

## Use of GNSS Navigation in LAPL & PPL Skills Tests

Matt Lane proposes a possible change to the PPL and LAPL skill tests to accommodate navigation by moving map.

The increasing problem of airspace infringements by UK GA pilots is well known and documented.<sup>1</sup> Use of GNSS functionality for navigation is now actively encouraged by the CAA<sup>2</sup> and GASCo as a mitigating measure. Indeed, the esteemed editor of this magazine has written extensively on the subject of late! However, the current LAPL and PPL skills test format denies the use of these aids to the candidate during the primary navigation test element.

The vast majority of pilots, post PPL or LAPL skills test, will immediately purchase an app and device to assist them in exploiting GNSS assisted VFR navigation. Unfortunately, as this equipment has been specifically denied during the skills test, the majority of the training also does not teach these capabilities. This leads to a situation where PPL/LAPL training and testing has become unrepresentative of real-life licence holding operations, and the opportunity to train the safe and effective integration of this equipment into the cockpit workflow has been missed. Indeed, confusion over device usage/capabilities, poor integration into the cockpit workflow and decreasing overall situational awareness is anecdotally being seen amongst licence holders.

Perhaps it is time we should change this! I have produced a detailed proposal on this, which is now being considered by EASA and the CAA. The rest of the article below gives a flavour of some of the background and proposals.



## Background

With complex airspace becoming normal in the GA operating environment, especially in the South East of the UK, pilots have increasingly adopted GNSS as a key navigational tool, replacing reliance on legacy 'dead reckoning' and radio navigation aid methods. Furthermore, many VORs, the only practical radio navigation for most PPL holders other than GNSS, are currently being phased out in many locations. In their stead, moving map GNSS units are now being used by many pilots, initially hand-held units such as the Garmin Pilot range, and more recently tablet devices running software applications such as SkyDemon, Runway HD and Easy VFR. The flight planning capabilities of these apps can be extremely developed, but the basic capability under consideration in this article is the inflight ability to ascertain current position and performance against the planned track to a significantly more accurate degree than using traditional 'dead reckoning' techniques.

For use in the skills test, it should be noted that GNSS in this context is assumed to be a VFR navigation package, either on an installed device or carry-one quipment. Equipment designed and installed for IFR operations, such as a Garmin 430W, may be able to provide positional information, but will not have the mapping capability for sole use in the proposed context. We are also not considering the intricacies of equipment certification and installation since the proposed capability will be a part of an overall navigation technique, as opposed to a primary source of navigation.



In response to a number of mid-air collision (MAC) accidents, portable Electronic Conspicuity devices have been rapidly gaining in popularity such as PilotAware and SkyEcho. Traffic

information from these devices is generally displayed by a GNSS navigation app such as Skydemon demonstrated below. Denial of the GNSS app would also denude the candidate of this traffic information and an important safety barrier to MAC is removed. The candidate loses the opportunity to demonstrate effective airborne Threat and Error Management (TEM) with information that he/she will most likely immediately adopt post skills test, and the examiner loses the opportunity to check effective cockpit work cycle integration.

A detailed study of the EASA Part-FCL and CAA documentation on skills test requirements was undertaken, and this suggested that the only regulatory requirement is that 'dead reckoning' is demonstrated at some point during the en-route phase of the test. Although not specifically defined in Part-FCL, it can be said that "dead reckoning is the process of calculating one's current position by using a previously determined position, or fix, and advancing that position based upon known or estimated speeds over elapsed time and course".<sup>3</sup> Therefore, in the current regulation, it is reasonable to agree that a non-GNSS assisted navigation leg is still required to be demonstrated.

## Proposal

It is proposed that the LAPL and PPL skills tests are amended as follows:

Candidates are permitted to use a carry-on GNSS navigation device designed for VFR navigation of light aircraft of their own provision.

Candidates are permitted to use installed GNSS equipment capabilities which are suitable for VFR operations.<sup>4</sup>

Candidates must demonstrate the device and/or app are up to date, and how the device will be safely secured, carried and used during the pre-flight briefing.

Candidates must be prepared to answer questions about the device capabilities and operation during the pre-flight planning phase.

Candidates must still prepare an appropriate navigation log and plan, but may use moving-map GNSS assistance to assess their position and progress towards next the turning point during the primary navigation leg.

A high standard of accuracy, simulating navigating in a congested airspace area, will be expected during the navigation phase when using GNSS assistance.

During the diversion to alternate aerodrome leg, the examiner will simulate the loss of GNSS capability. A dead reckoning leg will be required to be demonstrated using traditional techniques.

Once the diversion leg and satisfactory demonstration of 'dead reckoning' has been achieved, the examiner will restore all GNSS capability for use by the candidate during the remainder of the test.

Throughout the test, the candidate will be expected to deal with any actual GNSS or device failures in an appropriate manner and continue the test.



The integration of GNSS capability into cockpit workflow and airmanship will be assessed throughout the test in the extant airmanship sections.

It is hoped that the above changes do not require Part-FCL regulatory change, and could perhaps be implemented wholly by appropriate guidance changes in the Standards Document and Flight Examiner Handbook. In time, it may be possible to ascertain that failure of GNSS assistance for the diversion leg is equally unrealistic, but while Part-FCL specifies 'dead reckoning' it is appropriate to continue to check competence in this way.

These changes could hopefully encourage appropriate and effective utilisation of GNSS tools in the cockpit, guided in a controlled and professional manner by Flight Instructors and Examiners. This will replace the ad-hoc self-learning of equipment post license issue with a structured training programme. However, the temptation to subvert the issue into a detailed analysis of GNSS equipment technology/failure modes must be avoided and the focus should remain on sensibly allowing pilots to utilise their own carry on equipment and manage it accordingly.

If we do not evolve training and testing in line with commonly used aids, the training environment will become increasingly unrepresentative of actual post licence operating. With clear safety benefits, I believe the time is ripe to take this obvious and easily achievable step to change the skills test for the better.

Matt Lane

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## Notes

**1** CAP1404 summarises the problem and remedial action undertaken.

2 Part of 5 point action plan launched at GA Unit 2017 Roadshow presentations

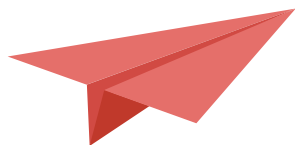
3 [https://en.wikipedia.org/wiki/Dead\\_reckoning](https://en.wikipedia.org/wiki/Dead_reckoning)

4 For example, the mapping on an IFR device such as the Garmin GNS430W, GTN650, or G1000, or the Avidyne IFD440, is not suitable as the only mapping display for a VFR navigation flight, but other indications should as track, ground speed and position are suitable.

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[Previous](#)

[Contents](#)



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