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  NASA Center for AeroSpace Information
  7121 Standard Drive
  Hanover, MD 21076-1320
NASA THESAURUS SUPPLEMENT

A three-part cumulative update of the 1998 edition of the NASA Thesaurus

National Aeronautics and Space Administration

July 2001
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A list of deletions or changes to postable terms.
Introduction


**Part 1 (Hierarchical Listing)** contains the full hierarchical structure for each new term along with all new cross references and term definitions.

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For a fuller explanation, see the Introduction (pages viii–xi) in the printed version of the 1998 *NASA Thesaurus*, Volume 1.

**Part 2 (Rotated Term Display)** is a ready reference tool which provides additional ‘access points’ to the thesaurus terminology. It contains the postable terms and nonpostable cross references found in the Hierarchical Listing (Part 1) arranged in a KWIC (key-word-in-context) index.

**Part 3 (Changes)** is a listing of deletions or changes to postable terms or USE references made since the 1998 edition of the *NASA Thesaurus*. To control the size of the Supplement, only significant changes in term hierarchies and related term lists are presented.

NOTE: Other resources and products related to the NASA Thesaurus can be found at the following URL: [http://www.sti.nasa.gov/thesfrm1.htm](http://www.sti.nasa.gov/thesfrm1.htm).

In addition to the above mentioned resources, a thesaurus listserv has been set up for submitting candidate terms and discussion of related lexicographical issues. A listing of candidate and accepted new terms is posted monthly. To subscribe to this listserv, send an e–mail message to listserv@sti.nasa.gov. Leave the subject line blank and in the message section, type SUBSCRIBE THESAURUS–L <Your name>. (Should you wish to cancel your subscription, send a message to the same address with UNSUBSCRIBE in the message section.)

Comments and suggestions regarding the NASA Thesaurus should be directed to:

Lexicographer  
NASA Center for AeroSpace Information  
7121 Standard Drive  
Hanover, MD 21076–1320

E–mail: help@sti.nasa.gov  
Fax: (301) 621–0134  
Telephone: (301) 621–0114
NASA THESAURUS SUPPLEMENT

PART 1
HIERARCHICAL LISTING

A

2001 Mars Odyssey
(adDED May 2001)
DEF Mars orbiter mission designed to make
global observations of Mars to improve our understanding
of the Martian climate and geologic history, including the search for liquid water and
evidence of past life. The three primary instruments carried onboard are THEMIS
(Thermal Emission Imaging System), GRS (Gamma Ray Spectrometer), and MARIE (Mars

GS space missions
. . . 2001 Mars Odyssey
RT gamma ray spectrometers
Mars (planet)
Mars exploration
Mars surface
Mars Surveyor 2001 Mission

ACE satellite
USE Advanced Composition Explorer

Advanced Composition Explorer
(adDED December 1999)
DEF Explorer spacecraft (launched August
25, 1997) carrying six high-resolution sensors and
three monitoring instruments for sampling low-energy particles of solar origin and
high--energy galactic particles. From a vantage
point approximately 1/100 of the distance from the
Earth to the Sun, the Advanced Composition
Explorer (ACE) can perform measurements over
a wide range of energy and nuclear mass, under
all solar wind flow conditions and during both large
and small particle events including solar flares.
When reporting space weather ACE can provide
an advance warning of geomagnetic storms.

UF ACE satellite
Explorer 71 satellite
artificial satellites
. . . Explorer satellites
. . . Advanced Composition Explorer

RT energetic particles
galactic cosmic rays
interplanetary medium
solar corpuscular radiation
solar cosmic rays
solar wind
space weather

aeroshells
(adDED May 1999)
DEF Aerodynamic structural shells that attach
to, or comprise a portion of, the exterior of an
aerospace vehicle or space probe; especially such
structures that support atmospheric entry,
aerobraking, aerosail, or hypersonic flight.

GS aerodynamic configurations
aeroshells
RT aeromaneuvering
noise cones
reentry vehicles

spacecraft design
spacecraft shielding
spacecraft structures

Alpha Magnetic Spectrometer
(adDED June 1998)

UF AMS (spectrometer)
GS measuring instruments
. . . spectrometers
. . . Alpha Magnetic Spectrometer

RT antimatter
Cerenkov counters
cosmic rays
dark matter
International Space Station
intersstellar matter
magnetic spectroscopy
space station payloads
spaceborne astronomy

AM-1 (EOS) spacecraft
USE Terra spacecraft

AMS (spectrometer)
USE Alpha Magnetic Spectrometer

anisoplanatism
(adDED May 1999)
DEF In adaptive optics (AO) systems, a
performance-degrading effect that arises
whenever light from the wave-front sensor beacon
and light from the target object sample different
volumes of optical turbulence. This effect results
in an increased value of the aperture-averaged
residual phase variance after AO compensation,
which causes an exponential decrease in system
performance.

RT aberration
adaptive optics
atmospheric correction
detection
image restoration
optical correction procedure
phase error
telescopes

antenna gain
(adDED June 1998)

GS amplification
antenna gain
RT antennas
automatic gain control
directional antennas
effectiveness
high gain
signal reception

anticoincidence detectors
(adDED August 2000)

DEF Detectors and related systems that
differentiate ambient background noise from
signals of interest by identifying unwanted input
signals that co--occur in time with other signals.
Often used with gamma-ray detection systems.

UF anticoimcidence shields
RT background radiation
coincidence circuits
compensators

anticoincidence shields
USE anticoimcidence detectors

anticoincidence boundaries
(adDED March 1998)

UF antiphase domains
APB (materials)
GS boundaries
. . . antiphase boundaries
RT binary alloys
crystal dislocations
crystal lattices
crystal structure
grain boundaries
interfacial energy
intermetallics
microstructure
order--disorder transformations
solid solutions
solid--solid interfaces
superlattices
ternary alloys

anticoincidence boundaries
USE antiphase boundaries

apoptosis
(adDED October 2000)
DEF One of the two mechanisms by which
cell death occurs (the other being the pathological
process of NECROSIS). Apoptosis is the
mechanism responsible for the physiological
deletion of cells and appears to be intrinsically
programmed. It is characterized by distinctive
morphologic changes in the nucleus and
cytosol, chromatin cleavage at regularly spaced
sites, and the endoneucleolytic cleavage of
nucieic acid at internucleosomal sites. This
mode of cell death serves as a balance to mitosis
in regulating the size of animal tissues and in
mediating pathologic processes associated with
tumor growth.

UF programmed cell death
GS physiological effects
apoptosis
RT biological effects
cells (biology)
cytology
death
dexxyribonucleic acid
necrosis
radiation effects

1
archaeomagnetism
USE paleomagnetism

associative memory
(added December 1999)
DEF A method or device for data storage in which data is identified by a part or properties of its content, rather than by an address or relative position.
UF associative storage
GS memory (computers)
RT associative memory

asteroseismology
(added March 2001)
DEF Study of stellar oscillations as a means to probing the internal structure and dynamics of stars.
UF stellar seismology
GS seismology
RT astrophysics

automatic indexing
USE indexing (information science)

baroreceptor reflexes
USE baroreflexes

baroreflexes
(added March 2001)
DEF A negative feedback system that buffers short-term changes in blood pressure. Increased pressure stretches blood vessels, which activates pressoreceptors (baroreceptors) in the vessel walls. The central nervous system's net response is a reduction of central sympathetic outflow. This reduces blood pressure by decreasing peripheral vascular resistance and by lowering cardiac output. Because the baroreceptors are tonically active, the baroreflex can compensate rapidly for both increases and decreases in blood pressure.
UF baroreceptor reflexes
GS reflexes
RT baroreceptors

biodevices
(added May 1999)
GS gears
RT bevel gears

biomass burning
(added December 1999)
DEF Burning of vegetation in forests, grasslands, and agricultural lands usually carried out to clear the land and change its use; a significant contributor to the global budgets of many radiatively and chemically active gases and particulates in the atmosphere.
GS combustion
RT biomass burning

Blot–Savart law
(added August 1998)
DEF Law describing the intensity of a magnetic field produced by a current carrying wire. Also applied in fluid dynamics to describe the flow-velocity field induced by a vortex.
GS laws
RT Blot–Savart law

blood–vessel configurations
(added April 2001)
DEF Flight vehicle configurations that maximize overall efficiency by integrating the engines, wings, and the body into a single lifting surface. Sometimes referred to as flying–wing configurations.
UF blended–wing–fuselage
GS blood–vessel configurations
RT blood–vessel configurations

Boeing 717 aircraft
(added October 1999)
GS Boeing aircraft

bottium
(added May 1998)
GS chemical elements

Bond number
(added December 1999)
DEF Dimensionless number representing the ratio between gravitational force and the surface tension of a bubble, drop, or meniscus.
GS dimensionless numbers
RT Bond number

BWB configurations
USE blended–wing–body configurations

carrier sense multiple access
(added April 2000)
DEF A data transmission protocol for multi-access networks where each node in the network senses traffic and waits for it to clear before transmitting. If two or more nodes transmit simultaneously, they wait a random interval before attempting to re-transmit.
GS protocol (computers)
RT carrier sense multiple access

cascade devices
(added August 1998)
DEF Amplifier devices consisting of a common grounded-emitter (cathode) or source stage that drives a grounded-base output stage, resulting in high-impedance, high-gain, and low-noise.
GS amplifiers
RT cascade devices
the gravitational vector; often applied to simulate clinostating clinostats
(august 2000)
def Devices for producing vector-averaged gravitational environments which mimic microgravity.
uf random positioning machines
gs simulators
... environment simulators
... space simulators
... clinostats
rt bioreactors centrifuges clinorotation gravitational effects gravitational physiology microgravity rotating environments space environment simulation tissue engineering weightlessness simulation
cloud-to-cloud discharges
(august 2000)
gs electric current
... electric discharges
... lighting
... cloud-to-cloud discharges
cloud-to-ground discharges
(august 2000)
gs electric current
... electric discharges
... lighting
... cloud-to-ground discharges
rt elves
sprites (atmospheric physics)
CMBR (astronomy)
ue cosmic microwave background radiation
cochannel interference
(april 2000)
def Interference caused by multiple, simultaneous transmissions occurring in the same communication channel.
gh electromagnetic interference
... radio frequency interference
... cochannel interference
rt channel capacity
channel noise intersymbolic interference phase shift keying
colloidal suspensions
ue colloids
comet nucleus tour
(fbuary 1999)
def A NASA Discovery-class mission to acquire imagery and comparative spectral maps of comet nuclei and analyze comet dust flows. The mission spacecraft will fly to within 100 kilometers of at least three near-Earth comets including Comet Encke, Comet Schwassmann-Wachmann, and Comet d'Arrest.
uf CONTOUR (mission)
gs space missions
... flyby missions
rt comet nucleus tour
encke comet
schwassmann--wachmann comet
swingby technique
commercial off-the-shelf products
(march 2001)
def Readily-available, commercially-developed products; often referring to commercial products that can be used as an alternative to in-house or customized product development.
uf COTS products
gs products
... commercial off-the-shelf products
rt commercialization
cost-effectiveness
government procurement
procurement management
product development
content-addressable memory
ue associative memory
CONTOUR (mission)
ue comet nucleus tour
cooper-harper ratings
(august 1999)
def pilot ratings
... Cooper-Harper ratings
ratings
rt Cooper-Harper ratings
helicopter performance
corrugated waveguides
(february 1998)
gh waveguides
... corrugated waveguides
rt gratings (spectra)
optical waveguides
waveguide antennas
cosmic microwave background radiation
(july 2000)
gh microwave background radiation
cosmic microwave background radiation
... cosmic microwave background
... electromagnetic waves
... extraterrestrial radio waves
... cosmic microwave background radiation
... short wave radiation
... microwaves
... cosmic microwave background radiation
... extraterrestrial radiation
... extraterrestrial radio waves
... cosmic microwave background radiation
... radio astronomy
... radio astronomy
... relic radiation
... sunyaev--zel'dovich effect
cosmics
ue weakly interacting massive particles
cost-benefit analysis
ue cost analysis
cost-effectiveness
COTS products
ue commercial off-the-shelf products
critical current
(December 1999)
def A current value in a superconductive material, at a particular constant temperature and in the absence of a magnetic field, below which...
cuprates

