A

A	Ampere, the SI base unit of electric current.
a, A	Acceleration. a = Δ velocity / Δ time. Acceleration = Force / Mass
AC	Alternating current
AC Bus	An electrical pathway that distributes alternating current electrical power to various Orbiter systems.
AC Bus Sensor	The AC bus sensor monitors each AC phase bus for over- or under voltage and each phase inverter for an overload signal.
AC Bus System	A three-bus system that distributes alternating current electrical power to the forward, mid, and aft sections of the orbiter for equipment used in those areas.
Acceleration	Change in velocity. Note that since velocity comprises both direction and magnitude (speed), a change in either direction or speed constitutes acceleration.
ALT	Altitude or Altimetry data.
AO	Announcement of Opportunity.
AOS	Acquisition of Signal.
Aphelion	Apoapsis in solar orbit.
Apoapsis	The farthest point in an orbit from the body being orbited.
Apogee	Apoapsis in Earth orbit.
APU	Auxiliary Power Unit is a device that provides energy for functions other than propulsion. The Space Shuttle APUs provides hydraulic pressure. The Space Shuttle has three redundant APUs, powered by hydrazine fuel. They function during powered ascent, re-entry, and landing. During ascent, the APUs provides hydraulic power for gimballing of Shuttle's engines and control surfaces. During landing, they power the control surfaces and brakes.
Argument	Angular distance.
Argument of periapsis	The argument (angular distance) of periapsis from the ascending node.

Ascending node	The point at which an orbit crosses a reference plane (such as a planet's equatorial plane or the ecliptic plane) going north.
Asteroids	Small bodies composed of rock and metal in orbit about the sun.
AU	Astronomical Unit, based on the mean Earth-to-sun distance, 149,597,870 km. Refer to "Units of Measure" section for complete information.
AZ	Azimuth.

B

BAT	Abbreviation for BATTERY.
Boiler System	See Water Boiler System.
BPS	Bits per Second, same as Baud rate.

C

c	The speed of light, 299,792 km per second.
Carrier	The main frequency of a radio signal generated by a transmitter prior to application of any modulation.
C-band	A range of microwave radio frequencies in the neighborhood of 4 to 8 GHz.
CDT	Central Daylight Time. Offset = UTC-5:00
Centrifugal force	The outward-tending apparent force of a body revolving around another body.
Centripetal acceleration	The inward acceleration of a body revolving around another body.
Chandler wobble	A small motion in the Earth's rotation axis relative to the surface, discovered by American astronomer Seth Carlo Chandler in 1891. Its amplitude is about 0.7 arcseconds (about 15 meters on the surface) with a period of 433 days. It combines with another wobble with a period of one year, so the total polar motion varies with a period of about 7 years. The Chandler wobble is an example of free nutation for a spinning non-spherical object.
Channel	In telemetry, one particular measurement to which changing values may be assigned.

CIRC	Abbreviation for CIRCULATION.
Clarke orbit	Geostationary orbit.
CNTRL	Abbreviation for CONTROL.
Coma	The cloud of diffuse material surrounding the nucleus of a comet.
Comets	Small bodies composed of ice and rock in various orbits about the sun.
COMM	Communication system
Conjunction	A configuration in which two celestial bodies have their least apparent separation.
CRT	Cathode Ray Tube video display device that allows onboard monitoring of orbiter systems, computer software processing and manual control for flight crew data and software manipulation.
CST	Central Standard Time. Offset = UTC-6:00

D

DAP	The Digital Auto Pilot software-based system that controls the orientation of the Space Shuttle. It can perform three-axis automatic maneuver, attitude tracking, and rotation about any axis or body vector. Crew interface to the Digital Auto Pilot was via the Orbiter cathode ray tubes/keyboard interface, which allowed the crew to control parameters in the software.
DC	Direct Current. (Electrical)
DC Bus	An electrical pathway that distributes direct current electrical power to various Orbiter systems.
DC Bus System	A three-bus system that distributes direct current electrical power to the forward, mid, and aft sections of the orbiter for equipment used in those areas.
DEC	Declination.
Declination	The measure of a celestial body's apparent height above or below the celestial equator.
Density	Mass per unit volume. For example, the density of water can be stated as 1 gram/cm3.

Descending node	The point at which an orbit crosses a reference plane (such as a planet's equatorial plane or the ecliptic plane) going south.
Doppler Effect	The effect on frequency imposed by relative motion between transmitter and receiver. See Chapters 2, 4 and 5.
Downlink	Signal received from a spacecraft.
DPS	Abbreviation for DATA PROCESSING SYSTEM. (Maro-pad command)
DSN	NASA's Deep Space Network.

