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

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
Radiation Environment Experiment). Launched
April 2001.
GS space missions
GS . . . 2001 Mars Odyssey
RT gamma ray spectrometers
RT Mars (planet)
RT Mars exploration
RT Mars surface
RT 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
two 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
GS artificial satellites
GS . . . Explorer satellites
RT energetic particles
RT galactic cosmic rays
RT interplanetary medium
RT solar corpuscular radiation
RT solar cosmic rays
RT solar wind
RT 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
GS aeroshells
RT aeromaneuvering
RT nose cones
RT reentry vehicles

spacecraft design
spacecraft shielding
spacecraft structures

Alpha Magnetic Spectrometer
(added June 1999)
GS measuring instruments
GS scientometrics
GS . . . Alpha Magnetic Spectrometer
RT antimatter
RT Cerenkov counters
RT cosmic rays
RT dark matter
RT interstellar matter
RT magnetic spectroscopy
RT space station payloads
RT spaceborne astronomy

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
RT adaptive optics
RT atmospheric correction
RT atmospheric optics
RT image resolution
RT optical correction procedure
RT phase error
RT telescopes

antenna gain
(added June 1998)
GS amplification
GS . . . antenna gain
RT antennas
RT automatic gain control
RT directional antennas
RT effectiveness
RT high gain
RT 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.
RT background radiation
RT coincidence circuits
RT comparators

anticoincidence shields
USE anticoineidence detectors

antiphase boundaries
(added March 1998)
UF antiphase domains
GS boundaries
RT antiphase boundaries
RT binary alloys
RT crystal dislocations
RT crystal lattices
RT crystal structure
RT grain boundaries
RT interfacial energy
RT intermetallics
RT microstructure
RT order-disorder transformations
RT solid solutions
RT solid--solid interfaces
RT superlattices
RT ternary alloys

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
cytoplasm, chromatin cleavage at regularly spaced
sites, and the endonucleolytic cleavage of
genomic DNA 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
RT biological effects
RT cells (biology)
RT cytology
RT death
tRT deoxyribonucleic acid
RT necrosis
RT radiation effects
vascular resistance and by lowering cardiac walls. The central nervous system's net response to probing the internal structure and dynamics of which data is both increases and decreases active, the baroreflex can compensate rapidly for reductions in blood pressure by decreasing peripheral resistance. A reduction of central sympathetic outflow occurs when pressoreceptors (baroreceptors) in the carotid sinus reflex mechanism are stimulated by a fall in blood pressure. This stretch of blood vessels, which activates baroreceptor reflexes so that short-term changes in blood pressure are maintained. Baroreceptors are also located in the aortic arch. The baroreflex is a negative feedback system that buffers changes in blood pressure. To keep blood pressure within the normal range, the baroreceptors compare the current blood pressure against a baseline, and if the blood pressure deviates from the baseline, the baroreflexes are activated to bring blood pressure back to normal. Baroreflexes are also important in the control of cardiovascular system functions, such as heart rate and blood pressure. Baroreceptors are located in the aortic arch and carotid sinus and respond to changes in blood pressure. When blood pressure increases, baroreceptors stretch and activate the baroreflex, which decreases heart rate and peripheral resistance, thereby reducing blood pressure. Conversely, when blood pressure decreases, baroreceptors relax and the baroreflexes are inhibited, allowing blood pressure to increase. Baroreceptors are sensitive to changes in blood pressure and can rapidly adjust the cardiovascular system to maintain blood pressure within a normal range. Baroreceptors, therefore, play a crucial role in the regulation of blood pressure and cardiovascular system function. Baroreceptors are located in the aortic arch and carotid sinus and are sensitive to changes in blood pressure. 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Boeing 717 aircraft (added October 1998) GS Boeing aircraft

Boeing 717 aircraft commercial aircraft

Boeing 717 aircraft jet aircraft

. . . Boeing 717 aircraft monoplane

Boeing 717 aircraft passenger aircraft

Boeing 717 aircraft transport aircraft

. . . Boeing 717 aircraft

C

carrier sense multiple access (added April 2000) GS multiple access
carrier sense multiple access transmission . . .
data transmission . . .
multiple access . . .
carrier sense multiple access communication networks

RT communication networks

computer networks

Ethernet local area networks

packet transmission

cascade devices (added August 1996) GS cascade devices

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 cascade devices electronic equipment
the gravitational vector; often applied to simulate
clinostating
clinostat

chain reactions (chemistry)

(added May 1999)

GS chemical reactions
chain reactions (chemistry)

RT chemical lasers
combustion chemistry

chain reactions (nuclear physics)

(added May 1999)

GS nuclear reactions
fission
.. chain reactions (nuclear physics)

RT fission products
neutrons

Chandra X Ray Astrophysics Facility
USE X Ray Astrophysics Facility

clamped structures

(added February 1998)

RT beams (supports)
clamps
composite structures
joints (junctions)
laminates
plates (structural members)
shells (structural forms)
structural members
structural vibration
.. structures

clinorotation

(added July 2000)
DEF Rotational motion of a test subject about one or more axes that are inclined with respect to the gravitational vector; often applied to simulate a microgravity environment.

UF clinostat rotation
clinorotation

GS gyration
.. clinorotation

RT centrifuging
clinostats
gravitational effects
gravitational physiology
microgravity
rotating environments
space environment simulation
weightlessness
weightlessness simulation

clinostats

(added July 2000)

DEF Devices for producing vector-averaged gravitational environments which mimic microgravity.

UF random positioning machines
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

(added August 1999)

GS electric current
electric discharges
.. lightening
.. cloud-to-cloud discharges

cloud-to-ground discharges

(added August 1999)

GS electric current
electric discharges
.. lightening
.. cloud-to-ground discharges

RT elves
sprites (atmospheric physics)

CMBR (astronomy)
USE cosmic microwave background

cochannel interference

(added April 2000)
DEF Interference caused by multiple, simultaneous transmissions occurring in the same communication channel.

GS electromagnetic interference
radio frequency interference
.. cochannel interference
RT channel capacity
channel noise
intersymbolic interference
phase shift keying

colloidal suspensions
USE colloids

Comet Nucleus Tour

(added February 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 nuclei
Encke comet
Schwassmann–Wachmann comet
swingby technique

commercial off-the-shelf products

(added 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
USE associative memory

CONTOUR (mission)
USE Comet Nucleus Tour

Cooper–Harper ratings

(added August 1999)
DEF Flight characteristics
pilot ratings
.. Cooper–Harper ratings
ratings
pilot ratings

RT aircraft performance
helicopter performance

corrugated waveguides

(added February 1998)

GS waveguides
corrugated waveguides
RT gratings (spectra)
optical waveguides
waveguide antennas

cosmic microwave background radiation

(added July 2000)

UF CMBR (astronomy)

GS electromagnetic radiation
.. radio 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

RT cosmology
radio astronomy
relativistic astronomy
Sunyaev–Zeldovich effect

cosmions
USE weakly interacting massive particles

cost benefit analysis
USE cost analysis
cost effectiveness

COTS products
USE commercial off-the-shelf products

critical current

(added 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
the material behaves normally.

GS electric current
RT critical current

RT critical temperature
current density
superconductivity
superconductors (materials)

cuprates
(added April 1999)
GS copper compounds
cuprates
RT BSCCO superconductors
copper oxides
YBCO superconductors

cycloaddition
(added June 1998)
DEF Pericyclic chemical reaction in which unsaturated molecules combine to form a cyclic compound under the influence of heat or light.

GS chemical reactions
cycloaddition
RT cycloaddition
photochemical reactions
polymerization
synthesis (chemistry)

Darkstar unmanned aerial vehicle
USE pilotless aircraft
reconnaissance aircraft

deformable mirrors
(added May 1998)
GS mirrors
deformable mirrors
RT adaptive optics
light modulation
phase modulation
segmented mirrors

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 nanocarbons and devices.

UF dendritic polymers
hyperbranched polymers
GS molecules
dendrimers
RT conducting polymers
dendritic crystals
nanostructure (characteristics)
organic micromolecules
polymer synthesis
synthetic metals
dendritic polymers
USE dendrimers
design optimization
(added February 2001)
GS optimization
design optimization
shape optimization
RT aircraft design
computer aided design

USE design analysis
optimal control

RT minimax technique
pursuit-evasion games
stochastic processes
zero sum games
digital cameras
(added July 1998)
GS optical equipment
cameras
digital cameras
photographic equipment
cameras
digital cameras
RT CCD cameras
digital systems
SDD digital techniques
photogrammetry
television cameras
video equipment
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 colloidial suspension, exhibiting for example...
crystalline, liquid, and gas phases, and a melting/freezing phase transition

**GS**
- particles
  - charged particles
  - energetic particles
  - plasmas (physics)
  - dusty plasmas
  - corpuscular radiation
  - energetic particles
  - plasmas (physics)
  - dusty plasmas

**RT**
- dust
- planetary rings
- plasma clouds
- plasma composition
- plasma-particle interactions
- space plasmas
- strongly coupled plasmas

---

**E**

**EAM (physical chemistry)**

**USE**
- embedded atom method

**EAP (polymers)**

**USE**
- electroactive polymers

**e-commerce**

**USE**
- electronic commerce

**ekranoplanes**

**USE**
- wing-in-ground effect vehicles

**electroactive polymers**

**added (June 2000)**

**UF**
- EAP (polymers)

**RT**
- actuators
  - conducting polymers
  - electromechanical devices
  - electrochemical fluids
  - electrostriction
  - microelectromechanical systems

