

GARMIN GOES PART 25



Wide-Screen Panels Come to Business Aviation

S T O R Y B Y D A V E H I G D O N

No one could say it wasn't expected, and few seemed shocked at the news. Garmin, a major supplier of avionics and integrated flight decks for everything from light sport aircraft to light business jets, launched an assault on the new territory: The market for "large" aircraft — planes weighing more than 12,500 pounds at take off — extends upward from the upper end of the light jet segment and, as such, must be certificated under Part 25.

With certification rules considered significantly more demanding than Part 23 — where the company heretofore focused its aviation energies — Garmin's new G5000 will, when certificated and in service in 2012, complete Garmin's expansion into every segment of aviation.

If 2012 seems particularly ambitious or sudden, it's worth noting the company said it was already about halfway through development and certification.

Garmin executives conceded the company is not pausing its pursuit of new markets — and the Part 25 segment is both new and potentially lucrative.

After two decades of building itself into a dominant player in general aviation avionics for Part 23 aircraft, the company that GPS built is expanding its scope into territory long dominated by two avionics giants: Rockwell Collins, which long ago withdrew from producing products for piston singles and twins; and Honeywell, which already competes head-on with Garmin in the Part 23 market, right down to the LSA segment.

Industry watchers and industry scuttlebutt pegged Garmin as an

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eventual Part 25 contender years ago — back when the G1000 first broke through as an available system on Cessna Aircraft's piston singles and beyond to the Citation Mustang light jet and, eventually, the Caravan turboprop.

Expectations sharpened further last fall when Garmin unveiled its latest Part 23 integrated package: the touch-screen controlled G3000.

An Ongoing Progression

Garmin builds on development of the G3000 in the expansive G5000, which shares touch-screen controllers with the former. But the G5000 is not simply a bigger, higher-standard variant of the G3000. The G5000 essentially creates new ground for the company.

And Garmin didn't unveil the G5000 to the market seeking takers — a launch customer already was on-board.

In tag-team fashion, Garmin and Cessna effectively multiplied the impact of their respective Media Day press conferences during the National Business Aviation Association's convention in the fall. From one corner, Garmin unveiled the G5000 as its latest, best-yet innovation in digital flight decks for business aviation, but would only confirm the existence of a launch customer for its first Part 25 product. From a different corner a couple of hours later, launch customer Cessna took the handoff and ran with it by simultaneously signaling the end of the Citation X and the reincarnation of the X as the Citation Ten.

While the announcements garnered the attention warranted, the real interest was in the details of the programs — in particular the G5000.

Wide-Screen Format, More Options

Garmin's G5000 sports improvements and advances across the spectrum of systems integrated into the package, from radar, data-link and transponders to attitude and air-data sensing.

In any integrated flight deck system, EFIS panel or stand-alone digital instrument, the display is a window into its brains, providing visual indications of what a host of sensors feel and how aircraft systems perform.

Garmin dramatically stepped up the display real estate in the G5000 system with two new offerings: the 14.1-inch GDU 1400 and the 12-inch GDU 1200. Both displays employ the 16:9 screen proportions of motion pictures and today's high-definition digital televisions and, increasingly, desktop computer displays. This widescreen format allows for more options in information displayed and in decisions about split-screen functions.

The displays' 1280 x 800 pixel-per-inch resolution might not quite qualify as full-tilt high-def, but at these improved numbers, the screens display a crisp depth and color realism that should make the standard synthetic vision technology look more photo-realistic than ever before on a flight-deck display.

The choice light-emitting-diode backlighting helps make the displays sunlight-readable, while generating little heat or power waste — and with a life expectancy several times that of the airplane itself.

Garmin showed off numerous configurations, using anywhere from three to five of the display screens — some using a single size, others mixing the display sizes — which lend the G5000 to a huge variety of cockpit solutions.

Displays installed as MFDs will have split-screen capability, allowing two different data sources to display side-by-side, such as flight planning and moving map, or weather and navigation maps, or some other combination. Aircraft synoptics can be displayed, along with the full spectrum of information pilots need and use, such as charts, plates, maps, terrain warnings, weather, flight planning and data-link information.

The PFDs will be able to show the full range of air-data, attitude and navigation information, as well as SVT and an image overlay from an enhanced vision system sensor — in essence, merging the synthetic vision and EVS in a way similar to products coming from both Honeywell and Rockwell Collins.

Touch Simple

While the display units are the most visible part of the G5000, the system's touch-screen controllers are, at their core, the management tool — display screens responsive to the touch of a human digit.

One step Garmin took to help simplify operation of the G5000 was to give each display screen its own dedicated controller. The controllers can be tasked to control other screens, if needed, but the normal set up links one controller to one screen, and it puts on that controller's screen controls relevant to that display.

In another nod to simplifying learning and using, Garmin employs graphic iconography to identify functions. Icons designate everything from intercom or radio volume level and entering frequencies to transponder control and flight planning.

Push the button for the radio control, and you get a window that allows you to dial in the frequency.

Garmin G1000

Growth Continues with King Air 300, 350 STC Projects

Want to program a flight into the FMS? Just tap the button, and the appropriate menu or window opens. Get confused? Dedicated “back” and “home” buttons stand by ready to take you back in either one step or all the way to the opening menu.

All the controllers and displays connect through a common network, which allows for considerable flexibility in configuring the system regardless of the number of displays.

To prevent inadvertent touches from producing unwanted commands, the touch-screen controllers employ infrared sensors arrayed around the screen surface, which allows the screen to differentiate between contact by human fingertip and by an inanimate object.

The Brains Behind the Displays

The G5000 is aimed at the Part 25 aircraft market and, as such, certification standards increase substantially for everything from displays to sensors.

