



Bob and Charlie Jacobson. Photo: Jim Porterfield.

Aspen's Evolution

Advanced Glass Panel Displays "For the Rest of Us"

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by Dale Smith



Back in the early part of this decade, bringing newer and bigger glass displays to business jets and turboprops was the thing to do. Companies often got so hung up in how big the displays were and what features they could offer, they forgot to ask one important question: How much is the customer willing to pay?

Well, in many cases, not as much as the manufacturers hoped for. It was, and is, hard to justify spending hundreds of thousands of dollars doing a panel upgrade in an airplane that is 20, 30—or more—years old. And what was a hard sell for owners of larger business aircraft was literally impossible for smaller General Aviation aircraft.

Fortunately, one company took a completely different route. When Aspen Avionics, Inc. was founded back in 2004, it was done so on the premise that there was a better, more affordable way to bring these new-generation capabilities to business and personal aircraft owners. In fact, the company's first advertising tagline was "avionics for the rest of us."

"They came up with this product called the AT300—it was a VSI replacement that also displayed altitude hazards—kind of a low-level terrain awareness product," explained Brad Hayden, Aspen's director of marketing. "It was a neat little product and it proved that the flexibility and affordability of these type replacement displays was attractive to aircraft owners."

With that first successful product in hand, Aspen's founders set out to do what they really wanted—create a full-on glass display product that could be easily and affordably installed in General Aviation aircraft and helicopters.

"Keeping affordability in mind, [Aspen] looked at various ways of building the products," Hayden said. "They came up with some very interesting—and



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- ^ Aspen's concept of easy installation was a major shift in the avionics aftermarket thinking.



I would go as far to say, revolutionary—ways of designing the product in a unique form factor that eliminated the necessity of having to go in and cut the instrument panel. You just go in and install the display in the existing instrument holes.”

“Our concept of easy installation was a major shift in the avionics aftermarket thinking,” he said. “Everyone else’s approach was to rip it all out and change everything. Nothing was upgradeable. We also made sure that our Evolution displays would integrate with the stuff you have in your panel now—radios, autopilots, GPS units. You can keep it all. That adds value and reduces cost.”

Actually, the process of designing an advanced glass display in the smaller form factor was a bigger challenge than making another big display. While other manufacturers were using larger, remote-mounted sensors and such, Aspen’s designers had to create tiny little components that fit in the instrument’s “can.”

“The availability of inexpensive solid-state Micro-Electro-Mechanical Systems (MEMS) has allowed us to put all the components of a modern Primary Flight Display (PFD) in a little tiny can three inches in diameter and four inches deep,” Hayden said. “We have had the benefit of designing a product using 2006 technology instead of mid-1990s technology.”

Thanks to MEMS and other advancements, the can holds the system’s integral Attitude Heading Reference System (AHRS), emergency GPS sensor and 30-minute backup battery. In fact, according to Hayden, the only external boxes that the system needs are a small module that has the magnetometer and outside air temperature probe and the other external unit is the analog converter for the autopilot and other interfaces.

Another technology that has been key to Aspen’s success is its use of new-generation small thin-film transistor (TFT) displays. “It’s a unique, customized display made especially for us,” he added. “It’s reflective as well as transmittive so it uses two separate technologies to make it more vibrant and clear. When it’s in direct sunlight it uses that light to help improve screen resolution—it uses the ambient light instead of fighting it. It’s easily readable in daylight or at night.”

“It’s also a very highly detailed dis-

play. There is very little pixelization. That’s important because people are always concerned that we are putting so much information on a smaller display,” Hayden said. “But once they see it, they’re sold. The enhanced resolution is amazing and very easy to read.”

Everything old is new again

Hayden proudly said that since the Evolution PFD was certified in March 2008, the company has delivered nearly 2,500 units and that the Multi-Function Display (MFD) unit, certified in fall 2009, is selling very well.

Of course, much of the Evolution’s success can be traced to its low cost and its high degree of upgradeability. Like the old electromechanical instruments it replaces, you can buy Aspen’s Evolution system in pieces. Start with the PFD, and add the MFD whenever you want. And if the company updates any software capabilities, that’s a simple upgrade, too. No need to remove or upgrade the hardware.

“We rolled out the entire product line based on expandability, upgradeability and modularity,” Hayden said. “Especially in today’s economy, the upgradeability and modularity of the Evolution family makes a ton of sense. You can just pay X amount this year and you know that next year you can add the MFD as your needs change or new capabilities are introduced.”

“Living up to the promise of system upgradeability, especially with the introduction of the MFD, is something we are really excited about,” Hayden continued. “Owners who have installed the EFD1000 Pro PFD can now go out and add a EFD1000 MFD and get unmatched system redundancy with DuoSafe, as well as a host of great capabilities like moving maps and our Evolution Hazard Awareness.”

