



GDC Technics has secured its third completion project for the Boeing 787.

Completion centers are busy

The need to travel and the desire for comfort and connectedness meet in glorious harmony in the cabins of today's business aircraft. Meanwhile, on the ground interior designers, engineers, completion specialists and myriad manufacturers strive to meet the ever-rising expectations and changing tastes of those who buy and fly on the finest conveyances mankind has ever ridden. This report highlights the products, services and developments that made a mark on the completions and refurbishment industry and its customers in the past year.

Organizational changes have accompanied work on single-aisles and widebodies for multiple completion centers at **Advent Aerospace (AA)** of Largo, Fla., formerly Yankee Pacific Aerospace. In April one of the company's three divisions, component manufacturer Advent Aircraft Systems, was spun off, leaving interior structures companies Jormac Aerospace and Cabin Innovations in the fold.

Steve Jourdenais, named AA president last December, said the spin-off won't affect the company's completions

work. Jormac, in Largo, manufactures interior components such as ceilings, walls and showers, while Texas-based Cabin Innovations makes galleys and lavatories for BBJs and ACJ319s up. Jourdenais said Cabin Innovations will be "expanding its refurbishment capabilities" into the business jet market. Jormac is developing latches that can work as either a quick release latch or a decompression latch, and Cabin Innovations will offer first-class seat surround pods used in some private

and commercial aircraft. AA is currently providing interior structures for several 747-8is and a 787 Dreamliner. "We're never allowed to disclose what completion center," Jourdenais said when asked. In a given year AA typically works on three to four widebodies and the same number of single-aisles, Jourdenais said, though he expects work to climb next year with more 787 projects and the Airbus A350's service entry. Global demand for single-aisle and widebody completion services remained strong in the past

year, with many providers expanding, reorganizing and introducing new offerings to take advantage of anticipated continued growth in the market. Here's the view on recent and upcoming developments from key players in the space.

Aeria Luxury Interiors inducted its first green BBJ last November, and is "well down the road" in the completion process, said Ron Soret, general manager of completions for the San Antonio firm. The company is also preparing to accept a Boeing widebody (type and owner undisclosed) for an interior refurbishment project. Concurrently, Aeria, ST Aerospace's private interiors brand, is performing a combination of interior work, maintenance and avionics upgrades for two Boeing 757s and a BBJ. Similar refurbishment projects are "in the pipeline," and Soret sees more such work ahead as the BBJ fleet (which began entering service in 1999) matures.

Aeria's 3-D printer, acquired last year, is proving invaluable, creating a variety of "conceptual, decorative, cosmetic and one-off parts," as well as production parts such as connector brackets and ducts for the ventilation system, Soret said. All Aeria's single seat armrests are 3-D printed, saving fabrication time and labor. He expects such equipment to make "a significant contribution to interiors in the future."

Aeria has established a refurbishment facility in Singapore for regional clientele, and is in the process of adding an interior design space and sales and marketing offices to the hangar complex. Construction began in May.

Looking ahead, Soret said the Middle East market remains strong, though China and Asia are coming online "a little slower" than hoped.

Basel's **Amac Aerospace** closed out last year with



Having started its completion business with a focus on single-aisle aircraft, Comlux America has rounded out its service offerings and can outfit widebodies as well, including the BBJ Max 8 for the parent company's charter operation.

redelivery of its first 747-8 completion, outfitted in "premium airliner configuration" for an undisclosed Asian head of state. Though Amac has its own design team, the owner provided the design package and specifications for the project and requested a proposal.

(Amac had previously performed an ACJ319 completion and maintenance services for the customer.) The aft cabin of the -8 has a mix of first and business class airliner seats, while the forward cabin features a main lounge, office, and two bedrooms and

lavatories with showers. CMS and IFE systems provide high-speed Internet access and control via personal devices. A humidification system helps keep the cabin comfortable; wood veneers provide soothing visual and tactile accents. Food and refreshments are



Aeria has several completions and refurbishment projects in the works and anticipates being even busier in the coming years as owners look to refresh older aircraft.



Amac Aerospace has seen demand from Asian clients build and has developed designs that reflect the aesthetic of customers in the region.



Greenpoint showed off its Boeing 787-9 Azure 1/20th-scale model Dreamliner at MEBA 2014. The Azure interior features open living space with a forward master suite, private office, and two aft mini suites for guest accommodations.

provided from seven galleys.

Amac Group COO Bernd Schramm said a 747 completion costs about four to five times the \$35 million to \$45 million price of an ACJ319 completion, commensurate with the difference in size.

Amac, like other completion centers, says demand is strong for IFE and connectivity. Last September Amac won a contract to upgrade the IFE system on a 737-7BC with new monitors and hi-def speaker system, and more IFE/CMS work may be on the way. "Now we are talking [to customers] about mobile phone usage in the cabin, fully digital entertainment systems, satcom, and Ku- and Ka-band installations," said Schramm.

As this issue went to press Amac was on the verge of completing a green Airbus ACJ319 for a customer in Asia, scheduled for delivery in the second quarter. The interior features

"quite a bit of carbon fiber," said Schramm, adding that "it's difficult to find the quality [of carbon fiber] that meets our expectations."

Associated Air Center (AAC) of Tempe, Ariz., joined the list of facilities performing completions on the Boeing 787, inducting a 787-8 for a head-of-state completion in October. AAC president James Colleary described the challenges of dealing with the composite structures and advanced systems on the 787 as "a whole new ball game," noting the engineering, tooling and technical capabilities required for the composite airframe. Redelivery is expected by year-end. AAC is also in the process of completing a 747-8.

