

BusinessJet *interiors* INTERNATIONAL

SEPTEMBER 2014

THE INTERNATIONAL REVIEW OF BUSINESS JET INTERIOR DESIGN AND COMPLETION

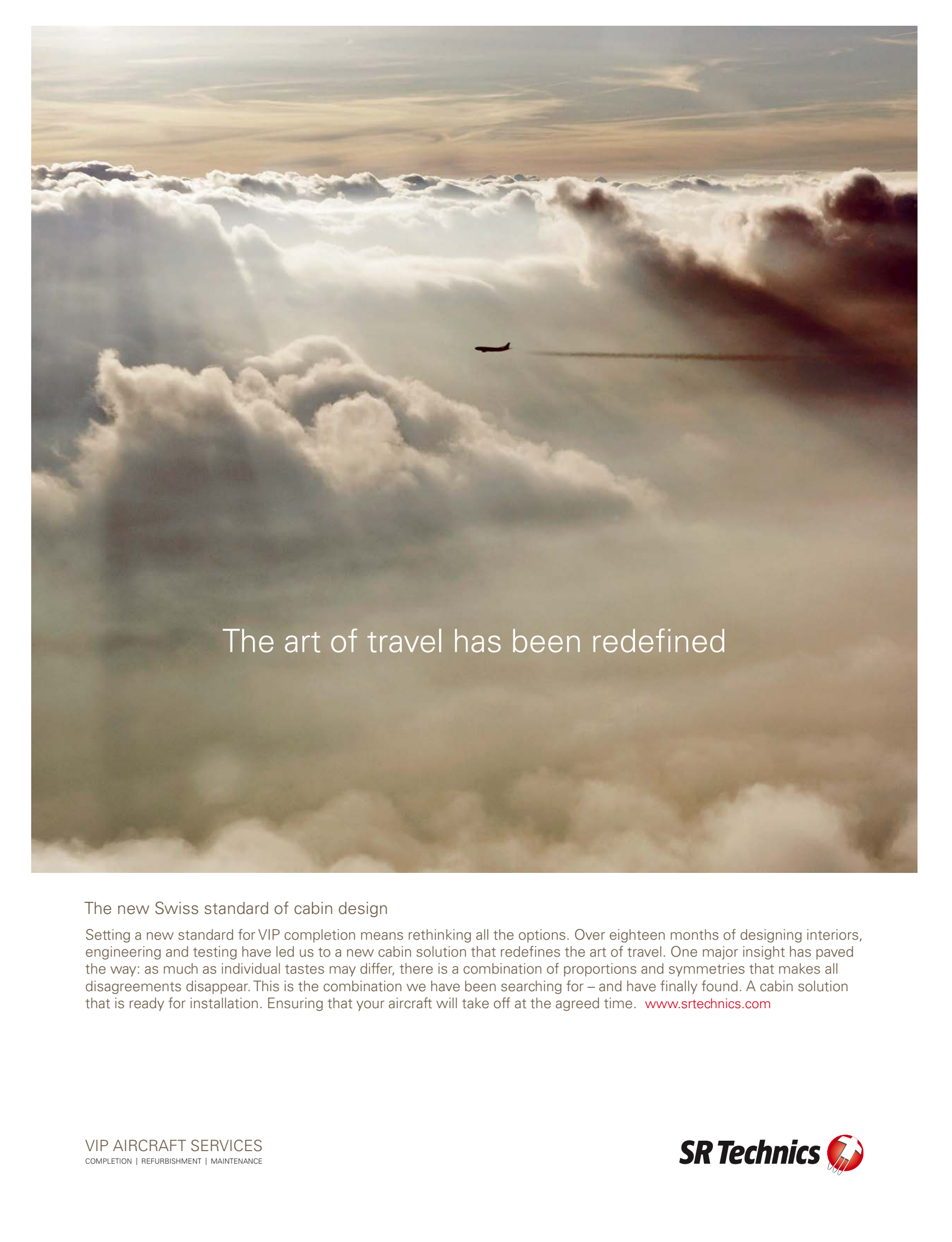
Global 7000

SEE INSIDE FOR ALL THE DETAILS ON BOMBARDIER'S NEW FOUR-ZONE CABIN; **PLUS** THE MAKING OF THE MOCK-UP, SAID TO BE THE INDUSTRY'S LARGEST-EVER



 ALSO IN THIS ISSUE: COMPLETIONS TRAINING **PRESENTATION TOOLS** AVANTI EVO **CUSTOM ACJ319** DESIGN DIRECTORY **SIDELEDGES**

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PROOFREADERS: Aubrey Jacobs-Tyson,
Christine Velarde
CONTRIBUTORS: Chris Colvin, Kirby Harrison,
Selwyn Parker, Amanda Roberts

ART DIRECTOR: James Sutcliffe
ART EDITOR: Anna Davie
ASSISTANT ART EDITOR: Louise Adams
DESIGN: Andy Bass, Andrew Locke,
Craig Marshall, Nicola Turner, Julie Welby

HEAD OF PRODUCTION & LOGISTICS: Ian Donovan
DEPUTY PRODUCTION MANAGER: Lewis Hopkins
PRODUCTION TEAM: Carole Doran,
Frank Millard, Robyn Skalsky

PUBLICATION MANAGER: Simon Hughes
simon.hughes@ukipme.com
INTERNATIONAL ADVERTISING SALES:
Roger Baker
roger.baker@ukipme.com
Sally James
sally.james@ukipme.com

CIRCULATION & SUBSCRIPTIONS MANAGER:
Suzie Matthews

CEO: Tony Robinson
MANAGING DIRECTOR: Graham Johnson
EDITORIAL DIRECTOR: Anthony James

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Business Jet Interiors International
Abinger House, Church Street,
Dorking, Surrey, RH4 1DF, UK
Tel: +44 1306 743744

Email: aircraftinteriors@ukipme.com

Website: www.businessjetinteriorsinternational.com



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virtualreality

I don't know about you, but sometimes I struggle to tell whether the image I am looking at is a photo or a rendering. The level of photorealism that can be achieved now with renderings is quite astonishing, making them a ubiquitous tool in designers' toolboxes. And they can be produced extremely quickly, as 3D Viz details on page 123. We examine the rise of rendering technology, along with emerging methods of communicating and refining cabin designs, such as apps and 3D printed models, in our feature on page 50. These technologies clearly offer a lot of benefits, but many people argue that the more traditional presentation tools – hand sketches, models and mock-ups – will always have a place too.

Maybe Bombardier thinks so, because at EBACE 2014 it unveiled its Global 7000 interior using what is said to be the industry's largest-ever mock-up. One of the aircraft's key selling points is its long, four-zone cabin, so it made sense to show it off in full.

"The mock-up is a good tool to showcase the design to potential customers and show existing clients where we're going, inviting them to come along with us and be part of it," says Sean Johnson, who is in charge of the Global 7000 and 8000 interior design team at Bombardier (and who goes into both programs in detail on page 22).

Johnson also says the mock-up has been useful in terms of validating the 7000's design, especially the focus paid to the end-user experience and ergonomics. "We put people at the center of all our design thoughts and it really paid off because they noticed it," he says.

The story of the mock-up's creation, tasked to DesignQ, is told on page 32. For Howard Guy, CEO of that company, the value of a mock-up is that it feels more real. "We do high-quality renderings, but when you actually get inside a mock-up that is of the correct size, and with the correct materials, it is better than any rendering," he says. "If it is executed well, then when a customer sees it, there are no questions in their mind. The questions become about practicalities like where they will store cushions. For the overall design, no imagination is needed."

Of course, many designs are launched at trade shows such as NBAA and MEBA, and judging by the packed previews on pages 99 and 109, there will be plenty to see. For me, it will be fascinating to see not only the designs, but how they are presented.

Izzy Kington, editor



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"We tried to make sure that everything was built so robustly that it would last the distance. At EBACE around 2,500 people went through the mock-up, so it endured a lot of pushing, prodding and pulling"

Global 7000 mock-up 32

BUILDING A MOCK-UP LARGE ENOUGH TO SHOWCASE THE GLOBAL 7000'S LONG CABIN INVOLVED A LOT OF THE SKILLS USED ON AN AIRCRAFT COMPLETION, WITH ADDED EQUIPMENT TO FULFILL THE MOCK-UP'S DEMONSTRATOR ROLE

Izzy Kington, Business Jet Interiors International



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THE LATEST ADDITIONS TO BOMBARDIER'S GLOBAL FAMILY – THE 7000 AND 8000 – ARE CAPABLE OF VERY LONG FLIGHTS, SO COMFORT AND ERGONOMICS WERE VITALLY IMPORTANT TO THE INTERIOR DESIGN

Izzy Kington, Business Jet Interiors International



completions training

COMPLETION CENTERS ARE SOWING THE SEEDS OF A SKILLED FUTURE WORKFORCE THROUGH APPRENTICESHIPS, COLLEGE PARTNERSHIPS AND INTERNSHIPS

Kirby Harrison, Business Jet Interiors International

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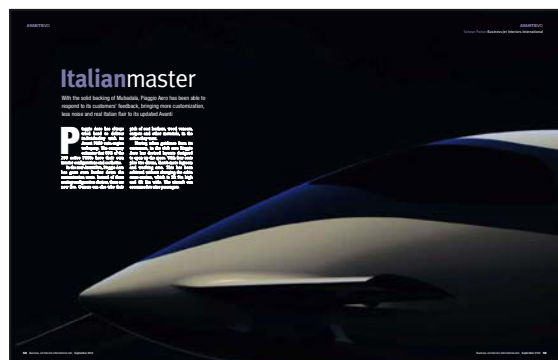


presentation tools

THE TECHNOLOGY USED TO SHOW CLIENTS HOW THINGS COULD LOOK IS CHANGING DRAMATICALLY. HAND RENDERINGS, FOAM CUT-OUTS AND PLYWOOD ARE LESS COMMONLY USED, SO WHAT'S ON THE RISE IN THEIR STEAD?

Chris Colvin, Business Jet Interiors International

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Avanti Evo

WITH THE SOLID BACKING OF MUBADALA, PIAGGIO AERO HAS BEEN ABLE TO RESPOND TO ITS CUSTOMERS' FEEDBACK, BRINGING MORE CUSTOMIZATION, LESS NOISE, AND REAL ITALIAN FLAIR TO ITS UPDATED AVANTI

Selwyn Parker, Business Jet Interiors International

custom ACJ319

MODERN MATERIALS AND ANCIENT SYMBOLS ARE MIXED TO CREATE THE WOW FACTOR ON THIS ACJ319 FOR A CHINESE BUSINESSMAN

Selwyn Parker, Business Jet Interiors International

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Leadership Select

WITH ITS PRE-CUSTOMIZED CABIN FOR NARROW-BODY VIP COMPLETIONS, LUFTHANSA TECHNIK BELIEVES IT CAN MARRY EFFICIENCY WITH LUXURY

Chris Colvin, Business Jet Interiors International

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INTERIOR DESIGNERS BASED IN NORTH
AMERICA, INCLUDING COMPLETION CENTERS
WITH IN-HOUSE DESIGN CAPABILITIES
Izzy Kington, Business Jet Interiors International

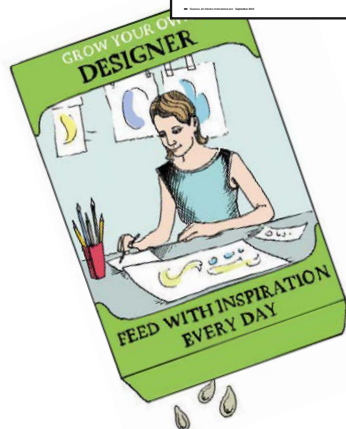
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90 coffee making

EXPECTATIONS OF COFFEE HAVE GONE THROUGH
THE ROOF, BUT SERVING A GOURMET CAFFEINE
HIT IN THE AIR IS A LOT MORE COMPLICATED
THAN ON THE GROUND

Amanda Roberts, Business Jet Interiors International



NBAA preview 99

HIGHLIGHTS FROM THE UPCOMING SHOW, SET TO BE
HELD IN ORLANDO, FLORIDA, USA, ON OCTOBER 21-23

MEBA preview 109

INNOVATIONS SET TO BE DISPLAYED AT MEBA 2014,
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DUNCAN AVIATION RECONFIGURES GLOBAL EXPRESS

Earlier in 2014, Duncan Aviation's facility in Battle Creek, Michigan, USA, converted this Bombardier Global Express for a businessman who uses the aircraft frequently.

After completing the aircraft's required 2A and 1C inspections, a team of engineers performed modifications, including the installation of new seats, veneer, IFE/CMS, lighting, window shades and reconfigured PSUs and switches. The aircraft's color scheme and materials were also updated.

The Global Express was delivered on schedule. "When I received an email from the customer's director of maintenance saying that the customer loves the aircraft and is incredibly impressed with the result, that's when I knew we did everything right," commented Dominic Buschini, project manager at Duncan Aviation.



The reconfigured aircraft features 12 new B/E Aerospace seats with taller backs than before. Some of the seats feature leg rests.



Rockwell Collins' Venue IFE and CMS solution was installed. It is an HD-capable, touchscreen-controlled system. The cabin's data network, wireless and wired options make it an airborne office.



Storage was very important to the client. Two club seats toward the rear of the aircraft were replaced by an entertainment cabinet with a counter and drinks ledge. In the mid-cabin area, a single seat and workstation were swapped for a credenza.

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Q&A: LORI BROWNING, DESIGNER AT DUNCAN AVIATION

HOW WILL THE AIRCRAFT BE USED?

Our customer is a businessman who essentially lives on his aircraft. Even in a world connected with Skype and cell phones, a face-to-face meeting and handshake cannot be replicated. He is constantly flying from one meeting to another, so he needs a place to work, rest and reboot. Therefore the brief was to turn the aircraft into a flying hotel room and office. As one of the most frequently flown Global Express aircraft in the world, this exceptionally mobile jet needed to be highly personalized for the individuals who spend countless hours on board.

WHAT WAS THE IDEA BEHIND THE RECONFIGURATIONS?

We reconfigured many things, to give our customer the storage space he needed for a wardrobe and everything else needed when traveling constantly for business, while still retaining enough seating for other passengers. It was essentially a brand-new aircraft by the time we were done, and there's nothing out there quite like it. Interior reconfigurations and design updates can completely transform an aircraft. Duncan Aviation makes use of its in-house engineering team and organization designation authorization to perform these. We can make pretty much anything a reality.

HOW WAS THE CABIN AESTHETIC CHANGED?

The look of the cabin was completely updated. The aircraft started with a very warm color scheme of creams and red wood, which was switched for a dark wood and taupe. The veneer is a smoked eucalyptus from Booth Veneers. Townsend Leather supplied the new leather, and the custom carpet came from Scott Group.

WHAT WAS CHALLENGING ABOUT THIS PROJECT?

IFEC systems can subtly add to the comfort of an aircraft cabin as well as create the perfect work environment for a business aviation traveler. Choosing the right combination isn't an easy task. Nearly every aspect is customized in one fashion or another. For example, in this case the customer went with Rockwell Collins' Venue system for IFE and CMS and Emteq's Quasar II system for cabin lighting. It was the first time these options had been combined, so Duncan Aviation worked with the two suppliers to ensure the systems operate seamlessly.

HOW BIG A MARKET IS REFURBISHMENT FOR YOU?

Duncan Aviation completes hundreds of interior projects every year. We have the ability to create custom designs in-house, as we have a team of professional aircraft interior and paint designers, and we work with third-party designers to bring their designs to life. We can also perform partial interior work to freshen up a cabin. Our capabilities include headliners, soft goods, custom cabinetry, articulating chairs, executive tables and more. We handcraft almost every aspect of an aircraft interior, right down to the stitching on the seats. Our interior refurbishments have earned the admiration and respect of operators and organizations around the world.



