

Technology moving at warp speed

by Kirby J. Harrison and Matt Thurber

Information in the form of an electromagnetic wave travels through coaxial cable at approximately 66 percent of the speed of light, or about 111,769 miles per second. While aircraft cabin electronics technology moves at a considerably slower pace, it is nevertheless moving fast enough to send today's marvels into tomorrow's trash bin in as little as a year.

The world of instant communication is a prime example. In the 1990s there was the 0G satellite phone, which weighed nearly five pounds and sold for more than \$3,000. It was followed by the 1G, also analog, and that was followed by the digital 2G smartphone, which begat the 3G, which begat the 4G at less than five ounces and a price tag as low as \$200 (after rebate). Now the smartphone world is anxiously awaiting the 5G, anticipated late this year or early next.

Did you buy an iPad when it was introduced in early 2010? Or did you hold out for the iPad 2 that went on sale in March 2011? Bad news for those who waited and jumped on that iPad 2. The latest word is that the iPad 3 may go on sale early next year, with a bright, high-resolution, active-matrix organic light-emitting diode display screen.

So here we are, in that brave new world in which we are all connected, all the time. And it's no different in the business jet cabin, racing along at about 475 knots at 41,000 feet, whether it's high-speed Internet connectivity or control of the cabin environment with a simple app added to a personal iPad or smartphone.

Clearing Up the Telecom Confusion

Choosing a telecommunications system for a business aircraft is potentially confusing, but understanding how the products fit into the available networks can help clarify the process. It's like walking into a mobile phone store and asking which phone is better. The salesperson will likely first ask which network you prefer because some mobile phone networks work well in certain countries or locales while others are better for world travelers.

And some offer better prices on unlimited data while others charge more for less data transfer. Once the customer chooses the network, the number of subsequent decisions into the available hardware that works with the chosen network diminishes.

The same holds true for aviation telecommunications systems, whether they are satellite-based or terrestrial air/ground systems. What seem like endless choices boil down to an easily fathomed family of solutions, once the desired network is identified.

Within the available networks, there are a surprising number of cabin telecom

offerings and manufacturers of equipment. Most are focused on delivering voice- and data-capable systems, with the goals of ease of use and data speeds similar to those found in the home or office.

Terrestrial and Satellite Networks

There are two main types of network, terrestrial and satellite. Two terrestrial networks serve the U.S.—Aircell and LiveTV Airfone.

Aircell worked for many years to develop an air/ground system to deliver in-flight Internet connectivity, and the company's mobile broadband network went live shortly after Aircell won an exclusive frequency license from the FCC in 2006.

Branded as Gogo for airliners and Gogo Biz for business aircraft, Aircell's network is available in the continental U.S. and portions of Alaska (including much of southern Alaska, Anchorage and Fairbanks) and above 10,000 feet. Aircell antennas are mounted on ground cellphone towers, but oriented toward the sky so as not to interfere with cellphones.

What sets Aircell apart is the low cost of its mobile broadband Internet service and the speed, up to 3.1 Mbps (peak speed, megabits per second). While home and office speeds of 5 Mbps and more are common, Aircell delivers a lot of data for the money. And Aircell has one significant advantage over satellite systems: virtually none of the signal latency common with satellite signals, which must travel thousands of miles.

Aircell offers ATG 5000 hardware for exclusive use of its mobile broadband network. The combination of ATG 4000 mobile broadband equipment and Aircell Axxess allows high-speed Internet via the Aircell system and two-channel Iridium satellite voice system calls. Axxess can be installed as a stand-alone without the ATG 4000, which can be added later. Both ATG systems include Wi-Fi or wired connections.

Gogo Biz Voice, due later this year, will be offered as an upgrade to the ATG 4000/5000 systems. Aircell expects to ship its new smartphone later this year as well. It will feature a 3.8-inch color touchscreen, Android operating system, Bluetooth and integrated audio jack. The Smartphone will work with Gogo Biz Voice and is a drop-in replacement for Axxess flush-mounted handsets.

LiveTV now runs the former Verizon (formerly GTE) Airfone Continental U.S. air/ground network and is



The new I-Ku airborne high-speed Internet system by Innotech allows simultaneous connection from any wireless device, including laptops, BlackBerrys, iPhones and iPads.

supporting business aircraft operators with MagnaStar systems.