In another milestone, last September AAC delivered its first green Airbus widebody completion, an A330-200 for an undisclosed head of state. The interior, installed

at the company's Love Field facility in Dallas, includes a high-speed connectivity platform and high-def IFE system, full front and rear galleys, a complete zonal drier and humidification system, sound insulation throughout the cabin and a standup shower. Anticipating more such work, Colleary said AAC has added staff and expanded its facilities "to accommodate this and future widebodies."

AAC is awaiting delivery of a green ACJ320 next month. Interior design and technical specification development is almost done. The layout includes a custom forward galley, master bedroom and lavatory, a three-zone main lounge and mid-cabin principal's lavatory. The IFE system features large bulkhead-mounted LED screens, with audio and video on demand (Avod) and surround sound. Satcom

broadband and global system for mobile communications (GSM) will support passenger connectivity. The aft cabin hosts a staff area, galley and passenger lavatory.

Greenpoint Technologies is on track to claim the first private 787 completion and redelivery, planned for next year. It's one of two 787-8 completions the company is currently performing. Redelivery of the second is slated for 2017, and the company says both programs are ahead of schedule. Greenpoint sees the market remaining strong as 747-8s continue to "hold capacity" and 787 production proceeds. However, low oil prices, unrest in the Middle East and China's austerity campaign are "pushing opportunities to the right," said Christine Hadley, senior manager of marketing.

Demand is strong for personal cabin designs that feature efficient use of cabin space, comfortable seating, media integration and state-of-the-art technology, particularly high-speed connectivity (Ka-band) and streaming IFE. Recent completion projects incorporate touches such as electric sensor doors, Oled (organic light-emitting diode) digital walls, hand-painted gold leaf ceiling coves and chandeliers.

For its 747-8 program, Greenpoint recently obtained the first European Aviation Safety Agency (EASA) supplemental type certificate (STC) for an Aeroloft, the eight-berth sleeping area above the aft main cabin Greenpoint developed for the jumbo. A second Aeroloft certification is under way, and two more are expected by year-end.

In June last year Zodiac Aerospace bought the Boeing widebody completion specialist, and this spring Greenpoint Technologies merged with sister companies Odyssey Aerospace and Greenpoint Products and Services to form an expanded Greenpoint Technologies Corp. The merger unites Greenpoint's cabinetry and machining facilities in Denton, Texas, and its manufacturing and testing facility in Marysville, Wash., with the corporate headquarters in Kirkland, Wash. The divisions were already operating as a unified company, according to Greenpoint CEO Scott Goodey, as the teams at each facility "work together on every program, representing true vertical integration. We are 'one Greenpoint' and it's efficient to combine our business processes to reflect this."

Greenpoint Aerospace, a business jet MRO facility in Denton, Texas, continues to operate as an independent division servicing private, corporate and military aircraft.

Last December Zurich-based Comlux the Aviation Group ordered two BBJ Max 8s for its charter business. No surprise the company turned to its **Comlux America** completion center in Indianapolis to handle the interior design and installation. Currently in development at Boeing, the first Max 8 is expected to roll off the assembly line in 2018; no date for delivery of Comlux's jets has been announced.

Meanwhile, Comlux America announced at MEBA 2014



Jet Aviation Basel has developed for widebody aircraft a plug-and-play in-flight dishwasher with a three-minute wash cycle that runs on three liters of water.

its first widebody completion contract, an A330 scheduled for induction this September. To meet the needs of this and future widebody projects, Comlux America is expanding its current hangar by some 19,000 sq ft, to 157,000 sq ft, large enough to house any widebody along with six single-aisle bizliners simultaneously. Project completion is slated for this year's fourth quarter.

"We are now capable of doing any type of narrow- or widebody completions, making us an even stronger player in the industry and on an equal playing field with our biggest competitors," said Richard Gaona, Comlux Group chairman and CEO.

Comlux America in the past year also signed contracts for a green ACJ320 completion and a BBJ refurbishment for a Chinese customer, while delivering a BBJ and ACJ321

completion for an Asian and Central Asia customer, respectively. The BBJ cabin features "ultra-modern" custom electric POD seats made by Iacobucci and four different cabin configurations that convert lounges and offices into bedrooms and sleeping quarters.

The ACJ321 is the first of its type ever completed, according to Comlux, and was performed under an "extremely strict timeline for redelivery." Comlux America met the schedule, and also beat the weight and sound level targets. Thanks to weight reduction and sharklet-equipped wings, the jet now has more range.

In March, Scott Meyer, former COO, was promoted to CEO of the U.S. facility.

Comlux has seen demand in Asia for its cabin completion and refurbishment services rise since opening a

Hong Kong office in 2012, Gaona said. The first contract came after Comlux assisted an owner negotiate purchase of three aircraft, with the client selecting the company for the completions "just after the signatures" went on the sales agreement.

A year after establishing its Original Equipment Innovation product division, backed by €200 million in R&D funding, **Lufthansa Technik (LHT)** has introduced a host of new partnerships and products.

This May at EBACE, LHT announced teaming with Mercedes-Benz Style to jointly develop "an entirely innovative, luxurious and integrated cabin concept" for short- and medium-haul aircraft. Their interior concept features a dynamic, spiral layout, creating new independent spatial zones without the traditional arrangement of seat and wall elements, according to the companies. Target customers are "global clientele with a strong affinity for unique design." The partners describe the interior as "organic and homogeneous, like a DNA helix," with furniture merging with the cabin interior. Windows are concealed by so-called black panels, inspired by the screen design in the Mercedes-Benz S-class. Mercedes-Benz Magic Sky technology allows the panels to be dimmed electrically from transparent to black. The companies will evaluate the general level of market interest while developing details of the design concept over coming months.



DAIMLER

Expect to see more innovative cabin concepts from the LHT-Mercedes team, which has set its sights on “global clientele with a strong affinity for unique design.”