E

Eccentricity	The distance between the foci of an ellipse divided by the major axis.
Ecliptic	The plane in which Earth orbits the sun and in which solar and lunar eclipses occur.
EDL	(Atmospheric) Entry, Descent, and Landing.
EDT	Eastern Daylight Time. Offset = UTC-4:00
EGT	APU Exhaust Gas Temperature
Ellipse	A closed plane curve generated in such a way that the sums of its distances from the two fixed points (the foci) is constant.
ELV	Expendable launch vehicle.
EM	Electromagnetic
EMF	Electromagnetic force (radiation).
EMR	Electromagnetic radiation.
Equator	An imaginary circle around a body which is everywhere equidistant from the poles, defining the boundary between the northern and southern hemispheres.

Equinox	The equinoxes are times at which the center of the Sun is directly above the Earth's equator. The day and night would be of equal length at that time if the Sun were a point and not a disc, and if there were no atmospheric refraction. Given the apparent disc of the Sun and the Earth's atmospheric refraction, day and night actually become equal at a point within a few days of each equinox. The vernal equinox marks the beginning of spring in the northern hemisphere, and the autumnal equinox marks the beginning of autumn in the northern hemisphere.
ERT	Earth-received time, UTC of an event at DSN receive-time, equal to SCET plus OWLT.
EST	Eastern Standard Time. Offset = UTC-5:00
ET	Ephemeris time, a measurement of time defined by orbital motions. Equates to Mean Solar Time corrected for irregularities in Earth's motions. Obsolete, replaced by TT, Terrestrial Time.
ET	Abbreviation for EXTERNAL TANK
eV	Electron volt, a measure of the energy of subatomic particles.
EXEC	Abbreviation for EXECUTE. (Macro-pad command)
EXT	Abbreviation for EXTERNAL.

F

f, F	Force. Two commonly used units of force are the Newton and the dyne. Force = Mass X Acceleration.
FDS	Flight Data Subsystem.
FE	Far Encounter phase of mission operations.
FE	Abbreviation for FLIGHT ENGINEER. (Cockpit crew member)
Fluorescence	The phenomenon of emitting light upon absorbing radiation of an invisible wavelength.
FM	Frequency modulation.
FTS	DSN Frequency and Timing System. Also, frequency and timing data.

G

G	Universal Constant of Gravitation. Its tiny value (G = 6.6726 x 10-11 Nm2/kg2) is unchanging throughout the universe.
g	Acceleration due to a body's gravity. Constant at any given place, the value of g varies from object to object (e.g., planets), and also with the distance from the center of the object. The relationship between the two constants is g = GM/r2 where r is the radius of separation between the masses' centers, and M is the mass of the primary body (e.g., a planet). At Earth's surface, the value of g = 9.8 meters per second per second (9.8m/s2). See also weight.
Gamma rays	Electromagnetic radiation in the neighborhood of 100 femtometers wavelength.
GEO	Geosynchronous Earth Orbit.
Geostationary	A geosynchronous equatorial circular orbit. Also called Clarke orbit.
Geosynchronous	A direct, circular, low inclination orbit about the Earth having a period of 23 hours 56 minutes 4 seconds.
GMT	Greenwich Mean Time. Obsolete. UT, Universal Time is preferred.
GPC	General Purpose Computer Control. When the toggle switch is in the straight up or middle position (not on or off) it allows the valve to be controlled by the flight software loaded in the general purpose computer.
Gravitation	The mutual attraction of all masses in the universe. Newton's Law of Universal Gravitation holds that every two bodies attract each other with a force that is directly proportional to the product of their masses, and inversely proportional to the square of the distance between them. This relation is given by the formula: F = Gm1m2/d2, where F is the force of attraction between the two objects, given G the Universal Constant of Gravitation, masses m1 and m2, and d distance. Also stated as Fg = GMm/r2 where Fg is the force of gravitational attraction, M the larger of the two masses, m the smaller mass, and r the radius of separation of the centers of the masses. See also weight.
Gravitational waves	Einsteinian distortions of the space-time medium predicted by general relativity theory (not yet directly detected as of March 2010). (Not to be confused with gravity waves, see below.)