the material is superconducting and above which the material behaves normally

GS electric current
  critical current
RT critical temperature
  current density
  superconductivity
  cuprates (materials)

Delta 3 launch vehicle
(added October 1998)
GS launch vehicles
  Delta launch vehicle
  Delta 3 launch vehicle

Delta 4 launch vehicle
(added October 1998)
GS launch vehicles
  Delta launch vehicle
  Delta 4 launch vehicle
dendrimers
(added October 2000)
DEF A class of polymeric macromolecules characterized by a regular highly-branched molecular architecture resembling a spherical starburst, and a synthesis process that permits nearly complete control over critical molecular design parameters, such as size, shape, surface/interior chemistry, flexibility, and topology. Because of these characteristics, dendrimers are seen as important elements in the manufacture of nanoscale materials and devices.

UF dendritic polymers
  hyperbranched polymers
  macromolecules
  dendrimers
RT conducting polymers
dendritic crystals
  nanostructure (characteristics)
  organometallic polymers
  polymers
  synthetic metals
dendritic polymers
USE dendrimers
design optimization
(added February 2001)
GS optimization
  design optimization
  shape optimization
RT aircraft design
computer aided design
  design
  genetic algorithms
  sensitivity analysis
  structural analysis
  structural design
  structural design criteria
  systems engineering

Destiny Laboratory Module
(added February 2001)
DEF Component of the International Space Station providing equipment and support systems for research and technology development. Also provides support and control for the US segment of the Space Station.

UF US Laboratory Module (ISS) GS laboratories
  space laboratories
  manned orbital laboratories
  Destiny Laboratory Module
dielectric loss
(added April 2000)
DEF The electric energy that is converted into heat in a dielectric material subjected to a changing electric field.

GS electrical properties
  dielectric properties
  losses
dielectric loss
RT dielectrics
  energy dissipation
  permittivity
dielectric waveguides
(added February 1998)
GS waveguides
dielectric waveguides
RT dielectrics
  microwave transmission
digital waveguides
  waveguide antennas
  waveguide filters
differential games
(added October 1998)
GS games
derential games
RT minimax technique
  optimal control
  pursuit-evasion games
digital cameras
(added July 1998)
GS optical equipment
cameras
digital cameras
  photographic equipment
cameras
digital cameras
RT CCD cameras
digital systems
digital techniques
  photogrammetry
television cameras
document indexing
USE indexing (information science)

DS1 (space mission)
USE Deep Space 1 Mission
dubnium
(added May 1998)
GS chemical elements
dubnium
RT rutherfordium
seaborgium
dusty plasmas
(added May 2001)
DEF Ionized gases containing small particles of solid matter, which are charged and interact through a Coulomb repulsion. They behave much like a colloidal suspension, exhibiting for example...
crystalline, liquid, and gas phases, and a melting/freezing phase transition.

**electronic structure**
* (added April 1999)
**SN** (The term 'atomic structure' was used for this concept prior to May 1999)
**RT** atomic structure
- band structure of solids
- electron energy
- electron orbitals
- electron states
- energy bands
- energy levels
- Fermi liquids

**electrosynthesis**
* USE electrochemical synthesis

**elves**
* (added January 2000)
**DEF** Transient air glow events observed near 90 km, nearly simultaneously with a strong cloud-to-ground lightning stroke. They often precede sprites, which may occur at lower altitudes a few milliseconds later. It is believed that elves are the result of wave heating by very low frequency (VLF) radio pulses emitted by the lightning discharge current.
**GS** atmospheric radiation
- sky radiation
- elves
- electromagnetic radiation
- light (visible radiation)
- sky radiation
- elves
**RT** atmospheric electricity
- atmospheric (ionization)
- cloud-to-ground discharges
- lightning
- sprites (atmospheric physics)
- thunderstorms

**e-mail**
* USE electronic mail

**embedded atom method**
* (added February 1999)
**DEF** A semiempirical calculation method developed by Daw and Baskes for determining the energetics of atoms in a bulk environment. The original form of the method was based on density functional theory and was intended primarily for tight-packed transition metals. More recent modifications have extended the applicability of the method to a large number of elements in the periodic table.
**GS** electronic structure
- EAM (physical chemistry)
- MEAM (physical chemistry)
- embedded atom method
- modified embedded atom method

**electromagnetic rocket engines**
* USE plasma engines

**electronic commerce**
* (added April 2000)
**DEF** The buying and selling of goods and services via the Internet or other computer communications network.
**GS** e-commerce
**RT** computer commerce
- computer information security
- electronic mail
- Internet resources
- websites
- World Wide Web

**Euler-Bernoulli beam theory**
* USE Euler-Bernoulli beams
Euler–Bernoulli beams

Euler–Bernoulli beams
(added April 1998)

UFEuler–Bernoulli beam theory
GSstructural members
RTaxial strain

Euler–Bernoulli beams
bending
dynamic structural analysis
elastic properties
mathematical models
partial differential equations
structural analysis
Timoshenko beams

evanescent waves
(added March 1998)

GSsurface waves
evanescence waves
RTacoustic impedance
fiber optics
internal waves
plane waves
propagation modes
reflected waves
wave propagation
∞ waves

exergic energy
USEexergy

exergy
(added December 2000)

DEFThe maximum amount of external energy that could be drawn from a system or form of energy in relation to a certain reference environment. Exergy is not considered to be a form of energy but a designation of the quality of energy.

UFexergic energy
RT∞ energy

exoplanets
USEextraterrestrial planets

exosolar planets
USEextraterrestrial planets

Explorer 71 satellite
USEAdvanced Composition Explorer

Explorer 73 satellite
USETransition Region and Coronal Explorer

Explorer 74 satellite
USESubmillimeter Wave Astronomy Satellite

Explorer 77 satellite
USEFar UV Spectroscopic Explorer

Explorer 78 satellite
USEIMAGE satellite

extraterrestrial oceans
(added June 2001)

SN(excludes magma oceans)
DEFExtensive bodies of water on planets and moons.

UFplanetary oceans
GSoceans
RTextraterrestrial oceans

Callisto
Europa
planetary surfaces
satellite surfaces

F

FDTD (mathematics)
USEfinite difference time domain method

ferroelastic materials
(added June 1998)

GSferroelastic materials
RTceramics
ferroelectricity
ferroelectric materials
∞ materials
smart materials

ferroelasticity
(added June 1998)

RTcrystal structure
domain wall
ferroelectric materials
phase transformations
shape memory alloys
smart materials

fiber pushout
(added September 1999)

GSreleasing
RTfiber pushout

ceramic matrix composites
composite materials
debonding (materials)
destructive tests
failure modes
fiber composites
fiber pullout
fiber-matrix interfaces
fibers
interfacial energy
∞ materials tests
metal matrix composites
reinforcing fibers

field tests
(added November 1999)

SN(excludes tests of electric, magnetic, or electromagnetic field)
DEFTests carried out in the actual setting in which the subject device is intended to operate
RTenvironmental tests
∞ tests

field-programmable gate arrays
(added April 2000)

GScircuits

flow noise
(added March 2000)

DEFNoise produced by the flow of fluids around or through a body; the pressure variations associated with a turbulent flow field.

GSelastic waves
∞ sound waves
flow noise
aerodynamic noise
blade slap noise
propeller noise
squeal tones

RTaeroacoustics
ducted flow
nozzle flow
pipe flow
underwater acoustics

flying wing configurations
USEblended-wing-body configurations

free-space optical communication
(added June 1998)

GStelecommunication
RThigh power lasers

optical communication
satellite communication
space communication

free-space optical interconnects
(added June 1998)

UFFSOI (integrated optics)
GSoptical interconnects
RTintegrated optics

free-space optical interconnects
interprocessor communication
optical computers
optical switching
optoelectronic devices
photonic

frequency domain analysis
(added April 1999)

GSanalysis (mathematics)
RTcontrol systems design
frequency domain analysis
dynamic response
parameter identification
signal processing
Analysis of the samples collected by the mission will contribute to an understanding of the origins of the solar system.