Also at EBACE this spring, LHT and Airbus Corporate Jets (ACJ) introduced the Elite ACJ319 modular cabin, based on the companies’ successful ACJ318 Elite (19 deliveries to date). The Elite offers predefined layouts and modular design elements as well as color and material options, promising lower costs and faster delivery times compared with customized completions. The baseline configuration consists of a crew-rest/entourage area and executive lounge with full-flat club seating and berthable divans, and mid-cabin lavatory with private office that converts to a bedroom. A master bathroom is aft. Beyond the basic design, the ACJ319 Elite has more

than 20 layout and systems options, and thanks to the length of the cabin can accommodate an optional executive office as an additional private room, unavailable in the ACJ318 Elite.

LHT also offers its own Leadership Select concept, a cost-conscious, modular concept adaptable for interior completions of the ACJ319 and BBJ2. Launched at EBACE last year, Leadership Select offers a multitude of cabin elements customers can mix and match. “This reflects the new customer base coming up, a lot younger in age,” said Wieland Timm, LHT’s director of sales, VIP and special mission aircraft. “It started in the Russian region, now it’s

in Asia,” among what he calls “the iPhone generation.” To help customers envision what the completed Leadership Select interior will look like, Lufthansa Technik has been demonstrating an online tool customers can use to select elements and design their own single-aisle aircraft cabins.

This doesn’t mean the bespoke market is hurting. “The widebody aircraft are mostly head-of-state customers or rich individuals,” Timm said. “They are interested in economic ups and downs, but they are more or less stable.”

Chair, LHT seats that are adaptable to passenger aircraft of all kinds, another product that made its debut at EBACE last year, is now

“coming into fruition,” said Timm. Other offerings range from the practical to the fanciful. LHT has introduced a next-generation patient transport unit, designed to meet the medical needs of any passenger traveling on a private airliner, and has also introduced a “fireplace” for private jet interiors. “We can make dreams fly,” Timm said, underscoring the message the fireplace is meant to send. It’s not real fire, but it can produce heat and alter the intensity of the “flames.”

As for traditional completion projects, LHT is finishing two head-of-state 747-8 projects and is in “concrete” discussions about completions with more 747-8 customers, said Timm.

The company also added a new product for its extensive 747-8 service portfolio: the Aircraft Production Inspection Program, an independent production inspection offered to all private customers, airlines and leasing companies.

Meanwhile, Lufthansa Technik's single-aisle completion subsidiary in the U.S., BizJet International, will perform an ACJ319 completion in cooperation with the bespoke division of Hermes, for an undisclosed customer from Taiwan. The seats and divans will be designed and upholstered by Hermes craftsmen in Paris, and the interior will feature exclusive Hermes fabric on bulkheads and curtains.

Jet Aviation Basel (JAB) is celebrating recent completion wins. It was contracted in May to perform both the first completion on a private 787-9 for a customer in the Middle East, and head-of-state completions on an A319 and A330 for a Middle East operator.

The 787-9 will be delivered to JAB this year with redelivery in 2018. JAB's "precise understanding of the data required by Boeing to validate the modification of systems and structures" will help ensure a smooth progress, said Neil Boyle, noting JAB engineers began working with Boeing in 2011 to prepare for completions on the composite 787 airframe. "Developing this degree of engineering specification so early in a project is unprecedented," said Boyle, v-p and general manager of JAB's completions

center. "As a basis of comparison, such engineering maturity is typically attained only with traditional metallic aircraft by the final design review. In this sense, Jet Aviation truly is writing the rule book for completing carbon-fiber aircraft."

Completion project management and interior design services will be performed by EH Aviation Advisors in cooperation with Andrew Winch Designs. The head-of-state interior features a master bedroom, bathroom and office suite, and large open-plan dining and living area, as well as rooms for guests. The interior will feature a global communications system, and state-of-the-art lighting, heating and sound-proofing.

The A319 and A330 completions will be performed for Riyadh-based Alpha Star Aviation Services, one of the Kingdom's major private aviation services providers, and both interiors are being designed by the Basel Design Studio. The green aircraft will be delivered to Basel in the fourth quarter, and once completed it will be available for charter.

Earlier this year JAB redelivered a long-range BBJ1, its 25th custom-completed BBJ. To help meet the jet's long-range mission requirements, JAB engineers drew on technology improvements gleaned from 787 project development to develop a sound insulation technique that cut insulation weight by 30 percent, resulting in longer range and a quieter cabin. The BBJ1's modern minimalistic interior design contrasts white



The BBJ has proved a significant platform for Pats Aircraft Systems, which expects to see even more demand for its services when the BBJ Max enters service in 2017.

and taupe tones against black wood, with stingray skin inlays emphasizing the custom-made furniture. Following completion and certification of the interior, the BBJ1 received what Jet Aviation Basel calls the most complex paint livery it has ever executed, a sleek black to gray fade-out livery of 19 mixed design colors that link the interior and exterior colors. Both interior and exterior design concepts were created in-house by the Jet Aviation Design Studio.

In another Boeing win, in April Boeing Business Jets selected the company after what JAB called "intensive and competitive bidding" for completions of two 777-300s for an undisclosed Asian customer. Work began immediately and is scheduled for completion in the third quarter of 2018. Since 1999 JAB has completed 25 Boeing interiors, the last earlier this year. Before the year is out JAB will also deliver an A340-600 and ACJ320, and the company

has a strong backlog, with a spate of inductions starting next year, said Matt Woolaston, JAB's v-p for completion sales and marketing.