There’s no upping the ante on screen real estate by simply sliding a G1000 or even a G3000 package into a Part 25 airplane — which means new sensors for attitude and heading reference, new air-data sensors and processors, a traffic alert and collision avoidance system, and navigation sensors.

Although incorporating the input of an EVS sensor is in the cards, neither heads-up display nor heads-up guidance technologies are planned.

Garmin has other capabilities available that depend on the airframe maker to select for integration. Some of those options show up in the G5000’s launch platform, the highly revised flagship of Cessna’s Citation line: the Ten.

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You could be forgiven if you didn’t expect Garmin’s launch of the G5000 during the National Business Aviation Association’s 2010 convention; after all, the company hardly has been idle lately.

There’s the G3000 in the works, several retrofit programs in play and now the G5000. The announcement really fulfilled years of expectations.

When Garmin first unveiled the G1000, the system set the industry chattering. Nothing quite like it existed — and certainly nothing like it as cost-competitive for airplanes like Cessna’s revived 172, 182 and 206 piston singles. While the G1000 also was a logical choice for the Citation Mustang, few expected the system to catch on as it has.

The system’s popularity helped inspire and underwrite Garmin’s launch of a more upscale Part 23 system in the G3000, with its sophisticated touch-screen controllers. And this experience and those controllers fed into the creation of the G5000.

Today, thousands of G1000 systems are installed and flying in a variety of aircraft, some with factory installs, some with STC upgrades.

The G1000 continues its march of market penetration, and it does it with one of the stalwarts of business aviation, Hawker Beechcraft’s sturdy King Air 300 and 350.

Configured with two 10.4-inch PFDs and a centrally mounted 15-inch MFD, the G1000 package for the King Air 300 and 350 aircraft brings with it all the capabilities and options typical of G1000 installations: electronic stability protection, SVT, the GFC 700 flight-control system and RVSM-compliance.

One benefit of the G1000 in these two turboprops is the impact it has on useful load. According to Garmin, the installation lightened the King Airs by about 200 pounds relative to the systems removed.

When completed in mid-2011, the STCs for the G1000 in the King Air 300 and 350 will complete Garmin’s G1000 penetration into the King Air line. Garmin already holds STC approvals to install the system in select C90, 200 and B200 King Air models. The company also holds STC authority to install the G1000 in Cessna CitationJet models.

The King Air 300 and 350 installations can be performed at any authorized G1000 dealer.

Also slated for STC in 2011 is installation of the G600 single-unit/split-display system in Cessna 441/Conquest II turboprop twins, with RVSM compliance.

The G600 is Garmin’s certified avionics system designed specifically for Part 23 Class I, II and III aircraft as a retrofit, which transforms an old panel from steam-gauge, six-pack panels to primarily glass. It shows critical flight data on two six-and-a-half-inch diagonal flat-panel displays.

Garmin is working with AeroMech of Everett, Wash., and Corporate Aircraft of Fresno, Calif., to develop the STC, which will be approved to work with ARC 1000 autopilot systems under the RVSM. □



Elliott Aviation recently announced it will offer the Garmin G1000 Integrated Avionics Suite glass cockpit in a Beechcraft King Air 300/350. According to Elliott Aviation, the company has retrofitted more King Airs with the G1000 than all other dealers/installers combined.

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Cessna First to Tap Garmin Advance

Cessna was the first to tap Garmin and its pioneering G1000 system for a turbine airplane back when the airplane manufacturer launched the Citation Mustang. Cessna also was first to tap the G1000 for any airplane, selecting the system for its piston singles.

Once again, Cessna saw what Garmin was offering and liked what it saw. Garmin got Cessna's nod to supply the G5000 to the re-imagined Citation X.

For Cessna's flagship, Garmin configured the G5000 with three GDU 1400s to serve as two PFDs and a single MFD. The flight crew gets four of the touch-screen controllers to manage the entire system and, as designed for the Citation Ten, it's a deep, sophisticated package.

In addition to the features already mentioned, the Citation Ten package will include dual FMS systems and WAAS LPV sensors certificated for RNP 0.3. The solid-state, weather-radar system features both vertical-scan capability and turbulence-detection capabilities. The G5000 package for the Ten also includes TCAS II with Change 7.1 and Link 2000+ data-link messaging.

Garmin plans ADS-Out, a new TAWS package and auto-throttle control capability for the Ten's new Rolls-Royce AE3007C2 powerplants. The auto-throttle control programming will allow control through either an airspeed setting or a thrust-level setting.

Options for the G5000 package include enhanced SafeTaxi, which

adds warnings for runway lengths too short for conditions, as well as alerts for runway and taxiway intersections. XM data-link weather for domestic operations also will be an available option, with the G5000 able to overlay the weather on other graphics. For international customers or operators, Garmin's Iridium-based worldwide weather data-link is available on the G5000.

One Giant Leap for Garmin

Gary Kelly, vice president of marketing for Garmin, said Garmin has long been a company that has progressed from the last challenge to the next — ever looking for the next area in which the company could bring new ideas and fresh solutions.

Garmin's operations have reflected this approach, from the modest portable GPS receiver maker, then to the developer of a series of more ambitious aviation GPS products to recreational and scientific GPS products and on into the full spectrum of avionics gear and integrated avionics packages with the G1000.

The G3000 system represented Garmin's view of the next step in Part 23 systems, with more capabilities and the simpler, touch-screen controls aimed at airplanes above where the G1000 fit.

The Part 25 G5000 system represents the next step in this progression without offering any hints at what might come next.

Right now, lining up the next few customers for, and completing certification of, the G3000 and G5000 have the Olathe company more than busy enough. But Garmin seems ready to continue its progression through the innovation and inventiveness that brought the company this far. □