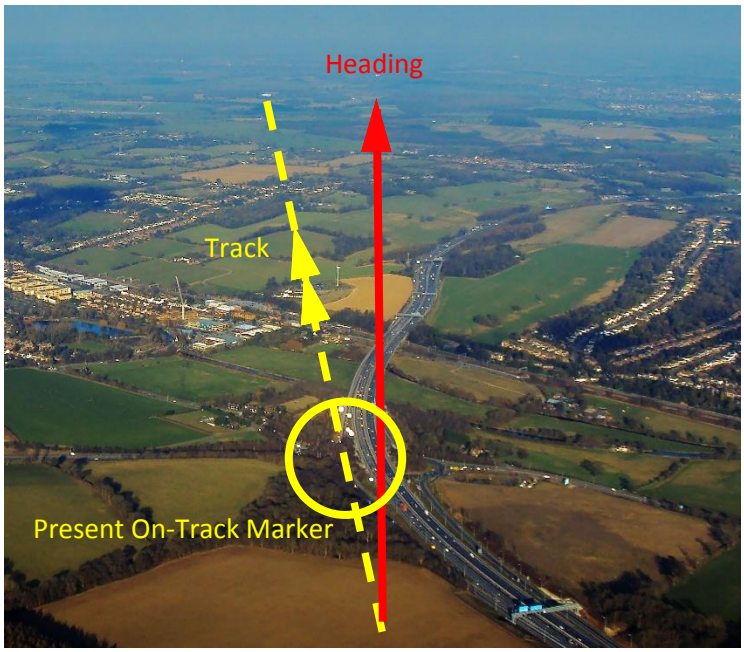
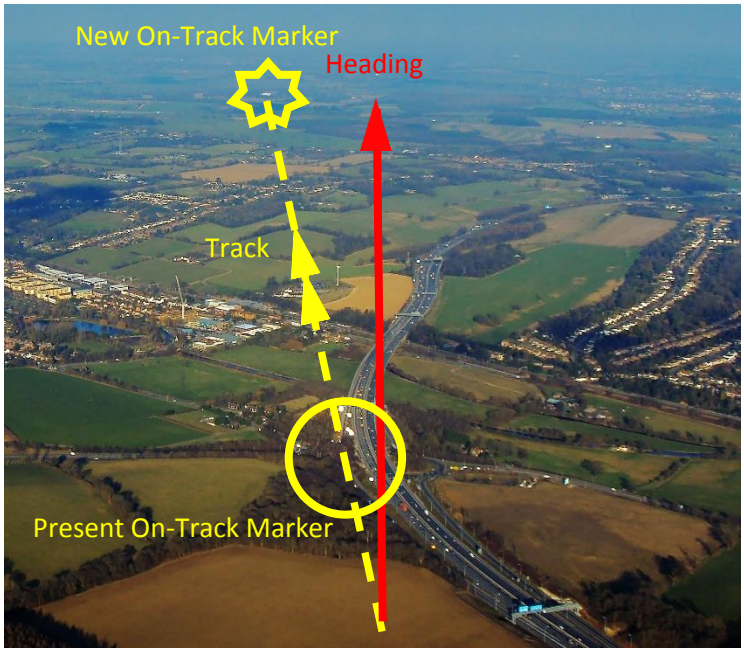
TEN TOP TIPS FOR TOPNAV

Have you ever considered having a go at TopNav? Have you been put off by thinking '… it's a bit A-level…'? Well, it isn't and you should. TopNav is designed to promote and enhance non-GPS navigation skills by means of a fun competition; the emphasis is now on the fun element and I should know – I'm one of the principal organisers. Even if pilots were taught well in the first place, in an era of ever-better GPS systems, traditional navigation skills are being forgotten through disuse; however, GPS can fail (yes, really!) or be interfered with so using GPS as part of a traditional technique allows you to avoid proceeding directly to the scene of the infringement…

The Ded(uced) Reckoning techniques that we were all taught rely on hoping that the forecast wind is close to the actual wind so that we won't get too far off-track before obtaining a fix and taking remedial action. In the 21st century, there are some flaws in this approach: being off-track is being on the way to an infringement, especially in the congested airspace of the south-eastern UK; forecast wind and actual wind rarely match; even if the heading is good, flying it accurately in the average GA aeroplane is not easy and the mental gymnastics involved in remedial action are capacity (and enjoyment) sapping. TopNav is about on-track navigation so we need a simple on-track technique that is largely independent of forecast wind and pre-planned headings.

