

NASA

National Aeronautics and
Space Administration

The NASA Scientific and Technical Information System

...Its Scope and Coverage

(NASA-TM-79903) THE NASA SCIENTIFIC AND
TECHNICAL INFORMATION SYSTEM: ITS SCOPE AND
COVERAGE (National Aeronautics and Space
Administration) 287 p CACL 05B 00/82 36066
N79-10935
Unclas

SEPTEMBER 1978

The NASA Scientific and Technical Information Branch

Preface

The NASA scientific and technical information system has been developed to provide NASA and the aerospace community with the information tools to accomplish their missions in the most effective and efficient manner. NASA's mission also includes the responsibility of providing maximum use of acquired knowledge for the benefit of all mankind. The system is a highly automated activity that not only meets the information requirements of NASA and others in the aerospace program, but provides access to the massive flow of this and related information to other government, industrial, and academic groups.

Each month finds thousands of documents added to this information bank for the benefit of its users. Many other documents are reviewed and rejected from inclusion in the system to prevent overlapping and excessive duplication of other large information storage and dissemination systems. This publication lists the subject criteria applied to the various documents to govern the decisions for accepting additions to the NASA information bank. In addition, it establishes subject guidance for those desiring to add documents to the collection of information or to search the collection for documents of interest to meet their needs.

This Scope and Coverage is not intended to be an exhaustive, all-inclusive listing of subjects to be included in the NASA information system. It is, rather, an attempt to provide a broad look at the subjects contained in the system in sufficient depth to assure an understanding of its holdings. The NASA scientific and technical information system is designed with the flexibility to meet the constantly changing information needs of NASA and the aerospace community.

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National Aeronautics and Space Administration
Washington, DC 20546

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Introduction

This publication was originally intended as a working guide for individuals who scan the published and report literature for documents to be added to the National Aeronautics and Space Administration's scientific and technical information system. It has become much more than that, since it now makes you, the user of the NASA information system, knowledgeable about the broad subject coverage included in the system. You can increase the utility of this system to yourself and your peers throughout government, industry, and the academic community by emphasizing the possibility of submitting your own and your organization's published and report literature for inclusion in the system within the overall subject bounds of this Scope and Coverage. Your contributions to the data bank should be sent to the address at the end of the Introduction.

The NASA information system includes the Technical Information Service of the American Institute of Aeronautics and Astronautics and the NASA Scientific and Technical Information Facility. Documents from world-wide sources are included in this system.

This revision of the March 1970 edition reflects NASA's changing interests in both depth and scope in areas such as the environment, energy production and sources, oceanography, and the social sciences. Although the range of Input Subjects of Specific Interest under each subject category is not exhaustive, it is indicative of the subjects of the documents to be included in the NASA information system within that category.

The many-faceted interests of NASA require a broad-based information bank with wide coverage and careful selection of reports, journal articles, books, and conference papers. NASA's wide interests in science include the environment and properties of the Earth, Moon, and planets; the Sun and its relationships to the Earth and the rest of the solar system; the space environment; the physical nature of the universe; and the search for extraterrestrial life. In technology, NASA's interests include spacecraft and launch vehicles; aircraft, including V/STOL, supersonic, hypersonic, and lighter-than-air; propulsion; auxiliary power; human factors; electronics; and structures and materials. In applications, NASA's interests include astronomical, geophysical, meteorological, and communications systems; as well as emphases on earth resources, air and water pollution, and urban transportation. In the utilization of technology resulting from NASA's aerospace

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activities, non-aerospace industries, government at all levels, educational institutions, the medical profession, and non-profit organizations are helped to obtain beneficial information from the information bank that would aid civilian applications of the results of the aerospace effort.

The rapidly growing volume of documentation resulting from new scientific and technical knowledge in all fields of endeavor is so voluminous that no single collection can be all inclusive. No one can anticipate precisely what the next research project will require from an information viewpoint and the NASA collection is not intended to completely cover all possibilities. The coverage of documents from world-wide sources in aeronautics and astronautics is as complete as possible. Those documents that meet the direct needs of NASA and the aerospace community are definitely included in the information bank as well as those reports and publications having a strong relevance to aerospace science and technology. Other collections of knowledge are available and background and peripheral material will be obtained from these collections as needed.

NASA's interests in scientific and technical information for its information bank are broadly summarized herein under the same subject categories (i.e. NASA Category Guide for *STAR* and *IAA* Categories) that are used in the abstract journals *Scientific and Technical Aerospace Reports* and *International Aerospace Abstracts*. The interest in each subject category may be "exhaustive", "selective" or "negative".

"Exhaustive" interest in a subject indicates that it lies almost wholly within aerospace science and technology. Most documents on such a subject will be of interest and should be maintained in the NASA collection. "Selective" interest implies that a subject is broader than NASA's direct interest in aerospace sciences and technology, but that a number of reports or published literature items may bear on one or more NASA programs. These documents will be selected carefully to assure that appropriate documents are maintained in the collection. "Negative" interest indicates that the subject is of no interest to NASA's program and will not be included in the NASA collection. Only an occasional document of this nature will be selected because of a specific, direct application to a specific NASA project.

Keep in mind that a subject can appear in several subject categories because of its application. For example, aerodynamics of launch vehicles may show in subject category 02, Aerodynamics as well as in subject category 15, Launch Vehicles. A specific launch vehicle's aerodynamics should appear in the subject category 15, whereas a general treatment of the aerodynamics of launch vehicles or their general aerodynamic configurations will appear in subject category 02, Aerodynamics.

Details about the NASA information system, its announcement journals, its micropublication program, its literature search services, and its other products are described in the publication "The NASA Information System and How to Use It". This publication may be requested from the address given below:

NASA Scientific and Technical Information Facility
P.O. Box 8757
Baltimore/Washington International Airport
Maryland 21240

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.

General Definition

The science and art of designing, constructing, and operating aircraft. NASA Aeronautical Dictionary, Frank Davis Adams, ed., 1959, p. 5.

Category 01

Aeronautics (General)

For related information see also Category 12, Astronautics (General).

Input Subjects of Specific Interest

- Aeronautics
- Aircraft maintenance
- Aircraft manufacturing
- Aircraft production

Category 02

Aerodynamics

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbo machinery. For related information see also Category 34, Fluid Mechanics and Heat Transfer.

General Definition

That branch of physics which treats of relative motion between air and bodies. These bodies may be ground structures, houses, hangars, or bridges acted upon by wind; or moving objects such as aircraft, ships, automobiles, and rockets passing through air at various speeds. Encyclopedia Americana, 1960 Edition, Vol. 1, p. 179.

NASA Interest

Exhaustive Interest: All information dealing with the effects of relative motion on the flow of air or other gases and vapors, at any velocity, over aircraft, air cushion vehicles, land transportation vehicles, spacecraft, launch vehicles, missiles, and their components; over geometric shapes of models used in laboratory and wind tunnel tests, e.g., cones, plates, shells, spheres, and cylinders; internal flow in channels, ducts and turbomachines; forces acting on bodies in aerodynamic flow, including aerodynamic lift and drag. (For aerodynamic heating see Category 34, Fluid Mechanics and Heat Transfer.)

Negative Interest: Aerodynamics of surface structures, ships, bridges, etc., other than aerodynamics of ground support equipment for aerospace research, results of aerodynamic testing for these effects, or as the aerodynamics of surface structures affect weather, environment, etc.

Input Subjects of Specific Interest

- Aerodynamic derivatives
- Aerodynamic flow fields
- Aerodynamic noise (airframe generated)
- Aerodynamic studies of skin friction

Category 02 Aérodynamiques

- Aerodynamic wakes
- Aerodynamics of:
 - Airfoils
 - Bodies
 - Combinations
 - Control surfaces
 - Diffusers
 - Exits
 - Launch vehicles (for specific launch vehicles see Category 15)
 - Missiles (for specific missiles see Category 15)
 - Propellers
 - Protuberances (antennas, braces, external stores, fairings, landing gear, and struts)
 - Reentry vehicles (for specific reentry vehicles see Category 15)
 - Rockets (for specific rockets see Category 15)
 - Rotary wings
 - Rotors
 - Spacecraft (for specific spacecraft see Category 15)
 - Stabilization surfaces
 - Wings

Category 02

Aerodynamics

- Aerothermodynamics
- Air cushion vehicle aerodynamics
- Air flow separation
- Aircraft aerodynamics
- Airfoil aerodynamics
- Airship aerodynamics
- Autogyro aerodynamics
- Balloon aerodynamics
- Boundary layer aerodynamics
- Boundary layer flow (aerodynamics)
- Buffeting
- Compressible flow (aerodynamics)
- Coriolis forces (aerodynamics)
- Exit aerodynamics
- Glider aerodynamics
- Ground effect machine aerodynamics
- Helicopter aerodynamics
- High speed aerodynamics
- Hovercraft aerodynamics

Category 02 Aerodynamics

- Hypersonic aerodynamics
- Inlet aerodynamics
- Internal flow in ducts
- Internal flow in turbomachinery
- Laminar flow (aerodynamics)
- Land transportation vehicles (aerodynamics)
- Launch vehicle aerodynamics (for specific launch vehicles see Category 15)
- Lifting body aerodynamics
- Lighter-than-air craft (balloons, airships)
- Lighter-than-air craft aerodynamics
- Low speed aerodynamics
- Missile aerodynamics
- Nozzle aerodynamics
- Parachute aerodynamics
- Rocket aerodynamics (for specific rockets see Category 15)
- Rogallo wing aerodynamics
- Rotary wing aircraft aerodynamics
- Sailplane aerodynamics
- Sonic boom (aerodynamic generated)

Category 02

Aerodynamics

- Spacecraft aerodynamics (for specific spacecraft see Category 15)
- Stabilization surfaces (aerodynamics)
- STOL aerodynamics
- Supercritical airfoils
- Supercritical wings
- Supersonic aerodynamics
- Transitional flow (aerodynamics)
- Transonic aerodynamics
- Turbulent flow (aerodynamics)
- Unsteady flow (aerodynamics)
- VSTOL aerodynamics
- VTOL aerodynamics
- Wind tunnel tests (Full-scale or model tests of specific aircraft, vehicles, or objects are entered under Category 05, Aircraft Design, Testing, and Performance; Category 07, Aircraft Propulsion and Power; Category 08, Aircraft Stability and Control; Category 15, Launch Vehicles and Space Vehicles; and Category 18, Spacecraft Design, Testing, and Performance)

Category 03

Air Transportation and Safety

Includes passenger and cargo air transport operations; and aircraft accidents. For related information see also Category 16, Space Transportation; and Category 85, Urban Technology and Transportation.

General Definition

Air Transportation - The use of aircraft, predominantly airplanes, to move passengers and cargo. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 40. Safety - Methods and techniques of avoiding accident or disease. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 1288.

NASA Interest

Exhaustive Interest: All information dealing with flight safety, aircraft accidents, aircraft operating problems, air traffic control problems, public nuisance implications, and passenger handling (systems specific to ground operations of aircraft, aircraft maintenance and support, and airport construction are covered in Category 09, Research and Support Facilities (Air).)

Selective Interest: Only that land transportation information that deals with transportation and safety to, from, and on airports.

Input Subjects of Specific Interest

- Accidents and emergencies (aircraft)
- Air piracy (incident or safety aspects)
- Air safety
- Air transportation
- Aircraft accident investigations
- Aircraft accidents

Category 03

Air Transportation and Safety

- Aircraft ditching
- Aircraft emergencies
- Aircraft in-flight collision
- Aircraft licensing
- Aircraft near miss
- Aircraft operating problems
- Aircrew licensing
- Aircrew training
- Baggage handling (aircraft)
- Bird collision (air transportation and safety)
- Bird ingestion (air transportation and safety)
- Cargo air transport operations
- Cargo handling (aircraft)
- Cargo transportation (aircraft)
- Collision avoidance (aircraft safety)
- Ejection systems and seats (air transportation and safety)
- Escape systems (aircraft)
- Explosions (aircraft)
- Fire (aircraft)

Category 03
Air Transportation and Safety

- Flight safety (aircraft)
- Foreign object ingestion (air transportation and safety)
- In-flight collision or near miss
- Parachutes (personal and aircraft applications)
- Passenger air transport operations
- Passenger handling (air transportation)
- Passenger transportation (air)
- Public nuisance implications
- Rescue operations (air)
- Restraint harness (aircraft)
- Safety (aircraft)
- Safety systems (aircraft)
- Seat belts (aircraft)
- Shoulder harness (aircraft)
- Survival (aircraft operations)

Category 04

Aircraft Communications and Navigation

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control. For related information see also Category 17, *Spacecraft Communications, Command and Tracking*; and Category 32, *Communications*.

General Definition

Communications - A means of communicating; specifically a system for sending and receiving messages, as by telephone, telegraph, radio, etc. Webster's New World Dictionary of the American Language, 1960, p. 296.
Navigation - The act or practice of navigating. NASA Aeronautical Dictionary, Frank Davis Adams, ed., 1959, p. 116.

NASA Interest

Exhaustive Interest: Information on development and utilization of communication and navigation systems for airlines, general aviation, and military aviation. Includes all techniques and equipment specifically intended for the transmittal of data to or from aircraft. For detailed equipment and designs, see Category 33, *Electronics and Electrical Engineering*.

Selective Interest: Communication and navigation techniques and theory of potential interest to aeronautical research and development.

Negative Interest: Commercial telephone operations, unless related to aeronautical communications; courier and messenger services; and ship navigation, unless related to aeronautical navigation.

Input Subjects of Specific Interest

- Air navigation
- Air navigation systems (ground based and satellite based)
- Air traffic control
- Air traffic control systems (ground based and satellite based)

Category 04
Aircraft Communications and
Navigation

- Air-sea navigation systems (ground based and satellite based)
- Aircraft command and control
- Aircraft communications
- Aircraft navigation
- Aircraft tracking
- All weather global position determination
- Celestial navigation (aircraft)
- Collision avoidance (aircraft control)
- Communication networks (aircraft)
- Communication systems (aircraft)
- Consol/Consolan navigation system
- Decca navigation system
- Digital communication systems (aircraft)
- Doppler navigation systems
- Electromagnetic devices (radiators, sensors and other equipment) for navigation systems
- Ground control approach (GCA) systems
- Guidance system design (aircraft)
- Inertial navigation systems (aircraft)
- Inertial sensors and measurement units (aircraft)

Category 04

Aircraft Communications and Navigation

- Instrument landing systems (ILS)
- Instrument navigation systems
- Ionospheric effects on radio transmission (aircraft)
- Laser communication systems (aircraft)
- Laser tracking systems (aircraft)
- Long range navigation system (LORAN)
- Man-machine communications (aircraft)
- Microwave communication systems (aircraft)
- Microwave receivers (aircraft)
- Microwave transmitters (aircraft)
- Navigation computer systems (aircraft)
- Navigation display devices (applications)
- Navigation system design (aircraft)
- Navigation systems (aircraft)
- Omega navigation system
- Omnidirectional radio range system (OMNI)
- Passive sensors, trackers, and references (aircraft)
- Radar communication systems (aircraft)
- Radar detection (aircraft navigation)

Category 04
Aircraft Communications and
Navigation

- Radar imagery (aircraft navigation)
- Radar tracking systems (aircraft)
- Radio communication systems (aircraft)
- Range and angle measurement (aircraft)
- Sea navigation
- Speech analysis (aircraft voice communication)
- Speech compression (aircraft voice communication)
- Systems for adverse weather avoidance
- Systems for collision avoidance
- Systems for optimum routing of air traffic
- Tactical air navigation system (TACAN)
- Telemetry (aircraft applications)
- Terrain avoidance systems
- Tropospheric scatter (aircraft communication/navigation disruption)
- Very high frequency omnirange (VOR) navigation
- Voice communication systems (aircraft)
- Wave propagation (aircraft communication effects)

Category 05

Aircraft Design, Testing and Performance

Includes aircraft simulation technology. For related information see also Category 18, Spacecraft Design, Testing and Performance; and Category 39, Structural Mechanics.

General Definition

Design - A plan or sketch to work from; pattern. Webster's New World Dictionary of the American Language, 1960, p. 397. Aircraft Testing - The subjecting of an aircraft or its components to simulated or actual flight conditions while measuring and recording pertinent physical phenomena that indicate operating characteristics. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 36. Performance - The way in which something operates or performs, such as an engine, propeller, an aircraft, etc. NASA Aeronautical Dictionary, Frank Davis Adams, ed., 1959, p. 124.

NASA Interest

Exhaustive Interest: Research, development, testing, evaluation, or performance of any complete aircraft, system, or component; operating problems that affect or are affected by design, development, testing, evaluation, or performance.

Selective Interest: Land transportation vehicles that are tested aerodynamically or designed with aircraft technology or procedures.

