



CABIN electronics

by Kirby J. Harrison

For at least a decade, the business aviation industry has looked forward to a seamless transition from the office or home to the private jet, with all the same electronic amenities, in particular high-speed Internet connectivity. Some in the industry now say that it's probably still a distant dream, simply because the ground-based technology, designed first for the mass consumer market, has always been ahead of what is available in flight, and perhaps always will be.

But there's good news too. In December, airborne communications specialist Aircell described 2009 as "a major turning point in business aviation connectivity." Accordingly, last year the company introduced Aircell 3G with the ATG 5000 package. The system is a business aviation version of the company's successful GoGo, the in-flight, high-speed Internet connection developed first for the airline community.

Aircell 3G—The Broomfield, Colo.-based company asserts that Aircell 3G has made the airborne office "a genuine reality." Certainly it has been well received, with Hawker Beechcraft selecting it as an option on new Hawker 750s and Hawker 900XPs, and fractional operator Flight Options picking it for its incoming Phenom 300s, as well as other airplanes in the fleet. Dassault has also said it will offer the system as optional equipment on its entire fleet.

The service is indeed a considerable leap forward for high-speed Internet connectivity in business jets. It should be noted, however, that at this point Aircell 3G service, dependent on ground stations, is restricted to the lower 48 states. There are plans to expand into Canada and Mexico in the near future, said senior v-p and general manager John Wade.

Aircell 3G offers a max upload data rate of about 3.1 megabits per second (Mb/s), considerably better than the average DSL line. It's not as fast as the typical cable hookup, but the passenger is unlikely to perceive the difference.

Aircell 3G offers a number of improvements over previous systems. The equipment weighs just 12.25 pounds, including two belly mounted antennas, the cost (not including installation) is in the \$85,000 range, and the monthly charge is approximately \$2,000 for full-rate access and \$900 for "light" use. According to Wade, Aircell's order book for the 3G service has passed the 300 mark, making it the fastest selling product in Aircell history.

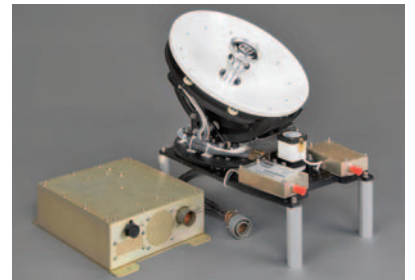
Beginning in December, Aircell's ATG 4000 and ATG 5000 systems include a built-in function to automatically manage multiple data networks installed aboard the aircraft. Called WAN (wide-area network) Management, the software feature enables an aircraft to automatically switch back and forth between Aircell high-speed Internet and Aircell's SwiftBroadband solution, according to the operator's pre-set preferences. As an example, a typical configura-

tion is to set Aircell high-speed Internet as the preferred network, defaulting to SwiftBroadband when the airplane travels outside the continental U.S.

Aircell is not the only high-speed in-flight Internet builder working on faster connectivity.

ViaSat Yonder—ViaSat and interiors partner Innotech Aviation of Montreal recently installed the first VMT-1500 Ku-band high-speed broadband package in a Global Express.

ViaSat Yonder service is near global, extending west from Moscow, across the Atlantic, North America, the Pacific and into Japan and South-



ViaSat's VMT-1500 was recently installed by interiors partner Innotech in a Global Express.

east Asia. The goal is to provide satellite-based worldwide coverage by the middle of next year.

Depending on the antenna size and type, Yonder offers download speeds of up to 10 Mb/s but a relatively slower upload speed of up to 1,024 kilobytes per second (kbps).

Current drawbacks to Ku-band are the weight and expense of the equipment. The ViaSat/KVH system, developed in partnership with KVH Industries of Middletown, R.I., weighs 32 pounds and is priced at \$365,000 (uninstalled).

Rockwell Collins and Arinc Direct have integrated their broadband solution for business jets—eXchange with service by SkyLink—and the system is now in service. EXchange with service by SkyLink includes Rockwell Collins eXchange avionics, coupled with SkyLink Ku-band satellite service from Arinc Direct.

SkyLink coverage begins when the system is turned on and operates continuously during taxi, takeoff,



Aircell's wide-area network management automatically switches between Aircell's high-speed Internet and Aircell's SwiftBroadband solution, allowing seamless global coverage.

flight and landing. It enables customers to access e-mail, corporate intranets (VPN) and the Internet, with options for global voice over Internet protocol (VoIP) telephone service and videoconferencing.

In addition, eXchange supports data connectivity for select WiFi-enabled smart phones, such as the BlackBerry 8320 and 8820, allowing users to access e-mail and other data services.

