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Flight School

Which One Is Right for You?

New Avidyne Autopilot

Helps Pilots Avoid Stalls

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AVIDYNE

Avidyne DFC90 Transforms Older Cirrus Autopilots

AVIDYNE'S NEW DFC90 autopilot replaces the computer and sensors in Avidyne Entegra-equipped Cirrus singles and brings an unmatched level of performance. The computer is a direct plug-in replacement for the STEC 55X autopilots originally installed. The servos and wiring for the system are essentially unchanged.

The 55X is a rate-based autopilot that doesn't receive attitude information, so its performance is somewhat limited and not as precise as possible. The DFC90 takes attitude and air data directly from the electronic sensors in the Entegra flat-glass system. The accuracy of those non-moving gyros gives the new autopilot a level of smoothness and precision that's not available in a rate-based system.

and in most respects more important to safety. Avidyne conducted a study of Cirrus accidents and determined that fully 28 percent during the past eight years involved autopilot-induced stall/spin accidents when the autopilot was in vertical speed or altitude hold mode.

To see the new DFC90 in action, I went flying with Avidyne President and CEO Dan Schwinn in an SR22. The controls of the new autopilot mimic the operation of the STEC unit it replaces. Avidyne thought long and hard about duplicating functions of the 55X it's replacing, because some features are unusual and out of the mainstream of human factors thinking. For example, to arm a mode you push two buttons at once. In other modern autopilots,

us know we were flying dangerously close to the stall, and a plain language annunciation appeared on the PFD saying the same thing. As the airplane slowed below approximately 1.3 times the stalling speed, the autopilot gradually lowered the nose just enough to maintain airspeed. It was giving up altitude, yes, but very gradually while it was keeping the airplane safely above the stall.

The system uses both airspeed information from the digital air-data computer and accelerations from the electronic gyro to calculate a safe margin above stall. When the airplane is flying in low-speed protection, bank angles will be limited to preserve margin above the stall. If you command a turn, the auto-pilot will turn, but very gradually, all the while warning



Even more important, the DFC90 has envelope protection built in, meaning that it will not allow the airplane to exceed the high airspeed limits, or to stall, while it is engaged. There is also a "straight and level" mode button that does exactly that — rolls the wings level and the nose slightly up. If a pilot ever becomes confused about the actual attitude of the airplane, or what the autopilot is trying to do, the new straight and level function is an instant way to recover and gain time to sort things out.

Preventing an over-speed is pretty simple stuff for a modern autopilot. If the airplane approaches the red line, the autopilot simply raises the nose enough to keep it within limits. Low-speed envelope protection is more complicated

mode-arming is either automatic, as in the case of altitude capture, or a one-button press. But in the end Avidyne stuck with the 55X operating scheme so that Cirrus owners wouldn't need to learn any new procedures.

The DFC90 is as smooth and precise as you would expect a modern digital electronic autopilot to be. Its superior computer is also immediately evident in the performance of the flight director V-bars. In the 55X system, the command bars lag and wander because of the lack of attitude information, but they are spot-on with the DFC90.

To see the low-speed envelope protection in action, we engaged altitude hold and reduced power. As the airspeed bled down, an aural alert sounded, letting

you of your too-low airspeed.

The DFC90 holds the promise of very important safety gains in the Cirrus. It's easy to become distracted and not notice the autopilot trying to maintain an altitude or vertical speed when there is not enough power available for the task, and this gives the pilot plenty of opportunity to remedy the situation before the airplane departs controlled flight.

The DFC90 is priced at \$9,995. The Entegra PFD must also be modified to output data to the autopilot, and that mod is \$3,000. Cirrus owners who send in their Entegra PFD for modification before the autopilot is certified this summer can buy the DFC90 for \$5,995 for a total upgrade price of \$8,995, a \$4,000 savings. avidyne.com — **JMM**