In 2009, LiveTV introduced the BlackBerry On Board (BOB) system, which allows BlackBerry users to send and receive email while airborne as well as make simultaneous voice calls using MagnaStar.

BOB uses a laptop PC to link to Airfone and to the RIM (BlackBerry) networks, and thus there are no installation costs. BOB costs \$12,995 plus \$299 per month (in addition to LiveTV Airfone fees) for unlimited BlackBerry minutes. The iBOB system lets iPhones/iPads and the BlackBerry use MagnaStar for messaging. LiveTV also offers BOBs for Iridium and Inmarsat networks.

Three Primary Satcom Systems

There are three primary satcom operators providing services for general aviation users, the Iridium, Inmarsat and Ku-band networks. An advantage of satcom systems is that within their areas of coverage, communications can take place from the ground to cruising altitude; there are no altitude restrictions as there are with air-to-ground systems.

The Iridium network consists of 66 low-earth-orbit satellites (with seven spares) orbiting about 483 miles above the earth. The satellites are cross-linked, sharing information so that calls are routed most efficiently, eliminating the need for heavy directionally stabilized antennas. The lower orbiting altitude also reduces latency, and the high number of satellites ensures global coverage.

Iridium is primarily a voice service, but also offers narrow-band data services such as asset tracking, text messaging and limited email. The company is planning a 2015 launch of Iridium Next, which will replace the current satellites with more capable ones offering voice and high-speed data.

Inmarsat has been serving aviation users for many years with a variety of satcom options. The latest is SwiftBroadband, delivered by Inmarsat's current I-4 satellite network. Inmarsat's satellites are geosynchronous, meaning they appear to be stationary, orbiting at 22,400 miles above the Earth. The three I-4 satellites

offer high-speed data and voice capability, with coverage over most of the world except northern and southern polar areas. The I-4 satellites are expected to last until about 2020.

Inmarsat offers a variety of services. Classic services include Aero-I and Aero Mini M (both with voice, fax and data, but Aero-I is 4.8 kbps while Mini M is 2.4 kbps) to Aero H and H+ (voice, fax and 10.5 kbps data). Newer products are Swift 64 and SwiftBroadband. Swift 64 voice and Internet offers a basic data speed of 64 kbps, but is capable of up to 256 kbps through channel bonding, and higher with data compression. SwiftBroadband is capable of simultaneous voice and data and speeds up to 432 kbps per channel. Antenna sizes are smaller for Swift 64 and SwiftBroadband compared to Aero-H systems and Ku-band.

Ku-band satellites are commercial with capacity to spare for communications capabilities. Like Inmarsat, Ku-band satellites sit in "stationary" orbits at 22,400 miles above the earth. Ku-band requires the largest antennas, which also have to move to be pointed at the satellites, but the big advantage of Ku-band is the high data rates, with peak speeds of 2 to 6 Mbps, fast enough to allow streaming videos.

Current coverage areas of Ku-band satellites are limited to the U.S. and Central America, the Pacific Ocean and parts of China and Southeast Asia, the Atlantic Ocean, portions of the southern half of Africa and most of Europe.

Coming soon will be Ka-band satellites, which will offer much higher data speeds, with basic service beginning at 2 Mbps and top speeds in the gigabit-per-second range. Inmarsat will run its own three-satellite Ka-band network, called Global Xpress, while other providers will run networks on leased satellite capacity. ViaSat operates its own Ka-band satellite.

Most satcom systems now offer Level D ATC safety services, something that most aircraft need now or will eventually need, especially for over-ocean travel. Safety services are available on Iridium and Inmarsat systems, but not on Ku- or the upcoming Ka-band networks.

It's in the Equipment

In addition to fielding equipment for its Gogo Biz air-to-ground broadband Internet network, Aircell also offers equipment for Iridium voice calling and



Aircell's smartphone handset runs the increasingly popular Android operating system.

distributes Thrane & Thrane's Aviator 200 and 300 systems for Inmarsat SwiftBroadband access.

Aircell's ST3100 has a single channel for Iridium voice or narrow-band data. The Axxess system offers two Iridium channels, and when interfaced with Aircell's ATG 4000, provides seamless access to Gogo Biz. Axxess also includes a PBX with call-waiting, call-routing and conference calling features.

