

## Retrofit Roundup: 15 Hot Panel Upgrades

Add instant value and capability with our list of panel retrofit ideas

By Marc C. Lee

### Avidyne AXP340 Mode S Transponder

[www.avidyne.com](http://www.avidyne.com)

The AXP340 provides an affordable and lightweight Mode S Surveillance and ADS-B Out solution for fixed-wing and helicopter operators. The panel-mount unit puts out 240 watts of transmitter power and meets all the current Mode S requirements for VFR and IFR flight, as well as ADS-B Out. The AXP340 has additional features like a direct-entry numeric keypad, pressure altitude and GPS Lat/Long readout, flight ID entry, one-touch VFR code entry, an easy-to-use stopwatch timer, flight timer and altitude alerter. If the features don't get you, the clean and modern green LED display will. The unit is a slide-in replacement for the venerable KT76A transponder, making it a great choice for upgrades, as well as new installations. Price: \$3,995.



**Avidyne AXP340 Mode S Transponder**



**Aspen Evolution 1000 VFR Primary Flight Display**

### Aspen Evolution 1000 VFR Primary Flight Display

[www.aspenavionics.com](http://www.aspenavionics.com)

Aspen brings the world of glass panels to VFR-only pilots with their innovative VFR PFD. The industry's first certified VFR PFD, it combines situational awareness and safety into a single flat-panel LCD that can be easily upgraded to a fully IFR-capable Evolution Pro. The \$4,995 slide-in unit includes the "six-pack" instruments plus a CDI, flight-plan overlay with a slew of data, navigation display with 360° Compass and ARC modes, winds aloft, OAT, TAS and ground speed, and more. The unit includes a built-in backup battery and emergency GPS. It can be upgraded to also include ADS-B and Evolution Hazard Awareness (EHA), providing weather, lightning and traffic hazards.

### BendixKing KSN 770

[www.bendixking.com](http://www.bendixking.com)

This MFD is different in that it allows multiple selectable user interfaces. BendixKing calls this their "Hybrid Interface" and, in practice, it's a perfect blend of touch screen and hard buttons. Easily control your GPS navigation, NAV/COM, weather, traffic and terrain in any condition (especially in turbulence). The slide-in unit is a next-generation, WAAS-enabled, integrated "safety navigator." The KSN 770 combines GPS navigation, NAV/COM, terrain mapping, charting and safety sensor displays. It will also display XM Datalink Weather, radar-based weather, traffic and terrain. The combination of hard buttons, cursor control and touchscreen allows whatever interface works at that moment. It also displays a full complement of safety systems including onboard weather radar, Enhanced Ground Proximity Warning System (EGPWS), XM Datalink weather, terrain awareness and warning system (TAWS) and traffic collision avoidance system (TCAS). The KSN 770 also features a split-screen capability.



**BendixKing KSN 770**

### Mid-Continent MD302 SAM

[www.flysam.com](http://www.flysam.com)



**Mid-Continent MD302 SAM**

Standby attitude indicators just make sense for general aviation (ask anybody who has had a vacuum failure), and this one is impressive. Mid-Continent Avionics makes this entirely self-contained, TSO'd, solid-state instrument that provides attitude, altitude, airspeed and slip/skid information to the pilot, either during normal flight operations or in case of a primary instrument failure. What make this unit unique are its two-screen design that can be installed in both vertical or horizontal orientation and its tiny size, weighing in at just 1.6 pounds. The MD302's self-contained, rechargeable Nanophosphate Li-Ion emergency battery will power the instrument for one hour. We love its aircraft-specific, programmable airspeed range markings and one-knob

control. Plus, it's made right here in the USA in Wichita, Kan.! MSRP is \$10,812.

