



Forward THINKING

Helicopters Gain Fresh Avionics Options



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

Where the airfoils meet the airways, the pilot's need for situational awareness, communications and navigation, recognize no differences among aircraft types.

The need for accurate readings of altitude, heading, and airspeed transcends whether the machine flies on fixed-in-place airfoils, dragged by its powerplant through the ocean of air, or on airfoils, the engine rotates fast enough to lift the craft – and with zero forward motion, at that.

Conversely, craft that fly by the latter technology, rotorcraft by name, present some unique issues for some of the equipment they employ in the service of those common needs.

Vibration, in particular, presents challenges for the makers of avionics used in rotorcraft. The rotating nature of the lifting surfaces, both main and the anti-torque systems, couple with the powerplant and power-delivery systems compound the vibration sources of the typical helicopter.

And, in the experience of users, those enduring those vibrations mandates the use of solutions more robust than the same type of device installed in a fixed-wing aircraft.

Thankfully, the avionics industry addresses such differences by offering versions of pretty much everything demonstrated to function reliably in the different world of helicopters.

In the year since the last Helicopter Association International trade show, the avionics community has developed new solutions for many of the needs common to aircraft – but targeted specifically at the helicopter market.

Steady Eddy: Helicopter Market Remains Active

According to avionics suppliers exhibiting at last October's National Business Aviation Association trade show in Atlanta, the helicopter market has remained relatively steady during the three years since the downturn started to impact most of general aviation.

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And the avionics market for helicopters has been particularly steady, the avionics-company sources noted.

The helicopter market itself expanded in October, again in the light-turbine segment, with the FAA certification of the much-anticipated Robinson R66 – an all-new machine that employs some of the latest in cockpit avionics.

A small bit of the latest helicopter-avionics gear emerged during the announcement-packed week encompassing the NBAA meeting. Much more came to light in the weeks ahead of the convention.

And, of course, expect to see even more early next month when Heli-Expo 2011 opens in Orlando, Fla. on March 5 for its four-day run.

With the retrofit market particularly active in the helicopter segment, avionics companies have found fertile ground for their products with helicopter potential or, in many cases, helicopters specifically in mind.

The more-robust protections against vibration damage and the helicopter units' resistance to electronic interference are particularly important in the rotorcraft world where power-train complexity and small-space mounting constraints come acutely into play.

But here's a glimpse into some of the advances logged between September and year-end.

Heli-TAWS: Terrain Alerts for those most in need

Two distinctly different companies arrived at a solution to a single need for helicopter pilots in the last few months.



Sandel Avionics' HeliTAWS

Sandel Avionics received FAA approval for its HeliTAWS helicopter terrain safety system in late August and shortly afterward confirmed it had won a Part 27 STC for the system. And just over a month later, the company announced its first deliveries of the system, one

for installation in a fleet of Agusta A109s operated by North Memorial Medical Center in Robbinsdale, Minn.

Sandel describes its HeliTAWS as a “ruggedized,

self-contained system with a high-resolution display.” In other words, the unit contains the database software, processing hardware and display in a single box.

Installation simplicity is one element of Sandel's products and it shows in the HeliTAWS. By removing a radar altimeter indicator, the 3-ATI HeliTAWS can fit into the same mounting hole without modification to the panel. Simple and time-saving; or, drop it into an empty 3-ATI slot.

Sandel employs what it calls TrueAlert technology, software created to eliminate nuisance alerts common to fixed-wing system in helicopter operations.

TrueAlert delivers the benefits of Class A terrain and obstacle warnings throughout a flight, but recognizes transitions at off-airport landing sites so that alerts sound only when needed – not during takeoff, landing or hover at remote landing locations.

Sandel designed its HeliTAWS system to also serve as a primary traffic-awareness display when connected with any of today's TCAS, TAS or TCAD units through an interface on the unit.

NVIS-compatible, Sandel's HeliTAWS meets DO-160F standards; the manufacturer puts its Mean Time Between Failure (MTBF) at more than 10,000 hours. Learn more at www.sandel.com/ST3400H.php.

Garmin HTAWS

Garmin International, meanwhile, continues its development of TAWS systems

designed to use remote displays when it added STC approvals for its innovative HTAWS, which sports its own set of helicopter-oriented features.

For example, Garmin developed three new, distinctly helicopter-oriented databases for the HTAWS system.

One, an obstacle database, adds almost 30,000 more obstacles, all low-altitude threats.

Second, Garmin enhanced the terrain data to display at higher resolution for lower-altitude flying.

Third, the enhanced navigation database guides he-



Garmin's HTAWS

heliporter pilots to more than 7,000 heliports – without needing to create a user-defined waypoint.

Similar to other new TAWS products Garmin's HTAWS employs forward-looking terrain assessment while showing terrain using a five-color scale – red, orange, yellow, green and black.

Voice callouts of altitude come when flying at or below 500 feet, while a reduced protection (RP) mode minimizes alerts while still providing affirmative terrain and obstacle warnings.

Available with either vertical or original horizontal mounts – both DO-160F compliant – and the ability to display on Garmin's GNS series of navigators and other screens makes Garmin's HTAWS package flexible enough to meet most helicopter operator's needs.

More information is available at www.garmin.com/helicopter.

