



# Pleasant Under Glass

**Avidyne steps up with glass retrofit, starting with the King Air 200**

*by Ken Ibold*

**I**ncremental advances in existing aircraft designs have, in recent years, been concentrated in the panel. What aircraft manufacturer hasn't shown up in Oshkosh or at the NBAA convention in recent years with announcements about glass panels and other electronic whistles and bells being the sole fruits of their product development?

Because airframes tend to be mostly static designs, and engine improvements are big-ticket items, the dividing line between a "modern" airplane and a "legacy" version of the same design generally revolves around whether it uses mechanical gyros or solid-state accelerometers for primary-flight information.

It's not just glass-panel snobs who are driving the call for glass-panel retrofits. The fact is that glass panels are more reliable and lighter than the electro-mechanical instruments they replace. Although empirical evidence about safety is sketchy so far, there is evidence that after the initial transition period the glass panels are more intuitive and result in a better pilot scan than the standard six-pack.



Before



After

Now that the airplane manufacturers are almost entirely on the glass-panel bandwagon for original equipment in new aircraft, the product-development folks behind the “general aviationization” of glass panels are turning toward retrofitting older airplanes. The Garmin G600, introduced at Oshkosh last summer, has not come to market as quickly as

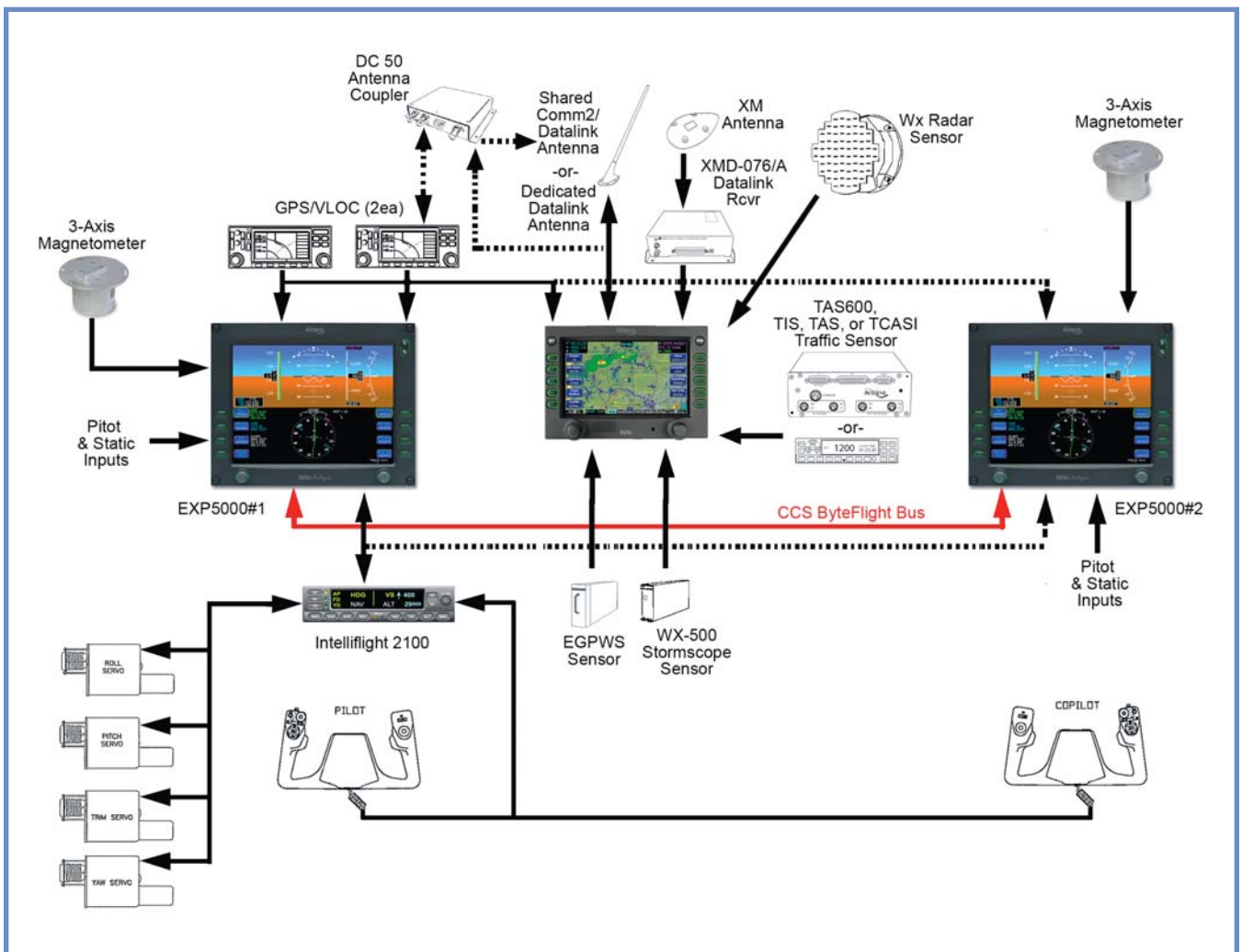
some would-be buyers have hoped. Chelton has been playing this field with its FlightLogic system since 2003 but uses smaller 6.25-by-5.5-inch display panels. Chelton is available on a wide variety of airplanes, ranging from Cessna singles to Citations and beyond.