Jet Aviation St. Louis (JASL) marked its 220th business jet interior completion last fall, less than two years after breaking the 200 barrier. "And we're proud to say that all but one of the deliveries was on schedule," said Chuck Krugh, JASL senior v-p and general manager. "We've kept building the pace of completions with a series of continuous improvements initiatives and 5S and Lean technologies at every level of the process." The majority of the completions—117 aircraft—have been performed since 2008, despite the global recession that began that year. JASL is an authorized Challenger and Global completions center.

JASL is also active in the refurbishment market, and Krugh says it's "reached the perfect balance among the

completions and the maintenance and refurb sides of the house.” The company sees a continuing trend toward detailed personalization, with new cabin features ranging from electric pocket doors in mid-cabin bulkheads to powered shades on windows in the bulkheads, new side-ledge designs, and heated seats and floor mats.

Dennis Gilbreth, JASL director of MRO operations and completions, said he’s seeing the return of the pop-up seat in the credenza that was popular many years ago. “This is our own design and we’ve done five recently,” said Gilbreth. Customers are introducing new materials, such as carbon fiber, stainless steel and anodized aluminum. Darker woods are becoming more popular, as are other exotics such as pearwood. Satin finish on wood elements is more requested than gloss.

Customers are getting bolder with their exterior paint design and colors, as the paint scheme JAB recently applied to the BBJ1 attests.

Meanwhile, JASL now has more than 225 completions to its credit.

At EBACE last year, Mohammad Alzeer announced rebranding Gore Design Completions, the widebody completion specialist, as **GDC Technics**, along with ambitious plans for reorganization and global expansion. At the annual May event this year, Alzeer, general partner of GDC Technics, who together with his partners bought the San Antonio-based company two years ago, announced

the company won its third 787 completion contract. The company is establishing facilities in Europe and the Middle East, and a facility in Africa (Morocco) is imminent.

Alzeer declined to identify the 787-8 customer but called the contract “a game changer, as it involves developing a new prestigious first-class cabin that integrates

new cutting-edge technologies with maximum luxury found only in VIP aircraft.” GDC is scheduled to take delivery of the green aircraft in 2017.

Completion work on the first two 787s and a 777-300ER is under way, and GDC also has a contract to refurbish a BBJ1.

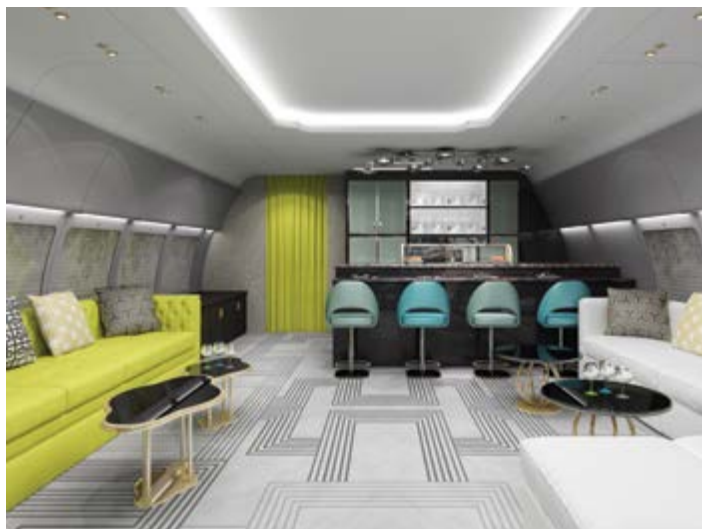
GDC built a new 850,000-sq-ft facility at Alliance

Airport in Fort Worth, Texas, and after investing \$20 million in restructuring, development and expanding its engineering and certifications capabilities, is now a “100-percent Catia environment,” Alzeer said.

While GDC has no plans to move from its home, maintaining an international presence is essential, Alzeer said. The company bought a German engineering firm (now GDC Munich) and is opening a Casablanca facility and as part of that strategy. “Our demand is global,” Alzeer said. “We have customers in China, the Middle East, in the U.S., in Central Asia. The weakness we had is that we were not close to customers.”

Hong Kong-based **Haeco Private Jet Solutions (HPJS)**, formerly Taeco Cabin Completion Center, launched its new corporate identity at MEBA last December and since has proceeded to unveil new interior designs for widebody and single-aisle private jets incorporating Asian aesthetics and influences. The company’s new name aims to underscore HPJS’s suite of services covering the entire lifecycle of an aircraft.

Haeco’s Xiao Yao design concept for ACJs brings feng shui principles used in traditional Chinese architecture to the aircraft cabin, expressed in curving lines and the relative positioning of living and sleeping areas. “Ultimately, the objective is to serve wealthy individuals in China,” said Henry Chan, commercial v-p of the Chinese company. The Xiao Yao interior would require 18 to 24 months, “only marginally longer than a



Haeco Private Jet Solutions showed off its “East Meets West” widebody cabin concept, combining traditional Asian design elements with Western motifs, at EBACE. In addition to more typical amenities, the cabin features a sushi bar in the dining room.



traditional green cabin completion,” said Chan.

Xiao Yao is complemented by Haeco’s widebody “East meets West” concept, which combines traditional Asian design elements with Western motifs, introduced at EBACE this spring. Based on the A330-200 cabin, the interior concept is adaptable to any widebody, said Chan. The Asian design elements include latticework and silk-embroidered Fromental wallpaper with dragon and bamboo representations, while Western

into reality, HPJS’s Haeco Xiamen MRO facility at East Gaoqi International Airport in Xiamen has six hangars, each capable of simultaneously accommodating two widebodies and one single-aisle aircraft. HPJS, the only company in Asia that is both an Airbus and Boeing approved completion facility, has access to EASA validation STC approvals through a working arrangement between the EASA and HKCAD (Hong Kong Civil Aviation Department), and

Ovation Select CMS, providing control of in-flight entertainment and environmental conditions such as lighting, temperature and window shades from a touchscreen at their seats or from their personal mobile device. According to Honeywell, this is the sixth Ovation Select installation on a BBJ. The aircraft will be “among the most elegant and well equipped in operation once delivered” late this year, said John Eichten, Pats’s senior v-p of sales.