**co**
- polymers
- robot arms

**electrochemical synthesis**

**added (January 2000)**

**DEF**
- A chemical synthesis reaction that is induced by an electric current.

**UF**
- electrocatalysis

**GS**
- synthesis (chemistry)
- electrochemical synthesis

**RT**
- electrochemistry
- electrocatalysis
- polymerization

**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.

**UF**
- electronic commerce

**GS**
- commerce

**RT**
- computer information security
- electronic mail
- Internet resources
- websites
- World Wide Web

**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 gaps (solid state)
  - energy levels
  - Fermi liquids

**electrosynthesis**

**USE**
- electrochemical synthesis

**elves**

**added (January 2000)**

**DEF**
- Transient airglow 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.

**UF**
- EAM (physical chemistry)
- MEAM (physical chemistry)
- modified embedded atom method

**RT**
- alloys
- crystal defects
- grain boundaries
- interatomic forces
- metals
  - methodology
  - molecular dynamics
  - potential energy

**enantiomeric compounds**

**USE**
- enantiomers

**enantiomers**

**added (August 1998)**

**DEF**
- Isomeric pairs whose crystalline forms or molecular structures are non-superimposable mirror images.

**UF**
- enantiomeric compounds

**environmental cleanup**

**added (February 1999)**

**GS**
- cleaning
  - environmental cleanup

**RT**
- decontamination
  - environmental management
  - environment protection
  - hazardous wastes
  - oil pollution
  - oil slicks
  - pollution control
  - reclamation
  - soil pollution
  - waste disposal
  - waste treatment
  - water pollution
  - water treatment

**Envisat-1 satellite**

**added (August 2000)**

**DEF**
- Polar-orbiting Earth observation satellite designed to provide continuous global measurements including high- and medium-resolution radar and optical images from its Advanced Synthetic Aperture Radar (ASAR) and Medium-Resolution Imaging Spectrometer (MERIS). Acquired data will support Earth sciences research and allow monitoring of environmental and climatic changes.

**GS**
- artificial satellites
  - ESA satellites
    - Envisat-1 satellite
  - ESA spacecraft
  - ESA satellites
    - Envisat-1 satellite

**RT**
- ERS-2 (esa satellite)
- imaging spectrometers
- remote sensing
- satellite observation
- satellite-borne radar
- synthetic aperture radar

**EOS AM-1 spacecraft**

**USE**
- Terra spacecraft

**Ethernet**

**added (January 2000)**

**DEF**
- Computer network protocol originally developed in the 1970s for local area network technology, uses carrier sense multiple access with collision detection (CSMA/CD), coaxial cable, and broadcast transmission.

**GS**
- protocol (computers)

**RT**
- carrier sense multiple access
- computer networks
- local area networks

**Euler–Bernoulli beam theory**

**USE**
- Euler–Bernoulli beams
Euler–Bernoulli beams

(added April 1998)

Euler–Bernoulli beam theory
GF E·-Bernoulli beam theory
GS structural members
. beams (supports)

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

Evanescent waves
(added March 1998)

GS surface waves
RT evanescent waves
acoustic impedance
fiber optics
internal waves
plane waves
propagation modes
reflected waves
wave propagation

∞ waves
evanescent
energy
USE exergy
e
e
(added December 2000)

DEF The 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.

GF exergic energy
GF energy
energy budgets
energy conservation
energy conversion efficiency
energy dissipation
entropy
e
power efficiency
thermodynamic efficiency
thermodynamic properties
thermodynamics
waste energy utilization

Exoplanets
USE extrasolar planets

Exosolar planets
USE extrasolar planets

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

Extraterrestrial oceans
(added June 2001)

SN (EXCLUDES MAGMA OCEANS)
DEF Extensive bodies of water on planets and moons.

GF planetary oceans
GF satellite oceans
GF oceans
GF extraterrestrial oceans
GF Callisto
GF Europa
GF planetary surfaces
GF satellite surfaces

F

FDTD (mathematics)
USE finite difference time domain method

Ferroelastic materials
(added June 1998)

GF ferroelastic materials
GF shape memory alloys
RT ceramics
ferroelectricity
ferroelectric materials
∞ materials
GF smart materials

Ferroelectricity
(added June 1998)

GF mechanical properties
GF elastic properties
GF ferroelasticity
GF crystal structure
GF domain wall
GF ferroelectric materials
GF ferroelectricity
GF phase transformations
GF shape memory alloys
GF smart materials

Fiber pushout
(added September 1999)

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

Field tests
(added November 1999)

SN (EXCLUDES TESTS OF ELECTRIC, MAGNETIC, OR ELECTROMAGNETIC
FIELDS)
DEF Tests carried out in the actual setting in which the subject device is intended to operate
RT environmental tests
GF performance tests
∞ tests

Field–programmable gate arrays
(added April 2000)

GF circuits
Analysis of the samples collected by the mission will contribute to an understanding of the origins of the solar system.

**GS** space missions
- **Genesis mission**
- **RT** solar system evolution
- **GL** solar wind

**glucocorticoids**
(added December 1999)
**DEF** Adrenocortical steroid hormones that are involved in the metabolism of fats, proteins, and carbohydrates, and have anti-inflammatory properties.

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

**RT** adrenal gland
- atrophy
- carbohydrate metabolism
- hormone metabolisms
- hypokinesia
- lipid metabolism
- muscles
- protein metabolism

**Godunov method**
(added February 1998)
**DEF** Non-oscillatory finite-volume scheme that incorporates the exact or approximate solution to the Riemann initial-value problem, or a generalization of it.

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

**RT** approximation
- Cauchy problem
- Cauchy-Riemann equations
- computational fluid dynamics

- **Euler equations of motion**
- finite difference theory
- shock wave interaction
- supersonic flow

**GOES 10**
(added March 2000)

**GS** artificial satellites
- meteorological satellites
- **GOES satellites**
- **GOES 10**
- synchronous satellites
- **GOES satellites**
  - **GOES 10**

**greedy algorithms**
(added March 2000)
**DEF** Any algorithm characterized by a procedure that selects the most extreme element from a set to satisfy a given goal. A recursive procedure for constructing a set of objects from the smallest possible elements.

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

**RT** graph theory
- heuristic methods

**Hall thrusters**
(added June 2000)
**DEF** Gridless ion engines that produce thrust by electrostatically accelerating plasma ions out of an annular discharge chamber.

- **GS** engines
  - rocket engines
halon (added January 2000)
DEF A bromofluorocarbon compound that was widely used as an agent for fire suppression and explosion protection. After being recognized as an ozone-depleting substance, the U.S. production and import of halons was banned in 1994.

- carbon compounds
  - halocarbons
  - halogen compounds
  - bromine compounds
  - halon
- RT fire extinguishers
- UF flame retardants
- fluorocarbons

hardware-in-the-loop simulation
(added February 1999)
UF hardware-in-the-loop tests
GS simulation
RT hardware-in-the-loop simulation
- control simulation
- performance tests
- systems simulation

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

hassium (added May 1998)
GS chemical elements
- hassium
- bohrium
- meitnerium

head up tilt
(added March 1998)
DEF Body posture while lying on a tilt table with the head higher than the rest of the body.

- UF HUT (physiology)
- GS posture
- RT aerospace medicine
- bed rest
- bioastronautics
- cardiovascular system
- gravitational physiology
- head down tilt
- hemodynamic responses
- hindlimb suspension
- lower body negative pressure
- orthostatic tolerance
- physiological responses
- supine position
- weightlessness simulation

health and usage monitoring systems
USE systems health monitoring

heavy fermion superconductors
(added April 1999)
GS conductors
- superconductors (materials)
  - heavy fermion superconductors
  - intermetallics
  - heavy fermion systems
  - heavy fermion superconductors

heavy fermion systems
(added April 1999)
GS intermetallics
RT fermions
- heavy fermion superconductors
- superconductors (materials)

heavy metals
(added July 1999)
DEF Metals or alloys having a high specific gravity, usually ones with a density greater than 5 grams per cubic centimeter.
GS metals
RT cadmium
- chromium
- contaminants
- copper
- industrial wastes
- lead (metal)
- mercury (metal)
- soil pollution
- toxic hazards
- zino

hindcasting
(added July 1999)
DEF The process of reconstructing the time and space evolution of an atmospheric or oceanic phenomenon that has occurred in the past, through an analysis of historical data, a mathematical-model simulation of the processes involved, or a combination of data analysis and modeling. GS predictions
RT forecasting
- meteorological parameters
- nowcasting
- oceanographic parameters
- weather forecasting

hindlimb suspension
(added June 2001)
DEF Technique for limiting use, activity, or movement by immobilizing or restraining animal by suspending from hindlimbs or tails. This immobilization is used to simulate some effects of reduced gravity and study weightlessness physiology.

