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AVIONICS SMACKDOWN

Choosing Retrofit Glass Aspen Takes the Prize

The Aspen Evolution and Garmin G500 both offer a powerhouse upgrade owners rave about. We favor the Aspen for its scalability and value.

by Larry Anglisano

If you're committed to the account-draining task of a major avionics upgrade, your sights are likely set on either of the two most sought-after systems for the aftermarket: Garmin's G500 and the Aspen EFD1000-series.

We think buyers go into the decision-making process smitten by the G500's bigger size, and for bigger, more valuable airplanes, it's easy to label the G500 a logical fit. But our experience is that Aspen wins the install bid more often than Garmin. Why? It's the install complexity that ultimately rules the decision even when a buyer's heart is set on the G500 from the get-go.

That said, keep in mind that to compare apples to apples, you need two Aspens to equal a single G500.

BIGGER, BUT BETTER?

Aircraft in the 6000- to 12,500-pound category have only one choice: Garmin's $30-grand G600 system. The G600's software is certified for this class and the system is sold soup-to-nuts with little in the way of add-on options. Aspen's EFD1000C3 flavor is aimed at Class III applications. The a-la-cart G500 is aimed at the lighter stuff and owners can add charting, SVT synthetic vision and other options as needed to keep the total cost a bit more in check.

The G500 stands out in the marketing propaganda because it looks

CHECKLIST		
ASPEN		GARMIN
~	SIZE AND CLARITY	+
+	SYSTEM FLEXIBILITY	~
~	SYSTEM REDUNDANCY	−
~	INSTALL COMPLEXITY	−
+	CUSTOMER SUPPORT	+

Here is a G500 and a two-screen Evolution system reproduced at one-half actual size. Garmin's on-screen text is noticeably bigger. Both systems rely on softkeys that are about the same size. The G500 relies more on multi-step menus than the Evolution. You can also see how two backup instruments or a third Aspen display could be added in the space occupied by this text.

bigger—and it is. The Garmin has dual screens (PFD and MFD) housed in a single bezel. Each color LCD screen measures 6.5-inch diagonal with 640x480 VGA resolutions, displaying 65,536 colors. Some owners react that the machine looks smaller in the panel than they envisioned after eyeing the brochures. This could be an illusion for large panels. But, on a small panel like in a Mooney or Skylane, the G500 is dominant.

Aspen's PFD is a single 760x400 32,768-color LCD screen design that measures six inches. The bezel width is such that it fits dead center in the middle of the six-pack, sliding through the existing three-inch instrument cutouts and secures to a rectangular, surface-mounted bracket. There's a flush-mount option, but it requires chopping of metal—just like the G500. An optional second or third screen, the 1000- and 500-series MFD, can occupy the space to the left or right. A dual screen setup is called the Evolution 2000.

The Aspen display has data bars that split it into a top and bottom half. Measure the total viewable area above that data bar (which contains horizon and airspeed and altimeter tapes) and you get an area that's roughly 2.50 inches high and 2.75 inches wide. The G500 is clearly wider at four inches. Thanks to that extra screen space, the G500 on-screen nomenclature is stamped in a larger font that buyers are, not-surprisingly, drawn to. The size also makes the G500 PFD screen look less busy than the Aspen.

Aspen's latest software (2.3.3) increases font size for airspeed, altitude bug, tape and drum values, baro setting, selected heading and course while also increasing the size of the values in the data bar. This is a big improvement, even for our 40-something-year-old eyes. On the topic of software, both systems have software platforms that are easily upgradeable in the field, in most cases.

INSTALLATION REALITY

Many of the systems flight-critical electronics live inside the EFD1000 display, which saves critical space and installation effort. It includes the AHRS and a digital air data computer that has pitot and static fittings on the back of the display chassis, an input-output processor (IOP) and of course a main system processor. A configuration module stores installation, aircraft-specific calibration, and user data settings so swapping out a display requires no reconfiguration. Housed in the rear of the display is a cooling fan and backup battery that has enough juice for 30 minutes of display life. A remote sensor module (RSM) containing a magnetometer, OAT sensor and GPS receiver is mounted on the airframe.

