**GPS Acronyms and Glossary of Terms**

By NavtechGPS Inc.

**ID, 1-D**  
One-dimensional

**2d, 2D, 2-D**  
Two-dimensional

**2 DRMS, 2drms**  
Two dimensional (or distance) root mean square; analogous to a 2D 2-standard deviation statistic. 2DRMS represents a 2-dimensional ellipse containing 95% (or greater) of the independent, uncorrelated position points in a measurement distribution. It may also represent the 2D, 2σ accuracy of a navigation system.

**3D, 3-D**  
Three dimensional

**Absolute Positioning**  
Positioning mode in which a position is identified with respect to a well-defined coordinate system, commonly a geocentric system (i.e., a system whose point of origin coincides with the center of mass of the earth).

**A/C**  
Aircraft

**Accuracy (in GPS)**  
The degree of conformance between the estimated or measured position, velocity, and/or time of a GPS receiver determination and its true position, time and/or velocity using an accepted standard. Radionavigation accuracy is usually presented as a statistical measure of error and can be characterized as follows:

- **Predictable Accuracy** - The accuracy of a radionavigation system's position solution with respect to the geodetic, or the most accurately known, position information. Both the navigation system position solution and the reference information must be based upon or converted to the same measurement datum.

- **Repeatable Accuracy** - The accuracy with which a user of a navigation system can return to a position. The position is one whose coordinates have been measured at a previous time with the same navigation system.

- **Relative Accuracy** - The accuracy with which a user can determine position relative to that of another user of the same navigation system at the same time. For real time applications, this normally requires the use of a data link between both user systems.

**ACSM**  
American Congress of Surveying & Mapping

**ACU**  
Antenna Control Unit

**A/D**  
Analogue/Digital [or Analogue to Digital (converter)]

**ADC**  
Analogue to Digital Converter

**ADF**  
Automatic Direction Finder

**ADI**  
Altitude Direction Indicator

**ADR**  
Accumulated Delta Range

**ADS**  
Automatic Dependent Surveillance

**AE**  
Antenna Electronics

**AEEC**  
Airlines Electronic Engineering Committee

**AES**  
Aerospace and Electronics Systems Society

**AFB**  
Air Force Base

**AFCRL**  
Air Force Cambridge Research Laboratory (now Phillips Laboratory)

**AFGD**  
Air Force Geophysics Directorate (was AFCRL)

**AFI**  
Automatic Fault Indication

**AFS**  
Air Force Station

**A/G**  
Air to Ground
AFSCF  Air Force Satellite Control Facility
AGD   Australian Geodetic Datum
AGL   Above Ground Level
AHRS  Attitude and Heading Reference System
AIMS  Airspace Information Management System
ATCRBS Air Traffic Control Radar Beacon System
AJ    Anti-Jamming
AKM   Apogee Kick Motor (See “Apogee”)

Almanac
A data file for a given constellation that contains coarse orbit information for all satellites. At times the almanac is considered to also include clock corrections and atmospheric delay parameters but these are provided in separate subframes of the GPS data message. The almanac is transmitted by GPS satellites to facilitate rapid satellite acquisition by GPS receivers.

Almanac Data
A set of parameters similar to the more precise ephemeris data, used for approximating the GPS satellite orbits.

Ambiguity or carrier cycle ambiguity
The number (N) of whole carrier signal wavelengths(cycles) between a GPS satellite and a GPS receiver or a defined part of the path. This is important in the use of relative carrier phase measurement techniques.

Analog or Analogue
A type of transmission characterized by variable values representing information, contrasted with the typical binary or n-ary characteristics of digital data. A clock with moving hands is an analog device, whereas a clock with electronically displayed numbers is a digital device. Modern computers are invariably digital, but when they communicate over telephone lines, their signals normally must be converted to analog form using a modem (a modulator/ demodulator). The analog signal is converted back to a digital form before being delivered to the destination computer.

Anti-Spoofing
Anti-spoofing (A-S) in GPS is the process whereby the P-codes used in the precise positioning service (PPS) are encrypted. The resulting encrypted codes are known as the Y-code. The Y-codes can be used only by receivers with decryption capability. This mode of operation provides protection to equipped GPS user equipment from signal spoofing, or the transmission of signals replicating the true GPS signals, by adversaries and others. The use of these signals can cause hazardous and misleading information to GPS users unless anti-spoofing methods, such as signal encryption, are employed.

Anywhere Fix (GPS)
The ability of a GPS receiver to start position calculations without being given an approximate location and time.

AoA  Analysis of Alternatives
AOC  Analysis of Output
AOL  Airborne Optical Laser
AOPA Aircraft Owners and Pilots Association
APL  Airport pseudolites

Apogee (GPS)
The point in the elliptical orbit of a satellite that is the greatest distance from the center of the earth.
**Application Software**
These programs accomplish the specialized tasks of the user, while operating system software allows the computer to functionally operate as designed. A computer-aided dispatch system is application software, as are word processing and graphics programs.

- **APT** Asia Pacific Telecommunity
- **ARCS** Automatic Route Control System
- **ARNS** Aeronautical Radionavigation Service (a band in the radio spectrum)
- **ARINC** Aeronautical Radio, Inc.
- **ARTCC** Air Route Traffic Control Center (FAA facility)
- **A-S** Anti-Spoof (see “Spoofing”)
- **ASAT** Anti-Satellite
- **ASCII** American Standard Code for Information Interchange
- **ASIC** Application Specific Integrated Circuit
- **ASOS** Automated Surface Observing System
- **A&T** Acquisition and Technology
- **ATC** Air Traffic Control
- **ATE** Automatic Test Equipment
- **ATM** Air Traffic Management

**Atomic Clock**
Any of a variety of highly stable, precise and accurate timekeeping devices that are based typically on the state transition behavior of particular elements such as cesium, hydrogen and rubidium in their gaseous phase.

- **ATON** Autonomous Navigation

**Attenuation**
Reduction in the strength or amplitude of a signal.

**Automatic Vehicle Location, AVL**
A type of system to track or automatically locate a vehicle.

**Availability**
The percentage of time over a defined interval that the services of a navigation system can be used within a particular coverage area while meeting specific user requirements. Signal availability is the percentage of time that navigational signals transmitted from external sources are available for use and meet specific operational performance requirements.

- **AVCS** Attitude and Velocity Control System
- **AVL** Automatic Vehicle Location
- **AVLN** Automatic Vehicle Location and Navigation
- **AWOS** Automated Weather Observing System

**Bandwidth**
The range of frequencies included in a radio signal, usually specified as greater than a given power level (such as a half power level, or –3dB.) It is expressed in Hertz (Hz) with the relative power level at band extremes normally specified.