Aspen is also hard at work developing other capabilities including airport diagrams, charts and a synthetic vision system for the Evolution family.

With its unique DuoSafe system Aspen has taken a new direction in terms of providing system display redundancy. “We are the only supplier to offer this level of total display redundancy below what’s available in the big iron,” Hayden explained. “If the PFD goes out you can hit the ‘REV’ button and the MFD1000 becomes a fully-functional PFD with its own AHRS and emergency GPS. If

you lose panel power, you still have two units running on independent batteries. There’s nothing else like it in GA.”

Big system capabilities in a small package

I can tell you from personal experience that the first time you slip into the left seat behind the Evolution PFD/MFD package what you see won’t be what you expected. You pretty much have everything available to you that you’ll find in a system costing a lot more.

To help deliver the maximum in situational awareness, Aspen has introduced Evolution Hazard Awareness, which features the system’s traffic and weather display capabilities.

“XM WX Satellite Weather is provided through the optional EWR50 datalink weather receiver,” Hayden said. “It is the lowest-cost, certified weather receiver on the market today.” Depending on the Evolution product installed and the XM WX subscription, the system enables the display to show NEXRAD radar, precipitation type, graphical TFRs, METARs, TAFs, SIGMETs, AIRMETs, and more. It can also display lightning returns when connected to a Stormscope WX-500.

Traffic information, including TIS, TAS and TCAS comes from any ARINC 735 traffic sensor, which is pretty much every certified unit on the market.

Hayden said that for terrain information, the Evolution system uses the Jeppesen Terrain Database, featuring full cultural, obstacle and navigation data.

While the units are loaded with capabilities, the real beauty of the Aspen Evolution system is the flexibility of display configuration. For example, let’s look at a “three-display” installation: a PFD in the center flanked by an MFD on either side.

“When you look at the capabilities provided in our three-screen system, we [have] the highest level of display flexibility,” Hayden said. “With the Evolution you can have weather displayed full-time on one MFD and your chart on the other—you can configure your cockpit and displays any way you want them.”

While the “three screen” system is impressive, there are a lot of capabilities available in a single screen system. If both your budget and panel space are tight, you can still enjoy the benefits of today’s glass display technologies. Thanks to Aspen’s designed-in

flexibility, you can just install the Aspen EFD1000 Pro PFD along with the Enhanced Hazard Awareness package and get traffic and weather displays without the need for a separate multi-function display.

It may not sound like such a big deal, but once you experience it for yourself, you'll see how much it can increase your situational awareness—especially when approaching or departing airport traffic areas.

On the other hand, if you're just looking to retire your old mechanical ADI or HSI, you can install the Aspen EFD1000 Pilot PFD and get a new-generation glass display for what you're probably paying to repair or replace your steam gauges.

Later on, if your flying needs require the upgrade to some serious IFR instrumentation, a simple software upgrade can turn your "Pilot" into a "Pro," protecting your original investment.

Bob Jacobson's Cherokee 180

Although Bob Jacobson owns Custom Avionics (www.customavionicsfl.com) in Bartow, Fla., when it came time to upgrade his Cherokee, he approached the project with the same eye on value and performance as any other owner. And that, in turn, led him to choose Aspen's Evolution displays.

"When I first saw the concept at the Aircraft Electronics Association (AEA) national convention a few years ago, I really got excited about it," Jacobson said. "I thought they had nailed it for someone who wanted to upgrade or replace their HSI. It seemed like the ideal solution for a lot of owners."

But once he saw an actual Aspen PFD in action, his mind was made up. "The screen is so easily readable," Jacobson said. "And I really like the ability to configure the display and make it as cluttered or de-cluttered as I want."

On top of its wonderful capabilities and flexibility, Jacobson was sold on the fact that he could install the Aspen glass panel one piece at a time.

"I could put in the PFD 1000 and not have to spend the extra money to do the MFD. It was small bang versus big bang—I could install it when I could afford to do it," he added. "I installed the PFD in June of '08 and installed the MFD as soon as it came out in October of last year."



Aspen's avionics are designed to fit in the existing panel holes.

Cherokee N6371J: Jacobson's flying showroom

Jacobson decided to install the Aspen EFD1000 MFD over the less expensive MFD500 because the 1000 gave him the DuoSafe redundancy capability. "If the PFD fails, it's a one-button push and you have full backup attitude and HSI. Other units can't do that," he said.

With the new dual-screen Aspen comfortably installed, Jacobson said his 1968 D-Model Cherokee 180 rivals the best of them and serves well as Custom Avionics' flying showroom. "We use it as our customer shuttle as well as a demonstrator. We use it to pick customers up and drop them off," he said. "So we outfit our airplane with our vendors' products so customers can experience how they work."