Input Subjects of Specific Interest

- Aeroelasticity (aircraft flexibility)
- Aircraft:
 - Design
 - Development
 - Evaluation

Category 05
Aircraft Design, Testing and
Performance

- Aircraft:(Cont.)
 - Flight simulation
 - Flight tests
 - Hydraulic systems (design)
 - Performance
 - Pneumatic systems (design)
 - Research
 - Simulation
 - Simulation technology
 - Structures
 - Testing
- Aircraft component:
 - Design
 - Development
 - Evaluation
 - Performance
 - Research
 - Simulation
 - Testing

Category 05

Aircraft Design, Testing and Performance

- Aircraft descriptions (types/names/designations)
- Aircraft systems:
 - Design
 - Development
 - Evaluation
 - Performance
 - Research
 - Simulation
 - Testing
- Airframe structures
- Bird collision (aircraft design)
- Boattail configurations (aircraft)
- Body-tail combinations (aircraft design)
- Depressurization systems (aircraft)
- Docking (aircraft)
- Ejection systems and seats (design)
- Expandable structures (aircraft)
- Fins (aircraft)
- Gliders (sailplanes, hang gliders)

Category 05
Aircraft Design, Testing and
Performance

- Inflatable structures (aircraft)
- Landing gear (aircraft)
- Lifting bodies
- Lighter-than-air craft (balloons, airships)
- Models (aircraft)
- Pneumatic systems (aircraft)
- Pressurization systems (aircraft)
- Remotely piloted vehicles (RPV)
- Tail surfaces
- Unfoldable structures (aircraft)
- Wind tunnel tests (aircraft and components) - (wind tunnels are entered under Category 09, Research and Support Facilities (Air))
- Wing-body combinations (aircraft design)
- Wing-nacelle combinations (aircraft design)
- Wings

Category 06

Aircraft Instrumentation

Includes cockpit and cabin display devices; and flight instruments. For related information see also Category 19, Spacecraft Instrumentation; and Category 35, Instrumentation and Photography.

General Definition

Electronic, gyroscopic, and other instruments for detecting, measuring, recording, telemetering, processing, or analyzing different values or quantities in the flight of an aircraft. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 36.

NASA Interest

Exhaustive Interest: Design, arrangement, installation, and use of devices for detecting, measuring, recording, telemetering, processing, or analyzing values or quantities characterizing an environment, flight, flight vehicle, or other experimental phenomena encountered in aircraft flight.

Selective Interest: Instruments or displays and off-the-shelf equipment from other transportation media that could be transferred or modified for aircraft use.

Negative Interest: Commercial off-the-shelf instruments for general use.

Input Subjects of Specific Interest

- Airborne radar displays
- Aircraft instrumentation
- Aircraft systems monitoring instruments
- Airspeed indicators
- Alarm systems (aircraft)
- Altimeters (aircraft)

Category 06
Aircraft Instrumentation

- Analyzing devices (aircraft)
- Anticollision devices
- Attitude indicators (aircraft)
- Bioelectronic instruments (aircraft)
- Biomedical instruments (aircraft)
- Blind flying instruments
- Cabin display devices (aircraft)
- Cathode ray tubes (aircraft systems)
- Cockpit display devices
- Compasses
- Control position indicators (aircraft)
- Detecting devices (aircraft)
- Display devices (aircraft)
- Engine fuel quantity gages
- Engine oil pressure gages
- Engine oil temperature gages
- Engine propulsion system instruments and gages
- Engine RPM indicators
- Flight instruments (aircraft)

Category 06

Aircraft Instrumentation

- Flight recorders (aircraft)
- Fluid flow sensors (aircraft)
- Gyroscopes (aircraft)
- Heads-up displays (aircraft)
- Infrared sensors (aircraft)
- Instrument arrangement (aircraft)
- Instrument design (aircraft)
- Instrument displays (aircraft)
- Instrument installation (aircraft)
- Instrument landing systems (ILS) displays
- Landing gear position indicators
- Landing instruments (aircraft)
- Laser altimeters (aircraft)
- Mach meters
- Navigation display devices
- Position indicators (aircraft)
- Propulsion system instruments and gages (aircraft)
- Rate of climb indicators
- Recording devices (aircraft)

Category 06

Aircraft Instrumentation

- Sensors for aircraft equipment and operation
- Skin temperature indicators (aircraft)
- Telemetry devices (aircraft)
- Terrain clearance indicators
- Turn and bank indicators
- Warning lights (aircraft)

Category 07

Aircraft Propulsion and Power

Includes prime propulsion systems and systems components; e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft. For related information see also Category 20, Spacecraft Propulsion and Power; Category 28, Propellants and Fuels; and Category 44, Energy Production and Conversion.

General Definition

Aircraft Propulsion - The means, other than gliding; whereby an aircraft moves through the air; effected by the rearward acceleration of matter through the use of a jet engine or by the reactive thrust of air on a propeller. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 36. Power - Force or energy applied or applicable to work. Webster's New Collegiate Dictionary, 1961, p. 662.

NASA Interest

Exhaustive Interest: All air-breathing engines and chemical, electric, hybrid, magnetohydrodynamic, or other types of energy conversion devices suitable for propulsion of aircraft or to provide a source of energy or power for the aircraft or its systems.

Selective Interest: Engines, rockets, and power conversion devices from other applications if readily convertible to aircraft use.

Negative Interest: Conventional, stationary power sources, and propulsion units for land and sea vehicles not modified for aircraft use.

Input Subjects of Specific Interest

- Aerodynamic noise (propulsion systems)
- Afterburner controls
- Airbreathing engines (aircraft)

- Aircraft engine:
 - Afterburners
 - Carburetors
 - Combustors
 - Components
 - Compressors
 - Cooling systems
 - Design
 - Development
 - Diffusers
 - Evaluation
 - Exhaust systems
 - Injection systems
 - Inlets
 - Maintenance
 - Noise
 - Performance
 - Research
 - Simulation

Category 07

Aircraft Propulsion and Power

- Aircraft engine:(Cont.)
 - Superchargers
 - Testing
 - Thrust reversers
 - Turbines
- Aircraft fuel systems
- Aircraft hydraulic systems (power)
- Aircraft pneumatic systems (power)
- Aircraft power
- Aircraft power systems
- Aircraft propellers
- Aircraft propulsion
- Aircraft propulsion system components
- Aircraft propulsion systems
- Auxiliary power systems (aircraft)
- Auxiliary power units (APU) (aircraft)
- Bird ingestion (aircraft engines)
- Bypass jet engines
- Chemical propulsion engines (aircraft)

Category 07

Aircraft Propulsion and Power

- Combustors (aircraft engines)
- Compression ignition engines (aircraft)
- Diesel engines (aircraft)
- Ejectors (aircraft)
- Electric power systems (aircraft)
- Electric power units (aircraft)
- Electric propulsion systems (aircraft)
- Engine control systems
- Engine ingestion
- Engine noise
- Engine noise suppressors
- Exit controls
- Fan jet engines
- Foreign object ingestion (aircraft engines)
- Fuel distribution pumps (aircraft)
- Fuel distribution systems (aircraft)
- Fuel injection systems (aircraft)
- Fuel system components (aircraft)
- Fuel systems (aircraft)
- Fuel tanks (aircraft)

Category 07

Aircraft Propulsion and Power

- Gas turbine engines
- Gasoline engines (aircraft)
- Inlet controls
- Inlets (aircraft)
- Internal combustion engines (aircraft)
- Jet engines
- Nozzles (aircraft)
- Nuclear engines (aircraft)
- Nuclear propulsion systems (aircraft)
- Piston engines (aircraft)
- Pneumatic systems (aircraft propulsion and power)
- Propellers
- Propulsion system components (aircraft)
- Propulsion systems (aircraft)
- Pulsejet engines
- Quiet engines
- Ramjet engines
- Reciprocating engines (aircraft)
- Rocket engines (aircraft)

Category 07
Aircraft Propulsion and Power

- Rotary engines (aircraft)
- Spark ignition engines (aircraft)
- Steam engines (aircraft)
- Sterling Cycle engines (aircraft)
- Throttle controls (aircraft)
- Thrust reverser controls
- Turbofan engines
- Turboprop engines
- Turborocket engines (aircraft)
- Wind tunnel tests (propulsion systems)

Category 08

Aircraft Stability and Control

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

General Definition

Stability - The property of a body, as an aircraft or rocket, to maintain its attitude or to resist displacement, to develop forces and moments tending to restore the original condition. NASA Aeronautical Dictionary, Frank Davis Adams, ed., 1959, p. 159. **Control** - To direct the movements of an aircraft or rocket with particular reference to changes in attitude and speed. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 65, NASA SP-7.

NASA Interest

Exhaustive Interest: Research, development, testing, evaluation, or performance of any complete aircraft or its components; the interaction between the components and the control of the aircraft in flight.

Selective Interest: Piloting as it affects the stability, control, and maneuverability of an aircraft. (Piloting as it affects navigation should be assigned to Category 04, Aircraft Communications and Navigation.)

Input Subjects of Specific Interest

- Aircraft control
- Aircraft stability
- Attitude control (aircraft)
- Autopilots (aircraft control)
- Body-tail combinations (stability and control)
- Control effectiveness (aircraft)
- Control surface interactions (aircraft)

Category 08
Aircraft Stability and Control

- Dutch roll
- Dynamic stability (aircraft)
- Flight control (aircraft)
- Flight dynamics (aircraft)
- Flight path control (aircraft)
- Flutter (aircraft)
- Flying qualities (aircraft)
- Handling qualities (aircraft)
- Lateral control (aircraft)
- Lateral stability (aircraft)
- Longitudinal control (aircraft)
- Longitudinal stability (aircraft)
- Maneuvering (aircraft)
- Operational effects of atmospheric variables (weather, buffeting, turbulence, wind shear)
- Piloting (aircraft)
- Pitch control (aircraft)
- Pitch stability (aircraft)
- Roll control (aircraft)
- Roll stability (aircraft)

Category 08

Aircraft Stability and Control

- Spin recovery
- Stability (aircraft)
- Stability augmentation (aircraft)
- Stability derivatives (aircraft)
- Stabilization surface interactions (aircraft)
- Static stability (aircraft)
- Vibration (aircraft)
- Wind tunnel tests (stability and control)
- Wing-body combinations (stability and control)
- Wing-nacelle combinations (stability and control)
- Yaw control (aircraft)
- Yaw stability (aircraft)

Category 09

Research and Support Facilities (Air)

Includes airports, hangars and runways, aircraft repair and overhaul facilities; wind tunnels; shock tubes; and aircraft engine test stands. For related information see also Category 14, Ground Support Systems and Facilities (Space).

General Definition

1. A physical plant such as real estate and improvements thereto, including buildings and equipment, which provides the means of assisting or making easier the performance of a function. 2. Any part or adjunct of a physical plant, or any item of equipment which is an operating entity and which contributes or can contribute to the execution of a function by providing some specific kind of operating action or operation. Air Force Glossary of Standardized Terms and Definitions. Air Force Manual AFM 11-1, Dec. 16, 1963. Department of the Air Force.

NASA Interest

Exhaustive Interest: All aspects of airports and airways except routine commercial operations; tracking and communications stations and networks utilized for aeronautical purposes (those for astronomical purposes should be assigned to Category 17, Spacecraft Communications, Command and Tracking); test facilities of direct interest to aeronautical activities, including wind tunnels, shock tubes and test stands.

Selective Interest: Research, development, and test laboratories having potential interest to aeronautics activities; specialized equipment to generate unusual or extreme conditions of temperature, pressure, stress and strain, etc.

Negative Interest: Administrative and housekeeping functions at supporting facilities, commonly available off-the-shelf instrumentation and equipment systems, and commercial equipment not developed specifically for aeronautical use.

Input Subjects of Specific Interest

- Aircraft ground handling equipment

Category 09

Research and Support Facilities (Air)

- Aircraft servicing equipment
- Airport lighting
- Airport planning
- Airports and airways
- Altitude test facilities
- Checkout facilities (air)
- Checkout systems (air)
- Clean rooms (aircraft manufacturing and test facilities)
- Control towers
- Crash test facilities
- Development facilities (air)
- Engine test blocks (air)
- Engine test stands (air)
- Flight simulators (aircrew training and aircraft development)
- Ground support equipment (air)
- Ground support facilities (air)
- Ground support systems (air)
- Ground support vehicles (air)
- Hangar facilities

Category 09

Research and Support Facilities (Air)

- High temperature test facilities (air)
- Low temperature test facilities (air)
- Maintenance facilities (air)
- Overhaul facilities (aircraft)
- Pressure test facilities (air)
- Repair facilities (aircraft)
- Research facilities (air)
- Runway approach lighting and markers
- Runway construction
- Runway lighting
- Runway surfaces and grooving
- Runways
- Shock tubes and tunnels
- Simulators (air)
- Structures test facilities (air)
- Support facilities (air)
- Temperature test facilities (air)
- Test facilities (air)
- Test facility utilization and results (air)

Category 09

Research and Support Facilities (Air)

- Tracking and communication stations and networks (aircraft)
- Wind tunnels

ASTRONAUTICS

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

General Definition

1. The art, skill, or activity of operating spacecraft. 2. In a broader sense the science of space flight. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 21, NASA SP-7.

Category 12

Astronautics (General)

For extraterrestrial exploration see Category 91, Lunar and Planetary Exploration.

Input Subjects of Specific Interest

- Astronautics
- Launch vehicle maintenance
- Launch vehicle manufacturing
- Launch vehicle production
- Mission planning (space)
- Space colonies
- Space colonization
- Space exploration (mission planning)

Category 12
Astronautics (General)

- Space manufacturing and assembly
- Space *processing of materials*
- Space programs
- Space vehicle maintenance
- Space vehicle manufacturing
- Space vehicle production
- Spacecraft maintenance
- Spacecraft manufacturing
- Spacecraft production

Category 13

Astrodynamics

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

General Definition

The practical application of celestial mechanics, astrobballistics, propulsion theory, and allied fields to the problem of planning and directing the trajectories of space vehicles. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 19, NASA SP-7.

NASA Interest

Exhaustive Interest: Theoretical analysis and actual orbit and trajectories of launch vehicles, spacecraft, and celestial bodies.

Input Subjects of Specific Interest

- Astrobballistics
- Astrodynamics
- Atmospheric entry effects
- Celestial mechanics (orbital characteristics of launch vehicles and spacecraft)
- Gravitational effects (orbital effects on launch vehicles and spacecraft)
- Launching dynamics
- Orbit dynamics of spacecraft
- Propulsion effects on launching, trajectories, and orbits
- Reentry dynamics
- Spacecraft orbits

Category 13

Astrodynamics

- Trajectories:
 - Ballistic
 - Free-flight
 - Launch vehicle
 - Powered
 - Reentry
 - Spacecraft
- Trajectory analysis
- Two and three-body problems (trajectory analysis)

Category 14

Ground Support Systems and Facilities (Space)

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

General Definition

That ground-based equipment; land; and buildings, including all implements, tools, and devices (mobile or fixed), required to inspect, test, adjust, calibrate, appraise, gage, measure, repair, overhaul, assemble, disassemble, transport, safeguard, record, store, or otherwise function in support of a rocket, space vehicle, or the like, either in the research and development, or in an operational phase, or in support of the guidance system used with the missile, vehicle, or the like. Modified from the term Ground-Support Equipment, Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 128, NASA SP-7.

NASA Interest

Exhaustive Interest: All information dealing with spaceports; launch towers; spacecraft and launch vehicle simulators; test facilities for spacecraft, launch vehicles and propulsion systems, transporters; shuttlecraft landing facilities; ground-support equipment.

Selective Interest: Hangars, maintenance facilities, airports, airways, and aerial navigation and tracking facilities when used in support of astronomical activities.

Negative Interest: Military launch vehicles, military mobile transporters, and missile storage silos unless directly applicable to or used in support of astronomical activities.

Input Subjects of Specific Interest

- Accelerators
- Assembly buildings
- Astronaut training facilities

Category 14

Ground Support Systems and Facilities (Space)

- Automatic picture transmission (APT) ground stations
- Block houses
- Checkout facilities (space)
- Checkout systems (space)
- Clean rooms (space)
- Deep space instrumentation facilities
- Development facilities (space)
- Engine test blocks (space)
- Engine test stands (space)
- Extraterrestrial bases
- Flight simulators (space)
- Gravity simulators
- Ground support equipment (space)
- Ground support facilities (space)
- Ground support systems (space)
- Ground support vehicles (space)
- High temperature test facilities (space)
- Laser range finder facilities
- Laser space communication facilities

Category 14
Ground Support Systems and
Facilities (Space)

- Launch complexes
- Launch facilities
- Launch pads and bases
- Launch towers
- Launch vehicle simulators
- Low temperature test facilities (space)
- Lunar and planetary bases
- Lunar gravity simulators
- Lunar roving vehicles
- Maintenance facilities (space)
- Mobile lunar laboratories
- Mobile planetary laboratories
- Mobile transporters
- Optical telescope facilities
- Optical tracking stations
- Overhaul facilities (space)
- Planetary roving vehicles
- Pressure test facilities (space)
- Radar telescope and range finder facilities

Category 14

Ground Support Systems and Facilities (Space)

- Radio telescope facilities
- Recovery equipment and vehicles
- Remote launch monitoring facilities
- Repair facilities (space)
- Research facilities (space)
- Rocket engine test pads
- Rocket test facilities
- Rover vehicles
- Shuttlecraft landing facilities
- Simulators (space)
- Solar heating simulators
- Solar simulators
- Space facility for cryogenic materials
- Space research facilities
- Space simulators
- Space vacuum simulators
- Spacecraft simulators
- Spaceport planning
- Spaceports

Category 14
Ground Support Systems and
Facilities (Space)

- Special vehicles (land, sea, air) (used as bases and for transportation or rescue of astronautics or astronautic-oriented equipment)
- Storage facilities for propellants and cryogenics
- Structures test facilities (space)
- Support facilities (space)
- Surface exploration vehicles
- Temperature test facilities (space)
- Test facilities (space)
- Test facility utilization and results (space)
- Test range facilities
- Test ranges
- Transporters
- Umbilical towers
- Vacuum test facilities

Category 15

Launch Vehicles and Space Vehicles

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

General Definition

Launch Vehicle - A rocket or other vehicle used to launch a probe, satellite, or the like. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 158, NASA SP-7. Space Vehicle - A structure, machine, or device designed to carry a burden through space. Adapted from Dictionary of Technical Terms for Aerospace Use. Wm. H. Allen, ed., 1965, p. 299, NASA SP-7.