Gravity assist	Technique whereby a spacecraft takes angular momentum from a planet's solar orbit (or a satellite's orbit) to accelerate the spacecraft or the reverse.
Gravity waves	Certain dynamical features in a planet's atmosphere (not to be confused with gravitational waves, see above).
GTO	Geostationary (or geosynchronous) Transfer Orbit.

H

H_2	Chemical formula for Hydrogen Gas.
HA	Hour Angle.
Halo orbit	A spacecraft's pattern of controlled drift about an unstable Lagrange point (L1 or L2 for example) while in orbit about the primary body (e.g., the Sun).
Heliocentric	Sun-centered.
Heliopause	The boundary theorized to be roughly circular or teardrop-shaped, marking the edge of the sun's influence, perhaps 100 AU from the sun.
Heliosphere	The space within the boundary of the heliopause, containing the sun and solar system.
Helium System	During prelaunch, the pneumatic helium supply provides pressure to operate the liquid oxygen and liquid hydrogen pre-valves and outboard and inboard fill and drain valves. The three engine helium supply systems are used to provide anti-icing purges.
HGA	High-Gain Antenna onboard a spacecraft.
Hohmann Transfer Orbit	Interplanetary trajectory using the least amount of propulsive energy.
Horizon	The line marking the apparent junction of Earth and sky.
Hour	A measure of time equal to 60 minutes.
Hour Angle	The angular distance of a celestial object measured westward along the celestial equator from the zenith crossing. In effect, HA represents the RA for a particular location and time of day.

HSI	The Horizontal Situation Indicator is used to follow both the glideslope and localizer. When tuned to the proper frequency, the navigation radio, or NAV, sends a signal to the HSI and two indicators will appear. The indicators are oriented perpendicular to each other - one oriented horizontally and the other vertically. The pilot maneuvers the aircraft so that the indicators form a "+" in the center of the HSI. When this occurs, the pilot knows that the aircraft is both on the proper glide path and is lined up with the runway.
HUD	Head-Up Display or Heads-Up Display is any transparent display that presents data without requiring users to look away from their usual viewpoints. The origin of the name stems from a pilot being able to view information with the head positioned "up" and looking forward, instead of angled down looking at lower instruments.
HX	Abbreviation for HEAT EXCHANGER.
HYD	Abbreviation for HYDRAULIC.
Hydraulic System	This system distributes the hydraulic pressure produced by the Auxiliary Power Unit (APU) System. The Hydraulic System is made up of three independent hydraulic systems, each of which is mated to a corresponding APU.
	
IF	Intermediate Frequency. In a radio system, a selected processing frequency between RF (Radio Frequency) and the end product (e.g., audio frequency).
IMU	The Inertial Measurement Units consist of an all-attitude, four-gimbal, inertially stabilized platform. They provide inertial attitude and velocity data to the navigation software. Guidance uses the attitude data, along with state vectors from the navigation software, to develop steering commands for flight control.
Inclination	The angular distance of the orbital plane from the plane of the planet's equator, stated in degrees.
Inferior conjunction	Alignment of Earth, sun, and an inferior planet on the same side of the sun.
Inferior planet	Planet which orbits closer to the Sun than the Earth's orbit.

ILS	**I**nstrument **L**anding **S**ystem. ILS is a precision landing aid that is used to provide accurate azimuth and descent guidance signals for guidance to aircraft for landing on the runway under normal or adverse weather conditions.
INT	Abbreviation for INTERNAL.
Ion	A charged particle consisting of an atom stripped of one or more of its electrons.
IR	Infrared, meaning "below red" radiation. Electromagnetic radiation in the neighborhood of 100 micrometers wavelength.
ISOE	Integrated Sequence of Events.
ISOL	Abbreviation for ISOLATION
Isolation valves	The propellant tank isolation valves are located between the propellant tanks and the manifold isolation valves and are used to isolate the propellant tanks from the remainder of the propellant distribution system.
Isotropic	Having uniform properties in all directions.
IUS	Inertial Upper Stage.

K

K-band	A range of microwave radio frequencies in the neighborhood of 12 to 40 GHz.
Keyhole	An area in the sky where an antenna cannot track a spacecraft because the required angular rates would be too high. Mechanical limitations may also contribute to keyhole size.
Klystron	A microwave traveling wave tube power amplifier used in transmitters.
Ku-band	The Ku band, used primarily for satellite communications, is the portion of the K-band radio spectrum in the 12 to 18 gigahertz (GHz) range. The symbol is short for "K-under", because it is the lower part of the original NATO K-band, which was split into three bands (Ku, K, and Ka) because of the presence of the atmospheric water vapor resonance peak at 22.24 GHz, (1.35 cm) which made the center unusable for long range transmission.