### PS Engineering PMA8000BT

[www.ps-engineering.com](http://www.ps-engineering.com)

PS Engineering introduced their new PMA8000BT audio panel, featuring Bluetooth capability. This truly intelligent audio control panel offers pilots with smartphones or other Bluetooth music devices the ability to connect wirelessly to the audio panel. This allows music streaming to the audio panel for distribution to passengers. You can also make or receive a cell phone call by pressing the "TEL" button. Four muting modes and several telephone modes allow complete control over who hears music or who's included in a telephone call. The PMA8000BT unit comes with features the PMA8000 line is known for, including six-place intercom with IntelliVox, monitor mode (great for IFR), alternate intercom mode, a digital aircraft recorder, built-in marker beacon receiver and various pilot selectable audio panel configurations. Price: \$2,095.



**PS Engineering PMA8000BT**

### Flying The Alpha

#### Angle-of-attack indicators come to general aviation

The FAA is finally recognizing what the military has known for decades: angle-of-attack (AOA) indicators save lives. The federal agency took a huge leap forward in adopting AOA indicators in February when it announced the simplification of design approval requirements for them. "Safety is our top priority, and with today's announcement, we are improving safety by streamlining regulations and cutting red tape—a win-win situation," said U.S. Secretary of Transportation Anthony Foxx.



**Garmin AOA on G3X Flight Display**

Loss of control is the number one root cause of fatalities in both general and commercial aviation. Currently, in GA alone, we're averaging one fatal loss of control accident every four days. Inadvertent stalls and spins are implicated in half of all GA approach and descent accidents, and 60% of them happen on takeoff and landing. Clearly, something needs to be done because pilots just aren't getting it.

The root of the problem occurs in primary training. Though AOA is taught as a theory to private pilots starting out in ground school, in the air they rely on speed, memorizing the stall speeds shown in the *POH*. Soon, it's the stall speed that pilots become fixated on, and they forget that speed has little to do with stalls and spins.

The problem with airspeed alone is that an airplane can stall at any speed, any attitude and any power setting. The stall speeds published in airplane flight manuals are only valid for unaccelerated flight (1-G load factor), coordinated (ball centered) and at one weight (most typically max gross weight). But, these conditions are rarely met on real-world flights. Consequently, speed itself isn't a reliable parameter to avoid a stall.

AOA, as we all learned, is the angle between the chord line of the wing and the relative wind, or flight path. John Cox, CEO of Safety Operating Systems, put it beautifully when he said, "Angle of attack is simply the difference between where the wing is pointing and where the wing is going." AOA is a better parameter to use in avoiding a stall because, for any given configuration, the airplane will always stall at the same AOA, also known as the "critical AOA." This stall AOA doesn't change with weight, temperature or density altitude. AOA indicators can help pilots detect this otherwise invisible wing (airfoil) position and avoid a stall.



Of course, military pilots have been flying by AOA for decades, instead of relying on airspeed alone—especially on approaches. They call it "flying the alpha." However, civilian pilots seem to just be discovering the idea of AOA, though it has been around since aviation began. In fact, awareness of the AOA at any given time is an art and is attributed to the world's best pilots. I have a friend who's fond of saying, "Be the wing," meaning, be aware of the AOA. This fine art isn't easily learned, however, without much practice. In today's overly technical cockpit environment, stick-and-rudder skills like AOA awareness seem to be fading. The current movement to equip GA aircraft with AOA indicators is a step toward helping pilots discover the importance of this critical parameter.

Although AOA indicators have been available in military and commercial turbine aircraft, the effort and cost associated with gaining installation approval has limited their use in general aviation. The streamlined requirements are expected to lead to greater use of the devices and increased safety in general aviation.

"We have eliminated major barriers so pilots can add another valuable cockpit aid for safety," said FAA Administrator Michael Huerta. "These indicators provide precise information to the pilot and could help many avoid needless accidents."

Under the new policy, manufacturers must build the AOA indicator system according to standards from the American Society for Testing and Materials (ASTM), and apply for FAA approval for the design via a letter certifying that the equipment meets ASTM standards and was produced under required quality systems.