Cobham offers six variations of Inmarsat SwiftBroadband solution, from single-channel 200 kbps to two-channel 864 kbps systems. Cobham also manufactures antennas, both mechanically steered and phased array, which are lighter and less complex than mechanically steered antennas. In partnership with International Communications Group, Cobham offers the Sora system, which integrates Iridium voice and SwiftBroadband data using ICG's NxtLink 220A communication system and NxtMail server and Cobham's satcom terminal.

EMS Aviation also manufactures satcom systems and antennas. The company's newest product line is the Aspire satcom, available for both the Iridium and Inmarsat SwiftBroadband networks. Passengers can use their own smartphones or EMS's new Android-based color touchscreen telephone handset (also capable of controlling the cabin environment and entertainment system).

Systems range from the Aspire 100 SC single-channel voice or narrowband data Iridium system to the Aspire 250 single-channel SwiftBroadband (up to 432 kbps). The Aspire 200 system was introduced in May and buyers can customize data rates depending on antenna selection (low-, medium- and high-gain). The high-gain antenna allows automatic switching to Inmarsat Swift 64 services.

EMS's latest product is the \$15,999 Aspire Portable AirMail system, which connects to an existing Iridium antenna and facilitates email via BlackBerry or other smartphones.

EMS is now part of the Honeywell Aerospace telecom business. The Phoenix-based company acquired EMS Technologies in June in a deal valued at about \$491 million.

Gulfstream Aerospace offers its own branded Broad Band Multi-Link (BBML) satcom system in its large-cabin jets (G300 through G550). BBML is a Ku-band system, using ViaSat hardware combined with a Gulfstream cabin server with data rates of up to 3.5 Mbps. Service is provided by ViaSat's Yonder Mobile Broadband.

Honeywell offers the MCS-7100 series satcoms for both flavors of Inmarsat service, Swift 64 and SwiftBroadband, at speeds of 64 to 432 kbps respectively.

Aircraft equipped with Honeywell's previous-generation MCS-6000 or -3000 can be upgraded easily to Swift 64 or SwiftBroadband with the MCS-7163 (basically replacing the high-power amplifier with the HD-710). The MCS-7147 is the upgrade path for the MCS-4000 or -7000. And the MCS-7120 is a single-LRU system for new installations. All three systems include the ability to offer a combination of Classic Aero service and Swift 64 or SwiftBroadband.

International Communications Group (ICG) is pursuing an Internet Protocol (IP)-based architecture called OpenLink for cabin and flight deck communications, according to president and COO Armin Jabs. The company uses a non-proprietary architecture to make the aircraft a node on an IP network, and in theory, any type of communications network will work to deliver voice and data to and from the aircraft. "It's a big advantage," he said. "We don't sell networks; we get no revenue from network operations. We're agnostic to the network." The advantage of OpenLink is that changes to the communication system will be much easier because the communication infrastructure in the aircraft remains the same. Buyers can start with a baseline OpenLink system and build on it as satcom providers add new capabilities and services.

A basic OpenLink system for a business aircraft would consist of ICG's ICS220A Iridium satcom plus its

Aerocom 1700 cabin telephony unit, which provides the interface to the Iridium transceiver. The Aerocom 1700 includes Wi-Fi capability and can accept wired Ethernet devices as well as ICG's upcoming cordless e-Phone handset. The Aerocom e-Router will be available around year-end and the e-Phone handsets in October.

The e-Phone, developed with an industry partner, uses digital enhanced cordless telecommunications (DECT) protocols, which allow the phone to consume much less power than a typical Wi-Fi handset, according to Jabs. A Wi-Fi handset will normally deliver two hours talk, 10 hours standby, he said, while a DECT phone can handle 12 hours of talk and 160 hours of standby.

The e-Phone supports both Ethernet and analog connections and therefore can be used with legacy satcom systems, as well as Bluetooth for external headsets. The e-Phone also can support cabin management system and entertainment systems. And the e-Phone base unit incorporates active noise canceling, eliminating the annoying whooshing sound that ground callers hear when speaking to someone in an aircraft.