- **GS** space missions
- **RT** solar system evolution

**glucocorticoids**

- **GS** organic compounds
  - lipids
  - steroids
  - corticosteroids
  - glucocorticoids
  - secretions
  - endocrine secretions
  - hormones
  - corticosteroids
  - glucocorticoids

**Godunov method**

- **GS** analysis (mathematics)
  - numerical analysis
  - finite volume method
  - Godunov method
  - procedures
  - finite volume method

**GOES 10**

- **GS** artificial satellites
  - meteorological satellites
  - GOES satellites

**greedy algorithms**

- **GS** mathematical logic
  - algorithms
  - greedy algorithms

**Hall thrusters**

- **GS** engines
  - rocket engines
was widely used as an agent for fire suppression
heavy health

halon

hardware-in-the-loop simulation

head up tilt

head down tilt

hindlimb suspension

hindlimb unloading

Holocene epoch

hydrophobicity

hypergravity

hypogavity

hypothetical particles

hypothetical planets
transported, and subsequently lost during
where magnetospheric plasmas are energized,
or biochemical processes occurring within a living
cell or organism.

or biochemical processes occurring in an artificial
environment or outside of a living cell or organism.
in vivo

in vitro methods and tests

in vivo methods and tests
Iron aluminides

. communication networks
. . Iridium network
. . satellite networks
. . . satellite constellations
. . . Iridium network
RT communication satellites
facsimile communication
mobile communication systems
satellite communication
telephony
wireless communication

Iridium satellites
USE communication satellites
Iridium network

iron aluminides
(added December 2000)
GS - aluminum compounds
. . . iron aluminides
iron compounds
iron aluminides
RT aluminum alloys
intermetallics
iron alloys

ISS (space station)
USE International Space Station

Java (programming language)
(added December 1998)
GS languages
. . . programming languages
. . . high level languages
Java (programming language)
RT C++ (programming language)
client server systems
internets
object-oriented programming
World Wide Web

Josephson effect
(added April 1999)
UF Josephson tunneling
RT electron tunneling
Josephson junctions
SIS (superconductors)
superconducting devices
superconductors (materials)

Josephson tunneling
USE Josephson effect

K

kink bands
(added March 1998)
RT buckling
compression loads
edge dislocations
failure modes
fiber composites
microstructure
plastic deformation
reinforcing fibers
single crystals

kinking
(added April 1998)
RT bending
buckling

knowledge discovery
USE data mining

knowledge extraction
USE data mining

L

LA-ICP-MS (spectrometry)
USE inductively coupled plasma mass spectrometry

Langmuir monolayers
USE monomolecular films

Lasra Interferometer Gravitational-Wave Observatory
USE LIGO (observatory)

Laser Interferometer Space Antenna
USE LISA (observatory)

laser spark spectroscopy
USE laser-induced breakdown spectroscopy

laser-induced breakdown spectroscopy
(added June 2001)
DEF A non-invasive, spectroscopic technique wherein a laser pulse is focused on the target sample to form a laser spark or plasma. The emitted light from the spark is then used to identify elemental constituents and quantify abundances of measured species.

UF laser spark spectroscopy
LASS (spectrometry)
LIBS (spectrometry)
GS spectroscopy
. laser-induced breakdown spectroscopy
RT absorption spectroscopy
emission spectra
laser applications
laser plasmas
laser spectroscopy
plasma diagnostics
Raman spectroscopy
spectroscopic analysis

LASS (spectrometry)
USE laser-induced breakdown spectroscopy

Laves phases
(added August 1998)
GS solid phases
. Laves phases
RT alloys
crystal lattices
crystal structure
cubic lattices
interstitials
microstructure
phase transformations

leaders (meteorology)
(added August 1999)
GS electric current
electric discharge
. lightning
. . . stepped leaders

LFA thrusters
USE magnetoplasmodynamic thrusters

LIBS (spectrometry)
USE laser-induced breakdown spectroscopy

LIGO (observatory)
(added December 2000)
UF Laser Interferometer Gravitational-Wave Observatory
GS antennas
. . . gravitational wave antennas
LIGO (observatory)
observatories
. . . astronomical observatories
. . . LIGO (observatory)
RT astronomical interferometry
gravitational waves
laser interferometry

LISA (observatory)
(added December 2000)
UF Laser Interferometer Space Antenna
GS antennas
. . . gravitational wave antennas
LISA (observatory)
artificial satellites
scientific satellites
. . . astronomical satellites
. . . LISA (observatory)
observatories
. . . astronomical observatories
. . . LISA (observatory)
. . . LISA (observatory)
RT astronomical interferometry
gravitational waves
laser interferometry
spaceborne astronomy

lithium batteries
(added December 1999)
GS electrochemical cells
electric batteries
. . . lithium batteries
. . . lithium sulfur batteries
RT storage batteries

Long March launch vehicles
(added January 1999)
GS launch vehicles
. . . Long March launch vehicles
RT Chinese space program
Chinese spacecraft
heavy lift launch vehicles

Lorentz force accelerator thrusters
USE magnetoplasmodynamic thrusters

Lunar Prospector
(added February 1998)
GS artificial satellites
lunar satellites
. . . Lunar Prospector
lunar spacecraft
lunar satellites
. . . Lunar Prospector
Madden-Julian Oscillation
(adDED September 2000)
DEF The most prominent and coherent component of the intraseasonal variability in the tropical atmosphere, characterized by a strong eastward propagation of atmospheric features, with a typical period of 30–60 days. The Madden-Julian Oscillation (MJO) may influence the tropical climate and modulate the timing and strength of El Niño–Southern Oscillation (ENSO) events, contributing to the mean heat budget of the western Pacific, and regulating the annual cycle of the tropical western Pacific, especially the Australian summer monsoon.

UN MJO (meteorology)
GS oscillations
RT air water interactions
annual variations
atmospheric circulation
atmospheric models
climatology
El Niño
monsoons
Southern Oscillation
zonal flow (meteorology)
magnetics
(adDED January 2000)
DEF Highly magnetized neutron stars believed to emit quasi-steady x-rays along with bursts of soft gamma rays—emissions powered by their magnetic energy. According to the magnetar theory, these stars form in some fraction of all supernovae. When they are young (with ages less than about 10,000 years) magnetars may be observed as soft gamma repeaters (SGRs) or anomalous X-ray pulsars.

GS celestial bodies
stars
magnetars
neutron stars
RT pulsars
soft gamma repeaters
supernova remnants
x-ray sources
magnetostratigraphy
(adDED April 1999)
GS stratigraphy
RT chronology
paleomagnetism

Mars missions
(adDED March 1999)
DEF One of two spacecraft comprising the Mars Surveyor 98 program, launched December 1998. After obtaining a polar, nearly circular orbit around Mars, the Orbiter will serve as a radio relay during the Lander surface mission, then begin monitoring the atmosphere, surface, and polar cap for a complete Martian year. The Orbiter carries two science instruments: the Pressure Modulated Infrared Radiometer and the Mars Color Imager.

UN MGS (spacecraft)
GS interplanetary spacecraft
RT Mars missions
Mars Observer
Mars surface
Mars landing sites
(adDED February 2001)
DEF Areas on the Martian surface selected for spacecraft landing, or areas where spacecraft have actually landed.

GS sites
landing sites
RT Mars exploration
Mars landing
Mars missions
Mars surface
site selection
Mars Polar Lander
(adDED March 1999)
DEF One of two spacecraft comprising the Mars Surveyor 98 program, launched January
1999. After a successful landing near the Martian south pole, the Lander will search for near-surface ice and possible surface records of cyclic climate change, and characterize physical processes key to the seasonal cycles of water, carbon dioxide and dust on Mars. Prior to landing, the Deep Space 2 microprobe will be released as part of a technology-validation mission related to multiple-lander spacecraft.

**Mars Surveyor 98 Program**

**Mars Surveyor 98 Lander**
- USE Mars Polar Lander

**Mars Surveyor 98 Orbiter**
- USE Mars Climate Orbiter

**Mars Surveyor 98 Program** *(added March 1999)*
- DEF Mars exploration mission consisting of two mission spacecraft—the Mars Climate Orbiter and the Mars Polar Lander. Two surface penetrating micropores (part of the associated Deep Space 2 mission) for detecting water ice are also piggybacking on the Lander.
- GS programs
  - NASA programs
  - NASA space programs
  - Mars Surveyor 98 Program
  - space programs
  - NASA space programs
  - Mars Surveyor 98 Program
- RT Mars atmosphere
  - Mars Climate Orbiter
  - Mars missions
  - Mars Polar Lander
  - Mars surface

**Mars Surveyor 2001 Mission** *(added July 1999)*
- DEF Mars exploration mission including an orbiter with a gamma ray spectrometer and a multispectral thermal imager, and a lander with an extensive set of instrumentation, a robotic arm, and the Marie Curie Rover. (In March 2000, the lander portion of the mission was cancelled; the orbiter mission was superceded by the 2001 Mars Odyssey mission.)
- GS space missions
  - Mars missions
  - Mars Surveyor 2001 Mission
- RT 2001 Mars Odyssey
  - Mars environment
  - Mars surface
  - Mars surface samples
  - NASA space programs

**Martian meteorites**
- USE SNC meteorites

**massive compact halo objects** *(added November 1999)*
- DEF Objects, such as brown dwarfs, black holes, and massive planets, hypothesized to account for the dark matter in the halo of the Milky Way. The signature of these objects is the occasional amplification of the light from extragalactic stars by the gravitational lens effect.
- UF MACHOs (astronomy)
- GS celestial bodies
  - massive compact halo objects
  - brown dwarf stars
  - dark matter
  - galactic halos
  - gravitational lenses
  - Milky Way Galaxy
  - missing mass (astrophysics)
  - red dwarf stars
- RT Mindlin plate theory
  - USE embedded atom method
  - meitnerium *(added May 1998)*
  - GS chemical elements
  - RT hassium

**membership functions** *(added December 2000)*
- DEF Characteristic functions of a fuzzy set, which assign a value indicating the degree of membership for each element in a universal set.
- GS functions (mathematics)
  - membership functions
  - RT control systems design
    - fuzzy sets
    - fuzzy systems
    - machine learning
    - neural nets
- USE Mindlin plates
  - USE microelectromechanical systems

**micelles** *(added June 2001)*
- DEF Electrically charged colloidal particles or ions consisting of oriented molecules, aggregates of a number of molecules held loosely together by secondary bonds.
- GS molecular clusters
  - micelles
- RT agglomeration
  - aggregates
  - block copolymers
  - clusters
  - colloids
  - flocculating nanostucture (characteristics)
  - self assembly

**microminiaturization**
- USE microsatellites
  - RT microelectromechanical systems
  - microelectromechanical systems
  - microsatellites
  - microminiaturization
  - microminiaturized electronic devices
  - satellites
  - satellite constellations
  - satellite design
  - small satellite technology
  - small scientific satellites

**microminiaturization** *(added October 1998)*
- USE artificial satellites
  - microsatellites

**Mindlin plate theory** *(added April 1998)*
- USE Mindlin plates

**Mindlin plates** *(added June 1998)*
- DEF An alloy consisting of a natural mixture of rare-earth metals; used in electrode materials and hydrogen–storage alloys, as a general alloy addition, and in the production of some aluminum alloys and steels.
- GS alloys
  - rare earth alloys
  - microminiaturization
  - RT alloying
    - aluminum alloys
    - cathodic coatings
    - cerium
description
  - electrode materials
  - intermetallics
  - steels

**MJO** *(meteology)*
- USE Madden–Julian Oscillation

**MMH** *(chemistry)*
- USE monomethylhydrazines

**modified embedded atom method**
- USE embedded atom method

**monomethylhydrazines** *(added February 2001)*
- USE monomethylhydrazines
  - monomethylhydrazines
through the methods of genetic engineering.

