

# Good Navigational Safety Sense!

## Navigate On-Track Using GNSS

Development of Global Navigation Satellite Systems (GNSS - commonly known as GPS), and new equipment running sophisticated software, has given pilots the ability to navigate accurately, providing a helping hand to traditional dead reckoning skills. However, the vulnerability of GPS and the erosion of traditional skills can put the unwary in jeopardy.

**This guide explains how you can safely integrate GPS into traditional navigation techniques. It will help you navigate with increased confidence, enabling you to better enjoy your flying.**

### GPS Installation Tips

- Avoid blocking controls, avoid glare, ensure a good 'view' of the sky.
- Use a secure mount which leaves aircraft controls accessible.
- Extremes of temperature can drain batteries or cause devices to shut down.

### Pre-Flight Planning

- Software needs the Internet for live NOTAM and weather information.
- Choose a route that keeps you away from airspace boundaries. Try to stay at least **2 nm** from the edge of and **200 ft** above/below controlled airspace. Allow room for the unexpected.
- Pick good waypoints/turning points: **C**ontrasting features; **U**nique; **L**arge; **T**all.
- Avoid 'electronic' waypoints (ie those only available using digital aids). GPS can, and does, fail.
- Mark your chart with key information. Remember that many planning tools allow you to print a chart/log.
- Check your GPS device batteries and that you have a back-up/alternate power source.
- Check your GPS device is in 'flight mode'.
- Consider diversions and contingency

### Marking Your Chart

Presenting key information on your paper chart can help simplify navigation:

- Planned turning points;
- Track lines;
- Wind arrow;
- Turning point box (with track bearing, expected drift, and leg distance);
- Fuel information;
- Distance-to-go marks;
- En-route features (see over);
- ETA.

### In-Flight

- Ensure the moving map on your GPS device has followed you onto the runway and along your climb-out path.
- A GPS device with appropriate software is an ideal tool for unexpected situations.
- Remember you can get lost even when using GPS! Make sure you have a plan.

### If Your Device Fails

- Aviate: Fly the aircraft first and always.
- Navigate: Revert to traditional methods.
- Communicate: Tell ATC and ask for help.

## Navigate On-Track Using Ground Features

This technique uses features chosen to create fixes at frequent intervals during your flight. It is a simple method for maintaining on-track navigation, and so helping you avoid airspace infringements. It is designed to keep your workload low, leaving plenty of time to look out!

**A paper chart is your primary tool, with GPS as support to enhance accuracy and provide confidence. If your device fails, using this technique will mean you are able to continue to navigate on-track and there is no need to panic.**

### Application and En-Route Checks

- Around one minute before you reach it, identify the feature on your chart. Adjust your tracking.

### Pre-Feature Checks

**T**rack required after the feature - set on the HSI, if available.  
**A**irspeed required after the feature.  
**A**ltitude required after the feature.  
**T**iming - is the elapsed time as expected?  
Zero the leg-time stopwatch (if used).

### At the Feature

If at an on-track feature, continue to track towards your aiming point.  
If at a turning point, turn onto the next track.  
Look ahead and choose your next on-track aiming point.  
Check it correlates with the 'magenta line'!  
Adjust heading to track towards aiming point.  
Check balance.

### Post-Feature Checks

**T**rack.  
**A**irspeed.  
**A**ltitude.  
**T**iming.  
**F**uel - compare to expected amount on chart.  
- Change tanks if required.  
**I**nstruments - normal management checks.  
**R**adio - check chart/PLOG for next call.  
- Check the frequency/listening squawk set.

- Stow the chart. Continue to look out and fly accurately. Adjust tracking towards the aiming point, selecting the next one as required.
- The GPS magenta line will confirm where you are going - enjoy the view and enjoy navigating on-track.
- At approximately one minute to go to the next feature, start the process again.

### Choosing the Next Feature

- Select your next aiming point before over-flying the present one.
- Sight ahead along the track line, not the projected heading.
- Before an aiming point, sight along track and choose a new feature before adjusting heading to track towards it.



For more information visit:  
[airspace4all.org/nav](http://airspace4all.org/nav)

