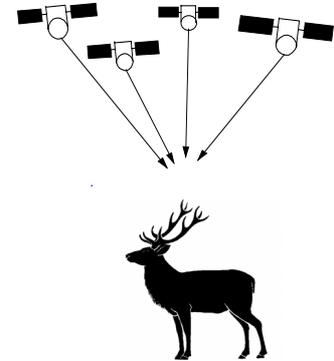


Glossary of GPS Terms

Explanations & Abbreviations of Global Positioning System terms



A

Absolute Positioning	A 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)
Accuracy	The degree of closeness of a measurement result to its true value. The degree of conformance between the estimated or measured position, time, and/or velocity of a GPS receiver and its true time, position, and/or velocity as compared with a constant standard. Radionavigation system accuracy is usually presented as a statistical measure of system error
Accuracy relative	The accuracy with which a user can measure position relative to that of another user of the same navigation system at the same time
Accuracy statistic	The industry standard definition of static accuracy is the standard deviation of error if a point set by a receiver was tested in a fix position for 24 hours.
Acquisition	The ability to find and lock on to satellite signals for ranging
Additional Secondary Factor (ASF)	Error propagation time caused by radiowaves slowing down as they pass over different terrain. This is in addition to slowing down as radiowaves pass over sea water
ADRG	ARC-digitized raster graphics. A United States military map format for providing maps on CD
AFE	Atlas Florae Europaeae. The AFE grid is modified from the Military Grid Reference System (MGRS)
Algorithm	A special method used to solve a certain type of mathematical problem

Almanac	A data file that contains orbit information on all satellites, clock corrections, and atmospheric delay parameters. It is transmitted by a GPS satellite to a GPS receiver, where it facilitates rapid satellite vehicle acquisition within GPS receivers. Almanac data must be acquired before GPS navigation can begin
Altimeter	An instrument that measures altitude or elevation with respect to a reference level, usually mean sea level, by means of air pressure
Ambiguity	The initial bias in a carrier-phase observation of an arbitrary number of cycles. The initial phase measurement made when a GPS receiver first locks onto a GPS signal is ambiguous by an integer number of cycles because the receiver has no way of knowing the exact number of carrier wave cycles between the satellite and the receiver. This ambiguity, which remains constant as long as the receiver remains locked on the signal, is established when the carrier-phase data are processed
Amplitude	Height of a radiowave as measured from an imaginary center line to the wave peak
Amplitude Modulation (AM)	A method of encoding a message on the carrier signal by altering the height of the signal while keeping its frequency constant
AMPS	Analog Mobile Phone System. Non-digital cellular mobile phones
Analog Mobile Phone System (AMPS)	Non-digital cellular mobile phones
Antarctic Circle	An imaginary circle on the surface of the earth at 66.5°S lat.or 23.5° north of the South Pole. It marks the southernmost point at which the sun can be seen at the winter solstice (about June 22) and the northernmost point of the southern polar regions at which the midnight sun is visible. .
Anti Spoofing (AS)	Encryption of the P code signal transforming it to Y code which is unavailable to civilian users. AS prevents an encryption-keyed GPS receiver from being "spoofed" by a bogus, enemy-generated GPS P-code signal
Anywhere fix	The ability of a receiver to start position calculations without being given an approximate location and approximate time
ARC-digitized raster graphics (ADRG)	A United States military map format for providing maps on CD
Arctic Circle	An imaginary circle on the surface of the earth at 66.5°N latitude, or, 23.5° south of the North Pole. It marks the northernmost point at which the sun can be seen at the winter solstice (about Dec. 22) and the southernmost point of the northern polar regions at which the midnight sun is visible
AROF	Ambiguity Resolution On the Fly Fast ambiguity resolution GPS surveying where the solution is determined while the receiver is in motion
ASF	Additional Secondary Factor. Error propagation time caused by radiowaves slowing down as they pass over different terrain. This is in addition to slowing down as radiowaves pass over sea water

Atlas Florae Europaeae (AFE)	A modified from the Military Grid Reference System (MGRS)
Automatic Packet Reporting System (APRS) Terminal Information Service (ATIS)	A protocol that uses packet radio to transmit data that depicts the position of a station with other
Automatic Terminal Information Service (ATIS)	Is is a continuous broadcast of recorded information at selected high activity airports
Automatic Vehicle Location (AVL)	The technique of using a navigation system to determine a vehicle's position, which is then transmitted to a central unit that monitors and tracks the vehicle's position and movement
Automatic Vehicle Monitoring (AVM)	The technique of using a navigation system to determine a vehicle's position, which is then transmitted to a central unit that monitors and tracks the vehicle's position and movement
Availability	The number of hours per day that a particular location has sufficient satellites to make a GPS position fix
Azimuth	This is the direction of a celestial object, measured clockwise around the observer's horizon from north. So an object due north has an azimuth of 0°, one due east 90°, south 180° and west 270°. Azimuth and altitude are usually used together to give the direction of an object in the topocentric coordinate system
B	
Bandwidth	That range of frequencies that compose a signal
Base Station	Also called a reference station. A receiver that is set up on a known location specifically to collect data for differentially correcting rover files. The base station calculates the error for each satellite and, through differential correction, improves the accuracy of GPS positions collected at unknown locations by a roving GPS receiver
Baseline	The difference in three dimensional coordinates (X, Y, Z) computed from the difference in simultaneous carrier phase observations at two or more receivers
Bearing	The compass direction from position to a destination
Bench mark	A relatively permanent material object, natural or man-made, with a known elevation. A bench mark can be used as a reference point when navigating a route or in determining the elevation of nearby land features
Binary Biphase Modulation	The phase modulation technique used to transmit a GPS signal. The phase of a carrier generated by a satellite is shifted by 180 degrees when there is a code or message binary signal level transition, either from 0 to 1 (normal to mirror image) or from 1 to 0 (mirror image to normal)
BIPM	Bureau International des Poids et Mesure. The international bureau of weights and measurements, in Paris. Responsible for the UTC time scale