A complete G500 is composed of the GDU620 display and remote units: a GRS77 AHRS, GDC74A air data computer, a temperature probe and GMU44 magnetometer. There's no backup battery.

The single-screen Aspen weighs roughly three pounds, while the G500 is closer to 15 pounds, including the huge wiring bundles (some of which is Ethernet) routed between all of those remote boxes.

Aspen understood early on that radio stacks have a smorgasbord of

equipment and designed to play with the crowd. The mysterious remote analog converter unit (ACU) converts analog signals to digital format, allowing vintage nav radios to play on the Aspen electronic HSI.

G500 is snobbish in comparison, accepting input from the world-conquering GNS-series (and now GTN700 and 600 systems) and the Garmin-AT SL30 Nav. Have a KX155 you want to feed the G500? It won't work, so you'll need to retain it stand-alone or buy a 430. For some buyers this is a deal-breaker.

On autopilot interconnects, both systems are liberal. Garmin was the first to offer a digital autopilot emulator with the GAD43 that can replace Bendix/King and some Collins autopilot gyros. Aspen joined the party with the EA100 emulator, which at this time only has Bendix/King emulation. Aspen said it's working on a Century and ARC interface. S-TEC interfacing would require turn-coordinator emulation and isn't in the plans for either system. The G500 can command the S-Tec the remote altitude preselector with a $2995 enablement card. The Aspen cannot. In our trials, both the EA100 and GAD43 work flawlessly and jump-start older analog autopilots while increasing reliability.

Both systems include integrated GPS roll steering (GPSS), which is a dollar saver since you won't need to buy the $3000+ GPSS upgrade for your existing autopilot. Aspen makes GPSS more seamless, however, with on-screen control. The G500 requires an external switch, increasing the install effort and operational complexity.

On the topic of GPSS, one function we like in the Aspen GPSS is the wings-level mode. If the GPSS is active and the GPS source is lost

ASPEN'S SYSTEM MAKES FOR A "SIMPLER" INSTALL

Installing either of these systems in any aircraft is a major job. If someone brags that the Aspen is a drop-in system they simply mean the chassis of the display drops through the existing horizon and DG instrument holes. That's where the simplicity ends.

Over the years, we've learned to judge install complexity by length of the installation manual. The G500 has several manuals, broken down into electrical, physical and the configuration process. Expect a shocking instrument panel gut-job.

For the G500, it's either the replacement of the entire pilot's instrument panel or creative sheet-metal artistry that includes painting the entire instrument to match.

With an Aspen, the paint cans and cutting wheels stay in the storage cabinet because the holes are already cut, and seldom does the instrument panel even need to be removed from the aircraft. There's some shifting around of supporting instruments and perhaps some relocation of toggle switches and annunciator panels, but that's about it.

The techy buzz word in a G500 suite is LRU for Line Replaceable Units. These sub-units are modular in design and are mounted either wherever there's room and appropriate environment for each particular sensor. Big work. Garmin says this design eases troubleshooting and maintenance by easy replacement of a remote box. But the install is time-consuming and complex, and it's not uncommon to relocate and rewire systems that might cause interference—like strobe lighting and power supplies and collocated coax cables.

Aspen's remote sensor module (RSM) can be an issue. It's the size of a GPS antenna and attaches on the rear of the fuselage in a magnetically clean area. This can be especially tricky on composite aircraft. There's an option for mounting the RSM internally, but that requires additional approvals and disables the OAT, winds aloft and TAS data.

Configuration and setup of either system is an important and lengthy portion of the job, but our experience is that Aspen's setup is easier. If you're installing autopilot gyro emulators, expect sizeable amounts of flight testing. That's more time off the calendar and on the final invoice.

(not unheard of and often unrecognized by the pilot) the GPSS mode automatically switches to wings level and alerts the pilot to select another means of tracking.

The G500 accepts oodles of re-mote inputs including the GDL69 XM receiver, a wide variety of traffic systems and the L-3 WX500 sferics. Garmin says it might work with Avidyne's TWX-series sferics. Aspen plays XM with the EWR50 Evolution Weather Receiver or Heads Up XMD76. Garmin's GDL69 won't work.