Rockwell Collins offers buyers a range of satcom systems, from Iridium to Inmarsat Classic Aero, Swift 64, SwiftBroadband and the company's eXchange Ku-band product (using ViaSat hardware), which offers peak speeds of up to 3.5 Mbps. Rockwell Collins is competing to be one of the airborne terminal providers for Inmarsat's Global Xpress Ka-band satcom, according to Bob Ellis, director of marketing for flight information solutions.

Ka-band should be available starting in 2015 or 2016, he said, and will offer seamless global coverage, with the exception of polar areas.

The recent development of software-based radio transceivers combined with the capabilities of Ka-band systems will allow for much smaller hardware installed in aircraft. "Terminals moving away from dedicated RF designs is the biggest change," Ellis explained. This means that adding a Ka-band system should be as simple as sliding a new modular circuit board into an avionics rack. Nevertheless, antennas will be fairly large for Ka-band, but improvements in antenna steering technology should help keep antenna footprints reasonable.

In partnership with OnAir's onboard network, Thales offers the TopFlight satcom system for the Inmarsat SwiftBroadband network. OnAir's system allows GSM handsets to be used in flight for voice calls, texting and emailing. A unique feature of the OnAir system is the ability of the flight crew to switch the network to data-only during quiet periods, thus eliminating the problem of noisy voice calls when passengers are trying to rest.

In the U.S., there remains a regulatory restriction on certain mobile electronic devices that currently precludes in-flight use of cellular handsets for cellular voice calls.

Thrane & Thrane's new Aviator wireless handset weighs just .39 pounds and features noise and echo cancellation, a 2.2-inch color display and tactile controls. The handset's lithium-ion battery allows for 24 hours of standby time, and up to six handsets can be installed on any Aviator satcom system. A 28 VDC cradle is available for handset charging.

Thrane & Thrane's Aviator satcom comes in three main configurations, systems that work with low-, medium-

and high-gain antennas on the Inmarsat SwiftBroadband service. The Aviator 200 offers a single voice channel and speed of up to 200 kbps. The Aviator 300 uses an intermediate-gain antenna and allows speeds of up to 332 kbps. Larger aircraft that can accommodate a high-gain antenna can be fitted with the Aviator 350 and 700 systems, with speeds of up to 432 kbps. The 700 can handle up to four channels of voice and data simultaneously. All the systems include Wi-Fi capability.

For aircraft that have older Thrane & Thrane Aero-M or Aero-I systems installed, the company is offering a simple upgrade path to the Aviator 300. The upgrade allows the Aero-M or Aero-I TT-5006A intermediate-gain antenna to be retained, making for a much simpler and lower cost installation.

TriaGnoSys manufactures equipment that connects to existing satcom systems, enabling passengers to connect using their smartphones while airborne. Service provider OnAir is the telecom services provider. Dasnair will be the first Falcon 7X operator to offer the telecom capability to passengers, beginning later this year and using Inmarsat's SwiftBroadband network.

TrueNorth announced in May the addition of the new HD Voice Quality (HDVQ) capability on its Simphonē OpenCabin system. HDVQ improves voice fidelity and lag time on the Inmarsat Swift64 and SwiftBroadband networks. Earlier this year, TrueNorth introduced the Stage2 router. "By integrating our exclusive Stage2 technology with our broadband router technology, operators can now get 1 Mbps performance from their current 432 Kbps Swift Broadband connection," according to TrueNorth president Mark van Berkel. The Stage2 router includes the ability to create a cabin Wi-Fi hotspot so passengers can use wireless devices while airborne.

OpenCabin is a software system that runs on the Simphonē hardware and provides a variety of capabilities, including PBX services and calls or data delivery via the Iridium and Inmarsat Classic Aero, Swift64 and SwiftBroadband networks.

TrueNorth's Express is a small unit that adds email capability to Iridium

Continues on next page ►



The upcoming cordless e-Phone from ICG uses much less power than a typical Wi-Fi handset.



Thrane & Thrane's new Aviator wireless handset weighs just .39 pounds.



Passengers with GSM handsets can use OnAir's system for in-flight voice calls, texting and emailing.



EMS's Aspire Portable AirMail system facilitates email via BlackBerry or other smartphones.