**Baseline**
A baseline consists of the three dimensional vector between a pair of GPS stations. Also, the vector distance between two points.
Base Station (GPS)
A base station is a GPS receiver at a known position specifically established to collect differential correction data for other GPS receivers in a given region. Base station data is used to calculate the errors relative to its known position which are provided to other users. The “relative difference” between the base station’s known position and the position calculated from GPS satellite signals become the basis for the corrections provided to other GPS receivers. Corrections can be transmitted in real-time, or used during later post-processing. A base station is also called a reference station.

BBS  Computer Bulletin Board Service
BCD  Binary Coded Decimal
BIH  Bureau International de L’Heure
BIPM  International Bureau of Weights and Measures (Bureau de Poids et Mesures).
Bit  A binary 1 or 0 or one of the two states possible in a binary digital sequence.

Block I, II, IIR, IIF Satellites or Spacecraft (S/C)
The various generations of GPS satellites: Block I spacecraft (S/C) were developmental satellites that began launch in February, 1978; Block II and IIA S/C are operational spacecraft used to populate the 24 operational slots in the NAVSTAR baseline constellation; Block IIR and IIR-M S/C are replenishment satellites; and Block IIF S/C are the follow-on generation of GPS S/C.

BPSK  Bi-Phase Shift Keying
bps  Bits Per Second
BTS  Bureau of Transportation Statistics
C3I  Command, Control, Communications and Intelligence
C/A-Code  Coarse/Acquisition-Code
CAA  Civil Aviation Authority (UK)
CAD  Computer Aided Design
CADC  Central Air Data computer

Carrier
The fundamental unmodulated RF signal. A radio signal having frequency and amplitude that may be varied from a reference value by modulation.

Carrier-Aided Tracking
A signal processing technique that uses certain characteristics of the GPS carrier signal (especially its Doppler shift) to provide a low noise signal for aiding the pseudorandom codes.

Carrier Frequency
The frequency of the unmodulated fundamental signal. The GPS L1 carrier frequency is 1575.42 MHz.

Carrier Phase Measurement
Relating to the relative phase difference measurement between two or more GPS carrier signals.

Cartesian/Geocentric Coordinates
A system of defining position which has its origin at the center of the earth with the x- and y-axes in the plane of the equator. Typically, the x-axis passes through the meridian of Greenwich, and the z-axis coincided with the agreed upon value for the earth’s axis of rotation.

CDMA  Code Division Multiple Access
CDU  Control Display Unit
CEP  Circular Error Probable
CEPT European Conference of Posts & Telecommunications

Cesium Clock (Cs Clock)  
An atomic clock based on the atomic transitions in gaseous cesium. Cesium Beam Automatic Standard Clock

Channel  
A channel of a GPS receiver consists of the signal and operations on the signal from a single GPS satellite.

Chip  
The period or interval of time to transmit either a "0" or a "1" in a binary sequence. An integrated circuit.

Chipping rate  
The bit rate, or rate at which binary digits are produced. Expressed as chips per second (cps). For example, the C/A-code chipping rate is 1.023 Mcps.

CGIC Civil GPS Information Center (at the NAVCEN, Alexandria VA)

CIGNET Cooperative International GPS Network

CGSIC Civil GPS Service Interface Committee

Circular Error Probable - CEP  
In a circular normal distribution, the radius of the circle that contains 50 percent of all the random samples in a 2-D region.

CIS Conventional Inertial System

Clock bias  
The difference between the GPS receiver clock's time and GPS time as established by the control segment.

Clock Offset  
The difference in the time reading between two clocks.

Cm Centimeter

CMOS Complementary Metal Oxide Semiconductor

C/No Carrier Energy to Noise Density Ratio

CNS Communications, Navigation and Surveillance

Coarse/Acquisition-Code  
The coarse/acquisition-code is modulated onto the GPS L1 signal. This code is a sequence of 1023 pseudorandom binary bits modulated on the GPS carrier at a chipping rate of 1.023 Mcps, resulting in a code repetition period of 1 millisecond. The code was selected to provide good acquisition properties. Also known as the "civil code since it is the only GPS signal generally used by the civil community."

Code Division Multiple Access - CDMA  
A method of frequency reuse whereby many radios use the same frequency but each one has a unique code. GPS uses CDMA techniques with Gold codes to obtain excellent cross-correlation properties.

Code Phase GPS  
GPS measurements based on the pseudo random code [C/A or P(Y)] as opposed to the use of the carrier of the signal.

Comm Communications

Continuous Tracking Receiver  
A receiver design which includes four or more channels to simultaneously track four or more satellites.

Control Point  
A point at which coordinates have been assigned that are of an agreed upon confidence level.
Control Segment
A world-wide network of GPS monitor and control stations responsible for maintaining the accuracy of satellite positions, clocks, and health.

CONUS
Continental United States (48 states, not including Hawaii or Alaska)

Coordinate System
One of a number of systems used to represent positions in space. Examples are latitude/longitude/altitude and state plane coordinates.

CORS
Continuously Operating Reference Station

Cos
Cosine

CRPA
Controlled Radiation (reception) Patterned Antenna

CPFF
Cost Plus Fixed Fee

CPM
See Carrier Phase Measurement

Cps
Chips per second

CRT
Cathode Ray Tube

Cs
Cesium

CS
Control Segment

CSOC
Consolidated Space Operations Center (at Schriever AFB, Colorado Springs, CO)

CW
Continuous Wave

Cycle Slip
A discontinuity in the measured carrier phase usually resulting from a temporary loss-of-lock in the carrier tracking loop of a GPS receiver.

DAC
Digital to Analog Converter

Data Message (GPS)
A message included in the GPS signal which reports the observed satellite's ephemeris, or predicted path, clock corrections and health. Includes almanac data that provides approximate information on the paths of other satellites and other status information.

Db
Decibel

Datum
A datum is a horizontal or vertical reference system for making survey measurements and computations. Horizontal datums are frequently ellipsoids. Improving technology has led to more precise values for the geographic points over time; to use recently collected data in conjunction with preexisting data, it is necessary to match datum and coordinate systems between the data sets. Some examples of datums are NAD-27 and WGS-84 (North American Datum 1927, World Geodetic System, 1984).

Differential GPS Positioning- DGPS
A technique used to improve positioning or navigation accuracy by canceling the common components of positioning error between a known location and a remote location. This is accomplished in near real-time by the transmission of a differential correction to the remote receiver by the use of a data link.