Emteq's Quasar II system is used for upwash and downwash lighting.



The installation includes an audio system from Alto Technologies.

PINBOARD



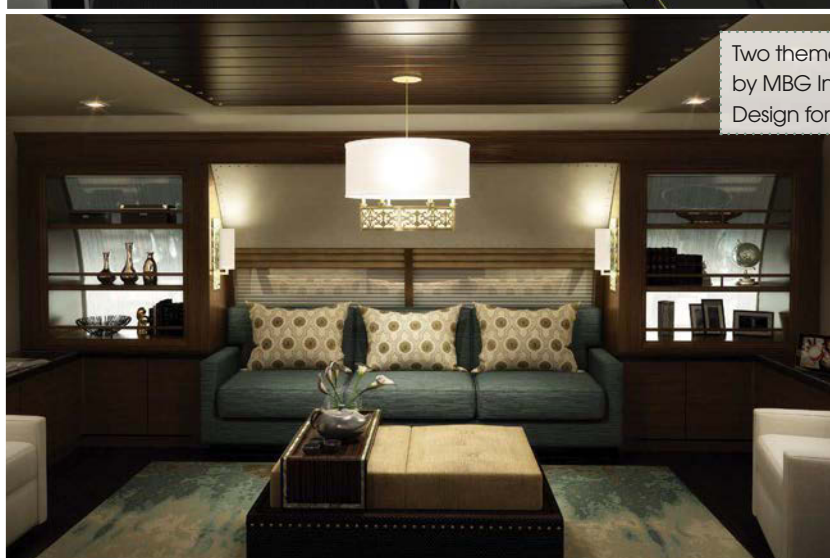
A BBJ design by Associated Air Center's in-house design team



A BBJ 2 designed by Marc Newson and completed by Lufthansa Technik, with project management by Freestream



A lounge area on a BBJ 747-8 interior concept by Greenpoint's design team



Two themes created by MBG International Design for a BBJ 737





The latest BBJ 787 design from Pierrejean Design Studio



The mid cabin lounge of a BBJ 787 designed by RWR Designs

LAUNCHES

Flight Display Systems has upgraded its JetJukebox wireless media streamer



Garrett Leather has renamed its Steerhides range of aviation leathers as Capelli, and added 12 new patterns

LUXURY LIVING

Amosu Call of Diamond iPhone 6, made from 18-carat solid gold and encrusted in diamonds; £1.7m (US\$2.76m)



Dutch Lab Gothicism cold-drip coffee machine; KRW7.5m (US\$7,220)

Purling London Art Chess set painted by Francesco Jacobello in collaboration with Debut Contemporary Gallery, Notting Hill; £2,495 (US\$4,085)



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A free smartphone app to help you get the most out of NBAA 2014:
www.nbaa.org/events/bace/2014/mobile-app/

NBAA members can download the new NBAA Aircraft Transactions Guide:
www.nbaa.org/admin/registration/aircraft-transactions-guide/

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COMPLETIONS ROUNDUP

THIS QUARTER'S ANNOUNCEMENTS FROM COMPLETION CENTERS AROUND THE WORLD

ABBOTSFORD, BRITISH COLUMBIA, CANADA: Marshall Aerospace Canada purchased a 4,343ft² building at Abbotsford Airport to act as Marshall's Canadian head office.

PETERBOROUGH, ONTARIO, CANADA: Flying Colours Corp received approval from the Qatar Civil Aviation Authority to carry out regular and line maintenance work on business aircraft registered in Qatar.

TOULOUSE, FRANCE: Joël Frugier has been appointed general manager of Airbus Corporate Jet Centre. The company also enhanced its Enginlife partnership with Snecma, strengthening its VIP Pass offering for ACJ customers.

CAMBRIDGE, UK: Marshall Aviation Services is to provide MRO and technical support for Suraviation's fleet of seven Cessna Citations.

ST. LOUIS, ILLINOIS, USA: Jet Aviation St. Louis received STCs for the installation of the Satcom Direct Router on the Global Express, XRS, 5000 and 6000 aircraft types. The company also appointed Eric Boelzner as senior director, supply chain and production control; and promoted Rick Hollandsworth to director of backshops; Brian Bauwens to business operations manager for Global and BBJ airframes; Tony Lang to business operations manager for refurbishments; and Tony Moorehead to manager of operations, second shift.

ST LOUIS, MISSOURI, USA: Flying Colours Corp KSUS was awarded AS9100 certification. The company also announced a new team of completion design engineers has been built up at KSUS, serving as the main engineering resource there and for Flying Colours Corp in Canada. KSUS also gained approval for maintenance work on Bombardier's Challenger 350, Learjet 70 and Learjet 75; and authorization from Honeywell to work on the HTF7350 engine.

BASEL, SWITZERLAND: Jet Aviation Basel announced the redelivery of a Global 5000 following a 12-year service check and an avionics modification, and a BBJ1 following a 12-year check and major refurbishment. The company also received South African Civil Aviation Authority approval as a design organization; signed an amendment to its Bombardier Authorized Service Center agreement to include the Challenger 350; received EASA Part 145 approval to provide line and base maintenance for B777-series aircraft; and appointed a new director of completion sales and market development, Hendrik Janssen.

HAMBURG, GERMANY: Johannes Bussmann is taking over as chairman of Lufthansa Technik's executive board from August Wilhelm Henningsen, who is to retire.

EMMEN, SWITZERLAND: Ruag Aviation can now install List's real wood flooring on various aircraft types.

VIENNA, AUSTRIA: Jet Aviation is now operating MRO and FBO facilities at Vienna International Airport.

COLUMBUS, OHIO, USA: Spirit Aeronautics appointed William (Bill) Highfill as director of maintenance. The company also launched its Aircraft-on-Demand program, whereby it performs avionics, interior and maintenance service at the client's location.

ARDMORE, OKLAHOMA, USA: King Aerospace Commercial Corporation (KACC) appointed Neil Simon as its avionics manager in Ardmore. He will be responsible for overseeing avionics modifications on VIP, VVIP and business aircraft.

KUALA LUMPUR, MALAYSIA: ExecuJet Malaysia has been approved as a Part 145 maintenance facility by aviation authorities in Bermuda and Hong Kong. The Bermudan approval covers base and line maintenance activities on Bombardier Challenger 300, 604, 605 and 700 series aircraft, as well as the Gulfstream G200. The Hong Kong approval covers Challenger 604 and Global Express BD 700 series aircraft.

PRAGUE, CZECH REPUBLIC, AND BRATISLAVA, SLOVAKIA: ABS Jes has been appointed by Honeywell as an authorized service center (level one) and avionics dealership.

DENTON, TEXAS, USA: Odyssey Aerospace Components has named Randy Kempf as the new senior director of operations at the cabinet and precision machining facilities.

SAN ANTONIO, TEXAS, USA: AERIA Luxury Interiors secured a nose-to-tail VIP wide-body cabin design and completion contract. The aircraft is scheduled to arrive at AERIA in the third quarter of 2014, with redelivery planned for the fourth quarter of 2016. Highlights will include CMS, custom RGB mood lights, high-definition large-format screens controlled via an integrated iPad, a humidification system and a sound-dampening package. AERIA plans to use its 3D printer to create decorative features for the custom ceiling panels.

JEDDAH, SAUDI ARABIA: Jet Aviation Saudi Arabia was approved by the FAA to operate as a repair station for Gulfstream aircraft.

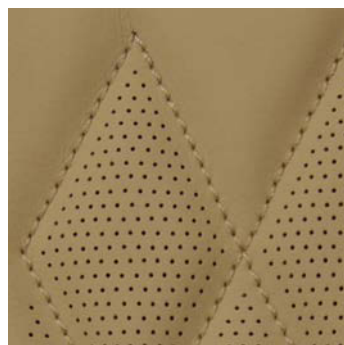
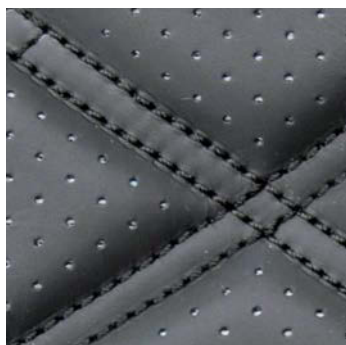
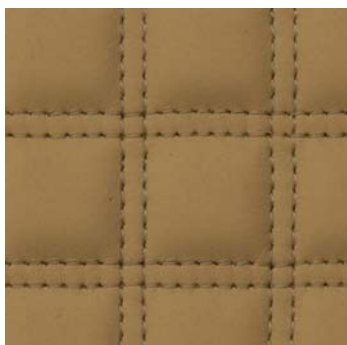
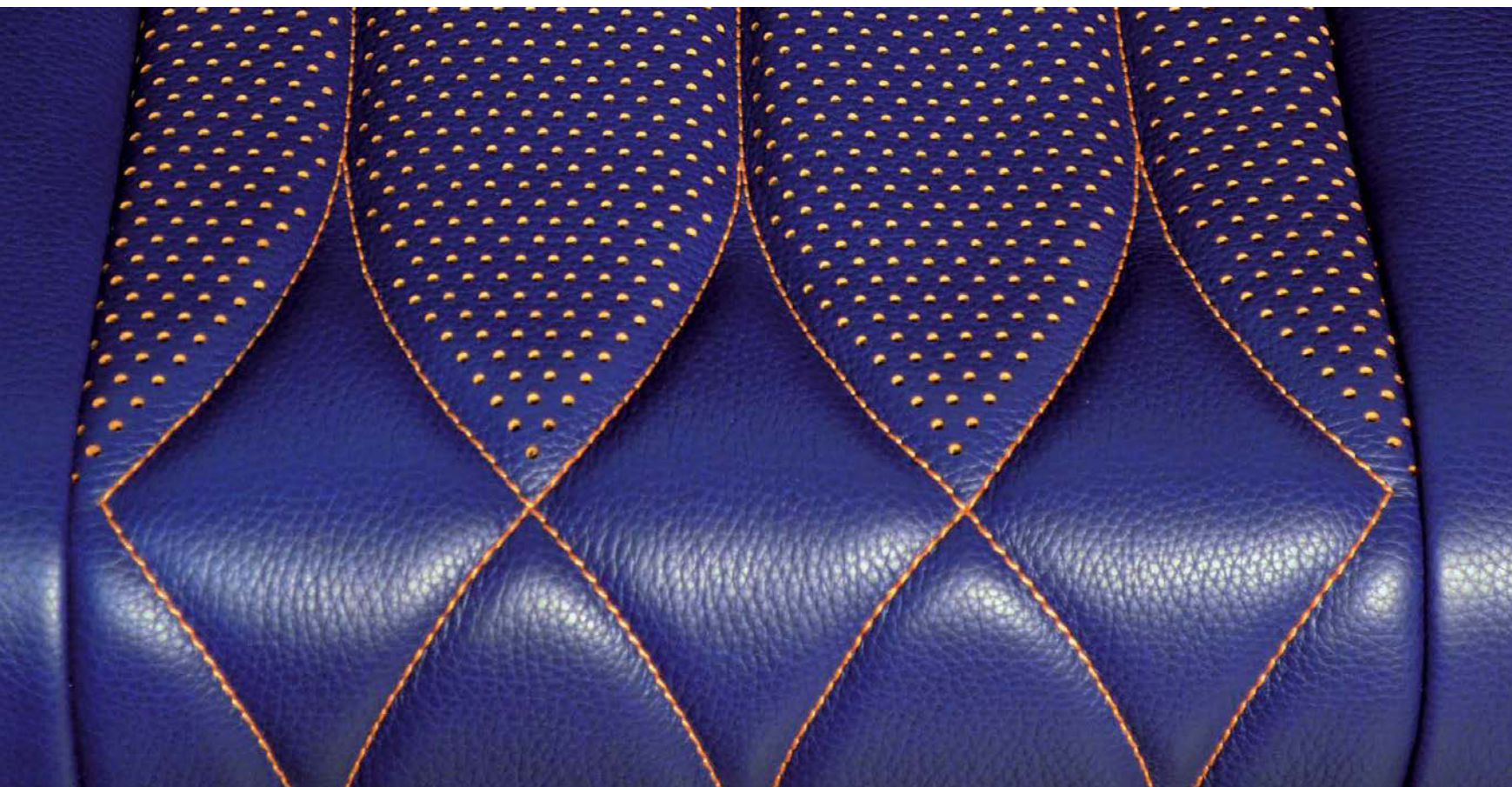
DUBAI, UAE: Jet Aviation Dubai appointed Prabhat Gummadi as its new maintenance director.

AMSTERDAM, NETHERLANDS: JetSupport's avionics shop has become part of the Honeywell service network through the addition of Honeywell and Bendix King service authorization to its scope.

SINGAPORE: John Riggir was appointed as vice president and general manager of Jet Aviation Singapore.

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AERISTOCRAFT

A stylized graphic element located below the 'AERISTOCRAFT' text. It consists of a series of curved, overlapping lines that suggest the shape of a hand or a wing, rendered in a dark grey or black color.

NATURAL BEAUTY

Greenpoint Design Team, partnering with designer Julie Myers, created this concept, Azure, for the BBJ 787-9. "Azure began with a love of the BBJ 787's open architecture and large windows," says Myers. "Inspiration comes from land and sea, with an emphasis on organic forms. Our goal is to marry innovative engineering with timeless, high-quality décor."

Highlights include decorative artworks, reflective dividing partitions, adjustable lighting and extensive CMS and IFE equipment, hidden in cabinetry. Materials include ebony, fig sycamore, Karelian burl birch and marble.

Greenpoint Design Team, part of completions company Greenpoint Technologies, has designed Azure to be fully buildable, accounting for critical decompression venting requirements specific to this airframe. "The design team works closely with engineering and certification staff to define the technical integration of each component, such as the ceiling, sidewall attachments, windows, IFE and plumbing systems, bearing in mind aspects such as electrical load analysis, rapid decompression and structural substantiation," says Greenpoint's design director, Annika Wicklund. "The result is a beautiful interior that conceals the airframe's sophisticated technical equipment." The BBJ 787's electrical architecture is "entirely different from other jetliners", says Wicklund. "The aircraft has advanced electrical systems, including power supply and software-controlled air-conditioning, water, waste and communication systems."

The composite fuselage and floor structure also mean items are attached in a new way. "The seat tracks are unique," says Wicklund. "Modifications to the primary structure require OEM involvement and approvals, a reinvented process with the composite airframe."



ARTWORK

This 'digital abyss' artwork mirrors a similar installation in the entranceway. The pattern also echoes the marble used in the cabin.

GUIDED TOUR

ENTRANCE AREA

A sister artwork to that in the lounge gives the aircraft a grand entrance.



REFLECTIONS

There are numerous mirrored surfaces, which serve to balance the warmer natural materials, and create reflections, evocative of the sea.

TABLE

Connection points for the communication system are hidden underneath a panel in the table, enabling the area to be used for dining or as a boardroom.

MASTER SUITE AND OFFICE

Interior finishes in the master suite were inspired by sandy shores, layered cliffs and tidal streams. Bronze is also used.



LOUNGE AND DINING AREA

The entertainment lounge can be transformed from a social to an intimate space through lighting changes simulating sunrise or sunset. The dining area makes heavy use of zebrawood.

MINI SUITES

These give guests a place to rejuvenate, and so feature cabinetry with soothing, organic forms.

GUEST LOUNGE

Adjacent to the guest suites is a smaller version of the office in the master suite, using similar deep earthy tones. It is equipped to enable an individual or small group to work, rest or play.

SPA ROOM

The aircraft features a dedicated spa area for exercise and relaxation.