Going Great Guns for Glass

Aspen Avionics continued to expand on its helicopter-oriented products with the EFD1000H Pro PFD, the EFD1000H MFD and the companion EFD500H MFD. These three units offer helicopter operators a set of DO-160F-compatible solid-state display-and-sensor systems that can provide systems redundancy as replacements for the traditional six pack – with accessory traffic, terrain, weather, vision and charting packages now available.

The EFD1000H Pro PFD and EFD1000H MFD sport their own internal GPS engine and separate antenna, allowing them to function as a stand-by navigator and flight-instrument pack thanks to their own integral stand-by battery.

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The PFD and one of the MFDs can be purchased in a package and installed as a set, or installed sequentially to spread out the costs.

With the December award of an STC for the Bell 206, Aspen is busy working to expand its installation approvals to include the Robinson R22 and R44, the Bell 407 and Eurocopter AS350. According to company information those approvals should come in the first half of 2011.

But thanks to work with a public-aircraft operator, the Dale County Police in Arkansas, Aspen's helicopter systems are also flying on a pair of OH-58 helicopters and an MD-500E; the latter is another STC target, as are larger FAR 29 ships such as the Bk-117.

The company also has won approval for its EA100 autopilot interface specifically created to work directly with attitude-based systems, further expanding the PFD's potential in the helicopter market.

For more information, visit www.aspenavionics.com/index.php/helicopter.

Garmin's G500H: Another Helicopter Glass-Cockpit Option

In addition to its new HTAWS product, Garmin last fall also announced STCs for installing its VFR Part 27-approved G500H glass-cockpit upgrade package.

The G500H brings to helicopter cockpits the benefits



Garmin's G500H



Aspen Avionics'
EFD1000H PFD

of two elements of an all-glass cockpit, but in a single-unit, split-screen package. The G500H packages both the PFD and MFD systems side-by-side, each sporting a 6.5-inch (diagonal) screen.

The PFD serves

up all the needed flight- and air-data information pilots need; the right-side MFD work with the full range of weather, traffic and terrain sensors – including Garmin's own HTAWS.

Garmin delivers the G500H pre-loaded with geo-referenced SafeTaxi airport diagrams for more than 900 U.S. airports as well as a trail version of Garmin's FliteCharts.

Garmin teamed with Rotorcraft Services Group in Fort Worth to develop the G500H STCs for the Eurocopter AS350B2, AS350B3, and EC130B4.

Under the STC, any authorized Garmin dealer can install the G500H using a parts kit provided by RSG. And expect more approvals in the coming year.

For more information visit, www.garmin.com/helicopter.

Going Steep with Bell's 429 & WAAS

Bell Helicopter used an advance in GPS and satellite navigation to give its top-line Bell 429 approach and landing capabilities absent from other ships – at least, as we near the end of 2010.

Time will change that exclusivity, established in early September, but not the distinction Bell snagged by becoming the first helicopter maker to certificate a ship with a Wide Area Augmentation System enhancement that gives the 429 unmatched WAAS-based approach capabilities.

To prove this advance in IFR-approach capabilities, Bell lead a team that included the FAA, the Global Navigation Satellite System (GNSS) Program Office, FAA Flight Standards, Hickok and Associates, Air Methods Corp., and the Mercy Medical Team.

The result of the team's efforts proved the WAAS enhancement in the 429 for flying LPV approaches at a 9-degree approach slope during IFR approaches at speeds down to 45 knots and with a mere 250 feet of visibility.

This enhancement gives the light-twin helicopter capabilities prized by emergency airlift and medical-flight operators.

For more information, visit www.bellhelicopter.com.

Vision Systems Advances

Cobham is delivering its helicopter-rated EFIS panel with synthetic vision; Aspen offers SVS on its helicopter products, as well.

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Max-Viz is working with a variety of companies on installations of its solid-selling IFR sensors for EVS – enhanced vision systems.

One Sky Aviation and Max-Viz collaborated on an STC for Max-Viz’s EVS-1500 dual-optical zoom sensor package in the Agusta A-109 helicopters.

With both day and night capability and a zoom function, the EVS-1500 system delivers images in conditions impossible to penetrate with the naked eye – to show images of items that won’t show up on an SVS display; SVS can’t display what’s not in its database.

Garmin offers a helicopter-specific incarnation of its proprietary synthetic-vision system technology designed specifically for the unusual environment in which helicopters operate.

Garmin’s own HSVT – Helicopter Synthetic Vision Technology – delivers a major graphics-based, outside-world perspec-

tive that’s complementary to the company’s helicopter-terrain-avoidance sensor.

Programmed using sophisticated computer modeling to generate a virtual topographic landscape from the system’s terrain alerting database, HSVT delivers a clear, sharp depiction of ground and water features, airports, obstacles, traffic and more. Garmin’s HSVT renders its world in three-dimensional perspective on the primary flight display of a system like the G500H.

The HSVT’s graphics generator produces a near photo-realistic image — almost like a clear-day “out-the-window” view of the flight situation regardless of lighting or weather.

But when terrain becomes a threat, the HSVT’s programming turns the threatening terrain or obstacles bright red on the PFD screen. Garmin HSVT “paint” system allows the pilot to select Reduced Production – which still paints threatening terrain and obstacles in bright red until they are no longer a threat.

It’s a lot like a TAWS and SVS system combined.

Garmin offers more details on its helicopter equipment at www.garmin.com/helicopters/. □

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