Bit	A unit of information in an electronic system expressed as a choice between two possible values, for example, 0 or 1
Blue Book	Term referring to the Federal Geodetic Control Subcommittee publication "Input Formats and Specifications of the National Geodetic Survey Data Base" which defines the file formats for data submission to the National Geodetic Reference System.
BNC	Bayonet N Connector. A common type of antenna connector. Push and Turn to lock
BRG	Bearing. The direction to the To waypoint
C	
C Code	The less accurate Civilian GPS Signal. See Selective Availability
C/A code	The standard (Course/Acquisition) GPS code. A sequence of 1023 pseudo-random, binary, biphasic modulations on the GPS carrier at a chip rate of 1.023 MHz. Also known as the "civilian code" or S-code
Call Sign	Each amateur radio station is assigned a call sign by the government of that country which allows the operator to transmit in the amateur radio bands
Carrier	A radio wave having at least one characteristic (e.g. frequency, amplitude, phase) that can be varied from a known reference value by modulation
Carrier frequency	The frequency of the unmodulated fundamental output of a radio transmitter
Carrier Phase	GPS measurements based on the L1 or L2 carrier signal
Carrier-Aided Tracking	A technique to improve accuracy by using the GPS carrier signal to get a more exact lock on the pseudorandom code
Carrier-to-Noise Power Density (C/N0)	The ratio of the power level of a signal carrier to the noise power in a 1-Hz bandwidth. This is a key parameter in the analysis of GPS receiver performance. Nominal GPS receiver C/N0 values often are in the 40 to 50-dB-Hz range
Carrier-Tracking Loop	A module in a GPS receiver that demodulates, or extracts, the satellite message by aligning the phase of the receiver's local oscillator signal with the phase of the frequency-shifted, received carrier. Once the local oscillator signal is locked to the carrier, its phase can be measured to provide the carrier-phase observation
Channel	A channel of a GPS receiver consists of the circuitry necessary to receive the signal from a single GPS satellite
Chip	Binary elements or digits that, unlike bits, convey no information. A PRN code consists of a sequence of chips
CIB	Controlled image base
Circular Error Probable (CEP)	A statistical measure of the horizontal precision. The CEP value is defined as a circle of a specified radii that encloses 50% of the data points

CITS	Close Air Support Integrated Targeting System is a program developed by Northport Systems Inc. for integrating the Global Positioning System with laser target locators
Clarke 1866	The reference ellipsoid for the NAD27 coordinate system
Clock Aiding	An accuracy enhancement technique in which an additional atomic clock (rubidium) provides accurate time to the receiver for calculating satellite clock frequency, phase bias, and clock drift
Clock Bias	The difference between a clock's indicated time and true universal time
CMG	Course Made Good. How you are progressing towards your next waypoint
Coarse Acquisition (C/A)-Code	A family of PRN codes transmitted by GPS satellites. Each satellite is assigned one of 32 unique codes in the family. Each code consists of 1,023 chips and is sent at a rate of 1.023 megabits per second. The code sequence repeats every millisecond. The C/A-codes are Gold codes -- PRN codes that are distinguished by a very low cross correlation between any two codes (that is, they are nearly orthogonal). C/A-codes currently are transmitted only on the L1 frequency
Code Division Multiple Access (CDMA)	A technique of multiplexing, also called spread spectrum, in which analog signals are converted into digital form for transmission. For each communication channel, the signals are encoded in a sequence known to the transmitter and the receiver for that channel
Code phase GPS	GPS measurements based on the pseudo random code (C/A or P) as opposed to the carrier of that code
Code-Tracking Loop	A module in a GPS receiver used to align a PRN code sequence present in a signal coming from a satellite with an identical PRN code sequence generated within the receiver. Alignment is achieved by appropriately shifting the receiver-generated code chips in time so that a particular chip in the sequence is generated at the same instant its twin arrives
COG	Course Over Ground, Your current direction of travel relative to a ground position (same as Track)
Cold Start	The ability of a GPS receiver to start providing position updates without the assistance of any almanac information stored in its memory
Constellation	Refers to either the specific set of satellites used in calculating positions or all the satellites visible to a GPS receiver at one time
Continuous Kinematic Surveying	Successive baseline solutions generated at every epoch of an unbroken observation set. Typically used to track a vehicle or platform in motion
Contour line	A line on a map that connects points of equal elevation
Control point	Also called a control station. The National Geodetic Survey maintains a nation-wide set of control points. A world-wide network of GPS monitoring and control stations that ensure the accuracy of satellite positions and their clocks

Control Segment	That portion of the Global Positioning System that consists of a master control station, monitoring stations, and ground antennas, which monitor and update satellite signals and upload correction data to the satellites
CONUS	Continental United States. An Abbreviation used in a class of Datums
Coordinated Universal Time (UTC)	See UTC
Correlation	The extent to which one observation or computed value is influenced by the change in an other, or that both are influenced by a third. The correlation coefficient is the proportion of the total variation in the dependent variable (y) which can be attributed to the relationship with the independent variable (x)
CORS	Continuously Operating Reference Station Fixed GPS receiver site in continuous operation
Course Made Good (CMG)	The bearing from the starting point to the present position
Course Over Ground (COG)	Your current direction of travel relative to a ground position
Cross-Track Error (XTE)	The difference between a vessel's actual position and its desired position on a given heading. This is usually measured as a range error in nautical miles but may also be expressed graphically using symbols
CTS	Course To Steer
Cycle Slip	A discontinuity in GPS carrier-phase observations, usually of an integer number of cycles, caused by temporary signal loss. If a GPS receiver loses a signal temporarily, due to obstructions for example, when the signal is reacquired there may be a jump in the integer part of the carrier-phase measurement due to the receiver incorrectly predicting the elapsed number of cycles between signal loss and reacquisition
D	
Data message	A 1500 bit message included in the GPS signal which reports the satellite's location, clock corrections, and health
Datalogger	A handheld, lightweight data entry computer. It can be used to store additional data obtained by a GPS receiver
Datum	Map Datum's are the reference system used between the Lat/Longs and the map being used as a reference. A vertical datum is a level surface to which heights are referred. The horizontal datum is used as a reference for position. Common f. ex. default to WGS84
Datum, geodetic	A set of constants specifying the coordinate system used for geodetic control. A complete geodetic datum provides, as a minimum, definition for orientation, scale and dimensions for the reference ellipsoid. The concept is generally expanded to include the published coordinates of control stations within the system