- UF hindlimb unloading
- GS immobilization
- hindlimb suspension

- suspended (hanging)
- hindlimb suspension
- aerospace medicine
- atrophy
- bioastronautics
- bone demineralization
- gravitational physiology
- head down tilt
- head up tilt
- hypodynia
- hypokinesia
- limbs (anatomy)
- weightlessness simulation

hindlimb unloading
USE hindlimb suspension

Holocene epoch
(added May 2001)
DEF Most recent geologic epoch of the Quaternary period extending from about 10,000 years ago to, and including the present.
GS Cenozoic Era
- Quaternary period
- Holocene epoch
RT geochronology
- Pleistocene epoch

HUT (physiology)
USE head up tilt

hybrid–Trefftz finite element method
USE finite element method
- Trefftz method

hydrophobicity
(added June 2000)
DEF The degree to which a substance is insoluble in water, or resists wetting or hydration.
GS hygral properties
- hydrophobicity
RT adsorption
- chemical properties
- hydration
- hygroscopy
- moisture resistance
- properties
- solubility
- sorption
- surface properties
- surfactants
- waterproofing
- wettability
- wetting

hyperbranched polymers
USE dendrimers

hypervelocity
USE high velocity environments

hypogravity
USE microgravity

hypothetical particles
(added November 1999)
GS particles
- elementary particles
  - hypothetical particles
  - gluons
  - gravitinos
  - gravitons
  - photons
  - quarks
  - tachyons
  - weakly interacting massive particles

hypothetical planets
(added June 1998)
UF Phaethon (hypothetical planet)
GS celestial bodies
- planet X
- rogue planets
- transplutonic planets
- planets
- hypothetical planets
- comets
- extrasolar planets
- planetary orbits
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 cell or organism.

**I IMAGE satellite**

*(added November 2000)*

DEF A medium class Explorer (MIDEX) mission to study the global response of the Earth's magnetosphere to changes in the solar wind. I IMAGE (Imager for Magnetopause-to--Aurora Global Exploration) will use neutral atom, ultraviolet, and radio imaging techniques to: (a) identify the dominant mechanisms for injecting plasma into the magnetosphere on substorm and magnetic storm time scales; (b) determine the directly driven response of the magnetosphere to solar wind changes; and, (c) discover how and where magnetospheric plasmas are energized, transported, and subsequently lost during substorms and magnetic storms.

**UF** Explorer 78 satellite

**GS** artificial satellites

- scientific satellites
- Explorer satellites

**IMAGE satellite**

**RT** auroral zones

Earth magnetosphere

magnetic storms

magnetopause

plasmasphere

space plasmas

**Imager for Magnetopause--to--Aurora Global Explorer**

**USE** IMAGE satellite

**in vitro methods and tests**

*(added May 1999)*

**DEF** Tests of, or methods related to, biological or biochemical processes occurring in an artificial environment or outside of a living cell or organism.

**RT** bioassay

- biotechnology
- conditions
- culture techniques
- cytology
- fertilization
- histology
- in vivo methods and tests

**∞** methodology

**∞** tests

- tissue engineering

**in vivo methods and tests**

*(added May 1999)*

**DEF** Tests of, or methods related to, biological or biochemical processes occurring within a living cell or organism.

**RT** bioassay

- biotechnology
- conditions
- culture techniques
- cytology
- histology
- in vitro methods and tests

**∞** methodology

**∞** tests

in vitro methods and tests

intravenous procedures

**Information analysis**

*(added April 2000)*

**GS** information analysis

- data mining
- indexing (information science)
- scientific visualization
- numerical flow visualization
- trend analysis

**RT** information resources management

- information retrieval
- natural language processing

**Integrated Truss Structure Z1**

*(added June 2000)*

**DEF** An early exterior framework for the International Space Station to allow the first U.S. solar arrays to be temporarily installed on the Unity module for early power.

**UF** Z1 truss structure

**GS** space station structures

- Integrated Truss Structure Z1

**RT** International Space Station

- Unity connecting module

intelligent materials

**USE** smart materials

**interannual variations**

**USE** annual variations

**Intercloud discharges**

*(added August 1999)*

**GS** electric current

- electric discharges

**∞** lightning

**∞** intercloud discharges

**intraseasonal oscillations**

**USE** intraseasonal variations

**intraseasonal variations**

*(added September 2000)*

**UF** intraseasonal oscillations

**GS** variations

- annual variations

- intraseasonal variations

- Madden--Julian Oscillation

**RT** atmospheric circulation

- atmospheric models
- climatology
- tropical meteorology

ion optics

*(added June 1998)*

**RT** beam waveguides

- beamforming
- electron optics
- ion beams
- ion engines
- ion propulsion

- mass spectrometers

**∞** optics

Iridium network

*(added December 1998)*

**DEF** A 66--satellite wireless personal telecommunications network designed to provide worldwide telephone, paging, facsimile and data services to handheld or mobile equipment.

**UF** Iridium satellites

**GS** networks
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
  • aluminides
  • 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
Si bipolar junction transistor
superconducting devices
superconductors (materials)

Josephson tunneling
USE Josephson effect

K

Kinking
(added April 1998)
RT buckling
compression loads
cracking (fracturing)
deflection
displacement
fatigue modes
fiber composites
folding
heaving
heaving
kinking

Iron

knowledge discovery
USE data mining

knowledge extraction
USE data mining

 Leaders (meteorology)
(added August 1999)
GS electric current
  • electric discharges
  • lightning
  • stepped leaders

LEA thrusters
USE magnetoplasmadynamic thrusters

LIBS (spectroscopy)
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)
  • scientific satellites
  • astronomical satellites
  • LISA (observatory)
observatories
  • astronomical observatories
  • LISA (observatory)
RT astronomical interferometry
  • gravitational waves
  • laser interferometry
  • spaceborne astronomy

Lithium batteries
(added December 1998)
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 magnetoplasmadynamic thrusters

Lunar Prospector
(added February 1998)
GS artificial satellites
  • lunar satellites
  • Lunar Prospector
lunar spacecraft
lunar satellites
Lunar Prospector

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

LASS (spectroscopy)
USE laser–induced breakdown spectroscopy

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 magnetoplasmadynamic thrusters

Lunar Prospector
(added February 1998)
GS artificial satellites
  • lunar satellites
  • Lunar Prospector
lunar spacecraft
lunar satellites
Lunar Prospector
magnetic fields to direct and accelerate plasma flows, thereby providing thrust for propulsion.

**Magnetoplasma dynamic thrusters**

**DEF** Electromagnetic rocket engines that produce thrust via the Lorentz body force ejecting a high velocity plasma stream. The thrusters can be operated in either steady-state or pulsed mode, and typically have an axisymmetric geometry (annular anode surrounding a central cathode).

**UF** LFA thrusters

**GS** engines

- rocket engines
- electric rocket engines
- plasma engines
- **magnetoplasma dynamic** thrusters

**RT** arc jet engines
- electromagnetic propulsion
- magnetoplasma dynamics
- plasma accelerators
- plasma propulsion
- spacecraft propulsion
- **thrusts**

**Magnetorheological fluids**

**DEF** Fluids comprised of magnetically soft particles dispersed in liquids and possessing rheological properties that can be rapidly and reversibly altered by the application of a magnetic field.

**UF**

**GS**

- engines
- rocket engines
- electric rocket engines
- plasma engines
- **magnetoplasma dynamic**
- **thrusters**

**RT**

- arc jet engines
- electromagnetic propulsion
- magnetoplasma dynamics
- plasma accelerators
- plasma propulsion
- spacecraft propulsion
- **thrusts**

**Magnetometers**

**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
- **magnetars**

**RT**

- pulsars
- soft gamma repeaters
- supernova remnants
- x-ray sources

**Mars Global Surveyor**

**DEF** Spacecraft and related mission designed to orbit Mars over a two year period and collect data on the surface morphology, topography, composition, gravity, atmospheric dynamics, and magnetic field. Launched November 1996.

**GS**

- spacecraft
- Mars probes
- **Mars Global Surveyor**

**RT**

- Mars atmosphere
- Mars missions
- Mars Observer
- Mars surface

**Mars landing sites**

**DEF** Areas on the Martian surface selected for spacecraft landing, or areas where spacecraft have actually landed.

**GS**

- landing sites
- **Mars landing sites**

**RT**

- Mars exploration
- Mars landing
- Mars missions
- Mars surface
- site selection

**Mars missions**

**DEF**

- **Mars missions**
- 2001 Mars Odyssey
- manned Mars missions
- Mars sample return missions
- Mars Surveyor 2001 Mission

**GS**

- spacecraft
- Mars missions
- Mars missions
- Mars missions
- Mars missions

**RT**

- Earth-Mars trajectories
- Mars Climate Orbiter
- Mars exploration
- Mars Global Surveyor
- Mars landing
- Mars landing sites
- Mars Observer
- Mars Pathfinder
- Mars Polar Lander
- Mars probes
- Mars surface samples
- Mars Surveyor 98 Program
- missions

**Mars Polar Lander**

**DEF** One of two spacecraft comprising the Mars Surveyor 98 program; launched January 11

**GS**

- spacecraft
- Mars missions
- **Mars Polar Lander**

**RT**

- Mars atmosphere
- Mars missions
- Mars Polar Lander
- Mars surface
- Mars Surveyor 98 Program
- missions
1999. After a soft 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 microprobes will be released as part of a technology-validation mission related to multiple-lander spacecraft.