mutagenesis

nanotechnology

nanocomposites

nanosatellites

nanotubes

NGST project

optical interconnects

orbit determination
osteoblasts

... minimum variance orbit determination
... orbital position estimation
RT Global Positioning System position errors
satellite tracking
space navigation
spacecraft control
spacecraft position indicators

osteoblasts
(addled June 2001)
DEF Bone-forming cells that secrete an extracellular matrix. Hydroxyapatite crystals are then deposited into the matrix to form bone.
GS cells (biology)

osteoelastics
RT bone demineralization
bone mineral content
bones
cytogenesis
fibroblasts
cathepsis

pathological cell death
USE necrosis

PDE (engines)
USE pulse detonation engines

PDHE (engines)
USE pulse detonation engines

PDS (spectroscopy)
USE photothermal deflection spectroscopy

PDWE (engines)
USE pulse detonation engines

perfectly matched layers
(addled July 1998)
DEF In the area of computational electromagnetism, an absorbing boundary condition used for terminating infinite domain calculations in the finite-difference time-domain (FDTD) or finite element methods. The approach has also been extended to the analysis of some problems in acoustics.
UF PML (electromagnetism)
GS conditions
... boundary conditions
RT computational electromagnetics
computational grids
electromagnetic absorption
electromagnetic scattering
finite difference theory
finite element method
Maxwell equation

Phaethon (hypothetical planet)
USE hypothetical planets

Phobos spacecraft
(addled August 1998)
DEF Two Soviet spacecraft (Phobos 1 and 2, both launched in July 1988) designed to study the plasma environment in the Martian vicinity, the surface and atmosphere of Mars, and the surface composition of the Martian satellite Phobos. Other mission objectives included the study of the interplanetary environment and solar observations.
GS interplanetary spacecraft
... Mars probes
... Phobos spacecraft
Soviet spacecraft
... Phobos spacecraft
unmanned spacecraft
... space probes
... Mars probes
... Phobos spacecraft
RT Mars atmosphere
Mars environment
Phobos

photosists
(addled June 2000)
DEF Photosensitive substances that are either rendered soluble or insoluble to chemical etchants when exposed to light, and are used in transferring circuit patterns in the production of integrated circuits.
RT etching
... integrated circuits
microelectronics
photolithography
photomasks
photopolymers
photosensitivity

photothermal deflection spectroscopy
(addled November 1998)
UF PDS (spectroscopy)
GS spectroscopy
... photothermal deflection spectroscopy
RT optical measurement
photoluminescence spectroscopy
thermal diffusivity
thermal lensing

piezoelectric motors
(addled January 2001)
DEF Any motor that uses the piezoelectric effect to produce its mechanical output.
UF piezomotors
GS electromechanical devices
electric motors
... piezoelectric motors
motors
... piezoelectric motors
RT micromechanical systems
piezoelectric actuators
piezoelectric transducers
ultrasonic wave transducers

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... piezoelectric motors
RT micromechanical systems
piezoelectric actuators
piezoelectric transducers
ultrasonic wave transducers

piezoelectric motors
USE piezoelectric motors

pilot opinion ratings
USE pilot ratings

pilot ratings
(addled August 1998)
DEF Subjective assessment of the handling and stability characteristics of an aircraft or other flight vehicle.
UF pilot opinion ratings
GS flight characteristics
... pilot ratings
Cooper–Harper ratings
RT aircraft performance
assessments
controlability
helicopter performance

PIT (rocket engines)
USE pulsed inductive thrusters

planet X
USE hypothetical planets

planetary oceans
USE extraterrestrial oceans

Planet-B spacecraft
USE Nozomi Mars Orbiter

Pleistocene epoch
(addled May 2001)
DEF Geologic epoch of the Quaternary period extending from about two million years ago to about 10,000 years ago and covering the last ice age.
GS Cenozoic Era
... Pleistocene epoch
RT geochronology
Holocene epoch

PML (electromagnetism)
USE perfectly matched layers

Polar Plasma Laboratory
USE Polar/GGS spacecraft

Polar/GGS spacecraft
(addled January 2001)
DEF One of two NASA spacecraft in the Global Geospace Science (GGS) initiative and part of the International Solar Terrestrial Physics (ISTP) program. Polar (Polar Plasma Laboratory) measures solar wind entry, ionospheric output, and the depositions of energy into the neutral atmosphere at high latitudes. Imaging instruments make possible the measurement of visible, ultraviolet, and X-ray spectra of the polar caps. The spacecraft was launched in February 1996.
UF Polar Plasma Laboratory
GS artificial satellites
geophysical satellites
... Polar/GGS spacecraft
RT scientific satellites

Polar/GGS spacecraft
USE Polar/GGS spacecraft

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UF Polar Plasma Laboratory
GS artificial satellites
gеophysical satellites
... Polar/GGS spacecraft
RT scientific satellites

Polar/GGS spacecraft
USE Polar/GGS spacecraft
plasma waves
solar waves
solar terrestrial interactions
solar wind
space plasmas
space weather
Wind/GSS spacecraft

Population III stars
(added July 1999)
UF primordial stars
GS celestial bodies
... Population III stars
RT cosmology
dark matter
radio radiation
stellar evolution
supernova stars

PPT (rocket engines)
USE pulsed plasma thrusters

pressoreceptor reflexes
USE baroreflexes

pressoreceptors
USE baroreceptors

pressure sensitive paints
(added March 2001)
DEF Luminescent paints used for the non-intrusive optical measurement of static and transient pressure fields. These paints are typically organic luminophores or dyes dispersed in an oxygen permeable polymer binder. The luminescence is induced by the excitation of the dye with an appropriate wavelength light. The emitted intensity or brightness of the paint is inversely proportional to the partial pressure of oxygen because the luminescence is quenched by oxygen.

PSP (paints)
GS coatings
... pressure sensitive paints
RT flow measurement
... optical measurement

preventive maintenance
(added June 2000)
GS maintenance
... preventive maintenance
RT aircraft maintenance
... reliability analysis

primordial stars
USE Population III stars

programmed cell death
USE apoptosis

proportional navigation
(added July 1998)
GS navigation
... proportional navigation
RT homing
... line of sight

proportional navigation
RT homing
... line of sight

quantum computers

pulsed plasma engines
DEF Electromagnetic propulsion devices in which electrical power is used to ablate, ionize, and electromagnetically accelerate atoms and molecules from a solid propellant material.

PIT (rocket engines)
GS engines
... pulse detonation engines

pulsed arcjet engines
USE pulsed jet engines

pulsed inductive thrusters
(added March 2000)
DEF Devices capable of performing quantum computations. There are many proposals for the physical basis of quantum computers. The 0 and 1 of a quantum bit (i.e., qubit) could be the ground and excited states of an atom in a linear ion trap; the polarizations of photons interacting in an optical cavity; or the excess of one nuclear spin...
quantum cryptography

state over another in a liquid sample in an NMR machine.

GS data processing equipment
RT computers
 quantum computers

quantum computing

USE quantum computation

quantum cryptography

(aassets March 2000)
DEF Any form of cryptography that depends for its security on coherent quantum-mechanical effects (quantum interference or quantum entanglement).

GS cryptography
RT quantum cryptography

quantum Hall effect

(aadded July 2000)
DEF Phenomenon where the Hall resistance of a two-dimensional electron system at low temperature and high magnetic fields, becomes quantized as h/e^2, where h is Planck's constant, e is the electronic charge, and j is either an integer or a rational fraction.

UF QHE (electronics)
GS galvanomagnetic effects
RT Hall effect
quantum Hall effect

electron gas
Hall resistance
magnetic effects
quantum electronics
semiconductor devices
superlattices

quasi-biennial oscillation

(aadded May 2001)
DEF A natural, quasi-periodic (2-2.5 years) oscillation of the zonal (east-west) stratospheric winds over the equatorial region. The quasi-biennial oscillation (QBO) affects stratospheric temperatures and trace gases (including ozone) and influences the response of the stratosphere to volcanic eruptions.

UF QBO (climatology)
GS oscillations
quasi-biennial oscillation
variations
periodic variations
quasi-biennial oscillation

RT annual variations
atmospheric circulation
atmospheric temperature
climatology
el Nino
equatorial atmosphere
ozone
Southern Oscillation
tropical meteorology
zonal flow (meteorology)

Quaternary period

(aadded May 2001)
DEF A period (sub-era) within the Cenozoic era, beginning about two million years ago and extending to the present. It is divided into two epochs—Holocene and Pleistocene.

GS Cenozoic Era
Quaternary period
Holocene epoch

.Pleistocene epoch
RT geochronology
Tertiary Period

R random positioning machines

USE clinostats

Rayleigh fading

(aadded June 2000)
DEF Rapid fluctuation, small-scale fading resulting from multipath effects, and typically occurring in non-line-of-sight (NLOS) environments.

GS fading
RT Rayleigh fading

red sprites
USE sprites (atmospheric physics)

Reissner-Mindlin plates
USE Mindlin plates

renewable energy

(aadded December 1998)
DEF Energy sources that are sustainable, non-polluting, and can be replenished.

GS renewable energy
geothermal energy utilization
hydroelectricity
tides
wave energy
windpower utilization

RT biocconversion
biomass energy production
burn energy
wind power

Rayleigh flow

(aadded July 1998)
DEF A high-speed jet that is produced by a rocket engine and is used in a number of applications, including aerospace propulsion.

GS fluid flow
compressible flow
Rayleigh flow
steady flow
Rayleigh flow
two-dimensional flow
Rayleigh flow

RT critical flow
subsonic flow
transonic flow

rocket-based combined-cycle engines

(aadded August 1999)
DEF Tools that are powered by a single engine but use multiple modes of propulsion, including both internal combustion and jet engines.
screech tones
(added March 1998)
DEF Discrete acoustic tones produced by imperfectly expanded supersonic jets. The phenomenon is a result of a resonant feedback condition involving downstream traveling shear-layer disturbances and upstream traveling acoustic waves.

GS elastic waves
- sound waves
- noise (sound)
-... flow noise
-... aerodynamic noise
-... screech tones
-... acoustic frequencies
-... screech tones
RT aeroacoustics
feedback
jet aircraft noise
jet mixing flow
nozzle flow
shear layers
supersonic jet flow
supersonic nozzles
seaborgium
(added May 1998)
GS chemical elements
- seaborgium
RT bohrium
dubium
Sea-Viewing Wide Field-of-View Sensor
(added December 1998)
UF SeaWiFS
GS scanners
- ocean color scanner
-... Sea-viewing Wide Field-of-view Sensor
RT chlorophylls
Coastal Zone Color Scanner
ocean surface
phytoplankton
remote sensors
satellite-borne instruments
water color
SeaWiFS
USE Sea-viewing Wide Field-of-view Sensor
self assembly
(added January 2001)
DEF Coordinated action of independent units to produce a larger structure or to achieve a desired group effect. A strategy for nanofabrication that involves designing molecules and supramolecular entities so that shape-complementarity or other properties causes them to aggregate into desired structures.