DBR	Differential Beacon Receivers tune to the United States Coast Guard's high differential correction beacon stations for improved position accuracy. RTCM 104 input signal is supplied to a DGPS unit to correct for SA and Atmospheric errors. The operating frequency range is 285 kilohertz to 325 kilohertz
DDE	Dynamic Data Exchange. A Windows protocol that allows communication between applications. When information is updated in one application, related information will be updated in other applications
Dead Reckoning	A very simple method of using time and distance to navigate. Distance traveled is determined by multiplying speed by elapsed time
Deflection of the vertical	The angle at a point on the surface of the earth between the vertical at that point (the line normal to the geoid) and the line through the point which is normal to the reference ellipse.
Degrees of freedom	The number of observations minus the minimum number required to uniquely define the figure
Delay-Lock Loop	Another term for a code-tracking loop
Demodulation	Separating coded data from the carrier signal
Deviation	Errors from your course. Either built in or unintentional. One type of deviation is Magnetic, the difference between a true course and what a compass shows
DGPS	Differential GPS. A local transmitter is used for greater accuracy.
Differential GPS (DGPS)	A technique to improve GPS accuracy that uses pseudorange errors measured at a known location to improve the measurements made by other GPS receivers within the same general geographic area. One to ten meter accuracy is typical, possible: <1 cm
Differential positioning	Precise measurement of the relative positions of two receivers tracking the same GPS signals
Digital Raster Graphic (DRG)	The United States Geological Survey is releasing digital versions of all of the topographic maps. These files are called Digital Raster Graphics (DRG) maps. The images themselves are stored in a format called GeoTiff
Dilution of Precision (DOP)	A dimensionless number that accounts for the contribution of relative satellite geometry to errors in position determination. DOP has a multiplicative effect on the User Equivalent Range Error. Generally, the wider the spacing between the satellites being tracked by a GPS receiver, the smaller the position error. The most common quantification of DOP is through the position dilution of precision (PDOP) parameter. Other DOPs include the geometric dilution of precision (GDOP), horizontal dilution of precision (HDOP), and vertical dilution of precision (VDOP)
Distance Root Mean Square (DRMS)	A measurement used to describe the accuracy of a fix. It is twice the square root of the sum of the squares of all radial errors surrounding a true point divided by the total number of measurements

Dithering	The introduction of digital noise. This is the process the US Department of Defense (DoD) uses to add inaccuracy to GPS signals to induce Selective Availability
DMA	Defence Mapping Agency
DOP	Dilution of Precision. Errors caused by bad geometry of the Satellites. The higher the number, the more "noise" in the position reading
Doppler aiding	A signal processing strategy that uses a measured doppler shift to help the receiver smoothly track the GPS signal. Allows more precise velocity and position measurement
Doppler shift	The apparent change in the frequency of a signal caused by the relative motion of the transmitter and receiver
Double difference	A GPS observable formed by arithmetically differencing carrier phases simultaneously measured by a pair of receivers tracking the same pair of satellites. 1. the phases obtained by each receiver from the first satellite are differenced. Second, the phases obtained by each receiver from the 2. satellite are differenced. 3. those differences are differenced. This procedure removes essentially all of the satellite and receiver clock errors.
DRG	Digital Raster Graphic. The United States Geological Survey is releasing digital versions of all of the topographic maps. These files are called Digital Raster Graphics (DRG) maps. The images themselves are stored in a format called GeoTiff
Drift	The rate of a vessel's departure from a given course as measured in knots
DTK	Desired Track. The course between to and from
Dynamic positioning	Dynamic positioning or kinematic positioning refers to applications in which the position of a moving object is determined
E	
ECEF coordinates	Earth Centered Earth Fixed rectangular coordinate system (Cartesian coordinates), where the positive X axis lies on the equatorial plane passing through the prime meridian (Greenwich), the positive Y axis lies on the equatorial plane at 90 east, and positive Z passes north through the mean rotational axis of the earth
Electromagnetic Spectrum	The continuous distribution of energy in the form of electromagnetic waves, which are arranged in order of their frequencies or wavelengths
Elevation	The vertical distance of a point above or below a reference surface, such as sea level
Ellipsoid	Spheroid. The mathematical function used to describe the shape of the earth for geodetic computations
Ellipsoid height	The distance from a point to the reference ellipsoid along a line normal to the ellipsoid

En Route	Navigation between the point of departure and point of arrival
EPE	Estimated Position Error. How much the unit thinks it is off target
Ephemeris	A description of the path of a celestial body indexed by time. The navigation message from each GPS satellite includes a predicted ephemeris for the orbit of that satellite valid for the current hour. The ephemeris is repeated every 30 seconds
Ephemeris Errors	Errors which originate in the ephemeris data transmitted by a GPS satellite. Ephemeris errors are removed by differential correction
Epoch	A specific instant in time. GPS carrier phase measurements are made at a given frequency (e.g. every 30 seconds) or epoch rate
Equator	Zero degrees Latitude. A line around the center of earth 24,901.55 miles (40,075.16 kilometers) long.
Error Budget	A set of individual error sources with statements of the percentage of the total system error contributed by each source
Error ellipse	A statistical measure of the positional error at a given point computed from the propagation of all errors contributing to the position
Estimated Time Enroute (ETE)	The time left to your destination at your present speed
Estimated Time of Arrival (ETA)	The time of day of your arrival at your destination
ETA	Estimated Time of Arrival. The time of day of your arrival at your destination
ETE	Estimated Time Enroute. The time left to your destination at your present speed
F	
Fast switching channel	A single channel which rapidly samples a number of satellite ranges. Switching time is sufficiently fast (2 to 5 milliseconds) to recover the data message
FGDC	The Federal Geographic Data Committee (FGDC) is an interagency committee, organized in 1990 under OMB Circular A-16 that promotes the coordinated use, sharing, and dissemination of geospatial data on a national basis
Fix	A position that is determined by the navigation unit (consisting of latitude, longitude (or grid position), altitude, time, and date)
FM	Frequency Modulation. A method of encoding information about a carrier signal by altering the frequency while amplitude remains constant
Frequency	The number of waves passing a specific point within a unit period of time, expressed in Hertz (cycles per second)
Frequency band	A particular range of frequencies

Frequency Modulation (FM)	A method of encoding information about a carrier signal by altering the frequency while amplitude remains constant
Frequency spectrum	The distribution of signal amplitudes as a function of frequency
G	
Galileo	Europe's satellite navigation system. May be operational by 2008
GANS	The Air Force's Global Access, Navigation, and Safety (GANS) program
GDOP	Geometric Dilution of Precision, see DOP. GDOP Components(see): HDOP, PDOP, TDOP, VDOP
Geocaching	The sport where you are the search engine, and you have to hunt for treasure caches with your GPS
Geodesy	The branch of applied mathematics that deals with the measurement, curvature, and shape of the earth
Geodetic Datum	A specifically oriented reference ellipsoid. Typically, eight parameters are required to define a geodetic datum: two to specify the dimensions of the ellipsoid, three to specify the location of its center with respect to the earth's center of mass, and three to specify the orientation of the ellipsoid with respect to the average spin axis of the earth and the Greenwich reference meridian
Geodetic Height	The height of a point above an ellipsoidal reference surface. Also known as ellipsoidal height. The difference between the geodetic height of a point and its orthometric height is equal to the geoidal height
Geodetic surveys	Global surveys done to establish control networks as a basis for accurate land mapping
Geodetic.	Geographic, or pertaining to geodesy. Latitude and longitude readings are geodetic coordinates
Geographic Information System (GIS)	A computer based system that is capable of collecting, managing and analyzing geographic spatial data
Geoid	The undulating, but smooth, equipotential surface (a surface of equal gravity potential) of the earth's gravity field, which coincides most closely with mean sea level. The geoid is the primary reference surface for heights
Geometric Dilution of Precision (GDOP)	The effects of the combined errors of four variables (latitude, longitude, altitude, and time) on the accuracy of a three-dimensional fix
Geostationary Satellites	Those satellites situated in a constant orbit position relative to a given area of the globe with the purpose of maintaining constant coverage of that area
Getting	Ivan A. Getting, Father of the GPS system born 1912
GIS	Geographic Information System. A computer based system that is capable of collecting, managing and analyzing geographic spatial data

