Garmin G

***FLYER* is invited to test fly the first UK customer's aircraft upgraded with Garmin's retrofit glass PFD and MFD kit – a Piper Dakota belonging to British Airways Flying Club**

Not very long ago, it only took something like a KN80 RNAV and an HSI to be able to claim a sophisticated avionics fit. Modern technology took a step forwards when owners started fitting compact GPS boxes which soon boasted small, low-resolution, single-colour maps. Sandel came to market with an electronic HSI that projected the image onto the back of a 3.5in screen – and gradually GPS maps grew in size and offered improved quality in the now colour displays. Things were changing, and changing fast.

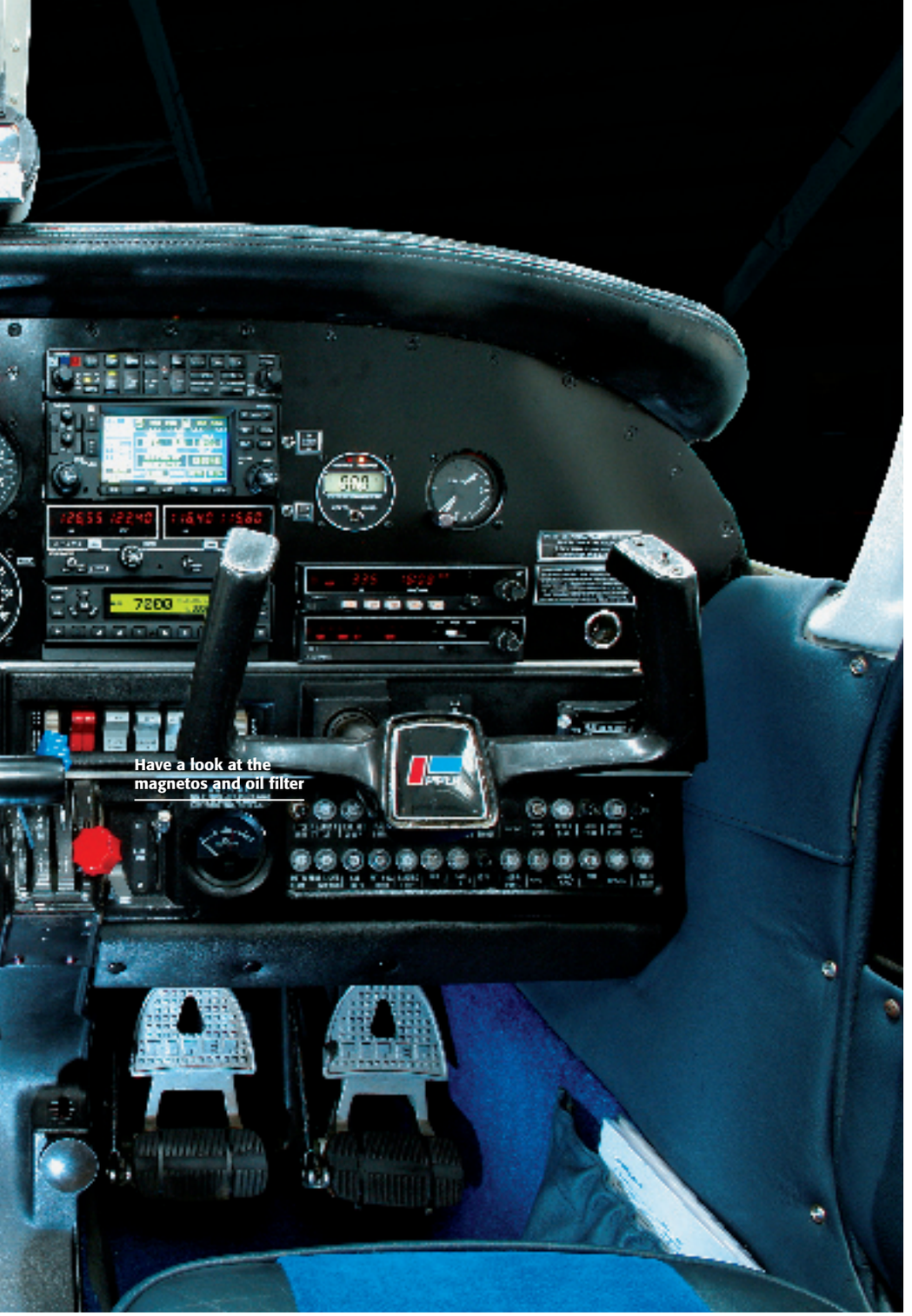
In the space of a few short years, the definition for a top-of-the-line avionics fit went from stacks of boxes combined with complex electromechanical displays to big screen systems incorporating solid state gyros, air data computers, digital engine monitoring, integrated autopilots and much more. The problem was, these systems were only really available as factory options on new aeroplanes, and there was no practical way to retrofit them to existing aircraft.