USE Mars Surveyor 98 Lander
GS Interplanetary spacecraft
RT Mars atmosphere

Mars Surveyor 98 Orbiter
USE Mars Climate Orbiter
GS Mars missions
GS Mars surface
GS Mars Surveyor 98 Program

Mars Surveyor 98 Program
(altered March 1999)
DEF Mars exploration program consisting of two mission spacecraft—the Mars Climate Orbiter and the Mars Polar Lander. Two surface penetrating microprobes (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
(altered 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 instruments, a robotic arm, and the Marie Curie Rover. (In March 2000, the lander portion of the mission was cancelled; the orbiter mission was superseded by the 2001 Mars Odyssey mission.)

GS space missions
Mars missions
Mars Surveyor 2001 Mission
RT 2001 Mars Odyssey
Mars environment
Mars surface
Mars Surveyor 98 Program

Mars Surveyor 2001 Mission
(altered July 1999)
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GS space missions
Mars missions
Mars Surveyor 2001 Mission
RT 2001 Mars Odyssey
Mars environment
Mars surface
Mars Surveyor 98 Program

Martian meteorites
USE SNC meteorites

massive compact halo objects
(altered 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.

USE embedded atom method

 MEAM (physical chemistry)
nanotechnology

NGST project

Next Generation Space Telescope project

quantum wires
self assembly

nanotubes
(added June 2000)

DEF Nanostructures having a closed, tubular morphology that can be single-walled or multi-walled. The structures are believed to be defect free, leading to high strength despite their low density, and can be either electrically conductive or semiconductive, depending on their helicity.

U F nanotubes
GS microstructure
nanotubes
RT fullerenes
graphite
nanostuctures (devices)
nanotechnology
º tubes

nanotubes
USE nanotubes

NDVI (remote sensing)

USE normalized difference vegetation index

necrosis
(added October 2000)

DEF One of the two mechanisms by which cell death occurs (the other being the physiological process of APOPTOSIS). A pathological process caused by the progressive degradative action of enzymes that is generally associated with severe cellular trauma. It is characterized by mitochondrial swelling, nuclear flocculation, uncontrolled cell lysis, and ultimately cell death. In general, cell or tissue death caused by disease or injury.

U F pathological cell death
GS pathological effects
necrosis
RT apoptosis
cells (biology)
cytology
dead
sick
injuries
myocardial
infarction
pathology
tissues (biology)

NGST project

USE Next Generation Space Telescope project

normalized difference vegetation index
(added June 2001)

DEF A transformation of satellite-based measurements computed as the ratio of reflectance in the red and near infrared portions of the spectrum. Reflectance in the red region decreases with increasing chlorophyll content of the plant canopy, while reflectance in the infrared increases with increasing wet plant biomass. The index value represents greenness, density, and vigor of vegetation.

U F NDVI (remote sensing)
GS ratios
NDVI
vegetation

Nozomi Mars Orbiter
(added August 1998)

DEF A Japanese Mars mission spacecraft designed to study the Martian upper atmosphere and its interaction with the solar wind, and to develop technologies for use in future planetary missions. Specifically, instruments on the spacecraft enable the measurement of the structure, composition and dynamics of the ionosphere, aeronomy effects of the solar wind, the escape of atmospheric constituents, the intrinsic magnetic field, and dust in the upper atmosphere and in-orbit around Mars.

U F Planet-B spacecraft
GS interplanetary spacecraft
Mars probes
Nozomi Mars Orbiter
Japanese spacecraft
Nozomi Mars Orbiter
unmanned spacecraft
space probes
Mars probes
Nozomi Mars Orbiter
aeronomy
Deimos
Phobos
planetary atmospheres
solar planetary interactions

optical interconnects
(added June 1998)

GS optical interconnects
free–space optical interconnects
RT connectors
electric connectors
integrated optics
optical computers
optical switching
optoelectronic devices
photonics

orbit determination
(added December 1998)

GS orbit determination
airborne range and orbit determination
osteoblasts

- orbit calculation
- minimum variance orbit determination
- orbital position estimation

RT Global Positioning System position errors
satellite tracking
space navigation
spacecraft control
spacecraft position indicators

osteoblasts

(adDED 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)

osteoblasts

RT bone demineralization bone mineral content bones
cytogenesis fibroblasts osteoporosis

P

pathological cell death

USE necrosis

PDE (engines)

USE pulse detonation engines

PDRE (engines)

USE pulse detonation engines

PDS (spectroscopy)

USE photothermal deflection spectroscopy

PDWE (engines)

USE pulse detonation engines

perfectly matched layers

(adDED 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
- perfectly matched layers

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

(adDED 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

phoetoressis

(adDED 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.

UF etching
- integrated circuits
- microelectronics
- photoelectrography
- photomasks
- photopolymers
- photosensitivity

photothermal deflection spectroscopy

(adDED November 1998)

USE PDS (spectroscopy)

GS spectroscopy
- photothermal deflection spectroscopy

RT optical measurement
- photoacoustic spectroscopy
- thermal diffusivity
- thermal lensing

piezoelectric actuators

USE piezoelectric actuators

piezoelectric actuators

(adDED January 2001)

DEF Any actuator that uses the piezoelectric effect as a basis for its function.

UF piezoelectric actuators

GS actuators
- piezoelectric actuators electromechanical devices
- piezoelectric actuators active control microelectromechanical systems piezoelectric motors piezoelectric transducers smart materials smart structures ultrasonic wave transducers vibration damping

piezoelectric motors

(adDED 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
- electric motors
- piezoelectric motors

RT microelectromechanical systems micromotors piezoelectric actuators piezoelectric transducers ultrasonic wave transducers

piezomotors

USE piezoelectric motors

pilot opinion ratings

USE pilot ratings

pilot ratings

(adDED August 1989)

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 controllability 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

(adDED 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 Quaternary period

RT geochronology Holocene epoch

PML ( electromagnetism)

USE perfectly matched layers

Polar Plasma Laboratory

USE Polar/GGS spacecraft

Polar/GGS spacecraft

(adDED 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 energies 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 scientific satellites
- Polar/GGS spacecraft

RT auroras Earth ionosphere Earth magnetosphere geomagnetism
missile control
proportional control
proportional guidance
terminal guidance

proton–antiproton interactions
title undercooling reactions
antiprotons
high energy interactions
matter–antimatter propulsion

protoplanetary disks

circumstellar disks from which planetary
systems are created during star formation.

pulsed plasma thrusters

electromagnetic propulsion devices in
which electrical power is used to ablate, ionize,
and electromagnetically accelerate atoms and
molecules from a block of solid propellant material.

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electromagnetic propulsion devices in
which electrical power is used to ablate, ionize,
and electromagnetically accelerate atoms and
molecules from a block of solid propellant material.
quantum cryptography

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

GS data processing equipment
computers
RT quantum computers

quantum computing
USE quantum computation

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

GS cryptography
quantum cryptography
RT computer information security
quantum computation

quantum Hall effect
(added 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-squared), 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
Hall effect
RT electron gas
Hall resistance
magnetic effects
quantum electronics
semiconductor devices
superlattices

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

Quaternary period
(added 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

random positioning machines
USE clinostats

Rayleigh fading
(added 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 channeling (data transmission)
mobile communication systems
multipath transmission
phase shift keying
radio signals
reception diversity

RBCC engines
USE rocket-based combined-cycle engines

red sprites
USE sprites (atmospheric physics)

Reissner–Mindlin plates
USE Mindlin plates

renewable energy
(added December 1998)
GS renewable energy
geothermal energy utilization
hydroelectricity
tidepower
wave energy
windpower utilization
RT biocconversion
biomass energy production
clean energy
energy policy
energy sources
energy technology
geothermal energy conversion
hydrogen–based energy
ocean thermal energy conversion
solar energy conversion
waste utilization
water wave energy conversion

Ringleb flow
(added July 1998)
GS fluid flow
compressible flow
Ringleb flow
steady flow
Ringleb flow
two dimensional flow
Ringleb flow
RT critical flow
subsonic flow
transonic flow

rocket-based combined-cycle engines
(added August 1999)
DEF Jet engines that integrate a high specific impulse, low thrust-to-weight, air-breathing engine with a low–impulse, high thrust-to-weight rocket. The engines are often defined by four modes of operation in a single-stage-to-orbit configuration. In the first mode, the engine functions as a rocket-driven ejector. When the rocket engine is switched off, subsonic combustion (mode 2) is present in the ramjet mode. As the vehicle continues to accelerate, supersonic combustion (mode 3) occurs in the ramjet mode. Finally, as the edge of the atmosphere is approached and the engine inlet is closed off, the rocket is reignited and the final ascent to orbit is undertaken in an all-rocket mode (mode 4).

UF RBCC engines
GS engines
rocket engines
rocket-based combined-cycle engines
RT air breathing boosters
air breathing engines
hybrid propulsion
integral rocket engines
ramjet engines
single stage to orbit vehicles
spacecraft propulsion
supersonic combustion ramjet engines

rogue planets
USE hypothetical planets

Rossi X Ray Timing Explorer
USE X Ray Timing Explorer

RXTE (satellite)
USE X Ray Timing Explorer

sample return missions
(added March 2001)
DEF Space missions to collect material samples from interplanetary space, a planet, or other body and return the samples to Earth.

GS space missions
sample return missions
Mars sample return missions
Stardust Mission
RT samples
space exploration

satellite oceans
USE extraterrestrial oceans

scarf joints
(added March 1998)
DEF A joint in which the overlapping parts are tapered to form a continuous length, with no increase in dimension at the joint.