GLL	A data sentence that is part of the NMEA protocol for transferring information between electronic devices. The GLL sentence contains position information
Global Navigation Satellite System (GLONASS)	The Russian satellite navigation system. GLONASS provides worldwide coverage, however, its accuracy performance is optimized for the northern latitudes
Global Positioning System (GPS)	A global navigation system that is based on triangulation from a constellation of 24 satellites orbiting the earth. A GPS receiver pinpoints its position on earth by measuring its distance from the satellites. It does so by calculating the time it takes for a coded radio message to pass from the satellite to the GPS unit. A GPS unit needs at least three measurements to determine its exact position
GMT	Greenwich Mean Time or UT1 (Universal Time One) is a time scale tied to the rotation of the Earth in respect to the fictitious 'mean Sun'. UTC is, however, kept within 0.9 seconds of UT1, by virtue of leap seconds
GPS	Global Positioning System. Usually refers to the USA's NAVSTAR system.
GPS System Time	The time scale to which GPS signals are referenced. GPS Time derives from a composite or paper clock consisting of all operational monitor station and satellite atomic clocks. It is steered over the long run to keep it within about 1 micro-second of UTC, as maintained by the Master Clock at the U.S. Naval Observatory, ignoring the UTC leap seconds
GPS week	Incremental number of weeks, starting at 0 hour UTC on the date January 6, 1980. April 6, 1997 is the first day of GPS week 900
Gravity void	A block or area of blocks within the gravity measurement database without observations. A geoid model relying upon this database would be weak and possibly in error at these blocks
Great Circle	The intersection of a plane through the center of the Earth and the surface of the Earth. The shortest distance between two points on the Earth is a great circle route. All longitudes are great circles. The only latitude that is a great circle is the Equator
Grid	A coordinate system that projects the earth on a flat surface, using square zones for position measurements.
Ground plane	A large flat metal surface, or electrically charged field, surrounding a GPS antenna used to deflect errant signals reflected from the ground and other near
Ground Speed	The velocity you are traveling relative to a ground position
Ground Wave.	A radiowave that travels along the earth's surface
GRS 80	The reference ellipsoid of the NAD83 coordinate system
GS	Ground Speed

H

Hand-Over Word (HOW)	The second word in each subframe of the navigation message. It contains the Z-count at the leading edge of the next subframe and is used by a GPS receiver to determine where in its generated P-code to start the correlation search process
Hardover word	The word in the GPS message that contains synchronization information for the transfer of tracking from the C/A to P code.
HDOP	HDOP = Horizontal Dilution of Precision (Latitude, Longitude).
Height Aiding	An accuracy enhancement technique in which the known height of the receiver is entered into the navigation solution, which in effect provides another satellite's range
Hertz	A unit used to measure a wave's frequency, one cycle per second
High Frequency (HF)	Radio frequencies in the band from 3 to 30 MHz
Horizontal Dilution of Precision (HDOP).	The effects on accuracy of the combined errors in a two-dimensional fix obtained from crossing two lines of position
HTDP	Horizontal Time Dependent Positioning model A computer database and interpolation program to predict horizontal displacements between coordinate points over time.

I

I/O	Abbreviation for Input/Output.
Illumination	The signal coming from the GPS Satellites
Inclination	One of the orbital parameters that describes the orientation of an orbit. It is the angle between the orbital plane and a reference plane, the plane of the celestial equator for geocentric orbits and the ecliptic for heliocentric orbits
Initialization	Entering such data as time, time off-set, approximate position, and antenna height into a receiver (cold start with no almanac) to help the unit find and track satellites
Inmarsat	An international consortium chartered in the mid-1970s to provide improved maritime public correspondence and radio determination capabilities
Integrity	The ability of a system to supply timely warnings in the event of a loss of navigation solution, excessive noise, or other factors affecting measured position
Interference	Any distortion of the transmitted signal that impedes the reception of the signal at the receiver
Interferometric Differencing	A variation of phase differencing in which two different antennas sample the GPS signal wavefront at two locations and then feed the information into a single amplifier and interferometer (mixer) in which phase difference observations are made
Ionization	The process by which atoms form electrically charged particles called ions

Ionosphere That layer of the atmosphere approximately 30-300 miles above the earth's surface that contains electrically charged particles (ions). These charged particles interfere with or distort transmissions of electromagnetic signals through the layer

Ionospheric Delay Signal delay or acceleration as a wave propagates through the ionosphere. Phase delay depends upon the electron content and affects the carrier signal. Group delay depends upon the dispersion in the ionosphere as well, and affects the code signal

Ionospheric Refraction The change in the propagation speed of a signal as it passes through the ionosphere

Isogonic Lines A line on a map or chart where the magnetic deviation is the same

ITU International Telecommunication Union

J

JPALS Joint Precision Approach and Landing System, is a DGPS system for rapid deployment

K

Kalman Filter An optimum mathematical procedure for recursively estimating dynamically changing parameters, such as the position and velocity of a vessel, from noise-contaminated observations

Keplerian Elements A set of six parameters that describe the position and velocity of a satellite in a purely elliptical (Keplerian) orbit. These parameters are the semimajor axis and eccentricity of the ellipse, the inclination of the orbit plane to the celestial equator, the right ascension of the ascending node of the orbit, the argument of perigee, and the time the satellite passes through the perigee

Kilohertz A radio signal that has 1,000 cycles per second

Kinematic GPS Observations while a receiver is in motion. In surveying applications, kinematic refers to uninterrupted carrier

Kinematic Positioning Positioning a continuously moving platform by using GPS carrier-phase data while operating in a differential mode