Kuiper belt	A disk-shaped region about 30 to 100 AU from the sun considered to be the source of the short-period comets.

L

Lagrange points	Five points with respect to an orbit which a body can stably occupy. Designated L1 through L5.
LAN	Local area network for inter-computer communications.
Laser	Light Amplification by Stimulated Emission of Radiation. Compare with Maser.
Latitude	Circles in parallel planes to that of the equator defining north-south measurements, also called parallels.
L-band	A range of microwave radio frequencies in the neighborhood of 1 to 2 GHz.
LCP	Left-hand circular polarization.
LEO	Low Equatorial Orbit.
LGA	Low-Gain Antenna onboard a spacecraft.
Light	Electromagnetic radiation in the neighborhood of 1-nanometer wavelength.
Light time	The amount of time it takes light or radio signals to travel a certain distance at light speed.
Lightspeed	299,792 km per second, the constant c.
Lightyear	A measure of distance, the distance light travels in one year, about 63,197 AU.
Local time	Time adjusted for location around the Earth or other planets in time zones.
Longitude	Great circles that pass through both the north and south poles, also called meridians.
LOS	Loss of Signal, used in DSN operations.
LOX	Liquid Oxygen.

M

m, M	Mass. The kilogram is the standard unit of mass. Mass = Acceleration / Force.
Main Propulsion System	Within the orbiter aft fuselage, liquid hydrogen and liquid oxygen pass through the manifolds, distribution lines and valves of the propellant management subsystem. During prelaunch activities, this subsystem is used to control the loading of liquid oxygen and liquid hydrogen in the external tank. During SSME thrusting periods, propellants from the external tank flow into this subsystem and to the three SSMEs. The subsystem also provides a path that allows gases tapped from the three SSMEs to flow back to the external tank through two gas umbilicals to maintain pressure in the external tank's liquid oxygen and liquid hydrogen tanks. After MECO, this subsystem controls MPS dumps, vacuum inerting and MPS re-pressurization for entry.
Major Axis	The maximum diameter of an ellipse.
Maser	A microwave traveling wave tube amplifier named for its process of Microwave Amplification by Stimulated Emission of Radiation. Compare with Laser. In the Deep Space Network, masers are used as low-noise amplifiers of downlink signals, and also as frequency standards.
Mass	A fundamental property of an object comprising a numerical measure of its inertia; the amount of matter in the object. While an object's mass is constant (ignoring Relativity for this purpose), its weight will vary depending on its location. Mass can only be measured in conjunction with force and acceleration.
MDT	Mountain Daylight Time. Offset = UTC-6:00
Mean solar time	Time based on an average of the variations caused by Earth's non-circular orbit. The 24-hour day is based on mean solar time.
MECO	The Main Engine Cut Off point is where the engines shut down at about 8 minutes and 30 seconds into the flight.
Meridians	Great circles that pass through both the north and south poles, also called lines of longitude.
Meteor	A meteoroid which is in the process of entering Earth's atmosphere. It is called a meteorite after landing.
Meteorite	Rocky or metallic material which has fallen to Earth or to another planet.

Meteoroid	Small bodies in orbit about the sun which are candidates for falling to Earth or to another planet.
MFD	Multi-function display is a small screen in an aircraft that can be used to display information to the pilot in numerous configurable ways.
MGA	Medium-Gain Antenna onboard a spacecraft. MLI
µm	Micrometer (10-6 m).
MLI	Multi-layer insulation (spacecraft blanketing).
Modulation	The process of modifying a radio frequency by shifting its phase, frequency, or amplitude to carry information.
MST	Mountain Standard Time. Offset = UTC-7:00
MSTR	Abbreviation for MASTER.
Multiplexing	A scheme for delivering many different measurements in one data stream.

N

N	Newton, the SI unit of force equal to that required to accelerate a 1-kg mass 1 m per second per second (1m/sec2).
N_2	Chemical formua for Nitrogen gas.
Nadir	The direction from a spacecraft directly down toward the center of a planet. Opposite of Zenith.
NE	Near Encounter phase in flyby mission operations. NiCad
NiCad	Nickel-cadmium rechargeable battery.
Nodes	Points where an orbit crosses a reference plane.
Non-coherent	Communications mode wherein a spacecraft generates its downlink frequency independent of any uplink frequency.
Nucleus	The central body of a comet.
Nutation	A small nodding motion in a rotating body. Earth's nutation has a period of 18.6 years and an amplitude of 9.2 arc seconds.