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DESIGN PANEL: **SIDELEDGES**

STORAGE SPACE, ARMREST, IFE CONTROL PANEL AND TABLE SUPPORT – THE MANY FUNCTIONS OF THE SIDELEDGE MAKE IT CHALLENGING BUT VITAL TO GET RIGHT

CINDY HALSEY: A comfortable area on which to rest your arm, storage for personal items, an area to hold beverages, and the ability to charge tablets and cell phones via USB are all expectations of a well-designed sideledge. The sideledge is an integral part of the passenger's personal space, and must be in concert with the seating and its surroundings. Also, the curvature of the fuselage creates real-estate challenges for fitting tables, storage and essential equipment for aircraft systems, which often share the space.

TOBIAS LAPS: The challenge is to integrate the many expected components into one design that is functional, ergonomically correct, pleasing to the eye and affordable to manufacture. Passengers expect to be able to store and charge personal electronic devices next to their seats, and as this consumer technology moves so fast, the sideledge must be easily adaptable.

Today there is a trend for straight and pure lines. Gaps need to be consistent widths, with features such as damping fixtures for doors and flaps, and opening mechanisms allowing synchronous movement of various parts, for example to enable cupholder recesses to appear or disappear. This requires very clever mechanisms, hidden by invisible flaps and covers. The mechanisms must maintain their performance over time and in various climatic conditions. Moreover, the mechanisms must be able to fit into the limited space.

WHAT ARE THE MAIN CHALLENGES IN CREATING SIDELEDGES FOR VIP AND BUSINESS JETS?

KYM CLAYTON: The primary function of sideledges is to close out the area between the window and the floor. Behind the scenes, they need to accommodate venting for rapid decompression and mounting for all manner of electrical components. They house everything from toilet paper to pull-out tables, and life rafts to monitor lifts. As a minimum, a sideledge is expected to hold drinks and house the local switch panel. They have to create continuity within the interior while being strong, lightweight, functional and complying with certification regulations.

Some companies are creating apps to control the CMS via personal electronics. Generally a USB connection is used so that a variety of operating systems and future upgrades can be supported. USB ports are not commonly integrated into switch panels the way headphone jacks are. The ports need to be incorporated in convenient locations and definitely not in cabinetry toekicks, because of the cable lengths.

Finally, with the integration of new electrical components, more care will be required to enable maintenance access.

JEAN-CYRILLE DESTIEU: The completion center has to ensure the best balance of cabin harmony, volume, weight and the need to conceal equipment. Wireless technology helps a lot – less equipment and fewer electrical cables allows us to reduce the width of monuments, create a lighter concept and gain volume in the cabin.

THE PANEL



KYM CLAYTON
senior design engineer at
Jormac Aerospace, a
division of Advent Aerospace



TOBIAS LAPS
head of sales for business
aviation at Ruag Aviation



CINDY HALSEY
vice president of interior
design, engineering and
development at Cessna



JEAN-CYRILLE DESTIEU
head of technical projects
at Airbus Corporate Jet
Centre

TOBIAS LAPS: We are looking at what can or should be transferred to the seat. There are also ideas to move away from fixed switch panels to handheld solutions that can be upgraded at a later date without having to change cutouts and wire looms in sideledges.

KYM CLAYTON: Switch panel bezels could be designed so that the USB port appears to be part of the switch panel. However, a horizontal application adjacent to the switch panel would tend to accumulate dust and crumbs. It could alternately be incorporated onto the lip of a cupholder.

HOW DO YOU RESPOND TO THESE CHALLENGES?

JEAN-CYRILLE DESTIEU: The ACJ319 Elegance launched at ABACE 2014 is a good example. This fully wireless cabin uses full internet protocol technology with a single wi-fi connection, helping us to rethink the cabin architecture, and in particular make the sideledges very slim.

CINDY HALSEY: The Citation Latitude has a clean, uncluttered cabin. Ample open storage compartments are located in the sidewall areas with USB charging next to each passenger seat, along with beverage holders and essential light switches.

JEAN-CYRILLE DESTIEU:
We could replace sideledges and window shades with large curved screens to promote the external view, where the cabin layout allows it.

IF YOU HAD THE OPPORTUNITY TO CREATE A RADICALLY DIFFERENT SIDELEDGE, WHAT WOULD YOU DO?

TOBIAS LAPS: I would create a sideledge with one straight surface and no interruptions at all from front to back, integrating all functions in a second layer underneath with elements to be opened or slid out. Is that radical? No, but it would be different from what we see today and maybe one step up in the level of elegance.

KYM CLAYTON: We could design a clear sideledge with a train set looping around, going behind a divan tunnel to reappear on the other side of the aircraft. VIP interiors are like snowflakes in that no two are exactly alike. Innovative designs require creative solutions.

TOBIAS LAPS: We will see more LED lighting elements in sideledges, either as strips or in recesses. Switches will become nearly invisible, touch-sensitive and continuous with the surface. Placards will be located under the surface and will be visible only when backlit. I also expect display technology to progress, enabling slimmer screens to be integrated. It might be possible to make sideledges narrower, but as long as fuselages remain circular it is also a question of shaping them to the contour of the cabin.

JEAN-CYRILLE DESTIEU:

Increasingly, concepts are replacing sideledges, windows shades, linings and ceiling with large curved screens, giving the passengers the feeling of traveling in a transparent aircraft.

WHAT DOES THE FUTURE
HOLD FOR SIDELEDGES?

CINDY HALSEY: Exciting developments are coming for IFE and cabin electronics that will greatly influence the design of sideledges. Our goal is to facilitate seamless integration from ground to sky for passengers. Sideledge design, device integration and the complete aircraft aesthetic will become more of a driving factor in each new aircraft program.

KYM CLAYTON: Very thin light panels could be added to cabinetry to allow illuminated logos, artwork or stars on nearly any sideledge surface. 3D printing of decorative details and eventually structural elements is another likely trend. Many unique pieces can be fabricated in this way without the need for special tooling, in lightweight, non-flammable materials. Complex curves and/or integration with window shades can put a modern twist on traditional sideledge shapes.



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humanendeavor

The latest additions to Bombardier's Global family – the 7000 and 8000 – are capable of very long flights, so comfort and ergonomics were vitally important for the interior design

The interior of the Global 7000 was showcased for the first time at EBACE in May 2014, just over three and a half years after the aircraft's launch alongside the Global 8000 in October 2010.

The 7000 and 8000 extend the Global range, which also includes the 5000 and 6000. The 7000 should enter service in 2016, and the 8000 in 2017. List prices are US\$72.4m for the 7000 and US\$68.4m for the 8000. "Now we have models that cover a spectrum of passenger comfort and flying range needs," says Sean Johnson, who is in charge of the 7000 and 8000 interior design team at Bombardier.

A key driver for both programs was customer demand for very long range, which also necessitates a high level of comfort. The 7000 can travel 7,300 nautical miles non-stop, while the 8000 is capable of 7,900 nautical miles. "These aircraft will connect more

cities non-stop than ever before," says Bassam Sabbagh, vice president and general manager of the 7000 and 8000 program at Bombardier. "They were developed to meet our customers' need for long-range travel in comfort, and have a flexible arrangement that allows passengers to enjoy the cabin while on a 16-hour flight."

The main difference between the 7000 and 8000 fuselages is the length. The 7000 will be Bombardier's biggest cabin, with four interior zones. The 8000 has three zones in a shorter fuselage, enabling its increased range. The fuselages are very similar in terms of geometry to the earlier Globals, but Bombardier has chosen new suppliers.

"While they are similar-looking aircraft to previous Globals, the 7000 and 8000 embody a lot of new designs and technologies," says Johnson. For example, the overall window area is 80% greater. "It's a huge boost to natural light," says Johnson.





GLOBAL7000/8000

Izzy Kington Business Jet Interiors International

1. The Global 7000

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This spec tool is currently being used by OEMs and designers to configure materials and paint schemes.



Interiors



Exteriors



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2

It's also a feature that had to be planned very early. "I am responsible for the interior and I was there very early on in the aircraft development program," says Johnson. "We took the opportunity to ensure that we spaced the windows evenly down the cabin and we baked that into the aircraft design very early. We created the ideal seating area, with windows in the right locations relative to the seats. We always have a window over a table, we always have a window next to a seat and they are evenly spaced, so there is a nice sense of symmetry. We designed from the inside out, tailoring the aircraft structure to the way that the interior should be laid out, not the other way around, which is very common in aircraft design."



3

Customization Customers can define their floorplan by choosing options for each zone. "We have put a lot of focus on ensuring that every zone is tailored to a certain need, whether it is sleeping, eating, entertaining or doing business," says Sabbagh.

Based on its experience of customers' preferences, social seating areas are positioned toward the front of the aircraft, with the back reserved as a private space for the principal. Lavatories are fixed in certain positions. "You can't put lavatories just anywhere without a lot of rework to the aircraft," explains Johnson.

There are plenty of options for each of the zones. "There are countless opportunities to personalize this aircraft, with options in terms of staterooms, beds, showers, the length of seating areas and so on," says

Johnson. "We need to ensure that it can be manufactured, so we have taken steps to ensure that we can reuse components based on customer selections. There are building blocks underneath the design to make it more efficient for us to build, but for the customer it feels like a completely bespoke experience."

There is a wide-ranging catalog of material and technology options, but Bombardier is prepared to work on non-catalog items if requested. "Our standard offering is comprehensive," says Sabbagh. "But in the end, we will work with every customer and every aircraft will be bespoke."

Sabbagh says the 7000's key advantage is its fourth zone. "The 7000 is the first true four-zone business aircraft," he says. "It brings flexibility that may not be there on a three-zone

2. One of four stateroom options on the Global 7000
3. Seats and tables are carefully aligned with the windows
4. An asymmetrical seating group at the aft of the Global 7000's main lounge



Bombardier Global 7000

Cabin width: 8ft 2in (centerline)

Cabin height: 6ft 3in

Cabin length: 54ft 7in (from cockpit divider to baggage compartment entrance)

Seats: 4 crew + 17 passengers

Range: 7,300 nautical miles at Mach 0.85 with 10 passengers, 4 crew, NBAA IFR reserves and ISA

High-speed cruise: 516kts

Max altitude: 51,000ft

Price: US\$72.4m

THE 7000 IS THE FIRST TRUE FOUR-ZONE BUSINESS AIRCRAFT



4

YOU CAN HAVE A PERMANENT BED IN THE BACK AND STILL SEAT 16 PEOPLE

aircraft. You can have a private stateroom with a full-size bed and all the amenities you would have at home. You can also have a small office in there, or an entertainment area.”

Sleeping beauty “The 7000 is 10ft longer than the 6000, so we can envisage people using it differently,” comments Johnson. “On the 6000 or competitive aircraft, sleeping tends to be catered for by a divan that pulls out into a bed, or by tracking two club seats together and putting a mattress on top. That’s OK, but we wanted to offer a more luxurious, home-like experience. With the extra length we think customers will opt for the best bed possible, because they can afford the space. You can have a permanent bed in the back and still seat 16 people easily. So we created four stateroom layouts with a permanent bed. Some customers may compromise a little on bed size to fit monitors, seats and credenzas, while others will want an extra-wide bed. The response has been overwhelmingly positive.”

5. The shower option on the Global 8000
6. The galley has an espresso maker, a coffee maker, a combination convection and steam oven, a combination convection microwave, and a chilled compartment



Bombardier Global 8000

Cabin width: 8ft 2in (centerline)

Cabin height: 6ft 3in

Cabin length: 45ft 7in (from cockpit divider to baggage compartment entrance)

Seats: 4 crew + 13 passengers

Range: 7,900 nautical miles at Mach 0.85 with 8 passengers, 4 crew, NBAA IFR reserves and ISA

High-speed cruise: 516kts

Max altitude: 51,000ft

Price: US\$68.4m

5

Another feature designed to convey a home-like feel is the shower, which is carried forward from the 6000. “It’s a very popular design on the 6000,” says Johnson. “We haven’t changed it much, other than integrating it into the new cabin. This aircraft is capable of flying more than 16 hours non-stop, so being able to freshen up seems an obvious requirement.”

The shower was designed for maximum efficiency in terms of water consumption. “The nozzle makes it feel a lot stronger than it is,” says Johnson. “It also has a very powerful in-line

Culinary delight

The galley on the 7000 and 8000 is bigger than on previous Globals. There were two main criteria for the design. “It’s the flight crew’s workspace and it’s also the first thing you see when you board, so it can take away from the owner’s experience if it doesn’t look world class,” says Sean Johnson, head of the 7000/8000 interior design team. “We needed to make sure that aesthetically it looked like a high-end domestic kitchen in a mansion or a yacht. It has beautifully designed appliances that you would show off, rather than hide, and very clean and timeless lines.”

Bombardier also spent 18 months working with flight attendants and customers to design the layout to enable the best possible service. “The focus groups helped us with simple details like putting the ovens closer to the cockpit, so the flight attendant can take food out of the oven, plate it on the counter and serve it in one blow without the oven doors getting in the way,” says Johnson. “Also, we placed the sink in the center of the countertop, but it has a pop-up faucet instead of a fixed one, so an insert can be placed on top of the sink to increase the countertop space when the sink is not needed.”



6

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GLOBAL TIMELINE

1993

Global Express launched

1996

Global Express makes first flight

2003

Global Express XRS (later to become the Global 6000) launched

2005

Global Express XRS makes first flight; first Global 5000 (a derivative of the Global Express) delivered; first Global Express XRS delivered

2010400th Global delivered; Global 7000 and Global 8000 launched**2011**100th Global 5000 delivered; Toronto, Canada, named as assembly site for Global 7000 and Global 8000**2013**500th Global delivered**2014**

Global 7000 mock-up unveiled at EBACE

2016

Global 7000 expected to enter service

2017

Global 8000 expected to enter service



7

heater, so you turn the shower on and it is instantly hot. We can also carry an extra tank of water in the baggage compartment, giving 40 minutes of non-stop use.

A further departure from previous Globals is the dining area. “We have introduced a six-person dining area where the tables come together to form a long dining table,” says Sabbagh. “Six people can sit around it comfortably by tracking the two middle seats inward.”

Subtle details The 7000 and 8000 continue the aesthetic of the 5000 and 6000 – which Johnson labels “timeless elegance”. “Our aim is to delight people with little details that are noticed over time spent in the aircraft, rather than producing one big ‘wow’ effect with a lot of flash and style that will age very quickly,” says Johnson.

Examples include a herringbone pattern in the veneer of the sideledge and little details in inlays and metalwork. “Likewise, there is a little Global emblem on the back of the seat that you wouldn’t see normally because the seatbacks face a bulkhead or another seatback,” says Johnson. “But if you take the time to walk around and look, you will see those little details.”