Kinematic Surveying A precision differential GPS surveying technique in which the moving user does not need to stop to collect precision information. Meter to centimeter-level accuracy is available using mode, dual-frequency, carrier-phase measurement techniques

Knot A speed of one nautical mile per hour

L

L Band The group of radio frequencies extending from 390 MHz to 1550 MHz. The GPS carrier frequencies L1 (15735 MHz) and L2 (1227.6 MHz) are in the L-band

L1 signal / Frequency Band The primary L-band signal transmitted by each GPS satellite at 1572.42 MHz. The L1 broadcast is modulated with the C/A and P-codes and with the navigation message

L2 signal / Frequency Band	The second L-band signal is centered at 1227.60 MHz and carries the P-code and navigation message
LAAS	Local Area Augmentation System. A system similar to WAAS, in that similar correction data are used. But in this case, the correction data are transmitted from a local source, typically at an airport or another location where accurate positioning is needed. These correction data are typically useful for only about a thirty to fifty kilometer radius around the transmitter
Latitude	An angular measurement (distance) of a point on the earth, north or south of the equator. The distance is measured in degrees, minutes, and seconds. Latitude is 0 degrees at the equator, +90 degrees at the North Pole, and -90 degrees at the South Pole (1 degree of latitude equaling 60 nautical miles and 1 minute of latitude being 1 nautical mile. Latitude is constant on a parallel). Lines (parallels) of latitude circle the earth horizontally and are parallel to one another
LDGPS	Local Differential GPS. Two or more GPS Receivers are used to create a local reference to each other
Line of Position (LOP)	Locus Of Points have a constant measurement (such as range, range difference). A fix is determined by crossing two lines of position
Local Area DGPS (LADGPS)	A form of DGPS in which the user's GPS receiver receives real-time pseudorange and, possibly, carrier- phase corrections from a reference receiver generally located within line of sight
Local-Area Augmentation System (LAAS)	A system similar to WAAS, in that similar correction data are used. But in this case, the correction data are transmitted from a local source, typically at an airport or another location where accurate positioning is needed. These correction data are typically useful for only about a thirty to fifty kilometer radius around the transmitter
Longitude	The angular measurement of a point on the earth's surface, east or west of the prime meridian. The prime meridian runs through Greenwich, England and is 0 degrees longitude. Since measurements are made East and West, the maximum longitude value is 180 degrees. Mathematically, longitudes are usually denoted as positive for easterly longitudes (e.g., +71 degrees = 71 E), and negative for westerly longitudes (e.g., -65 degrees = 65 W).
Loran	Long range navigation system that determines position by comparing the arrival times of radio signals with two or more master/secondary station pairs
M	
Magnetic North	The direction to the Magnetic North Pole. It is what a magnetic compass indicates. It is different from True North, by the value of the Magnetic Variation
Magnetic Variation	The different between true North (pointing towards the Geographic Pole) and Magnetic North (pointing towards Magnetic Pole) where a compass points to. The magnetic variation of the earth changes at a rate of 50.27 seconds of arc per year

Map Datum	What reference map is used in determining the Fixes
Map projection	The systematic arrangement of the earth's spherical or geographic coordinate system onto a plane; the process of transforming a globe into a flat map with the least amount of distortion; a transformation process
Mask angle	Cut off angle The point above the observer's horizon below which satellite signals are no longer tracked and/or processed. 10° to 25° is typical
MCX	Antenna connector used on some of the newer GPS units
Megahertz (MHz)	One million cycles per second. Used to describe a radio frequency
Meridian	An imaginary line that circles the earth, passing through the geographic poles and any given point on the earth's surface. All points on a given meridian have the same longitude
MGRS	Military Grid Reference System is an alphanumeric version of a numerical UTM (Universal Transverse Mercator) or UPS (Universal Polar Stereographic) grid coordinate
Microstrip Antenna	A type of antenna commonly used with GPS receivers. It is usually constructed of one or more (typically rectangular) elements that are photoetched on one side of double-coated, printed-circuit board
Military Grid Reference System (MGRS)	A alphanumeric version of a numerical UTM (Universal Transverse Mercator) or UPS (Universal Polar Stereographic) grid coordinate.
MOB	Man Over Board. A button to take an immediate fix, so you can find a lost person
Modulation	A method of encoding a message signal on top of a carrier, which can be decoded at a later time
MOPS	Minimum Operational Performance Standards
MRGS	The Military Grid Reference System is an alphanumeric version of a numerical UTM (Universal Transverse Mercator) or UPS (Universal Polar Stereographic) grid coordinate.
MSAS	Multi-functional Satellite Augmentation System, operation in Asia
Multi-channel receiver	A GPS receiver that can simultaneously track more than one satellite signal
Multipath	Interference caused by reflected GPS signals arriving at the receiver, typically as a result of nearby structures or other reflective surfaces
Multipath error	Errors caused by the interference of a signal that has reached the receiver antenna by two or more different paths. Usually caused by one path being bounced or reflected
Multiplexing	The technique used in some GPS receivers of rapidly sequencing the signals of two or more satellites through a tracking channel. This ensures navigation messages from the satellites tracked by the channel are essentially acquired simultaneously

N

NAD 83	Horizontal coordinate system for U.S., Canada and Mexico. Originally published in 1986 it is based upon the GRS 80 ellipsoid with its origin at the center of mass defined by BIH at epoch 1984.0. Geodetic surveyors must be particularly cognizant of epoch dates attached to the NAD 83 an acronym. These refer to the mean date of the observations used in the regional adjustment
NAD27	North American Datum 1927. It is broken down into different areas, from Central America to Greenland
NAGU	Notice Advisory to GLONASS Users. A periodic bulletin alerting GLONASS users to changes in system performance.
NANU	Notice Advisory to NAVSTAR Users. A periodic bulletin alerting GPS users to changes in system performance
Narrow Correlator	A correlator in a code-tracking loop in which the spacing between the early and late versions of the receiver-generated reference code is less than one chip. The use of narrow correlators results in pseudorange observ. with lower noise
Narrow Lane	The GPS observable obtained by summing the carrier-phase observations simultaneously measured, in cycles, on the L1 and L2 frequencies. The effective wavelength of the narrow-lane observable is 10.7 centimeters. The narrow-lane observable can help resolve carrier-phase ambiguities
Nautical Mile	A distance of 18519999 meters which is one minute of arc of a great circle of the Earth (1.15 times longer than a statute mile, or 6076.1 feet)
NAVD 88	Vertical (elevation) reference system for U.S., Canada and Mexico. Published in 1991 the orthometric heights are derived from an adjustment of leveling data constrained at a single point on the St. Lawrence Seaway
Navigation Message	A 37500-bit data message included in the GPS signal. The message, sent at a rate of 50 bits per second, includes the satellite ephemeris, clock data, almanac, and other information about the satellites and their signals
NAVSTAR	NAVigation Satellite Timing and Ranging. The name given to GPS satellites
NDGPS	Nationwide Differential GPS, The NDGPS plan calls for the conversion of a number of U.S. Air Force Ground Wave Emergency Network (GWEN) sites to broadcast DGPS signal. The range is 250 miles
NEMA	National Electrical Manufacturers Association
NEMA 0183	A communication protocol used by GPS units and other types of navigation and marine electronics
NGVD 29	Mean sea level reference system for U.S. prior to NAVD 88. Constrained to 26 tide stations in U.S. and Canada, the datum is distorted to fit sea surface topography