Thankfully, that's all changing and there are now several options open to the owner who wants to upgrade. Garmin is the dominant player in this Original Equipment Manufacturer (OEM) market, with its G1000 system and recently gained EASA approval for its G600, and FLYER was recently invited to go and fly the first customer installation, in a Piper Dakota, that Harry Lees Avionics recently completed for British Airways Flying Club.

John Hartill, BAFC's CFI, explained that the Dakota, basically a PA-28 with a 235hp engine, is often rented for touring by club members so it seemed to be the ideal and logical choice for an upgrade. The aeroplane is also used to provide familiarisation training on glass cockpits and John believes that the G600 will require anything between half-an-hour and a couple of hours depending on the pilot's experience and previous exposure to glass.

As part of the install, the decision was taken to replace the original Piper panel, plastic and post lights with a custom-made fitting. The post lights have been removed and the instruments are now either all lit internally or with NuLite rings. The black-painted aluminium in place of the more usual plastic trim really improves the cockpit.

The G600 itself consists of one display unit that is 17cm high x 25.4cm wide. That unit has two vertically-mounted screens, the left-hand one being the PFD encompassing the AI, Altimeter, ASI and VSI at the top, and an HSI at the bottom. It is possibly to display GPS, VOR, glideslope and ADF information on the HSI. The AHRS (Attitude Heading and Reference System), Magnetometer and Air Data computer are the same components that are used in the G1000. The PFD will also display OAT, the True Air Speed and the wind vector. Status and flight plan information sits right at the top of the PFD. The right-hand screen acts as the MFD and displays the map and any compatible external data, e.g. things like traffic information, lightning and even weather radar, if you have the required equipment.


Have a look at the magnetos and oil filter

600

The system for getting the most out of the buttons is pretty simple. The PFD has four buttons on the lower right-hand side. These are used to select the function of the one rotary knob on the PFD. The selection will revert to heading after a few seconds of inactivity. Along the bottom of the PFD are five buttons with onscreen tabs that change depending on equipment fitted. The MFD has a map-range rocker button and menu, enter and clear buttons. Again there are five buttons along the bottom of the unit with more onscreen tabs. Finally, there's the inner and outer knob that is used to navigate through menus or to move the cursor around the screen.

It's worth remembering here that here, as with any Garmin, pressing and holding the CLR button will take you back to the default NAV page from anywhere in the system.

The G600 contains its own airspace and terrain data, but unlike the G1000 has no integral GPS units, so the system is driven by Garmin's GNS 430W, 530W or 480. These units also have their own databases, but flight plan and steering information is transferred from these to the G600. Although not installed in BAFC's G600, it is possible to load Jeppesen's ChartView software which will provide geo-referenced IFR approach plates, a significant bonus for IFR flyers. Sitting alongside the G600's display unit you'll find the old instruments. One of the requirements with the EASA STC is that the back-up instruments (pretty much everything that was there before apart from the VSI) are close to and in the eyeline of the G600.

Easier than it sounds

Enough of the theory, time to go flying. The first thing that grabs your attention is the quality of BAFC's aircraft. G-ODAK has fresh paint, a good clean interior and of course a brand new instrument panel. As soon as the master switch goes on, the G600 comes alive and the AHRS begins the process of aligning itself. Unlike the G1000, the aircraft's engine and fuel data remains displayed on the aircraft's existing instrumentation – there are no inputs here for the G600.

While the PFD is running through internal checks and alignment, the MFD displays a list of database dates and software version numbers which the pilot has to acknowledge. Position data is supplied in this case by the GNS430W, which turns on with the avionics master. We put a route into the 430W that would take us from Wycombe to Wycombe via Westcott and Cranfield. Two things then happen automatically: the flight plan is displayed on the MFD and the HSI is set. Pilots who know how to drive either a 430 or 530 will find themselves at a distinct advantage as the G600 is pretty intuitive. For example, when ATC give us the QNH, all that is required is for the pilot to press the BARO key on the left and then to turn the knob to set the pressure setting on-screen. Similarly, the pilot can set bugs for altitudes or rates of descent, or set a course in order to create a pseudo-localiser for any waypoint. It sounds much, much more complicated than it is.