This year Pats received its fifth consecutive Diamond

business, according to John Martin, Pats president and CEO. The company’s auxiliary tank installations, which provide an entrée for pitching its completions capabilities, have slowed in recent quarters, but Martin sees a rebound ahead when the BBJ Max becomes available in 2018.

A new player has entered the greenspace with the debut of **Sierra Completions** at the NBAA Convention last fall. The Sierra Nevada (SNC) subsidiary aims to focus on the composite widebody completion market, and expects to receive its first contract by the end of this year.

“There is a global customer demand for a financially and technically strong, proven performance partner in this market segment, and we are committed to being the premier global partner,” said Sierra Completions president Jon Burgoyne. “While the aircraft completions market is a highly specialized segment with a demanding clientele, we have the backing of SNC, which has been in the aerospace and defense business for more than 50 years, and has modified and integrated 200 aircraft of various sizes,” Burgoyne said.

Work will be performed at Sierra’s planned \$88 million completions complex at the Colorado Aerospace Park at Colorado Springs Airport, which will be capable of performing completions on the Airbus A350 and Boeing 747 and 787. SNC expects the facility will employ more than 2,100 people within five years. □



Lufthansa Technik is completing two 747-8 projects. Details are confidential, but the final product will satisfy even the most demanding passenger.

style can be seen in its bold color contrasts of matte gold and pale green, and open, clean lines. The dining room features a sushi bar. “It’s a new gourmet concept,” Chan said. “If you swing by Tokyo, you can buy fresh catch of the day” and have it prepared on board. The aft cabin provides a private room, master area with en suite bath, and an exercise area with treadmill and stationary bicycle.

To translate its concepts

FAA certification services in the U.S. through its San Antonio, Texas facility.

A year ago **Pats Aircraft Systems** was acquired by Moelis Capital Partners (MCP) of New York City, a bullish sign for the widebody and BBJ completion markets. Pats is currently performing a head-of-state completion on a new BBJ2, inducted in October, for an undisclosed Asia-Pacific-based customer. The aircraft is being outfitted with Honeywell Aerospace’s

Award of Excellence from the FAA for commitment to aviation safety through maintenance technician training, and hosted a celebratory luncheon for its more than 300 employees and guests, among them personnel from the FAA Flight Standards District Office.

The Georgetown, Del.-based company remains focused on BBJ completions, and is looking for more customers overseas, though it might put more emphasis on its refurbishment



Greenpoint Aerospace is performing interior work ranging from minor upgrades to complete refurbishments and service on various aircraft. This Falcon cabin was one of the company's recent projects.

Refurbishment Specialists

Carbon fiber, iPad apps and maintenance downtime are among the ingredients driving a robust refurbishment market. Here are highlights of the past year from some of these turnaround specialists.

A Cessna Citation 650 was the canvas for a complete interior refurbishment performed by **Spirit Aeronautics**. The do-over incorporated carbon-fiber inlays, blackened wood laminates, high-gloss coatings and brushed nickel-plating, details typically seen only on larger business jets. Seats were covered in complementary graphite charcoal gray leather over multi-layer hand shaped foam, and the two-tone block pattern carpet was crafted to give the illusion of depth, enhancing the perceived size of the walkways.

"The client was attracted to

clean European styling combined with western comfort, which is challenging in an aircraft of this size," said Tony Bailey, president and COO of the Columbus, Ohio company. Furthermore, "The client did not want to change the certification basis of the aircraft, so we had to look for stylings that gave a minimalist impression without adding or removing any of the current furnishings."

Constant Aviation finished 2014 with delivery of a custom refurbished Beechjet, its 11th of the year. Constant replaced all soft goods and designed and installed new drink rails,

window lines and passenger service units. A three-place divan was added, the lavatory extended and new galley installed. The Cleveland-based refurbisher, a Directional Aviation Capital company, has also begun using a custom iPad app that allows "the customer to virtually walk through the new interior, and ensures that they will be pleased with the outcome," said John Shirley, director of interior operations.

Bombardier completion specialist **Flying Colours** is converting eight CRJs into executive aircraft with the assistance of technicians in training from China's Sparkle Roll Aviation. This is the first project under a partnership agreement announced at ABACE 2014. The conversions are being performed at Flying Colours' facility in Peterborough, Ontario,

Canada, and the interiors range from executive configuration to shuttle. The first three jets will be finished as mixed-class, with half corporate shuttle, half VIP combo interiors, all featuring ebony seat leather and black trim with rose gold plating, and an exterior custom scheme with a mauve palette. Interior designs of the remaining five are being finalized. The long-term plan calls for transferring the CRJ conversion work to China. Future projects have not been announced.

Fokker Services is performing a head-of-state completion on a BBJ2 for an undisclosed Asian customer under a contract with Boeing concluded in December. Work is under way at its Netherlands facility with redelivery scheduled for August next year. The award "will bring our relationship with Boeing to new levels," said Johan van Dorst, sales director for Fokker's completion and conversion business. Fokker's SkyView panoramic window, developed for the BBJ and introduced at EBACE '14, also displays the companies' growing ties. Fokker announced its first order for the jumbo port-hole installations at EBACE this spring. Spanning the space of three standard windows, as many as four SkyView windows can be installed in a BBJ.