NASA Interest

Exhaustive Interest: Design, research, development, testing, evaluation, and performance of any launch vehicle, space vehicle, combination of launch vehicle and space vehicle, propulsion system, auxiliary system, or component, and all operating procedures and problems related to the peaceful uses of space vehicles.

Negative Interest: Design and performance of military weapons and warheads, military characteristics of weapons and their effects, performance and effectiveness of anti-aircraft missiles, anti-missile missiles, and pyrotechnic rockets used for displays and festivals.

Input Subjects of Specific Interest

- Active communication satellites
- Active satellite stabilization
- Artificial satellites
- Astronomical observatory satellites
- Boattail configurations (space vehicles)
- Boosters (launch vehicles)

Category 15
Launch Vehicles and Space Vehicles

- Combinations of launch vehicles and spacecraft
- Communication satellites
- Countdown
- Cruise missiles
- Design of space vehicles, propulsion units, tanks, components, systems
- Earth Resources Technology Satellites (ERTS) (applications)
- Effects of space radiation on space vehicles and components
- Geophysical satellites
- Land-use satellites
- Landing of spacecraft
- LANDSAT (applications)
- Launch operations
- Launch vehicle:
 - Design
 - Development
 - Evaluation
 - Flight operations
 - Performance
 - Research

Category 15

Launch Vehicles and Space Vehicles

- Launch vehicle:(Cont.)
 - Structures
 - Testing
- Launch vehicles
- Lunar landers (unmanned)
- Lunar orbiters
- Manned orbital laboratories
- Meteorological satellites
- Missiles
- Multi-stage launch vehicles
- Navigation satellites
- Nose cones
- Observation satellites
- Passive communication satellites
- Passive satellite stabilization
- Payload and equipment carried on specific space vehicles
- Pioneer space probe
- Planetary landers (unmanned)
- Planetary orbiters

Category 15
Launch Vehicles and Space Vehicles

- Recovery of spacecraft
- Reentry vehicles
- Reusable vehicles
- Rockets
- Satellite launching dynamics
- Satellite stabilization
- Satellites for air, land, or sea navigation
- Satellites for air, land, or sea traffic control
- Scientific satellites
- SEASAT (applications)
- Separation and staging techniques (for stages of space vehicles)
- Single-stage launch vehicles
- Skylab
- Sounding rockets
- Space laboratories
- Space platforms
- Space probes
- Space stations

Category 15

Launch Vehicles and Space Vehicles

- Space vehicle:
 - Configurations
 - Control
 - Design
 - Development
 - Dynamics
 - Evaluation
 - Flight operations
 - Handling and preparation for launch
 - Operations
 - Performance
 - Research
 - Stability
 - Testing
- Space vehicle auxiliary system:
 - Design
 - Development
 - Evaluation
 - Performance

Category 15
Launch Vehicles and Space Vehicles

- Space vehicle auxiliary system:(Cont.)
 - Research
 - Testing
- Space vehicle propulsion system:
 - Design
 - Development
 - Evaluation
 - Performance
 - Research
 - Testing
- Space vehicles
- Spacecraft launch dynamics
- Synchronous satellites
- Tracking and data relay satellites
- Viking space probe
- Weather satellites
- Wind tunnel tests (launch vehicles and space vehicles)

Category 16

Space Transportation

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques. For related information see also Category 03, Air Transportation and Safety; and Category 85, Urban Technology and Transportation.

General Definition

Act of transporting, or being transported, to; through; or from outer space. Adapted from Webster's New Collegiate Dictionary, 1961, p. 904.

NASA Interest

Exhaustive Interest: All information dealing with passenger and cargo handling, flight safety, and rescue operations and techniques (systems specific to ground operations, maintenance and support, and launch complex construction are covered in Category 14, Ground Support Systems and Facilities).

Selective Interest: Only that land transportation information that deals with transportation and safety to, from, and on launch complexes.

Input Subjects of Specific Interest

- Accidents and emergencies (spacecraft)
- Baggage handling (spacecraft)
- Cargo handling (spacecraft)
- Cargo transportation (spacecraft)
- Escape systems (spacecraft)
- Explosions (spacecraft)
- Extravehicular activity (EVA) (operations)
- Fire (spacecraft)

Category 16

Space Transportation

- Flight safety (spacecraft)
- In-orbit maintenance
- Parachutes (spacecraft applications)
- Passenger handling (space transportation)
- Passenger transportation (space)
- Rescue operations (space)
- Restraint harness (spacecraft)
- Safety (spacecraft)
- Safety systems (spacecraft)
- Shoulder harness (spacecraft)
- Shuttle operations
- Space operation emergencies
- Space shuttles
- Space transportation
- Space tugs
- Spacecraft ditching
- Spacelab
- Survival (space operations)

Category 17

Spacecraft Communications, Command and Tracking

Includes telemetry; space communications networks; astronavigation; and radio blackout. For related information see also Category 04, Aircraft Communications and Navigation; and Category 32, Communications.

General Definition

Communications - The science and technology by which information is collected from an originating source, transferred into electric currents or fields, transmitted over electrical networks or space to another point, and reconverted into a form suitable for interpretation by a receiver. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 300. **Command** - A signal which initiates or triggers an action in the device which receives the signal. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 59, NASA SP-7. **Spacecraft Tracking** - The determination of the positions and velocities of spacecraft through radio and optical means. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 1386.

NASA Interest

Exhaustive Interest: All techniques, research, development, and application of methods, systems, and equipment intended for the transmittal of data to or from launch vehicles, space vehicles, communications and scientific satellites, and lunar and planetary bases; ground based and space based tracking and data acquisition stations and systems; and launch vehicle and space vehicle navigation.

Selective Interest: Communication and navigation techniques and theory of potential interest to space flight.

Negative Interest: Telephone, teletype, radio, radar, and microwave equipment and technology not having aerospace communication, command, or tracking applications.

Input Subjects of Specific Interest

- Astronavigation

Category 17

Spacecraft Communications, Command and Tracking

- Automatic picture transmission (APT)
- Celestial navigation (spacecraft)
- Collision avoidance (spacecraft)
- Command and control of spacecraft
- Communication blackouts (reentry)
- Communication networks (space)
- Communication systems (space)
- Deep space network
- Digital communication systems (spacecraft)
- Ground-based data acquisition stations
- Ground-based data acquisition systems
- Ground-based tracking stations
- Ground-based tracking systems
- Guidance system design (spacecraft)
- Inertial navigation systems (spacecraft)
- Inertial sensors and measurement units (spacecraft)
- Laser communication systems (spacecraft)
- Laser tracking systems (spacecraft)
- Launch vehicle navigation

Category 17

Spacecraft Communications, Command and Tracking

- Man-machine communications (spacecraft)
- Manned space flight network
- Microwave communication systems (spacecraft)
- Microwave receivers (spacecraft)
- Microwave transmitters (spacecraft)
- Navigation computer systems (spacecraft)
- Navigation display devices (spacecraft)
- Navigation system design (spacecraft)
- Navigation systems (spacecraft)
- Radar communication systems (spacecraft)
- Radar detection (spacecraft navigation)
- Radar imagery (spacecraft navigation)
- Radar tracking systems (spacecraft)
- Radio communication systems (spacecraft)
- Range and angle measurement (spacecraft)
- Rendezvous guidance
- Space communication networks
- Space flight communication techniques and theory
- Space flight navigation techniques and theory

Category 17

Spacecraft Communications, Command and Tracking

- Space navigation
- Space tracking and data acquisition network (STADAN)
- Space-based data acquisition stations
- Space-based data acquisition systems
- Spacecraft command
- Spacecraft communications
- Spacecraft control (communications)
- Spacecraft navigation
- Spacecraft tracking
- Speech analysis (spacecraft voice communication)
- Speech compression (spacecraft voice communication)
- Telemetry (spacecraft applications)
- Tracking and communication stations and networks
- Tracking networks
- Tracking stations
- Voice communication systems (spacecraft)
- Wave propagation (spacecraft communication effect)

Category 18

Spacecraft Design, Testing and Performance

Includes spacecraft thermal and environmental control; and attitude control. For life support systems see Category 54, Man/System Technology and Life Support. For related information see also Category 05, Aircraft Design, Testing, and Performance; and Category 39, Structural Mechanics.

General Definition

Spacecraft - Devices, manned and unmanned, which are designed to be placed into an orbit about the earth or into a trajectory to another celestial body. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 258, NASA SP-7. Design - The act of conceiving and planning the structure and parameter values of a system, device, process, or work of art. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 394. Spacecraft Testing - The subjecting of a spacecraft or its components to simulated or actual flight conditions while measuring and recording pertinent physical phenomena that indicates operating characteristics. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 36, modified. Performance - The way in which something operates or performs, such as a rocket engine, a control jet, a spacecraft, etc. NASA Aeronautical Dictionary, Frank Davis Adams, ed., 1959, p. 124, modified.

NASA Interest

Exhaustive Interest: Research, development, testing, evaluation, or performance of any complete spacecraft, system, or component; operating problems that affect or are affected by design, development, testing, evaluation, or performance.

Input Subjects of Specific Interest

- Apollo spacecraft
- Attitude control (spacecraft)
- Autopilots (spacecraft)
- Control effectiveness (spacecraft)

Category 18
Spacecraft Design, Testing and
Performance

- Depressurization systems (spacecraft)
- Docking (spacecraft)
- Dynamic stability (spacecraft)
- Expandable structures (spacecraft)
- Fins (spacecraft)
- Flight control (spacecraft)
- Flight dynamics (spacecraft)
- Flight path control (spacecraft)
- Flutter (spacecraft)
- Flying qualities (spacecraft)
- Gemini spacecraft
- Handling qualities (spacecraft)
- Inflatable structures (spacecraft)
- Landing gear (spacecraft)
- Lateral control (spacecraft)
- Lateral stability (spacecraft)
- Longitudinal control (spacecraft)
- Longitudinal stability (spacecraft)
- Lunar landers (manned)

Category 18

Spacecraft Design, Testing and Performance

- Maneuvering (spacecraft)
- Manned spacecraft
- Mercury spacecraft
- Meteorite protection
- Missile design
- Models (spacecraft)
- Piloting (spacecraft)
- Pitch control (spacecraft)
- Pitch stability (spacecraft)
- Planetary landers (manned)
- Pneumatic systems (spacecraft)
- Pressurization systems (manned)
- Radiation effects on spacecraft and components
- Roll control (spacecraft)
- Roll stability (spacecraft)
- Separation and staging techniques (spacecraft)
- Spacecraft:

Cabins

Descriptions (types/names/designations)

Category 18
Spacecraft Design, Testing and
Performance

- Spacecraft:(Cont.)

Design

Development

Docking

Environmental control

Evaluation

Flight simulation

Flight tests

Hydraulic systems (design)

Performance

Pneumatic systems (design)

Research

Safety features

Separation and staging techniques

Simulation

Simulation technology

Structures

Testing

Thermal control

Category 18

Spacecraft Design, Testing and Performance

- Spacecraft component:

- Design

- Development

- Evaluation

- Performance

- Research

- Simulation

- Testing

- Thermal control

- Spacecraft systems:

- Design

- Development

- Evaluation

- Performance

- Research

- Safety features

- Simulation

- Testing

- Stability (spacecraft)

Category 18
Spacecraft Design, Testing and
Performance

- Stability augmentation (spacecraft)
- Stability derivatives (spacecraft)
- Stabilization surface interactions (spacecraft)
- Stabilization surfaces (spacecraft)
- Static stability (spacecraft)
- Thermal protection sensors (design)
- Unfoldable structures (spacecraft)
- Vibration (spacecraft) (see Category 39, Structural Mechanics, for effects on structural elements and fatigue)
- Wind tunnel tests (spacecraft)
- Yaw control (spacecraft)
- Yaw stability (spacecraft)

Category 19

Spacecraft Instrumentation

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

General Definition

Instrumentation - Designing, manufacturing, and utilizing physical instruments or instrument systems for detection, observation, measurement, automatic control, automatic computation, communication, or data processing. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 758.

NASA Interest

Exhaustive Interest: Design, arrangement, installation, and use of devices for detecting, measuring, recording, telemetering, processing, or analyzing values or quantities characterizing an environment, spaceflight, launch vehicle, spacecraft, or other experimental phenomena encountered in launch vehicle and spacecraft flight.

Selective Interest: Instruments or displays and off-the-shelf equipment from other transportation media that could be transferred or modified for spacecraft or launch vehicle use.

Negative Interest: Commercial off-the-shelf instruments for general use.

Input Subjects of Specific Interest

- Ablation sensors (spacecraft)
- Alarm systems (spacecraft)
- Altimeters (spacecraft)
- Analyzing devices (spacecraft)
- Astrophysical instruments
- Attitude indicators (spacecraft)

Category 19
Spacecraft Instrumentation

- Bioelectronic instruments (spacecraft)
- Biomedical instruments (spacecraft)
- Cabin display devices (spacecraft)
- Cathode ray tubes (spacecraft display systems)
- Control position indicators (spacecraft)
- Detecting devices (spacecraft)
- Display devices (spacecraft)
- Flight instruments (spacecraft)
- Flight recorders (spacecraft)
- Fluid flow sensors (spacecraft)
- Gyroscopes (spacecraft)
- Heads-up displays (spacecraft)
- Horizon sensors
- Infrared sensors (spacecraft)
- Instrument arrangement (spacecraft)
- Instrument design (spacecraft)
- Instrument displays (spacecraft)
- Instrument installation (spacecraft)
- Landing gear position indicators (spacecraft)
- Landing instruments (spacecraft)

Category 19

Spacecraft Instrumentation

- Laser altimeters (spacecraft)
- Measuring sensors for magnetic fields
- Micrometeoroid sensors
- Navigation display devices (design and development)
- Onboard computer systems for spacecraft
- Onboard instrument systems for spacecraft
- Onboard sensors and recorders for spacecraft
- Passive sensors, trackers, and references (spacecraft)
- Planetary atmosphere sensors
- Position indicators (spacecraft)
- Propulsion system instruments and gages (spacecraft)
- Radiation and radiation belt sensors
- Recording devices (spacecraft)
- Sensors for space, stellar, solar, planetary, lunar, and earth related phenomena
- Sensors for spacecraft equipment
- Skin temperature indicators (spacecraft)
- Solar radiation sensors
- Solar wind sensors
- Space cabin atmosphere sensors

Category 19
Spacecraft Instrumentation

- **Spacecraft instruments**
- **Spacecraft systems monitoring instruments**
- **Star trackers (navigation)**
- **Telemetry devices (spacecraft)**
- **Thermal protection sensors (instrumentation)**
- **Two-gas sensors (spacecraft)**
- **Upper atmosphere sensors**
- **Warning lights (spacecraft)**

Category 20

Spacecraft Propulsion and Power

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources. For related information see also Category 07, Aircraft Propulsion and Power; Category 28, Propellants and Fuels; and Category 44, Energy Production and Conversion.

General Definitions

Spacecraft Propulsion - The use of rocket engines to accelerate space vehicles. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 1386. Power - Force or energy applied or applicable to work; specifically mechanical or electrical force or energy. Webster's New Collegiate Dictionary, 1961, p. 622.

NASA Interest

Exhaustive Interest: All chemical, electric, magnetohydrodynamic, hybrid, or other types of energy conversion suitable for propulsion or stationkeeping of spacecraft, satellites, space probes, planetary probes, space stations, and lunar probes; and for use as auxiliary power sources for spacecraft; including liquid rocket engines, solid rocket engines, nuclear rocket engines, ion rocket engines, electric rocket engines, etc.; including their components.

Negative Interest: Propulsion and mobile or stationary power sources for earthbound use or transportation, e.g., ship, locomotive, automobile, aircraft, and truck propulsion; or mobile or stationary electric power plants, unless directly applicable to spacecraft use.

Input Subjects of Specific Interest

- Attitude thrusters
- Auxiliary power systems (spacecraft)
- Auxiliary power units (spacecraft)
- Boosters (spacecraft)
- Chemical power sources

Spacecraft Propulsion and Power

- Chemical propulsion engines (spacecraft)
- Clustered rockets
- Combustors (spacecraft)
- Ejectors (spacecraft)
- Electric power systems (spacecraft)
- Electric power units (spacecraft)
- Electric propulsion systems (spacecraft)
- Electric rocket engines
- Electrostatic rocket engines
- Electrothermal rocket engines
- Fuel distribution pumps (spacecraft)
- Fuel distribution systems (spacecraft)
- Fuel injection systems (spacecraft)
- Fuel system components (spacecraft)
- Fuel systems (spacecraft)
- Fuel tanks (spacecraft)
- Hybrid propellant rocket engines
- Igniters (rocket engines)
- Inlets (spacecraft)

Category 20

Spacecraft Propulsion and Power

- Ion rocket engines
- Liquid propellant rocket engines
- Low thrust engines
- Magnetohydrodynamic (MHD) power sources
- Magnetohydrodynamic (MHD) thrusters
- Main propulsion system components
- Main propulsion systems
- Multi-stage rockets
- Nozzles (spacecraft)
- Nuclear engines (spacecraft)
- Nuclear power sources (spacecraft)
- Nuclear propulsion systems (spacecraft)
- Nuclear rocket engines
- Onboard solar arrays
- Onboard solar generators
- Pneumatic systems (spacecraft propulsion and power)
- Propellant flow systems
- Propellant injectors, pumps, and tanks
- Propulsion system components

Spacecraft Propulsion and Power

- Propulsion systems (spacecraft)
- Retrorockets
- Rocket engine exhaust plumes
- Rocket engine noise
- Rocket engines (spacecraft)
- Rocket throttling systems
- Solid propellant rocket engines
- Space vehicle booster engines
- Spacecraft auxiliary power sources
- Spacecraft hydraulic systems (power)
- Spacecraft pneumatic systems (power)
- Spacecraft power
- Spacecraft power systems
- Spacecraft propulsion
- Systems for energy conversion (spacecraft)
- Thrust vector control devices
- Turbines for propellants
- Turborocket engines (spacecraft)

Category 20

Spacecraft Propulsion and Power

- Vector control engines
- Vernier engines

CHEMISTRY AND MATERIALS

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

General Definition

Chemistry - The scientific study of the properties, composition, and structure of matter, the changes in structure and composition of matter, and accompanying energy changes. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 257. **Materials** - In general, the substances of which aircraft, launch vehicles, and space vehicles are composed; specifically, the metals, alloys, ceramics, and plastics used in structural, protective, and electronic functions. Adapted from the Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 172, NASA SP-7.