GS assembling
- self assembly
RT abiogenesis
- assembly
- chemical evolution
- fabrication
- micelles
- molecular biology
- molecular structure
- monomolecular films
- nanostructure (characteristics)
nanotechnology
- synthesis (chemistry)
sensitivity analysis
(added February 2001)
DEF Study of how the variation in the output of a system model can be qualitatively or quantitatively apportioned to different input parameters, model structures, or calibration data.
RT co analyzing
- design analysis
- design optimization
- error analysis
- fractional design
- optimization
- parameter identification
- parameterization
- shape optimization
- systems analysis
Service Module (ISS)
(added March 1998)
DEF Primary Russian component of the International Space Station providing an early station living quarters and life support system functions to all early elements. Also provides propulsive attitude control and reboost capability for the early station.
UF Zvezda Service Module
GS modules
-... Service Module (ISS)
RT International Space Station
life support systems
SNC meteorites
(added March 1998)
DEF Meteorites with petrologic characteristics, isotopic signatures, trapped gas compositions, and relatively young crystallization ages (less than 1.3 billion years), which together point to a Martian origin. The name of these meteorites is derived from first three known examples—Shergotty, Nakhla, and Chassigny.
UF Martian meteorites
GS Chassigny meteorites
-... Martian meteorites
RT chassignites
Mars (planet)
Mars surface
nakhites
shergottites
SOAC (electronics)
USE systems-on-a-chip
soft gamma repeaters
(added January 2000)
DEF A class of x-ray source which emits repeating bright bursts of "soft" or low-energy gamma rays, along with steady x-ray pulsations. By the end of 1999 only a handful of these sources have been identified in our galaxy and in the Large Magellanic Cloud. They are associated with supernova remnants and are thus apparently some kind of young neutron star. One theory holds that these stars are young magnetars (magnetically-powered neutron stars). Bright bursts occur when the evolving, ultra-strong magnetic field stresses the neutron star's solid crust to breaking, in a sudden starquake. X-ray pulsations are due to the rotation of the star, with it's hot surface bright in x-rays.
UF SGR (astronomy)
GS celestial bodies
- stars
-... neutron stars
-... soft gamma repeaters
-... x-ray stars
solar nebula

<table>
<thead>
<tr>
<th>Added Date</th>
<th>Definition/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 2001</td>
<td>DEF Clouds of gas and dust from which the Sun, planets, and other solar system bodies formed.</td>
</tr>
</tbody>
</table>

UF protosolar nebula
GS celestial bodies
nebulae

RT meteoritic composition
planetary evolution
protoplanets
protostars
solar system
solar system evolution
star formation
stellar evolution
sun

solar nebula

space station modules

<table>
<thead>
<tr>
<th>Added Date</th>
<th>Definition/Description</th>
</tr>
</thead>
</table>
| November 1998 | GS modules | spacecraft modules
... Destiny Laboratory Module
... Kvant modules
... Priroda module
... Service Module (ISS)
... Unity connecting module
... Zarya control module |

RT air locks
compartments
International Space Station
Mir space station
orbital assembly
space erectable structures
space station structures
spacecraft modules

space tourism

<table>
<thead>
<tr>
<th>Added Date</th>
<th>Definition/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 1999</td>
<td>GS space industrialization</td>
</tr>
</tbody>
</table>

RT space commercialization
space transportation

space weather

<table>
<thead>
<tr>
<th>Added Date</th>
<th>Definition/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 1999</td>
<td>SN (FOR METEOROLOGICAL CONDITIONS RELATED TO THE MIDDLE AND LOWER ATMOSPHERES OF NON-EARTH PLANETS) USE &quot;TERRESTRIAL METEOROLOGY.&quot;</td>
</tr>
</tbody>
</table>

UF red sprites
GS atmospheric radiation
... sky radiation
... sprites (atmospheric physics)
... electromagnetic radiation
... light (visible radiation)
... sky radiation
... sprites (atmospheric physics)
RT atmospheric electricity
atmospheric ionization
cloud-to-ground discharges
elves
lightning
thunderstorms

Stardust Mission

<table>
<thead>
<tr>
<th>Added Date</th>
<th>Definition/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 1999</td>
<td>DEF First U.S. mission launched to robotically obtain samples in deep space and return them to Earth. The NASA Discovery-class mission will return dust samples collected from the debris cloud surrounding the nucleus of Comet Wild 2. Interstellar dust will also be collected. The mission spacecraft takes advantage of an Earth gravity-assist maneuver to reach the comet, and uses an aerogel-based dust collector.</td>
</tr>
</tbody>
</table>

GS space missions
flyby missions
. Stardust Mission
... sample return missions
Stardust Mission
comet nuclei
interstellar matter
Wild 2 comet

stellar seismology

used asteroseismology

stopped leaders

<table>
<thead>
<tr>
<th>Added Date</th>
<th>Definition/Description</th>
</tr>
</thead>
</table>
| August 1999 | GS electric current |... electric discharges
... lightning
... leaders (meteorology)
... stopped leaders |

Submillimeter Wave Astronomy Satellite

<table>
<thead>
<tr>
<th>Added Date</th>
<th>Definition/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 2000</td>
<td>DEF A NASA Small Explorer Project (SMEX) satellite designed to study the chemical composition, energy balance, and structure of interstellar gas clouds and the processes that lead to the formation of stars and planets. Its primary objective is to survey water, molecular oxygen, carbon, and isotopic carbon monoxide emission in a variety of galactic star forming regions.</td>
</tr>
</tbody>
</table>

UF Explorer 74 satellite
SWAS (satellite)
GS artificial satellites
... scientific satellites
... astronomical satellites
Submillimeter Wave Astronomy Satellite
... Explorer satellites
Submillimeter Wave Astronomy Satellite
... small scientific satellites
Submillimeter Wave Astronomy Satellite
observatories
... astronomical observatories
... astronomical satellites
Submillimeter Wave Astronomy Satellite
... interstellar chemistry
... interstellar matter
... molecular clouds
spaceborne astronomy
star formation
submillimeter waves

Sunyaev–Zeldovich effect
(added July 2000)
DEF Compton scattering of microwave radiation in the vicinity of galaxy clusters resulting in fluctuations in the cosmic microwave background radiation (CMBR).
UF S-Z effect
RT anisotropy
Compton effect
cosmic gases
microwave scattering
radio astronomy
relic radiation

superhumps (astronomy)
(added October 1998)
RT accretion disks
astroblastic photometry
binary stars
cataclysmic variables
dwarf novae
eclipsing binary stars
stellar spectroscopy

SWAS (satellite)
USE Submillimeter Wave Astronomy Satellite

systems-on-a-chip
(added May 2001)
DEF Single electronic chips that incorporate the multiple functional elements comprising a complete system, usually include processor core, I/O subsystems, and memory elements, and may include mixed-signal and mixed-technology subsystems.
UF SOAC (electronics)
GS chips (electronics)
systems-on-a-chip
RT application specific integrated circuits
large scale integration
micronanotronics
micronanotronic devices
RISC processors
systems integration

S-Z effect
USE Sunyaev–Zeldovich effect

Taguchi methods
(added September 2000)
DEF Quality engineering methodology, developed by Genichi Taguchi, for minimizing a product's sensitivity to uncontrollable system disturbances by simultaneously varying both design and disturbance parameters. The method incorporates a special set of arrays called orthogonal arrays that define the minimal number of experiments that would provide the full information for all factors that affect the performance parameter.
GS quality control
Taguchi methods
RT design analysis

thermal lenses
USE thermal lensing

thermal lensing
(added November 1998)
DEF Phenomena associated with the combination of temperature, pressure and displacement oscillations caused by acoustic waves interacting with solid boundaries, such as the walls of a tube or a "stack".
UF thermal lenses
GS thermal lensing
RT atmospheric optics
focusing
laser beams
photothermal deflection spectroscopy
wave front deformation

thermoacoustic effects
(added May 2000)
DEF A class of prestressed structures whose shape is guaranteed by the interaction between a continuous network of members in tension and a discontinuous network of members in compression. These members can serve simultaneously as sensors, actuators, and load carrying elements. The word "tensile" is a contraction of "tensile integrity".
UF tensile–integrity structures
tensile–integrity structures
RT isometroid structures
prestressing
smart structures
structural design

thermoacoustic refrigerators
(added May 2000)
DEF Cooling devices in which intense sound waves in pressurized resonant cavities are used to generate temperature gradients in an array of parallel plates in the interior of a tube that serves as a heat exchanger and in which heat is drawn away by a heat sink.
GS refrigerating machinery
thermoacoustic refrigerators
RT cooling systems
refrigerating
thermoacoustic effects

thermocapillary migration
(added September 1999)
DEF Phenomenon where droplets (or bubbles) in a host fluid with a uniform temperature gradient migrate to the hot end of the host fluid because of the temperature dependence of the interfacial energy of the droplets.
RT bubbles
capillary flow
drops (liquids)
electromigration
interfacial tension
Marangoni convection
microgravity
space processing
temperature gradients
thermomigration

time domain analysis
(added April 1999)
USE analysis (mathematics)
time domain analysis
RT clocks
frequency standards
frequency synchronization
Global Positioning System
time measurement
time signals
universal time

tissue engineering
(added October 2000)
DEF Discipline for the in vitro growth and maintenance of tissue, organ primordia, or the whole or part of an organ so as to preserve its architecture and/or function. In terms of
Titan 4B launch vehicle

application, the primary goal of this technology is
the replacement of deficient organs.

GS bioengineering

 . tissue engineering

 . technologies

 . biotechnology

GS tissue engineering

RT bioreactors

 . cells (biology)

 . clinics

 . culture techniques

 . cytology

 . growth

 . histology

 . in vitro methods and tests

 . microgravity applications

 . organs

 . tissues (biology)

Titan 4B launch vehicle

(added October 1998)

GS launch vehicles

 . Titan launch vehicles

 . Titan 4 launch vehicle

 . Titan 4B launch vehicle

 . rocket vehicles

 . multistage rocket vehicles

 . Titan launch vehicles

 . Titan 4 launch vehicle

 . Titan 4B launch vehicle

RT Cassini mission

 . laser gyroscopes

 . total impulse

(added March 2000)

DEF The integral of thrust over a given
interval of time; the product of thrust and duration
expressed in force-seconds; the total thrust
produced by a rocket engine or motor over the
time that its fuel is burning.

GS impulses

 . total impulse

RT propulsion system performance

 . propulsive efficiency

 . spacecraft propulsion

 . specific impulse

 . thrust

tourism

(added April 1999)

GS tourism

 . space tourism

RT industries

 . recreation

 . transportation

 . travel

TRACE satellite

USE Transition Region and Coronal
Explorer

 . transition elements (chemistry)

USE transition metals

Transition Region and Coronal Explorer

(added May 1998)

DEF Small Explorer Mission satellite
supporting the investigation of the relationships
between fine-scale magnetic fields and their
associated plasma structures in the transition
region and lower corona of the Sun.