MRO provider **Greenpoint Aerospace** (sister company of widebody completion specialist Greenpoint Technologies) is performing interior work ranging from minor

upgrades to complete refurbishments on some 20 business aircraft. Based at Denton Municipal Airport in Texas, Greenpoint has OEM approvals to service Challengers, Learjets, Gulfstreams, Hawkers, Beechcraft, Citations, PC-12s and Avantis, and its paint facility accommodates Global/ GIV-size aircraft.

Ruag Aviation's Geneva maintenance facility, under contract to Malaysian MRO provider Airod, performed a major refurbishment of a Falcon 900 owned by the Royal Malaysian Air Force. The full cabin renovation coincided with an extensive 4C check and upgrade of the avionics systems. It includes new seating and LED lighting, along with installation of Vision Systems' new electronic dimming window shades, and a Honeywell Ovation cabin management system, Ruag's first installation of that CMS in a Falcon 900. An Airshow 4000 and Satcom 7000 system were also added to the cabin.

Threshold Aviation Group of Chino, Calif., is planning to "flip" a Citation CJ2 purchased with structural damage to its wings, the latest of some 50 "distressed" aircraft the MRO provider has bought, refurbished and resold over the past 15 years, said COO Tom Bressan. Last year Threshold refurbished and resold a Europe-based Citation CJ3 with an extensive blue stain on its belly from a lavatory leak. Threshold de-mated the wings using tooling company technicians designed

and built for the project. After inspecting, cleaning and reassembling the aircraft, the company refreshed the interior and repainted the exterior. The CJ3 is "back in airworthy condition with no issues," according to Bressan.

West Star Aviation had a record year, performing 35 refurbishments in 2014, half of them major projects such as complete soft goods replacements and cabinetry renovations, along with IFE and

company refurbished its first Global at Alton this spring, a project that included removing the shower. Meanwhile, customers are asking for more automotive styling in the cabin. "They want seats refurbished in high-end Ferrari, Maserati and Bentley styling," Cunningham said.

West Star also completed a major refurbishment of its own facilities, including a \$6 million maintenance hangar and accessory shop renovation



Flying Colours has carved a niche for itself converting airliners, such as the Bombardier CRJ, to executive use and landed several such contracts this year.

avionics upgrades. The Alton, Ill.-based MRO is "getting away from partials," said Debi Cunningham, v-p of marketing and interior design, as those projects tend to "blossom into full interiors. Customers see you can't do a partial [refurbishment] and think everything else will look good." Some of the upgrades amount to downsizing. "We're seeing a trend: airplanes come in with ovens and all kinds of fancy galley equipment, and we're taking it out and going back to microwaves." The

and a \$1 million wood and upholstery shop expansion. A new \$9 million paint shop at its Grand Junction, Colo. facility opened last month.

The major refurbishment projects **Jet Aviation Basel** (JAB) performed in the past year included a trio of BBJs. One required a configuration modification, performed according to a plan created by JAB Design Studio, and the others received complete CMS and IFE system replacements. Customers who formerly used maintenance time

only for repairs now "want to use their aircraft downtime for refurbishment projects, including new interior designs, re-upholstery, technology upgrades or even a new cabin layout," said Vincent Rongier, JAB's head of refurbishment, modification and upgrades.

"Several" 747s and BBJs, an ACJ, and multiple Gulfstreams, Falcons and Bombardier aircraft are currently in the hangars or scheduled to arrive later in the year for retrofit, modification and upgrade services, Rongier said.

Concurrently, JAB has upgraded its facilities and capabilities, the enhancements spanning the upholstery, paint, wheel, repair, survival-equipment and interior shops.

Gulfstream Aerospace captures a large share of refurbishment services for its pre-owned aircraft. Approximately 70 percent are custom projects, but for customers who want to minimize refurbishment downtime, Gulfstream offers its Portfolio Collection, a branded, in-stock collection of materials, patterns, finishes and colors encompassing all interior elements. The collection is constantly evaluated to include current design trends; this year alone more than 50 new fabrics were added to the collection before summer, complemented by new leathers, said Matthew Huhn, director of product support business and program support. The collection is particularly helpful for pre-owned aircraft buyers, who aren't able to plan a completion in advance. □

The OEMs

OEMs set the standards that define state-of-the-art business aircraft interiors, and the work of their interior design departments is critical to sales success. Here's what manufacturers are doing to keep their interiors contemporary amidst constantly changing tastes and rising expectations.

Bombardier's interior design teams are highlighting the Global 7000, Challenger 650 and Learjet 75 this year. Customer reaction to the full-scale mock up of the Global 7000 interior introduced last spring affirmed the team's design direction, said Brad Nolan, Bombardier's director of product planning and strategy. Inspired by grand homes, yachts and five-star hotels, the mock-up's four-zone configuration is "one of a thousand possible combinations" of cabin layouts, said Tim Fagan, Bombardier's manager of industrial design. The longer-range, shorter-fuselage Global 8000 will have a three-zone cabin; the models are slated for service in 2016 and 2017, respectively.

The prototype interior of the Challenger 650 made its debut at EBACE in May, modeled on the Challenger 350 introduced a year ago. Both cabins incorporate new lie-flat seats, redesigned galley, side ledges and intuitive side ledge-mounted passenger control units.

In the Learjet line, Nolan cited the Learjet 75, the updated Learjet 45, certified in late 2013, calling it "a brand-new airplane from a customer



MARIANO ROSALES

Gulfstream displayed this mock-up of the G600 interior at last year's NBAA Convention, where it sought feedback from potential customers. The cabin of the G600 can have as many as four living areas and a crew rest area.

standpoint," with its flat-floor interior allowing two distinct floor plans; options include double club seating, and the now standard LHT Nice CMS from Lufthansa Technik installed on Challengers.