Digital
Generally, information is expressed, stored and transmitted by either analog or digital means. In a digital form, this information is seen as information in a binary (or n-ary) sequence.
**Dilution of Precision - DOP**
The multiplicative factor that relates ranging errors to position errors caused by the geometry of the user and the set of satellites in view at the time. Standard terms for the GPS application are: GDOP: Geometric (3 position coordinates plus clock offset in the solution) PDOP: Position (3 coordinates) HDOP: Horizontal (2 horizontal coordinates) VDOP: Vertical (height only) TDOP: Time (clock offset only) RDOP: Relative (normalized to 60 seconds).

**Distance Root Mean Square - drms**
The root-mean-square value of the distances from the true position in a collection of measurements. As typically used in GPS positioning, 2 drms is the radius of a circle that contains 95 percent of a large set of independent measurements.

**Dithering**
The deliberate introduction of digital noise. This is the process the DoD used to add inaccuracy to GPS signals to induce Selective Availability.

**Doppler-Aiding**
A signal processing strategy that uses measured Doppler shift data to help the receiver smoothly track the GPS signal, providing a more precise measurement of velocity and position.

**Doppler Shift**
The apparent change in the frequency of a signal caused by the relative motion between the transmitter and receiver.

**D to A, D/A**
Digital to Analog

**DARPA**
Defense Advanced Research Projects Agency

**DBw, dBw**
Decibels Relative to a Watt

**DBm, dBm**
Decibels Relative to a milliwatt

**Deg**
Degree

**DGPS**
Differential GPS

**DL**
Data link

**DMA**
Defense Mapping Agency (Now NIMA)

**DME**
Distance Measuring Equipment

**DOC**
U.S. Department of Commerce

**DoD, DOD**
U.S. Department of Defense

**DOI**
U.S. Department of the Interior

**DOJ**
U.S. Department of Justice

**DOP**
Dilution of Precision (See Dilution of Precision)

**DoT, DOT**
U.S. Department of Transportation

**DPR, dPR**
Differential pseudorange

**DPRC**
Differential pseudorange correction

**DR**
Delta Range or Dead Reckoning, Deduced Reckoning

**DRMS**
Distance Root Mean Square

**DRS**
Dead Reckoning System

**DSARC**
Defense Systems Acquisition Review Committee

**DTC**
Dry Term Correction (in troposphere)

**DT&E**
Development, Test and Evaluation
Earth-Centered Earth-Fixed Coordinate System, ECEF
A Cartesian coordinate system where the x-direction is in the direction of the intersection of the prime meridian (Greenwich Longitude) with the equator. The z-axis is the agreed upon direction of the Earth’s spin, or the earth’s geographic polar, axis. The y-axis is in the direction of advance of a right-handed screw when the x-axis is rotated in the direction of the z-axis. The position vectors rotate with the earth and all positions in this reference frame are relative to the rotating earth (e.g., the fixed Latitude and Longitude) coordinate system.

Eccentricity
The ratio of the distance between foci of the ellipse to the major axis distance. Or, the ratio of the distance from the center of an ellipse to a foci divided by the semi-major axis distance.

EC  European Commission
ECDIS  Electronic Chart Display & Information System
ECEF  Earth-centered, Earth-fixed
ED  European Datum
EDM  Electronic Distance Measurement
EFIS  Electronic Flight Instrument System
EIRP  Effective Instantaneous Radiated Power

Elevation
The height above a reference point or the distance measured normal to a reference frame. For example, altitude is frequently considered as the height above mean sea level, or the vertical distance above the geoid.

Elevation Angle
An angle measured above and relative to the horizon.

Elevation Mask Angle
Usually a user definable angle (in degrees) below which data measurements from a satellite will not be used. The mask angle value is typically set to avoid excessive degradation of the signal from the effects of the ionosphere, troposphere and multipath.

ELINT  Electronic Intelligence

Ellipsoid
In geodesy, a mathematical figure formed by revolving an ellipse about its minor axis. It is often used interchangeably with spheroid. Two quantities define an ellipsoid, the length of the semi-major axis (a) and the flattening, f = (a - b)/a, where b is the length of the semi-minor axis. Prolate and triaxial ellipsoids are usually described as such.

Ellipsoid
A solid figure for which all plane sections through one axis are ellipses and through the other are ellipses or circles.

Ellipsoid Height
The measure of vertical distance above the ellipsoid. Not the same as elevation above sea level.
EOL  End of Life

**Ephemeris**
The predictions of current satellite positions transmitted to the user in the data message. A list of accurate positions or locations of a celestial object as a function of time. Available as "broadcast ephemeris" or as post-processed "precise ephemeris."

**Ephemeris Parameters**
A set of parameters used in defining the orbit of a celestial body or of a satellite

**Epoch**
The initial or recurring start time for a process.

**EPS**  Electrical Power System

**ERP**  Effective Radiated Power

**Error Budget**
A breakdown or listing of statistical errors for various contributors, which, when combined together, make up the total expected error for a process.

**ESA**  European Space Agency (headquartered in Noordwijk, The Netherlands)

**ESGN**  Electrically Suspended Gyro Navigator

**ETA**  Estimated Time of Arrival

**ETRF**  European Terrestrial Reference Frame

**EU**  European Union

**EW**  Electronic Warfare

**FAA**  U.S. Federal Aviation Administration (part of the Department of Transportation)

**FANS**  Future Air Navigation Systems (prior activity of ICAO)

**Fast-Multiplexing Channel (GPS receiver)**
see Fast-switching channel

**Fast-Switching Channel (GPS receiver)**
A single channel receiver that rapidly samples the pseudoranges of a number of GPS satellites. "Fast" usually means that the switching time is sufficiently fast (typically 2 to 5 milliseconds) to recover the data message.

**FCC**  U.S. Federal Communications Commission

**FCC**  Fire Control Computer (JPO version)

**FDE**  Fault Detection and Exclusion

**FDI**  Fault Detection and Isolation

**FHWA**  Federal Highway Administration

**FIG**  Federation Internationale des Geometres

**Figure of Merit (FOM)**
An indication of the navigational quality of a military receiver, represented by a digit between 0 and 9.

**FBM**  Fleet Ballistic Missile

**FGCC**  Federal Geodetic Control Committee

**FMI**  Flexible Modular Interface
**Frequency Band**
A particular range of frequencies in a region of the electromagnetic spectrum.

**Frequency Spectrum**
A range of frequencies associated with a signal. Also, the distribution of signal amplitudes as a function of frequency of the constituent signal.