UF Explorer 73 satellite

 . TRACE satellite

 . artificial satellites

 . scientific satellites

 . Explorer satellites

 . . . Transition Region and Coronal
Explorer

 . . . small scientific satellites

 . . . Transition Region and Coronal
Explorer

RT chromosphere

 . SOHO Mission

 . solar atmosphere

 . solar corona

 . solar magnetic field

 . solar observatories

 . solar physics

 . solar transition region

transplutonic planets

USE hypothetical planets

transverse momentum

(added June 1999)

GS momentum

 . transverse momentum

RT angular momentum

 . elementary particle interactions

 . particle motion

 . transverse acceleration

Treffitz method

(added July 1998)

DEF Boundary-type approximation scheme
for the solution of boundary value problems for
partial differential equations.

UF hybrid-Treffitz finite element method

GS analysis (mathematics)

 . numerical analysis

 . approximation

 . boundary element method

 . Trefftz method

RT bending theory

 . boundary conditions

 . boundary value problems

 . finite element method

 . partial differential equations

 . plate theory

 . structural analysis

TRMM satellite

(added May 1998)

DEF Satellite supporting the joint
US-Japanese Tropical Rainfall Measuring Mission
(TRMM) to explore tropical rainfall and its effects
on the Earth energy budget, general circulation,
and climate. The TRMM satellite represents the
first dual deployment of a precipitation radar and
passive microwave radiometer on an Earth-
viewing satellite.

UF Tropical Rainfall Measuring Mission sat

GS artificial satellites

 . meteorological satellites

 . TRMM satellite

 . scientific satellites

 . TRMM satellite

RT atmospheric circulation

 . Earth radiation budget

 . equatorial atmosphere

 . rain

 . tropical meteorology

Trojan asteroids

(added August 2000)

DEF Any asteroid that orbits in the Lagrange
points of another (larger) body. In particular, those
asteroids with a revolution period approximately
equal to that of Jupiter (1:1 resonance) and
clustered at either of the two Lagrange points—60
degrees ahead of or behind the Jupiter. Most

 . asteroids of this group are named after the heroes

 . of the Trojan War.

GS celestial bodies

 . asteroids

 . Trojan asteroids

RT Jupiter (planet)

 . Lagrangian equilibrium points

 . three body problem

 . Trojan orbits

Tropical Rainfall Measuring Mission sat

USE TRMM satellite

U

Ukrainian space program

(added January 1999)

GS programs

 . space programs

 . Ukrainian space program

RT Ukraine

 . Zenit launch vehicles

ultrasonic processing

(added June 1998)

DEF The use of ultrasonic radiation to
synthesize a compound or material, or alter the
structure, properties, or form of a material.

UF sonochemistry

 . ultrasonic processing

UF (ultrasound)

 . ultrasonic treatment

UF (ultrasound)

 . ultrasonic cleaning

 . ultrasonics

ultrasonic treatment

USE (ultrasound)

 . ultrasonic treatment

USE (ultrasound)

 . ultrasonic treatment

USE 

uncertain systems

(added June 2000)

RT control systems design

 . control theory

 . fuzzy systems

 . linear systems

 . nonlinear systems

 . probability theory

 . systems

undercooling

USE supercooling

Unity connecting module

(added November 1998)

DEF Component of the International Space
Station providing six ports that serve as
connecting points for other station modules and
framework elements.

GS modules

 . space station modules

 . Unity connecting module

RT Integrated Truss Structure Z1

 . International Space Station

 . spacecraft docking

US Laboratory Module (ISS)

USE Destiny Laboratory Module

V

Variable Specific Impulse Magnetoplasma
Rocket

USE VASIMR (propulsion system)

VASIMR (propulsion system)

(added November 2000)

DEF A high-power, RF--driven magnetoplasma rocket system capable of (sp) thrust
modulation at constant power. The VASIMR utilizes radiofrequency (RF) power both to generate a high-density plasma in a helicon source and to accelerate the plasma ions to high velocity by ion cyclotron resonance heating (ICRH). The system features a magnetic nozzle, which accelerates the plasma particles by converting their azimuthal energy into directed momentum.

**wave rotors**

- Defined: Rotor devices that use gasdynamic waves to transfer energy rather than the motion of solid surfaces. Typically, they consist of a series of passages arranged on a drum which rotates about an axis. Through rotation, the ends of the passages are periodically exposed to various circumferentially arranged ports which initiate the traveling expansion or compression waves within the passages. The particular circumferential location of the ports determines the thermodynamic cycle of the working fluid.
- Synonyms: Rotors, wave rotors.
- Abbreviations: RT, wave rotors.

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**WEAKLY INTERACTING MASSIVE PARTICLES**

- Defined: Hypothetical elementary particles predicted by supersymmetry theories, that interact only through gravity and weak-type interactions; postulated to account for dark matter in the Universe.
- Synonyms: WIMPs (astrophysics).
- Abbreviations: UF, weakly interacting massive particles.

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**WEBSITES**

- Defined: Locations on the World Wide Web providing a collection of linked resources, usually including a homepage, and prepared and maintained as a collection of information by a person, group, or organization.
- Synonyms: Websites.
- Abbreviations: UF, websites.
Wind/GGS spacecraft

Wind/GGS spacecraft

DEF One of two NASA spacecraft in the Global Geospace Science (GGS) initiative and part of the International Solar Terrestrial Physics (ISTP) program. The main purpose of the Wind spacecraft is to measure the incoming solar wind, magnetic fields, and particles, although early in its mission Wind observed the Earth foreshock region. The spacecraft was launched in November 1994.

GS artificial satellites

• Earth magnetosphere
• interplanetary magnetic fields
• Polar/GGS spacecraft
• solar corpuscular radiation
• solar terrestrial interactions
• solar wind
• space plasmas

Wing-in-ground effect vehicles

X-35 aircraft

• V/STOL aircraft
• X-32 aircraft

X-35 aircraft

(added October 1998)

DEF Experimental strike fighter incorporating a vertical lift fan for short takeoffs/vertical landing capability. Developed as part of the Joint Strike Fighter (JSF) program.

GS Boeing aircraft

• X-32 aircraft
• jet aircraft
• X-32 aircraft
• research vehicles
• research aircraft
• X-32 aircraft

X-37 vehicle

(added March 2000)

DEF NASA/Boeing experimental space plane developed to demonstrate airframe, propulsion, and operations technologies for reduced-cost reusable launch vehicles. The unpiloted X-37 can be carried into orbit by the Space Shuttle or launched by an expendable rocket, and flies in both orbital and reentry environments, operating at speeds up to 25 times the speed of sound.

GS aerospace vehicles

• X-37 vehicle
• hypersonic planes
• X-37 vehicle
• maneuverable spacecraft
• aerospace planes
• X-37 vehicle
• reusable spacecraft
• aerospace planes
• X-37 vehicle
• research vehicles
• X-37 vehicle
• soft landing spacecraft
• aerospace planes
• X-37 vehicle
• reusable launch vehicles

X-43 vehicle

(added September 1999)

DEF The experimental research vehicle of the NASA Hyper-X program designed to flight validate key propulsion and related technologies for air-breathing hypersonic aircraft.

GS aerospace vehicles

• X-43 vehicle
• hypersonic vehicles
• X-43 vehicle
• research vehicles
• X-43 vehicle

RT hypersonic flight

Pegasus air-launched booster

super sonic combustion ramjet engines

XMM (telescope)

USE XMM–Newton telescope

XMM–Newton telescope

(added August 2000)

DEF Spaceborne x-ray telescope, launched in December 1999, providing simultaneous, high-throughput non-dispersive spectroscopic imaging (EPIC instrument), medium-resolution dispersive spectroscopy (Reflection Grating Spectrometer), and optical/UV imaging and timing from a co-aligned instrument (Optical Monitor).

UF X Ray Multi-Mirror Mission

GS artifical satellites

• ESA satellites
• XMM–Newton telescope
• scientific satellites
• astronomical satellites
• XMM–Newton telescope

RT x ray astronomy

X Ray Astrophysics Facility

Z

Z1 truss structure

USE Integrated Truss Structure Z1

Zarya control module

(added November 1998)

DEF Component of the International Space Station providing propulsion, steering, and communications during the early assembly stages of the station; later serving as a docking port and fuel tank. Zarya was built by Russia under contract to the U.S. and is owned by the U.S.

GS modules

• space station modules
• Zarya control module

RT International Space Station

Zenit launch vehicles

(added January 1999)

GS launch vehicles

• Zenit launch vehicles

RT sea launching

Ukrainian space program

zero sum games

(added October 1998)

GS games

• zero sum games

RT differential games

Markov processes

optimal control

pursuit–evasion games

saddle points (game theory)

Zvezda Service Module

USE Service Module (ISS)
NASA THESAURUS SUPPLEMENT

PART 2

ROTATED TERM DISPLAY

A

systems-on- a--chip
Lorentz force
carrier sense multiple
access
ACE satellite
magnetoplasmadynamic thrusters
Advanced Composition Explorer
aerial vehicle
reconnaissance aircraft
aeroshell
eletronics
machine
Boeing 717
very large transport aircraft
VLT
X-32
X-35
algorithms
iron
aluminides
AM-1 (EOS) spacecraft
AMS (spectrum)
use Alpha Magnetic Spectrometer
AMS (spectrometer)
use Alpha Magnetic Spectrometer
analysis
use cost analysis
cost effectiveness
frequency domain information
sensitivity
SMA (image analysis)
spectral mixture time domain
Laser Interferometer Space Antenna
use LISA (observatory)
aperture gain
anticoincidence detectors
anticoincidence shields
antiphase boundaries
antiphase domains
use antiphase boundaries
antiproton interactions
APB (materials)
apoptosis
archaeomagnetism
use paleomagnetism
pulsed
cost benefit analysis
use cost analysis
cost effectiveness

field-programmable gate self
arrays
pulsed jet engines
assembly
associative memory
use associative memory
Trojan asteroids
astrophysics
antimatter
radiation

CMBR
astrophysics
subahumps
WIMPs
astrophysics
weakly interacting massive particles

Submillimeter Wave Astronomy Satellite
Chandra X Ray Astrophysics Facility

spectrum
eutron method
use embedded atom method
atoms
use embedded atom method
atomic indexing
use indexing (information science)

B

Planet-B spacecraft
use Nozomi Mars Orbiter
background radiation
kink
baroreceptor reflexes
use baroreflexes
baroreflexes
rocket-batteries
Euler-Bernoulli beam theory
use Euler-Bernoulli beams
Euler-Bernoulli beams
beams
cost benefit analysis
use cost analysis
cost effectiveness
Euler-Bernoulli beam theory
use Euler-Bernoulli beams
Euler-Bernoulli beams
bevel gears
spiral
biennial oscillation
biomass
biomimetics
biot-Savart law
blended-wing-body configurations
blended-wing-body configurations
use blended-wing-body configurations
body and tail configurations
use body-wing and tail configurations
Hale-Bopp comet
Bond number
Bopp comet
boundaries
decomposition
burning
WBB configurations
use blended-wing-body configurations