GS joints (junctions)
scarf joints
RT bolted joints
bonded joints
lap joints
metal joints
scarfing

scene generation
(added July 1998)
GS imaging techniques
scene generation
simulation
RT computer graphics
flight simulation
image reconstruction
scientific visualization
target simulators

16
to produce a desired structure or other properties causes them to aggregate into molecular entities so that shape-complementarity that involves designing molecules and supramolecular structures.

**SeaWiFS** (Sea-Viewing Wide Field-of-view Sensor)

- **Usage**
  - Sea-viewing Wide Field-of-view Sensor

**Self-assembly**

- **Definition**
  - 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.

**Sensitivity analysis**

- **Definition**
  - 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.

**Service Module (ISS)**

- **Definition**
  - 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.

**Shape optimization**

- **Definition**
  - Process of, or techniques for, determining values of shape design variables that minimize or maximize a selected objective function while satisfying limiting constraints.

**Smart materials**

- **Definition**
  - Engineered materials capable of responding to their environment to a significant degree, by virtue of intrinsic properties and/or built-in sensor/actuator elements. Applications of these materials include vibration suppression/isolation, precise positioning, damage detection, and tunable devices.

**SNC meteorites**

- **Definition**
  - 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.

**Soft gamma repeaters**

- **Definition**
  - 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 had 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 its hot surface bright in x-rays.
solar nebula

(added June 2001)

DEF Clouds of gas and dust from which the Sun, planets, and other solar system bodies formed.

UF protosolar nebula
GS celestial bodies
nebulae

solar nebula

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

solar chemistry

USE ultrasonic processing

space station modules

(added November 1998)

GS modules

space station modules
Destiny Laboratory Module
Kvant modules
Priroda module
Service Module (ISS)
Unity connecting module
Zarya control module

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

space tourism

(added April 1999)

GS space industrialization
space tourism
tourism

RT space commercialization
space transportation

space weather

(added June 1999)

SN spacecraft modules

RT gamma ray astronomy
gamma ray burst
magnetars
supernova remnants

spacecraft

and ground-based systems; and potential health hazards during extravehicular activity.

RT Advanced Composition Explorer
aerospace environments
aerospace safety
Earth ionosphere
Earth magnetosphere
Earth orbital environments
geomagnetism
ionospheric disturbances
magnetic disturbances
magnetic storms

USE spacecraft
radiation hazards
solar activity effects
solar terrestrial interactions
space plasmas
weather

spacewalks

USE extravehicular activity

spectral mixture analysis

(added July 2000)

DEF Linear algebraic method for defining subpixel fractions for each of the spectral endmembers (e.g., ground cover categories) that constitute a mixed-pixel spectral signature.

UF SMA (image analysis)
GS discrimination

RT spectral mixture analysis
image analysis
image processing
pixels
principal components analysis
remote sensing
spectral reflectance

spectral response

USE spectral sensitivity

spiral bevel gears

(added May 1999)

GS gears

RT bevel gears
spiral bevel gears

spreadsheets

(added March 2001)

DEF Software applications that present a display of multiple columns and rows, and allow a user to input and manipulate numerical data for planning, tracking, analysis, and financial calculations.

GS computer programs
applications programs (computers)
spreadsheets

RT computer techniques
tables (data)

SPRITE detectors

USE Infrared detectors

spites (atmospheric physics)

(added January 2000)

DEF Short-lived luminosities observed at high altitudes above thunderstorms, apparently associated with upward discharges of thunderstorm electricity. They appear as columnar diffuse reddish glows between 30 km and 80 km above ground, lasting tens of milliseconds, following large positive cloud-to-ground lightning strokes.

RT atmospheric electricity
cloud-to-ground discharges
elves
lightning
thunderstorms

Stardust Mission

(added March 1999)

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.

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

stellar seismology

USE asteroseismology

stopped leaders

(added August 1999)

GS electric current

electric discharges
lightning
leaders (meteorology)
stopped leaders

Submillimeter Wave Astronomy Satellite

(added November 2000)

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.

UG 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

RT interstellar chemistry
interstellar matter
molecular clouds

UF red sprites
GS atmospheric radiation
sky radiation

RT atmospheric electricity
cloud-to-ground discharges
elves
lightning
thunderstorms
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 Compton effect
cosmic gases
cosmic microwave background radiation
∞ effects
galactic clusters
intergalactic media
microwave scattering
radio astronomy
relic radiation

superhumps (astronomy)
(added October 1998)
RT accretion disks
astronomical photometry
binary stars
cataclysmic variables
cw dwarf novae
eclipsing binary stars
stellar spectrophotometry

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
microelectronics
microminiaturized electronic 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
RT design analysis
tissue engineering
expedition design
multidisciplinary design optimization
optimization
parameter identification
reliability engineering
statistical analysis
total quality management
tensile structures
USE tensile structures
tensile structures
(added January 2001)
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 structures
tensile–integrity structures
RT isosceles structures
prestressing
smart structures
structural design
∞ structures
tensile–integrity structures
USE tensile structures
terra spacecraft
(added June 1999)
DEF First in a series of EOS (Earth Observing System) spacecraft developed to advance the understanding of the ways that the Earth's lands, oceans, air, ice, and life function as a total environmental system. The spacecraft carries five high-resolution instruments: the Advanced Spaceborne Thermal Emission Radiometer (ASTER), the Clouds and the Earth Radiant Energy System (GERTES), the Multi–Angle Imaging Spectroradiometer (MISR), the Moderate Resolution Imaging Spectroradiometer (MODIS), and the Measurements of Pollution in the Troposphere (MOPITT) instrument.
UF AM-1 (EOS) spacecraft
EOS AM-1 spacecraft
GS artificial satellites
TERA spacecraft
Earth Observing System (EOS)
Terra spacecraft
RT Earth observations (from space)
remote sensing
thermal lenses
USE thermal lensing
thermal lensing
(added November 1998)
DEF Phenomenon of the focusing of laser beams by a thermal deflection of a medium.
UF thermal lenses
GS thermal lensing
RT atmospheric optics
focusing
cosmic thermal deflection
photothermal deflection
remote sensing
thermal wave front deformation
thermoacoustic effects
(added May 2000)
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".
RT acousto-optics
cosmic thermal deflection
thermoacoustic effects
∞ effects
heat transfer
sound waves
thermoacoustic refrigerators
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
RT cooling systems
thermoacoustic refrigerators
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
thermocapillary migration
tissue engineering
(added October 2000)
DEF Discipline for the in vivó 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 biotechnology

GS tissue engineering

RT bioreactors

cells (biology)

clinicats

culture techniques

cytology

growth

histology

in vitro methods and tests

∞ microgravity applications

GS organs

GS 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 vehicles

. 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 entire time that its fuel is burning.

GS impulses

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.

GS Explorer 73 satellite

TRACE satellite

RT 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

RT 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

Treffitz 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 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)

Lagrange 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 treatment

RT co processing

ultrasonic cleaning

ultrasonics

ultrasonic treatment

USE ultrasonic processing

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 I(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.

UD Variable Specific Impulse Magnetoplasma Rocket
GS engines
- rocket engines
  . . electric rocket engines
  . . . plasma engines
  . . . . VASIMR (propulsion system)
RT magnetic nozzles
plasma heating
plasma propulsion
radio frequency heating
spacecraft propulsion
veins (petrology)
(added June 2001)
DEF A relatively thin mass of mineral that fills a crack or joint in a host rock.
RT inclusions
metarock composition
mineral deposits
minerals
rock intrusions
rocks

VentureStar launch vehicle
(added June 1999)
DEF Reusable single-stage-to-orbit launch vehicle employing linear aerospike engines, and having a payload capacity roughly equivalent to that of the Space Shuttle; developed in coordination with the X-33 advanced technology demonstrator vehicle.
GS aerospace vehicles
- aerospace planes
  . . VentureStar launch vehicle
  . . . maneuverable spacecraft
  . . . . aerospace planes
  . . . VentureStar launch vehicle
  . . . . reentry vehicles
  . . . . . recoverable spacecraft
  . . . . . . reusable spacecraft
  . . . . . . . aerospace planes
  . . . . . . . . VentureStar launch vehicle
  . . . . . . . . . soft landing spacecraft
  . . . . . . . . . . aerospace planes
  . . . . . . . . . . . VentureStar launch vehicle
  . . . . . . . . . . . . commercial spacecraft
  . . . . . . . . . . . . . X-33 reusable launch vehicle
very large transport aircraft
(added November 1998)
DEF Aircraft capable of a maximum takeoff weight greater than 400 metric tons (881,600 lbs) or having a seating capacity greater than 660.
UF VLTA (aircraft)
GS transport aircraft
  . very large transport aircraft
RT cargo aircraft
passenger aircraft
video conferencing
(added August 2000)
UF video teleconferencing
GS telecommunication
  . teleconferencing
  . . video conferencing
  . . . video communication

video teleconferencing
USE video conferencing

VLTA (aircraft)
USE very large transport aircraft

VOC (organic chemistry)
USE volatile organic compounds

volatile organic compounds
(added March 2000)
DEF Any compounds of carbon (excluding carbon oxides, carbonyl acid, metallic carbonates and carbonates, and carbon-nitrogen compounds) that are readily vaporizable; any of such compounds that participate in atmospheric photochemical reactions, or that are considered室内 local, regional, or global contaminants.
GD VOC (organic chemistry)
GS organic compounds
- volatile organic compounds
RT air pollution
  . air quality
  . contaminants
  . exhaust emission
  . indoor air pollution
  . ozone
  . photochemical reactions

