

Advertisement feature

Taking pride in others people's joy

Wycombe's Lees Avonics has carved out an enviable reputation as a world-class specialist in avionics, working on aircraft of all sizes - but they have never lost sight of the customer's elation at having an old aircraft transformed

HARRY LEES, founder of Lees Avonics based at Wycombe Air Park, is very much in the business of producing a "silk purse from a sow's ear" when it comes to transforming an old aircraft into a state of the art avionics masterpiece.

Not that any doting owner of a pre-80s aeroplane would like to hear the object of his affections referred to as a "sow's ear", but in the face of the technical metamorphosis that has been achieved with a late seventies Cessna 310 by Lees Avonics, he might not blanch at hearing it now referred to as a "Silk Purse".

When the owner of the 310 approached Harry Lees the objective was to have an avionics upgrade that would give him the avionics capability equivalent to a new Piper Seneca 5 or a Beech Baron. To buy new, the Seneca would cost in the region of \$700,000 and the Beech Baron not far short of \$1.5million. Starting out as just a radio and transponder upgrade, the project evolved into one that features the first EASA-approved retrofit of the Avidyne EXP5000 Primary Flight Display (PFD) system.

The projected spend will result in an aircraft costing less than a third of what it would cost to purchase the Seneca 5, but with an equal or better level of avionic functionality.

When experts at Lees suggested fitting an Avidyne glass cockpit as a retro-fit, it meant removing everything from the existing cockpit except the factory-installed Cessna 400 Auto-Pilot. Changing the autopilot as well would have added significantly to the price, and panel space is also at a premium.

It was decided to keep the existing Cessna system, but add additional capability to the autopilot by installing a DAC International Roll Steering system, the GDC31, which allows the aeroplane to follow a route programmed into the GPS.

The Avidyne EXP5000 PFD that has been used is the same unit that you'll find in a new Cirrus or Piper, and is a 10.4-inch liquid crystal display with integral air data computer and attitude/heading reference sensors all built into one box. The only remote items that form part of the PFD are the Magnetometer and OAT probe.

Fitting the large PFD has provided the opportunity to re-design the instrument panel completely, with a modern flat panel in place of the original stepped version, and no pillar lamps: all instruments now have back-lighting. All the old warning lamps have been replaced with modern annunciators normally found on KingAirs and Citations - and all sticky labels have gone, in favour of engraving!

‘*The projected spend will result in an aircraft costing less than a third of what it would cost to purchase [a new] Seneca 5*

Feeding into the EXP5000 PFD for Navigation are two Garmin GNS430W units (approved for BRNav and GPS non-precision approach) and also a King KR87 ADF.

One of the certification requirements of the EXP5000 PFD is that it has three standby instruments within the pilot's scan: a standby attitude indicator (in this case, electric with a dedicated back-up battery), a mechanical airspeed indicator and an altimeter. These items are all two-inch versions mounted on the left side of the pilot's panel.

One of Lees' objectives in producing the EASA STC for EXP5000 PFD system is to turn it into a FAA-approved STC as well, so the same data that has been produced can be used to fit this system in FAA registered 310s. Lees have been very pleased with the support they have received from Avidyne on this project and Avidyne hope to market the FAA STC in the USA once approved.

Lees have created a complete IFR panel on the co-pilot's side by relocating the original NSD360 HSI and the original attitude indicator so the aircraft can fly two crew for training but with a full IFR panel for each pilot. The co-pilot's attitude indicator also still provides pitch and roll information to the autopilot.

Excellent quality audio is provided by the Garmin 340 audio panel with six place intercom and two music inputs



This Cessna 310, over 30 years old, now has a working area for a pilot that is a match for factory-fresh aircraft - saving the owner a fortune.

(one for the passengers and one for the crew – so no need to listen to the kids' nasty music!). The crew music input mutes automatically if the radio is active, so the crew won't miss radio calls. This particular installation also features the Garmin 330 Mode S transponder with audio altitude alerting.

Lees have also installed an Avidyne EX500 Multi Function Display which takes its data from either of the GNS430W GPS's, to draw a full topographic moving map. It can also display Jeppesen charts. Overlaid on the EX500 moving map is traffic data from an Avidyne TAS610 Traffic Advisory System (TAS). The TAS also displays traffic on both Garmin 430Ws. In addition to the visual displays, the crew receive traffic alert audio in their headsets and over the cockpit speaker. To further help identify the location of traffic, and keep pilots' eyes outside the cockpit where they belong, the TAS gives precise information such as "Traffic one o'clock, high, two miles!".