C

cameras
carrier sense multiple access
cascode devices

cellular manufacturing
use group technology
use transition metals

chain reactions (chemistry)
use transition metals

chain reactions (nuclear physics)
use transition metals

Chandra X Ray Astrophysics Facility
use X Ray Astrophysics Facility

Chassigny meteorites
use SNC meteorites

EAM (physical chemistry)
use embedded atom method

MEAM (physical chemistry)
use embedded atom method

MMH (chemistry)
use monomethylhydrazines

transition elements
use transition metals

VOC (organic chemistry)
use volatile organic compounds

systems-on-a-chip
clamped structures

cleanup

Mars Climate Orbiter
use quasi-biennial oscillation

climatology
use clino-rotation

clino-rotation
use clino-rotation

clino-station
use clino-rotation

clino-station
use clino-rotation

cloud discharges
cloud-to-ground discharges

CMBR (astronomy)
use cosmic microwave background radiation

cochannel interference
Darkstar unmanned aerial vehicle
use pilotless aircraft
reconnaissance aircraft
data mining
death
use necrosis
Deep Space 1 Mission
organized cell
deflection spectroscopy
deformable mirrors
Delta 3 launch vehicle
Delta 4 launch vehicle
dendrimers
dendritic polymers
use dendrimers
design optimization
Destiny Laboratory Module
detectors
use infrared detectors
SPRITE
detectors
use infrared detectors
orbit
determination
pulse
detonation engines
pulse
detonation wave engines
use pulse detonation engines
cascade
devices
use microelectromechanical systems
Voronoi diagrams
dielectric loss
dielectric waveguides
finite difference time domain method
difference vegetation index
differential games
digital cameras
cloud-to-cloud discharges
cloud-to-ground discharges
intracloud discharges
knowledge discovery
use data mining
protoplanetary disks
use data mining
fingerprint
domain analysis
use indexing (information science)
finite difference time domain method
antiphase domains
use antiphase boundaries
DS1 (space mission)
use Deep Space 1 Mission
dubnium
use pulsed plasma thrusters
E
use e-commerce
e-mail
EAM (physical chemistry)
use embedded atom method
EAP (polymers)
use electroactive polymers
Josephson
quantum Hall
effect
Sunyaev-Zeldovich
S-Z
wing-in-ground thermoacoustic
effect vehicles
effects
ekranoplane
use wing-in-ground effect vehicles
electroactive polymers
electrochemical synthesis
electromagnetic rocket engines
use plasma engines
PML (electromagnetism)
use perfectly matched layers
MEMS
electromechanical devices
use microelectromechanical sys-
tems
use electronics
use quantum Hall effect
SOAC
use systems-on-a-chip
electrosynthesis
use electrochemical synthesis
signal-processing-in-the-
hybrid-Trefftz finite element
detectors
use finite element method
Trefftz method
transition elements (chemistry)
use transition metals
elephant
embedded atom method
modified embedded atom method
use embedded atom method
enantiomeric compounds
use enantiomers
enantiomers
enantiomorphs
use enantiomers
exergonic
energy
use exergy
renewable
tissue
engineering
emagnetic rocket engines
use plasma engines
FDE (engines)
use pulse detonation engines
PDRE (engines)
use pulse detonation engines
PDWE (engines)
use pulse detonation engines
PIT (rocket engines)
use pulsed inductive thrusters
PPT (rocket engines)
use pulsed plasma thrusters
pulse detonation engines
use pulse detonation engines
pulsed arcjet engines
use pulsed arcjet engines
RBCC engines
use rocket-based combined-cycle engines
rocket-based combined-cycle engines
environmental cleanup
Envisat–1 satellite
AM-1 (EOS) spacecraft use Terra spacecraft
EOS AM-1 spacecraft use Terra spacecraft

Holocene epoch

Ethernt

Euler-Bernoulli beam theory use Euler-Bernoulli beams
Euler-Bernoulli beams evanescent waves

pursuit-evasion games

exergonic energy use exergy
exergy

exoplanets use extrasolar planets
exosolar planets use extrasolar planets

Advanced Composition Imager for Magnetopause-to-Aurora Global
Explorer use IMAGE satellite

Rossi X Ray Timing Explorer use X Ray Timing Explorer

Transition Region and Coronal Explorer
Explorer 71 satellite use Advanced Composition Explorer
Explorer 73 satellite use Transition Region and Coronal Explorer
Explorer 74 satellite use Submillimeter Wave Astronomy Satellite
Explorer 77 satellite use Far UV Spectroscopic Explorer
Explorer 78 satellite use IMAGE satellite

knowledge extraction use data mining
extraterrestrial oceans

Chandra X Ray Astrophysics Facility use X Ray Astrophysics Facility

Rayleigh fading FDTD (mathematics) use finite difference time domain method

heavy fermion superconductors
heavy fermion systems
ferroelastic materials
ferroelasticity
fiber pushout

Sea-viewing Wide Field-of-view Sensor field-programmable gate arrays field tests
Gabor filters finite difference time domain method

hybrid-Trefftz finite element method use finite element method
Trefftz method

in-flight simulation
Riegle flow
flow noise
magnetorheological fluids

flying wing configurations use blended-wing-body configurations

Lorentz force accelerator thrusters use magnetoplasmadynamic thrusters

free-space optical communication
free-space optical interconnects

frequency domain analysis
FSOI (integrated optics) use free-space optical interconnects

turnerides membership functions
FUSE (satellite) use Far UV Spectroscopic Explorer

blended-wing-fuselage use wing-fuselage stores

fuselage

G

Gabor filters
Gabor transformation

antenna gain
differential games
differential games
games

games

soft gamma repeaters
field-programmable gate arrays
bevel
gears
spiral bevel
gears
generation

Next Generation Space Telescope project

Genesis mission

Polar/GGS spacecraft

Wind/GGS spacecraft

Imager for Magnetopause-to-Aurora Global Explorer use IMAGE satellite

Mars Global Surveyor

glucocorticoids

Godunov method

GOES 10 Laser Interferometer

Gravitational-Wave Observatory use LIGO (observatory)
greedy algorithms
cloud-to-wing-in

ground
ground discharge
ground effect vehicles
group technology (manufacturing)

H

H-2 control

Hale-Bopp comet
quantum Hall effect
Hall resistance
Hall thrusters

massive compact halo objects

halon

hardware-in-the-loop simulation
hardware-in-the-loop tests

use hardware-in-the-loop simulation

Cooper-Harper ratings

hassium

head up tilt
Population SMA

Variable Specific

normalized difference vegetation

index

document

machine aided

laser-pulsed

indexing

FSOI

tensile-

weakly

proton-antiproton

interannual variations

intercalibration

interconnections

interconnections

interference

Laser

Interferometer Gravitational-Wave Observatory

use LIGO (observatory)

Laser

Interferometer Space Antenna

use LISA (observatory)

intracloud discharges

intrasessional oscillations

intrasessional variations

ion optics

Iridium network

Iridium satellites

use communication satellites

Iridium network

iron aluminides

ISS (space station)

use International Space Station

Java (programming language)

joints

Josephson effect

Josephson tunneling

use Josephson effect

Madden-Julian Oscillation

kink bands

kinking

knowledge discovery

use data mining

knowledge extraction

use data mining

LA-ICP-MS (spectrometry)

use inductively coupled plasma mass spectrometry

Polar Plasma Laboratory

use Polar/GGS spacecraft

Destiny Laboratory Module

use Destiny Laboratory Module

Mars Polar Lander

use Mars Polar Lander

Mars landing sites

Langmuir monolayers

use monomolecular films

Java (programming language)

markup

languages

use document markup languages

very large transport aircraft

laser-induced breakdown spectroscopy

interannual variations

intercalibration

interconnections

interconnections

interference

Laser

Interferometer Gravitational-Wave Observatory

use LIGO (observatory)

Laser

Interferometer Space Antenna

use LISA (observatory)

intracloud discharges

intrasessional oscillations

intrasessional variations

ion optics

Iridium network

Iridium satellites

use communication satellites

Iridium network

iron aluminides

ISS (space station)

use International Space Station

Java (programming language)

joints

Josephson effect

Josephson tunneling

use Josephson effect

Madden-Julian Oscillation

kink bands

kinking

knowledge discovery

use data mining

knowledge extraction

use data mining

LA-ICP-MS (spectrometry)

use inductively coupled plasma mass spectrometry

Polar Plasma Laboratory

use Polar/GGS spacecraft

Destiny Laboratory Module

use Destiny Laboratory Module

Mars Polar Lander

use Mars Polar Lander

Mars landing sites

Langmuir monolayers

use monomolecular films

Java (programming language)

markup

languages

use document markup languages

very large transport aircraft

laser-induced breakdown spectroscopy
Laser

Laser Interferometer
  Gravitational-Wave Observatory
  use LIGO (observatory)
Laser Interferometer Space Antenna
  use LISA (observatory)
laser spark spectroscopy
  use laser-induced breakdown spectroscopy
LASS (spectroscopy)
  use laser-induced breakdown spectroscopy
Delta 3
  launch vehicle
Delta 4
  launch vehicle
Titan 4B
  launch vehicle
VentureStar
  launch vehicle
Long March
  launch vehicles
Zenit
  launch vehicles
Laves (materials)
  phases
Biot-Savart
  perfectly matched stepped thermal layers
  leaders
  leaders (meteorology)
thermal lenses
  use thermal lensing
thermal lensing
LFA thrusters
  use magnetoplasmadynamic thrusters
LIBS (spectroscopy)
  use laser-induced breakdown spectroscopy
LIGO (observatory)
LISA (observatory)
lithium batteries
Long March launch vehicles
loop simulation
loop tests
Lorentz force accelerator thrusters
  use magnetoplasmadynamic thrusters
dielectric loss
Lunar Prospector