► Continued from preceding page

satcom systems, for BlackBerry and other smartphone models such as Android and iPhone. For Magnastar users who need to upgrade to a modern telecom system, TrueNorth offers a lighter and smaller single-box Simphonē transceiver that replaces the Magnastar system without cabin modification.

TrueNorth offers a variety of phone handsets to complement the OpenCabin system, including a recent custom-developed carbon-fiber handset and the Simphonē multimedia handset with color LCD, noise-canceling and calling features such as caller ID, call transfer, forwarding and hold, last-number redial, teleconferencing and so on.

In addition to manufacturing satcom hardware, ViaSat operates service provider Yonder (in partnership with KVH Industries). ViaSat's Ku-band VMT-1500 satcom transceiver employs the company's ArcLight technology, which allows for a small lightweight antenna and provides peak speeds of 1 to 2 Mbps.

Launch of ViaSat-1 services on ViaSat's Ka-band satellite was expected to take place this summer, and once running, it will have capacity for up to 130 Gbps.

Cabin Management and Cabin Entertainment

The speed at which cabin communication technology is advancing nearly boggles the senses, and the same could be said for cabin entertainment technology, starting with cabin management systems.



TrueNorth Avionics offers a more compact Wi-Fi cabin-networking device, dubbed TrueNorth Express+.

The cabin management system (CMS) has long been a source of customer complaints, from questionable reliability to a user-unfriendly interface that almost required a user to have a Ph.D. from MIT. That is changing.

Custom Control Concepts continues to focus on in-flight entertainment and CMS packages for single- and twin-aisle aircraft being configured for executive use.

Kurt Mayall, CEO of the Kirkland, Wash.-based company, places a premium on agility and innovation, as well as reliability.

As a means to ensure dependability in its CMS, every system is tested at the company's systems integration lab in Kirkland. Lighting, wiring, audio/video output and input, monitors; everything is run through a complete acceptance test procedure, to which the customer is invited and encouraged to put the system through its paces. Not until any bugs are worked out and it is approved does Custom Control Concepts break it down and ship it to the completion center for installation.

Flight Display Systems of Alpharetta,



ViaSat's Ku-band VMT-1500 satcom transceiver uses the company's ArcLight technology, which provides peak speeds of 1 to 2 Mbps.

Ga., is a relative newcomer to the market with its Club CMS. The retrofit system for light and midsize aircraft is a follow-on to its Select CMS for super-midsize and large-cabin business jets.

The Club CMS standard package, priced at \$25,000 (not including installation), has already been installed in a Phenom 100 and a Citation Mustang. According to v-p of sales Jay Healey, Flight Display has shipped orders this year for its CMS systems for a Gulfstream V and IV, a Challenger, two Hawkers, an MD-80, a Boeing 757 and a BBJ. More remarkable, it has also been installed in a Eurocopter EC145 as part of a package that includes a six-genre music player, moving map, Blu-ray player and 10.2-inch widescreen monitor in an overhead mount.

According to Healey, Flight Display places a premium on its customer interaction. "One of the frustrating things about our industry is that too many shops simply respond to what the customer says he wants, rather than educate the customer to find out what he really needs." One of Flight Display's most valuable tools in this respect, explained Healey, is a portable demonstration box through which a potential customer can gain first-hand experience operating the CMS. "They can see first-hand just how user-friendly this system is," said Healey.

And Healey emphasizes the Select and Club CMS packages are both high-definition at 1080p resolution and come with a Blu-ray player that will provide either composite or HD signal.

Ruag Geneva is currently installing Flight Display's Select CMS in a Falcon 50 as part of a major refurbishment project. It includes such Flight Display features as arm-mounts for the iPad, and two 15-inch bulkhead-mount monitors.

Goodrich, which completed its purchase of a majority of DeCrane Aerospace's assets last year, recently introduced Platinum HD CMS under its new Goodrich Cabin Electronic Systems division. It features not one but two Blu-ray players and offers 1080p resolution on monitors from 12 to 42 inches. The first aircraft to be equipped with Platinum HD is a Boeing Business Jet, scheduled for delivery in this year's third quarter.

Honeywell Aerospace, which originally re-introduced its Ovation Select CMS at the NBAA Convention last fall, was back at the Ebace Convention this spring with more improvements and was expecting certification of Ovation Select on Honeywell's corporate Falcon 900 this month. Jet Aviation has also chosen the

Continues on page 46 ►

► Continued from page 44

Ovation Select for a Boeing Business Jet undergoing outfitting at its Basel, Switzerland facilities.