Bombardier is experimenting with installing back lighting behind veneer



8

7. A dining area on the Global 8000

8. A stateroom option on the Global 8000

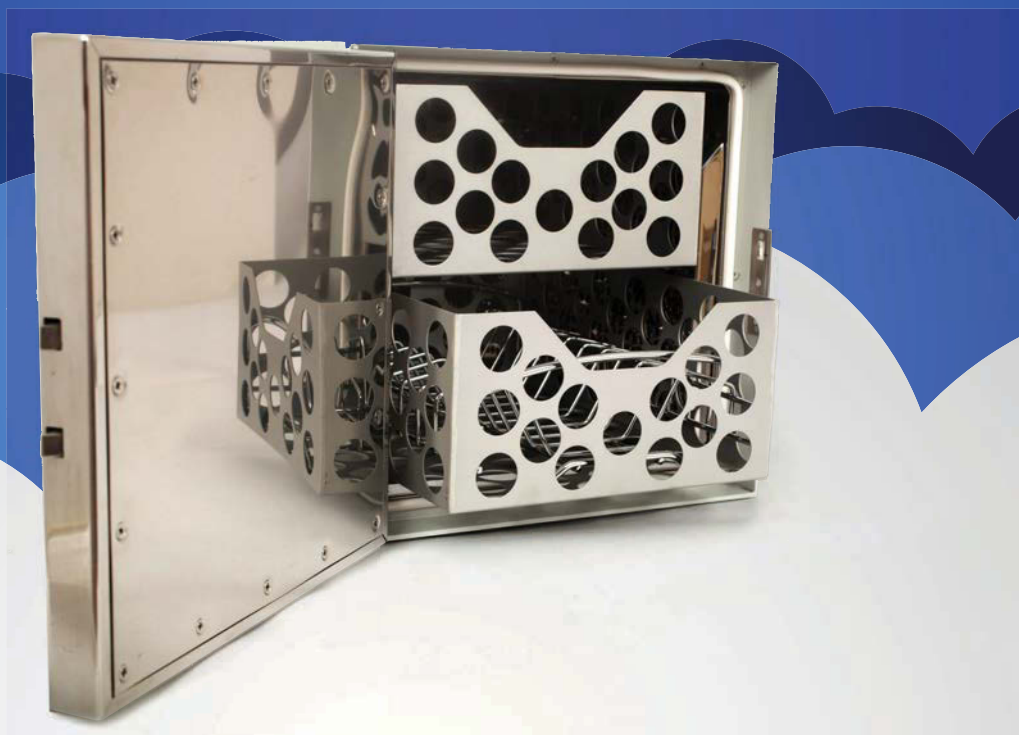
on a bulkhead, and putting a textured surface on a bulkhead that is then combined with upwash lighting for maximum effect.

The main cabin lighting is supplied by Diehl. “It is a very good company in terms of the research it has conducted on aircraft fatigue as it relates to lighting cycles,” says Johnson. “It has done a lot of research to optimize its LEDs so that they don’t tire your eyes.”

Bombardier is also paying a lot of attention to acoustics. “We are the industry leader in terms of quietness in the cabin,” contends Johnson. “We are going to maintain that, looking at new insulation materials and applying it wherever it needs to be.”

Seat research The aircraft have new seats, on the development of which Bombardier was heavily involved. “We spent a lot of time conducting our own research on seating comfort, even

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The oven incorporates baskets and crumb tray and the baskets can have plate racks inserted for storage.

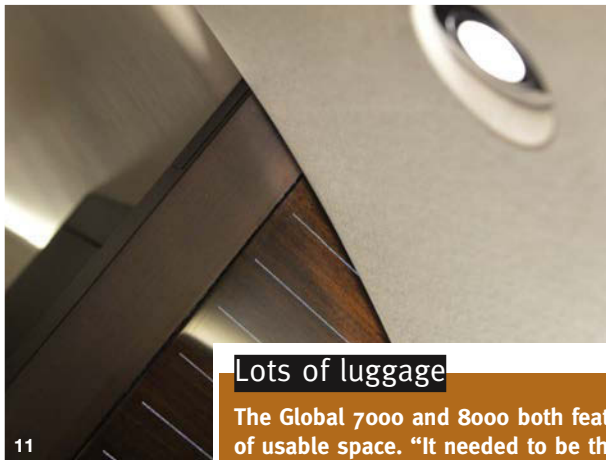


FIRST AND FOREMOST, WE CONSIDER HOW THE END USER WOULD WANT IT TO BE

before engaging with suppliers,” says Johnson. “There is a lot of material out there on seat comfort, but it mostly relates to residential seats. Believe it or not, there hasn’t been a lot of work in the aerospace industry to apply lessons from that. So before working with suppliers, we built our own mock-ups and experimented with geometries to try to enhance comfort, and I think we have done a really good job.”

Bombardier is actually working on five patents relating to the seat’s geometry. “It’s little details like being able to sit in a slightly more reclined position; shortening the seat pan just enough so that a fifth-percentile female’s feet touch the floor when she is seated, which is not possible with most aircraft seats; and putting the recline point by the knees instead of the hips, so you feel fully supported when reclining, rather than having your legs slide off the chair. We also upholstered the seats to have a welcoming cupping effect when you sit down.”

Ergonomics Everything in the cabin is designed “from the human being out” according to Johnson. “First and foremost, we consider how the end user would want it to be,” he says. “How does it sound and feel when the table comes out of the sideledge? We



- 9. An entertainment lounge on the Global 7000 mock-up
- 10. Sideledges feature veneer laid in a herringbone pattern
- 11. The Global 7000 mock-up displays Bombardier's focus on subtle details

want it to feel solid, smooth and luxurious, not just functional. Where are the most intuitive locations for seat controls? How easy is it for passengers to see which button does what? We have done a lot of research, built mock-ups and tested them.”

The company is still working on the IFE and CMS. “With those aspects, we have gone another step beyond in terms of the human experience and interaction,” says Johnson. “When we add that to the overall cabin aesthetic, which is already a step beyond what is in the marketplace, I think people are really going to be blown away.” **END**

Lots of luggage

The Global 7000 and 8000 both feature a baggage compartment with 195ft³ of usable space. “It needed to be the biggest that we could make within the restraints of the regulations and so on,” says Sean Johnson, leader of the 7000/8000 interior design team at Bombardier. “This aircraft can seat up to 19 passengers and we want to make sure that there is adequate space for all their luggage – everything they could possibly take and more.”

Johnson also contends the baggage compartment helps the aircraft meet the needs of a variety of missions. “We had to consider the multipurpose nature of this aircraft. It will be used for short-hop business trips with a lot of people. It will be used as a vacation aircraft for families with a lot of extra bags. And it will be used to bring back shopping.”

In keeping with the rest of the Global family, the compartment is accessible when the aircraft is flying. “Suppose the aircraft is going on an overnight mission, and when it lands the passengers are going to a business meeting. They might want to bring a change of clothes so that they are fresh, and maybe take a shower,” says Johnson. “In other instances, passengers might have left something important in their luggage, or change their mind about what they want to wear, so the ability to go back into the baggage compartment while flying is something people really appreciate about the Global family today.”

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showstopper

Building a mock-up large enough to showcase the Global 7000's long cabin involved a lot of the skills used on an aircraft completion, with added equipment to fulfill the mock-up's demonstrator role



1. The Global 7000 mock-up unveiling at EBACE 2014

Bombardier chose to draw attention to the interior it has developed for the new Global 7000 through a full-scale, 110ft-long mock-up, believed to be the biggest ever made in the business aviation industry. It certainly did the trick – at EBACE 2014, where it was unveiled, people were waiting as long as an hour and a half to take the tour.

“It was phenomenal,” says Sean Johnson, manager of the 7000/8000 interior design team at Bombardier. “It felt like the whole show was lining up! The first impressions were almost comical – jaws literally dropped.”

At the unveiling, Bombardier publicly thanked DesignQ for building the mock-up. The UK-based design company had worked with Bombardier before, on the Global Vision flight

deck, which was successfully delivered in 2006. Before the 7000, the largest mock-up DesignQ had built was a full-size ACJ cabin section. This was made in 2012 to serve as a showroom for The Jet Business, a business jet brokerage in London, UK.

But the 7000 mock-up is a much bigger structure. “The 7000 is the biggest mock-up that has ever been made in this industry, which we didn’t



Air support

The 7000 mock-up is serviced by five self-contained air-conditioning units built into the two trailers. Air enters the cabin through ducts that go in-between the windows, letting air in through PSU panels.

There are open chambers hidden under the floor, double seats and bed, through which the air goes back out. Also hidden in those holes are two sub-woofers for the surround sound and hi-fi system.

realize until halfway through,” says Guy. “Even at Airbus and Boeing, the mock-ups are usually of sections. So there was a lot of faith on Bombardier’s part, to give a smaller company in the UK the responsibility of delivering something so crucial. We knew the result had to be not only good, but better than anything anybody had ever done before.”

Accurate representation As well as actually constructing the mock-up, DesignQ’s remit was to work carefully and closely with Bombardier’s design team to ensure that its design specification was met accurately.

The agency had about a year to make the mock-up. It was given the surface data of Bombardier’s in-house design, which was already fixed, although as to be expected with a program that is not scheduled to enter service until 2016, engineering work is ongoing.

Bombardier built the two cabin ‘fuselage’ sections in California, USA. These were stitched onto the Global Vision flight deck mock-up made by DesignQ in 2006. In November 2013, the assembly was driven across the USA and shipped to Liverpool in the UK. After painting, the package was delivered back to DesignQ on Christmas Eve 2013. The company hired a building next door to its facility in Redditch to house it.

Meanwhile, DesignQ had been hard at work on a mini mock-up – a portion of fuselage with the same chassis and construction. “We had to figure out how to install the air-conditioning ducts, the pipe and cable runs, all that sort of thing,” says Guy. “We used the mini mock-up as a slave to prove how

2. The ‘fuselage’ is made from two sections, plus the nose cone
3. Lighting, electrics and air-conditioning had to be installed

we were going to mount things like the passenger service units, ceiling panels and sideledges. By the time the fuselage arrived, we had a lot of moldings and parts already made.”

Work on the fuselage itself began with updating the flight deck, which had evolved a lot since 2005. “Around 40% of the panels and parts were either replaced or modified,” says Guy. “It’s represented as a real flight deck.”

DesignQ then moved onto the galley. “It is big, with a lot of parts,” says Guy. “On top of this, because it is a mock-up, some of the galley is dedicated to electronics for audiovisual (AV) and other systems.”

The cupboard nearest the flight deck has a pull-out panel with the AV controls on one side and cables on the other, for easy access. “A mock-up

WE USED THE MINI MOCK-UP AS A SLAVE TO PROVE HOW WE WERE GOING TO MOUNT THINGS



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A LOT OF EFFORT WENT INTO ENSURING WE CAN CHANGE OR UPGRADE THINGS EASILY

a large flatscreen, with full surround sound and lower lights. The mock-up is representative of production intent for the 7000, so has a full lighting system, including switch gear. It is also equipped with an IFE system for demonstration purposes. There are five screens in the mock-up.

Unique features An extra feature of the mock-up is that the windows in the aft section are equipped with LCD blackout technology, to demonstrate what the stateroom would look like at night. The stateroom is equipped with a 32in LED screen, bookcase and fully dressed bed. “These details help people to imagine themselves spending time there,” says Guy.

The lav/dressing room is finished in shiny black marble and chrome. The walls feature a solution whereby fiber optics are inlaid between strips of veneer. Bombardier saw the mock-up as an opportunity to explore this

emerging technology, and gauge customer interest in it. “When you turn the lights on, you get this very crisp line coming through each of the joints,” says Guy. “This product has not been implemented in an aircraft before; it’s used in commercial architecture, where they don’t have the same challenges with space or packaging. We had to install it between the veneer and the bulkhead, a space that is less than 0.5in wide. It was quite a task. We had to experiment to make it happen.”

Guy adds that it is the only thing on the mock-up that is not yet ready for certification, but is sure it soon will be. “We have broken the back of the problem,” he says. The company has form in taking non-aviation products through to inflight service; the crystal lights it designed for The Jet Business are now being fitted on a Global.

The 7000 mock-up tour concludes with a baggage compartment featuring cabin finishes, used to showcase its

is like a real aircraft in that if anything breaks down, you have to be able to fix it without taking everything apart,” says Guy. “A lot of effort went into ensuring we can change or upgrade things easily.”

Seamless aesthetic After the galley comes the main cabin. Key challenges here included the book-matched herringbone pattern of the sideledge veneer, which involved assembling veneer pieces around a central chrome strip. Then there was the task of creating sidewalls and PSUs in one piece running the length of the main cabin, to avoid joints.

Beyond the main cabin is an entertainment lounge dominated by

4. The fully equipped galley on the Global 7000 mock-up



expanded volume. “It is the last thing that people see as they leave the mock-up,” says Guy. “The ceiling and sidewalls are the same as in the rest of the cabin interior, and the floor is a hardwood with inset machined baggage bay rails. It looks gorgeous. Everybody loved it, and people have asked for their aircraft to actually have that.”

One of the most important aims was reliability in the face of extreme use. “The last thing you want is for customers to find that something doesn’t work, or an armrest falls off or something,” says Guy. “We tried to make sure that everything was built so

THE LAST THING YOU WANT IS FOR CUSTOMERS TO FIND THAT SOMETHING DOESN’T WORK

robustly that it would last the distance. At EBACE around 2,500 people went through the mock-up, so it endured a lot of pushing, prodding and pulling. It survived very well.”

On the road Now Bombardier has the mock-up, it is taking it on a tour that would give The Rolling Stones a

5. The joint DesignQ and Bombardier mock-up team, at EBACE 2014

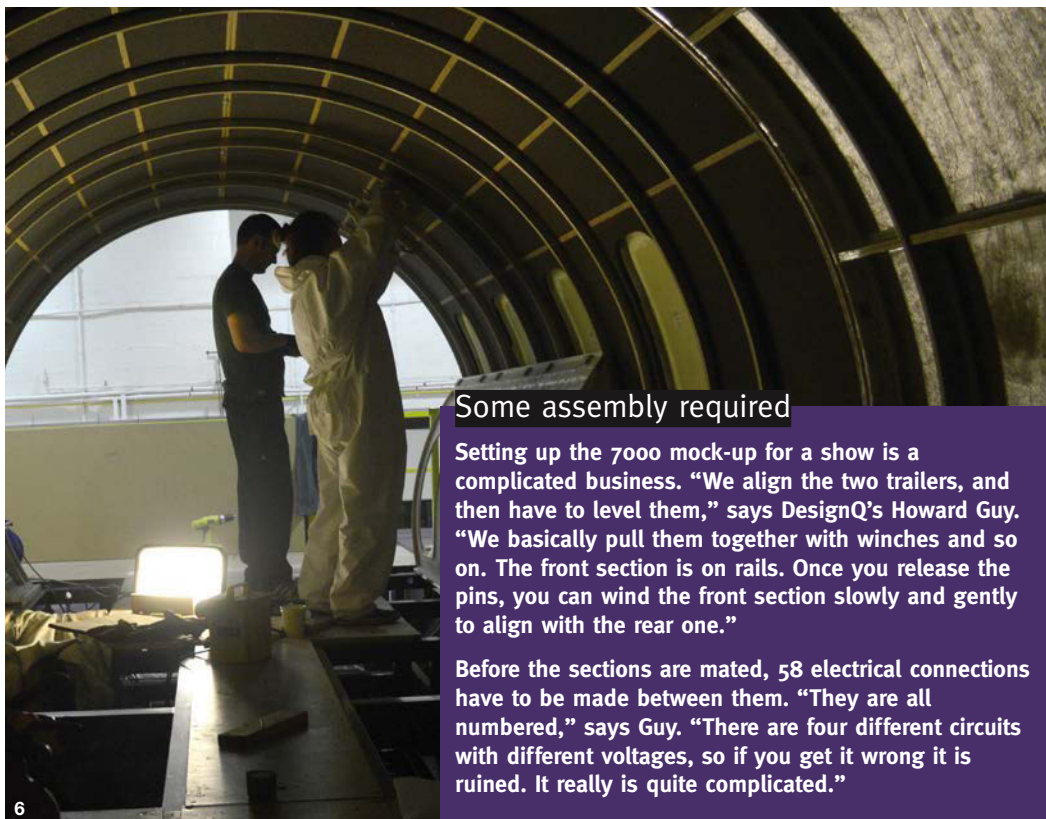
6. Installing the air-conditioning was a key challenge

run for their money. Having already traveled by road from the UK to Geneva, Switzerland, for EBACE, the mock-up was transported back to the UK for the Farnborough Airshow. “It was there for about three weeks in incredibly hot conditions and had probably another 100-200 people go through it,” says Guy.