The SkyLink coverage area includes the continental U.S., Mexico, the Caribbean, Central America, parts of South America, Canada, the North Atlantic, the north Pacific, Europe and coastal areas of Asia. Middle East coverage is "in the works."

Thrane & Thrane Aero recently received parts manufacturer approval (PMA) in July 2009 for its new Aero-SB Lite SwiftBroadband Internet connection. The Danish manufacturer claims Aero-SB Lite is "the lightest and most compact" SwiftBroadband solution on the market to receive PMA.

At least six aircraft manufacturers are considering the package as a standard option, according to Andy Beers, director of aeronautical sales for North America.

Aero SB-Lite provides data transmission at 332 kbps with the



standard intermediate-gain antenna and 432 kbps with the optional high-gain antenna. The system has built-in Wi-Fi capability, VoIP (voice-over-Internet protocol) technology and allows passengers to use their own compatible handsets or Wi-Fi-enabled PDA devices.

With the intermediate-gain antenna, the package weighs 17 pounds and lists for \$88,000. Beers said there are about 1,000 Aero-M and Aero-I systems in service with the teardrop antenna that can be upgraded to Aero-SB at a saving of about \$22,000.

Aero-SB is already being installed in aircraft as small as the King Air 200.

ICG and Cobham Sora—A relatively new global Internet connectivity provider has also joined the fray in the form of a partnership between International Communications Group and Cobham Antenna Systems (formerly Chelton Satcom) of Lewisville, Texas.

Dubbed Sora (Japanese for



International Communication Group's NxtLink mail server

"sky"), it is being promoted as a lighter, smaller and less expensive alternative to the Air-cell/Thrane & Thrane product.

Sora will combine an ICG ICS 220A Iridium satcom system with Cobham's SDU 7320 SwiftBroadband terminal and IGA 5001 intermediate-gain antenna.

The two systems will be linked by an ICG NxtMail server that hosts software to switch automatically between the satcom links as needed. It will provide a worldwide Iridium link for satcom voice calls and a data transfer speed of about 330 kbps.

Listed at \$164,000 (uninstalled), it costs about 20 percent less than comparable competing systems. It is also 40 percent smaller and, at 39 pounds, about 30 percent lighter, according to ICG v-p Jeff Saucedo. It can be installed in business jets as small as the Gulfstream G150.

High-speed Voice and Data

EMS Satcom continues to be a serious competitor with its global eNfusion Broadband, a voice and high-speed data connection that can be configured to provide wired connections or wireless access points for Wi-Fi-enabled laptops and devices such as the BlackBerry or iPhone.

ENfusion HSD-XI adds one SwiftBroadband and one Swift 64 channel to the company's HSD-440 high-speed data transceiver. The combined system results in a dual-channel SwiftBroadband that also offers classic services.



EMS Satcom's HSD 440

Panasonic GCS—Panasonic Avionics, which launched its Global Communications Suite (GCS) with Lufthansa German Airlines last fall as FlyNet, is offering a version of the system for business aviation. The first is already in service on a Boeing Business Jet, and plans call for installation in an Airbus ACJ and an executive Boeing 777 in the near future.

The primary components of GCS are branded eXConnect

and eXPhone and use the Ku-band satellite array. They can be purchased as a bundled package or separately.

eXConnect, according to Panasonic, will provide reception speeds of up to 30 Mb/s and transmission speeds up to 1 Mb/s. The package also includes global satellite-live television reception.

EXPhone allows voice or text data reception and transmission using a BlackBerry or similar PDA.

Users pay a monthly fee, which varies based on service and the amount of megabit capacity desired. A spokesman said Panasonic Avionics is in discussions with "nearly all the OEMs" about the GCS system.

Forté AirMail—EMS Sky Connect, a division of EMS Satcom and a specialist in communication services using Iridium-based satellite technology, introduced its Forté AirMail communication service last October.

The system gives passengers "pole-to-pole, anywhere-on-the-globe, unfettered, in-flight e-mail access." It uses the Iridium satellite network to provide e-mail access to any Wi-Fi-enabled smart phone or PDA. "We tested every device we could find, and everything we tested worked," said EMS Sky Connect general manager Steve Silverman. "We had as many as 10 devices [operating] simultaneously, and every person was getting e-mail in less than a minute."

The default mode monitors the connected Wi-Fi devices and opens the connection when the system detects an e-mail action. The connection remains active until it is manually disconnected or a pre-set time-out occurs.

Once the connection has been disabled, it remains off for a minimum pre-set interval, but it can be re-established as needed. Automated and manual modes allow the operator and user to control airtime use and thereby manage costs.