NIMA	National Imaging and Mapping Agency
NMEA	National Maritime Electronics Association. The association sets standards for interfacing nautical electronic devices, including Global Positioning System receivers
Noise	An interfering signal that tends to mask the desired signal at the receiver output and which can be caused by space and atmospheric phenomena, can be human made, or can be caused by receiver circuitry
Notice Advisory to GLONASS Users (NAGU)	A periodic bulletin alerting GLONASS users to changes in system performance
Notice Advisory to NAVSTAR Users (NANU)	A periodic bulletin alerting GPS users to changes in system performance
NSDI	National Spatial Data Infrastructure
NSTB	FAA's National Satellite Test Bed
NTSB	National Transportation Safety Board
O	
On-the-Fly (OTF)	The term used to identify a technique that resolves differential carrier-phase integer ambiguities without requiring a GPS receiver to be stationary at any time
Ordnance Survey Maps (OSM)	Britain's National Mapping Agency
Orthometric Height	The height of a point above the geoid
Oscillator	A device that generates a signal of a given frequency
OSM	Ordnance Survey Maps. Britain's National Mapping Agency
OziExplorer	Scanned map software for use with GPS.
P	
P Code	The Precise or Protected code. A very long sequence of pseudo-random binary biphasic modulations on the GPS carrier at a chip rate of 10.23 MHz, which repeats about every 267 days. Each 1-week segment of this code is unique to one GPS satellite and is reset each week
Packet	A single group of digital signals sent from an originator to an addressee
Packet Messaging	Radio transmitted message system
Packet Radio	The radio transmission of data in packets between stations
Parity	An extra bit at the end of a string of bits. Used in error detection, this reveals whether the number of 1s is odd or even
Pass-to-Pass Accuracy	Also called repeatability. In parallel tracking, this is how far off it is from one path to the next, regardless on which pass you are on. Mostly the pass-to-pass accuracy is approximately 2 to 3 times more precise than the statistical accuracy

PDOP	PDOP is proportional to 1 divided by the volume of the pyramid formed by lines running from the receiver to four observed satellites. Small values, such as "3", are good for positioning while higher values produce less accurate position solutions. Small PDOP is associated with widely separated satellites
Phase Angle	The time difference between the same point on two different waves, usually measured in fractions of a cycle (radians or degrees)
Phase Center	The apparent center of signal reception at an antenna. The phase center of an antenna is not constant but is dependent upon the observation angle and the signal frequency
Phase Differencing	The technique of using different GPS receivers at different locations to measure the phase angles of the carrier signal from the same satellite. These angles are compared by a communications link between the two locations if real-time operations are required
Phase Lock Loop	Another term for carrier-tracking loop
Phase Modulation	Encoding information on a carrier signal by changing the phase so that some segments of the carrier are out of phase while others are in phase. With GPS, only two phase angles are used, 0 and 180, representing the two values, I or Q
Pixel	Picture element. Definable locations on a display that are used to form images on the screen
Position	The latitude, longitude, and altitude of a point.
Positional Dilution of Precision (PDOP)	A unitless figure of merit expressing the relationship between the error in user position and the error in satellite position, which is a function of the configuration of satellites from which signals are derived in positioning (see DOP). Geometrically, PDOP is proportional to 1 divided by the volume of the pyramid formed by lines running from the receiver to four observed satellites. Small values, such as "3", are good for positioning while higher values produce less accurate position solutions. Small PDOP is associated with widely separated satellites
Post processed differential GPS	Process of differentially correcting GPS data after it has been collected by differential correction software
Precise Positioning Service (PPS)	The full-accuracy, single-receiver GPS positioning service provided to the United States and its allied military organizations and other selected agencies. It includes access to the unencrypted P-code and the removal of SA effects
Precision	The degree of repeatability that repeated measurements of the same quantity display, and is therefore a means of describing the quality of the data with respect to random errors. Precision is traditionally measured using the standard deviation
Precision Code (P-code)	A very long sequence of pseudo-random binary biphasic modulations on the GPS carrier at a chip rate of 10.23 MHz, which repeats about every 267 days. Each 1-week segment of this code is unique to one GPS satellite and is reset each week
Prime Meridian	The zero longitude location from where east and west is measured. It passes through Greenwich, England

PRN	Pseudo random noise, a sequence of digital 1's and 0's which appears to be randomly distributed like noise, but can be exactly reproduced. Each NAVSTAR satellite has its own unique C/A and P pseudo noise codes and are often referred to by their PRN number
Pseudo random code	A signal with random noise-like properties. It is a very complicated but repeating pattern of 1's and 0's
Pseudolite	A ground-based differential GPS, installed on the ground in the local area. It is used to supply "illumination" and correction signals for DGPS systems
Pseudo-random noise (PRN)	A sequence of digital 1's and 0's that appear to be randomly distributed like noise but that can be reproduced exactly. Their most important property is a low autocorrelation value for all delays or lags except when they coincide exactly. Each GPS satellite has unique C/A and P pseudorandom-noise codes
Pseudorange	A distance measurement based on the correlation of a satellite transmitted code and the local receiver's reference code, that has not been corrected for errors in synchronization between the transmitter's clock and the receiver's clock

Q

Quadrifilar Helix	A type of circularly polarized antenna used with some GPS receivers. The antenna consists of two orthogonal, fractional-turn bifilar wire or metal strip helices fed in phase quadrature
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R