It was then sent to New York via Liverpool. “In the boat, it was subject to a lot of moisture and rocking,” points out Guy. From New York, where it is being shown to customers, the mock-up will be taken by road to Orlando, Florida, for NBAA 2014. “It may then have another 2,500 people going through it, and will be subject to high humidity,” says Guy. From there, the mock-up will go to California.

Quality control “The veneers are probably the most vulnerable feature because they will absorb moisture, expand and contract,” comments Guy. “We have to make absolutely sure the veneers don’t split and the lacquer doesn’t crack.”

DesignQ is underwriting the mock-up with a two-year warranty. The company will set up the mock-up with every move. “If anything goes wrong, it is our fault,” Guy says. “If anything needs replacing, we can do that. We will ensure that the mock-up is always going to work and be in shipshape all the time. So far, so good.” **END**



Some assembly required

Setting up the 7000 mock-up for a show is a complicated business. “We align the two trailers, and then have to level them,” says DesignQ’s Howard Guy. “We basically pull them together with winches and so on. The front section is on rails. Once you release the pins, you can wind the front section slowly and gently to align with the rear one.”

Before the sections are mated, 58 electrical connections have to be made between them. “They are all numbered,” says Guy. “There are four different circuits with different voltages, so if you get it wrong it is ruined. It really is quite complicated.”



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Completion centers are sowing the seeds of a skilled future workforce through apprenticeships, college partnerships and internships

Although increased demand is obviously good news, finding the skilled workforce to meet it is not an easy task. This is partly because the global economic downturns of 2002 and 2007 resulted in a reduction of the business aviation industry's talent pool, as many people found similar work in other industries.

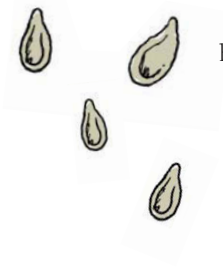
Completion and refurbishment centers are not only in competition with one another for the remaining craftspeople. "We're also competing for their experience and skills with the automotive industry, theme parks, the energy segment and yacht builders," comments Sarah MacLeod, executive director of the Aeronautical Repair Station Association.

MacLeod says the aviation industry has responded by making itself a more

attractive option. "Today's airframe and powerplant (A&P) mechanics work with both hands and minds, and the industry is recognizing it with better opportunities, better pay, flexible hours, health benefits, job stability and, most of all, respect," she explains.

According to the US Bureau of Labor Statistics, mechanics' and service technicians' mean salary in 2012 was US\$55,690 a year, while payscale.com lists annual salaries for A&P mechanics ranging from US\$32,288 all the way up to US\$71,026.

Besides competing for those already trained up, many companies are now investing in developing a new generation. "The challenge is to take those apprentices and interns and turn them into a qualified, technically trained and government-certified workforce that will also mentor the next generation," says MacLeod.



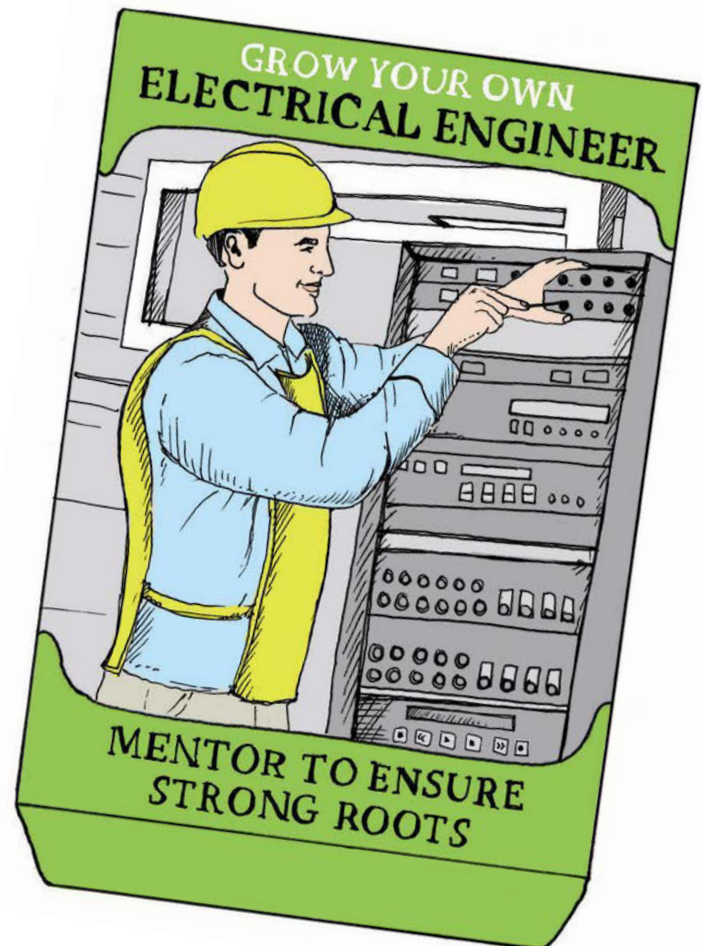


Illustration: May van Millingen

DO YOU HAVE PROBLEMS WITH YOUR WOOD?

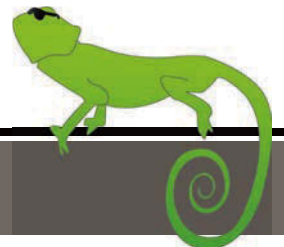


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The UK's Marshall Aerospace and Defence Group takes this approach. The company has a long-running apprentice program. In fact it's current CEO, Steve Fitz-Gerald, was an apprentice (although not at Marshall). "We invest heavily in our apprentice program," says Oliver Drury, director of external communications at Marshall. He notes that the company's 2014 class of apprentices totals 22 men and women. "They train in a variety of disciplines, which allows them to then choose a specialty that they can create a career with," explains Drury.

Marshall's AeroAcademy designs, delivers, recruits for and manages the apprentice program. AeroAcademy also works with educational institutions "to ensure that we can deliver aerospace and aeronautical qualifications to undergraduate and post-graduate students", says Drury. The institutions involved include Kingston University, Cambridge Regional College and several other local colleges.

"We are committed to bringing young talent into our business," says Drury. "Our apprentice program is a wonderful mechanism to attract, train and employ committed and passionate people who will become valued assets to the company."

Also in the UK, Semta and Aviation Skills Partnership (ASP) are trying to connect employers with young talent. The two entities recently signed a memorandum of understanding that will see them jointly promote aviation careers, ranging from aircraft interior upholstery to airframe maintenance. They say the aviation industry as a whole is struggling with a deficit of 10,000 engineering students and apprentices per year.

Recent convert A relatively recent adopter of the idea of apprenticeships is Jet Aviation Basel of Switzerland. The completion and refurbishment center launched its program in 2012 with a single apprentice. The program has



Q&A:

Connor Whelan,
apprentice upholsterer at
Marshall Aviation Services
in Broughton, UK

What influenced your direction?

Firstly, I knew I wanted to work on active aircraft. I had two stints of work experience in the trim department at Marshall's site in Broughton, and felt it was perfect for me. I was impressed by the high standard of workmanship required; enjoyed working within the friendly, hard-working environment; and gained a basic understanding of how the department operates.

How does the scheme work?

The apprenticeship takes three years. In the first year, I attended Deeside College (Coleg Cambria) full time, together with an intake from Airbus (UK) Broughton. At college, I gained experience in hand skills, including filing, shaping, cutting and drilling; and using various aircraft-related materials, including aluminum alloy, heavy skin and light skin. We were taught how to mark material accurately using calibrated tooling (Vernier height gauge, Vernier caliper and micrometers). I also studied a lot of theory – including human factors, material properties and mathematics – to complement the practical work.

In the second year, I entered the working environment for four out of the five working days – the fifth was spent at college, again along with the Airbus intake. I worked with various members of the trim shop staff, each of them showing me techniques and ways of carrying out a task. I used this knowledge to create assessments as part of my National Vocational Qualification (NVQ). The NVQ is staged over the last two years, and involves the apprentice completing jobs on the aircraft or in the trim shop and creating a job report. I was assigned an assessor from Coleg Cambria, who regularly visits me on-site to examine my progress and assessments.

The third year is closely linked with the second year. I will be continuing with my NVQ, while also attending college.

How are you finding it?

The apprenticeship is very enjoyable. I am always learning new ways of carrying out tasks and overcoming problems. I have gained experience in the trim shop and also in the hangar working on active aircraft. I like using different materials, working with components and sewing materials together. I have learned how to read drawings and mark out material in a way that minimizes waste. I have learned a lot about installing components, such as galleys, window panels and seating. I find it challenging sometimes, but I have a good sense of achievement when I complete the task. I feel very lucky that I have gained an apprenticeship working on live aircraft with such professional and talented people. They are always helpful and friendly and I have never felt undervalued.

What are your plans for after the apprenticeship?

I would like to progress to eventually become the lead mechanic within the trim shop. I feel I would be a good leader and would strive to keep the standard of work in the trim shop as high as it can be.

1. Connor Whelan, an upholstery apprentice at Marshall Aviation Services

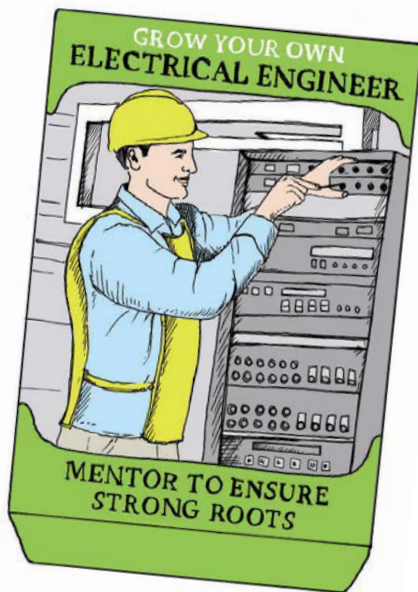


2. Selina Koller, an upholstery apprentice at Jet Aviation Basel

proved successful, and the 2014 program will include three individuals, with the 2015 class set to include at least three. "Looking at current developments, the program will in all likelihood be extended further," says Johannes Turzer, vice president and general manager of the maintenance center at Jet Aviation Basel.

Jet Aviation Basel's upholstery apprenticeship is a three-year program, led by an official Swiss curriculum and supported by a professional upholsterer at the company. It covers aspects including material handling, fabric analysis, machine handling, cutting, hand stitching, technical drawing and furniture development for seats and panels. Meanwhile, the polymechanics apprenticeship includes two years of vocational schooling combined with on-the-job training, followed by full-time work under the supervision of a mentor for two years.

As well as its apprenticeships, Jet Aviation Basel is working very closely with local vocational schools and



professional associations. "We are about to join the VSCS, a Swiss association taking part in efforts to promote and foster professional development in the upholstery profession," says Turzer.

Young blood North American completion centers are also taking action to try to meet anticipated demand. Hanging above the entrance to GDC Technics' center in San Antonio, Texas, USA, is a sign proclaiming, 'We're hiring'. The center (formerly known as Gore Design



Q&A:

Madison Fichtner, interior design intern at Associated Air Center (AAC) in Dallas, Texas, USA

Why did you choose this direction?

I knew in high school that I would be happiest working in a creative profession. Therefore it was essential to select a university with a strong fine-arts program – I am in my second year at Abilene Christian University majoring in interior design. During the last month of high school, I had the opportunity to participate in a career day at AAC. I spent the day in the interior design department and I was hooked.

How does the scheme work?

The scheduling is very flexible, enabling me to join the team when needed without interfering with my classes at Abilene. There are no typical days in AAC's design department. If the team is working on a big proposal, I help by researching fixtures and design elements; ordering tear sheets; checking product availability, sizes and weights, etc. AAC has an enormous design library and I really like working in it. Some days I stay busy incorporating new materials into the library, or organizing existing samples and eliminating discontinued ones. I really enjoy meeting with showroom representatives when they present new textile collections. Making color boards is fun and gives me the opportunity to test out my creativity on the designers. I want to develop my own design point-of-view and their feedback and constructive criticism has been invaluable.

How are you finding it?

The experience has been fantastic. I have had the opportunity to see first-hand how seriously the entire team takes details, deadlines and quality. Seeing their dedication and teamwork helps me to be mindful of those things when I am working on my individual and team assignments in class. This experience has made me a better and more conscientious student. It has also made me aware of how high the expectations will be once I graduate.

I assumed that I would be able to see and experience what it is like to work in a professional design department. What I didn't expect was how much fun it would be. I also did not realize how swiftly projects have to be prepared and completed, nor how many people are involved in the design process and the importance of respectful and professional teamwork.

What are your plans for after school?

I have three more years to go before graduation. I am going to focus on making the most of my aviation industry exposure and refining my personal design point-of-view, so I can secure a design position before I graduate. I am anxious to explore European and Middle Eastern architecture, cultures and foods before starting my design career.

THE PROGRAM WILL, IN ALL LIKELIHOOD, BE EXTENDED FURTHER





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Q&A:
Matt Clubb,
trainee cabinet builder
at Odyssey Aerospace
Components in Denton,
Texas, USA

Why did you choose this direction?

Before coming to Odyssey, I built cabinets and furniture for high-end residential homes. Looking into different varieties of craftsmanship, I was curious about aircraft interiors and their components. Odyssey provided me with the opportunity to broaden my skills by training me in the art of building aircraft interiors.

How does the scheme work?

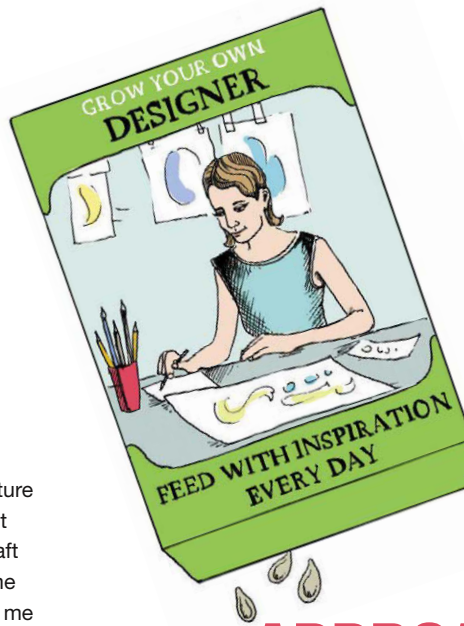
I have been working at Odyssey for approximately 18 months. I am learning a great deal about the processes and materials used. For example, we use honeycomb and aluminum, whereas I worked with plywood for homes. I am also learning how to build a custom cabinet from start to finish, fabricating parts from sheet metal, applying veneer, milling and applying molding. It's a profession where you learn something new every day.

How are you finding it?

I enjoy it. It definitely challenges me more than simply working with wood. Aircraft interior manufacturing is highly technical as well as artistic. I enjoy the fact that I learn every day and take satisfaction in seeing the finished product.

What are your plans for the future?

There isn't a traditional apprentice program at Odyssey Aerospace. However, I expect to continue to train and refine my skills so they meet those of my peers. My plan is to continue growing at Odyssey, becoming a strong team member while building beautiful custom cabinetry.



3. Matt Clubb, a trainee at Odyssey Aerospace Components, working on a cabinet

AS OUR MORE EXPERIENCED CRAFTSPEOPLE APPROACH RETIREMENT, THERE IS A CONTINUING NEED FOR YOUNG PEOPLE

Completions) expects to hire as many as 350 more people over the coming year, bringing its total workforce to around 1,000.

As of early September 2014, the 145,000ft² hangar held two BBJ 787s, an ACJ330 and an ACJ320. Another twin-aisle and another single-aisle aircraft are scheduled to arrive in 2015.