M

machine aided indexing
  use indexing (information science)
random positioning
machines
  use clinostats
MACHOs (astronomy)
  use massive compact halo objects
Madden-Julian Oscillation
magnetars
magnetic nozzles
Magnetic Spectrometer
Magnetopause-to-Aurora Global Explorer
  use IMAGE satellite
Magnetoplasma Rocket
  use VASIMR (propulsion system)
magnetoplasmadynamic fluids
magnetothermodynamical fluids
magnetostriatigraphy
email
  use electronic mail
maintenance

cellular manufacturing
  use group technology (manufacturing)
group technology
Longo March launch vehicles
markup languages
  use document markup languages
Mars Climate Orbiter
Mars Global Surveyor
Mars landing sites
Mars missions
2001 Mars Odyssey
Mars Orbiter
Mars Polar Lander
Mars Surveyor 98 Lander
  use Mars Polar Lander
Mars Surveyor 98 Orbiter
  use Mars Climate Orbiter
Mars Surveyor 98 Program
Mars Surveyor 2001 Mission
Martian meteorites
  use SNC meteorites
inductively coupled plasma
mass spectrometry
massive compact halo objects
weakly interacting massive particles
perfectly matched layers
APB (materials)
  use antiphase boundaries
ferroelastic materials
  use smart materials
intelligent materials
  use smart materials
FDTD
  use finite difference time domain method
MEAM (physical chemistry)
  use embedded atom method
Tropical Rainfall Measuring Mission satellite
  use TRMM satellite
meitnerium
memory
  use associative memory
MEMS (electromechanical devices)
  use microelectromechanical systems
heavy metals
  use SNC meteorites
meteorites
  use SNC meteorites
SNC meteorites
  use SNC meteorites
MJO leaders
  (meteorology)
(meteorology)
embedded atom method
  use Madden-Julian Oscillation method
finite difference time domain method
Godunov method
hybrid-Trefftz finite element method
modified embedded atom method
  use finite element method (Trefftz method)
hybrid-Trefftz finite element method
  use embedded atom method
Trefftz method
methods
Taguchi methods
  methods and tests
in vitro
  methods and tests
in vivo
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>VOC</td>
<td>Volatile organic compounds</td>
</tr>
<tr>
<td>organic chemistry</td>
<td>Use volatile organic compounds</td>
</tr>
<tr>
<td>Nozomi Mars</td>
<td>Orbiter</td>
</tr>
<tr>
<td>Orbiter</td>
<td>(organic chemistry) Use volatile organic compounds</td>
</tr>
<tr>
<td>Madden-Julian</td>
<td>Volatile</td>
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<td>quasi-biennial domain</td>
<td>Inductively coupled electrons</td>
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<td>intraseasonal oscillations</td>
<td>Use intraseasonal variations</td>
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<tr>
<td>oscillations</td>
<td>Use intraseasonal variations</td>
</tr>
<tr>
<td>Press sensitive paints</td>
<td>Use pressure sensitive paints</td>
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<tr>
<td>PSP</td>
<td>Use pressure sensitive paints</td>
</tr>
<tr>
<td>Pressure sensitive</td>
<td>Weakly interacting massive</td>
</tr>
<tr>
<td>plate theory</td>
<td>Hypothetical plates</td>
</tr>
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<td>Relativistic-Mindlin</td>
<td>Plates</td>
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<tr>
<td>Mindlin</td>
<td>Plates</td>
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<tr>
<td>Mars</td>
<td>Polar/Plasma Laboratory</td>
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<tr>
<td>Mars</td>
<td>Use Polar/Plasma Laboratory</td>
</tr>
<tr>
<td>Phaethon</td>
<td>Hypothetical planet</td>
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<tr>
<td>Phaethon</td>
<td>Use hypothetical planets</td>
</tr>
<tr>
<td>Phobos spacecraft</td>
<td>Use Phaethon (hypothetical planet)</td>
</tr>
<tr>
<td>photoresists</td>
<td>Use embedded atom method</td>
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<tr>
<td>photothermal deflection</td>
<td>Use embedded atom method</td>
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<td>spectroscopy</td>
<td>Use embedded atom method</td>
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<tr>
<td>EAM</td>
<td>Use electroactive polymers</td>
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<td>MEAM</td>
<td>Use electroactive polymers</td>
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<tr>
<td>hyperbranched polymers</td>
<td>Use dendrimers</td>
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<tr>
<td>random positioning</td>
<td>Use clinostats</td>
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<td>Population III stars</td>
<td>Use Population III stars</td>
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<tr>
<td>ultrasonic processing</td>
<td>Use in-the-element detectors</td>
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<td>commercial off-the-shelf</td>
<td>Use commercial off-the-shelf</td>
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<tr>
<td>COTS</td>
<td>Use commercial off-the-shelf</td>
</tr>
<tr>
<td>Mars Surveyor 98 Program</td>
<td>Mars Surveyor 98 Program</td>
</tr>
<tr>
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| hypothesized planets     | Use hypothesize...
PSP (paints) use pressure sensitive paints
pulse detonation engines
pulse detonation wave engines use pulse detonation engines
pulsed arcjet engines use pulsed jet engines
pulsed inductive thrusters
pulsed plasma thrusters
pursuit-evasion games fiber pushout

Q
QBO (climatology) use quasi-biennial oscillation
QHE (electronics) use quantum Hall effect
quantum communication
quantum computation
quantum computers
quantum computing use quantum computation
quantum cryptography
quantum Hall effect
quasi-biennial oscillation
Quaternary period

R
cosmic microwave background radiation
Rainfall Measuring Mission sat use TRMM satellite
random positioning machines use clinostats
Cooper-Harper pilot ratings
pilot opinion ratings use pilot ratings
slenderness ratio use aspect ratio
Chandra X Ray Astrophysics Facility use X Ray Astrophysics Facility
X Ray Multi-Mirror Mission use XMM-Newton telescope
Rossi X Ray Timing Explorer use X Ray Timing Explorer
Rayleigh fading
RBCC engines use rocket-based combined-cycle engines
chain reactions (chemistry)
chain reactions (nuclear physics) red sprites
use sprites (atmospheric physics)
baroreceptor reflexes use baroreflexes
pressoreceptor reflexes use baroreflexes
thermoacoustic refrigerators
Transition Region and Coronal Explorer
Reissner-Mindlin plates use Mindlin plates
NDVI (remote sensing) use normalized difference vegetation index

S
S-Z effect use Sunyaev-Zeldovich effect
sample return missions
water sampling
TRMM satellite use TRMM satellite
ACE satellite use Advanced Composition Explorer
Explorer 71 satellite use Advanced Composition Explorer
Explorer 73 satellite use Transition Region and Coronal Explorer
Explorer 74 satellite use Submillimeter Wave Astronomy Satellite
Explorer 77 satellite use Far UV Spectroscopic Explorer
Explorer 78 satellite use IMAGE satellite
FUSE (satellite) use Far UV Spectroscopic Explorer
IMAGE satellite use X Ray Timing Explorer
RXTE (satellite) use X Ray Timing Explorer
Submillimeter Wave Astronomy Satellite
SWAS satellite use Submillimeter Wave Astronomy Satellite
TRACE satellite use Transition Region and Coronal Explorer
TRMM satellite extraterrestrial oceans

...
Iridium satellites
- use communication satellites
- Iridium network

Biot-Savart law
- scarf joints
- scene generation
- science

Indexing (information)
- screech tones
- Sea-viewing Wide Field-of-view Sensor
- seaborgium
- SeaWiFS
- use Sea-viewing Wide Field-of-view Sensor
- stellar
- seismology
- use asteroseismology
- self assembly
- carrier sense
- multiple access
- NDVI (remote sensing)
- use normalized difference vegetation index
- pressure
- sensitive paints
- sensitivity analysis
- Sea-viewing Wide Field-of-view Sensor
- Service Module (ISS)
- Zvezda Service Module
- use Service Module (ISS)
- SGR (astronomy)
- use soft gamma repeaters
- shape optimization
- commercial off-the-shelf products
- Shergotty Nakhla Chassigny meteorites
- use SNC meteorites
- shields
- use anticoincidence detectors
- Shuttle Superlightweight Tank
- use external tanks
- propellant tanks
- signal-processing-in-the-element detectors
- use infrared detectors

Hardware-in-the-loop simulation
- in-flight simulation
- use in-flight simulation

Mars landing sites
- use websites
- slenderness ratio
- use aspect ratio
- SLWT (propellant tank)
- use external tanks
- propellant tanks
- SMA (image analysis)
- use spectral mixture analysis
- smart materials
- SNC meteorites
- SOAC (electronics)
- use systems-on-a-chip
- soft gamma repeaters
- solar nebula
- sonochemistry
- use ultrasonic processing

Deep Laser Interferometer
- Space 1 Mission
- Space Antenna
- use LISA (observatory)

DS1 (space mission)
- use Deep Space 1 Mission
- free-space optical communication
- free-space optical interconnects

Ukrainian space program
- ISS (space station)
- use International Space Station space station modules

Next Generation Space Telescope project
- space tourism
- space weather

AM-1 (EOS)
- spacecraft
- use Terra spacecraft

EOS AM-1
- spacecraft
- use Terra spacecraft

MGS
- spacecraft
- use Mars Global Surveyor

Phobos spacecraft
- Planet-B spacecraft
- use Nozomi Mars Orbiter

Polar/GGS
- spacecraft
- Terra spacecraft
- Wind/GGS spacecraft
- use extravehicular activity
- laser spark
- spectroscopy
- use laser-induced breakdown spectroscopy

Variable Specific Impulse Magnetoplasma Rocket
- use VASIMR (propulsion system)
- spectral mixture analysis
- spectral response
- use spectral sensitivity

Alpha Magnetic Spectrometer
- AMS (spectrometer)
- use Alpha Magnetic Spectrometer

ICP-MS (spectrometry)
- use inductively coupled plasma mass spectrometry
- LA-ICP-MS (spectrometry)
- use inductively coupled plasma mass spectrometry

Laser spark
- spectroscopy
- use laser-induced breakdown spectroscopy

LIDAR (spectroscopy)
- use laser-induced breakdown spectroscopy

LIBS (spectroscopy)
- use laser-induced breakdown spectroscopy

PDS (spectroscopy)
- use photothermal deflection spectroscopy

Photochemical deflection
- spectroscopy
- spiral bevel gears
- spreadsheets
- SPRITE detectors
- use infrared detectors

Red sprites
- use sprites (atmospheric physics)
- sprites (atmospheric physics)
- Stardust Mission

Population III stars
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<th>Term</th>
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**T**

- **Taguchi methods**
- **tail configurations**
- **fuselage-wing and tail configurations**
- **Shuttle Superlightweight Tank**
- **SLWT (propellant tank)**
- **group technology (manufacturing)**
<table>
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No term changes or deletions were made during this period.
The NASA Thesaurus Supplement is a cumulative update to the 1998 edition of the NASA Thesaurus (NASA/SP—1998–7501). The Supplement, published every 6 months, includes all new terms and associated hierarchies added since the cutoff for the 1998 edition (December 1997). Parts 1 and 2 (Hierarchical Listing and Rotated Term Display) correspond to Volumes 1 and 2 of the 1998 printed edition of the NASA Thesaurus. Definitions are included in Part 1; uppercase/lowercase forms are provided in both Parts 1 and 2. Part 3 is a list of deletions or changes to valid terms.