Voronoi diagrams
(added October 2000)
DEF In computational geometry, a partitioning of a space containing a finite set of points, P, in such a way that each partition contains a single point in P and the subspace for which it is the nearest point from the set. Some applications include regional planning, image analysis, and robot path planning.
GS diagrams
  . Voronoi diagrams
RT computational geometry
  . geometry
  . grid generation (mathematics)
  . image analysis
  . partitions (mathematics)
  . spatial distribution
  . topology
  . trajectory planning

W water sampling
(added March 1998)
DEF The process of obtaining a representative sample of water from any natural or artificial environment.
GS sampling
  . water sampling
RT environmental monitoring
  . ground water
  . pollution monitoring
  . sea water
  . surface water
  . water
  . water pollution
  . water quality

wave rotors
(added March 1998)
DEF 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.
GS rotating bodies
  . rotors
  . . wave rotors
RT compression waves
  . energy transfer
  . engine parts
  . gas dynamics
  . gas generators
  . gas turbine engines
  . topping cycle engines
  . turbomachinery
  . turbochargers
  . wave generation

weakly Interacting massive particles
(added November 1999)
DEF 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.
UF cosmions
  . WIMPs (cosmology)
GS particles
  . elementary particles
  . . hypothetical particles
  . . . weakly interacting massive particles
RT dark matter
  . missing mass (astrophysics)
  . solar neutrinos

web sites
USE websites

websites
(added March 2001)
DEF 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.
UF web sites
GS resources
  . Internet resources
  . . websites
RT electronic bulletin boards
  . electronic commerce
  . information dissemination
  . information resources management
  . information systems
  . on-line systems
  . World Wide Web

WG vehicles
USE wing-in-ground effect vehicles

Wild 2 comet
(added March 1999)
DEF Periodic comet, discovered January 1978, relatively new to the inner Solar System due
to a shift in its orbit caused by the gravitational influence of Jupiter.

- GS celestial bodies
- comets
- Wild 2 comet
- RT Stardust Mission

**WIMPs (astronomy)**

**USE weakly interacting massive particles**

**Wind/GGS spacecraft**

(added 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. 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 forefront region. The spacecraft was launched in November 1994.

- GS artificial satellites
  - geophysical satellites
  - Wind/GGS spacecraft
  - scientific satellites
  - . . Wind/GGS spacecraft
- RT Earth magnetosphere
- gamma rays
- interplanetary magnetic fields
- Polar/GGS spacecraft
- solar corpuscular radiation
- solar terrestrial interactions
- solar wind
- space plasmas

**wing-body and tail configurations**

**USE body-wing and tail configurations**

**wing-body configurations**

**USE body-wing configurations**

**wing-in-ground effect vehicles**

(added December 1999)

**DEF** Vehicles designed to fly about half their mean chord above the surface, taking advantage of the reduced drag and increased lift caused by ground effect. These vehicles, also known as WIGs or WIGEs, normally operate above a water surface.

- UF ekranoplanes
- WIG vehicles
- GS ground effect machines
- . . wing-in-ground effect vehicles
- RT ground effect (aerodynamics)
  - surface effect ships

**X**

*X Ray Multi-Mirror Mission*

**USE XMM-Newton telescope**

**X-32 aircraft**

(added October 1998)

**DEF** Experimental supersonic strike fighter developed to be configured as a conventional or short takeoff/vertical landing vehicle. 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
    - supersonic aircraft
  - X-32 aircraft

**X-35 aircraft**

(added October 1998)

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

- GS jet aircraft
  - X-35 aircraft
  - Lockheed aircraft
  - X-35 aircraft
  - research vehicles
  - research aircraft
  - . . X-35 aircraft
  - V/STOL aircraft
  - X-35 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
  - . . aerospace planes
  - . X-37 vehicle
  - supersonic aircraft
  - . X-37 vehicle
  - maneuverable spacecraft
  - . . aerospace planes
  - . X-37 vehicle
  - reentry vehicles
  - . . recoverable spacecraft
  - . . reusable spacecraft
  - . . aerospace planes
  - . X-37 vehicle
  - research vehicles
  - . . X-37 vehicle
  - soft landing spacecraft
  - . . aerospace planes
  - . X-37 vehicle
  - . . reusable launch vehicles
  - . . space aircraft
  - Z

**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
  - supersonic vehicles
  - . X-43 vehicle
  - hypersonic vehicles
  - . . X-43 vehicle
  - research vehicles
  - . . X-43 vehicle
  - hypersonic flight
  - . . Pegasus air-launched booster
  - . . supersonic 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

**Specrometer), and optical/UV imaging and timing from a co-aligned instrument (Optical Monitor)**

- UF X Ray Multi-Mirror Mission
  - XMM (telescope)
  - . . . artificial satellites
  - . . . ESA satellites
  - . . . XMM–Newton telescope
  - . . . scientific satellites
  - . . . astronomical satellites
  - . . . XMM–Newton telescope
  - . . . ESA spacecraft
  - . . . ESA satellites
  - . . . XMM–Newton telescope
  - . . . spaceborne telescopes
  - . . . spaceborne telescopes
  - . . . x ray telescopes
  - . . . x ray astronomy

**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)

**USE launch vehicles
  - . . Zenit launch vehicles
  - RT sea launching
  - Ukrainian space program

**zero sum games**

(added October 1998)

**USE 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)**

22
NASA THESAURUS SUPPLEMENT

PART 2

ROTATED TERM DISPLAY

A

systems-on-a-chip
 Lorentz force
 carrier sense multiple
 access
 piezoelectric actuators
 content-addressable memory
 Advanced Composition Explorer
 Darkstar unmanned aerial vehicle
 aeroshells
 machine aided indexing
 Boeing 717
 very large transport aircraft
 VLT
 greasy algorithms
 iron aluminides
 EOS AM-1 spacecraft
 AMS (spectrometer)
 cost benefit analysis
 frequency domain analysis
 information sensitivity analysis
 SMA (image analysis)
 spectral mixture analysis
 time domain analysis
 Laser Interferometer Space Antenna
 A

architectural
terminals
B

Boeing 717

VLTA

X-32

X-35

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421
blended-wing-body configurations
body and tail configurations
use body-wing and tail configurations

laser-induced biomass

BWB configurations
use blended-wing-body configurations

Chassigny meteorites
use SNC meteorites

Chandra X Ray Astrophysics Facility
use X Ray Astrophysics Facility

cosmic microwave background radiation
use cosmions
use weakly interacting massive particles

cost benefit analysis
use cost analysis
use cost effectiveness

COTS products
use commercial off-the-shelf products

quantum cryptography
use quantum computation
video conferencing

Blended-wing-body configurations
use blended-wing-body configurations

Flying wing configurations
use blended-wing-body configurations

Nacelle wing configurations
use wing nacelle configurations

Body-wing configurations
use body-wing configurations

Body-wing and tail configurations
use body-wing and tail configurations

Unity connecting module
use addressable memory

CONTOR (mission)
use Comet Nucleus Tour

H2 control module
use Cooper-Harper ratings

Transition Region and Corona
Explorer

Corrugated waveguides
use cosmic microwave background radiation

Cosmions
use weakly interacting massive particles

Cost benefit analysis
use cost analysis
use cost effectiveness

COTS products
use commercial off-the-shelf products

Inductively coupled plasma mass spectrometry
use inductively coupled plasma mass spectrometry

Critical current
use critical current

Cycle engines
use cycle engines

Cycloaddition
D

Darkstar unmanned aerial vehicle
use pilotless aircraft
reconnaissance aircraft
data mining
dead
use necrosis
Deep Space 1 Mission
Deep Space 1 Mission
Delta 3 launch vehicle
Delta 4 launch vehicle
dendrimers
dendritic polymers
use dendrimers
designed 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
discharges
discharges
discharge
discovery
discovery
use data mining
protoplanetary disks
document indexing
use indexing (information science)
frequency
domain analysis
domain analysis
finite difference time domain method
antiphase domains
use antiphase boundaries
DS1 (space mission)
use Deep Space 1 Mission
dubnium
dusty plasmas

E

e-commerce
e-mail
EAM (physical chemistry)
EAP (polymers)
Josephson effect
quantum Hall effect
Sunyaev-Zeldovich effect
S-Z effect
wing-in-ground thermoacoustic effect vehicles
effects
ekranoplanes
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 systems
electronic commerce
electronic structure
QHE (electronics)
use quantum Hall effect
SOAC (electronics)
use systems-on-a-chip
electrosynthesis
use electrochemical synthesis
signal-processing-in-the-element detectors
element detectors
element method
use finite element method
Trefitz method
transition elements (chemistry)
use transition metals
electroactive polymers
modified embedded atom method
use embedded atom method
enantioinomic compounds
use enantiomers
enantiormers
enantiomorphs
use enantiomers
exergic energy
use exergy
renewable energy
tissue engineering
emitter engines
use microelectromechanical systems
engines
PDE (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
pulsed arcjet engines
use pulse detonation engines
pulsed arcjet engines
use pulsed jet 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
Pleistocene epoch
Ethernet
Euler-Bernoulli beam theory
use Euler-Bernoulli beams
evanescent waves
pursuit-evasion games
exergic energy
use exergy
exoplanets
use extrasolar planets
exosolar planets
use extrasolar planets
Advanced Composition Imager for Magnetopause-to-Aurora Global Exploration
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 72 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
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
fullerides
membership functions
FUSE (satellite)
use Far UV Spectroscopic Explorer
blended-wing-body fuselage
fuselage-wing stores
use wing-fuselage stores
fusion propulsion