Forté AirMail is priced at \$25,995 (including Wi-Fi interface, Iridium transceiver and antenna). Sky Connect expects to begin shipping units early this year.

Innotech Sky Berry—In Quebec, Canada, independent aviation services specialist Innotech Aviation recently received a supplemental type certificate (STC) for its Sky Berry, a system that allows passengers wireless reception and transmission of data using personal communication devices. The system uses NxtMail technology supplied by International Communications Group (ICG) of Newport News, Va.

Like Forté AirMail, it operates through the Iridium satellite net-



Honeywell's highly detailed HD moving map display shows where the aircraft in relation to highways, cities and terrain.



Rockwell Collins Venue continues to evolve even as the company gears up for first deliveries for the new Citation CJ4.

work and will interface with existing Aero H satcom systems. Sky Berry permits global e-mail service and mobile Web browsing for up to 10 passengers simultaneously and supports BlackBerry Internet Service, BlackBerry Enterprise Server, Yahoo Mail, Hotmail and Gmail.

The 3.2-pound Iridium satcom package that allows Internet access costs \$17,000. Aircraft not already equipped with ICG service require a NxtLink Iridium-based radio at prices ranging from \$11,500 for a single-channel unit to \$45,000 for a five-channel transceiver. User cost is a maximum of \$90 an hour for the "always-on" mode.

LiveTV Airfone—LiveTV Airfone is offering its business jet customers unlimited Wi-Fi connectivity for BlackBerry smart phones using an existing Magnastar phone system. The product consists of a carry-on, plug-and-play box that requires no installation or aircraft down time. It simply plugs into existing outlets to create a Wi-Fi hotspot. The service provides unlimited minutes for \$299 a month. LiveTV acquired the Airfone network in January last year.

Cabin Management System Competition Heats Up

There is also plenty of competition in the area of cabin management systems (CMS), which have suffered in the past from maintenance difficulties and a reputation for being particularly user-unfriendly. In response to installer and customer demands, that has begun to change.

Honeywell Ovation Select— "Customers want to be able to

move from home or office or automobile into the aircraft cabin and a similar system," said Paul Lafata, Honeywell's cabin management business leader. "The cabin management system must be reliable, easily maintained, aesthetically pleasing and intuitive with regard to user interface."

Honeywell expects to introduce its new Ovation Select CMS in the second quarter of this year. With it will come high-definition distribution along with surround-sound being developed with audio specialist Alto Aviation of Leominster, Mass. Honeywell is developing a line of LCD, high-definition video monitors with Rosen Aviation of Eugene, Ore.

The all-digital system features an Ethernet backbone with 1080p high-definition video and digital distribution throughout the cabin. It also includes all the digital interfaces required for high-speed Internet connectivity, iPod audio and video, MP3 players and HD game systems. The package also puts the entertainment system, JetMap moving-map display, seats and window shade controls at the passenger's fingertips through a new 4.3-inch color touch-screen device. "It's a one-hundred-percent solution," said Lafata, "from cabin temperature to DVD, with an emphasis on intuitive passenger interface."

Rockwell Collins Venue—Rockwell Collins introduced its Venue CMS two years ago and has since put considerable effort into upgrades and improvements to this digital, high-definition

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package. “The Ethernet backbone system has continued to evolve and mature as we get closer to the first deliveries to Cessna for its new Citation CJ4,” said senior director of cabin systems John Hill. In the CJ4 as standard equipment, it will include standard high-definition displays, OLED (organic light-emitting diode), local controls at every seat, switch panels and a media center with audio/video jukebox.

Rockwell Collins makes the 10- and 15-inch displays, and in the near future will offer 22- and 32-inch monitors. “After that, we’ll work with a partner for larger displays.” Also in development are iPod and iPhone integration kits. “We recently displayed iPod video on a 42-inch screen with very, very good resolution,” said Hill.

High-definition distribution is over a dedicated channel, which means there is no latency response or display degradation.

Hill said Venue was originally designed to replace systems on large-cabin aircraft but has been expanded to include the light-jet market and the company has two contracts to install Venue in Boeing Business Jets. “As we start to get into very large aircraft, we’ll be offering larger displays,” he added.

Emteq SkyPro—In October last year, Emteq unveiled “Easy HD” for its own SkyPro CMS as well as those of other CMS manufacturers. Custom Control Concepts of Seattle is Emteq’s partner in the SkyPro CMS and in-flight entertainment system.

The all-digital system components work independently of an aircraft’s existing CMS, and



Emteq’s SkyPro touchscreen

installation requires little or no modification of the CMS, according to the New Berlin, Wis.-based company. Easy HD can also be mated to existing cabin sound systems or the SkyPro speaker and digital sound options.