**FRA**
Federal Railroad Administration

**FRP**
Federal Radionavigation Plan, published by the DoT. Available online.

**FRPA-GP**
Fixed Radiation Pattern Antenna - Ground Plane

**FTA**
Federal Transit Administration

**FY**
Fiscal Year

**GAAS**
Gallium Arsenide Semiconductor

**Galileo**
A navigation satellite system under development and implementation by the European Commission of the European Union, the European Space Agency and European industry. The Galileo system is planned for initial operation by 2008 and, although autonomous, is expected to be used primarily with GPS.

**GATM**
Global Air Traffic Management (Air Force)

**GDM**
General Development Model

**GDOP**
See Geometric Dilution of Precision

**GEO**
Geostationary Earth Orbit

**Geodesy**
The science related to the determination of the size and shape of the Earth, the location of points on the Earth, its gravity field, the properties of its interior and the time variations of these.

**Geodetic Datum**
A mathematical model designed to best fit part or all of the geoid. It is defined by an ellipsoid and the relationship between the ellipsoid and a point (or points) on the topographic surface established as the origin of the datum.

**Geodetic Surveys**
Global surveys done to establish control networks (comprised of reference or control points) as a basis for accurate land mapping.

**Geoid**
The particular equipotential surface that coincides with mean sea level and that may be imagined to extend through the continents. This surface is everywhere perpendicular to the force of gravity.

**Geoid Height or Geoidal Height**
The height above the geoid is often called elevation above mean sea level.

**GES**
Ground Earth Station

**GDOP**
Geometric Dilution of Precision See Dilution of Precision

**GHz**
Gigahertz One billion Hz. 10 exp 9 Hz.

**GIS**
Geographic Information System
GLONASS
Global Orbiting Navigation Satellite System of the Russian Federation
The Russian Federation's equivalent to the American NAVSTAR GPS. GLONASS was designed to provide worldwide coverage. The GLONASS design has three orbital planes containing eight satellites each. The constellation has had only 8-12 S/C for the past several years (c.2004) and is not currently providing worldwide service.

GMT
Greenwich Mean Time

GNSS
Global Navigation Satellite System
A system that incorporates GPS, GLONASS, Galileo and other space-based and ground-based segments to support global navigation, position determination and related measurements.

GPS
Global Positioning System
A DOD sponsored and operated constellation of satellites [baseline of 24 S/C but now (c.2004) with 27-29 S/C] orbiting the earth in 6 orbital planes at a nominal altitude of 10,898 nautical miles (or 20,190 km). GPS satellites transmit signals that allow the accurate passive determination of GPS receiver (antenna) locations. Receivers can be located at fixed locations, moving on the earth's surface, in the earth's atmosphere, or in low-Earth orbit. GPS is used in air, land, sea and space navigation as well as in mapping, surveying and other applications where precise positioning is necessary. The GPS civil signal is provided free to all properly equipped users on or near the earth who have a view (in general) of at least four satellites.

GPS ICD-200
The GPS Interface Control Document (ICD) is a U.S. government document that contains the technical description of the elements of the GPS signal and the interface between the satellites and the user.

GRS
Geodetic Reference System

Handover Word, HOW Word
The second 30-bit word in the GPS data message subframes that provide GPS time data. It provides at six second (subframe) intervals the exact time for a particular spacecraft's transmission from the start of the current week, i.e., from midnight GPS time of the previous Saturday night. This is used for timing, including synchronization information for the acquisition of the P(Y)-code signal.

Hardware
The physical components of a system. It is also frequently considered as the physical part of a system that uses instructions to accomplish a task or operation. Reference is often made to computer "hardware" and "software". In this context, "hardware" consists of the computer (case, motherboard, drives, memory, etc), input and output devices and other peripheral equipment.

HD
High Dynamic

HDOP
See Horizontal Dilution of Precision

HDUE
High Dynamic User Equipment

Hertz, Hz
One cycle per second

HF
High Frequency

HOL
High Order Language (for computer programming)

HOW
See Handover Word

HPA
High Power Amplifier

Hrs, hrs
Hours
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSI</td>
<td>Horizontal situation indicator</td>
</tr>
<tr>
<td>HV</td>
<td>Host Vehicle</td>
</tr>
<tr>
<td>Hz</td>
<td>Hertz</td>
</tr>
<tr>
<td>IAG</td>
<td>International Association of Geodisists</td>
</tr>
<tr>
<td>ICAO</td>
<td>International Civil Aviation Organization</td>
</tr>
<tr>
<td>ICS</td>
<td>Initial Control System</td>
</tr>
<tr>
<td>ICD</td>
<td>Interface Control Document</td>
</tr>
<tr>
<td>IEC</td>
<td>International Electro-Technical Commission</td>
</tr>
<tr>
<td>IEEE</td>
<td>Institute of Electrical and Electronics Engineers</td>
</tr>
<tr>
<td>IERS</td>
<td>International Earth Rotation Service</td>
</tr>
<tr>
<td>IF</td>
<td>Intermediate Frequency</td>
</tr>
<tr>
<td>IFF</td>
<td>Identification Friend or Foe</td>
</tr>
<tr>
<td>IFR</td>
<td>Instrument Flight Rules</td>
</tr>
<tr>
<td>IFRB</td>
<td>International Frequency Review Board</td>
</tr>
<tr>
<td>IGE</td>
<td>Interagency GPS Executive Board</td>
</tr>
<tr>
<td>I-Level</td>
<td>Intermediate Level</td>
</tr>
<tr>
<td>ILA</td>
<td>International LORAN Association</td>
</tr>
<tr>
<td>ILS</td>
<td>Instrument Landing System</td>
</tr>
<tr>
<td>IMO</td>
<td>International Maritime Organization</td>
</tr>
<tr>
<td>IMU</td>
<td>Inertial Measurement Unit</td>
</tr>
<tr>
<td>INMARSAT</td>
<td>International Maritime Satellite Consortium, Ltd.</td>
</tr>
<tr>
<td>INS</td>
<td>Inertial Navigation System</td>
</tr>
<tr>
<td>Integrity</td>
<td>The ability of a system to provide timely warnings to users when the system should not be used for navigation.</td>
</tr>
<tr>
<td>Intelsat</td>
<td>International Telecommunications Satellite Organization</td>
</tr>
<tr>
<td>Interface</td>
<td>A shared boundary that exists between various systems or programs. An interface is also frequently considered as the equipment or device that facilitates the interoperation of two or more systems, or system components.</td>
</tr>
<tr>
<td>I/O</td>
<td>Input/Output</td>
</tr>
<tr>
<td>IOC</td>
<td>Initial Operational Capability</td>
</tr>
<tr>
<td>ION</td>
<td>U.S. Institute of Navigation</td>
</tr>
<tr>
<td>IONDS</td>
<td>Integrated Operational Nuclear Detection System</td>
</tr>
<tr>
<td>Ionosphere (iono)</td>
<td>The band of charged particles between the stratosphere and the exosphere at an altitude of 50 to 250 miles above the earth's surface which represent a non-homogeneous and dispersive medium for radio signals. The free electrons in the ionosphere refract radio waves resulting in delays and direction of arrival effects on signals traversing the ionosphere.</td>
</tr>
</tbody>
</table>
**Ionospheric Delay**
A wave propagating through the ionosphere experiences delay. Ionospheric phase delay depends on the electron content of the signal path through the ionosphere and relates to the carrier signals. Group delay also depends on the electron content and relates to the delays in the signal modulation (code) components. The phase and group delay are of the same magnitude but opposite in sign.

