Basic Instruments 4 - GPS And Loggers

Nigel Page - www.50k-or-bust.com

This article cannot possibly cover all the types of GPS instruments available to HG or PG pilots. What it will attempt to do is to explain the basic limitations of GPS and how to get the best from the GPS part of your instruments. It will be limited to GPS systems readily available to PG and HG pilots at the present time.

GPS Reception

The Global Positioning System comprises of 32 American satellites. Additionally there are 24 Russian "GLONASS" satellites and some others. Modern systems may only use the 32 GPS satellites but many use GLONASS satellites as well and a well designed unit utilising both systems will perform better in poorer reception conditions than a unit using GPS alone. Henceforth this article will use the term GPS to mean GPS alone or GPS with GLONASS although the proper term for combined systems or satellite navigation systems generally is GNSS.

GPS is often regarded as either working or not. In some respects this is true, but the user can take some steps to ensure his instrument has the best probability of a good position fix at all times.

The quality of GPS reception varies enormously and depends on a wide range of factors. Many of these are beyond the control of the pilot but some are not.

Read the instructions about positioning and orienting your instrument. Try and keep the antenna away from your body and pointing upwards.

Make sure your instrument has a good "view" of the sky.

Try to make sure your instrument is switched on for some time before you launch to ensure your GPS is well "locked" to the satellites.

Be aware that other electronic devices may interfere with GPS reception.

Problems arising from these factors may not be apparent until you happen to encounter poor reception conditions and the instrument loses lock.

What GPS Can Tell You

GPS itself can only tell us our location on the surface of the earth, our speed and direction of travel, and, rather poorly, our height. Other GPS related functions in modern instruments are derived from these few pieces of

information, sometimes combined with other sources such as pressure sensors. As mentioned in the altimeters article, GPS altitude can be very unreliable and liable to differ from altitude indicated on properly set barometric altimeters.

Groundspeed

Groundspeed from our GPS is one of the most useful functions for paragliding. If we know our approximate airspeed it gives us an immediate indication of what the wind is doing.

GPS For Rescue And Retrieve

As well as helping us to navigate in the air GPS can sometimes help us find a downed pilot. Efficient use of GPS for retrieve saves a lot of hassle and is good practice in case of an emergency.

Smartphones

If we have good mobile phone cover and our smartphone incorporates an efficient GPS receiver the best way to communicate our location may be to use an app which texts our coordinates automatically. This eliminates human error when reading out or listening to coordinate figures.

Unfortunately the nature of PG and HG is such that accidents can happen in areas of poor phone cover and we may have to communicate GPS coordinates by radio.

Reception Quality

If the area is heavily wooded or has deep valleys or gorges the receiving performance of our GPS device may be much more important than it is for an airborne pilot.

GPS Datums

The WGS 84 datum is almost universal for GPS and it is unlikely that another will be used in a rescue involving GPS.

Coordinate Units

There are three commonly used systems of coordinate units:

Degrees and decimal degrees (This may be indicated as DD.dddd)

Degrees, minutes and seconds (DD.MM.SS)

Degrees, minutes and decimal minutes (DD MM.mm)

Furthermore:

Latitude may be given as + or - corresponding to north or south of the equator.

Longitude may be given as + or - corresponding to east or west of the meridian.

Nothing is simple! It is crucial when communicating coordinates that you check you are using the same units at those the other party is using.

Be Prepared For Emergencies

Don't expect the other people to understand differences in coordinate systems.

Be prepared to reset the units in your GPS to accept or send coordinates in formats you do not normally use yourself.

Have a pen and paper available to write coordinates down.

If possible always try and double check verbally transmitted coordinates by reading them back to the sender.

Occasionally practice extracting your location coordinates from your GPS unit, entering coordinates in different units and using the GoTo function to find a location.

Have a written “cheat sheet” available with simplified instructions of how to use your instrument for rescues.

Remember that one day the pilot in need of rescue may be you.

Loggers

Modern instruments often have built in GPS loggers. Not all produce files acceptable for competitions or leagues so check the requirements of the competitions you wish to enter and choose instruments which will comply.

GPS Or Barometric Altitude

Some instruments log only GPS altitude and some can log barometric altitude

as well. Because of poor understanding of altitude measurement and convenience, GPS altitude has been used for altitude logging in the past. However things are improving and the trend is currently moving towards barometric altitude logging.

Auto Logging Start

Many loggers have the facility to automatically start logging when they detect movement. If these are configured for sailplane use they may not start reliably when paragliding because the detection speed is too high. I set mine to auto start but try to remember to start it manually before I launch.

Auto Logging Stop

Again, with paragliding, automatic stop detection for loggers can result in the logger stopping if the ground speed is low for a while because of a strong wind.

Most modern logger instruments have a very large storage capacity so it is probably best to leave them logging all the time they are switched on. It is usually easy to determine the duration of a flight by looking at the altitude trace.