TOP TIP 1 – On-Track Navigation





Being on-track is not a sin and derisive comments about 'track-crawling' belong in a bygone era. Staying on-track is not about thumbing your way along the line on the chart with furtive glances outside the cockpit to make sure that the features match. This is my method (and it works!):

- Start off on-track – obvious, really. In TopNav, the starting waypoint (WP) will be an easy-to-find prominent feature, which you can fly over already on the first track.
- At the WP – turn the aircraft to point down **track** (not onto heading) look ahead and pick an on-track marker – anything will do but it should be big, unique and contrast with its surroundings. The only requirement is that the marker is on track: it does not have to show on your chart and it can be on the extended track beyond the WP.
- Make the aircraft track towards the marker – heading is irrelevant but, when you check, the heading required to maintain tracking to the marker will give you an indication of the accuracy of the forecast wind (and your planning…).
- Before reaching the marker, sight ahead along track (where the aircraft is going, not where it's heading) and choose a new marker. The visibility will dictate the distance to your next marker – clearly (pun intended), poorer visibility requires more frequent changes of marker.

And so on…

TOP TIP 2 – Use Clock(s)/Stopwatch(es)

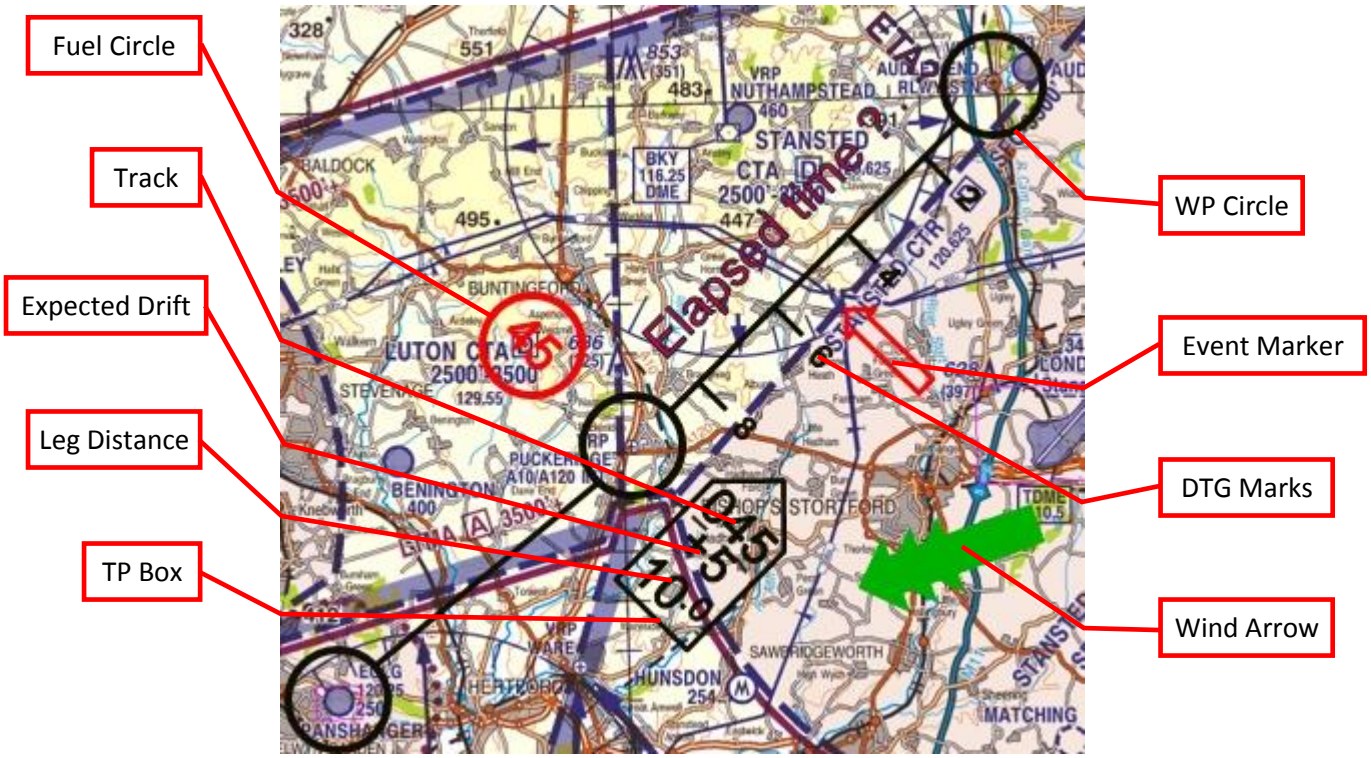
Starting a clock at the beginning of each leg will (a) give you an idea of how far along track you are (important for the 'Work-cycle' later) and (b) a method of narrowing the search area if you become 'temporarily unsure of position'. I carry at least two: one for leg-time and one for total elapsed time (in case I forget to zero/restart the leg timer… I'm sure you wouldn't do that!).