**Ionospheric Refraction**
The change in the propagation velocity and direction of a signal as it passes through the ionosphere.

**IOT&E**
Initial Operational Test and Evaluation

**IP**
Instrumentation Port

**IR**
Infra-red

**IRU**
Inertial Reference Units

**ISU**
International System of Units

**ITRF**
International Terrestrial Reference Frame

**ITU**
International Telecommunications Union

**IVHS**
Intelligent Vehicle Highway System

**Jamming**
The interference with the reception of a desired signal typically by an intentional or unintentional signal or noise.

**JCS**
Joint Chiefs of Staff

**JGPSC**
Japan GPS Council

**JPALS**
Joint Precision Approach and Landing System

**JPO**
Joint Program Office (as in GPS JPO, El Segundo, California)

**J/S**
Jamming/Signal (or Jamming to Signal) ratio

**JSC**
Joint Spectrum Center Also, the NASA Johnson Space Center in Houston, TX.

**JTIDS**
Joint Tactical Information Distribution System

**Kalman Filter**
A method for processing data to provide an optimal future estimate based upon multiple time-sequenced statistical measurements. Kalman filters typically employ numerical methods to provide an estimate for a time-varying signal in the presence of noise.

**Kg**
Kilogram

**KHz, kHz**
Kilohertz

**Kinematic Surveying**
Surveying that involves the rapid movement of the rover system relative to the stable reference or base station.

**Km, km**
Kilometer

**LAN**
Longitude of the Ascending Node in orbital mechanics. Defines the earth Longitude at which an inclined orbit satellite crosses the equatorial plane in its motion from the Southern hemisphere to the Northern hemisphere. Also used for Local Area Network

**LAAS**
Local Area Augmentation System

**L-Band**
The radio frequency band extending from about 1 to 2 GHz (1000 – 2000 MHz). The GPS carrier frequencies (1575.42 MHz for L1 and 1227.6 MHz for L2) are in the L-band.
**L1 Signal**
The primary L-band signal transmitted by each GPS satellite is centered at 1575.42 MHz. The L1 broadcast is modulated with the C/A and P(Y)-codes and with the navigation message. Future plans call for a new military signal (the M-code). This band is 24 MHz wide as authorized by the ITU.

**L2 Signal**
The secondary L-band signal is centered at 1227.60 MHz. The L2 signal carries the P(Y)-codes and the navigation message data and future plans call for a second civil signal (the C-code) and a new military signal (the M-code). This band is 24 MHz wide as authorized by the ITU.

**L5 Signal**
GPS 3rd civil frequency, centered at 1176.45 MHz. This band is 24 MHz wide as authorized by the 2000 ITU WRC.

**LCD**
Liquid Crystal Display

**LD**
Low Dynamic

**LED**
Light Emitting Diode

**LEP**
Linear Error Probable

**LF**
Low Frequency

**LO**
Local Oscillator

**LOP**
Line of Position

**LOS**
Line of Sight

**LORAN**
Long Range Navigation System

**LO**
Local Oscillator

**LRU**
Line Replaceable Unit

**LRIP**
Low Rate Initial Production

**Low SNR GPS**
Low Signal-to-Noise Ratio GPS. Systems employing data aiding, integration and other techniques to obtain operation in poor signal areas, or in high noise areas, or both.

**M**
Meter(s) or Mega (1,000,000)

**m**
Meter(s) or milli (0.001)

**µ**
Micro (one millionth)

**MAGR**
Miniaturized Aviation GPS Receiver

**MARAD**
Maritime Administration

**Master Control Station, MCS**
A computer processing and communications facility that gathers measurements from the Monitor Stations and uses this data to determine orbital elements, clock correction and related factors for the GPS satellites. (Located at Schriever AFB, Colorado Springs, CO)

**Mb**
Megabit

**MB**
MegaByte or millibar

**mBar**
millibar

**Mbps**
Megabits per second

**MCMT**
Mean Corrective Maintenance Time

**Mcps**
Megachips per second (Millions of chips per second)
**GPS Acronyms and Glossary of Terms**

By NavtechGPS Inc.

**MCS**  
See Master Control Station

**MD**  
Medium dynamic

**(MDT)** -  
**Mobile Data Terminal**
A device, typically installed in a vehicle consisting of a small screen, a keyboard or other operator interface, and various amounts of memory and processing capabilities.

**(MHz)** Megahertz  
One million cycles per second

**Microsecond**  
One millionth of a second. Sometimes written as $\mu$sec.

**MIDS**  
Multifunction Information Distribution System

**Milliseconds**  
One thousandth of a second

**MLS**  
Microwave Landing System

**MLV**  
Medium Launch Vehicle (e.g. Delta II)

**mm**  
Millimeter(s)

**M max CT**  
Maximum Maintenance Corrective Time

**MMD**  
Mean Mission Duration

**MMLS**  
Mobile MLS

**M mean CT**  
Maintenance Mean Corrective Time

**Monitor Stations (GPS)**
The worldwide group of stations used in the GPS control segment to track the satellites and obtain data on their clocks, orbital parameters and other information. Data collected at monitor stations are linked to a master control station where corrections are calculated. This correction data is uploaded to the satellites and provided to other parts of the system as needed.