Radio Direction Finder	A radio receiver that features a directional antenna and a visual null indicator for use in determining lines of position from radiobeacons at known positions
Radio Frequency (RF)	Radio frequency refers to a signal generated by a radio transmitter and sent out through an antenna. The frequency of the transmission is described in terms of the number of cycles per second or Hertz (Hz). A radio would be tuned to this frequency in order to receive the transmission. A radio signal is sometimes referred to by its initials, "RF"
RAIM	Receiver Autonomous Integrity Monitoring. A technique whereby the redundant information available at a GNSS receiver is autonomously processed to monitor the integrity of the navigation signals
Range	A fixed distance between two points, such as between a starting and an ending waypoint or a satellite and a GPS receiver
Ranging	A technique used to determine a line of position by calculating the distance between a receiver and a known reference point
Raster	Computer graphics term describing a predetermined pattern of line that provides uniform coverage of a display space
Real Time Kinematic (RTK)	The DGPS procedure whereby carrier phase corrections are transmitted in real time from a reference station to the user's roving receiver

Real-time differential GPS	A base station which computes, formats, and transmits corrections usually through some sort of data link (e.g. VHF radio or cellular telephone) with each new GPS observation. The roving unit requires some sort of data link receiving equipment to receive the transmitted GPS corrections and get them into the GPS receiver so they can be applied to its current observations
Real-Time Kinematic (RTK)	The DGPS procedure whereby carrier-phase corrections are transmitted in real time from a reference receiver to the user's receiver. RTK is often used for the carrier-phase integer ambiguity resolution approach
Receiver Autonomous Integrity Monitoring (RAIM)	A technique by which a GPS receiver system detects incorrect satellite signals by comparing solutions with different sets of satellites
Receiver-Independent Exchange (RINEX)	A set of standard definitions and formats to promote the free exchange of GPS data and facilitates the use of data from any GPS receiver with any software package. The format includes definitions for time, phase, and range
Reference Station	A ground station at a known location used to derive differential corrections. The reference station receiver tracks all satellites in view, computes their pseudoranges, corrects these for errors, and then transmits the corrections to users
Relative Accuracy	The accuracy with which a user can measure position relative to that of another user of the same navigation system at the same time
Relative Positioning	The determination of relative positions between two or more receivers which are simultaneously tracking the same GPS signals
Relative Precision	Precision is defined as a measure of the tendency of a set of numbers to cluster about a number determined by the set (e.g. the mean). The usual measure is the standard deviation with respect to the mean. Relative precision denotes the tendency for the various components (X, Y, Z) between one station and other stations in the network to be clustered about the adjusted values
Reliability	The ability to perform a specific function without failure under specified conditions for a given length of time
Relief	Changes in terrain; elevations or depressions in the land
Relief shading	A technique for showing the ups and downs of the land portrayed on a topographic map. The process makes land look three-dimensional by the use of graded shadow effects. Traditionally, maps are shaded as though the light source is coming from the northwest
Rhumb Line	A line that passes through all meridians at the same angle. When drawn on a Mercator chart, the rhumb line is a straight line, because the Mercator chart is a distortion of a spherical globe on a flat surface. The rhumb line results in a longer course than a great circle route
RINEX	Receiver INdependent EXchange format. A set of standard definitions and formats to promote the free exchange of GPS data and facilitates the use of data from any GPS receiver with any software package. The format includes definitions for time, phase, and range

RMS	Root Mean Square. The standard deviation of the error in the GPS location
RNP	Required Navigation Performance standards.
Rover	Any mobile GPS receiver collecting data during a field session. The receiver's position can be computed relative to another, stationary GPS receiver
RS232	The electronic voltage and timing interface definition for the connection of electronic equipment
RTCM	Radio Technical Commission for Maritime Services Commission set up to define a differential data link to relay GPS correction messages from a monitor station to a field user
RTK OTF	Real-Time Kinematic (RTK) On-The-Fly (OTF) positioning. A DGPS technique for high precision positioning of moving objects

S

SA	Selective Availability. A policy adopted by the Department of Defense to introduce some intentional clock noise into the GPS satellite signals thereby degrading their accuracy for civilian users. This policy was discontinued as of May 1, 2000 and now SA is turned off
Satellite constellation	The arrangement in space of a set of satellites
Scale	The distance between two points on a map as they relate to the distance between those same points on the earth
Secular Motion	That portion of crustal motion which is continuous and at a constant velocity. Secular motion is uniformly predictable over time and is independent of any seismic events
Selective Availability (SA)	A policy adopted by the Department of Defense to introduce some intentional clock noise into the GPS satellite signals thereby degrading their accuracy for civilian users. This policy was discontinued as of May 1, 2000 and now SA is turned off
Signal to Noise Ratio (SNR)	The ratio of incoming signal strength to the amount of interfering noise as measured in decibels on a logarithmic scale
Single Difference	A GPS observable formed by arithmetically differencing carrier phases that are simultaneously measured by a pair of receivers tracking the same satellite, or by a single receiver tracking a pair of satellites. The between-receiver's-single-difference procedure essentially removes all satellite clock errors
Slow switching channel	A sequencing GPS receiver channel that switches too slowly to allow the continuous recovery of the data message
SMG	Speed Made Good. Marine term Giving speed to waypoint taking into effect the course you are steering
SNAFU	Situation Normal, All Fouled UP. Military term
SOG	Speed Over Ground. Marine term to tell you to ignore tidal and current effects
SOIT	FAA's Satellite Operational Implementation Team

Space segment	The part of the whole GPS system that is in space, i.e. the satellites.
Spatial Decorrelation	The distance between the user and the reference station. When calculating differential corrections, the greater the distance between the two, the greater the error of corrections
Speed Made Good (SMG)	Marine term Giving speed to waypoint taking into effect the course you are steering
Spherical Error Probable (SEP).	A measure of accuracy in navigation. SEP is the radius of the sphere inside of which the true three-dimensional coordinates of a position have a 50-percent probability of being located
Spoofing	The deliberate transmission of fake signals to skew the position calculations of a GPS receiver. The spoofer mimics a GPS satellite, rather like a pseudolite, but with disruptive intent
Spread spectrum	A system in which the transmitted signal is spread over a frequency band much wider than the minimum bandwidth needed to transmit the information being sent. This is done by modulating with a pseudo random code, for GPS.
SPS	Standard Positioning Service (civilian GPS)
Squelch Control	This control on a radio is used to silence the inherent background noise in a radio receiver so that only signals that appear above this background will be heard. To set a squelch control, turn it until the background noise is heard and then rotate the control until the noise just stops
Standard Positioning Service (SPS)	The normal civilian positioning accuracy obtained by using the single frequency C/A code
Static GPS	Carrier phase differencing technique where the integer ambiguities are resolved from an extended observation period through a change in satellite geometry
Static positioning	Location determination when the receiver's antenna is presumed to be stationary in the earth. This allows the use of various averaging techniques that improve the accuracy by factors of over 1000
Statistic accuracy	The industry standard definition of static accuracy is the standard deviation of error if a point set by a receiver was tested in a fix position for 24 hours.
Statute Mile	A distance of 1609 meters
Stop-and-Go Surveying	A precision DGPS surveying technique, also referred to as semikinematic, by which the rover is used to collect data a point for a few seconds or minutes before moving on
T	
TDOP	Time Dilution of Precision
Telemetry	Transmission of radio signals and coded data from a space vehicle
Temporal Decorrelation	The age or time lapse in corrections used in differential GPS. The longer the time lapse between the corrections, the less accurate they become