TRULY À LA CARTE

A huge selling point for Aspen is the incremental upgrade potential. Simply add a second or third screen as budget allows. Like the right half of a G5000, the second screen is for playing weather, terrain and georeferenced NACO charts but the wider screen area on the Garmin makes for a nicer chart presentation, in our view. There's also traffic overlay that can play on a single EFD (as can XM weather) with appropriate software. It takes two Aspens to challenge a G500.

But pairing Aspen displays also provides redundant backup and flight data integrity cross-checking with dual-AHRS. There's also split-screen data capability. The reward for this extra cost and install effort is a regulatory green-light for removing all of the backup flight instruments except the attitude gyro. Note that you'll need the 1000MFD and remote battery for this. The lower-end 500-series MFD won't allow reversion to function as a backup PFD.

A single G500 offers little in the way of single-point display failure redundancy. If the screen fails, you're now on the steam gauge backup instruments.

But that's not the whole story. The Evolution system's Achilles heel is pitot-static blockage. Loss of either pitot or static data will not only remove the airspeed and altitude, it will remove heading and attitude on all Evolution displays because its reliability may be in question. It will also take down the autopilot if you're using the EA100 to drive it. Good thing you still have that retained attitude gyro.

Aspen told us certification without traditional horizon gyro is on the doorstep, and the new software won't remove the attitude data. It may still be unreliable, however. The G500 will still provide attitude data without airspeed input.

While we're talking about dependent systems, flying IFR with an Evolution requires an IFR GPS is installed and working.

We think the G500 MFD capability exceeds the Aspen, if simply because it is that much bigger. It can also overlay ship radar. The G500 has FliteCharts (NACO approach charts) and SafeTaxi standard. The pricey Jeppesen ChartView is optional. Aspen offers NACO charts only, but they are georeferenced (your position is shown on the chart) where FliteCharts are not. An annual FliteChart subscription for the Garmin is $395. For the Aspen, it's $299, and is supplied by Seattle Avionics.

Aspen should soon offer synthetic vision for $2995. For multi-screen setups, the syn vision cross-feeds among displays. Garmin's SVT is wonderful on the G500 and worth the $4995 option. We'll have to fly it on the Aspen to see if the extra visual information overloads the already-busy display.

We don't care much for the Aspen's rate of turn indicator, a curved white line on either side of the heading, with tick marks for full and half-standard rate turns. We're not fans of the Aspen's small and non-linear vertical speed indications that disappear in calm air. Because of this, some owners insist on retaining the round-gauge VSI in the panel.

Lacking in the Aspen is audio output. The G500 altitude bug provides aural (and visual) alerts within 200 feet of, or when deviating 200 feet beyond, a bugged altitude.

DECISION TIME

A basic G500 without SVT or GAD43 emulator retails for $15,995. The best equivalent Aspen system would be the Evolution 1500 package (no backup attitude option) for $14,990. Invest in the worthwhile SVT and GAD43 emulator for your autopilot and you get a G500 at $23,985. The better Aspen would be an Evolution 2000 (backup attitude capable), EA100 for the autopilot, remote battery and the planned synthetic vision ($2995) for $22,780. Average install labor favors the Aspen, widening the takeaway price gap.

For lean budgets, a single-screen Aspen offers decent amounts of utility if you can accept that it's a major step down from a G500 and offers little MFD function. On the other hand, it's liberal when playing with radios old and new and requires little if any instrument panel modification. With an out-the-door installed price that could fall well south of $15,000, we think it's a solid value with room to grow if you find a pot of gold a year later.

No solution is for all cockpits, and the G500 has the advantage in feature set and screen size. We also like its audio outputs, and autopilot vertical speed and altitude selector. It's the only choice if you want to wrap in on-board radar.

Here's a final thought for you: Expect a sizable learning curve with either system. A seasoned ATP told us it took him a solid 10 hours of VFR flying before he became comfortable going it IMC behind the Aspen in his single turboprop. This was after misprogramming the GPSS botched a departure procedure and turned him the wrong way after launching into the clouds. The last piece of equipment that must be upgraded with any of these installs is the one between the yoke and the seatback.

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