**MMR**  
Multi-Mode Receiver

**MOA**  
Memorandum of Agreement

**MOPS**  
Minimum Operational Performance Standards

**MOU**  
Memorandum of Understanding

**MP**  
Manpack

**MPS, mps**  
Meters per second

**Mrad, mRad**  
Milliradian (0.001 radian)

**M/S, mps**  
Meters per second

**Ms, ms, msec**  
Millisecond

**MSL**  
Mean Sea Level

**MSS**  
Mobile Satellite Service

**MTBF**  
Mean Time Between Failures

**MTBM**  
Mean Time Between Maintenance (operations)

**MVUE**  
Man/Vehicular User Equipment

**Multichannel Receiver**
A receiver containing multiple channels, each of which can track one satellite continuously, so that navigation solutions are derived from the set of simultaneous measurements of pseudoranges and range rates.

**Multipath**  
Errors caused by the reflection or refraction of a signal that has reached the receiver antenna by two or more different paths. It is usually caused by one path being reflected from nearby structures or other reflective surfaces.

© 2012 NavtechGPS
**Multiplexing Channel**
A single receiver channel that is designed to track more than one satellite signal by using a rapid sequencing process. See Fast Multiplexing Receiver.

**NAD-27**
North American Datum of 1927. Obsolete horizontal datum of North America. NAD 27 depends upon an early approximation of the shape of the earth, known as the Clarke Spheroid of 1866, designed to fit only the shape of the conterminous United States, and utilizing a specific Earth surface coordinate pair as its center of reference.

**NAD-83**

**NAVD-88**
North American Vertical Datum of 1988. Effort underway by the National Geodetic Survey (NGS) to readjust the North American Vertical Datum. The NAVD 88 readjustment, when completed, will remove distortions from the continent-wide vertical geodetic (height) reference system.

**Nanosecond, nanosecond**
One billionth of a second. 10 exp -9 seconds.

**NANU**
Notice Advisory to Navigation Users

**NAS**
National Airspace System

**NASA**
National Aeronautics and Space Administration

**Nav Message, Nav Data Message, Data Message, NAV-msg.**
Navigation Message or Data Message
The navigation message broadcast by each GPS satellite at 50 bps on the L1 and/or L2 signals. This message contains data on system time, clock correction parameters, ionospheric delay model parameters, and the vehicle’s ephemeris and health. The information is used to process GPS signals to give user time, position, velocity and the capabilities of the spacecraft..

**NATO**
North Atlantic Treaty Organization

**Nav**
Navigation

**NAVSTAR**
One of the names given to the U.S. GPS satellite constellation. NAVSTAR is an acronym for NAVigation Satellite Timing and Ranging. The term NAVSTAR also has been used to designate specific spacecraft in the GPS constellation.

**NAVWAR**
Navigation Warfare

**NBS**
National Bureau of Standards (now NIST- National Institute of Standards and Technology))

**NCA**
National Command Authority

**NCO**
Number controlled oscillator. Also, Non Commissioned Officer

**NDGPS**
Nationwide Differential GPS

**NDB**
Non-Directional Radio Beacon

**NDS**
Navigation Development Satellite

**NET**
Not Earlier Than

**NGS**
National Geodetic Survey

**NHTSA**
National Highway Traffic Safety Administration

**NIMA**
National Imagery and Mapping Agency (was DMA, Defense Mapping Agency)

**NIST**
National Institute of Standards and Technology
n.mi., nm  Nautical mile
NNSS  Navy Navigation Satellite System (Transit)
NOAA  National Oceanic and Atmospheric Administration
NOSC  Naval Ocean Systems Center
NOTAM, Notam  Notice to Airmen
NPA  Non-precision Approach
NRC  National Research Council of the National Academies of Science and Engineering
NRL  Naval Research Laboratory
NSA  National Security Agency
Nsec, ns  Nanosecond (10 exp –9 seconds)
NTDS  Naval Tactical Data System
NTIA  National Telecommunications and Information Administration
NTDS  Navy Tactical Data System
NTS  Navigation Technology Satellite
Nm, nm  Nautical miles
NUDET  Nuclear detection system. An auxiliary payload on the GPS spacecraft.

Observation Period (GPS Survey)
The period of time over which GPS data is collected. In the survey field, it indicates the period during which data is simultaneously collected by two or more receivers.

OBS  Omni Bearing Select
OCC  Operational Control Center
OCS  Operational Control Segment or Operational Control System
0 dBi  0 decibels isotropic (unity gain) – the gain of an idealized omni-directional antenna
OEM  Original equipment manufacturer
OMB  Office of Management and Budget
Orbit  The path followed by a satellite or celestial body as it moves through space around a central force field.
OSD  Office of the Secretary of Defense
P-Channel  Precision code channel
PCM  Pulse code modulation
P-code  See Precise Code
PDD  Presidential Decision Directive (as in removal of S/A)
PDF  Probability Density Function

PDOP - Position Dilution of Precision \((x, y, z)\)
A geometric dependent term expressing the relationship between the errors in user position and the errors in the ranging measurements to the satellites. PDOP is a function of the geometric configuration of satellites from which signals are derived for position (see DOP). PDOP typical values range between 2 and 4. They vary continuously since the satellites are continuously in motion providing a changing geometry.
**PDOP Mask**
Usually a user-definable upper limit for the PDOP that will be tolerated during collection of a dataset. If PDOP becomes greater than the pre-set limit, GPS data collection will be suspended or the data will be notated until the PDOP decreases below the limit.

**Perigee**
The point in the orbit of a satellite that is closest to the center of the earth.

**Phase Lock**
The technique where the phase of an oscillator signal is made to follow closely the phase of a reference signal. The receiver first compares the phases of the two signals, and then uses the resulting phase difference signal to adjust a reference oscillator.

**PL**
See Pseudolite

**PLGR**
Precise Lightweight GPS Receiver or P-code Lightweight GPS Receiver

**PLL**
Phase-lock Loop

**PLRS**
Position Location and Reporting System

**PN, PRN**
Pseudo Noise (see pseudo random noise, PRN)

**Point Positioning**
A geographic position produced from one receiver in a standalone (or autonomous) mode.

**Point Solution**
An instantaneous position solution that uses current pseudo-range measurements from four or more satellites.

**Position**
The latitude, longitude, and altitude of a point or other designation for a point using three independent coordinates. An estimate of error is often associated with a position.

**Post-Processed Differential GPS**
Differential GPS operation in a post-processed mode employs data collection and computational techniques that do not require the base and rover receivers to have a data link connecting them. Each receiver independently records data. This data is later processed with data from other receivers taken during the same time period. The set of satellites used in later processing must be common to all receivers collecting data. Differential correction post processing software is used to combine and process the data collected.