G
Gabor filters
Gabor transformation
gain
differential games
pursuit-evasion games
zero-sum games
soft gamma repeaters
field-programmable gate arrays
bevel gears
spiral bevel gears
generation
Next Generation Space Telescope project
Genesis mission
Polar/Global Surveyor
GGS spacecraft
GGS spacecraft
Gravitational-Wave Observatory
use LIGO (observatory)
greedy algorithms
cloud-to-wire-
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
health and usage monitoring systems

heavy fermion superconductors

heavy fermion systems

heavy metals

hindcasting

hindlimb suspension

hindlimb unloading

Holocene epoch

HUT (physiology)

head up tilt

hybrid–Trefitz finite element method

Trefitz method

hydromobility

hyperbranched polymers

use dendrimers

hypergravity

use high gravity environments

hypogravity

use microgravity

hypothetical particles

(hypothetical planet)

use hypothetical planets

hypothetical planets

ICP-MS (spectrometry)

use inductively coupled plasma mass spectrometry

LA-ICP-MS (spectrometry)

III stars

(image analysis)

use spectral mixture analysis

IMAGE satellite

Imager for Magnetopause-to-Aurora Global Explorer

use IMAGE satellite

interannual variations

use annual variations

intercalibration

interconnects

interconnects

interference

Laser Interferometer Gravitational-Wave Observatory

use LIGO (observatory)

Laser Interferometer Space Antenna

use LISA (observatory)

intercloud discharges

intraseasonal oscillations

use intraseasonal variations

intraseasonal variations

ion optics

Iridium network

Iridium satellites

use communication satellites

Iridium network

iron aluminides

Service Module (ISS)

use Destiny Laboratory Module

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 Poler Lander

use Mars Polar Lander

Mars landing sites

Langmuir monolayers

use monomolecular films

Java (programming language)

language

use document markup languages

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
phases
Biot-Savart
perfectly matched stepped
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
magnets
magnetic nozzles
Alpha Imager for
Magnetic Spectrometer
use VASIMR (propulsion system)
Magnetopause-to-Aurora Global Explorer
use IMAGE satellite
Magnetoplasma Rocket
use VASIMR (propulsion system)
magnetoplasma dynamic thrusters
magneto rheological fluids
magnetostratigraphy
e-mail
use electronic mail
preventive

manufacturing
use group technology
(group technology)
manufacturing
Long March launch vehicles
mark up languages
use document markup languages
Mars Climate Orbiter
Mars Global Surveyor
Mars landing sites
Mars missions
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
weakly interacting massive particles
perfectly matched layers
APB
use antiphase boundaries
ferroelastic materials
intelligent materials
use smart materials
smart materials
FDTD
use finite difference time domain method
MEAM (physical chemistry)
use embedded atom method
Tropical Rainfall Measuring Mission sat
use TRMM satellite
meitnerium
memory
use associate memory
MEMS (electromechanical devices)
use microelectromechanical systems
heavy metals
meteorites
use SNC meteorites
Shergotty Nakhlia Chassigny
SNC
leaders
MJO
embedded atom
finite difference time domain
Godunov
hybrid-Trefftz finite element
modified embedded atom
method
use finite element method
Trefftz method
method
use embedded atom method
method
method
methods and tests
methods
methods and tests
MGS (spacecraft)
micelles
microelectromechanical systems
microsats
microwave background radiation
reissner
thermocapillary
migraton
Mindlin plate theory
Mindlin plates
Data
X Ray Multi-
deformable
Mirrors
CONTOUR (mission)
Deep Space 1
Mission
use Deep Space 1 Mission
Genesis
Mission
Mars Surveyor 2001
Mission
X Ray Multi-Mirror
Mission
Tropical Rainfall Measuring
Mission
Mars sample return
spectral
Mission
missions
mixture analysis
MJO (meteorology)
use Madden-Julian Oscillation
MMH (chemistry)
use monomethylhydrazines
modified embedded atom method
use embedded atom method
Destiny Laboratory
Module
use Service Module (ISS)
US Laboratory
Module
modules
monitoring systems
use systems health monitoring
Langmuir
monolayers
use monomolecular films
monomethylhydrazines
piezoelectric
motors
MPD thrusters
use magnetoplasmadynamic thrusters
ICP-
MS (spectrometry)
use inductively coupled plasma mass spectrometry
LA-ICP-
X Ray
MS (spectrometry)
Multi-Mirror Mission
use XMM-Newton telescope
carrier sense
multiple access
mutagenesis

N
nacelle wing configurations
use wing nacelle configurations
Shergotty
Nakhla Chassigny meteorites
use SNC meteorites
nanocomposites
nanosatellites
nanosats
use nanosatellites
nanotechnology
nanotubes
nanotubules
use nanotubes
proportional
NDVI (remote sensing)
use normalized difference vegetation index
protosolar nebula
use solar nebula
solar nebula
necrosis
Indium XMM-
Newton telescope
Next Generation Space Telescope project
NGST project
use Next Generation Space Telescope project
flow
noise
normalized difference vegetation index
Nozomi Mars Orbiter
nozzles
(nuclear physics)
Comet Bond
MJO (meteorology)
use Madden-Julian Oscillation
MS (spectrometry)
extraterrestrial oceans
use extraterrestrial oceans
extrasolar
2001 Mars Odyssey
off-the-shelf products
on-a-chip
opinion ratings
use pilot ratings
free-space optical communication
optical interconnects
free-space optical
FSOI (integrated)
ion design
optimization
optimization
orbit determination
Orbiter
Mars Climate Orbiter
use Mars Climate Orbiter
Orbiter

Nozomi Mars
VOC
volatile
Madden-Julian
quasi-biennial
intraseasonal

Orbiter
(organic chemistry)
use volatile organic compounds

organic compounds

Oscillation
oscillation
oscillations
use intraseasonal variations

osteoblasts

P
pressure sensitive
PSP
use pressure sensitive paints

hypothetical
weakly interacting massive

particles
particles
pathological cell death
use necrosis

PDE (engines)
use pulse detonation engines

PDRE (engines)
use pulse detonation engines

PDS (spectroscopy)
use photothermal deflection
spectroscopy

PDWE (engines)
use pulse detonation engines

perfectly matched layers
period
(petrology)

Phaethon (hypothetical planet)
use hypothetical planets

Laves
phases

Phobos spacecraft

photoreceptors
photothermal deflection spectroscopy

EAM
(physics)
use embedded atom method

MEAM
(physics)
use embedded atom method

chain reactions (nuclear sprites (atmospheric)

HUT
use head up tilt

piezoelectric actuators
use piezoelectric actuators

piezoelectric actuators

piezoelectric motors

piezomotors

use piezoelectric motors

pilot opinion ratings
use pilot ratings

pilot ratings

PIT (rocket engines)
use pulsed inductively coupled plasma thrusters

pressoreceptor reflexes
use baroreceptor reflexes

pressoreceptors
use baroreceptors

pressure sensitive paints

preventive maintenance

primordial stars

ultrasonic

signal-processing---in-the-erqent

detectors

COTS
use commercial off-the-shelf products

Mars Surveyor 98
Ukrainian space program

field-programmable gate arrays

programmed cell death

apoptosis

Java (programming language)

Next Generation Space Telescope
NGST

use Next Generation Space Telescope project

SLW- (propellant tank)
use external tanks

propellant tanks

proportional navigation

fusion

VASIMR

Lunar

Prospector

proton-antiproton interactions

protoplanetary disks

solar nebula

use solar nebula

rogue planets
use hypothetical planets

transplutonic planets
use hypothetical planets

Polar Plasma Laboratory
use Polar/GGS spacecraft

inductively coupled plasma mass spectrometry

plasma thrusters

plasmas

Mindlin plates

use Mindlin plates

Pleistocene epoch

PML (electromagnetism)

use perfectly matched layers

Polar GGS spacecraft

Polar Lander

Polar Plasma Laboratory

use Polar/GGS spacecraft

dendritic polymers

use dendrimers

EAP (polymers)

use electroactive polymers

electroactive polymers

hyperbranched polymers

use dendrimers

Population III stars

random positioning machines

use clinostats

PPT (rocket engines)

use pulsed plasma thrusters

pressoreceptors

use baroreceptors

pressure sensitive paints

preventive maintenance

primordial stars

use Population III stars

processing

processing-in-the-element detectors

products

use commercial off-the-shelf products

Program

program

programmable gate arrays

programmed cell death

use apoptosis

Java

(next generation space telescope)

project

use Next Generation Space Telescope project

SLW- (propellant tank)