Though AOA indicators aren't a cure-all for eliminating accidents, they're another source of information for pilots. Their purpose is to warn pilots when they're entering the stall realm so they can react faster than a traditional stall warning might allow. Manufacturers are jumping on this potential bonanza with Garmin announcing that their GI 260 AOA indicator would be available in the third quarter of this year. BendixKing has their KLR 10 available now, and **Alpha Systems** has several AOA kits available, as well. Safe Flight Instruments offers a "lift detector" that works with their stall warning product. More manufacturers are expected to offer AOA indicators in the coming months.

### L-3 Stormscope

[www.l-3com.com](http://www.l-3com.com)

Any pilot who has flown with L-3 Avionics' Stormscope will wonder how they ever flew without one. The system provides accurate lightning data in real time, helping to define the location of nasty thunderstorms, convective activity, wind shear and turbulence. Stormscope works by detecting the electrical activity present as a storm builds, not by detecting precipitation. It presents the location of areas that should be avoided on a moving-map display. In conjunction with Datalink weather, it offers the most accurate view possible of where adverse weather might exist. Pilot-selectable ranges, display modes and viewing angles provide true cockpit situational awareness. Various models offer different features at varying price points.





**Garmin G500**

### Garmin G500

[www.garmin.com](http://www.garmin.com)

Using technology derived from Garmin's highly successful G1000 integrated avionics system, the new G600/G500 package brings a wealth of graphical flight capabilities to the retrofit market. Dual 6.5-inch LCDs mounted side by side in the 10-inch bezel put both Primary Flight Display (PFD) and Multifunction Display (MFD) capabilities directly in your field of view. On the left-hand side, the PFD consolidates all primary situational information regarding your aircraft's position, speed, attitude, vertical rate, altitude and flight progress. On the right-hand side, the MFD provides detailed moving-map graphics of your aircraft's current position in relation to ground features, chart data, nav aids, flight-plan routings and more. A trial version of

Garmin's FliteCharts and SafeTaxi come preinstalled. Basically a "mini-G1000," the G500 has enough features and upgrade options to meet the needs of any pilot.

### Dynon SkyView Touch

[www.dynonavionics.com](http://www.dynonavionics.com)

The latest edition of Dynon's flagship SkyView avionics suite now includes SkyView Touch (touch screen), two new control panels and dozens of new features in SkyView 10.0 software. The integrated avionics suite gives pilots the option of using a touchscreen or dedicated knobs to control the crisp 10-inch display. Dynon's thinking is that touch interfaces aren't always the best choice (like in turbulence), so users can choose either interface with a button. The screen can display the "six-pack" of primary flight instruments in a "retro" round format, or a modernized EFIS-type presentation at the touch of a button. The unit's map gains georeferenced VFR sectional charts and IFR Lo/Hi charts, as well as displaying engine instruments in customizable colors, plus a whole lot more. The SkyView Touch 10.0 lists for \$3,995.



**Dynon SkyView Touch**

### Icom IC-A210 Panel-Mount Radio

[www.icomamerica.com](http://www.icomamerica.com)

Though communication radios may not seem exciting, Icom's IC-A210 is. We fell in love with the unit's bright and easy-to-read OLED (organic light-emitting diode) display. It's a first in comm radios, and it works by emitting light on its own. The display offers many advantages in brightness, vividness, high contrast, wide viewing angle and response time compared to a conventional display. An auto dimmer function adjusts the display for optimum brightness. In addition to the unique display, the IC-A210

offers a "dualwatch" function that allows you to monitor two channels simultaneously and an auto stack memory that stores the last 10 channels used. It has a built-in voice-activated intercom and a NOAA weather channel. The unit is easy to install. List price: \$2,165.



**Icom IC-A210 Panel-Mount Radio**

### BendixKing KLR 10 Lift Reserve Indicator

[www.bendixking.com](http://www.bendixking.com)

The hottest news in GA is the adoption of angle-of-attack (AOA) indicators for GA aircraft. BendixKing has announced their KLR 10, which they term a "lift reserve indicator," and if interest at Sun 'n Fun is any indication, these little gadgets are the retrofit items of the future. The KLR 10 is designed to provide you with a clear indication of the wing's available lift reserve. It provides lift awareness at a glance, and alerts you with visual and audible cues well in advance of traditional stall warning systems. It's lightweight, at a low cost, easy to install and consumes very little power. The unit works independent of pitot-static systems, so it can be used even if the existing air data system is compromised by ice, water or other contaminants. A heated probe is an available option. MSRP is \$1,600.