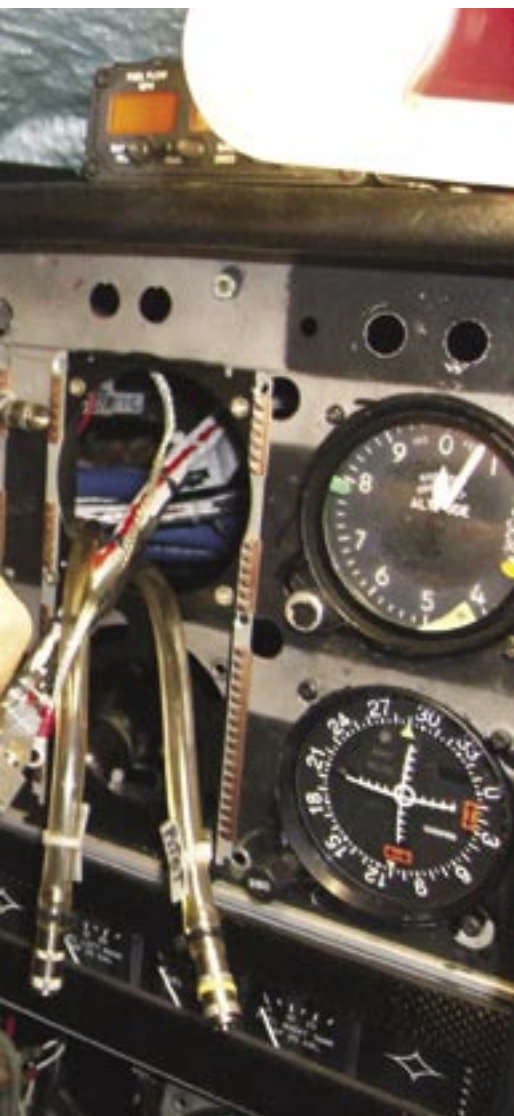
Jacobson also said that because the

Aspen system is so intuitive to operate, it's easy for easy first-time users to understand.

"My customers call me their 'crack dealer,'" Jacobson joked. "They get in my airplane and get a little taste of what they can have... and then they have to have it. It's been a very effective tool for us."

He explained how customers can see how easy it is to get traffic information by just installing a Mode S transponder with their Garmin GNS 430 and how well the Aspen Evolution units integrate with the S-TEC autopilot.

"Customers love the Aspen displays because they don't want the bigger screens. All they want is to replace their HSI and they can upgrade with the Aspen PFD and get the latest technology for about the same price as a steam



Above, top: Aspen displays can be configured to be as cluttered or de-cluttered as the pilot wants. Above: Jacobson is thrilled with the features and safety benefits of his Aspen system.

gauge HSI,” Jacobson said. “But it’s more than that—you are getting an attitude display, an HSI, an air data computer and GPS steering for most autopilots, plus all the other capabilities the EFD1000 delivers.”

Flight time

Jacobson said that after flying behind the Aspen Evolution PFD for over a year and the MFD for six months or so, he’s thrilled with the features and safety benefits the system delivers.

“I always liked the PFD from the beginning. I didn’t have an HSI, so to add that capability was great on its own. Also, the ability to switch between the GPS and ILS with the push of a button is great, too,” he said.

“But when I added the MFD, the biggest surprise was the difference a few

inches makes... I had traffic and terrain displays in my center stack, but with the MFD I could move the display right into my primary field of view. I can see things so much quicker now that it’s in front of me.”

“The MFD has three ways you can configure the display,” Jacobson explained. “The way I like it is with three windows on the display. I chose to put the traffic in a small window, the terrain in a small window and the moving map in the large window. That’s what works best for me.”

Jacobson said that while the Aspen’s capabilities and flexibility is great, the number one benefit is increased safety through improved situational awareness. “The biggest thing for me is having the information I want right where I can immediately see it,” he said. “I can see the

terrain change as I climb out or spot traffic or towers in the area that I need to be cautious of. It puts critical information right in my primary field of view.”

The bottom line to Bob Jacobson is that the Aspen Evolution package has lived up to his expectations. “I really like the system. It’s perfect for me and my airplane,” he said. “And every one of my customers who have it feel the same way, too.” As an avionics dealer, you can’t ask for more than that.

Dale Smith has been in love with airplanes and flying forever. A prolific aviation journalist, along with this magazine, Dale writes for numerous other aviation magazines. When he’s not writing fun stuff about airplanes, Dale is also a principal partner in Flying Boat Creative Services, an advertising agency specializing in aviation. Send questions or comments to editor@piperflyer.org.