Dassault Falcon design teams are spec-ing interiors for the 8X, scheduled for certification in the middle of next year, said Judy Miller, manager of aircraft interior design at the company's U.S. headquarters in Teterboro, N.J. Added space in the stretched version of the 7X cabin creates opportunities for an enlarged crew rest space in the front and a "cozy corner" with a small divan in the aft cabin.

Meanwhile, the teams "are just now starting to meet with customers" about the interiors of the 5X, the clean-sheet, wider-cabin Falcon expected to enter service in 2017, Miller said. The wider cabin has a "different and unique geometry" designers are exploiting in several ways, such as using

larger patterns on carpeting to create a feeling of extra space.

Early this year Dassault Falcon upgraded its Teterboro Design Center to improve the completion selection process. The company has also introduced the Falcon Configurator for the selection process, a 3-D visualization tool that provides a virtual walk-through of a Falcon cabin with different layouts, colors furnishings and other options, so customers can "see" and compare how various interiors look and function.

Dassault Falcon's completion center in Little Rock, Ark., is in the midst of a major expansion in preparation for the expected onslaught of 8X and 5X completions.

Seated aboard an **Embraer** Legacy 500, Jay Beever, the Brazilian OEM's v-p for interior design, pointed to the metal cup holders, all recessed into the rich wood veneer, rather than atop the surface as usually positioned in business

jets. "The key is to have layers of detail—metal, wood, leather—the primary, secondary and tertiary accents," he said, talking about the overall look and feel of the interior. Indeed, those accents are repeated throughout the cabin, which also highlights strips of exposed machined aluminum from the airframe. Beever came to Embraer in 2012 after heading Gulfstream's interior department; the Legacy 500, certified last summer, and the Legacy 450, slated for certification this year, are the first interiors fully reflecting his design ethos, and the direction Embraer's interiors are headed. Aesthetics aren't the only concern.

Interior panels, easily removable for aircraft servicing, have floating gaps, minimizing the effects of normal airframe shrinkage and expansion. Underneath the surface, industrial design has simplified the interior production process, for example ensuring



As Dassault designers lay out the cabin of the clean-sheet Falcon 5X, above, they are certain to consider convenient storage/power for passengers' essential devices.

the French stitching on the leather seats can be performed simply and perfectly every time. "This interior assembles so much faster than any in the past, and it comes out easily," said Beever. "You need the airplane up and running. All these parts are designed for dispatch and reliability."

Gulfstream is emphasizing "more opportunities for personalization" in its completions, said Tray Crow, the OEM's director of interior design, while also focusing on the G500 and G600 programs, announced last October. A full-scale cabin mockup of the G600 shown at the NBAA Convention last year drew "a lot of feedback from prospects and buyers," said Cindy Halsey (formerly of Textron Aviation), who was named v-p of customer completions and designs last October and charged with ensuring customers have a "world-class completion experience." The G500 has three living areas and the G600 has up to four, and an optional crew rest

area. Both will feature a new seat design, and some architecture from the Elite interiors developed for the new G650 and later applied to the G550 and G450 will be incorporated in the new models.

Gulfstream also introduced a cabin configurator iPad app last fall. "We're using it as a tool during the outfitting definition process," said William Gay, director for customer completions. The company also opened a new design center at its Long Beach, Calif. facility last fall, to provide greater support to West Coast customers in selecting interiors and paint options for their aircraft.

Textron Aviation's reorganization of its interior design processes over the past year "allows us to be more customer focused," said Christi Tannahill, now senior v-p for turboprops and interior design. Interior specialists are readying for the production flow of the Citation Latitude, which received FAA type certification last month; it has the widest and the first new Citation fuselage cross section in four decades. The six-foot, flat-floor Latitude cabin offers either club or double side-facing couch seating, and six styling choices of leather, fabric and veneer. Slim-contour ergonomic seating delivers comfort while adding cabin space, and wireless in-cabin communication and entertainment is provided by Cessna's Clairity CMS.

During the first quarter of this year Textron introduced

a new interior for the Cessna Caravan, providing a club seating option and reducing empty weight by 55 pounds. Textron is developing modular tables to complement the club seating arrangement. In the third quarter Textron will begin refreshing King Air 250 and 350 interiors with Wi-Fi and, for domestic deliveries, Talk and Text service. Wi-Fi will be available as an option for C90s.

Textron has streamlined its interior selection process over the past year. Tannahill said 70 percent of completions are directed by the design team, with 30 percent of customers seeking a more customized look and hands-on involvement in the projects.

Airbus Corporate Jets introduced its A330-200 Summit interior at the NBAA Convention in October, offering more capacity in both the forward VIP section and an airline-style seating aft area. Standard layouts provide options for office, VIP seating and conference area in the front, followed by

business class seating for an owner's advisors and guests, with economy seating for support staff in the rear. Summit brings the cost of a VIP A330 to less than \$200 million and shortens completions time to between 24 and 30 months. The concept could be installed at any completion center with widebody capabilities, but Airbus would install the airline-style seating during production to lower cost and time.

Split scimitar winglets are now standard equipment on BBJs, making it the first fleet that will be so outfitted. The winglets—designed, developed and certified by **Aviation Partners Boeing** (APB)—also will be offered for retrofit on in-service BBJs by Aviation Partners (API). The new winglets take the existing blended winglet and add a scimitar tip and downward strake, providing 2.2 percent more range on a 6,000-nm flight. The first in-service BBJ with split scimitar winglets (owned by API) was displayed at EBACE this year. □



Recognizing that not all customers want a customized interior—or the extensive planning and downtime that goes with it—Airbus offers its standardized Summit layout.

Specialty Services

Hong Kong-based aviation service provider **Metrojet is collaborating with Tai Ping Carpets International** (both are Kadoorie Group companies) to bring personalized carpets to customers' jets. "A high-quality customized carpet embellishes the overall décor of a new jet, and refreshes the look and feel of pre-owned business jets," said Björn Näf, Metrojet CEO.