**Ppm, ppm**
Parts Per Million

**PPS**
Precise Positioning Service

**PR**
Pseudorange

**PRC**
Pseudorange Corrections

**PRE**
Pseudorange Error

**Precise (or Precision) Code (P-Code)**
The GPS precise, or precision code, is authorized primarily for military use. It consists of a very long sequence of pseudo-random binary bits that are biphase modulated on the GPS carriers at a chipping rate of 10.23 Mcps. These repeat about every 267 days. One-week segments of this code are assigned to the GPS spacecraft forming codes that have a one-week period.

**Precise Positioning Service (PPS)**
The most capable level of military dynamic positioning accuracy provided by GPS, typically using the P(Y)-codes in the dual-frequency mode. PPS is also frequently used in the single frequency mode (such as with the PLGR).

**PRN**
Pseudorandom noise (modulation)
Pseudolite (shortened form of pseudo-satellite)
A ground-based transmitter that broadcasts a signal similar to that of a GPS satellite. Pseudolites are typically used to improve geometric solutions in a local area. The data portion of the signal may also contain differential corrections and other information (such as integrity) that can be used by receivers.

Pseudorandom Code, PRN code, PN code
A signal consisting of a sequence of binary bits that have random noise-like properties but which, in fact, have a well-defined deterministic sequence pattern.

Pseudorandom Noise Codes
A sequence of digital 1's and 0's that appear to be randomly distributed and have noise-like properties but are, in fact, generated with reproducible properties. An important characteristic of PRN codes is a low autocorrelation value for all delays except when the codes coincide. Each GPS satellite transmits unique C/A and P(Y)-code pseudorandom-noise codes.

Pseudorange
A distance measurement between a satellite and a receiver (antenna), based on the correlation of a satellite-transmitted code and the local receiver's reference (replica) code.

PSK Phase Shift Key
PTTI Precise Time and Time Interval
PVT Position, Velocity and Time
P/Y Code Precision-code or / Encrypted P-code
RAAN Right Ascension of the Ascending Node
RAIM Receiver Autonomous Integrity Monitoring
RAJPO Range Applications Joint Program Office (now RISPO)

Radionavigation
The determination of position, or of information relating to position and navigation by means of the propagation properties of radio waves. GPS is a method of radionavigation.

Range A distance between two points, such as between a satellite and a GPS receiver.

Range Rate The rate of change in the distance (range) between a satellite and receiver or other range measurement. The range to a satellite continually changes due to satellite and observer motion. Range rate is determined by measurement of the Doppler shift of the satellite carrier signal.

R&D Research and development
Rb Rubidium. An element used in some types of atomic standard clocks.
Rcvr, Rec. Receiver
RDF Radio Direction Finder
RDSS Radio Determination Satellite Service
Real-Time Differential GPS
A position improvement process whereby a GPS receiver receives real-time correction data from another source in order to remove the effects of bias errors. One way to obtain correction data is by the use of a GPS receiver located at a known position (typically known as a base station). The GPS receiver at the known position computes, formats, and transmits corrections usually through a data link with each new GPS observation. The rover unit receives the GPS corrections and applies the corrections to its current observations. Other sources of correction data include satellite-based systems such as OMNISTAR, StarFire, CORS stations, etc.

Relative Navigation
A technique for determining position in which one or both of the position points may be moving. A data link is used to provide error data to the moving vehicles to improve real-time navigation.

Relative Positioning
The process of determining the relative difference in position between two locations. In the case of GPS, by placing a receiver over each site and making simultaneous measurements observing the same set of satellites at the same time. This technique allows the receiver to cancel errors that are common to both receivers, such as satellite clock and ephemeris errors, propagation delays, etc.

Reliability
The probability of performing a specified function without failure under given conditions for a specified period of time.

RF
Radio Frequency

RINEX
Receiver INdependent EXchange format. A set of standard definitions and formats that permits interchangeable use of GPS data from dissimilar GPS receiver models or post processing software. The format includes definitions for time, phase, range and other parameters.

RISPO
Range Instrumentation System Program Office

RLG
Ring Laser Gyroscope (type of INS)

RMS, rms
Root Mean square

RNAV
Area Navigation

RNPC
Required Navigation Performance Capability

Rover
Any mobile DGPS receiver used during a data collection session. The receiver's position can be computed relative to one or more stationary (reference) GPS receivers.

RPV
Remotely piloted Vehicle

RSPA
Research and Special Programs Administration of DoT

RSS, rss
Root Sum Square

RT
Remote Terminal

RTCA

RTCM
Radio Technical Commission for Maritime Services. Special Committee 104 of RTCM has established and periodically updates the data message format for the transmission and use of differential GPS broadcasts over data links to provide real-time and other corrections to GPS computed positions.

Rubidium Clock, Rubidium Atomic Clock
A stable and precise atomic clock based on the atomic transitions associated with gaseous rubidium.

SA
See Selective Availability

SAC
Strategic Air Command
GPS Acronyms and Glossary of Terms
By NavtechGPS Inc.

**SAMSO** Space and Missile Systems Organization
**S-band** A microwave frequency band (in the 2-4 GHz region)
**SBAS** Space-Based Augmentation System

**Satellite Configuration**
The arrangement or state of the satellite constellation at a specific time, relative to a specific user or set of users. Occasionally used interchangeably with satellite constellation.

**Satellite Constellation**
The arrangement in space of a set of satellites. In the case of GPS, the fully operational constellation is currently composed of six orbital planes, each containing four or more satellites. GLONASS has three orbital planes which, when fully occupied, contain eight satellites each. Galileo tentatively plans to have three inclined orbits and one geostationary orbit and a total of 30 satellites.

**Satellite Elevation Mask**
A user definable elevation mask in degrees above the horizon in which spacecraft signals are not used by a GPS receiver. SVs at an elevation angle below the mask angle may be tracked, but data from them will not be used to compute positions. SVs near the horizon have larger error effects due to atmospheric and multipath conditions.

**Selective Availability - SA**
A DOD technique for distorting (or dithering) the GPS spacecraft time base and thereby corrupting the pseudorange and range rate measurements available to civil users. The purpose of this was to degrade the GPS navigation accuracy available to the civil community to a level of about 100 meters (2drms) in position. SA was set to zero on May 1, 2000 (EST) by Executive Order and there are commitments from the government that it will not be reinstated in the future.