TOP TIP 3 – Use Events

In the planning stage, identify easy-to-recognise features on or very close to track – some of these will be the TopNav WPs but you will need one about every six minutes between the WPs. You can use these to confirm your tracking or for simple remedial tracking action (turn to fly over the feature, turn onto track, pick a better marker and make the aircraft track to it). The elapsed time at the event will allow you to reassess the headwind/tailwind component, which will give an opportunity to update ETAs (hitting the declared or updated ETA ±1 minute is worth 5 points).

TOP TIP 4 – Consolidate Information

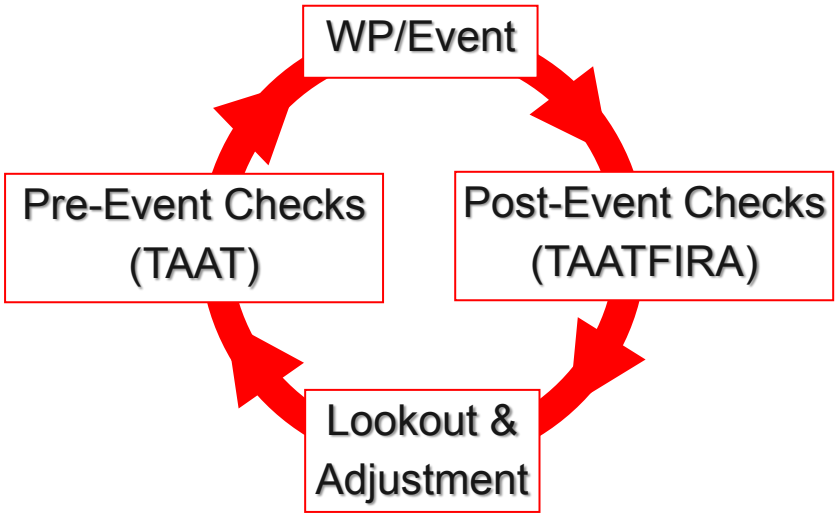
A tidy cockpit is an efficient cockpit so keeping your information to hand on the minimum number of bits of paper is important. I do everything on my chart – including any log keeping:



A fictionalised route on an out-of-date chart!