use external tanks

propellant tanks

proportional navigation

fusion

VASIMR

Lunar

Prospector

proton-antiproton interactions

protoplanetary disks

solar nebula

use solar nebula

ulsquakes

use hypothetically

volatiles

VOC

Madden-Julian

oscillations

use intraseasonal variations

PSP

hypothetical

weakly interacting massive

particles

pathological cell death

use necrosis

PDE (engines)

use pulse detonation engines

PDRE (engines)

use pulse detonation engines

PDS (spectroscopy)

use photothermal deflection spectroscopy

PDWE (engines)

use pulse detonation engines

perfectly matched layers

period

hypothetical planets

use hypothetical planets

EAM

use embedded atom method

MEAM

use embedded atom method

HUT

use head up tilt

piezoelectric actuators

use piezoelectric actuators

piezoelectric motors

piezomotors

use piezoelectric motors

pilot opinion ratings

use pilot ratings

pilot ratings

PIT (rocket engines)

use pulsed inductively coupled plasma thrusters

pressoreceptor reflexes

use baroreceptor reflexes

pressoreceptors

use baroreceptors

pressure sensitive paints

preventive maintenance

primordial stars

use Population III stars

processing

processing-in-the-element detectors

products

use commercial off-the-shelf products

Mars Surveyor 98
Ukrainian space program

field-programmable gate arrays

programmed cell death

use apoptosis

Java

(next generation space telescope)

project

use Next Generation Space Telescope project

SLW- (propellant tank)

use external tanks

propellant tanks

proportional navigation

fusion

VASIMR

Lunar

Prospector

proton-antiproton interactions

protoplanetary disks

solar nebula

use solar nebula

ulsquakes

use hypothetically

volatiles

VOC

Madden-Julian

oscillations

use intraseasonal variations

PSP

hypothetical

weakly interacting massive

particles

pathological cell death

use necrosis

PDE (engines)

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PDRE (engines)

use pulse detonation engines

PDS (spectroscopy)

use photothermal deflection spectroscopy

PDWE (engines)

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perfectly matched layers

period

hypothetical planets

use hypothetical planets

EAM

use embedded atom method

MEAM

use embedded atom method

HUT

use head up tilt

piezoelectric actuators

use piezoelectric actuators

piezoelectric motors

piezomotors

use piezoelectric motors

pilot opinion ratings

use pilot ratings

pilot ratings

PIT (rocket engines)

use pulsed inductively coupled plasma thrusters

pressoreceptor reflexes

use baroreceptor reflexes

pressoreceptors

use baroreceptors

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processing-in-the-element detectors

products

use commercial off-the-shelf products

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Ukrainian space program

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programmed cell death

use apoptosis

Java

(next generation space telescope)

project

use Next Generation Space Telescope project

SLW- (propellant tank)

use external tanks

propellant tanks

proportional navigation

fusion

VASIMR

Lunar

Prospector

proton-antiproton interactions

protoplanetary disks

solar nebula

use solar nebula

ulsquakes

use hypothetically

volatiles

VOC

Madden-Julian

oscillations

use intraseasonal variations

PSP

hypothetical

weakly interacting massive

particles

pathological cell death

use necrosis

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use pulse detonation engines

PDRE (engines)

use pulse detonation engines

PDS (spectroscopy)

use photothermal deflection spectroscopy

PDWE (engines)

use pulse detonation engines

perfectly matched layers

period

hypothetical planets

use hypothetical planets

EAM

use embedded atom method

MEAM

use embedded atom method

HUT

use head up tilt

piezoelectric actuators

use piezoelectric actuators

piezoelectric motors

piezomotors

use piezoelectric motors

pilot opinion ratings

use pilot ratings

pilot ratings

PIT (rocket engines)

use pulsed inductively coupled plasma thrusters

pressoreceptor reflexes

use baroreceptor reflexes

pressoreceptors

use baroreceptors

pressure sensitive paints

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use commercial off-the-shelf products

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Ukrainian space program

field-programmable gate arrays

programmed cell death

use apoptosis

Java

(next generation space telescope)

project

use Next Generation Space Telescope project

SLW- (propellant tank)

use external tanks

propellant tanks

proportional navigation

fusion

VASIMR

Lunar

Prospector

proton-antiproton interactions

protoplanetary disks

solar nebula

use solar nebula
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
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
Tropical
radiation
Rainfall Measuring Mission sat
use TRMM satellite
random positioning machines
use clinostats
Cooper-Harper pilot
ratings
pilot opinion
ratings
slenderness
total ratio
Chandra X Ray Astrophysics Facility
use X Ray Astrophysics Facility
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
pressure receptor reflexes
use baroreflexes
thermoacoustic refrigerators
Transition Region and Coronal Explorer
Reissner-Mindlin plates
use Mindlin plates
NDVI (remote sensing)
use normalized difference vegetation index
renewable energy
soft gamma repeaters
Hall resistance
spectral response
sample return missions
Ringleb flow
Variable Specific Impulse Magnetoplasmadrive
Rocket
use VASIMR (propulsion system)
rocket-based combined-cycle engines
electromagnetic rocket engines
use plasma engines
PIT (rocket engines)
use pulsed inductive thrusters
PPT (rocket engines)
use pulsed plasma thrusters
rogue planets
use hypothetical planets
Rossi X Ray Timing Explorer
use X Ray Timing Explorer
clinostat rotation
use clinorotation
wave rotors
RXTE (satellite)
use X Ray Timing Explorer

S
S-Z effect
use Sunyaev-Zeldovich effect
sample return missions
water sampling
Tropical Rainfall Measuring Mission sat
use TRMM satellite
ACE satelite
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)
Satellite (satellite)
use Submillimeter Wave Astronomy Satellite
TRACE satellite
use Transition Region and Coronal Explorer
TRMM satellite
use extraterrestrial oceans
Iridium satellites

Biot-Savart law

indexing (information)

scarf joints

scene generation

science)

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 Nakhl Chassigny meteorites

use SNC meteorites

anticoincidence

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

tree-space optical communication

tree-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

spacewalks

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

inductively coupled plasma mass spectrometry

LA-ICP-MS (spectrometry)

use inductively coupled plasma mass spectrometry

laser spark spectroscopy

use laser-induced breakdown spectroscopy

laser-induced breakdown spectroscopy

use laser-induced breakdown spectroscopy

LASS (spectroscopy)

use laser-induced breakdown spectroscopy

LIBS (spectroscopy)

use laser-induced breakdown spectroscopy

PDS (spectroscopy)

use photothermal deflection spectroscopy

photothermal 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
primordial stars
use Population III stars
ISS (space station)
use International Space Station
space station modules
stellar seismology
use asteroseismology
stepped leaders
associative storage
use associative memory
fuselage-wing stores
use wing-fuselage stores
electronic structure
Z1 truss structure
use Integrated Truss Structure Z1
Integrated Truss clamped structures
tensegric structures
use tensegrity structures
tensegrity structures
tensile-integrity structures
use tensegrity structures
Submillimeter Wave Astronomy Satellite
zero sum games
Sunyaev–Zeldovich effect
heavy fermion superconductors
superhumps (astronomy)
Shuttle Superlightweight Tank
use external tanks propellant tanks
Mars Global Surveyor
Mars Surveyor 98 Lander
use Mars Polar Lander
Mars Surveyor 98 Orbiter
use Mars Climate Orbiter
Mars Surveyor 98 Program
Mars Surveyor 2001 Mission
hindlimb suspension
SWAS (satellite)
use Submillimeter Wave Astronomy Satellite
time synchronization
synthesis
system (sytem)
systems
use systems health monitoring
heavy fermion microelectromechanical systems
uncertain systems
systems-on-a-chip

T
Taguchi methods
tail configurations
use body-wing and tail configurations
Shuttle Superlightweight Tank
use external tanks propellant tanks
SLWT (propellant tank)
use external tanks propellant tanks
group technology (manufacturing)

video teleconferencing
use video conferencing
XMM (telescope)
use XMM-Newton telescope
Next Generation Space Telescope project
tensegric structures
use tensegrity structures
tensegrity structures
tensile-integrity structures
use tensegrity structures
Terra spacecraft
field tests
use hardware-in-the-loop simulation
in vitro methods and in vivo methods
euler-Bernouilli beam theory
use Euler-Bernoulli beams
Mindlin plate theory
use Mindlin plates
thermal lenses
use thermal lensing
thermal lensing
thermoacoustic effects
dynamic refrigerators
thermocapillary migration
Hall thrusters
LFA thrusters
use magnetoplasmadynamic thrusters
MHD thrusters
use magnetoplasmadynamic thrusters
pulsed inductive pulsed plasma head up
thrusters
tilt
time domain analysis
finite difference
time domain method
time synchronization
Rossi X Ray Timing Explorer
use X Ray Timing Explorer
tissue engineering
Titan 4B launch vehicle
screech
tones
total impulse
Comet Nucleus
Tour tourism
space
Gabor transformation
transition elements (chemistry)
use transition metals
Transition Region and Coronal Explorer
transplutonic planets
use hypothetical planets
very large transport aircraft
transverse momentum
treatment
use ultrasonic processing
Z

S-

Z effect
use Sunyaev-Zeldovich effect

Integrated Truss Structure
Z1
Z1 truss structure
use Integrated Truss Structure Z1

Zarya control module

Sunyaev-

Zeldovich effect

Zenit launch vehicles

zero sum games

Zvezda Service Module
use Service Module (ISS)
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.