

*New cockpit equals the capability of any new turboprop, and surpasses most jets.*

# FLYING

BY J. MAC McCLELLAN

# Garmin G1000

## Pushes King Air 90s to the Top

At decision height on the ILS approach I pushed the go-around button on the throttle of the Beech King Air 90. The flight director command bars on the big flat-glass display in front of me commanded a wings level, nose-up attitude. I brought the power up for climb, reached up and

pushed the autopilot engage button, raised the landing gear and flaps, and sat back to watch.

The missed approach procedure called for a runway heading climb to 2,000 feet and then a right turn direct to a nearby VOR to hold. When the King Air reached 2,000 feet, the autopilot rolled smoothly into a right turn and the navigation system displayed a course direct to the VOR, which the autopilot followed while continuing the climb to 3,000 feet, as prescribed on the approach chart, where the airplane leveled off. At the VOR the King Air entered the holding pattern using the odd, but correct, parallel entry pattern. And I had not touched a single button on the navigation system, or autopilot, other than to press go-around and reengage the autopilot.

For a few years the most sophisticated navigation systems have been able to automatically fly an airplane through procedure turns, DME arcs, holds and approaches, but now Garmin's G1000 has transformed a missed approach—one of the most demanding, high workload and risky parts of an IFR flight—into a fully automatic procedure that leaves the human pilot free to monitor the airplane and consider his options on where to go next. The G1000 system fills the role of the best trained, most reliable copilot ever, bringing single-pilot operations as close to the safety of a trained crew as possible.

Garmin's flat glass, fully integrated avionics system that can do all of this had been reserved for only new production airplanes,

but now an STC conversion makes its comprehensive avionics capabilities available to existing Beech King Air 90s. The system is very similar to the G1000 package installed in Cessna's new Mustang light jet and carries a typical all-up installed price of around \$350,000.

The finished conversion is amazing because the system looks as though it has been in the King Air from the factory. The reason is that the entire instrument panel from the glareshield to the subpanel is replaced with a new, perfectly smooth piece of metal. All of the old gauges and dials are gone, replaced by three big flat-glass displays. In front of each pilot is a 10.4-inch primary flight display (PFD) while a giant 15-inch multifunction display (MFD) dominates the center of the panel.

Garmin also created a flight guidance control panel so all mode selection for the autopilot is made via knobs and buttons on the panel located above the MFD where it is easy to see and reach from both pilot seats. And the knobs have a dedicated full-time function so the heading knob, altitude select knob, altimeter set knob and so on always do the same thing with no intermediate mode selection. A keyboard located on the center pedestal can be used to enter nav information such as the flight plan and to select various display modes. The knobs and buttons on the G1000 displays can also be used to control the system.

Because the attitude-heading reference systems (AHRS) and air data computers inherent in the G1000 use digital electronics, there

is no need for the King Air's AC electrical system, so the inverters that make AC power and the associated wires are gone. Elimination of the AC electrical system and replacement of the remote gyros and avionics that are typical of a King Air C90 with the G1000 compact modules will typically save 100 pounds or more of empty weight, not to mention what the full integration of the system will do for reliability and ease of maintenance.

The dual AHRS and air data computers constantly monitor each other and if there is a failure, essential flight information transfers to a reversionary mode so there is always primary data available after the failure of a sensor or a display. The AHRS can also align in flight if there were to be a power interruption, for example. And the air data computers meet reduced vertical separation minimum (RVSM) standards so the airplane is eligible to fly above 28,000 feet.

The MFD shows all engine information for the PT6 turboprop engines, so those gauges are gone. And new integrated radio modules handle all voice communications, along with VOR and ILS navigation. The heart of the navigation system is, of course, dual WAAS-capable GPS receivers. The complete system qualifies for GPS primary navigation, meaning you can fly approaches or other procedures where no VOR or other conventional guidance is available.

The G1000 conversion also adds safety information with standard Class-B terrain awareness and warning system (TAWS) and Garmin's digital weather radar. Traffic alerting sensors can be displayed on the system, and though the GDL-69 XM Weather receiver is optional, every U.S.-based pilot will add it to see real-time weather reports including Nexrad radar returns, lightning, forecasts, metars and so on. Garmin's "safe taxi" runway charts are standard, and the system is capable of showing Jeppesen's approach and airport charts if you subscribe. The Jepp charts look spectacular on the big MFD and are easy to read without the zooming or panning necessary on smaller displays.

The G1000 conversion is available for most airplanes in the King Air C90 series, but not all. You can check to see if your serial number is eligible for conversion by checking [garmin.com](http://garmin.com) for a list of specific serial numbers. King Airs that have been converted to the more powerful Dash 135 version of the PT6 engines by Blackhawk or others are approved for the G1000 retrofit. Or, you can change engines later without invalidating the approval of the G1000 and its automatic flight control system.

It is very difficult to predict how long a King Air will be in the shop to complete the G1000 installation because every airplane may be at least a little different. The installation can only be performed at selected Garmin locations that possess the expertise and equipment to do the work. By restricting the number of installers the experience level should ramp up quickly. And, the installation kit is very complete, including the new instrument panel itself, autopilot servo brackets and so on. To find a list of authorized installation locations check [garmin.com/buzz/g1000](http://garmin.com/buzz/g1000).

There is no more solid or durable airframe around than the King Air. And its long history of reliability and safety makes it relatively easy for owner pilots to be insured. With the G1000 system installed there is no light turbine airplane available—new or used—that has more avionics and safety equipment capability, so this conversion looks like a sure winner that can carry the comfortable King Air far into the future while conceding nothing to other airplanes in terms of its cockpit sophistication. And the Super King Air 200 is next to receive the G1000 conversion option with certification work already underway. ✈



The top photo shows the G1000 MFD in the King Air in the reversionary mode with primary flight information combined with engine instruments and other data. This mode is used after the failure of a PFD display. The other photo above of the MFD shows an airport diagram along with frequencies and other information. On the MFD photo below is a display of precipitation from the onboard Garmin weather radar that is part of the conversion package.