TOP TIP 5 – Develop a Work-Cycle

A work-cycle is key to providing a systematic approach to navigation tasks whilst freeing most of your time and capacity for flying the aircraft and looking out. I use one driven by simple checks:



- Approximately one minute before the event, pick up the chart and use 'clock-chart-to-ground' to identify the ground feature marking the event. Adjust tracking.
- Carry out the Pre-Event Checks:
  - **T**rack required after the event – set on the HSI, if available.
  - **A**irspeed required after the event.
  - **A**ltitude required after the event.
  - **T**iming – is the elapsed time as expected? Zero the leg-time stopwatch.
- At the event:
  - If at an on-track event, continue to track towards your marker
  - If at a WP, turn onto the next ***track***
  - Look directly ahead and choose an on-track marker
  - Adjust heading to track towards the marker
  - Check balance
- Carry out the Post-Event Checks:
  - **T**rack – is the track correct? Check heading is as expected (PLOG), note any difference
  - **A**irspeed – are you flying the planned airspeed? Adjust if required.
  - **A**ltitude – are you at the planned altitude? Adjust if required.
  - **T**iming – is the leg-time stopwatch running?
  - **F**uel – compare to expected amount noted on chart. Change tanks if required.
  - **I**nstruments – normal management checks. Compass gross error check; compare with DI.
  - **R**adio – check chart/PLOG for next call; check correct frequency is selected.
  - **A**irspace – check surrounding airspace including vertical limits
- Stow the chart. Continue to lookout and fly accurately. Adjust tracking towards the marker, selecting new markers as required.

At a WP this process, even when interrupted by maintaining a systematic lookout, should take no more than two minutes; at an event, it should be complete in well under two minutes. Thus, with events/WPs six minutes apart, four to five (plus) minutes of each cycle will be devoted to looking out and flying accurately.

TOP TIP 6 – Keep a Log

A log will aid the judges by explaining deviations from track; if these are for sound threat/error management reasons, they will not be penalised. Also, should you become 'temporarily unsure of position', a note of when you were last sure can be very handy. For TopNav, logs may be kept on the sheet issued, on your own PLOG or even on your chart – the easiest way (a photo will be required for the judges). The RIN volunteers at your venue will also accept verbal debriefs. TopNav is a crew effort: in a two-person crew, the navigator keeps the log; however, the rules allow more crewmembers and there's no reason why log keeping can't be delegated to one of them.

TOP TIP 7 – Plan for Eventualities

Mainly, this is about knowing what to do if the next WP or event doesn't come up where and when you expected it to… The following procedure has stood me in good stead on (too) many occasions:

- Admit to the possibility that all is not well!
- Stop the leg timer – stopping the clock gives you a rough guide to how far you might have gone from your last known position.
- Note the heading – this might give you an instant clue about what went wrong!
- Establish a 'racetrack' pattern at a safe height and a slow-but-safe airspeed – this gives time for lookout and for the compass to settle on the 'straights'.
- Orientate – use the compass and any unique landmarks to orientate the chart.
- Plot a 'circle of uncertainty' – using the elapsed time to give a rough distance and the heading noted for direction. The 'circle of uncertainty' (usually more of an ellipse) is defined by the least and most distance you could have flown from the last known position against an estimate of the tracking error – there is a good chance that you are in the circle.
- Ask for help – call Distress and Diversion (D&D) on 121.5MHz.
- When 'found' check endurance remaining and work out what caused the 'lost' situation; decide whether to carry on, go back or divert.

TOP TIP 8 – Don't Sweat the Small Stuff

The highest possible TopNav score is 240; 100 points are available for the percentage of time you remain within 0.5nm of the scoring track (there's a non-scoring 1nm buffer around each WP to allow positioning ie. you can be off-track without penalty within 1nm of a TP but you must still pass within 0.75nm to get the overflight marks). There are 40 points available for passing within 0.75nm of all the WPs and another 40 for making your ATAs match your ETAs (ETAs may be revised providing there's a note in the log). Thus, three-quarters of the marks are in the bag by staying on-track and on-time. Another 20 are won or lost before take-off depending on your planning and the rest are based on the content of your log (airmanship, decision-making etc). It's obvious where your main priorities lie…

TOP TIP 9 – Enjoy the Day

It's meant to be fun…

TOP TIP 10 – Use the Experience

TopNav is a great learning experience - you will encounter ideas that you can use every time you go flying and have a chance to practice them. Taking part also counts towards the AOPA and LAA wings schemes.

Mark Batin

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