Category 23

Chemistry and Materials (General)

Includes biochemistry and organic chemistry.

Input Subjects of Specific Interest

- Biochemistry
- Chemical manufacturing
- Chemistry
- Materials
- Organic chemistry
- Organometallic compounds

Category 24

Composite Materials

Includes laminates.

General Definition

Structural materials of metals, ceramics, or plastics with built-in strengthening agents which may be in the form of filaments, foils, powders, or flakes of a different compatible material. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 60, NASA SP-7.

NASA Interest

Exhaustive Interest: Physical and mechanical properties, production, handling, testing, and evaluation of composite materials for use in aircraft, rockets, launch vehicles, space vehicles, reentry vehicles, aircraft and spacecraft propulsion systems, and supporting facilities (e.g., cryogenic storage facilities).

Selective Interest: Research and development on composite materials having potential aerospace applications such as light weight, radiation resistance, heat or cold useages, or other unusual attribute.

Negative Interest: Routine developments of structural composite materials for use in housing, heavy industry, and earthbound transportation, unless a potential exists for aerospace use.

Input Subjects of Specific Interest

- Ablation composite materials
- Boron filament materials
- Carbon filament materials
- Composite materials:
 - Development
 - Evaluation

Category 24

Composite Materials

- Composite materials:(Cont.)
 - Handling
 - Mechanical properties
 - Physical properties
 - Production
 - Research
 - Testing
- Composition materials
- Fatigue (composite materials)
- Filament materials
- Filament wound structures (composite materials)
- Filament-matrix materials
- Glass fiber-plastic materials
- Honeycomb materials
- Insulation
- Laminates
- Metal filament systems
- Offgasing (composite materials)
- Packing (composite materials)

Category 24
Composite Materials

- Reinforcing fibers
- Reinforcing filaments (composite materials)
- Seals (composite materials)
- Shear strength (composite materials)
- Surface properties (composite materials)
- Tensile strength (composite materials)
- Testing of materials (composite materials)
- Whiskers (composite materials)

Category 25

Inorganic and Physical Chemistry

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry. For related information see also Category 77, Thermodynamics and Statistical Physics.

General Definition

Inorganic Chemistry - The study of chemical reactions and properties of all the elements and their compounds, with the exception of hydrocarbons, and usually including carbides, oxides of carbon, metallic carbonates, carbon-sulphur compounds, and carbon-nitrogen compounds. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 755. Physical (Organic) Chemistry - The chemistry of the hydrocarbons and their derivatives (or, which is almost the same, of carbon compounds) whether found in organisms or not. Webster's New Collegiate Dictionary, 1961, p. 142 (Chemistry).

NASA Interest

Exhaustive Interest: Chemistry of elements and compounds characteristic of NASA's space, planetary, and astronomical interests; combustion theory and processes of direct relevance to aircraft, launch vehicle, and spacecraft materials and propulsion; and low pressure and vacuum reactions.

Negative interest: Chemical research of elements, processes, and compounds that do not have possible aerospace applications.

Input Subjects of Specific Interest

- Alkali metal vapors
- Analytical chemistry
- Catalysts (chemicals)
- Chemical analysis
- Chemiluminescence

Category 25

Inorganic and Physical Chemistry

- Chemistry of compounds
- Chemistry of elements
- Chromatography
- Combustion chemistry
- Combustion kinetics
- Combustion physics
- Combustion processes
- Combustion theory
- Electrochemical processes
- Electrochemistry
- Electrophoresis
- Flame studies
- Flammability (general)
- Gas absorption
- Gas-solid reactions
- Gas-surface interactions
- Gas-surface reactions
- Gaseous reactions
- Ignition studies (general)

Category 25
Inorganic and Physical Chemistry

- Infrared gas analysis
- Inorganic chemistry
- Low pressure chemistry
- Luminescence (chemistry)
- Mass spectroscopy
- Photochemistry
- Physical chemistry
- Polarography
- Spectrophotometry
- Spectroscopic analysis
- Spectroscopy (chemistry)
- Vacuum chemistry

Category 26

Metallic Materials

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

General Definition

Metallic - Of, pertaining to, or made of a metal; of the nature of metal; being, or characteristic of, a metal in the free state. Webster's New Collegiate Dictionary, 1965, p. 528.

NASA Interest

Exhaustive Interest: Physical; chemical; and mechanical properties; testing; evaluation; and protection of metals, alloys, and related compositions for use in aircraft, rockets, launch vehicles, space vehicles, reentry vehicles, aircraft and spacecraft propulsion systems, and supporting facilities (other than conventional building structural materials).

Selective Interest: Research and development on metallic materials that have potential aerospace applications such as light weight, radiation resistance, heat or cold usages, or other unusual attribute.

Negative Interest: Routine developments of structural metallic materials for use in housing, heavy industry, and earthbound transportation, unless a potential exists for aerospace use.

Input Subjects of Specific Interest

- Alloys
- Cermets
- Chemical properties of alloys
- Chemical properties of metals
- Compression strength (metallic materials)
- Corrosion

Category 26

Metallic Materials

- Creep strength (metallic materials)
- Crystal structure (metallic materials)
- Crystals (metallic)
- Development of alloys
- Eutectics
- Eutectoids
- Evaluation of alloys
- Evaluation of metals
- Fatigue (metallic materials)
- Ferrites
- Fibers (metallic materials)
- Flammability (metallic materials)
- Gaskets (metallic)
- Heat treatment of metals
- Hydrogen embrittlement
- Mechanical properties of alloys
- Mechanical properties of metals
- Metal crystals
- Metallic fibers

Category 26

Metallic Materials

- Metallic materials
- Metallography
- Metallurgy
- Metals
- Microstructure of welded joints
- Offgasing (metallic materials)
- Packing (metallic materials)
- Phase equilibrium
- Physical properties of alloys
- Physical properties of metals
- Powder metallurgy
- Protection of alloys
- Protection of materials (metallic)
- Protective coatings (metallic)
- Refractory materials
- Reinforcing filaments (metallic)
- Research on alloys
- Research on metallic materials
- Seals (metallic materials)

Category 26
Metallic Materials

- Shear strength (metallic materials)
- Sintering
- Surface hardening of metals
- Surface properties (metallic materials)
- Tensile strength (metallic materials)
- Testing of alloys
- Testing of materials (metallic)
- Vacuum arc melting
- Whiskers (metallic materials)

Category 27

Nonmetallic Materials

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

General Definition

Nonmetal - An element not a metal; any of several elements, as carbon, phosphorus, nitrogen, oxygen, sulfur, bromine, etc., which do not form basic oxides or basic hydroxides. Webster's New Collegiate Dictionary, 1961, p. 571. Nonmetallic - Not metallic; of, pertaining to, or of the nature of a nonmetal. Webster's New Collegiate Dictionary, 1961, p. 571.

NASA Interest

Exhaustive Interest: Physical, chemical, and mechanical properties; testing; evaluation; and protection of nonmetallic materials (other than conventional building structural materials).

Selective Interest: Research and development on nonmetallic materials that have potential aerospace applications such as light weight, radiation resistance, heat or cold usages, unusual lubrication capabilities, or other unusual attribute.

Negative Interest: Routine developments of structural nonmetallic materials for use in housing, heavy industry, and earthbound transportation, unless a potential exists for aerospace use.

Input Subjects of Specific Interest

- Adhesives
- Ceramic materials
- Chemical properties of:
 - Adhesives
 - Ceramics

Category 27
Nonmetallic Materials

- Chemical properties of:(Cont.)
 - Elastomers
 - Lubricants
 - Plastics
 - Polymers
 - Textiles
- Cleaners
- Compression strength (nonmetallic materials)
- Creep strength (nonmetallic materials)
- Crystal structure (nonmetallic materials)
- Crystals (nonmetallic)
- Development of nonmetallic materials
- Elastomers
- Evaluation of nonmetallic materials
- Fatigue (nonmetallic materials)
- Fibers (nonmetallic materials)
- Film strength
- Flammability (nonmetallic materials)
- Foam materials

Category 27

Nonmetallic Materials

- Gaskets (nonmetallic)
- Glass materials
- Graphite
- Greases
- Hydraulic fluids
- Insulation (nonmetallic materials)
- Lubricants
- Lubrication properties of nonmetallic materials
- Mechanical properties of:
 - Adhesives
 - Ceramics
 - Elastomers
 - Lubricants
 - Plastics
 - Polymers
 - Textiles
- Nonmetallic fibers
- Nonmetallic materials
- Offgasing (nonmetallic materials)

Category 27
Nonmetallic Materials

- Packing (nonmetallic materials)
- Paints
- Patching compounds
- Physical properties of:
 - Adhesives
 - Ceramics
 - Elastomers
 - Lubricants
 - Plastics
 - Polymers
 - Textiles
- Plastics
- Plywoods
- Polymers
- Protection of materials (nonmetallic)
- Protective coatings (nonmetallic)
- Reinforcing filaments (nonmetallic)
- Research on nonmetallic materials
- Sealants

Category 27

Nonmetallic Materials

- Seals (nonmetallic materials)
- Shear strength (nonmetallic materials)
- Solvents
- Surface properties (nonmetallic materials)
- Tensile strength (nonmetallic materials)
- Testing of materials (nonmetallic)
- Textiles
- Whiskers (nonmetallic materials)
- Woods

Category 28

Propellants and Fuels

Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels. For related information see also Category 07, Aircraft Propulsion and Power; Category 20, Spacecraft Propulsion and Power; and Category 44, Energy Production and Conversion.

General Definition

Propellant - Any agent used for consumption or combustion in a rocket and from which the rocket derives its thrust. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 218, NASA SP-7. **Fuel** - Any substance used to produce heat, either by chemical or nuclear reaction, as used, e.g., in a heat engine. NASA Aeronautical Dictionary, Frank Davis Adams, ed., 1959, p. 81.

NASA Interest

Exhaustive Interest: Physical, chemical, and mechanical properties; testing; evaluation; storage and handling of rocket propellants and fuels for aircraft use. For facilities to store or handle fuels or propellants see Category 09, Research and Support Facilities (Air); and Category 14, Ground Support Systems and Facilities (Space).

Selective Interest: Research and development of fuels and propellants for earthbound transportation systems and power production that have potential aerospace applications.

Negative Interest: Routine developments of fuels for automotive, home heating, heavy industry, and other earthbound applications, unless a potential exists for aerospace use.

Input Subjects of Specific Interest

- Aircraft fuels
- Boiloff
- Boron-based fuels

Category 28

Propellants and Fuels

- Burning rates
- Catalysts (propellants)
- Chemical properties of fuels
- Chemical properties of propellants
- Combustion characteristics
- Combustion controllability
- Combustion instability
- Combustion kinetics
- Combustion of fuels
- Combustion of propellants
- Combustion products
- Cryogenic propellants
- Decomposition
- Development of fuels
- Development of propellants
- Diffusion
- Evaluation of fuels
- Evaluation of propellants
- Exotic fuels

Category 28

Propellants and Fuels

- Exotic propellants
- Explosives
- Flames and flame propagation
- Fluorine/oxygen propellants
- Fuel grain shapes
- Fuel grains
- Fuels
- Gelled fuels
- Gelled propellants
- Handling of fuels
- Handling of propellants
- High energy fuels
- High energy propellants
- Hybrid fuels
- Hybrid propellants
- Hydrazine propellants
- Hydrogen fuels
- Hydrogen propellants
- Hypergolic propellants

Category 28

Propellants and Fuels

- Igniters (propellants)
- Ignition studies (propellants and fuels)
- Jet engine fuels
- Kerosene-based fuels
- Liquid fuels
- Liquid hydrogen (propellants and fuels)
- Liquid oxygen (propellants and fuels)
- Liquid petroleum gas (LPG)
- Liquid propellants
- Mechanical properties of fuels
- Mechanical properties of propellants
- Metal-based fuels
- Metal-based propellants
- Monopropellants
- Nitrate-based fuels
- Nitrate-based propellants
- Oxidizers
- Physical properties of fuels
- Physical properties of propellants

Category 28

Propellants and Fuels

- Piston engine fuels
- Propellants
- Research on fuels
- Research on propellants
- Rocket propellants
- Service life of fuels
- Service life of propellants
- Solid propellant curing
- Solid propellants
- Space storable propellants
- Storage of fuels
- Storage of propellants
- Testing of fuels
- Testing of propellants
- Thermal characteristics
- Thixotropic propellants
- Vaporization of fuels
- Vaporization of propellants

ENGINEERING

Includes engineering (general); communications; 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.

General Definition

The science by which the properties of matter and the sources of power in nature are made useful to man in structures, machines, and products. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 493.

Category 31

Engineering (General)

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

Input Subjects of Specific Interest

- Civil engineering
- Control engineering
- Cryogenics
- Display engineering
- Engineering
- Fire prevention
- Hydrofoil vehicles (engineering)

Category 31
Engineering (General)

- Industrial process control
- Industrial safety procedures
- Liquefied gases
- Liquid helium
- Liquid hydrogen
- Liquid nitrogen
- Liquid oxygen
- Metrication
- Safety procedures
- Vacuum technology

Category 32

Communications

Includes land and global communications; communications theory; and optical communications. For related information see also Category 04, Aircraft Communications and Navigation; and Category 17, Spacecraft Communications, Command and Tracking.

General Definition

Act, power, or means of communicating or passing from place to place. Webster's New Collegiate Dictionary, 1961, p. 166.

NASA Interest

Exhaustive Interest: All equipment, techniques, research, development, and application specifically intended for the transmittal of data, voice communication, code, or other intelligence to, from, or between aircraft, launch vehicles, space vehicles, communications satellites, scientific satellites, manned or unmanned spacecraft, lunar and planetary bases; ground based tracking and communication stations; tracking and data acquisition networks; and transmittal of data from aerospace related experiments.

Selective Interest: Earthbased communication techniques and theory of potential interest for aerospace applications.

Negative Interest: Commercial telephone, teletype, television, and radio operations unless directly related to aerospace communications; courier and messenger service.

Input Subjects of Specific Interest

- Antenna theory
- Code application
- Code development
- Code equipment
- Code research

Category 32

Communications

- Code techniques
- Communication blackouts (electromagnetic interference)
- Communication coding
- Communication interference
- Communication networks (theory)
- Communication noise
- Communication satellite operational problems
- Communication systems (theory)
- Communication techniques
- Communication theory
- Communications
- Data transmission applications
- Data transmission development
- Data transmission equipment
- Data transmission research
- Data transmission techniques
- Digital communication systems (theory)
- Electromagnetic interference
- Electromagnetic radiation (communications)

Category 32 Communications

- Electromagnetic wave propagation
- Global communications
- Ionospheric effects on radio transmission (communication)
- Ionospheric propagation
- Ionospheric scatter
- Laser communication
- LIDAR and related atmospheric attenuation problems
- Man-machine communications (theory)
- Microwave communication systems (application and design)
- Microwave radiation (properties)
- Microwave receivers (theory)
- Microwave techniques
- Microwave theory
- Microwave transmitters (theory)
- Modulation
- Networks (communication)
- Optical communication (theory)
- Radar absorbing materials
- Radar antenna theory and techniques

Category 32

Communications

- Radar communication systems (theory and techniques)
- Radar detection (communications)
- Radar imagery (communications)
- Radar theory and techniques
- Radar tracking systems (theory and techniques)
- Radio antenna theory and techniques
- Radio communication systems (theory and techniques)
- Radio theory and techniques
- Radomes (design)
- Side looking radar (theory and techniques)
- Signal analyzers
- Signal detection theory
- Signal generators (theory)
- Signal modulators
- Signal processing
- Sonar detection (aerospace application)
- Speech analysis (electromagnetic aspects)
- Speech compression (electromagnetic aspects)
- Television systems

Category 32
Communications

- Tropospheric scatter (electromagnetic effects)
- Voice communication
- Voice communication application
- Voice communication development
- Voice communication equipment
- Voice communication research
- Voice communication systems (theory)
- Voice communication techniques
- Wave propagation (electromagnetic)
- Whistlers

Category 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 Category 60, Computer Operations and Hardware; and Category 76, Solid-State Physics.

General Definition

Electronics - That branch of physics that treats of the emission, transmission, behavior, and effects of electrons. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 96, NASA SP-7. Electrical Engineering - Engineering that deals with practical applications of electricity; generally restricted to applications involving current flow through conductors, as in motors and generators. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 469.

NASA Interest

Exhaustive Interest: Theory, research, development, design, testing, performance, and operation of components, devices, and circuitry that have direct application in aircraft, launch vehicles, space vehicles, and their components and equipment; launch, research, and testing facilities, and the components and equipment used in these.

Selective Interest: Theory, research, development, design, testing, performance, and operation of earthbound equipment, components, devices, and circuitry having potential applications for aerospace use, or for use under extreme or unusual conditions or environments.