According to cabin systems business leader Paul Lafata, the Ovation Select upgrade now features single-touch activation. And the “seamless connectivity” permits passengers to stay connected to the outside world via BlackBerry, iPad, iPod, smartphone or laptop.

Lufthansa Technik’s Innovation Business Unit continues to make upgrades to the German center’s cabin management and in-flight entertainment system, better known as “Nice.” The latest is Nice HD, “a new generation” of its CMS and in-flight entertainment system. Fully digital, it is based on a full-fledged wired and wireless high-bandwidth Ethernet backbone. The first Nice HD system is scheduled for



Flight Display's CMS demonstration box allows potential customers to actually “play” with its cabin management system.

installation in next year’s first quarter.

Moving to the retrofit market, the earlier Nice system was recently part of a retrofit package in a Global Express. It was installed as part of an 8C-check scheduled maintenance event performed by Hamburg-based Lufthansa Technik at its Berlin facilities.

According to Innovation Business Unit director Andrew Muirhead, the Nice package in the Global Express features intuitive passenger control panels, the NiceView HD moving-map system, iPod integration and Wi-Fi network. “We even have an option to control the system via an iPhone app...that places control at the user’s fingertips.”

An offspring of Lufthansa Technik and Panasonic Avionics emerged in May as IDAir with the goal of developing, manufacturing and supplying cabin management, communication and in-flight entertainment systems. The independent, Hamburg-based company involves in part the coupling of Lufthansa Technik’s Nice system and Panasonic Avionics’ X series and global communication suite (eXphone, eXconnect and eXTV). “We look forward to providing new, comprehensive solutions

to VIP customers on a scale not previously seen in this market,” said IDAir chief technical officer Craig Depner.

Mid Continent Controls is busily developing its next-generation, fully digital CMS with a 4.3-inch touchscreen switch panel to replace the old push-button panels. Also new to the system are remote software updates and system diagnostics, as well as real-time system health monitoring. Cabin controls through personal electronic devices are also part of the package.

It is also scalable to fit a variety of business aircraft, from “the smallest cabin size to large, widebody aircraft.” According to the Derby, Kan.-based company, the new system will debut in functioning form with all the bells and whistles at the NBAA Convention this fall.

Rockwell Collins introduced Venue

High definition defines cabin entertainment

In terms of cabin entertainment, high-definition is almost the first word out of an owner’s mouth when spec’ing out a cabin completion or refurbishment. What many owners fail to realize is that true high-definition video must be HD from one end to the other and at every point between. And that does not mean only from the HD Blu-ray player to the HD monitor. For example, a standard disc played on a Blu-ray player that will also accommodate standard discs does not produce HD images, even though the image on the HD monitor might appear a bit sharper and cleaner.

In Europe, Airbus Corporate Jet Center in Toulouse, France, is offering high-definition cabin entertainment through HDMI provided by HDMI Licensing of Sunnyvale, Calif., for the Airbus Corporate Jetliner (ACJ) green aircraft line. According to the ACJC design office, a retrofit solution is also available.

The system provides HD video on up to four monitors in each private area simultaneously, either through a local source such as Blu-ray player or from an external device (video game console or laptop) with an HDMI plug.

It is available as a stand-alone solution and can be adapted to any cabin management system. According to marketing manager Caroline Lancien, ACJC’s HDMI suite can be controlled through

remote devices such as iPods and iPads.

Flight Display Systems is now offering a dual Blu-ray player that has both high-definition (HDMI) and composite (standard) output. According to v-p of sales Jay Healey, the resolution is 1080p. And he noted that the Flight Display equipment sends both video and audio over coaxial cable, ensuring the synchronization of video and voice.

Heads Up Technologies of Carrollton, Texas, a long-time supplier of cabin electronics, has announced a new flight entertainment system designed specifically for small to midsize business jet cabins.

The new Premier package supports up to four independent passenger controls, while the Executive package provides capacity for eight. It also allows passengers easily to select between audio and video sources, from Blu-ray player and gaming equipment to satellite radio and MP3 players, said senior v-p of sales and marketing David Groos.

