

# Tech focus

*This month's focus is on avionics and avionics-related developments.*

## Rockwell Collins takes integration to higher altitude

The benefits in size, weight, power, reliability, and functionality of integration are so great for avionics companies that it cannot be ignored.

**Rockwell Collins**, if its activity in the area is any indication, has gotten the message.



**Rockwell Collins is the supplier and systems integrator of the Boeing 787 Dreamliner's flight deck display and crew-alerting system, pilot controls, communication and surveillance systems, the aircraft's common data network, and the core network cabinet.**



**With Rockwell Collins' eFlight information-management solution, electronic flight bags replace aircraft manuals and other paper documents.**

Integration is a top priority at the Iowa-based company, according to Jeffrey Standerski, Vice President, Strategy Development, Commercial Systems. It has been for some time, he noted, "And what you see now is things are moving to a next level of integration."

In addition to market research and analysis, Standerski is responsible for "kind of pushing the organization from a top-down perspective." In that sense, he says, his job is to keep his fingers on the pulse of the industry so Rockwell Collins can respond, as well as to be proactive in exploiting the company's expertise and innovation to help shape trends in the avionics and communications arenas.

Rockwell Collins already has addressed integration in the area of navigation, combining global positioning and radar technologies to produce a multi-mode receiver.

With the **Boeing 787 Dreamliner** program, Rockwell Collins combines several surveillance systems into one integrated solution. "In the past, it was three individual sensors," Standerski said. "Now, it's one integrated system that includes weather radar, collision avoidance, and terrain awareness.



**"Things are moving to a next level of integration," said Jeffrey Standerski, Vice President, Strategy Development, Commercial Systems, Rockwell Collins.**

"If you look at what's next on the commercial side," Standerski continued, "certainly there's an opportunity to integrate communications, and there's an opportunity to maybe integrate communications and navigation together. And we have a variety of different things going on to integrate those capabilities."

Rockwell Collins is mining integration opportunities on the military side as well. Many of the integration ideas for the commercial side apply to the military side as well, according to Standerski. "A great example of that is a program we have called the joint tactical radio system (JTRS). In the past, you had individual communications radios that now are all being integrated into one subsystem—one box—that features lower-band frequencies all the way up to satellite communications."

And on top of that, Rockwell Collins is moving toward what Standerski calls software-defined communications in which radios can be reprogrammed from a software perspective to accommodate different frequency bands. "Things are being integrated to provide much more flexibility to the user on the military side," he said.

The company has an initiative for the commercial sector that it calls SWAP (size, weight, and power). The idea is to use integration for maximum reduction in each of those areas for any given application. "Say you're running four different communications boxes with four different power amplifiers and four different antennas. If you get that down to one radio system with maybe one or two power amplifiers and one or two antennas, you are really saving a lot of power. Anytime you can reduce the size, weight, or power consumption of a piece of equipment, it's a great thing for Boeing or Airbus or one of our business jet manufacturers. We very much focus our integration around that."

There are also advantages in reliability with integrated equipment that has fewer parts to break or malfunction.

Rockwell Collins is a big proponent of open systems architectures to integrate flight operations with navigation and

guidance functions. An open systems architecture involves what Standerski describes as an "overall integrated computer—whether a mission computer on the military side or an avionics computer in the commercial market space"—that is the brains behind integrated functionality. "Rockwell Collins is heavily involved in the integration of products as well as the integration of systems, and we view ourselves as a technology driver and a technology leader in this area," said Standerski.

Exemplifying the company's expertise in this area are recent avionics upgrades for several military programs. Rockwell Collins has applied open architecture principles as prime avionics systems integrator for the **U.S. Air Force's** C/KC-125 GATM program. For that program, the company is providing the technology that prepares aircraft for changing communication/navigation/surveillance and air-traffic-management requirements as the airspace transitions to Free Flight operation.

Is there a Holy Grail that Rockwell

Collins and the industry as a whole is pursuing? Standerski said it is difficult to answer that question. But he gave it a try: "If you look at the computer industry, you see how it's evolved as it relates to size, weight, and power, and it's evolved as it relates to additional processing and memory capability. As those things evolve, they will allow us to get more and more integrated and add more and more functionality to an individual unit. So I don't know if there's a Holy Grail. But what I do believe is that as technology evolves we will continue to integrate more functionality into smaller packages."

Rockwell Collins is also heavily involved in the information-management arena. Its eFlight product is designed to put into a convenient electronic form the navigation charts and other information sources currently embodied in paper form, much of it in the cockpit. "Given today's technology, both in communications and software, there's no reason airlines still need all that paper floating around creating inefficiencies,"



**Rockwell Collins makes a Joint Tactical Radio System software-defined radio communications system for the military.**

Standerski said. "And as you can imagine, airlines are all about trying to be more efficient these days."

eFlight provides increased airline operational efficiency by reducing the amount of paper involved and making certain functions automated. For example, Standerski said, a pilot can push a

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## Briefs

**Embraer** is extending use of **Thales'** Integrated Electronic Standby Instrument (IESI) on its aircraft. The IESI will be used on Embraer's Light and Very Light Jet programs, the Phenom 100 and Phenom 300. The unit provides the classical standby instrument functions of aircraft attitude (gyro horizon), airspeed, and altitude in a single electronic instrument. It also provides the data interface with other avionics systems to display and provide additional information. The IESI is produced using Thales' own active matrix LCD technology. The company claims that, compared to electromechanical instruments, its electronic unit performs three to four times better in terms of mean time between failures. It also claims an improvement in direct maintenance costs of 50% over "today's instruments."