**BendixKing KLR 10 Lift Reserve Indicator**

### Insight Avionics G1 Engine Monitor

[www.insightavionics.com](http://www.insightavionics.com)

Insight claims the G1 engine monitor is the first low-cost, complete color-graphic engine-monitor system available in aviation today. It's a gorgeous and useful little display, featuring Simultaneous EGT, CHT, TIT, and CT (Carburetor Temperature) bars and temperatures on a color-coded LCD screen. The 2.25-inch display unit fits into a standard three-inch instrument hole. Price: \$1,235-\$1,495 depending on number of cylinders.



**Insight Avionics G1 Engine Monitor**

### FreeFlight Systems ADS-B Solutions

[www.adsbuniversity.com](http://www.adsbuniversity.com)

FreeFlight Systems offers complete low-cost solutions to make your aircraft fully ADS-B compliant using your existing avionics. Their all-in-one RANGR FDL-978-XVR UAT combines a 978 MHz UAT "ADS-B Out" transmitter, a WAAS GPS and an "ADS-B In" receiver that can display weather and traffic on your MFD or on an iPad via WiFi. Even cooler is the FreeFlight Systems' "ADS-B University," a set of seven free videos to bring you completely up to speed on what ADS-B is, why you need it and how it can make your flying safer. FreeFlight is running a special where orders placed and delivered by Dec. 31, 2014, are priced at \$3,995 for a complete system, which saves \$1,500 off of the \$5,495 regular system price.



**FreeFlight Systems ADS-B Solutions**



**True Blue Power Dual USB Charging Port**

### True Blue Power Dual USB Charging Port

[www.mcico.com](http://www.mcico.com)

True Blue Power is a division of Mid-Continent Instruments. They've developed this ingenious little USB charging port that can be mounted in the panel or in the cabin. Each USB port on the 1.5-inch square unit is designed to supply the electric current needed to charge any standard or high-power device with a USB interface. The TA102 protects itself and the charging device from short circuits, power surges and over-current potential. Simultaneous charging of two devices is fully supported. It's available in lighted or non-lighted versions. Made in the USA with a two-year warranty. MSRP \$449.

## NextGen GA Fund

The NextGen General Aviation Fund has been established to support the rollout of the U.S. "NextGen" program, which enables updated air traffic information to both pilots and controllers. There are more than 150,000 general aviation aircraft requiring access to controlled airspace, and NextGen can't provide its promised benefits to the air traffic system unless these aircraft are participating with updated technology.

Given this fact, the United States Congress has authorized federal support of avionics equipment upgrades to address the needs of the general aviation community. The NextGen GA Fund will approve financing for individuals and businesses operating general aviation aircraft to upgrade with NextGen gear. The deadline for GA aircraft owners to comply with NextGen equipment requirements is Jan. 1, 2020.

The fund is a public-private partnership formed between the U.S. Government, the aerospace industry and the private sector investment community. Congress enacted this program by authorizing federal loan guarantees for NextGen aircraft equipage (equipment) in Section 221 of the Federal Aviation Administration Reauthorization Act of 2012. The NextGen GA Fund will initially bring approximately \$550 million of financing capital, eventually supporting some \$1.3 billion in recurring financings, to the general aviation sector over the coming years. The NextGen GA Fund estimates that this will enable the retrofit of tens of thousands of general aviation aircraft. The NextGen GA Fund is awaiting FAA approval of its application for federal loan guarantees.

In March, the NextGen GA Fund announced two partnership agreements with Pilot Bank and Madison Capital, LLC, to accelerate the rollout of NextGen by providing access to quick and affordable financial assistance to general aviation aircraft owners.