The 310 now boasts a spectacular Avidyne active weather sensor – the TWX 670. This sensor goes beyond the traditional Stormscope systems in that you get a full colour weather presentation so you can get an indication of the depth and intensity of an electrical storm. Unlike many other electrical storm detection systems, the TWX670 works down to very short ranges.

Clearly the main intent is that you want to avoid nasty storms completely but with this equipment you can better interpret the storm intensity and can plan your route accordingly – even more flexible.

One further device installed as part of the upgrade, if the above was not enough, is the JP Instruments EDM760 Graphic Engine Monitor, which also includes fuel flow. The sophisticated EDM760 provides fuel planning and endurance data to both GNS430Ws, thus helping in planning diversions as well as being able to manage engine temperatures and leaning for optimum fuel burn and economy with great accuracy.

Harry Lees is eager to stress that the avionics put in this aircraft for this particular customer is a reflection of what he wants to use his aeroplane for. In this case it is to achieve the best possible level of upgrade for a really efficient and safe IFR touring machine.

If they were refitting or upgrading a plane that was going to be used for training purposes then the advanced

weather and autopilot Roll Steer systems might not be appropriate but for somebody like the owner of the Cessna 310. The Roll Steering, TAS610 Traffic and the TWX670 weather systems afford massive advantages not only in the handling and management of the aircraft but in providing peace of mind when unexpected and unwanted intrusions are made by the elements or indeed by other aircraft traffic.

It is clear that Harry Lees is very taken by the advantages of having the Roll Steer system installed. If you are a long distance flyer, you can pre-programme your GPS route, engage the autopilot in heading mode, select Roll Steering, engage altitude hold as well and then you actually have time to sit back.

You can concentrate on flight planning, read your map, do your radio calls and the aircraft will fly your route, do all the turns automatically at each waypoint and will even fly the lateral part of a GPS approach. All the turns at waypoints are made with progressive turn anticipation, so it won't arrive at the waypoint and turn suddenly – it will be a nice gentle change of direction.

The whole avionic installation in this 310 is designed to reduce the pilot workload and massively increase situational awareness. Having a Traffic Advisory System installed, particularly if you are flying in IMC or in very limited visibility conditions – possibly where out of LARS service from ground-based radar – means you will at least see all other transponder-equipped traffic. Because the TAS device is an active interrogator, it is talking to other aircraft transponders and this is where it is different to the portable traffic systems that people carry as stick-on-the-glareshield units. These passive devices only listen to other people's transponders but if you are out of range of a ground station, the other transponder-equipped aircraft will not be interrogated, so won't reply.

Harry Lees has Traffic on his PA 28 and finds it a godsend. He says: "If you are flying into the setting sun on an autumn evening, you cannot see much in front of you – including other aircraft. Also, although getting a LARS service is absolutely essential where available, getting a word in edge-ways with some LARS units can be very difficult on nice days.

"Having TAS on board will give you that traffic advisory warning and give you time to take evasive action."

In a country which prides itself on its aviation history, Lees is a firm that is carrying that pride into the future

As Harry points out, once you know where the traffic is, you pretty much know what you have to do about it. It is a great system to have and a real safety benefit.

Lees Avionics have been established since 1991. Their recent sale to Gama Aviation at Farnborough should see them grow to work on larger corporate aircraft, but they're not leaving their traditional GA work behind. Far from it; despite the recession and the credit crunch they are actually recruiting. Harry puts it down to having a settled and reliable staff, and products that give pilots great improvements to their aircraft at a price that is a lot more affordable than buying a new state of the art aircraft.

Harry believes that another major advantage in the current trading conditions, is holding an EASA Design Organisation Approval (EASA Part 21J). Lees now run a full-time design office based at Farnborough and this has meant they have now produced more EASA STC's than any other comparative organisation in the UK. EASA rules only allow DOA holders to apply for STC's, so this approval is vital if undertaking glass-cockpit upgrades.

Lees' DOA approval covers everything from a Cessna 152 to a Boeing 747 – as well as all helicopters – and includes structural modifications and interiors as well as avionics.

A lot of the work Lees Avionics undertakes comes to them at Wycombe Air Park from abroad and customers from Ireland, Germany, Italy and Scandinavia regularly land at their premises for refits or upgrades.

Nor are Lees afraid to travel and are frequently found throughout the UK, and abroad, currently working in Germany refitting ex military helicopters. They undertake design contracts in Scandinavia and will shortly be working in the Middle East as well as with their parent company Gama Aviation, who run a fleet of corporate jets at Farnborough.

In a country which prides itself on its aviation history, Lees is a firm that is carrying that pride into the future.

Lees are able to deal with everything from a 152 through to a 747. The firm's ethos from day one has been to maximise bang for buck, and exceed expectation.

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