The Easy HD package consists of an array of basic options, including: stand-alone HD without integration; audio integration to the existing CMS; audio/video integration to the existing system; audio/video plus AVOD integration to the existing system; audio and video integration to the existing system plus SkyShow moving map; and audio/video integration to the existing system plus SkyShow moving map and AVOD.

Honda has selected SkyPro and its high-definition components for the HondaJet.

Flight Display Systems Select—Also last October, Flight Display Systems of Alpharetta, Ga., entered the CMS market with its Select system, designed specifically as an after-market retrofit package.

It was created to interface with the company’s own high-definition displays and source equipment, including the new Blu-ray player. The backbone, rather than Ethernet, is a CAN-bus message-based protocol system that, according to v-p of sales Jay Healy, ensures that the failure of any particular com-

ponent will not affect other components.

Select from Flight Display is already adaptable to a variety of new products, including:

- a 32-inch, low-profile, motorized-lift monitor that folds into its own enclosure and fits into a credenza or table top (\$28,065).
- the Genre audio player; a lightweight box with six independent SD cards, each holding up to 15 hours of music (\$3,000).
- Jet Jukebox, holding up to 100 full-length movies allowing resolutions up to 1080p (\$6,055).
- Blu-ray video player that plays Blu-ray high-definition video discs at 1080p and will also play standard video discs (\$4,879).
- iPod cable adapter that can be mounted on a drink rail, will allow audio and video use as well as a battery charger (\$875).

Rosen Aviation Ultra-CMS—Rosen Aviation entered the cabin management system in 2008 with the acquisition of the Ultra-CMS system from Avion Partners, and the latest upgrades are now available.

The system is scalable to fit any fixed-wing aircraft or helicopter. Features include passenger control of the system and entertainment interface at every seat, customizable functions and iPod interface. It allows audio input from any analog source, including MP3 players,

CD players and XM Radio. The system weighs less than 15 pounds and consists of just five part-number items. It digitally distributes up to 40 audio entertainment channels and six video channels.

Lufthansa Nice—Nice is already standard equipment on Bombardier’s Challenger 300 and is available as an option on the Challenger 605, Global 5000 and Global Express XRS through independent completion centers Midcoast Aviation and Savannah Air Center.

The latest version of this Ethernet-based platform will be customized for Bombardier’s Learjet 85 and will feature a digital amplifier feeding high-fidelity speakers and an interface to support the aircraft cabin environment.

The system’s open architecture will facilitate integration of third-party equipment and new applications, such as high-definition video. The Learjet 85 system will also include a new user interface, high-definition distribution to each seat, Blu-ray video players, smart-phone integration and system controls.

More Improvements

Among other cabin electronics technology, high-definition audio/video is rapidly becoming the standard, and larger, high-definition monitors are appearing as providers work to obtain supplemental type certificates, and more partnerships are being formed among the players.

In fact, Annapolis, Md.-based Arinc has just completed integration and testing of a “feature-rich” broadband system in a Boeing Business Jet that combines Rockwell Collins’s eXchange broadband avionics with Arinc’s SkyLink Ku-band satellite service.

According to **Arinc**, the package adds several flight communications features that are not available elsewhere. It provides

full support of the Apple iPhone, supports UMA voice calling, access to e-mail and corporate Intranet (VPN), high-speed Internet connection, videoconferencing and VoIP.

In what Arinc says is an “industry first,” it includes a terminal wireless local area network unit as a wireless bridge from the cabin to ground-based public and private networks. During flight, the systems will automatically hand off between SkyLink Ku-band satellite service and the Inmarsat SwiftBroadband over its L-band satellites. This allows relatively seamless global communication network access.

Along with high definition is the Blu-ray video player. While those being offered will also play standard DVDs, they are not generally appropriate as retrofit items as in many cases neither the signal transmission wiring nor the older monitors are HD-capable.

Light-emitting diode (LED) lighting throughout the cabin has become standard in the industry over the past several years. While LED remains somewhat more expensive than the older fluorescent and incandescent lighting, it offers greater reliability, ease of maintenance and low heat emission. In addition, the price has steadily fallen, a trend likely to continue for the near term.

Aware that growing numbers of passengers are coming aboard with their own entertainment electronics, from iPods and MP3 players to video games, electronics providers are also rushing to ensure that the cabin entertainment systems offer adequate interface for their in-flight use.

It is unlikely there will ever be a completely seamless transition from home or office to the aircraft cabin, but it remains a worthy goal. “We’ll never really get there,” predicts Aircell’s Jay Wade. “But we’ll get close.” □



Flight Display Systems is new to the full cabin management system market and emphasizes simplified, user-friendly controls.

