

Glass vs Analogue

Once upon a time, pilots learned to fly in a cockpit that sported dials and gauges. Now, many fly aircraft with multiple screens and flashing colours. So isn't that progress? Where's the problem?

Over the last few years, aircraft with modern 'glass' cockpits (also referred to as Technically Enhanced Aircraft or TEAs) have arrived in New Zealand. Their features include computer-based instrument systems, GPS, and moving map displays.

Some pilots who trained on the older analogue cockpits are now having to get used to the glass cockpits.

And many of the 'Gen Y' pilots, who learned to fly on TEAs, are going on to fly analogue aircraft in the real world.

How has the changeover been for both types of pilots? And how can they prepare for it?

Old Dogs, New Tricks

For pilots who have trained on analogue aircraft, like CAA Aviation Examiner Marc Brogan, "the first danger in the glass cockpit is possible information overload. It can take some time getting used to".

Nelson Aviation College Chief Flying Instructor (CFI), Jeremy Anderson, found the glass cockpit the ideal place to become distracted. "It's easy to get consumed by all that equipment and information," he says.

Marc found it very helpful to de-clutter that information. "Use the option to reduce the number of displays and information, and change the way it is displayed."

Tony Downes, a CTC Aviation Flight Instructor, says that finding out where the information is, can be hard.

"For example, in an analogue cockpit, the altimeter is just one instrument. But in a glass cockpit, you have the display panel staring at you with all this information, and you have to find that one piece of information you need – where it is and what it's telling you.



"You can't rush it. Slow down and try not to scan everything at once. The glass cockpit is a complex system, and can do far more than what we need it to do. Not knowing the system properly can cause problems. What if you pushed the wrong button?"

"Undergoing 'difference training' and practising on the ground really helps with all that."

CAA Aviation Safety Adviser, Carlton Campbell, notes another trap in the glass cockpit. "It is chasing the tape (following the tape numbers too closely as they change) with the consequent attitude fluctuations. It's all so different to following a needle – you can get too absorbed by all that information."

Tony Downes agrees. "The glass cockpit has super accurate systems – it will tell you if you are plus or minus 20 feet. So, new pilots can end up obsessing with that – at the expense of flying the aircraft.

"The other danger is that once you get comfortable, you get complacent, and blindly follow the machine. Or you just trust it without cross-checking against the current information both inside and outside the cockpit."

The CAA's Principal Aviation Examiner, Bill MacGregor, cautions pilots against the 'inside versus outside' scenario.

"You can easily end up focusing inside on the primary flight display (PFD), rather than on the outside making use of your

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usual references. You're getting information from the PFD, which is very good for situational awareness, but how about the real world? For example, what if you fly into cloud?"

Jeremy Anderson has a few tips. "The biggest thing is 'don't forget to look out the window'. That is what I always tell my students, and even other instructors. We tell each other to keep an eye out, and if anyone, including me, is getting too much into the cockpit and forgetting to look out, we remind each other."

Carlton Campbell agrees. "One has to be cautious that the priority balance doesn't get affected. This is 'eyes outside versus eyes inside', as the temptation to be referencing to those instruments is much more in an aircraft with a glass cockpit."

"Be prepared and aware that the electronic components may fail sometimes. In this situation, you need to smoothly move to backup equipment."

Jeremy Anderson warns, "We shouldn't expect to become experts straight away. Do the initial training on the glass cockpit *on the ground*. And make sure you pick a time when other stresses and workload are low."

"The threats are in their lack of currency and competency, irrespective of whether they fly a glass or analogue cockpit."

Marc Brogan says pilots should stick to the basics, and remain current on secondary instruments.

"They are the older style ones and should the electronics fail, you need to know how to read them, as they are normally present even on newer aircraft."

New Dogs, Old Tricks

Lonic Harkness trained on Diamond DA40s and DA42s at Massey University, and until recently, was flying Beechcraft 1900D aircraft for Eagle Airways.

He found that it took a bit of time to get used to the older cockpit instrumentation.

"I was used to receiving lots of information from the system to aid my situational awareness.

"For example, wind velocity would be displayed on the PFD. It's great on a PFD because it's right there in

front of you at all times. But it's a different story on the Beech, where you have to input values on the GPS to get an approximate indication of the wind.

"It really helped that I had to get a non-directional beacon (NDB) rating for my position with Eagle. The rating also served as an introductory lesson on the analogue system.

"What also helped was practice and currency on the older analogue system, and gaining a thorough understanding of it. I'm used to it now, and know how to interpret and use the information.

"You *can* find the same information on the analogue system – it just requires more thinking and information processing on your part."

Another pilot who went from new to old is Greg White, who now flies Cessna Caravans for Skydive Australia



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in Cairns. He, too, learned how to fly on the Diamonds.

"It is the same information, just displayed differently. Of course, compared with the sophisticated equipment and information available in a glass cockpit, the analogue cockpit is a lot simpler but also less accurate.

"Before I flew the Caravan for skydiving ops, I completed my endorsement training. There, I had plenty of time to familiarise myself with where I would be getting the information from, and how to interpret the analogue instruments as accurately as I could.

"It helped that I did have some exposure to analogue cockpits, gained during my aerobatics training in an Alpha Robin.

"The biggest difference is that the situational awareness and information available in a glass cockpit far exceeds that of an analogue cockpit.

"Currency and familiarity on either system is extremely important, as are the basic flying skills."

CAA Aviation Examiner, John Parker, a 9000-hour pilot who trained on analogue instrumentation, is a complete fan of the glass cockpit.

"It's just so good, it's such a fantastic advance over analogue. The moving map is brilliant. Most systems are fitted with an autopilot. You know whether you're inside or outside controlled airspace."

But John, who is of the 'old school' also admits there's a danger in the dazzle of the glass cockpit.

"It's hard not to be seduced by it all. And I can see a problem in pilots simply kneejerk reacting to the blip in front of them, rather than checking its validity by looking at hard copy charts, or looking out the window."

John says today's student pilots do learn "the old way of flying".

"Our current theory exams are based on the old analogue instruments. So the students have the background theory about flying older aircraft to begin with. What they need is more practice flying them."

Current and Competent

Ardmore Flying School CFI, Warren Sattler, says that he's found younger students generally adapt well to the glass cockpit.

"After all, for them, the glass cockpit is just an extension of a computer game. But we always do a check ride when transferring from analogue to glass.

"The older generation hasn't grown up with this technology. But an older computer-literate pilot has a distinct advantage. By nature, they often expect a high standard of personal flying performance, and outcome.

"Age is certainly no bar. The oldest pilot that I am aware of converting to a G1000 cockpit was in his late 60s."

Carlton Campbell says that as far as the changeover goes, there seems to be more of a problem with people who are neither current nor fly often. "The threats are in their lack of currency and competency, irrespective of whether they fly a glass or analogue cockpit. Currency or competency with one instrument panel does not immediately translate to currency with the other."

Marc Brogan sums it up.

"Whether you train on a new aircraft and end up flying an old one, or the other way round, it all comes down to being current and competent on the equipment or aircraft you are flying." ■

to this, the aircraft instrumentation panel has come a long way!