Michigan's Scott Group Custom Carpets introduced two new collections for interior refurbishments: its Handmade Collection combines sophisticated neutral tones with accents of metallic silks, while the Express II Collection of updated colors is intended for designers who need fast turnaround from order to delivery.

Jeff Bonner Research & Development

offers a pleated window shade created for the Boeing 787 Dreamliner, and an "easy install" pocket door. Both are available in manual or electric versions, the latter using an ultra-quiet motor with manual override option.

Vision Systems' Nuance electronically dimmable window can dim from clear to dark in less than five seconds, the company reported.

Using suspended particle device technology, the Nuance window reduces light, glare, heat and damaging UV rays entering the cabin.

New York's **Townsend Leather Company's** new lines for aircraft interiors include the Corked Cowhide Collection, featuring European bull hides; the Fifth Avenue line of lightly pigmented leather; and the new Softina



Cowhide, a full-grain aniline leather.

Italian seat manufacturer **Iacobucci** is offering its Aerospace Gusto Oven, a certified induction oven series capable of producing "five-star restaurant"-quality meals. "If you want to have what we call the Academy of Taste, or Gusto, on board, there's no other choice," said a company spokesman.

Pac Seating Systems of Florida will provide all seats for two 787s and one BBJ for completion specialist GDC Technics. Pac plans more seat models for the 787's unique floor track system, company director Andrew Perl said.

Yasava introduced Aïana Wave, the latest in its Aïana line of custom seats that use gravity as a source of energy. The Swiss company signed six letters of intent at

EBACE in May to supply the seats for aircraft including ACJs and BBJs, to be firmed up on initial EASA/FAA certification.

Custom Control Concepts of Kent, Wash., unveiled a lightweight, space-saving surround-sound system developed using 3-D printing technology. The system creates deeper, richer tones from smaller speakers, custom designed for each installation, according to the specialty IFE/CMS manufacturer.

Tanury Industries of Rhode Island, which lays claim to being the first aviation plating company to obtain an FAA repair station certificate, is expanding its services beyond "VIP jet interiors," to "a yacht, palace, restaurant—anything requiring high-end metal finishing," said company chairman Thomas Tanury. □



Connected cabin keeps passengers happy

Connectivity has been this year's buzzword, as customers demand onboard entertainment, Wi-Fi and communication capabilities. Completions and refurbishment specialists and system and service providers are simultaneously leading and following the charge, as milestone developments illustrate.

Taking advantage of the brand recognition of its airline Wi-Fi service, the former **Aircell** rebranded itself as **Gogo Business Aviation** last fall and enhanced its Gogo Vision In-Flight Entertainment and Connectivity (IFEC) service, enabling on-demand viewing of some 200 movies from major studios and episodes of top TV shows through passengers' smart devices. Gogo Vision is available in North America and Europe. Content is uploaded to Gogo's onboard UCS 5000 Smart Router/Media Server, either via

thumb drive or wirelessly via Gogo Cloud at select Signature Flight Support locations in the U.S., said John Wade, executive v-p and general manager of Gogo Business Aviation. The Colorado company will introduce a product for individual hangars later this year that enables automatic content refreshment. The service costs \$400 per month for content, and a \$10 per movie or \$5 per TV show viewing fee. About 40 business jets are currently outfitted with Gogo Vision. Net-Jets will install the system on at least 650 of its new Signature Series aircraft.

Satcom Direct launched GlobalVT at EBACE, a connectivity service enabling use of personal smartphones for phone calls, texting and data services aboard business jets from takeoff to landing anywhere in the world. GlobalVT works through Satcom Direct's SDR router

via Inmarsat SwiftBroadband or ViaSat Yonder service, and is compatible with both iOS and Android phones. More than 100 business jets currently have SDRs, and the Florida company has supplemental type certificates (STCs) for installation on all OEMs' business aircraft. The SDR router costs \$35,000 and weighs 8.6 pounds. Installation requires three days to a week. Satcom charges a one-time GlobalVT license for the phone service and a monthly fee, and users also pay roaming charges incurred for the phone calls and texting. Chris Moore, Satcom's chief commercial officer, said the costs will vary depending on service plans.

Sita and OnAir partnered earlier this year as Sita OnAir launched their e-Aircraft nose-to-tail solutions for applications including passenger connectivity and control, streamlining cabin and cockpit operations, and optimizing maintenance and flight operations. The e-Aircraft solutions provide passenger



Sabena Technics is working to certify Honeywell's JetWave satcom hardware (shown, tail-mounted antenna) on a widebody aircraft.

access to content from onboard servers (OnAir Play) via personal devices, and use of their own smartphones to make and receive calls (Mobile OnAir). With Mobile OnAir, phone charges are sent to the phone's owner, rather than the aircraft operator. Stephan Egli, the Geneva company's chief commercial officer, said this makes the system ideal for charter operators, who would otherwise have to track telephony charges and bill passengers.

Sabena Technics is collaborating with Honeywell to develop, certify and install Honeywell's Ka-band JetWave satcom hardware on a widebody aircraft owned by an undisclosed customer. JetWave supports Inmarsat's Jet ConnectX (JX) global Wi-Fi connectivity service, scheduled to go live in the second half of next year. The system and service supports video conferencing, transfer of large files and streaming video via Inmarsat's JX service. Paris-based Sabena is drawing on its satcom experience in performing the installation, and will offer it for other bizliners, along with customized service packages. □



With Gogo Business Aviation's in-flight entertainment and connectivity service, passengers can stream movies and TV shows to their personal devices. The service is available in North America and Europe.