O

O_2	Chemical formula for Oxygen Gas.
OB	Observatory phase in flyby mission operations encounter period.
OMS	The Space Shuttle Orbital Maneuvering System, is a system of rocket engines for use on the space shuttle orbiter for orbital injection and modifying its orbit
One-way Comm	Communications mode consisting only of downlink received from a spacecraft.
Oort cloud	A large number of comets theorized to orbit the sun in the neighborhood of 50,000 AU.
Opposition	Configuration in which one celestial body is opposite another in the sky. A planet is in opposition when it is 180 degrees away from the sun as viewed from another planet (such as Earth). For example, Saturn is at opposition when it is directly overhead at midnight on Earth.
OTM	Orbit Trim Maneuver, spacecraft propulsive maneuver.
OWLT	One-Way Light Time, the elapsed time between Earth and spacecraft or solar system body.

P

PAM	Payload Assist Module upper stage.
Parallels	Circles in parallel planes to that of the equator defining north-south measurements, also called lines of latitude.
PDT	Pacific Daylight Time. Offset = UTC-7:00
PE	Post Encounter phase in flyby mission operations.
Periapsis	The point in an orbit closest to the body being orbited.
Perigee	Periapsis for Earth orbit.
Phase	1 - The angular distance between peaks or troughs of two waveforms of similar frequency; 2 - The particular appearance of a body's state of illumination, such as the full or crescent phases of the Moon; 3 - Any one of several predefined periods in a mission or other activity.
Photovoltaic	Materials that convert light into electric current.

Plasma	Electrically conductive fourth state of matter (other than solid, liquid, or gas), consisting of ions and electrons.
PM	Post meridiem (Latin: after midday), afternoon.
Prograde	1 - Orbital motion in the usual direction of celestial bodies within a given system, i.e. in the direction of the planets rotation; 2 - Orbit in which the spacecraft moves in the same direction as the planet rotates.
PST	Pacific Standard Time. Offset = UTC-8:00
PWR	Abbreviation for POWER.

Q

Quasar	Quasi-stellar object observed mainly in radio waves. Quasars are extragalactic objects believed to be the very distant centers of active galaxies.

R

RA	Right Ascension.
Radian	Unit of angular measurement equal to the angle at the center of a circle subtended by an arc equal in length to the radius. Equals about 57.296 degrees.
RAM	Random Access Memory.
RCS	The reaction control system is a subsystem of a spacecraft whose purpose is attitude control and steering by the use of thrusters. An RCS system is capable of providing small amounts of thrust in any desired direction or combination of directions The RCS engines use a Hypergolic Fuel which lights up when its two components (Fuel and Oxidizer) come into contact. This allows the system to be almost fail-safe due to the simple nature of the system.
RECIRC	Abbreviation for RECIRCULATION.
Reflection	The deflection or bouncing of electromagnetic waves when they encounter a surface.
Refraction	The deflection or bending of electromagnetic waves when they pass from one kind of transparent medium into another.

Retrograde	1 - Motion in an orbit opposite to the usual orbital direction of celestial bodies within a given system, i.e. in the opposite direction of the planets rotation; 2 - Orbit in which the spacecraft moves in the opposite direction from the planet's rotation.
RF	Radio Frequency.
RFI	Radio Frequency Interference.
RGA	The orbiter Rate Gyro Assemblies are used by the flight control system during ascent, entry and aborts as feedbacks to final rate errors that are used to augment stability and for display on the commander's and pilot's attitude director indicator.
Right Ascension	The angular distance of a celestial object measured in hours, minutes, and seconds along the celestial equator eastward from the
Rise	As in ascending above the horizon.
ROM	Read-only Memory.

S

s	Second, the SI base unit of time.
SA	Solar Array, photovoltaic panels onboard a spacecraft. SAR
SAR	Synthetic Aperture Radar
Satellite	A small body which orbits a larger one. A natural or an artificial moon. Earth-orbiting spacecraft are called satellites. While deep-space vehicles are technically satellites of the sun or of another planet, or of the galactic center, they are generally called spacecraft instead of satellites.
S-band	A range of microwave radio frequencies in the neighborhood of 2 to 4 GHz.
SCET	Spacecraft Event Time, equal to ERT minus OWLT.
SCLK	Spacecraft Clock Time, a counter onboard a spacecraft.
Sec	Abbreviation for Second.
Second	The SI base unit of time.
Semi-major axis	Half the distance of an ellipse's maximum diameter, the distance from the center of the ellipse to one end.
Set	As in going below the horizon.