The monitors are all HD-capable and support wide-screen formats. Groos said further that the design has reduced the parts count over more traditional systems by as much as 40 percent.

Heads Up has a Part 25 STC on the system and deliveries began in July.

Honeywell Aerospace offers 1080p HD for virtually its entire line, and according to senior manager of technical sales Bill Rowell, the Ovation Select CMS certification has created “a much clearer path to integrate our HD audio/video on demand (AVOD) at 1080p as well.”

Honeywell’s JetMap HD is already 1080p with a 15-meter resolution terrain map. “We expect to get that down to one meter in a six-mile radius around airports,” said senior manager of technical sales Bill Rowell. JetMap HD is an upgrade that allows viewers to select a flight path from no fewer than 18 different perspectives and make a virtual diversion to “visit” other destinations “at Mach 5” in the time it takes to imagine being there.

Honeywell, working with monitor specialist Rosen Aviation of Eugene, Ore., and

Aircraft Cabin Systems of Redmond, Wash. plans new monitor sizes, from a 15-inch touch-screen to a 65-inch behemoth.

Also working with Rosen, Honeywell is now offering its version of a “slim line” monitor from 16-inch to 32-inch sizes. “Everybody wants a thin, flat screen,” said Rowell.

The slim line monitors from Rosen come in a credenza-mount version and three bulkhead-mount variants. The real advantage is that the power supply and video electronics are in a separate box away from the monitor. This allows for a 42-inch screen only 1.1-inches deep with an appearance similar to that of the latest super-slim home theater monitors. The monitor also produces “dramatically” less heat, according to Rosen v-p of engineering Jeff Unger. The power supply and video electronics box can be as far as 50 feet from the monitor.

When it introduces its new CMS as a fully functional package at the NBAA Convention this fall, Mid Continent Controls will also unveil an impressive new range of related entertainment offerings.

They include a dual Blu-ray player, digital dock for iPhone, iPod Touch and iPod, and a variety of USB, auxiliary audio/video and RJ 45 ports, including a high-power USB port for charging iPads. It is designed for HD video distribution throughout and supports multiple video formats—HDMI, component and composite. The monitors are 1080p resolution input capable. A high-power multi-channel audio amplifier improves sound fidelity.

From Aircraft Cabin Systems comes an eye-popping 65-inch monitor with 1080p resolution via HDMI input from a Blu-ray source. According to the Redmond, Wash.-based company, the screen weighs less than 110 pounds and has a viewing angle of 178 degrees. It will allow video input from HDMI, composite, component and VGA.

Perhaps the ultimate cabin entertainment end product at this point is from Fort Lauderdale-based SkyTheater Design Group. Led by CEO Gregg Launer, the company has just delivered its most ambitious project, a true theater in the sky that not only



Everyone wants a thin, flat-screen television, and Rosen Aviation’s high-def monitors—at 1.1 inches—are as slim as those in the typical home entertainment center.

expands the envelope but has also created a whole new level in cabin entertainment.

According to Launer, every aspect of the HD audio and video systems—from a 32-inch 3-D monitor (no glasses required) to the multi-channel surround-sound speaker array—was custom-made by SkyTheater for the client.

The database will hold up to 1,000 movies (per seat) and 6,000 CDs. It will not only interface with iPads or iPods, but will also expand the audio to match the video fidelity. A 57-inch LED HD monitor allows what Launer calls “true-vision film replication.”

All of this in three movie theaters and a separate concert room for music that is acoustically isolated from the rest of the airplane. “Sound compression fills every molecule of this room,” said Launer. “You’re not just breathing air, you’re breathing the music.” At altitude,” he added, “the SkyTheater system will perform with Imax quality.”

The home of this entertainment system is an executive Boeing 757, but in emphasizing the one-off aspect of the package, Launer noted that no two SkyTheater systems are the same, “not even in another 757.”

No cabin entertainment system is perfect. There are barriers inherent to aviation in producing audio/video quality—the noise produced by an airplane in flight, the process of certification, weight, vibration. And the list goes on.

But as the latest technology continues to make its way into the business jet cabin, it’s certainly improving. And it promises to get better, in quantum leaps. —K.J.H.



LCDs from Flight Display Systems are mounted from the ceiling of this EC145.