The next generation "We take craftsmanship very seriously," says Joe Barrett, sales and marketing director at GDC Technics. "As our more experienced craftspeople approach retirement, there is a continuing need for young people with equivalent skills. We're currently developing a new

apprenticeship program to augment our internship program."

GDC Technics expects to have this apprenticeship program in place by the end of 2015. The center also works closely with the Alamo Community College District, Texas A&M University, the University of Texas and the University of the Incarnate Word; and even some of the local high schools. Barrett says GDC Technics frequently makes presentations at educational institutions in the area, "and we have standing room only for almost every one of them".

Nest egg Flying Colours Corp of Peterborough, Ontario, Canada, offers a one-year apprenticeship with an A&P license as the reward. The center has 10-15 apprentices going through the course annually. "Our goal is to hire them afterward, and keep them," says Eric Gillespie, executive vice president at the company. "We consider it as an investment."

Four years ago, the company also established a six-month, recurring aircraft interior fundamentals course in coordination with Sir Sanford Fleming College. At the Sutherland Campus, the course provides a general overview of aviation and business jet cabin interiors, while at Flying Colours Corp the syllabus is focused on practical application. "A lot of people who have gone through the syllabus still work for us today," says Gillespie.

The company will also soon be training Singaporean staff at its





Engineering interns at Associated Air Center

Harsh Shastri is working on a Masters degree in mechanical engineering (with a specialization in design and manufacturing) at the University of Texas at Arlington, and working as an intern at Associated Air Center (AAC) in Dallas for six months.

Shastri, whose childhood dream was to be a pilot, describes his time at AAC as “one of the best experiences of my life”. His day-to-day work with the engineering team includes revising drawings, working on redlines and AutoCAD. “It is a very hands-on experience and I have learned a lot in a very short amount of time,” he says. “I have really enjoyed working with the design team and backshops. They are a diverse group of very talented people.”

Brendan Peck is also working as an intern at AAC, three days a week. He is due to complete his Bachelors degree (majoring in electrical engineering) from the University of Texas at Dallas in 2015.

Peck previously worked at a telecommunications company and as an automotive technician with Audi, but says he has always been intrigued by aviation. “There is some crossover between the automotive industry and aviation; anti-lock breaks for example,” he says. “I am finding aviation far more interesting and engaging than networking diagrams and automotives. Also, standing in the same hangar as a BBJ747-8 is awe-inspiring.”

His duties include working on engineering change orders, revising drawings and helping with redlines. “The engineers have been very welcoming and made me feel like a part of the team,” says Peck. “Daily I have seen why high-quality engineering work is so important, and how vital it is to work closely with the other departments that depend on the information that engineering provides.”



INTERNSHIPS ARE ANOTHER GOOD WAY TO GET NEW PEOPLE INTO THE BUSINESS JET INDUSTRY

Peterborough facility. In February 2014, Flying Colours Corp signed an agreement with Bombardier to provide full-service interior refurbishment for Learjet, Challenger and Global business jets at the Canadian OEM’s service center in Singapore. The agreement will include hiring people there and bringing them back to Peterborough for training, primarily in woodwork and upholstery.

Quality not quantity Internships are another good way to get new people into the business jet industry. Greenpoint Technologies in Kirkland,

4. Harsh Shastri (seated) and Brendan Peck (standing), interns at Associated Air Center

Washington, USA, hires college student interns in engineering, interior design, marketing and finance. The students are typically completely new to the aviation industry and the goal is to develop them into strong, contributing team members.

“Actually, it’s easy to find technical talent,” says Christine Hadley, senior marketing manager at the company. “The question is more whether they will be able to adapt to our culture of highly productive, customer-centric work. It’s a culture in which if one of us fails, then we all fail, and we have to remember that.” **END**

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visiblechange

The technology used to show clients how things could look is changing dramatically. Hand renderings, foam cut-outs and plywood are less commonly used, so what's on the rise in their stead?

Less than a decade ago, it was not unthinkable for a completion center working on a VIP aircraft conversion to try to show the customer what they were paying for by creating a crude mock-up on the hangar floor. This might consist of foam cut-outs of furniture and monuments, with the cabin boundary marked out by masking tape.

How times have changed. Client presentations have gone high-tech and been imbued with a deeper level of psychology to get the customer more heavily invested in the product, sooner.

In almost all cases, customers still receive traditional renderings, but the methods used to produce them have changed radically in recent years.

Photorealism “Everyone in the industry has discovered their way onto a similar path,” says Jay Beever, vice president of interior design at Embraer Executive Jets. “The tools that we are using from a high level are 3D configurators that use 3DXcite, Bump Speed and other software programs that tie into CATIA.”

In Beever's opinion, many of the images that are strictly tied to 3D engineering drawings appear too

1. An ACJ320 concept designed and rendered by Andrew Trujillo using Rhino with a Vray plug-in
2. Gulfstream's DesignBook iPad app is used to identify clients' preferences



cartoonish to present to customers. “What I like to do is a little different; I don’t want to tie data to engineering,” he says. “Customers might not care what nuts and bolts are behind the drawer, how big the drawer is, and if the proper sam latches and slides are in place. Rather, the idea is to give them the storefront, to show them what it is going to look like from a superficial point of view and in terms of the configuration. The basic specification is there – what the aircraft will do and how much space they have.”

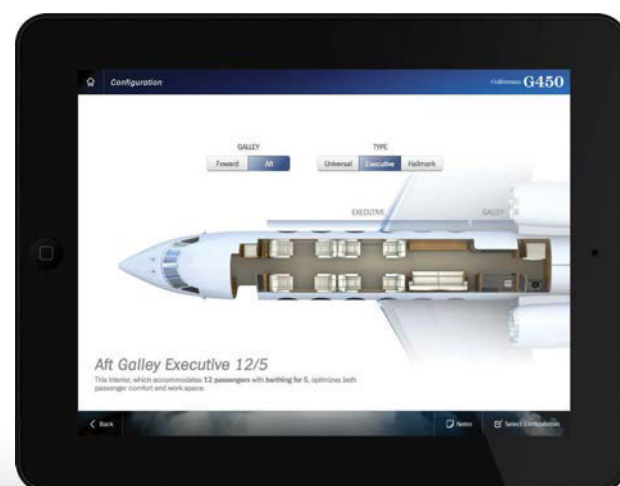
Beever also stresses that psychology has to be factored into the equation: “When people get in the aircraft, what does it look and feel like? Does it feel like an extension of their personality that they can really feel proud of because they were involved with every detail of the look?”

Beever and his team use a mix of off-the-shelf software packages. “We use Autodesk 3ds Max a lot,” he says. “We take data from CATIA and create tessellated 3D graphics that can be rendered with photorealism. It involves

more work than just using engineering data from CATIA, but photorealism is the most important thing for us when it comes to helping customers to pick interiors. Unless you have photorealism with the proper ray-tracing technology and bump and texture mapping, customers are not going to really understand what the aircraft will look like in the end. You give yourself more headaches if the final aircraft looks different from what they were expecting.”

Design centers The approach also speeds up customers’ visits to the design center, according to Beever. “Renderings are made initially to get a feel for the direction the customer wants to go in,” he says. “Sometimes we think a customer is a khaki-and-tan ‘corporate look’ guy, only to find that he wants piano black with blue seats and a contrasting stitch because his Aston Martin looks that way. We may find out the customer has an alter ego and wants a different look. So we fish with these images. The images really

PHOTOREALISM IS THE MOST IMPORTANT THING FOR US WHEN HELPING CUSTOMERS TO PICK INTERIORS



2



speed up the process and the customer becomes excited and is drawn into the development. We can't make the images fast enough. We are throwing muffins at a giant, hungry monster."

Real showrooms High-tech images are not a replacement for the traditional service offered in the design center. "Customers want to touch the materials and that is the part of the process you can't replace," comments Beever. "It's important to have design centers. Customers like the images so much that they want to see and touch the materials even more."

Beever also notes that these new presentation tools also yield benefits when used internally, to help everyone



3

Q&A: Dan Ouweleen,

president of PacMin, explains the enduring appeal of physical models as a way of presenting an aircraft design



How are your models used?

Our models are used by aircraft manufacturers and operators as sales and marketing tools. Our models are seen around the world at tradeshow, contract signings, airports, customer lobbies, flight museums, professional stadiums, private lounges and anywhere our clients want to delight their customers. We have made lots of cutaways to showcase the possibilities of luxury interiors and promote new aircraft coming into service, such as the BBJ 747-8 and BBJ 787-9 in 1:20 scale, and the G650 in 1:10 scale.

How are renderings impacting your work?

We use computer-generated renderings provided by clients to help us visualize scenes, textures and materials, which we then recreate in physical form, also using aircraft data from the client. Renderings are helpful during the conceptual phase, but ultimately they cannot replace a physical model. No matter how detailed the image, it cannot replace the feeling conveyed from seeing a physical aircraft replica.

Has the advent of 3D printing or other new technologies affected your work?

Yes, 3D printing is an invaluable tool. For example, it has given us greater flexibility and options for creating cutaways. Complex parts can now be printed instead of molded. However, despite these improvements, 3D printing is not used on a day-to-day basis and has not replaced the need for state-of-the-art tooling. We are also exploring ways to incorporate Bluetooth and wi-fi into our models. This will give our clients more options and make the models more interactive.



What are some of the challenges involved in producing very large models?

The more complex the model, the more time is needed to discuss and plan it. Some projects can take more than 12 months to complete. If a model involves lights or moving parts, not only do the parts need to be created and installed, they also need to be tested. We work on ensuring every model is user friendly for set-up. This means minimizing issues when models travel from show to show.

What's the most challenging project you worked on recently?

There are many exciting projects we're working on but they have not been unveiled to the public yet. We recently completed a 1:20-scale 777X model for the official unveiling of the program at the 2013 Dubai Airshow. Our Special Projects team collaborated with Boeing to create a model worthy of the announcement. We created new tooling for exhibit and desktop models to ensure they had a consistent image across all scales. The model incorporated moving parts, exterior lighting and a custom base. On the day of the announcement, Boeing brought in commitments from Etihad, Emirates, Qatar and Lufthansa.





CATIA in the cabin

Now an application on Dassault Systèmes' 3DEXperience business platform, CATIA began life in the 1980s in the design of complex aircraft shapes. Originally used to model aerodynamic surfaces in 3D, today the app is also used to design aircraft interiors. CATIA provides specific tools to create, validate, modify and visualize complex interiors.

To address the physical and aesthetic constraints of aircraft cabin interior design, CATIA allows users to interact with a virtual model of the complete aircraft, in any situation. Everyone involved in the product development process can experience physically correct visualizations, which can be used to make decisions on aspects such as colors, materials, volume and proportion.

- 3-4. Almost the same design, by Andrew Trujillo, rendered using different software programs
5. Mecaer Aviation Group's iPad-based virtual configurator for the Bell 429
6. LoftJet, a concept rendered using CATIA by Pierre Maheut of Dassault Systèmes' CATIA Creative Design team

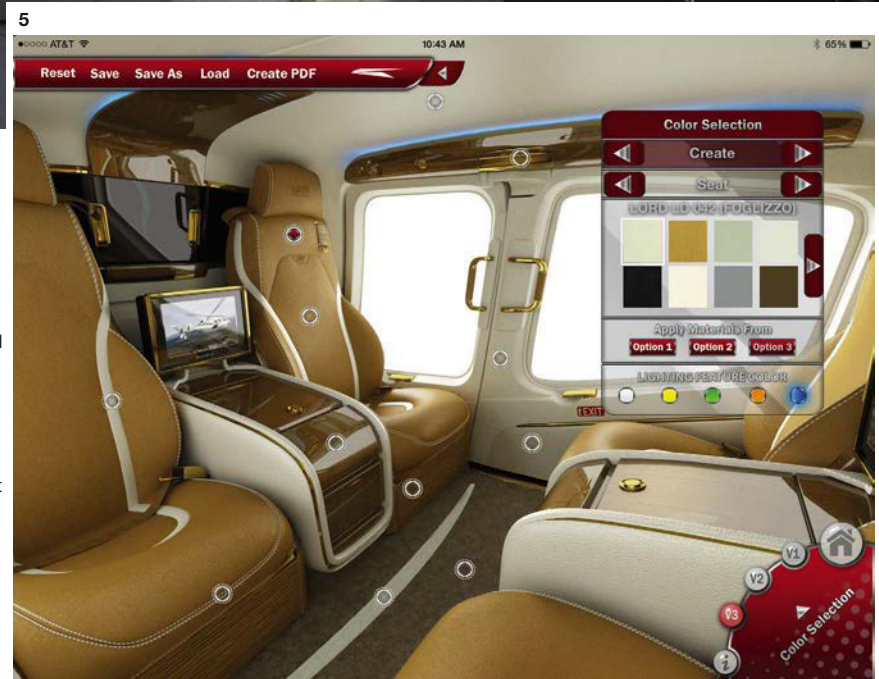


Image: Dassault Systèmes/CATIA

visualize what a new interior would look like. It also helps sell inventoried aircraft that are nearly or already completed. "It helps customers who have an immediate need to understand quickly what they are getting," says Beaver. "Having this tool available for them has been the Holy Grail. They can make a choice between several serial-number aircraft immediately."

There's an app for that Part of Gulfstream Aerospace's approach is to use technology that its customers are already familiar with using – tablets. "DesignBook is an application we developed more than two years ago," says Tray Crow, director of interior design at Gulfstream Aerospace. "The whole premise was that it be light, fast and mobile rendering technology. We put it on an iPad and it is deployable



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Beechcraft King Air 350i interior

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Autodesk 3ds at Bombardier

Autodesk 3ds Max Design software is used for modeling, animation and rendering. One Autodesk customer is Bombardier, which uses 3ds Max Design to design and customize its aircraft.

Bombardier's Advanced Visualization and Media team in Montreal, Canada, uses 3ds Max Design for interior visualization work, including floorplans and décor. In the past, Bombardier used 3ds Max Design visualizations only to confirm customer choices. These days, Bombardier's design team creates many more iterations in a much shorter time. Autodesk 3ds Max Design has gone from a rendering tool to a design tool. Renderings that used to take months to create and deliver to customers – usually as a gift that also confirmed their design – are now completed within days of the customer signing for the jet.

Bombardier's design team has also used 3ds Max Design to develop an online design selection tool called Snapshot, which enables customers to select colors, veneers, fabrics and more for their aircraft and see the results almost immediately. All the imagery is created through 3ds Max Design. It can even be used to create a 3D animation of the design.

"We're using Autodesk 3ds Max Design more as a design tool than ever before," says Evie Kokkinos, senior interior designer at the Global Completion Center. "The customer can pick and choose from an increasingly wide variety of possibilities. Design choices are now being made and revised as a result of these renderings."



7

Crow says customer feedback has been incredible, particularly to the gyroscopic feature, which makes the iPad screen follow the viewer in the cabin as they turn their body.

DesignBook is used primarily to help customers decide on their preferences. "If you can show someone what a tan interior looks like with a dark veneer, even if it's not their preference, it's useful because you've been given an immediate response," says Crow.

Once preferences are established, Gulfstream switches to a live scanning software program, 3DXcite DeltaTex.

7. Gulfstream's DesignBook enables clients to try out colors and materials in real time
8. A rendering of Embraer's Legacy 450 interior

EVEN IF IT'S NOT THEIR PREFERENCE, IT'S USEFUL BECAUSE YOU'VE BEEN GIVEN AN IMMEDIATE RESPONSE

anywhere in the world. We really enjoyed the flexibility of being able to use Apple TV to show it on a monitor."

Preferential treatment The app is loaded with a lot of color and material options, which the customer can apply to images in real time. "The app is particularly advantageous when we are working with customers on the initial definition and they are not yet sure if they want light or dark veneers, for example," explains Crow. "You can scroll through and change the veneers in the cabin very quickly. Once the larger decisions like carpet and veneer are decided, you can then start tweaking the leathers, sidewalls and all the other supporting materials in the cabin. The customers love it."