Negative Interest: Research, development, design, testing, performance, and operation of components, devices, and circuitry of electronic-electrical equipment for routing commercial non-aerospace applications.

Input Subjects of Specific Interest

- Amplifiers
- Antenna construction

- Antenna design
- Audio amplifiers
- Batteries (electrical properties)
- Bridge circuits
- Capacitors
- Cathode ray tubes (electrical properties)
- Chemical batteries (electrical properties)
- Chips (integrated circuits)
- Chokes
- Circuit theory
- Converters
- Crystals (electronic applications)
- Dielectrics
- Diodes
- Electric batteries (electrical properties)
- Electric circuits
- Electric power units (electrical properties)
- Electrical components
- Electrical engineering

Category 33

Electronics and Electrical Engineering

- Electron beam devices
- Electron tubes
- Electronic circuits
- Electronic components
- Electronic packaging
- Electronic test equipment
- Electronics
- Field effect transistors (FET)
- Filters (electric)
- Filters (electronic)
- Inductors
- Insulation (electric)
- Insulation (electronic)
- Integrated circuits
- Inverters
- Lead-acid batteries (electrical properties)
- Light emitting diodes (LED)
- Magnets (electrical and electronics application)
- Mercury batteries (electrical properties)

Electronics and Electrical Engineering

- Microcircuits
- Microminiaturization
- Modulators
- Network theory
- Networks (circuitry)
- Nickel-cadmium batteries (electrical properties)
- Opto-acoustic electronics
- Oscillators
- Photoelectric devices
- Photomultipliers
- Power amplifiers
- Power packs
- Power supplies
- Printed circuits
- Radar antenna construction
- Radar antenna design
- Radio antenna construction
- Radio antenna design
- Radomes

Category 33

Electronics and Electrical Engineering

- Resistors
- Semiconductors
- Servomechanisms (electrical aspects)
- Signal generators (applications)
- Silicon cells (electrical properties)
- Silver-cadmium batteries (electrical properties)
- Sneak circuit analysis
- Solar cells (electrical properties)
- Solid state circuitry
- Solid state devices
- Solid state effects
- Superconductivity (applications)
- Surface wave acoustic devices (electronic properties)
- Switches
- Test equipment (electrical properties)
- Thyratrons
- Transducers
- Transformers
- Transistors

Category 33
Electronics and Electrical Engineering

- Transmission lines
- Transmitters
- Triodes
- Tunnel diodes
- Vacuum tubes
- Waveguides

Category 34

Fluid Mechanics and Heat Transfer

Includes boundary layers; hydrodynamics; fluidics; mass transfer, and ablation cooling. For related information see also Category 02, Aerodynamics; and Category 77, Thermodynamics and Statistical Physics.

General Definition

Fluid mechanics - The study of the behavior of fluids at rest and in motion. Fluid Dynamics, R.H.F. Pao (Rose Polytechnic Institute). Charles E. Merrill Books, Inc., Columbus, Ohio, 1967. Heat transfer - The transfer or exchange of heat by radiation, conduction, or convection within a substance and between the substance and its surroundings. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 132, NASA SP-7.

NASA Interest

Exhaustive Interest: Theories, research, and studies on the forces, flow, mechanical properties and heat transfer of fluids or gases having specific relevance to aerospace interests or under conditions encountered in aircraft, spacecraft, launch vehicles, space vehicles, propulsion systems, or support facilities; and theory, research, and development on heat transfer of relevance also to the thermodynamic properties of elements, compounds, materials, and substances found in aerospace science and technology. (Those concerned with astronomical, solar, and stellar phenomena and their interactions should be included in Category 89, Astronomy; or Category 90, Astrophysics.)

Selective Interest: Research developments, and studies of fluids and gases and heat transfer of potential interest for aerospace applications or under unusual or extreme conditions.

Negative Interest: Heat transfer and flow of fluids and gases over weirs, through channels, ducts, and pipes related to normal powerplant, reservoir, irrigation, and residential-business use unless related to remote sensing, earth resources, or for other potential aerospace application.

Category 34

Fluid Mechanics and Heat Transfer

Input Subjects of Specific Interest

- Ablation
- Ablation cooling
- Boiling
- Boundary layer dynamics
- Boundary layer flow (fluids)
- Cavitation
- Compressible flow (fluids)
- Convection
- Flow measurement
- Flow of gases
- Flow of liquids
- Flow with heat addition
- Fluorics
- Fluid flow
- Fluid forces
- Fluid heat transfer
- Fluid mechanical properties
- Fluid mechanics

Category 34

Fluid Mechanics and Heat Transfer

- Fluidics
- Fluids
- Gas dynamics
- Gas flow
- Gas forces
- Gas heat transfer
- Gas mechanical properties
- Gaseous film cooling
- Gases
- Heat exchangers
- Heat pipes
- Heat shields
- Heat sinks
- Heat transfer
- Hydraulics
- Hydrodynamics
- Hydrostatics
- Induction heating
- Laminar flow (fluids)

Category 34

Fluid Mechanics and Heat Transfer

- Liquid settling
- Liquid sloshing
- Mass transfer
- Mixing of fluids
- Mixing of gases
- Radiators
- Shock waves
- Skin friction
- Thermal radiation
- Transitional flow (fluids)
- Transpiration cooling
- Turbulent flow (fluids)
- Unsteady flow (fluids)
- Viscous flow

Category 35

Instrumentation and Photography

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography. For aerial photography see Category 43, Earth Resources. For related information see also Category 06, Aircraft Instrumentation; and Category 19, Spacecraft Instrumentation.

General Definition

Instrumentation - A special field of engineering concerned with the design, composition, and arrangement of instruments. Adapted from the Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 144, NASA SP-7. **Photography** - The process of forming visible images directly or indirectly by the action of light or other forms of radiation on sensitive surfaces. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 1114.

NASA Interest

Exhaustive Interest: Design, development, installation, and use of devices for detecting, measuring, recording, telemetering, processing, or analyzing values or quantities related to aeronautical or space flight, the environment within and outside the flight vehicle, the physical operation and well being of the flight vehicle and its structure during all phases of its flight, the facilities for testing and/or developing the flight vehicle, and the observations and experiments performed as a result of the flight of these vehicles.

Selective Interest: Instrument design, development, and theory for other purposes that have potential aerospace applications because of advanced or unusual features, or are developed for extreme environments or unusual test conditions.

Negative Interest: Commercial off-the-shelf photographic equipment and instrument design and development for general use for artistic or commercial applications.

Input Subjects of Specific Interest

- Ablation sensors (theory and techniques)

Category 35
Instrumentation and Photography

- Alarm systems (theory and techniques)
- Analyzing devices (theory and techniques)
- Anemometers (theory and techniques)
- Attitude indicators (theory and techniques)
- Bioelectronic instruments (theory and techniques)
- Bioinstrumentation (theory and techniques)
- Biomedical instruments (theory and techniques)
- Cameras
- Darkroom equipment
- Detectors
- Earth sensors
- Electro-optical systems
- Electron microscopes
- Emissivity measurements
- Filters (photographic)
- Flow visualization instrumentation
- Fluid flow sensors (theory and techniques)
- Gages
- Gyroscopes (design and operation)

Category 35

Instrumentation and Photography

- Holography
- Instrument design (theory and techniques)
- Instrumentation
- Interferometers
- Ion mass spectrometers
- Lenses (photographic)
- Mass spectrometers
- Measuring instruments
- Micrometeoroid sensors
- Microscopes
- Multimode sensors
- Multispectral sensors
- Nondestructive testing instruments
- Optical imaging devices
- Oscilloscopes
- Photographic processing equipment
- Photographic supplies
- Photography
- Photometry

Category 35

Instrumentation and Photography

- Phototheodolites
- Physiological monitoring devices (theory and techniques)
- Position sensors
- Pressure transducers
- Radiation instruments
- Radiography
- Recorders
- Remote sensors
- Sensors
- Shock tube instruments
- Spectral analysis instruments
- Spectrometers
- Spectrophotometers
- Spectroscopes
- Strain gage instruments
- Tape recorders
- Test equipment (theory and techniques)
- Test facility instruments
- Thermocouples (theory and techniques)

Category 35

Instrumentation and Photography

- Time measurement equipment
- Two-gas sensors (theory and techniques)
- Ultrasonic testing equipment
- Vidicon cameras
- Wind tunnel instruments

Category 36

Lasers and Masers

Includes parametric amplifiers.

General Definition

Laser - (From light amplification by stimulated emission of radiation.) A device for producing light by emission of energy stored in a molecular or atomic system when stimulated by an input signal. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 156, NASA SP-7.

Maser - An amplifier utilizing the principle of microwave amplification by stimulated emission of radiation. Emission of energy stored in a molecular or atomic system by a microwave power supply is stimulated by the input signal. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 171, NASA SP-7.

NASA Interest

Exhaustive Interest: Fundamental research, theory, and developments of particular or potential aerospace application; in drilling and welding of materials and electronic devices, space communication, tracking, navigation, and optical radar.

Negative Interest: Laser medical and surgical use unless related to specific aerospace disorders.

Input Subjects of Specific Interest

- Chemical dye lasers
- Gas lasers
- Laser amplifiers
- Laser communication systems (theory and techniques)
- Laser damage
- Laser drilling

Category 36

Lasers and Masers

- Laser materials
- Laser navigation
- Laser optical radar
- Laser optics
- Laser radiation
- Laser radiation effects
- Laser radiation hazards
- Laser research
- Laser theory
- Laser tracking systems (theory and techniques)
- Laser welding
- Lasers
- Liquid lasers
- Masers
- Parametric amplifiers
- Quantum generators
- Short pulsed lasers
- Solid state lasers

Category 37

Mechanical Engineering

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

General Definition

The branch of engineering that deals with the generation, transmission, and utilization of heat and mechanical power and with production of tools, machines, and their products. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 916.

NASA Interest

Selective Interest: Machine elements and processes, nonpower auxiliary systems, and equipment of potential aerospace application.

Input Subjects of Specific Interest

- Airbreathing engines (nonaircraft)
- Applied mechanics
- Auxiliary systems (nonpower)
- Bearings
- Bonding
- Brayton Cycle turbines
- Brazing
- Cams
- Centrifugal pumps
- Cladding
- Clutches

Category 37

Mechanical Engineering

- Coatings
- Compression ignition engines (nonaircraft)
- Containers
- Dies
- Diesel engines (nonaircraft)
- Drives
- Electrodeposition
- Electron beam welding
- Electroplating
- Fasteners
- Filters (mechanical)
- Fittings
- Fixtures
- Friction measurement
- Gasoline engines (nonaircraft)
- Gears
- Impact phenomena
- Impact testing
- Internal combustion engines (nonaircraft)

Category 37
Mechanical Engineering

- Joining
- Lubrication
- Machine elements
- Machine processes
- Machinery
- Manufacturing processes
- Materials fabrication
- Materials forming
- Materials handling
- Materials manufacturing
- Mechanical engineering
- Mechanical equipment
- Mechanics (practical)
- Packaging
- Packing
- Piston engines (nonaircraft)
- Plasma spraying
- Plating
- Pressure vessels

Category 37

Mechanical Engineering

- Pumps
- Reciprocating engines (nonaircraft)
- Rollers
- Rotary engines (nonaircraft)
- Seals (performance)
- Servomechanisms (mechanical aspects)
- Shafts
- Spark ignition engines (nonaircraft)
- Steam engines (nonaircraft)
- Sterling cycle engines (nonaircraft)
- Telescope mounts
- Throttle controls (nonaircraft)
- Tools
- Turbine engines (nonaircraft)
- Vacuum forming
- Valves
- Welding techniques

Category 38

Quality Assurance and Reliability

Includes product sampling procedures and techniques; and quality control.

General Definition

Quality Assurance - A system of activities whose purpose is to provide assurance and show evidence that the overall quality control job is in fact being done effectively. The system involves a continuing evaluation of the adequacy and effectiveness of the overall quality control program with a view to having corrective measures initiated where necessary. From the forthcoming Multilingual AGARD Dictionary. Reliability - Of a piece of equipment or a system, the probability of specified performance for a given period of time when used in the specified manner. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 236, NASA SP-7.

NASA Interest

Exhaustive Interest: Quality control, quality assurance, and reliability theories, procedures, and practices specifically applicable to aircraft, space vehicles, launch vehicles, supporting facilities, other aerospace applications, and related equipment.

Selective Interest: Quality control, quality assurance, and reliability theories, procedures, and practices specifically concerned with developments and techniques for non-aerospace oriented activities that may be unusual or of use within the aerospace effort.

Input Subjects of Specific Interest

- Accelerated life testing
- Environmental engineering
- Environmental test facilities
- Environmental testing
- Failure rates

Category 38

Quality Assurance and Reliability

- Fault detection (quality control)
- Inspection
- Inspection methods
- Life testing
- Maintainability procedures
- Maintainability theory
- Nondestructive testing
- Product sampling procedures
- Product sampling techniques
- Quality assurance
- Quality control
- Radiography (quality control)
- Redundancy
- Reliability
- Reliability criteria
- Reliability techniques
- Reliability theory
- Sampling procedures

Category 38
Quality Assurance and Reliability

- Sampling techniques (quality control)
- Service life

Category 39

Structural Mechanics

Includes structural element design and weight analysis; fatigue; and thermal stress. For applications see Category 05, Aircraft Design, Testing and Performance; and Category 18, Spacecraft Design, Testing and Performance.

General Definition

Structural - Of or pertaining to structure or a structure, Webster's New Collegiate Dictionary, 1961, p. 841. Mechanics - The practical application of the principles of physics, especially the laws of motion, and of the effect of forces upon the properties of bodies, to the working of machines, Webster's New Collegiate Dictionary, 1961, p. 522.

NASA Interest

Exhaustive Interest: Theory, design, development and testing of structures and structural elements developed for use in aircraft, space vehicles, and launch vehicles.

Selective Interest: Theory, design, development, and testing of lightweight or unusual structures or structural elements of potential aerospace use.

Negative Interest: Structures or structural elements of conventional types utilized in bridges, buildings, heavy transportation, radio and microwave towers, and the like unless specifically aimed at aerospace use.

Input Subjects of Specific Interest

- Acoustoelasticity
- Aeroelasticity (structural flexibility)
- Beams
- Bending
- Bolted joints

Category 39
Structural Mechanics

- Bonded structures
- Buckling
- Columns
- Combined loads
- Compression
- Compression loads
- Compression strength (structural)
- Cones
- Crack propagation
- Cracks
- Cylinders
- Elasticity
- Energy absorption
- Fatigue (structural)
- Filament wound structures (design and tests)
- Flutter (structural)
- Fracture mechanics
- Honeycomb structures
- Lightweight structural elements

Category 39

Structural Mechanics

- Lightweight structures
- Panels
- Photoelasticity
- Plates (structural elements)
- Rings
- Riveted joints
- Shear
- Shear strength (structures)
- Shells
- Shock
- Shock testing
- Stress (structural)
- Stress analysis
- Structural:
 - Analysis
 - Design
 - Elements
 - Fatigue
 - Mechanics

Category 39
Structural Mechanics

- **Structural:(Cont.)**
 - Testing
 - Theory
 - Vibration effects
- **Tensile strength (structures)**
- **Tension**
- **Thermal stress**
- **Vibration**
- **Vibration testing**
- **Wave propagation (structural response)**
- **Weight analysis**
- **Welded structures**

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography. For related information see also SPACE SCIENCES.

General Definition

The sciences (such as geology, physical geography, geomorphology, geophysics, geochemistry) dealing with the earth. Webster's Third New International Dictionary, Unabridged, G. & C. Merriam Co., Springfield, Mass., 1964, p. 950.

Category 42

Geosciences (General)

Input Subjects of Specific Interest

- Earth sciences
- Geosciences

Category 43

Earth Resources

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography. For instrumentation see Category 35, Instrumentation and Photography.

General Definition

Earth - The planet which we inhabit, the fifth in order of size and third in order of distance from the sun. Webster's New Collegiate Dictionary, 1961, p. 258.

NASA Interest

Exhaustive Interest: Theory, studies, results, developments, mapping, photographic presentations, and the like resulting from and related to earth resources.

Negative Interest: Geology and geodesy of a routine, earthbound study unless for ground truth or related purposes.

Input Subjects of Specific Interest

- Aerial photography
- Cartography
- Computer processing of earth resources data
- Crop disease detection
- Crop forecasts
- Earth resources
- Earth Resources Technology Satellite (ERTS) (data acquisition)
- Foliage sensing
- Forest fire detection

Category 43
Earth Resources

- Geodesy (earth resources)
- Geological exploration
- Geological survey
- Gravitational collapse (terrestrial)
- Gravitational theory (terrestrial)
- Gravity waves (terrestrial)
- Ground truth
- Hydrology
- Infrared sensors (earth resources)
- LANDSAT (data acquisition)
- Limnology
- Lithology
- Littoral regions
- Mapping
- Mineral deposits
- Orography
- Petrography
- Petroleum deposits
- Petrology

Category 43

Earth Resources

- Photogrammetry
- Radar detection (earth resources)
- Radar imagery (earth resources)
- Remote sensing of earth resources
- Rheology
- SEASAT (data acquisition)
- Side looking radar (earth resources)
- Signature analysis
- Snow and ice observations
- Soil identification
- Tectonic analysis
- Timber inventory
- Water resources

Category 44

Energy Production and Conversion

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power. For related information see also Category 07, Aircraft Propulsion and Power; Category 20, Spacecraft Propulsion and Power; Category 28, Propellants and Fuels; and Category 85, Urban Technology and Transportation.

General Definition

Energy - The capacity for doing work. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 492.
Production - Output, such as units made in a factory, oil from a well, or chemicals from a processing plant. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 1174.
Energy Conversion - The process of changing energy from one form to another. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 492.