Terminal Node Controller (TNC)	A device that converts and controls the radio transmission and reception of digital signals from a computer
Topography	Relief of the land surface; the graphic portrayal of that relief in map form by the use of contour lines
Track	Your current direction of travel relative to a ground position (same as COG, Course Over Ground)
Track (TRK)	The direction of movement relative to a ground position.
Transit	The satellite-based system that measured successive Doppler (frequency) shifts of signals transmitted from satellites in polar orbits to determine position
Triple Difference	The arithmetic difference of sequential, doubly differenced carrier-phase observations. The triple-difference observable is free of integer ambiguities. It is a useful observable for determining initial, approximate coordinates of a site in relative GPS positioning and for detecting cycle slips in carrier-phase data
Troposphere	The portion of the atmosphere from the earth's surface to the stratosphere; that is, the lowest 10 to 20 kilometers of the atmosphere
Tropospheric Delay	Retardation of GPS signals caused by elements in the troposphere such as temperature, air pressure, and water vapor
True North	The direction to the geographic North Pole. It is different from Magnetic North, by the value of the Magnetic Variation
U	
Ultra High Frequency (UHF)	Radio frequencies in the band from 300 to 3,000 MHz
Universal Time (UT)	see UT0, UT1 and UT2
Universal Transverse Mercator (UTM)	A grid coordinate system that projects global sections onto a flat surface to measure position in specific zones
UPS	Universal Polar Stereographic, a version of UTM
URA	User Range Accuracy The contribution to the range measurement error from an individual error source
User Equivalent Range Error (UERE)	Any error contributing to the error budget of stand-alone GPS receiver positioning, expressed as an equivalent error in the range between a user's receiver and a satellite. Also known as user range error (URE). UERE errors originate from different sources and thus are independent of each other. The total UERE is the square root of the sum of the squares of the individual errors. A prediction of maximum anticipated total UERE (minus ionospheric error) is provided in each satellite's navigation message as the user range accuracy (URA)
User interface	The way a receiver conveys information to the person using it. The controls and displays
User segment	The part of the whole GPS system that includes the receivers of GPS signals

USNG	U.S. National Grid
UT0	Universal Time as deduced directly from observations of stars (based on the rotation of the earth) and the fixed numerical relationship between Universal and Sidereal Time; 3 minutes 56.555 seconds. When UT0 is corrected for the shift in longitude of the observing station caused by polar motion, the time scale UT1 is obtained
UT1	Is UT0 corrected for the effects of small movements of the earth relative to the axis of rotation (polar motion). Because Earth does not spin at exactly a constant rate, UT1 is not a uniform time scale
UT2	Is UT1 corrected for seasonal variation in the earth's rotation rate
UTC	Universal Time Coordinated. The standard time common to every place in the world. Uniform atomic time system kept very closely to UT2 by offsets. Maintained by the U.S. Naval Observatory. GPS time is directly relatable to UTC. UTC-GPS = 9 seconds (in 1994)
UTM	Universal Transverse Mercator, A type of map projection. The grid lines you see on a USGS Quads represent a map projection known as Universal Transverse Mercator (UTM), and are 1000 meters apart. See map projections

V

Variance	The square of the standard deviation
VDOP	VDOP = Vertical Dilution of Precision (height only)
Vector	Images defined by sets of straight lines that are defined by the locations of the end-points. Vector graphics require much less storage space than raster or bitmapped graphics
Velocity Made Good (VMG)	The speed you are closing in on a destination along a desired course
Very High Frequency (VHF)	Radio frequencies in the band from 30 to 300 MHz
VMG	Velocity Made Good. Marine term giving velocity to waypoint taking into effect the course you are steering
VOG	Velocity Over Ground. Same as Ground Speed

W

WAAS	Wide Area Augmentation System. A system of satellites and ground stations that provide GPS signal corrections, giving a even better position accuracy
WADGPS	A form of DGPS in which the user's GPS receiver receives corrections determined from a network of reference stations distributed over a wide geographical area. The corrections are typically supplied in real time by way of a geostationary satellite or through a network of ground-based transmitters
Warm Start	The ability of a GPS receiver to begin navigating using almanac information stored in its memory from previous use

Waypoint	A destination. The coordinates of locations along the desired path as measured in geographic coordinates of longitude and latitude
WGS 84	World Geodetic Survey 1984. Geodetic datum for the GPS orbits and consequently positions and baselines computed using them
WGS84	World Geodetic Survey 1984. A common map datum reference
Wide Area DGPS (WADGPS)	Wide Area DGPS. A form of DGPS in which the user's GPS receiver receives corrections determined from a network of reference stations distributed over a wide geographical area. The corrections are typically supplied in real time by way of a geostationary communications satellite or through a network of ground-based transmitters
Widelane	A linear combination of the L1 and L2 observation (L1 L2) used to partially remove ionospheric errors
Wide-Lane Observable	The GPS observable obtained by differencing the carrier-phase observations simultaneously measured, in cycles, on the L1 and L2 frequencies. The effective wavelength is 86.2 centimeters
World Geodetic Survey 1984 (WGS 84)	A common map datum reference. Geodetic datum for the GPS orbits and consequently positions and baselines computed using them
World Radio Conference (WRC)	An international conference where standards and interference issues are discussed
WRC	World Radio Conference, an international conference where standards and interference issues are discussed
X	
XTE	Crosstrack Error. The distance you are off a desired course in either direction
Y	
Y-Code	The encrypted P-code
Z	
Z-Count	The fundamental GPS time unit. It is a 29-bit binary number, of which the 10 most significant bits give the binary representation of the GPS week number, and the 19 least significant bits give the time-of-week (TOW) count in units of 1.5 seconds
2D Mode	2 Dimensional Mode. A two-dimensional GPS position fix that includes only horizontal coordinates, no elevation. It requires a minimum of three visible satellites
3D Mode	3 Dimensional Mode. A three-dimensional GPS position fix that includes horizontal coordinates plus elevation. It requires a minimum of four visible satellites