The SkyWatch 497 Collision Avoidance System from **L-3 Avionics Systems** now features Verbal Intruder Positioning (VIP). The VIP capability extends aural alerts of range, bearing, and relative altitude when a traffic advisory is issued for a threat aircraft. "Traffic, traffic, 12 o'clock high, 3 miles" is an example of the type of threat warning that will be heard. The system will continue to provide visual warnings and can display up to 10 targets simultaneously, depending on an aircraft's display capability.

**Lockheed Martin** will complete the integration of sensor and avionics systems on 12 **Sikorsky Aircraft** MH-60R multi-mission helicopters and begin work on 25 others under separate contracts with the **U.S. Navy**. Lockheed Martin is the prime systems integrator and cockpit provider to Sikorsky for the aircraft. It will deliver the first 12 by late 2008 and the additional 25 by mid-2009.

**CMC Electronics** has selected the **Green Hills Platform for Avionics** with the Integrity-178B real-time operating system to support the development of integrated cockpit avionics solutions. CMC Electronics Aircraft Management System supports an all-glass cockpit anchored by two powerful CMC Integrated Avionics Computers that are fully qualified to commercial standards. The rugged mission system uses a PowerPC 7457 processor and will support multiple display functions.

**AgustaWestland** has approved **Engenuity Technologies** as an airborne software supplier and selected the supplier's VAPS XT 661 for use in the development of its ARINC 661 cockpit displays. Based on the open architecture of VAPS XT, VAPS XT 661 gives developers control over virtually every object parameter, allowing for greater creative freedom, according to Engenuity.

*The Pro Line 21 open-architecture avionics system from Rockwell Collins is an integrated unit for various business jets such as the Bombardier Challenger 605 (shown).*



button on a display instead of signing his name to approve an aircraft's weight and balance. More broadly, e-Flight provides real-time communication between an aircraft and other parts of the airline—be it the back office or ground-support operations.

For business jets, Rockwell Collins'

emphasis is more on the cabin than on the cockpit. Connectivity is the name of the game there. Executives want an "office in the sky," said Standerski, so cabin electronics to supply real-time Internet access and other sources of information sources is the focus.

*Patrick Ponticel*

## Landmark busy with Chelton avionics installations

**Chelton's** avionics systems are proving to be a nice source of business for **Landmark Aviation**, which recently equipped and delivered its first M28 **SkyTruck** utility aircraft with the Chelton Flight Systems FlightLogic Synthetic Vision Electronic Flight Instrumentation System (EFIS).

In recent months, Landmark's Roanoke, VA, facility has installed several other Chelton Flight Systems Synthetic Vision EFIS. It installed the first Dual Sensor 4-Tube SV-EFIS System as part of a project with Chelton to amend a current Supplemental Type Certificate for the Part 23 Large/Commuter Class Aircraft. The M28 SkyTruck project is the second system to include the same dual sensor architecture. The primary flight display features 3-D perspective terrain modeling with real-time GPS/WAAS (Wide Area Augmentation System) positioning, and "highway in the sky" predictive flight director guidance from takeoff to touchdown.

The FlightLogic EFIS is a complete flight navigation instrumentation system

that interfaces the remote-mounted AHRS [attitude heading reference system], air data computer, GPS, and WAAS receiver as well as existing VHF navigation equipment. The system has its own terrain awareness and warning system.

"Landmark is pleased to deliver this SkyTruck aircraft equipped with a leading-edge avionics system that provides optimal situational awareness, navigation, and 'moving maps' that are fully integrated into the cockpit displays," said Mike Anderson, Director of Avionics, Landmark Aviation. "The Chelton system, which has its own display in the cockpit, enhances aircraft safety by improving situational awareness and reducing pilot workload."

FlightLogic supports optional traffic and weather systems to create a single, integrated console for all flight-deck operations. The **FAA**-certified EFIS, designed to replace primary flight instruments, and mechanical gyros and compass systems, provides innovative technology and functionality that delivers new situational awareness and groundbreaking auto-

mated flight-management capabilities, according to Landmark.

The FlightLogic EFIS combines advanced head-up display symbology with real-time, forward-looking 3-D terrain to create what Landmark calls an innovative primary flight display.

Chelton's autopilot interface can guide the aircraft through departure procedures and standard terminal arrival routes, arc approaches, procedure turns, and complex holding pattern entries with no pilot interaction. The integral master caution voice warning system provides a wide range of alarm and alert information that also appears on the screen for undesirable conditions that may arise during the flight.

The Chelton system currently has Technical Standard Order and Supplemental Type Certificate for installation on more than 740 aircraft.

The M28 SkyTruck, suited for passenger and/or cargo transportation, is designed for multiple-mission usage, and is



The Chelton Flight Systems FlightLogic Synthetic Vision Electronic Flight Instrumentation System recently was installed in an M28 SkyTruck by Landmark Aviation.

available for different cargo aircraft applications. The aircraft is sold throughout the world.

Landmark's Roanoke facility is a full-

service fixed-base operation with avionics maintenance and installation capability.

Patrick Ponticel



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