The app does have limitations. "iPad storage is only so big," says Crow. "But it can store 14,000 renderings and we are very proud of it." DesignBook is currently available for the G280, G450, G550 and G650. The G150 should come on line by the middle of 2015.



8

“You can come to one of our design centers (in Savannah, Georgia, USA; Dallas, Texas, USA; and London, UK) and we can put the carpet or fabric on a scanner bed and it is scanned into a rendering in real time,” says Crow. “That provides a deeper experience that helps refine the interior. DesignBook is akin to getting an understanding of what the customer is after in an interior and 3DXcite DeltaTex is a tool that allows more specific definition of that interior. It certainly has a wow factor for customers.”

In addition, 3DXcite DeltaTex has configuration capabilities that facilitate the selection of floorplans and seating arrangements. Overall, Crow says technological tools like DesignBook and 3DXcite DeltaTex are less about saving time and more about enhancing communication and the customer experience. “We bring them the latest and greatest technology to help them define their cabins,” he says.

The fine print Now 3D printing is enabling cabins to actually take physical shape rapidly, albeit on a somewhat smaller scale. Since unveiling a 50th-scale 3D-printed model of a BBJ cabin at EBACE 2014, it's become the hot tool for AERIA Luxury Interiors of San Antonio, Texas, says Chris Mason, the company's vice president of sales and marketing. “We can show customers a true-to-scale mock-up of their aircraft using less expensive, non-fire-rated materials;



9



10

we can make headliner contours; it's a great tool for us,” he says.

AERIA also uses 3D renderings and provides clients with a ‘virtual flyover’, a video composed of 3D renderings going through the interior of the cabin.

Mason says that in combination with 3D printed models, renderings can hasten the design process substantially. “In the past, when I was at other companies, we used to do foam core mock-ups so customers

9-10. The same bed design, by Pierrejean Design Studio, showcased with a hand sketch and a rendering
11. A 3D printed BBJ cabin by AERIA

could actually walk through it, but nowadays with these rendering technologies and 3D printing we don't need to do that,” says Mason. “Using foam was a hugely expensive endeavor. It required space on the hangar floor or off-site. It was very costly from a time and money standpoint. Now we can print the cabin for the customer and give it to them as a memento that they can display in their conference room. 3D printing is becoming more of a standard in our industry.”

Mason also expects 3D printing to become more standard fare in tradeshow booths. “I would rather spend money on something that shows the actual printout of a cabin, as opposed to spending big money on a cabin cutaway,” he says. “I can do a lot more with 3D printing.” **END**

Humans versus computers

Designer Andrew Trujillo points out that for some clients, there is no substitute for human artistry. “I have found on many occasions that hand-drawn visuals have had a much more positive result than any photorealistic presentation,” he says. “There is a common misconception that photorealistic images are made by the mere pressing of a button, whereas many can relate to the artistic skill required to make a polished hand drawing. A lot of artistry and technical knowledge is required to make a photorealistic image using the latest software, but the result is perhaps less personal and human.”

Trujillo also adds that with photorealistic imagery, clients may be distracted by relatively minor details. “They might dismiss a good design because of a fabric texture or the color of some minor item,” he says. “Most clients seem to be more forgiving of inaccuracies with hand-drawn sketches and visuals.”



11



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With the solid backing of Mubadala, Piaggio Aero has been able to respond to its customers' feedback, bringing more customization, less noise and real Italian flair to its updated Avanti

Piaggio Aero has always tried hard to deliver individuality with its Avanti P180 twin-engine turboprop. The company estimates that 80% of the 250 active P180s have their own interior configurations and aesthetics.

In the new Avanti Evo, Piaggio Aero has gone even further down the customization route. Instead of three seating configuration choices, there are now five. Owners can also take their

pick of seat leathers, wood veneers, carpets and other materials, in the colors they want.

Having taken guidance from its customers, in the club area Piaggio Aero has devised layouts designed to open up the space. With four seats plus two divans, there's more legroom and working area. This has been achieved without changing the cabin cross-section, which is 5ft 9in high and 6ft 1in wide. The aircraft can accommodate nine passengers.





Mubadala's influence

The development of the Avanti Evo owes much to the deep pockets of Mubadala, the Abu Dhabi-based sovereign wealth fund that now owns 98.05% of Piaggio Aero. Piero Ferrari holds the remaining 1.95%.

A major shareholder since 2006, Mubadala has allowed the aerospace group "to define a clear strategy for years to come", according to Giuliano Felten, head of sales at Piaggio Aero. As well as the Evo, Piaggio Aero is working on unmanned spacecraft and engine production while merging these two arms of the business into a full-scale development facility at Villanova d'Albenga in Italy.

Another important benefit of having Mubadala on side is the low cost of funds it is able to deliver. The investment group, which is pumping US\$260m into Piaggio Aero, has a strong credit rating.

1. The Avanti Evo can seat up to nine passengers

THE SEATS ARE HIGHLY ADJUSTABLE, WITH FLEXIBLE BACK AND HEADRESTS, AND EXTENDABLE LEG RESTS

The seats are made by a fellow Italian company, Iacobucci HF, which entered the business jet seat market in 2010. Its latest electromechanically operated seats passed dynamic and burn tests earlier in 2014. The seats are highly adjustable, with flexible back and headrests, and extendable leg rests. On the Avanti Evo, the seats are upholstered in Pelle Frau leather from another Italian company, Poltrona, and finished with hand stitching.

The galley is much the same as on the P180, except for the addition of an espresso machine as standard. This was requested by customers and ties in with Piaggio Aero's aim to reflect its country's culture.

The air-conditioning can also now be customized. A patented adjustment system allows passengers to control the temperature separately on either side of the cabin. "It's just like in customers' limos," says Giuliano Felten, president of global sales and US chief executive at Piaggio Aero.

Light upgrade Floor LED lighting, previously only available on the luxury version of the P180, has been installed as standard equipment throughout the Evo's passenger cabin and lav.

What hasn't changed is the 1.25m³ storage space, which can swallow golf bags and skis. It is accessible from outside the aircraft.

But the real breakthrough in the cabin experience is the reduced noise. Piaggio Aero claims that the interior is "whisper-quiet", with sound levels within the aircraft having been lowered by 1dB. This was mostly achieved through work on the exterior rather than the interior. "It was a huge engineering achievement," enthuses Carlo Logli, CEO at Piaggio Aero.

With the Evo, the pressure was on Piaggio Aero to deliver a more environmentally friendly aircraft. "We were very good on fuel consumption

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WE WERE VERY GOOD ON FUEL CONSUMPTION AND EMISSIONS, BUT WE WERE NOT PERFORMING ON NOISE

and emissions, but we were not performing on noise,” says Felten, citing increasingly tough standards for noise pollution.

The company admits that the P180’s noisiness was hurting its reputation in smaller airfields near towns and cities, where its short landing and take-off have long been one of its strengths.

After a series of complex tests, Piaggio Aero decided the solution lay with a new propulsion system with

new five-blade scimitar propellers, which are lighter in weight and produce less noise.

The company invested a lot in developing the propellers specifically for the Avanti Evo. After searching for a suitable manufacturer, Hartzell Propeller was selected for the job. The 97 year-old company is based in Ohio, USA, and once worked with the Wright brothers. The result of the companies’ collaboration is an 85in-diameter, five-blade, fully feathering and reversible, hydraulically controlled, constant-speed propeller, made from aluminum alloy. The key to reducing noise was to reduce the rpm by 10% – from 2,000 to 1,800, without slowing the Avanti Evo down. The aircraft has a maximum speed of 402 knots, unchanged from the P180. “We were able to accomplish



2



CABIN
STATS

Piaggio Aero Avanti Evo

Cabin width: 6ft 1in

Cabin height: 5ft 9in

Cabin length: 14ft 11in

Seats: 2 crew + 8 passengers
(or 1 crew + 9 passengers)

Range: 1,470 nautical miles in standard
configuration with NBAA reserves, IFR profile

High-speed cruise: 402kts

Max altitude: 41,000ft

Price: US\$7.395m

2. There is an option to increase the range to 1,720 nautical miles
3. The Iacobucci HF seats are upholstered in Poltrona leather

AVANTI TIMELINE

1979

Studies begin on P180 Avanti

1990

P180 Avanti certified and enters service

1998

Rinaldo Piaggio acquired and renamed Piaggio Aero Industries

2005

P180 Avanti II certified and enters service

2014

Mubadala Development Company acquires a 98.05% share in the company; Avanti Evo launched; Avanti Evo certification and service entry expected

Nordam's involvement

Seating aside, Nordam is providing most elements of the cabin – including the galley, entertainment center, composite acoustic panels and handcrafted cabinetry.

The 45-year-old company supplies everything from fully integrated and customized interiors through to engines and technical parts. “We deliver the complete spectrum,” says Phil Marshall, vice president and general manager for the interiors and structures division at Nordam.

The company is based in Tulsa, Oklahoma, USA, with further facilities in Mexico, the UK and Singapore. Although the Avanti Evo is being assembled in Italy, some of the interior options required by US owners will be put together by Nordam in the USA.

4



5



AS MANY AS 90% OF THE MODIFICATIONS WERE MADE IN RESPONSE TO SURVEYS

Piaggio Aero's Avanti Evo performance objectives while greatly reducing its interior and exterior noise profile,” comments Joe Brown, president at Hartzell Propeller.

Also contributing to lower external and internal noise levels are a new duct design for the engine exhaust and redesigned engine nacelles. The overall result is a 68% reduction in exterior noise. It means the aircraft should meet environmental standards comfortably for years to come.

Piaggio Aero says the lower noise also makes the cabin a more restful

4-5. There are five floorplans to choose from – Aria, Ambiente, Armonia, Atmosfera and a shuttle configuration

place. “It’s like a different aircraft when you hear it taking off and landing,” says Felten. “It’s quite stunning.”

Listening to the customer Feedback from customers was crucial to the development of the Avanti Evo. “As many as 90% of the modifications were made in response to market surveys,” says Felten.

The aircraft has a diverse group of owners to satisfy. Roughly half of the Avanti Evos in production are destined for pilot owners and charter companies, a quarter for the fractional

market and a quarter for governments, for surveillance purposes.

Already popular in Europe and the USA, the Avanti Evo is rapidly building a market in Asia. In fact, the very first aircraft to come off the production line will go to a customer in India. Piaggio Aero is also fielding mounting interest from China. Hong Kong-based investment firm Bravia Capital has signed for 10 Avanti Evos, with an option for a further 40. “The launch of the Avanti Evo is a perfect starting point that underpins future growth,” says Logli. **END**



"It was essentially a brand new aircraft by the time we were done, and there's nothing out there quite like it."



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After completing this Bombardier Global Express' required 2A and 1C inspections, Duncan Aviation Designer Lori Browning and a team of engineers worked to remove two club seats toward the rear of the aircraft and added an entertainment cabinet with a counter and drink ledge. In the mid-cabin area, they swapped out a single seat and work station for a credenza to increase storage space.

Along with all of these changes, the look and feel of the cabin's interior was updated. The aircraft started with a very warm color scheme—creams and red wood—and the final scheme used high-contrasting dark wood and taupe.

With this color swap, the owner decided to add new seats, new veneer, install electric windows with a single-control panel and reconfigure the PSUs, as well as the switches.

"It was essentially a brand new aircraft by the time we were done, and there's nothing out there quite like it," says Lori.

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Modern materials and ancient symbols are mixed to create the wow factor on this ACJ319 for a Chinese businessman

When a Chinese client came to Cabinet Alberto Pinto with a brief for an ACJ319 cabin, it's fair to say the businessman's aesthetic ambitions provided a challenge worthy of the Paris, France-based design studio.

His concept called for a fusion of the old and new worlds – high-tech materials next to lacquer, filaments of gold and traditional Chinese symbols. And, nothing if not open-minded, the client would embrace a quirky nod to Western art – lamps based on a famous French sculpture.

Luckily, the chosen completion center, AMAC of Basel, Switzerland, is no stranger to one-off interiors. “No aircraft we do is like any other,” says Bernd Schramm, chief executive at AMAC. “This is not series production.”

Around 30 engineers and other specialists are currently working on the project, but this will increase to up to 60 people when the aircraft hits peak production. Delivery is planned for the second quarter of 2015.

The customer is a self-made entrepreneur. He wants his aircraft to set a benchmark in his home nation – it's intended not only as a statement of success, but to be aesthetically



1. Cabinet
Alberto Pinto's
design for
a Chinese
client's
ACJ319

groundbreaking. “He kept on saying he wanted something that had never been seen before,” says Yves Pickardt, the aerospace specialist in the design house now managed by the late founder’s sister, Linda. “He wanted everybody coming on board to say ‘wow’.”

Cabinet Alberto Pinto’s aviation division has designed 32 aircraft interiors, with particular expertise in big jets. This is the design house’s first project for an Asian client.

Fiber provider The aircraft features a lot of carbon fiber. “The owner wanted

to introduce as much carbon fiber as possible,” explains Pickardt. The owner sees the material as an expression of modernity and Cabinet Alberto Pinto has done its best to oblige. Thus carbon fiber will adorn the seats and divans, sideledges, tables and shelves in the main cabin. It is applied in the main bedroom and in the bathroom pilasters – decorative, trompe l’oeil columns derived from classical architecture. Carbon fiber is also found at the entrance and along the corridors. It is even used for an insect-shaped design on side cabinets.

Maintenance matters

At the same time as working to meet the client’s aesthetic vision for the interior, AMAC is also focused on the less visible matter of optimizing the aircraft for maintenance. “This is a very big issue for us,” explains Bernd Schramm, chief executive at AMAC. “A carefully designed, low-maintenance interior will save a lot on costs in the long run, especially in heavy checks. We always design with maintenance in mind. It’s about investing in the future of the aircraft.”

The idea is to minimize the time and effort required to get at working elements, for example under the floor and above the ceiling. If the maintenance crew has to remove most or all of a cabin interior to get at the wiring, the aircraft will be on the ground much longer than otherwise. That’s why AMAC’s electricians are installing a lot of connectors along the wiring so that the loom doesn’t have to be removed in its entirety during checks or if something goes wrong. “The VIP will not see all these connectors, but the maintenance technicians certainly will,” says Schramm.

THE OWNER WANTED TO INTRODUCE AS MUCH CARBON FIBER AS POSSIBLE

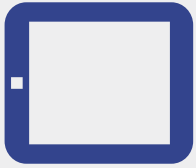


2. The entrance way, featuring a bespoke carpet design
3. The master bedroom and bathroom is at the front of the aircraft



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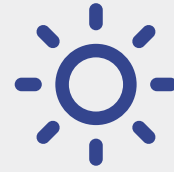
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While filaments of pale gold – another material with an historic association with success in Asia – are used discreetly along the wooden bulkheads, it is carbon fiber that dominates the cabin.

Learning curve The amount of carbon fiber in the design also took AMAC back to school. Apart from the time-consuming job of locating a material that met the project's needs (a French supplier did the honors) and then fulfilling all the burn and other tests, there were considerable technical demands to meet. Technicians had to learn how to shape the material to precise tolerances and how to bond it to the underlying honeycomb panels. But downplaying the difficulties, Schramm insists, "The carbon fiber is not so much challenging as different."

THE CARBON FIBER IS NOT SO MUCH CHALLENGING AS DIFFERENT

4. The aft lavatory
5. An eight-place table can be created by placing a wooden bridge between the four-place and two-place tables



In terms of other materials used, the top of the console table in the entrance corridor is finished in black lacquer, while the top and side surfaces of other furnishings are finished with koto veneer. Koto is a whiteish-yellow, semi-glossy wood that flourishes in tropical West Africa and is much-prized as a veneer in VIP applications such as this. The seats are upholstered in an off-white full-grain leather. Champagne gold satin was used for the plating.

