical techniques and applications; probability and reliability theory; probability equations; problem solving.

66 Systems Analysis
Related Topics
61-01 Computer Software
Computer and language programming; computer systems programs; software tools; software engineering.

67 Theoretical Mathematics

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.

70 Physics (General)
Related Topics
See Subject Categories 71 through 77.

71 Acoustics
71-01 Acoustics
Acoustic attenuation; simulation; scattering radiation and vibration; hydroacoustics.

71-02 Ultrasonics
Science of ultrasonic sound waves; nondestructive testing; clinical medicine; acoustic properties; materials research.

72 Atomic and Molecular Physics
72-01 Atomic Physics
Atomic theory, collision, beams, energy, reactions, and properties.

72-02 Molecular Physics
Molecular theory, energy, structure, collision, and beams; molecules; properties and instrumentation.

73 Nuclear and High-Energy Physics
73-01 Nuclear Physics
Nuclear particles, structure, reactions, and force.

73-02 Radioactivity
Radiation measurement, hazards, and effects; high energy interactions; nuclear medicine; radiochemistry.
Related Topics
93-01 Cosmic Radiation
Primary and secondary cosmic radiation; galactic and stellar radiation.

74 Optics
74-01 Optics
Optical equipment and technology; electron optics; crystal optics; fiber optics; optical properties.

74-02 Light
Light scattering; measurement effects and transmission.

75 Plasma Physics
75-01 Plasma Applications
Plasma arc welding; plasma spraying; plasma power sources; plasma jet technology.

75-02 Plasma Dynamics
Plasma-particle and electromagnetic interactions; space plasmas; laser applications; transport properties.
75-03 Magnetohydrodynamics
Magnetohydrodynamic theory and applications.
Related Topics
90-02 Astrophysical Plasmas
Space plasmas; solar, cosmic, stellar, and interstellar plasmas; solar and stellar atmospheres.

76 Solid-State Physics
76-01 Solid State Devices
Devices using solid state components, diodes, and rectifiers.
76-02 Superconductivity
Superconductivity; superconducting magnets; superconducting transition temperatures; critical temperatures; critical field curves of superconducting material.
76-03 Dielectrics
Dielectric material including dielectric constant of materials; electric losses and ohmic resistance of compounds; permeability and polarization of dielectric substances and media.
76-04 Epitaxial Deposition
Film deposition techniques and applications; semiconductor devices; substrates; electrical properties.
Related Topics
33-02 Semiconductors and Transistors
Types of semiconductors and transistors; devices, materials, and applications.
33-12 Magnetism
Theory and research; aeromagnetism; electromagnetism; ferromagnetism; hydromagnetism; paramagnetism; thermomagnetism.

77 Thermodynamics and Statistical Physics
Related Topics
25-02 Metal Crystals
Structure, defects, and technology of metal crystals.
65-01 Probability and Statistics
Statistical techniques and applications; probability and reliability theory; probability equations; problem solving.
72-02 Molecular Physics
Molecular theory, energy, structure, collision, and beams; molecules; properties and instrumentation.

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)
Related Topics
See Subject Categories 81 through 85.

81 Administration and Management
81-01 Aerospace Management
Management techniques; cost control; production engineering; personnel management.

82 Documentation and Information Science
82-01 Information Technology
Documentation; information processing and retrieval; information systems; integrated library systems; technology utilization; information management.

83 Economics and Cost Analysis
Related Topics
81-01 Aerospace Management
Management techniques; cost control; production engineering; personnel management.

84 Law, Political Science and Space Policy
84-01 World Space Programs and Aerospace Law
NASA programs in general; foreign aerospace programs; international cooperation; law related to space and aeronautics; Congressional aerospace hearings.
Related Topics
15-06 U.S.S.R. Spacecraft
Manned and unmanned Soviet spacecraft and space programs; Soviet satellites.
84-02 Space Commercialization
Policies, incentives, and techniques for commercial ventures in space by private industry.

85 Urban Technology and Transportation
85-01 Urban Technology and Transportation
Application of aerospace technology to the problems of cities; urban development, planning, research, and transportation; rail transportation; rapid transit systems; police services; water and sewage treatment; waste utilization; air, water and noise pollution; pollution control; land use.
SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.

88 Space Sciences (General)

Related Topics
See Subject Categories 89 through 93.

89 Astronomy

89-01 Solar Astronomy
Solar activity; solar physics; solar telescopes and observatories.

89-02 Stellar Astronomy and Cosmology
Stellar and galactic astronomy including radio astronomy; origin and evolution of the universe.

89-03 Meteors and Meteorites
Meteor properties and hazards; micrometeoroids and micrometeorites; comets; interplanetary dust.

90 Astrophysics

90-01 Gravitation
Gravitational theory, effect, and fields; equations and potential; antigravity; gravitational collapse; gravity gradient control of satellites; geophysical gravitational fields.

90-02 Astrophysical Plasmas
Space plasmas; solar, cosmic, stellar, and interstellar plasmas; solar and stellar atmospheres.

91 Lunar and Planetary Exploration

91-01 The Moon
Lunar atmosphere; topography; environment; lunar exploration; lunar spacecraft and roving vehicles; surface properties.

91-02 Planetary Sciences and Exploration
Planetary composition, surfaces, atmospheres, and environment; spacecraft and vehicles used in planetary exploration.

92 Solar Physics

Related Topics
89-01 Solar Astronomy
Solar activity; solar physics; solar telescopes and observatories.

93 Space Radiation

93-01 Cosmic Radiation
Primary and secondary cosmic radiation; galactic and stellar radiation.

93-02 Solar Radiation and Activity
Solar radiation; observation and instrumentation; hazards to space flight; protection from solar radiation; solar storms; solar flares; solar winds; sunspots.

93-03 Radiation Belts
Inner and outer radiation belts; Van Allen Belt; artificial radiation belts; geomagnetically trapped particles; proton belts; trapped radiation.

99 General

Includes aeronautical, astronautical, and space science related histories, biographies, and pertinent reports too broad for categorization; histories or broad overviews of NASA programs.
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**ABSTRACT** (maximum 200 words)

Outlined here is the subject scope of the NASA Aerospace Database, a publicly available subset of the NASA Scientific and Technical (STI) Database. Topics of interest to NASA are outlined and placed within the framework of the following broad aerospace subject categories: aeronautics, astronautics, chemistry and materials, engineering, geosciences, life sciences, mathematical and computer sciences, physics, social sciences, space sciences, and general. A brief discussion of the subject scope is given for each broad area, followed by a similar explanation of each of the narrower subject fields that follow. The subject category code is listed for each entry.