NASA Interest

Exhaustive Interest: Systems or developments that may provide power or fuel for aircraft, space vehicles, launch vehicles, satellites, or manned spacecraft; earth based energy production and conversion; and energy for transportation, heating, light, manufacturing, and other power needs.

Selective Interest: New developments in hydroelectric power (new sources, high efficiency units, etc.); lightweight, low cost nuclear power units.

Negative Interest: Large nuclear and hydroelectric power plants.

Input Subjects of Specific Interest

- Batteries (applications)
- Brayton Cycle turbines (applications)
- Chemical batteries (mercury, nickel-cadmium, silver-cadmium, lead-acid)

Category 44

Energy Production and Conversion

- Chemical energy conversion devices
- Electric batteries (applications)
- Electric energy conversion devices
- Energy conversion
- Energy conversion devices
- Energy conversion systems
- Energy production
- Fossil fuels (coal, gas, oil)
- Fuel cells
- Generators
- Geophysical energy conversion
- Geothermal energy
- Global energy resources
- Hybrid energy conversion devices
- Hydroelectric power
- Lead-acid batteries (applications)
- Magnetohydrodynamic (MHD) energy conversion devices
- Mercury batteries (applications)
- Metal vapor turbines

Energy Production and Conversion

- Microwave energy conversion
- Microwave energy transmission
- Nickel-cadmium batteries (applications)
- Nuclear reactors (power generation)
- Photovoltaic energy converters
- Power conversion devices
- Silicon cells (applications)
- Silver-cadmium batteries
- Solar cells (energy conversion)
- Solar heating
- Solar power
- Systems for energy conversion (applications)
- Thermionic devices
- Thermionic energy conversion systems
- Thermocouples (applications)
- Tidepower
- Windpower

Category 45

Environment Pollution

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

General Definition

Environment - The sum of all external conditions and influences affecting the development and life of organisms. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 496.
Pollution - Destruction or impairment of the purity of the environment. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 1145.

NASA Interest

Exhaustive Interest: Air, noise, thermal, atmospheric pollution and contamination resulting from air, earthbound, and space transportation.

Selective Interest: Industrial, commercial, and residential air, noise, thermal, atmospheric, and thermal and water pollution as it impacts air and space transportation, or is monitored by aircraft or spacecraft.

Negative Interest: Air, noise, thermal, water pollution, sewage pollution, and contamination from industrial, commercial and residential sources.

Input Subjects of Specific Interest

- Aerosols (pollution aspects)
- Air pollution
- Atmospheric analysis (terrestrial)
- Atmospheric pollution
- Atmospheric sampling (terrestrial)
- Commercial pollution

Category 45

Environment Pollution

- Contamination control
- Ecology
- Environment monitoring
- Environment pollution
- Environmental modifications
- Industrial pollution
- Noise abatement
- Noise pollution
- Pollution control
- Residential pollution
- Sonic boom (noise pollution)
- Stratospheric pollution
- Thermal pollution
- Transportation pollution
- Waste treatment (pollution control)
- Water pollution
- Water treatment (pollution control)

Category 46

Geophysics

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

General Definition

The physics of the earth and its environment, i.e., earth, air, and (by extension) space. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 123.

NASA Interest

Exhaustive Interest: Experimental physics of the earth, including its atmosphere and its hydrosphere, as revealed by aircraft, satellite, and manned spacecraft observations; observation of natural phenomena; upper atmosphere and ionosphere; geomagnetism and earth gravitational field.

Selective Interest: Geology of direct interest to aerospace activities.

Negative Interest: Surface surveys; surface or seismic prospecting; assaying processes or records; paleontology other than early indications of development of life; geological investigations not having potential relevance to ground truth for remote sensing or earth evolution and structure.

Input Subjects of Specific Interest

- Aeronomy
- Aerosols (physical properties)
- Airglow
- Atmospheric density
- Atmospheric physics
- Atmospheric radiation

Category 46
Geophysics

- Atmospheric radioactivity
- Atmospheric scattering
- Atmospheric studies
- Aurora
- Continental drift
- Earth gravitational field
- Earth magnetic field
- Earth origins
- Earth structure
- Earth-reflected radiation
- Fault detection (geological)
- Geochemistry
- Geodesy (physics)
- Geomagnetism
- Geophysics
- Glaciology
- Gravitational anomalies
- Hydrosphere studies
- Ionosphere

Category 46

Geophysics

- Ionospheric electron density
- Ionospheric physics
- Ionospheric plasmas
- Ionospheric scintillation
- Lower atmosphere studies
- Magellanic clouds
- Magnetism (terrestrial)
- Magnetospheric research
- Noctilucent clouds
- Plate movement
- Plates (tectonic)
- Seismology
- Soil mechanics
- Stratospheric circulation
- Upper atmosphere studies
- Volcanoes

Category 47

Meteorology and Climatology

Includes weather forecasting and modification.

General Definition

Meteorology - The study dealing with the phenomena of the atmosphere. This includes not only the physics, chemistry, and dynamics of the atmosphere, but is extended to include many of the direct effects of the atmosphere upon the earth's surface, the oceans, and life in general. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 175. Climatology - A quantitative description of climate, particularly with reference to the tables and charts which show the characteristic values of climatic elements at a station or over an area. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 278.

NASA Interest

Exhaustive Interest: Earthbound, air, and space observations and measurements of global meteorological conditions and phenomena; atmospheric structure studies; weather forecasting of particular interest to, and use by, the aerospace community; and meteorological satellite studies and remote sensing observatory studies.

Selective Interest: Research and observations not related to aerospace activities, but contributing to a better understanding of weather and climatological problems.

Negative Interest: Routine, day-to-day weather forecasts for local weather forecasting unless associated with unusual global weather systems.

Input Subjects of Specific Interest

- Acoustical atmospheric phenomena
- Anemometers (applications)
- Atmospheric circulation

Category 47

Meteorology and Climatology

- Atmospheric cloud physics
- Atmospheric energy exchanges
- Atmospheric interactions
- Atmospheric structure
- Atmospheric studies (meteorological)
- Atmospheric turbulence
- Barometric pressure
- Clear air turbulence
- Climatology
- Cloud cover analysis
- Cloud patterns
- Cloud research
- Cloud seeding
- Coriolis forces (meteorology)
- Cyclones
- Diurnal effects (meteorology)
- Electrical atmospheric phenomena
- Fog dissipation
- Global meteorology

Category 47
Meteorology and Climatology

- Hail
- Hurricanes
- Ice crystals
- Jet streams
- Lightning
- Long-term effects
- Macrometeorology
- Meteorological optics
- Meteorological satellite studies
- Meteorological sounding rocket studies
- Meteorology
- Micrometeorology
- Monsoons
- Optical atmospheric phenomena
- Precipitation (meteorology)
- Seasonal effects
- Seasonal variations
- Short term effects
- Short term variations

Category 47

Meteorology and Climatology

- Solar-atmospheric interactions
- Storm cells
- Synoptic scale circulation
- Temperature variations (meteorology)
- Temporal effects
- Temporal variations
- Thermodynamic atmospheric phenomena
- Thunderstorms
- Tornadoes
- Typhoons
- Weather forecasting
- Weather modification
- Wind
- Wind shear

Category 48

Oceanography

Includes biological, dynamic, and physical oceanography; and marine resources.

General Definition

The scientific study and exploration of the oceans and seas in all their aspects. Also known as Oceanology. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 1028.

NASA Interest

Exhaustive Interest: Air-sea interactions, marine resource studies by aerospace means, ocean currents, wave phenomena, and ocean floor studies.

Selective Interest: Ocean floor core drilling related to age studies, plate movement, and earth structure.

Negative Interest: Oil and mineral drilling and searching; and fish location, unless of interest to ground truth activities or resulting from aerospace activities.

Input Subjects of Specific Interest

- Air-sea interactions
- Biological oceanography
- Dynamic oceanography
- Marine biology
- Marine resources
- Ocean circulation
- Ocean currents

Category 48

Oceanography

- Ocean floor drilling
- Ocean floor studies
- Ocean wave studies
- Oceanography
- Physical oceanography
- Temperature variations (oceanography)
- Wave phenomena

LIFE SCIENCES

Includes genetics.

General Definition

Application of biosciences, psychology, and psychiatry to the space program. The sciences are basically divided into two parts: the biological sciences which include chemistry, botany, zoology, and derivatives; and the physical sciences, which include psychology and psychiatry (including physiology). Space Age Dictionary, Charles McLaughlin, ed., D. Van Nostrand Co., 1963, p. 94.

NASA Interest

Exhaustive Interest: Spacecraft sterilization, effects of space environment and earth simulation on plants, animal biology, microbiology, diurnal effects of animals and plants, all with aerospace applications.

Selective Interest: Sterilization, biology, botany, and diurnal studies having potential aerospace applications.

Negative Interest: Medical instrument sterilization, home gardening, farming, zoology, etc.

Category 51

Life Sciences (General)

Input Subjects of Specific Interest

- Acceleration effects (biological)
- Altitude effects (biological)
- Animal biology
- Atmospheric pressure effects (biological)

Category 51

Life Sciences (General)

- Bioelectronic instruments (animal and plant)
- Bioengineering
- Biology (aerospace oriented)
- Botany
- Chronobiology
- Circadian rhythm (animal and plant)
- Diurnal effects (biological)
- Earth biology
- Earth simulation
- Environmental effects (biological)
- Estivation
- Genetics (animal and plant)
- Gravitational effects (biological)
- Hibernation
- Infrared radiation effects (biological)
- Life sciences
- Magnetic field effects (biological)
- Microbiology
- Origin of life (terrestrial)

Category 51
Life Sciences (General)

- Planetary environment simulation (terrestrial)
- Plants
- Quarantine (animal and plant)
- Radiation effects (biological)
- Reduced gravity effects (biological)
- Space biology
- Space environment effects (animal and plant)
- Spacecraft sterilization
- Temperature effects (biological)
- Theory of evolution
- Weightlessness effects (biological)
- Zero gravity effects (biological)

Category 52

Aerospace Medicine

Includes physiological factors; biological effects of radiation; and weightlessness.

General Definition

That branch of medicine dealing with the effects of flight through the atmosphere or in space upon the human body and with the prevention or cure of physiological or psychological malfunctions arising from these effects. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 7, NASA SP-7.

NASA Interest

Exhaustive Interest: All pharmacological, physiological and psychological effects of atmospheric and space flight on the human being.

Selective Interest: Stress, psychological, physiological, biological, and radiation effects of conventional medicine with direct application to aerospace flight.

Negative Interest: Medicine, pharmacology, psychology, and radiation effects of conventional, earthbound medicine and biology.

Input Subjects of Specific Interest

- Acceleration effects (physiological)
- Aerospace medicine
- Altitude effects (physiological)
- Atmospheric pressure effects (physiological)
- Bioelectronic instruments (aerospace medicine)
- Biological effects of atmospheric flight
- Biological effects of physical stress

Category 52
Aerospace Medicine

- Biological effects of radiation
- Biological effects of space flight
- Biomedical instruments (aerospace medicine)
- Centrifugal motion effects
- Circadian rhythm (human)
- Confinement (physiological effects)
- Coriolis forces (physiological effects)
- Deceleration effects (physiological)
- Diurnal effects (physiological)
- Effects of radiation
- Effects of stress (physiological)
- Environmental effects (physiological)
- Exercise
- Fatigue (physiological)
- Genetics (human)
- Gravitational effects (physiological)
- High temperature effects
- Infrared radiation effects (physiological)
- Low temperature effects

Category 52

Aerospace Medicine

- Magnetic field effects
- Pathology
- Pharmacological effects of atmospheric flight
- Pharmacological effects of space flight
- Pharmacology
- Physiological effects of flight
- Physiological factors
- Physiological monitoring devices (aerospace medicine)
- Physiology
- Physiology of cardiac organs
- Physiology of sensory organs
- Quarantine (human)
- Radiation effects (physiological)
- Radiobiology
- Radiography (aerospace medicine)
- Rapid eye movement (REM)
- Reduced gravity effects
- Sensory deprivation (physiological effects)
- Sleep deprivation (physiological effects)

Category 52
Aerospace Medicine

- Space environment effects (physiological)
- Stress (physiological effects)
- Stress effects of atmospheric flight
- Stress effects of space flight
- Temperature effects (physiological)
- Toxicology
- Visual acuity
- Visual tracking
- Weightlessness effects (physiological)
- Zero gravity effects (physiological)

Category 53

Behavioral Sciences

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

General Definition

Behavior - The way in which an organism, organ, body, or substance acts in an environment or responds to excitation. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 35, NASA SP-7.

NASA Interest

Exhaustive Interest: Effects of the aerospace environment on man, alone or in groups, as it affects his mental adaptation to flight in the earth's atmosphere or in space.

Selective Interest: Mental and emotional effects of small group behavior, isolation, confinement, and the like as they might affect aerospace flight adaptation of man.

Negative Interest: Clinical psychology and psychiatry that would have little or no application to aerospace activities.

Input Subjects of Specific Interest

- Behavior
- Behavioral sciences
- Confinement (psychological effects)
- Crew evaluation
- Crew training
- Effects of stress (psychological effects)
- Entertainment

Category 53
Behavioral Sciences

- Flying training
- Group behavior
- Human behavior
- Individual behavior
- Isolation effects
- Mental adaptation to flight
- Perception
- Piloting (human performance)
- Piloting skills
- Psychiatric research
- Psychological effects of flight
- Psychological factors
- Psychological research
- Sensory deprivation (psychological effects)
- Sleep deprivation (psychological effects)
- Social interaction (small groups)
- Sociological research (psychology)
- Stress (psychological effects)
- Weightlessness effects (psychological)

Category 54

Man/System Technology and Life Support

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

General Definition

Man-Machine System - A system in which the functions of the man and the machine are inter-related and necessary for the operation of the system. From the forthcoming AGARD Multilingual Aeronautical Dictionary. **Life Support System** - That complex of equipment which provides for the maintained health, comfort, and security of a vehicle occupant. General usage excludes atmospheric control (environmental control) but includes provision of food and water, waste collection and disposal, escape and survival gear. From the forthcoming AGARD Multilingual Aeronautical Dictionary.

NASA Interest

Exhaustive Interest: Those items and systems specifically concerned with the human aspects of aeronautical and space flight.

Selective Interest: Those items, systems, and life support from other areas of activities (other transportation systems, mining, industry and the like) that may have an application in the human aspects of aeronautical and space flight.

Negative Interest: General industrial- and transportation-related equipment, systems, and applications.

Input Subjects of Specific Interest

- Bioinstrumentation (physiological)
- Bionics
- Biotechnology
- Closed ecological systems

Category 54

Man/System Technology and Life Support

- Extravehicular activity (EVA) (physiological)
- Extravehicular activity (EVA) equipment
- Flight suits
- Food
- Food preparation
- Food storage
- Helmets
- Human engineering
- Life support
- Man-machine interface
- Man-system technology
- Nutrition
- Protective clothing
- Quarantine procedures
- Radiation safety measures (physiological effects)
- Space cabin atmospheres
- Space cabin oxygen supplies
- Space cabin water supplies
- Space flight feeding

Category 54

Man/System Technology and Life Support

- Space hygiene
- Space sanitation
- Space suits
- Teleoperators
- Waste products conversion (aerospace vehicles)
- Waste products disposal (aerospace vehicles)
- Waste products storage

Category 55

Planetary Biology

Includes exobiology; and extraterrestrial life.

General Definition

Planetary - Of or pertaining to a planet or the planets. Webster's New Collegiate Dictionary, 1961, p. 645. Biology - The science of life; the branch of knowledge which treats of living organisms. Webster's New Collegiate Dictionary, 1961, p. 86.

NASA Interest

Exhaustive Interest: All facets of biology concerning outer space (beyond the earth's atmosphere), the planets (other than planet earth), and stellar and galactic biology, including extraterrestrial life and the origin of life.

Selective Interest: The biological research concerned with the nature and origin of life; the chemical composition, growth, development, and reproduction of life; and the adaptation of life to extremes of altitude, temperature, atmospheric conditions, drought, etc., with possible application to exobiology and the search for extraterrestrial life.

Negative Interest: Medical, agricultural and botanical, animal, and microbial biology as it relates to and results from existing earthbound life.

Input Subjects of Specific Interest

- Altitude effects (exobiology)
- Amino acid analysis
- Atmospheric analysis (extraterrestrial)
- Atmospheric pressure effects (exobiology)
- Atmospheric sampling (extraterrestrial)
- Biochemical detection of life

Category 55

Planetary Biology

- Bioinstrumentation (extraterrestrial life)
- Biology (extraterrestrial)
- Chemical evolution
- Culturing
- Enzyme analysis
- Exobiology
- Extraterrestrial biochemistry
- Extraterrestrial biology
- Extraterrestrial life
- Extreme temperature effects
- Galactic biology
- Gravitational effects (planetary biology)
- Infrared radiation effects (planetary biology)
- Life detection
- Magnetic field effects (planetary biology)
- Nature of life
- Origin of life (extraterrestrial)
- Planetary atmospheres
- Planetary biology

Category 55
Planetary Biology

- Planetary environmental simulation
- Protobiological evolution
- Reproduction of extraterrestrial life
- Spontaneous generation of 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.

General Definition

Mathematical - Of, pertaining to, or according to mathematics; hence, theoretically precise; accurate. Webster's New Collegiate Dictionary, 1961, p. 518. Computer - A machine for carrying out calculations and performing specified transformations on information. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 60, NASA SP-7.