CMS three years ago and continues to refine and polish it. The system appeared first in a Cessna Citation CJ4, and it has grown and is a scalable and easily upgradable system now installed in a variety of aircraft, including the Airbus A319.

"On smaller aircraft, we sometimes hear people say, 'Oh, high definition doesn't make a difference.' But that's until they actually see it," said principal marketing manager Lupita Ho.

Venue is Ethernet based and point-to-point digital—from dual-disc Blu-ray player to 42-inch HD monitor—with no latency, even with Xbox videogame system. It also features wireless compatibility with the iPhone or iPad. "Our goal is to target all the most popular personal devices, including Android," said Ho. The Venue roadmap, she added, is for more application-based solutions to allow integration for business or entertainment, and for additional wireless solutions.

Ho emphasized that Venue is high-definition, end-to-end, with 1080i or 1080p resolution, "depending on the source—HDMI [high-definition multimedia interface] or HDSDI [high-definition serial digital interface]."

One of the most recent Venue retrofit installations was in two executive Dornier 328DBJs outfitted by 328 Support Services of Germany. Venue is available as a forward-fit CMS on the King Air 350i. Gulfstream has also installed the system

as part of several refurbishment projects on Gulfstream business jets.

Among the latest in Venue upgrades is CabinRemote, a free application (app) that transforms an Apple iPhone or iPod or iPad into a two-way remote controller. It allows passenger control of all Venue audio/video systems, aircraft lighting, shades and other functions from anywhere in the cabin. According to Rockwell Collins, the app is available for both forward-fit and retrofit markets.

For operators of multiple Venue-equipped aircraft, CabinRemote automatically syncs with each cabin as the passenger boards the aircraft.

Here Come the Apps

In fact, such apps are a growing part of cabin management systems, and the industry can only expect this technology to grow.

Cabin Management Systems of Kent, Wash., has put a fresh face on its product range with its iPlane app that allows the passenger to control all aspects of the cabin through an iPad, iPhone or iPod.

iPlane can also control Cabin Management's SkyShow moving map, and the map perspective can be changed either by using pan, tilt or rotate buttons, or simply by tilting the iPad. The iPlane is already in service on several BBJs. Any CMS can be upgraded to accommodate iPlane.

This past spring, Flight Display Systems introduced an Android software

application for use with its Select CMS. The launch of the app came as part of a Gulfstream III refurbishment for an unidentified Hollywood producer.

Gulfstream Aerospace introduced one of the earliest apps when it showed up at the NBAA Convention last fall with its first G650 with a finished interior. That the CMS was of its own design was not surprising, but Gulfstream also unveiled a software application that would morph the ubiquitous personal smartphone into a remote that could control every aspect of the cabin, from lighting to entertainment to the environment.

At Duncan Aviation, the Lincoln, Neb.-based MRO, completion and refurbishment specialist has received Service Mark approval from the U.S. Patent and Trademark office for its iCabin app.

The iCabin is an integrated iPad application for wireless control of cabin systems in a Falcon 900 using an Aircell CTR Wi-Fi source and an interface unit to communicate instructions to Honeywell's MH cabin management system.

At Ebace, Lufthansa Technik took advantage of the international stage to introduce its own Nice remote app that allows passengers to control cabin functions through an iPhone, iPod or iPad.



The Rockwell Venue features wireless compatibility with the iPhone or iPad.

And so it goes; faster and cheaper high-speed Internet data transfer, clearer and less expensive voice transmission, high-definition from end to end, more and more seamless integration of smartphones, tablet computers and personal audio/video devices.

And with the technology moving so quickly, it is becoming a matter of whether the technology selected during the early planning stage of a completion or refurbishment will be outdated by the time the airplane is delivered to the owner.

One example is the Nice system being designed by Lufthansa Technik on behalf of Bombardier for the Canadian OEM's new Learjet 85. The largest Learjet ever, it is not scheduled for certification until 2013. As a result, according to program director Ralph Acs, the specifics of the CMS, communication and entertainment systems are not to be finalized until late into the flight-test program. "We want to make sure the CMS backbone is adaptable," he said.

So as cabin electronics technology moves further into this 21st Century—Anno Domini era or the Common Era in accordance with the Gregorian calendar—the question is not so much where are we, but where are we going? □