**SC, S/C** Spacecraft
**SC-155** RTCA Special Committee on the Future CNS
**SC-159** RTCA Special Committee on MOPS and MASPS for GNSS
**SCAT-1** Special Category-1 Approach and Landing system
**SCF** Satellite Control Facility
**SDOF, SDF** Single Degree of Freedom
**SESC** Satellite and Environmental Service Center
**SEP** Spherical Error Probable
**SI** International System of Units
**Sigma, σ** Standard Deviation
**SGLS** Space-Ground Link, S-band system
**SLAM** Standoff Land Attack Missile
**SLGR** Small Lightweight GPS Receiver
**SNR** Signal-to-Noise Ratio. The measure of the signal power to the noise power, normally expressed in decibels. A higher number is desirable.

**Space Segment (GPS)**
The portion of the GPS system that is located in space. This includes the GPS satellites and any ancillary spacecraft that provide GPS augmentation data (i.e., differential corrections, integrity messages, etc.)
**Spread Spectrum (GPS)**
The received GPS signal is a wide-bandwidth spread spectrum signal at a very low power level (-160 to –166 dBW). The L-band signals are modulated with high-rate (1.023 and 10.23 Mcps) PRN codes. This spreads the signal energy over a much wider bandwidth than the signal information bandwidth.

**Spherical Error Probable**
The radius of a sphere within which there is a 50 percent probability of locating a point (or being located). SEP is the three-dimensional analogue of the two dimensional CEP.

**Spheroid**
A solid figure generated by rotating an ellipse about either axis.

**SPS**
See Standard Positioning Service

**Spoofing (GPS)**
The misleading of the user's GPS navigation determination by the use of signals that replicate GPS signals but are timed differently. In most cases, a receiver is unaware it is being spoofed.

**Squaring-Type Channel**
A GPS receiver channel that multiplies the received signal by itself to obtain a second harmonic of the signal. This signal does not contain the code modulation. Used in "codeless" receiver equipment.

**Standard Deviation (Sigma)**
A measure of the dispersion of random errors about the mean value. If a large number of independent, or uncorrelated measurements or observations of the same process are made, the standard deviation is the square root of the sum of the squares of the deviations from the mean value of all the measurements divided by the number of observations less one.

**Standard Positioning Service, SPS (for GPS)**
The GPS service available to the civil community and used for certain applications by the military Precise Positioning Service (PPS) user. It basically consists of the C/A-codes on L1. On a temporary basis, civil users have been authorized the use of "codeless" techniques, involving the P(Y)-codes at L2 and L1 to establish two frequency ionospheric correction data, primarily for aviation users in the WAAS program.

**SPS Accuracy (GPS)**
The normal civil positioning accuracy obtained by using the GPS C/A-code at the L1 frequency. Under selective availability conditions, guaranteed to be no worse than 100 meters 95 percent of the time (2 drms). Since SA was set to zero in May, 2000, SPS accuracy has been typically at the 5-10 meter level on a 2drms basis.

**Static Positioning**
Position determination accomplished with a stationary receiver. This allows the use of various averaging and differential techniques.
**GPS Acronyms and Glossary of Terms**  
By NavtechGPS Inc.

**TBD**  
To Be Determined

**TD**  
Tokyo Datum

**TDOF, TDF**  
Two Degrees of Freedom

**TDOP**  
Time Dilution of Precision

**TDRSS**  
Tracking and Data Relay Satellite System

**TEC**  
Total Electron Content

**Tropospheric Correction**  
The correction applied to the range measurements to account for tropospheric delay.

**TT&C**  
Tracking, Telemetry and Control

**TTFF**  
Time to First fix

**TTSF**  
Time to Subsequent Fix

**UDRE**  
User Differential Ranging Error

**UE**  
User Equipment

**UERE**  
User equivalent range error

**UHF**  
Ultra High Frequency

**UMTA**  
Urban Mass Transit Administration

**Universal Time Coordinated (UTC)**  
An international, highly accurate and stable uniform atomic time system kept very close to Universal Time corrected for seasonal variations in the earth’s rotation rate (UT2). Maintained by the U.S. Naval Observatory in Washington, D.C. GPS time is directly relatable to UTC by accounting for the leap seconds since midnight January 4, 1980, currently at 13 (c. 2004).

**URE**  
User Range Error

**USACE**  
U.S. Army Corps of Engineers

**USAF**  
U.S. Air Force

**USCG**  
U.S. Coast Guard

**USDA**  
U.S. Department of Agriculture

**USGS**  
U.S. GPS Industry Council

**USGS**  
U.S. Geological Survey

**USMC**  
U.S. Marine Corps

**USN**  
U.S. Navy

**USNO**  
U.S. Naval Observatory

**User Segment**  
The portion of the GPS that can be directly interfaced by the user (e.g., GPS receivers). The controls and displays, including the GPS receiver, by which a receiver conveys GPS system information to the user.

**UT**  
Universal Time

**UTC**  
Universal Time Coordinated

**URA**  
See user range accuracy.

**User Interface**  
The hardware and operating software by which a receiver operator executes procedures on equipment (such as a GPS receiver) and the means by which the equipment conveys information to the person using it, i.e., the controls and displays.
**User Range Accuracy - URA**

The contribution to the range-measurement error from related error sources

- **UT** Universal Time
- **UTC** See Universal Time Coordinated
- **UV** Ultraviolet
- **VAFB** Vandenberg Air Force Base
- **VDOP** Vertical Dilution of Precision (z)
- **VFR** Visual Flight Rules
- **VHF** Very High Frequency
- **VHSIC** Very High Speed Integrated Circuit
- **VLSIC** Very Large Scale Integrated Circuit
- **VLBI** Very Long Baseline Interferometry
- **VLF** Very Low Frequency
- **VLSI** Very Large Scale Integration
- **VOR** VHF omni-range navigation system
- **VPA** Vehicle Power Adapter
- **VTS** Vessel Traffic Services
- **WAAS** Wide Area Augmentation System
- **WARC** World Administrative Radio Conference
- **WADGPS** Wide Area Differential GPS
- **WDOP** Weighted Dilution of Precision
- **WGS-72, 84** World Geodetic systems (1972 and 1984)

**World Geodetic System (WGS)**

A consistent set of parameters describing the size and shape of the Earth-derived from: the positions of a network of points with respect to the center of mass of the Earth; transformations from major geodetic datums; and the gravity potential of the Earth.

**WGS-84 (World Geodetic System 1984)**

The mathematical ellipsoid used as a reference datum for GPS since January 1987.

- **w.r.t., wrt** with respect to
- **WWDGPS** World Wide Differential GPS
- **Y-code** The encrypted version of the P-code.
- **YPG** Yuma Proving Ground