Category 59

Mathematical and Computer Sciences (General)

Input Subjects of Specific Interest

- Computer manufacturing
- Computer production
- Computer sciences
- Mathematical sciences

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Category 60

Computer Operations and Hardware

Includes computer graphics and data processing. For components see Category 33, Electronics and Electrical Engineering.

General Definition

Computer Operations - The electronic action required in a computer to give a desired computation. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 308. Hardware - The physical, tangible, and permanent components of a computer or a data-processing system. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., 1974, p. 665.

NASA Interest

Exhaustive Interest: All computer operations and specific hardware in use, under development, or in theory for use in aerospace flight; as test equipment for aerospace hardware, research, or development; for aerospace launch, takeoff, landing, flight control, or navigation.

Selective Interest: Computer operations and specific hardware for land or sea navigation; for transportation control systems; for industrial applications and testing or study purposes with a potential for aerospace application; and for machine tool control.

Negative Interest: Pocket calculators, desk calculators, and computer operations and hardware developed for routine operations such as banking, inventory control, production line control, and the like.

Input Subjects of Specific Interest

- Acoustical couplers
- Adaptive computers
- Airborne computers
- Analog computers

Category 60

Computer Operations and Hardware

- Automatic data processors (ADP)
- Automatic film digitizers
- Calculators
- Compilers (design)
- Computer buffers
- Computer display devices
- Computer graphics
- Computer hardware
- Computer interfacing equipment
- Computer memory devices
- Computer operations
- Computer peripheral equipment
- Computer printers
- Computer readers
- Computer storage devices
- Computer storage techniques
- Computerized information systems
- Computers
- Data input devices

Category 60

Computer Operations and Hardware

- Data input techniques
- Data processing
- Digital computers
- Digital storage devices
- Digital storage techniques
- Electronic computer architecture
- Electronic computers
- Electronic data processing
- Fluidic computers
- Hybrid computers
- Input devices
- Interpreters (design)
- Keypunch equipment
- List processors
- Mechanical computers
- Memory devices
- Minicomputers
- Modems
- Output devices

Category 60
Computer Operations and Hardware

- Plotters
- Pneumatic computers
- Processors (hardware)
- Read-only memories
- Remote input equipment
- Remote input techniques
- Remote readout equipment
- Remote terminals
- Ruggedized computers
- Spaceborne computers
- Storage devices
- Tape drives

Category 61

Computer Programming and Software

Includes computer programs, routines, and algorithms.

General Definition

Programming - To work out a sequence of operations to be performed by electronic computer, an accounting machine, or other automatic equipment; code instructions or problems, as on punched cards or punched tape, to be fed to computing equipment. Webster's Third New International Dictionary, Unabridged, G. and C. Merriam Co., 1964, p. 1812. Software - The totality of programs and routines used to extend the capabilities of computers, such as compilers, assemblers, narrators, routines and subroutines. Air Force Glossary of Standardized Terms and Definitions, Department of the Air Force, 16 December 1963, p. 154, Air Force Manual AFM. 11-1.

NASA Interest

Exhaustive Interest: All computer programming and software concerned with aerospace activities including those for flight computers, test facilities, navigation, control, manufacturing, data processing from the results of these activities, and for the purpose of advancing the state-of-the-art of aerospace research and development.

Selective Interest: Computer programming and software from all sources (e.g., transportation, industry, university, etc.) that would have possible aerospace application.

Negative Interest: Computer programming and software for routine medical, banking, ship operation, production line control, and the like, not having application to aerospace activities.

Input Subjects of Specific Interest

- Algorithms (computer operations)
- Coding techniques
- Compilers (software)

Category 61

Computer Programming and Software

- Computer algorithms
- Computer editing techniques
- Computer programming
- Computer routines
- Computer simulation
- Computer software
- Computer-aided design techniques
- Data acquisition programs
- Debugging procedures
- Debugging programs
- Diagnostic procedures
- Diagnostic programs
- Flight computer programs
- Flight computer software
- Formatters
- Interpreters (software)
- Linear programming
- Mathematical programming
- Navigation computer programs

Category 61

Computer Programming and Software

- Navigation computer software
- Processors (software)
- Programming
- Programming languages
- Signal cleanup
- Test facility computer programs
- Test facility computer software
- Testing programs

Category 62

Computer Systems

Includes computer networks.

General Definition

The hardware and software joined together, such as a program stored in a computer, are considered the operating system. See "software" -- Standard Dictionary of Computers and Information Processing, Martin H. Weik, ed., Hayden Book Co., Inc., 1969, p. 266.

NASA Interest

Exhaustive Interest: Computer systems used for aerospace applications; e.g., launch control, tracking, navigation, communications, weather forecasting, aerospace data compilation and processing, test data calculation, aeronautical and space vehicle control, etc.

Selective Interest: Computer systems used for data compilation and processing in such fields as navigation, mathematics, manufacturing, earth resources, transportation information handling, etc., that may have possible aerospace application.

Negative Interest: Computer systems for routine business and commercial operations, manufacturing and industrial operations and control, and conventional data compilation and processing for academic purposes unless applicable to aerospace activities.

Input Subjects of Specific Interest

- Aircraft control computer systems
- Communications computer systems
- Computer hardware-software combinations
- Computer logic systems
- Computer networks

Category 62

Computer Systems

- Computer systems
- Computer systems engineering
- Computer time sharing
- Data compilation systems
- Data management systems
- Data processing systems
- Flight control computer systems
- Launch control computer systems
- Navigation computer systems
- Nonlinear computer systems
- Self-repairing computer systems
- Spacecraft control computer systems
- Tracking computer systems
- Weather forecasting computer systems

Category 63

Cybernetics

Includes feedback and control theory. For related information see also Category 54, Man/System Technology and Life Support.

General Definition

The study of methods of control and communication which are common to living organisms and machines. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 72, NASA SP-7.

NASA Interest

Exhaustive Interest: All aspects of cybernetics except those specifically for non-aerospace activities.

Selective Interest: Cybernetics of interest to non-aerospace activities that have potential aerospace application.

Input Subjects of Specific Interest

- Adaptive control theory
- Artificial intelligence
- Automata theory
- Automation
- Computer filter theory
- Computer machine theory
- Control theory
- Cybernetics
- Decision theory
- Feedback theory

Category 63

Cybernetics

- Information coding
- Information theory
- Multivariable controls
- Neural net simulation
- Pattern recognition
- Sequential machine theory
- Switching theory

Category 64

Numerical Analysis

Includes iteration, difference equations, and numerical approximation.

General Definition

The study of approximation techniques using arithmetic for solutions of mathematical problems. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 1022.

NASA Interest

Exhaustive Interest: All facets of numerical analysis.

Input Subjects of Specific Interest

- Abelian groups
- Algorithms (mathematics)
- Approximations
- Boundary problems
- Calculus
- Difference equations
- Differential equations
- Dispersion analysis
- Finite element methods
- Functional analysis
- Harmonic analysis
- Iteration

Category 64
Numerical Analysis

- Markov processes
- Mathematical analysis
- Mathematics
- Matrices
- Numerical analysis
- Numerical approximation
- Numerical integration
- Parameter estimation
- Second order equations
- Spline functions
- Variational methods

Category 65

Statistics and Probability

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

General Definition

Statistic - A quantity calculated from a sample of observations, usually as an estimate of some population parameter such as mean or standard deviation. Forthcoming AGARD Multilingual Aeronautical Dictionary. **Probability** - A real number in the scale 0-1 attached to a random event. It can be related to a long run relative frequency of occurrence or degrees of belief that an event will occur. Forthcoming AGARD Multilingual Aeronautical Dictionary.

NASA Interest

Exhaustive Interest: All statistical and probability theory, sampling techniques, reliability theory and techniques, and data processing related to aerospace activities; aircraft and spacecraft control; facilities; development; manufacturing; and the like.

Selective Interest: Statistics and probability related to transportation, agriculture, water pollution and air pollution of possible aerospace interest or application.

Negative Interest: Statistics and probability concerned with banking, housing, home furnishing, and general manufacturing of a non-aerospace nature.

Input Subjects of Specific Interest

- Bayesian statistics
- Data sampling
- Data smoothing
- Error estimation

Category 65

Statistics and Probability

- Error theory
- Monte Carlo method
- Prediction analysis
- Probability
- Probability theory
- Random sampling
- Sampling techniques (numerical analysis)
- Statistical techniques
- Statistical theory
- Statistics
- Stochastic processes
- Weibull distribution

Category 66

Systems Analysis

Includes mathematical modeling; network analysis; and operations research.

General Definition

The examination of an activity, procedure, method, technique or a business to determine what must be accomplished and how the necessary operations may best be accomplished. AGARD Glossary of Documentation Terms, Third Revision, H. A. Stolk, ed., 1968, p. 35.

NASA Interest

Exhaustive Interest: All systems analysis theory and all aerospace related practice, procedures, and applications.

Selective Interest: Systems analysis practice, procedures, and applications from transportation, manufacturing, communications, and scientific fields having potential interest for aerospace activities.

Negative Interest: Business, banking, and management applications unless directly involving aerospace activities.

Input Subjects of Specific Interest

- Convergence criteria
- Mathematical modeling
- Network analysis
- Operations research
- Queueing theory
- Systems analysis
- Systems analysis applications
- Systems analysis practice

Category 66

Systems Analysis

- Systems analysis procedures
- Systems analysis theory

Category 67

Theoretical Mathematics

Includes topology and number theory.

General Definition

Theoretical - Pertaining to theory; depending on, or confined to, theory or speculation. Webster's New Collegiate Dictionary, 1961, p. 881. Mathematics - The deductive study of shape, quantity, and dependance; the two main areas are applied mathematics and pure mathematics, the former arising from the study of physical phenomena, the latter the intrinsic study of mathematical structures. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 910.

NASA Interest

Exhaustive Interest: Mathematical theories developed for and of use in aerospace programs.

Selective Interest: Mathematical theories with applications that may be of potential use for aerospace activities.

Input Subjects of Specific Interest

- Boolean algebra
- Group theory
- Mathematical theories
- Number theory
- Riemann surfaces
- Set theory
- Stability theory
- 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. For related information see also ENGINEERING.

General Definition

The science which deals with those phenomena of inanimate matter involving no changes in chemical composition; more specifically, the science of matter and motion. Physics includes mechanics, heat, electricity, light, and sound and the branches of sciences devoted to the study of radiations (X-rays, gamma rays, cosmic rays) and of atomic structure. Webster's New Collegiate Dictionary, 1961, p. 636.

Category 70

Physics (General)

For geophysics see Category 46, Geophysics. For astrophysics see Category 90, Astrophysics. For solar physics see Category 92, Solar Physics.

NASA Interest

Exhaustive Interest: The elements of physics as they relate to aeronautics, astronautics, and the aerospace sciences.

Selective Interest: The elements of physics from all fields that might have potential aerospace applications.

Negative Interest: Nuclear physics for weaponry, large-scale commercial electricity generation, and other applications not having aerospace potential.

Input Subjects of Specific Interest

- Electromagnetic radiation (theory)

Category 70
Physics (General)

- Field energy
- Field theory
- Infrared radiation theory
- Kinetics
- Magnetism (theory)
- Many-body problems
- Mechanics (theory and analysis)
- Microwave radiation (theory)
- Physics
- Theory of relativity
- Time measurement
- Wave propagation (theory)

Category 71

Acoustics

Includes sound generation, transmission, and attenuation. For noise pollution see Category 45, Environment Pollution.

General Definition

1. The study of sound, including its production, transmission, and effects.
2. Those qualities of an enclosure that together determine its character with respect to distance hearing. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 4, NASA SP-7.

NASA Interest

Exhaustive Interest: Acoustic theory, noise generation, sound attenuation, and related phenomena as it applies to aerospace equipment and vehicles and their operating environment. For specific applications see Category 02, Aerodynamics; Category 07, Aircraft Propulsion and Power; Category 15, Launch Vehicles and Space Vehicles; Category 18, Spacecraft Design, Testing, and Performance; and Category 20, Spacecraft Propulsion and Power.

Selective Interest: Noise generation and sound attenuation related to other means of transportation, manufacturing, and construction that may have potential aerospace application.

Negative Interest: Home and commercial noise generation and sound attenuation unless a direct result of or applicable to aerospace developments.

Input Subjects of Specific Interest

- Acoustic scattering
- Acoustic theory
- Acoustics
- Aeroacoustics

Category 71

Acoustics

- Aerodynamic noise (theory and measurement)
- Noise attenuation
- Noise generation
- Noise measurement
- Noise propagation
- Noise reduction
- Sonic boom (physics of)
- Sound absorption
- Sound attenuation
- Sound generation
- Sound generation in ducts
- *Sound propagation*
- Sound propagation in materials
- Sound reduction
- Sound transmission
- Surface wave acoustic devices (theory)
- Ultrasonic applications
- Ultrasonic theory

Category 72

Atomic and Molecular Physics

Includes atomic structure and molecular spectra.

General Definition

Atomic Physics - The science concerned with the structure of the atom, the characteristics of the elementary particles of which the atom is composed, and the processes involved in the interactions of radiant energy with matter. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 108. Molecular Physics - The study of the behavior and structure of molecules, including the quantum-mechanical exploration of several kinds of chemical binding between atoms in a molecule, directed valence, the polarizability of molecules, the quantization of vibrational, rotational, and electronic motions of molecules, and the phenomena arising from intermolecular forces. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 961.

NASA Interest

Exhaustive Interest: The basic theories and formulae of atomic and molecular physics.

Selective Interest: Those elements of atomic and molecular physics that have actual or potential application to the aerospace program.

Negative Interest: Large, heavy nuclear reactor applications, ship propulsion reactors, etc.

Input Subjects of Specific Interest

- Absorption of radiation by atoms
- Activation analysis
- Atomic beam measurements
- Atomic collisions

Category 72

Atomic and Molecular Physics

- Atomic electron properties
- Atomic energy levels
- Atomic frequency standards
- Atomic fuels
- Atomic physics
- Atomic reactions
- Atomic structure
- Chemical binding
- Electron collisions
- Emissivity of radiation by atoms
- Fluorescence
- Intermolecular forces
- Ion beams (theory)
- Ion dynamics
- Luminescence (atomic structure)
- Molecular beams
- Molecular collision theory
- Molecular energy
- Molecular physics

Category 72

Atomic and Molecular Physics

- Molecular properties
- Molecular spectra
- Molecular spectroscopy
- Molecular structure
- Quarks
- Radiation absorption by atoms
- Radiation chemistry
- Theories of atomic physics
- Theories of molecular physics
- X-ray radiation (physics)

Category 73

Nuclear and High-Energy Physics

Includes elementary and nuclear particles; and reactor theory. For space radiation see Category 93, Space Radiation.

General Definition

Nuclear Physics - The study of the characteristics, behavior, and internal structures of the atomic nucleus. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 1020. High-Energy Physics - The branch of physics concerned with understanding the properties and behavior of elementary particles, especially through studies of collisions or decays involving energies of hundreds of MeV (million electron volts) or more. Also known as particle physics. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 1082.

NASA Interest

Exhaustive Interest: The basic theories and formulae of nuclear and high-energy physics and testing and research equipment to support these developments.

Selective Interest: Those applications that may be of use to the aerospace program, i.e., propulsion systems and power sources, suitable for aerospace use.

Negative Interest: Large, heavy nuclear reactor applications, ship propulsion reactors, etc.

Input Subjects of Specific Interest

- Alpha rays (theory)
- Beta rays (theory)
- Cyclotrons
- Electron beams

Category 73

Nuclear and High-Energy Physics

- Elementary particles
- Fission spectra
- Gamma rays (theory)
- High energy accelerators
- High energy particles
- High energy physics
- High energy research equipment
- High energy test equipment
- Ion beam particle generators
- Ion beams (high-energy physics)
- Linear accelerators
- Neutron properties
- Neutron spectra
- Nuclear engines
- Nuclear fission
- Nuclear fuels
- Nuclear magnetic resonance
- Nuclear particles
- Nuclear physics

Category 73

Nuclear and High-Energy Physics

- Nuclear power sources (theory)
- Nuclear propulsion systems (theory)
- Nuclear reactor operation
- Nuclear reactor theory
- Nuclear reactors (theory)
- Nuclear research equipment
- Nuclear test equipment
- Particle scattering
- Proton beams
- Radiation safety measures (nuclear reactor)
- Radioisotopes
- Reactor theory
- X-rays (theory)

Category 74

Optics

Includes light phenomena.

General Definition

1. Narrowly, the science of light and vision. 2. Broadly, the study of the phenomena associated with the generation, transmission and detection of electromagnetic radiation in the spectral range extending from the long-wave edge of the x-ray region to the short-wave edge of the radio region, or in wavelength from about 1 nanometer to about 1 millimeter. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 1046.

NASA Interest

Exhaustive Interest: Theories of light transmission and lenses, light absorption, reflection, and scattering.

Selective Interest: Applications of optics and light phenomena to aerospace use.

Negative Interest: Industrial, commercial, and household applications of optics and light phenomena, lenses, eyeglasses, etc., that do not have direct application to aerospace activities.

Input Subjects of Specific Interest

- Cassegrain optics
- Coherent light
- Electron optics theory
- Fiber optics
- Infrared optics
- Infrared radiation effects (optical applications)

Category 74

Optics

- Infrared spectra
- Lens theory
- Lenses (optical properties)
- Light absorption
- Light phenomena
- Light reflection
- Light scattering
- Light transmission
- Liquid optics
- Luminescence (optics)
- Modulation transfer functions
- Optical communication (optics)
- Optical imaging devices (optics)
- Optical imaging systems
- Optical materials
- Optical properties of gases
- Optical properties of liquids
- Optical properties of solids
- Optical waveguides

Category 74

Optics

- Optics
- Photon beams
- Telescopes (optical properties)

Category 75

Plasma Physics

Includes magnetohydrodynamics and plasma fusion. For ionospheric plasmas see Category 46, Geophysics. For space plasmas see Category 90, Astrophysics.