The NextGen GA Fund will finance FAA-approved NextGen avionics, including WAAS-capable GPS, ADS-B In, ADS-B Out, RNAV/RNP avionics, data communications, flat-panel displays, antennas, electronic components and instrument panel modifications, along with related installation and certification costs. Facilitated through the Aircraft Electronics Association (AEA), member repair stations will be able to easily refer customers to the NextGen GA Fund and to applicant processors, Pilot Bank and Madison Capital.

The application process is easy, with a minimum financing amount of \$10,000. Owners will locate an AEA-member, FAA-certified repair station from [www.aea.net](http://www.aea.net) and select the avionics package they want to install. The owner applies for financing through the repair station or web portal on the NextGen website ([www.nextgenfund.com](http://www.nextgenfund.com)). Once approved, the owner takes the aircraft to the repair station, and the funds are distributed to the approved repair station. Financing terms will be, "attractive and highly competitive compared with conventional financing alternatives," according to the website.

It's comical that when we look at an instrument panel today, the array of gear that would have launched waves of envy 10 years ago looks, sadly, like a thrift-store bargain. We smile at the quaint VOR dials and Loran units, and try to imagine how we ever got along without the magenta "direct-to" lines of our GPS or the LED readouts of our digital engine analyzers. Even standard "six-packs" are quickly fading into obsolescence. In the last decade, the floodgates of capability have opened for general aviation aircraft, and we're in the midst of an era when airliner features are available to GA aircraft owners at realistic prices.

Though "realistic" doesn't mean "cheap," the fact remains that an owner of a legacy GA aircraft could remove two analog gauges, and slide in a glass HSI and moving-map-equipped PFD with all the bells and whistles, for less than \$5,000 and replace the entire six-pack of analog instruments. In exchange, the owner gets far better reliability and accuracy, a field-upgradable unit that can be transformed into an IFR panel without removing a single screw and the situational awareness that only comes from better information at the pilot's fingertips.



Panel retrofits come in many flavors and price points, so there's something for everybody. If you want to increase the market value of your airplane with minimal hassle and investments, there are a wide variety of options available and some mind-blowing features on the market. Few things in aircraft ownership are more exciting than upgrading your panel, so let's look at the best of what's available today.



**Sandia  
Aerospace SAI-340  
Quattro**

### **Sandia Aerospace SAI-340 Quattro**

[www.sandia.aero](http://www.sandia.aero)

The SAI-340 Quattro is a digital backup for steam-gauge instruments in EFIS-equipped aircraft. The compact, lightweight (it weighs half a pound) unit was in development for the last two years and displays indicated airspeed, altitude, roll and pitch, and an inclinometer (ball) to show slips and skids. The display is bright and crisp, and features easy-to-read graphics, especially for those of us with "over-40" vision. As a stand-alone backup, the Quattro incorporates a rechargeable lithium battery, giving it about two hours of life depending on several factors, with a minimum duration of 30 minutes. The unit includes both automatic and manual backlight control, internal battery charge status display and a panel-tilt configuration. A single knob on its face allows selection of the altimeter setting (barometric pressure).

The Quattro fits in a standard three-inch instrument hole and has an MSRP of \$3,595.

### **Rockwell Collins Airshow 500**

[www.rockwellcollins.com](http://www.rockwellcollins.com)

From the "cool" department comes the Airshow 500. This is the first 3D moving map system for light business jets. A modernized, lighter-weight drop-in replacement for the Airshow 410 unit, Airshow 500 comes fully loaded with worldwide maps that utilize NASA's Blue Marble map data. "Blue Marble" is the name of NASA's newest generation of stunning earth images, collected from their network of 18 highly advanced satellites. The unit's maps include a variety of 2D and 3D views, international language selection, "Fasten Seat Belt" and "No Smoking" briefings, and a lot more. The Airshow 500 supports SD-SDI, VGA and NTSC video output to a wide variety of cockpit displays. It works with Rockwell Collins' "Airshow interactive" app for the iPad, allowing passengers to take advantage of the industry's first panorama view, which displays a moving map of the outside world from any direction the iPad is pointed.



**Rockwell Collins Airshow  
500**