We took off and headed for WCO. The displays are crisp and easily readable, and the various buttons and knobs give good tactile feedback and are obviously quality items. In terms of autopilots, the G600 will interface with most of them, including Piper's wing-leveller. There are two modes, Heading and GPSS, which when engaged give roll steering information to the wing-leveller. This means that approaching a waypoint the aircraft will anticipate the turn, eliminating the slight weaving that's a feature of non-GPSS systems.

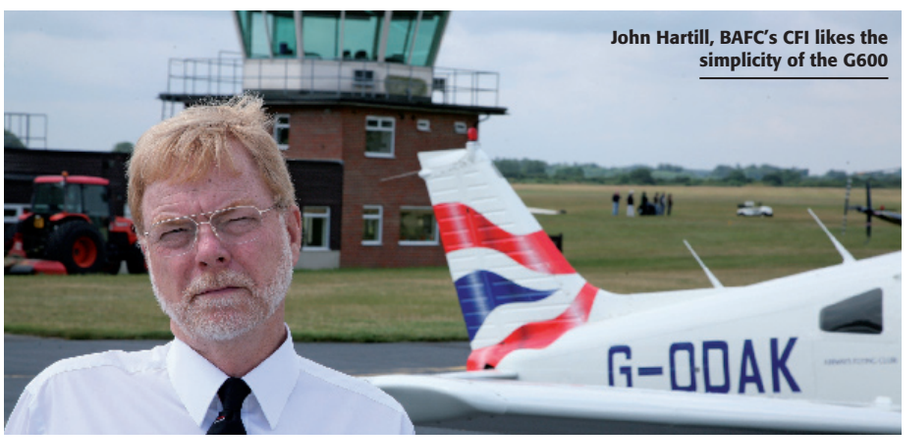
After we'd turned at Westcott we 'diverted' – this has to be done by changing the flight plan in the GNS 430W. This highlighted part of the system that could cause issues if the pilot is not fully aware of how everything is linked together. If there's some airspace ahead that you want to ▸

In flight and on autopilot, the GPSS steering smooths out the waypoint turns

check, you can scroll the cursor around the MFD until the airspace is highlighted. You will then be able to see, on the screen, details about that airspace, i.e. class, height, etc. It's possible to get the same information from the GPS, but the information does not come from the same place! Both the 430W and the G600 have databases that can be updated and it is possible that some owners will not necessarily update both at the same time. It's therefore important to know whether the data is current, and if it isn't, to know which database is most current!

Some people take a little while to get used to looking at things like speed, altitude and vertical speed with a tape rather than a needle on a round dial. Because the data is rendered digitally, it's at least initially tempting to try to nail airspeed to within +/-1kt – a fine ambition but if it leads to chasing the number then the enterprise is doomed. According to John Hartill, most people settle down to glass panels very quickly, and it is certainly far easier to go from traditional to glass than it is the other way around.

If you want to sample it for yourself, the BAFC Dakota is available for rental to members. Monthly membership costs £15 (annual is £120) and the Dakota is charged out at £202.80 dual and £167.40 solo, both being wet rates.



John Hartill, BAFC's CFI likes the simplicity of the G600

The G600 brings high quality glass screens to used aircraft. I doubt that many owners of C150s will be beating a path to Garmin's door, but for more valuable aircraft, particularly those used for a lot of touring or IFR, it's a great unit. And although the price tag may seem high, when compared to buying new, or even compared to fitting or replacing a traditional HSI, it starts to make sense, add something like GPSS steering through coupling to an autopilot, or traffic and weather information and it looks like a sensible way to upgrade an existing aeroplane. ■

How much?

AS WITH ALMOST all avionics work, there's no easy answer. Fitting the G600 will require cutting a new metal panel, and if you don't have an existing GNS430W, 530W or 480, then you'll need to upgrade that too. Barry Peat, General Manager at Lees Avionics, estimated £25,000 to complete the work, although he was keen to stress that every job would be different and as such it was only a very rough guide.