SI	The International System of Units (metric system).
SI base unit	One of seven SI units of measure from which all the other SI units are derived.
SI derived unit	One of many SI units of measure expressed as relationships of the SI base units. For example, the watt, W, is the SI derived unit of power. It is equal to joules per second. W = m2 * kg * s3 (Note: the joule, J, is the SI derived unit for energy, work, or quantity of heat.)
Sidereal time	Time relative to the stars other than the sun.
SNR	Signal-to-Noise Ratio.
SOE	Sequence of Events.
Solar wind	Flow of lightweight ions and electrons (which together comprise plasma) thrown from the sun.
Specific Impulse	A measurement of a rocket's relative performance. Expressed in seconds, the number of which a rocket can produce one pound of thrust from one pound of fuel. The higher the specific impulse, the less fuel required to produce a given amount of thrust.
Spectrum	A range of frequencies or wavelengths.
SRB	Abbreviation for SOLID ROCKET BOOSTER.
SSME	Space Shuttle Main Engines are reusable liquid-fuel rocket engines, each Space Shuttle ascent to orbit is propelled by three engines
Star Tracker	The star tracker system is part of the orbiter's navigation system which works to help maintain the IMU during flight.
STS	Space Transportation System, generally kown as the Space Shuttle. It is comprised of the Orbiter, External Tank (ET) and Solid-Rocket Boosters (SRB).
Subcarrier	Modulation applied to a carrier which is itself modulated with information- carrying variations.

TCM	Trajectory Correction Maneuver, spacecraft propulsive maneuver.

TCS Thermal Conditioning System consists of an air revitalization system, water coolant loop systems, atmosphere revitalization pressure control system, active thermal control system, supply water and wastewater system, waste collection system and airlock support system. These systems interact to provide a habitable environment for the flight crew in the crew compartment in addition to cooling or heating various orbiter systems or components.

TNK Abbreviation for TANK

TOS Transfer Orbit Stage, upper stage.

Transducer Device for changing one kind of energy into another, typically from heat, microphone or speaker.

Transponder An Electronic device which combines a transmitter and a receiver.

TRM Transmission Time, UTC Earth time of uplink.

True anomaly The angular distance of a point in an orbit past the point of periapsis, measured in degrees.

U

UHF Ultra-high frequency (around 300MHz).

Uplink Signal sent to a spacecraft.

UT Universal Time, also called Zulu (Z) time, previously Greenwich Mean Time. UT is based on the imaginary "mean sun," which averages out the effects on the length of the solar day caused by Earth's slightly non-circular orbit about the sun. UT is not updated with leap seconds as is UTC.

UTC Coordinated Universal Time, the world-wide scientific standard of timekeeping. It is based upon carefully maintained atomic clocks and is highly stable. Its rate does not change by more than about 100 picoseconds per day. The addition or subtraction of leap seconds, as necessary, at two opportunities every year adjusts UTC for irregularities in Earth's rotation.

UV Ultraviolet (meaning "above violet") radiation. Electromagnetic radiation in the neighborhood of 100 nanometers wavelength.

V

Velocity A vector quantity whose magnitude is a body's speed and whose direction is the body's direction of motion.

VLV Abbreviation for VALVE.

VOR **V**ery High Frequency **O**mni-Directional **R**ange. VOR is a ground-based electronic system that provides azimuth information for high and low altitude routes and airport approaches.

W

W Watt, a measure of electrical power equal to potential in volts times current in amps.

Walking orbit A spacecraft orbit that precesses, wherein the location of periapsis changes with respect to the planet's surface in a useful way.

Water Boiler System See **Water Boiler System.**

Wavelength The distance that a wave from a single oscillation of electromagnetic radiation will propagate during the time required for one oscillation.

Weight The gravitational force exerted on an object of a certain mass. The weight of mass m is mg Newtons, where g is the local acceleration due to a body's gravity.

WWW World-Wide Web.

X

X-band A range of microwave radio frequencies in the neighborhood of 8 to 12 GHz.

X-ray Electromagnetic radiation in the neighborhood of 100 picometer wavelength.

Z

Z Zulu in the phonetic alphabet, stands for UT, Universal Time.

Zenith The point on the celestial sphere directly above the observer. Opposite the Nadir.