Now Avidyne has stepped up to the plate with its Envision integrated flight deck for retrofit installations. Based on the Entegra integrated flight decks found on some new aircraft, Envision integrates one or two Avidyne EXP5000 10.5-inch primary flight displays with one or two EX500 multifunction displays.

Driving the displays are dual air data and attitude/heading reference system (ADAHRS) solid state “gyros” that use Avidyne’s Cross-Compare System. The system monitors both ADAHRS and the navigation systems, and alerts the pilot if a discrepancy arises. Should one of the ADAHRS fail, it can be isolated from the displays without losing any functionality.

For its product launch, Avidyne teamed with S-Tec to create the





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Alliant system, which features dual primary flight displays, and EX500 multifunction display coupled with the S-Tec Intelliflight 2100 digital autopilot.

The Alliant system's original installation is in a King Air 200, with more models in development. A significant difference between the Alliant and the FlightLogic is that the Alliant merges the design with S-Tec's modern, clean-sheet autopilot. (In fact, S-Tec holds the King Air STC.) Together, the two create a low-workload, feature-rich cockpit that allows an older King Air to hold its own against a glass-panel King Air fresh from the factory.

The system's integrated air data computer provides a full-time reference to winds aloft, displaying a

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wind vector on the PFD to help the pilot compensate for winds (as when flying an approach) or to optimize cruise altitude. The MFD can display a moving map, Jeppesen CMax instrument approach charts, traffic and weather. The stock engine instrumentation remains in place.

#### **Does It Work?**

The displays, navigation information and autopilot are highly

integrated, and herein lies the real value of the joint effort between Avidyne and S-Tec. All of the autopilot functions are annunciated on the PFDs, and can hold indicated airspeed on climb, cruise or descent. The combination of flight data and digital precision allows the autopilot fly the airplane smoothly in departure, cruise and approaches, holding the airplane to better-than-ATP standards.

In fact, the autopilot even handles engine failure with aplomb. During a demonstration flight, chopping power to the left engine resulted in a slight yaw oscillation, but the autopilot quickly compensated with a slight bank into the good engine and no altitude loss.

S-Tec envisions the Intelliflight 2100 autopilot as a flexible package that can be altered to fit a variety

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of airplanes. The company says the line will soon include remote computers, more powerful brushless servos and modular smart servo technology. That would allow the autopilot computer to be housed in the control panel, a remote unit, or even in the servos themselves, depending on the demands of the particular aircraft model.

Because most aircraft frequently are flown single-pilot, S-Tec designers focused on two aspects of operation: airspeed hold and control wheel steering.

Airspeed hold is useful in a variety

of turboprops and light jets to manage airspeed during climbs and descents. Control-wheel steering allows the pilot to interrupt autopilot operation – such as when given vectors in busy airspace – and then have the servos seamlessly re-engage when the control wheel steering button is released.

From now, the Alliant system is available for installation on about 800 of the 1,200 King Air 200s. The companies say more approvals are on the way. For more information, including a list of shops authorized to do the conversion, see [www.alliantkingair.com](http://www.alliantkingair.com). And if you find you can't wait for your

shop to get its approval or an STC to become available for your airplane, check the airplane classifieds; as of mid-December S-Tec had listed its converted King Air 200 for sale.

Adding new airplane features to an older airframe isn't cheap – but then, neither is buying a new airplane. In the case of the King Air 200, the retrofit is priced at \$99,850 for the Envision system plus \$70,257 for the S-Tec autopilot. Add in installation for another \$50,000 to \$70,000, and the total package costs about 20 percent of the value of the airplane.