General Definition

The study of the properties of plasmas. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 210, NASA SP-7.

NASA Interest

Exhaustive Interest: Theoretical magnetohydrodynamics and plasma fusion, and research and test equipment for studies in plasma physics.

Selective Interest: Applications of magnetohydrodynamics and plasma fusion that may be of interest for propulsion, power sources, and other uses in the aerospace program.

Negative Interest: Heavy industrial and commercial applications and large power reactors not of direct application to aerospace activity.

Input Subjects of Specific Interest

- Boltzmann transport theory
- Collision effects
- Electrogasdynamics
- Electrohydrodynamics
- Ion beams (plasma physics)
- Laser interaction with plasmas
- Magnetogasdynamics
- Magnetohydrodynamics

Category 75
Plasma Physics

- Magnetoplasmas
- MHD generators
- Microwave interaction with plasmas
- Nuclear fusion
- Plasma conductivity
- Plasma diagnostics
- Plasma dynamics
- Plasma flow
- Plasma fusion
- Plasma oscillations
- Plasma physics
- Plasma physics research equipment
- Plasma physics test equipment
- Plasma pinch
- Plasma seeding
- Plasma sheath
- Plasma theory
- Plasma waves

Category 76

Solid-State Physics

Includes superconductivity. For related information see also Category 33, Electronics and Electrical Engineering; and Category 36, Lasers and Masers.

General Definition

The branch of physics centering about the physical properties of solid materials. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 1378.

NASA Interest

Exhaustive Interest: All facets of solid-state physics and the solid-state effects in electrical and electronic devices.

Selective Interest: Commercial applications of solid-state physics that might have a potential for use in aerospace applications.

Negative Interest: Automotive and household applications of solid-state physics having no aerospace potential.

Input Subjects of Specific Interest

- Acceptors in semiconductors
- Band structure of solids
- Conductivity in semiconductors
- Critical field curves of superconducting materials
- Critical temperatures of superconducting materials
- Crystal defects
- Crystal defects in ionic materials
- Crystal growth

Category 76

Solid-State Physics

- Crystal structure (semiconductors)
- Crystallography
- Dielectric materials properties
- Donors in semiconductors
- Electrical transport properties in solids
- Electron energy band structure
- Electron energy bands
- Electron motion in conductors
- Electron paramagnetic resonance in semiconductors
- Energy gaps in semiconductors
- Holes in semiconductors (electron deficiencies)
- Lattice vibrations
- Mossbauer effect
- Piezoelectricity
- Radiation effects in semiconductors
- Solid state physics
- Superconducting materials
- Superconductivity (theory)
- Transition of superconducting materials

Category 77

Thermodynamics and Statistical Physics

Includes quantum mechanics; and Bose and Fermi statistics. For related information see also Category 25, Inorganic and Physical Chemistry; and Category 34, Fluid Mechanics and Heat Transfer.

General Definition

Thermodynamics - The study of the flow of heat. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 285, NASA SP-7.
Statistical - Of, relating to, or dealing with statistics. Webster's Third New International Dictionary, 1964, p. 2230.

NASA Interest

Exhaustive Interest: The basic theories and formulae of thermodynamics and statistical physics.

Selective Interest: Those applications that may be of use to the aerospace program.

Input Subjects of Specific Interest

- Antigravity
- Bose and Fermi statistics
- Enthalpy
- Entropy
- Quantum mechanics
- Statistical physics
- Temperature-pressure phenomena
- Thermodynamic properties of:

Compounds

Category 77

Thermodynamics and Statistical Physics

- Thermodynamic properties of:(Cont.)
 - Elements
 - Gases
 - Liquids
 - Materials
 - Solids
- Thermodynamics

SOCIAL SCIENCES

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

General Definition

One of a group of sciences dealing with special phases of human society, as economics, sociology, ethics, etc. Webster's New Collegiate Dictionary, 1961, p. 803.

Category 80

Social Sciences (General)

Includes educational matters.

Input Subjects of Specific Interest

- Dictionaries (refer to appropriate category for dictionaries on specific subjects)
- Educational matters
- Foreign languages
- Social sciences
- Sociological research (humanities)

Category 81

Administration and Management

Includes management planning and research.

General Definition

Administration - The performance of the executive of an institution, business, or the like. Webster's New Collegiate Dictionary, 1961, p. 12. Management - Act or art of managing; conduct; control; direction. Webster's New Collegiate Dictionary, 1961, p. 510.

NASA Interest

Exhaustive Interest: Administration and management of NASA and the aerospace industry.

Selective Interest: Administration and management applicable to the aerospace program.

Negative Interest: Routine industrial and transportation administration and management not related to the aerospace program.

Input Subjects of Specific Interest

- Administration
- Administrative decision making
- Administrative planning
- Analysis of alternatives and tradeoffs
- Contract supervision
- Critical path method and PERT
- Decision making
- Management

Category 81
Administration and Management

- Management information systems
- Management planning
- Management research
- Management tools
- PERT
- Project management
- Research management
- Research planning
- Tradeoffs and options

Category 82

Documentation and Information Science

Includes information storage and retrieval technology; micrography; and library science. For computer documentation see Category 61, Computer Programming and Software.

General Definition

Documentation - The creating, collection, organizing, storing, citing, and disseminating of documents, or the information recorded in documents. Compilation of Terms in Information Sciences Technology, Federal Council for Science and Technology, Florence Casey, ed., April 1970, p. 143. Information Science - The study of generating, acquiring, processing, storing, retrieving, disseminating, and using information; and the development of methods for the useful organization of data and dissemination of information. Compilation of Terms in Information Sciences Technology, Federal Council for Science and Technology, Florence Casey, ed., April 1970, p. 217.

NASA Interest

Exhaustive Interest: All facets of documentation and information science theory.

Selective Interest: Documentation and information science methods and procedures of possible application to the processing, retrieval, and dissemination of aerospace information.

Negative Interest: Community library procedures and techniques.

Input Subjects of Specific Interest

- Data bases
- Document miniaturization
- Document processing
- Documentation
- Graphic arts

Category 82
Documentation and Information
Science

- Information retrieval
- Information science
- Information storage
- Library science
- Mechanical drawing
- Microfiche techniques
- Micrography
- Project documentation
- Reprography
- Technical writing

Category 83

Economics and Cost Analysis

Includes cost effectiveness studies.

General Definition

Economics - The science that investigates the conditions and laws affecting the production, distribution, and consumption of wealth, or the material means of satisfying human desires; political economy. Webster's New Collegiate Dictionary, 1961, p. 260. **Cost Analysis** - Analysis of the factors contributing to the costs of operating a business and of the costs which will result from alternative procedures, and of their effects on profits. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 336.

NASA Interest

Exhaustive Interest: Those elements of economics and cost analysis theory, law, and other developments that would impact directly the aerospace program.

Selective Interest: Those elements of economics and cost analysis that would have possible application to the aerospace program. (e.g.: Contract procurement, production forecasts, marketing predictions, transportation funding forecasts.)

Negative Interest: The economics and cost analysis of household, routine business and marketing, manufacturing, and local, state, and Federal government procedures that have no impact on aerospace activities.

Input Subjects of Specific Interest

- Aircraft economics
- Airline economics
- Contract procurement
- Cost analysis

Category 83
Economics and Cost Analysis

- Cost effectiveness studies
- *Economics*
- Marketing predictions
- Marketing research
- Production costs
- Production forecasts
- Space flight economics
- Space shuttle economics
- Transportation funding forecasts

Category 84

Law and Political Science

Includes space law; international law; international cooperation; and patent policy.

General Definition

1. A rule of conduct or action prescribed by the supreme governing authority and enforced by a sanction; as any edict, decree, order, ordinance, statute, judicial decision, etc. 2. The whole body of such rules; also, the control or regulation, or state of society, brought about by the existence and enforcement of such rules. Webster's New Collegiate Dictionary, 1961, p. 476.

NASA Interest

Exhaustive Interest: All aspects of law and political science, both domestic and international, that is concerned with or directly affects the aerospace programs.

Negative Interest: Domestic and international civil law, shipping and other transportation law, and political science, unless directly concerned with aerospace programs.

Input Subjects of Specific Interest

- Aerospace agreements
- Air piracy (legal aspects)
- Civil aeronautical law
- Congressional legislation
- Federal aviation decisions
- Federal aviation laws
- International cooperation
- International law

Category 84

Law and Political Science

- Law
- Legal liability of commercial aviation
- Legal liability of general aviation
- Legal liability of manned space flight
- Legal liability of unmanned space flight
- NASA appropriation hearings
- Patent policy
- Patents
- Political science
- Space law
- Treaties

Category 85

Urban Technology and Transportation

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

General Definition

Technology - Systematic knowledge of and its application to industrial processes; closely related to engineering and science. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 1477. Transportation - An act, process, or instance of transporting or being transported. Webster's Third New International Dictionary, Unabridged, G. and C. Merriam Co., 1964, p. 2430.

NASA Interest

Exhaustive Interest: All aspects of the transfer of NASA-supported technology to the use of, and to provide solutions for, urban, ecological, agricultural, manufacturing, energy, and other problems of interest to mankind; and the assessment of science and technology within NASA, domestically, and world wide.

Selective Interest: Technology transfer from non-NASA sources that might be applicable to NASA use, or in conjunction with developments for use outside NASA; and surface and mass transportation that might serve NASA or provide improved transportation as a result of the NASA aerospace effort.

Negative Interest: Routine ship, railroad, bus, trucking, or automotive transportation unless of an unusual nature or utilized in an unusual manner in the aerospace program.

Input Subjects of Specific Interest

- Air cushion vehicles (transportation applications)
- Application of space technology to urban problems

Category 85

Urban Technology and Transportation

- City planning
- Fresh water sources
- Hydrofoil vehicles (transportation applications)
- Land transportation vehicles (development and technology)
- Mass transportation
- Rapid transit systems
- Science assessment
- Seat belts (land transportation)
- Sewage disposal
- Shoulder harness (land transportation)
- Space technology applications to urban problems
- Space technology assessment
- Space technology transfer
- Surface transportation
- Technology assessment
- Technology transfer
- Technology treatment
- Transportation
- Urban planning

Category 85

Urban Technology and Transportation

- Urban problems
- Urban technology
- Urban transportation
- Waste products conversion (urban technology)
- Waste products disposal (urban technology)
- Waste treatment (development and technology)
- Water treatment (development and technology)

SPACE SCIENCES

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

General Definition

The specific discipline associated with the development of knowledge about the universe. Apollo Terminology, August 1963, p. 91, NASA SP-6001.

Category 88

Space Sciences (General)

Input Subjects of Specific Interest

- Extraterrestrial communication
- Extraterrestrial intelligence
- Space sciences

Category 89

Astronomy

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

General Definition

The science that treats of the location, magnitudes, motions, and constitution of celestial bodies and structures. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed. 1965, p. 23, NASA SP-7.

NASA Interest

Exhaustive Interest: All facets of astronomy including radio and gamma-ray astronomy, celestial mechanics, and planets and their structure, motions, and locations.

Input Subjects of Specific Interest

- Asteroid belt
- Asteroids (observation)
- Astrometry
- Astronomy
- Binaries
- Black holes
- Celestial bodies
- Celestial mechanics (observation)
- Comets
- Discovery of celestial bodies
- Ephemerides of celestial bodies

Category 89

Astronomy

- Galaxies
- Gamma-ray astronomy
- Identification of celestial bodies
- Infrared telescopes
- Moons
- Natural satellites
- Nebulae
- Novae
- Observation of celestial bodies
- Optical telescopes
- Planet location
- Planet motion
- Planet structure (observation)
- *Planetary satellites*
- Planets
- Pulsars
- Quasars
- Radar telescopes
- *Radio astronomy*

Category 89

Astronomy

- Radio telescopes
- Spectroscopy (astronomy)
- Star trackers (observation)
- Stars
- Sun
- Supernovae
- Telescopes (operation)
- X-ray telescopes

Category 90

Astrophysics

Includes cosmology; and interstellar and interplanetary gases and dust.

General Definition

A branch of astronomy that treats of the physical properties of celestial bodies, such as luminosity, size, mass, density, temperature, and chemical composition. Dictionary of Technical Terms for Aerospace Use, Wm. H. Allen, ed., 1965, p. 23, NASA SP-7.

NASA Interest

Exhaustive Interest: All facets of the physical properties of celestial bodies, interplanetary, interstellar, and intergalactic properties. For planetary structure see Category 91, Lunar and Planetary Exploration.

Input Subjects of Specific Interest

- Astrophysics
- Calculations of chemical composition
- Calculations of density
- Calculations of luminosity
- Calculations of mass
- Calculations of physical properties
- Calculations of size
- Calculations of temperature
- Celestial body orbits
- Celestial body physical properties
- Celestial body trajectories

Category 90

Astrophysics

- Celestial mechanics (data analysis and calculations)
- Celestial trajectories
- Cosmic noise
- Cosmology
- Data analysis and calculations (astrophysics)
- Data analysis and calculations of binaries
- Data analysis and calculations of black holes
- Data analysis and calculations of galaxies
- Data analysis and calculations of nebulae
- Data analysis and calculations of novae
- Data analysis and calculations of pulsars
- Data analysis and calculations of quasars
- Data analysis and calculations of stars
- Data analysis and calculations of supernovae
- Galactic structure
- Gravitational collapse (space)
- Gravitational radiation
- Gravitational theory (space)
- Gravitational waves

Category 90
Astrophysics

- Gravity waves (space)
- Intergalactic dust
- Intergalactic gases
- Intergalactic matter
- Intergalactic properties
- Interplanetary dust
- Interplanetary gases
- Interplanetary matter
- Interplanetary properties
- Interplanetary shock waves
- Interstellar dust
- Interstellar gases
- Interstellar matter
- Interstellar properties
- Magnetism (extraterrestrial)
- Photosphere
- Physical properties of celestial bodies
- Solar system
- Space exploration (flyby missions)

Category 90

Astrophysics

- Stellar luminosity
- Stellar magnetic fields
- Stellar physics
- Stellar spectroscopy
- Unmanned flights (flyby missions)

Category 91

Lunar and Planetary Exploration

Includes planetology; and manned and unmanned flights. For spacecraft design see Category 18, Spacecraft Design, Testing and Performance. For space stations see Category 15, Launch Vehicles and Space Vehicles.

General Definition

Lunar - Of or pertaining to the moon. Dictionary of Technical Terms for Aerospace Use. Wm. H. Allen, ed., 1965, p. 165, NASA SP-7. Planetary - Of or pertaining to a planet or the planets. Webster's New Collegiate Dictionary, 1961, p. 645.

NASA Interest

Exhaustive Interest: All facets of manned, unmanned, or remote exploration of planets and their structure, including planets within the solar system or elsewhere within the universe.

Input Subjects of Specific Interest

- Asteroids (characteristics and composition)
- Lunar exploration
- Lunar mapping
- Lunar photography
- Lunar samples
- Lunar structure
- Manned flights (space exploration)
- Manned lunar exploration
- Manned planetary exploration
- Meteorites

Category 91

Lunar and Planetary Exploration

- Meteoroids
- Meteors
- Planet structure (characteristics and composition)
- Planetary exploration
- Planetary mapping
- Planetary photography
- Planetary samples
- Planetology
- Remote exploration of planets
- Selenography
- Selenology
- Tektites
- Unmanned flights (space exploration)
- Unmanned lunar exploration
- Unmanned planetary exploration

Category 92

Solar Physics

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

General Definition

The scientific study of all physical phenomena connected with the sun; it overlaps with geophysics in the consideration of solar-terrestrial relationships, such as the connection between solar activity and auroras. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes ed., McGraw-Hill Book Co., 1974, p. 1376.

NASA Interest

Exhaustive Interest: All facets of solar physics.

Input Subjects of Specific Interest

- Alpha rays (solar)
- Beta rays (solar)
- Chromosphere
- Gamma rays (solar)
- Lunar eclipses
- Solar activity
- Solar constants
- Solar corona
- Solar cycles
- Solar density
- Solar eclipses

Category 92

Solar Physics

- Solar flares
- Solar magnetic field
- Solar mass
- Solar physics
- Solar radiation
- Solar radio emissions
- Solar ratio
- Solar structure
- Solar wind
- Sunspots
- X-rays (solar)

Category 93

Space Radiation

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

General Definition

Radiation - The emission and propagation of waves transmitting energy through space or through some medium; for example, the emission and propagation of electromagnetic, sound, or elastic waves. Dictionary of Scientific and Technical Terms, Daniel N. Lapedes, ed., McGraw-Hill Book Co., 1974, p. 1209.

NASA Interest

Exhaustive Interest: All facets of space radiation.

Input Subjects of Specific Interest

- Alpha rays (space)
- Beta rays (space)
- Cosmic radiation
- Galactic radiation
- Gamma rays (space)
- Inner earth radiation belts
- Intergalactic radiation
- Interstellar radiation
- Outer earth radiation belts
- Radiation belts

Category 93

Space Radiation

- Space radiation
- Stellar radiation
- Van Allen belts
- X-ray radiation (space)
- X-rays (space)

GENERAL

General Definition

Reports of such wide subject coverage and of such broad nature that it is impossible to determine a suitable or predominate subject category or for which no other subject category exists.

Category 99

General

Input Subjects of Specific Interest

- Aeronautical history
- Astronautical history
- Biographies of astronauts, aviation pioneers, pilots, and scientists
- Histories of aeronautics and space programs

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