Light fantastic In a nice European touch proposed by the studio, the owner has embraced bespoke decorative lamps featuring an iconic design by Guy de Rougemont, a French sculptor and painter revered for his witty, avant garde work.

The ceiling is also non-standard. The owner had asked for no technical

items to be placed in the ceiling, but there are certain things that are mandatory, so will be fitted. However, the final result will still be a one-off. A soft synthetic material developed by Majilite Smart Fabrics will be deployed along the valences, running the length of the ceiling. It resembles a soft grain.

There is also a linear design on the bulkheads and cabinets. Where the lines intersect, there is a double-circle symbol representing success in Chinese culture. "The design is pure decoration, a game of graphics," says Pickardt. The pattern extends to the ceiling, minus the symbols, and the entrance area also features a design that combines elements of the sun, earth, moon and stars. "We've made it very modern and decorative," says Pickardt.

Dining in the aisle The floorplan is fairly simple. The entrance corridor leads to the master bedroom and bathroom (which is equipped with

a shower and toilet) before flowing into the main cabin. This area features 10 business-class seats. The prototypes of these are being developed in Florida, USA, and will be upholstered in AMAC's own workshop.

The seats will be placed either side of coffee tables that can be converted into a dinette. A four-place folding dining table dominates the second half of the space. It can be converted into an eight-place table simply by inserting a lightweight wooden bridge between it and a two-place table. With the bridge in place, the dining table takes up the width of the fuselage. Although this is an unusual option on this type of aircraft, Cabinet Alberto Pinto did the same on an aircraft for Acropolis Aviation and the configuration has been successful. Dinner will be served to surround sound – acoustic engineers are experimenting with the placement of speakers to achieve the perfect background music.

Spot the lights

The lighting was a point of debate. At first, the owner specified the cabin should have no spotlights or other visible light, but was persuaded that some direct lighting was obligatory, for instance in the emergency and exit locations. A compromise was reached in the form of indirect upwash and downwash lighting installed underneath the cabinetry and in other discreet locations. However, the cabin will have about half the usual number of spotlights.

6. The cabin will feature AVOD IFE, satcom for phone and internet service, and a visual information system

The aft section has a lavatory, a guest bedroom/lounge and a galley. Delivered by Cabin Innovations, a division of Advent Aerospace (formerly Yankee Pacific) that specializes in customized installations for narrow-body aircraft, the galley is fitted with a microwave oven and coffee machine.

Courtesy of the UK's Autonomy Securities, the aircraft is protected by a mechanical key, alarmed doors and access panels, and external cameras that allow the pilots to see anybody approaching on the tarmac. When this much planning and execution has gone into an aircraft, the best possible security system becomes an obligation rather than an option. **END**

THE DESIGN IS PURE DECORATION, A GAME OF GRAPHICS





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1. Lufthansa Technik's
Leadership Select
ACJ319 cabin



opposites attract

With its pre-customized cabin for narrow-body VIP completions, Lufthansa Technik believes it can marry efficiency with luxury

Serialized production of custom aircraft interiors sounds oxymoronic and has always been a tricky business. The goal, of course, is to rationalize manufacturing, taking weight, time and cost out of the process – and therefore the final product. It's been tried many times before, so when Lufthansa Technik (LHT) announced its pre-customized VIP cabin program for narrow-body ACJ and BBJ aircraft at EBACE 2014, a few industry wags could be forgiven for yawning.

However, when you drill down into the Leadership Select program you realize that nap time is definitely over. Using the pre-customized concept, LHT says it will manage to cut an average of 25%, sometimes more, from completion times and costs. That means a green completion could be done in six months at prices starting at US\$20m for an ACJ319.

The LHT program is different from its industry progenitors' in many ways. Firstly, LHT has had a foot in this game in one form or another since 2001, when it produced serial interiors for four BBJ 1s operated by fractional ownership company NetJets, and later for 20 ACJ318 Elites. It has also built 12 serial cabins for the Bombardier Challenger 850 and kitted out various VVIP interiors.

Despite this experience, the team at LHT spent a lot of time working out the necessary engineering and value proposition required to make the idea of a modular interior appealing to customers accustomed to luxury.

“Being Germans, before we launch or commit to something, we really think twice or maybe even three times about it: we need to be 100% convinced it is going to work,” says Jörg Löwes, deputy director of product design and sales at LHT.

This isn't just marketing hype. With nearly two decades of ACJ and BBJ experience, LHT knows these aircraft and what works and what should be avoided in the cabins. Over the course of two months they compiled this data, roughed-in the standard choices and options, and designed a customer-friendly tablet app for it.

Configurator app “We developed an app in parallel to convey all the choices to a customer. We decided to develop an app inspired by configurators from the car industry,” says Löwes. “When you go on the BMW website you can

ON THE BBJ 2 WE HAVE FIVE ZONES WITH VARIOUS OPTIONS AND ALTOGETHER THERE ARE 720 VARIATIONS



Master of disguise

Leadership Select is also being used as a platform for the launch of a new home-grown seat structure, chair, which features a sleek and rounded carbon fiber base. The seat structure has multiple applications for seats of various shapes and sizes throughout an aircraft. Lufthansa Technik (LHT) says it saves up to 44 lb per seat, although the weight reduction gets less dramatic as the seat grows larger and more features are added.

LHT intends to sell the seat on the open market – even to its competitors. “We first revealed the chair this year at EBACE and the response was tremendous,” says Karsten Döge at LHT. “One competitor came by and asked when they could buy the seat and how much it would cost.”

2. The new chair platform
3. The concept applied to a BBJ 2

see what your car looks like in terms of fabrics, materials and colors. This was the inspiration for the app. You can play with options and assemble each room module by module.”

Spoiled for choice Another reason for developing the app was to help customers navigate the potentially bewildering number of possibilities. “On the ACJ319 we have three zones with several different options, and altogether there are 96 variations; on the BBJ 2 we have five zones with various options and altogether there are 720 variations,” says Bjoern Frasch, project manager for specification and design for VIP and executive jet solutions at LHT. “That was another reason for doing this app. If you just show the floorplan with all these options, it is like a big puzzle and I can't imagine how all the customers would understand what everything would look like in the end. So this app shows what it would look like.”

The number of permutations is the result of the flexibility of the center of gravity (CG) ranges of the aircraft. “The Airbus products have sensitive

Custom Interior Products for VVIP Completions



Initial layout of 747-8 Ceiling Panel Assembly at Jormac Aerospace



747-8 Ceiling panel assembly during fit check in full-scale mockup

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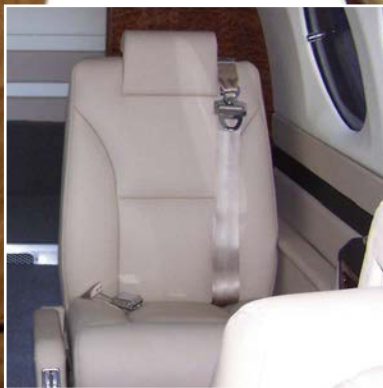
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Contact Tom Newman

M. J. Aircraft, Inc.
262 Airport Road
Anderson, Indiana 46017
800-736-2134
e-mail: mjaircraftinc@hotmail.com

WWW.MJAIRCRAFT.COM

4. There is an app to help customers define their cabin
- 5-6. Different seats produced from the chair platform

WE SPENT A LOT OF TIME MAKING SURE THAT WHAT WE PROPOSED WAS VIABLE

Structurally sound

In April 2014, LHT announced it was bundling all its cabin product development activities into a new Original Equipment Innovation division.

The division brings together more than 80 interdisciplinary employees, led by Andrew Muirhead, previously head of the Innovation unit. All products offered by LHT as an OEM will be developed, planned, manufactured and sold from the new division.



4



5



6

CG, so that was a factor we addressed in developing this concept,” says Löwes. “The deck plan and the options always consider these limits.”

“We spent a lot of time making sure that what we proposed was viable in terms of CG and loads, and that it all fits, is buildable and maintainable,” stresses Karsten Döge, senior sales executive at LHT.

The target market for this product is the single, affluent decision-maker who lives in the gap between serial-production aircraft interiors, such as that of the ACJ318 Elite, and the rarified world of certain VVIP customers. “The market ranges from the ACJ318 Elite to VVIP aircraft where the customer brings his own designer,” says Löwes. “We feel there is a gap

in the market between these two types of customers for the modular concept.”

LHT says the aspects that make the cabin special are below the surface. “The designs are not completely overwhelming and new, but the attachment methods and structural integration are,” says Löwes. “We opened up the box and asked what would be a typical owner-oriented design when it comes to modularity? The outcome is the two concepts we put out at EBACE. A never-before-seen design was not the target here.”

Customers can order wow-factor items such as the steam shower shown at EBACE, but there’s an extra charge for that, as there is for any materials beyond the 35 options offered in the standard catalogue.

- 7. The forward lounge on the ACJ319 concept
- 8. The aft lounge on the ACJ319 design
- 9. The forward lounge on the BBJ 2 concept



While many layouts are available, given the target audience and the attention to CG, they all feature certain similarities. “The main entrance and crew area in every variation is the same and the very aft of the aircraft has the lavatory in the back,” explains Löwes. “In front of that is the master bedroom. In the second half of the aircraft, the VIP lavatory is in the same position.”

Balanced layout Beyond these absolutes, things change. “The aircraft is divided into variable and fixed zones demarcated by archways, which are the defining monuments between the rooms,” explains Löwes. “There are synchronized floorplans left to right and front to back. This takes care of the exit locations, which we have optimized, and helps to distribute some loads. It gives you a good starting position for weight and balance later on. The distribution of the cabinets and the heavier monuments is done in such a way as to optimize the auxiliary fuel tank mass concentration when the aircraft is going toward the maximum take-off weight. It’s always an issue when you create floorplans for narrow-body aircraft.”

The pre-customized cabin is also available for the retrofit market, either the entire aircraft or one zone at a time. “This is advantageous for a client who

Steam clean

LHT has developed a new steam shower, and it is available as a non-standard option on the Leadership Select cabins.

The Aircraft Steam Generator System is a self-contained unit that operates independently of the aircraft’s water system. The company says there were two main challenges to ensuring the shower was a success – they had to eliminate the possibility of steam escaping, and of overheating inside the generator. Therefore, system isolation and sealing were important focuses.

The final product measures 343 x 363 x 439mm and weighs 18kg. Passengers can even add essential oils.



wants to adapt the aircraft for a different use or to cater for an altered lifestyle,” says Löwes. “Customers can expect greatly reduced downtime to convert the aircraft from one zone to another.” Indeed, with much of the installed ACJ and BBJ fleet nearing refurbishment time, and great airline demand for these platforms, retrofit may be the strongest market for LHT’s pre-customized cabin.

Whether a green completion or a retrofit, customers can choose from a variety of IFE and CMS systems that can be controlled by tablets and/or smartphones, including LHT’s own nice system. Other add-ons include monochromatic window shades, the steam shower and queen-sized beds. Overall, the aircraft are optimized with regard to interior weight, seating comfort, stowage volume and the integration of client-oriented features.

LHT plans to install these cabins both in Hamburg, Germany, and at its BizJet subsidiary in Tulsa, Oklahoma, USA. Löwes notes that BizJet currently has the capacity to complete three ACJ318 Elites in parallel and could easily add two pre-customized cabins per year to its existing workflow. “This would be a very good product for BizJet,” he says. **END**

CUSTOMERS CAN EXPECT GREATLY REDUCED DOWNTIME TO CONVERT THE AIRCRAFT FROM ONE ZONE TO ANOTHER

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Airbus and Boeing VIP and VVIP Galleys under construction at Cabin Innovations



Completed turnkey galley for Boeing 747-8

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design directory

Contact details for VIP aircraft interior designers based in North America, including completion centers with in-house design capabilities

AERIA Luxury Interiors

9800 John Saunders Road, San Antonio, Texas 78216, USA

Contact: Chris Mason (vice president of sales and marketing for completions), chris.mason@vt-saa.com, +1 210 293 6925

www.aeriainteriors.com

Aeria Luxury Interiors, a division of VT San Antonio Aerospace, has an in-house design team with a full range of capabilities for aircraft completions and refurbishments. The company says its designers harness advanced technology, such as 3D printing (used in design development, mock-up and custom fabrication), together with a deep understanding of the form and function of VIP aircraft interiors, to compose works that range from airborne palaces to sleek executive environments.



Ascending Designs

2251 Fox Ridge, Frisco, Texas 75034, USA

Contacts: Scott Ohrmundt (owner, designer), +1 214 734 1892; Jeannine Ohrmundt (owner, designer), +1 214 685 9651; ascendingdesigns@sbcglobal.net

www.ascendingdesigns.com

Ascending Designs was founded in 1996 by Scott and Jeannine Ohrmundt. The basis of the company is a group of specialized individuals experienced exclusively in aviation design and completion management. Ascending Designs has accomplished VIP and VVIP luxury interiors, including narrow- and wide-body ACJ and BBJ aircraft. The company's services range from pre-buy consulting and completion management to interior design and project monitoring. Ascending Designs has more than 50 years of combined experience in VIP interiors.



Associated Air Center

8201 Lemmon Avenue, Dallas, Texas 75209, USA

Contact: Patricio Altuna (executive vice president of sales, marketing and product support), patricio.altuna@associated.aero, +1 214 385 3055, +1 972 559 7039

www.associated.aero

Associated Air Center (AAC) has assembled its in-house interior design team over the past three years. The team comprises Julie Mandrell, Karen Cooper, Trung Bui, Ferdi Canapi, Carlos Hernandez, Glenda Palacios, Ken Simmons and Rafael Tapia, who together have almost 130 years of aviation expertise. The team has recently designed interiors for a BBJ 747-8, a BBJ 787 and other BBJ and ACJ aircraft. Authorized by both Boeing and Airbus, AAC offers full completion capabilities for narrow- and wide-body aircraft, including maintenance, refurbishment, modifications and upgrades. AAC's facility provides interior design, engineering and completion capabilities, engine and airframe MRO and ODA certification authority.



Aviation Aesthetics

6 Wilton Road, Westport, Connecticut 06880, USA

Contact: Havilande Whitcomb (owner, interior designer), hbw@aviationaesthetics.com, +1 203 984 2607

www.aviationaesthetics.com

Aviation Aesthetics designs cabin interiors and exterior paint schemes for private aircraft. The firm promises superior execution, achieved through its independence and advocacy for the owner throughout the design, the completion center selection and the installation process.

Aviation Concepts

8932 Falls Hollow Road, Rogers, Arkansas 72756, USA

Contact: +1 214 914 7737

www.aviationconcepts.net

BizJet International

Tulsa International Airport, 3515 North Sheridan Road, Tulsa, Oklahoma 74115, USA

Contacts: Brian Barber, +1 918 281 7474;

Rick Townsend, +1 405 570 3215

www.bizjet.com

BizJet International, Lufthansa Technik's 100% US subsidiary, offers a broad spectrum of services, including VIP interior completions, conversions and refurbishments; MRO; authorized Rolls-Royce engine overhaul; and FBO.



BMW Group DesignworksUSA

2201 Corporate Center Drive, Newbury Park, California 91320, USA

Contact: Jackie Jones (manager, marketing and communications), contact@designworksusa.com, +1 805 499 9590

www.designworksusa.com

Acquired by BMW Group in 1995, BMW Group DesignworksUSA provides creative consulting services to its parent company as well as external clients. Aviation clients include B/E Aerospace, Boeing Business Jets, Dassault Aviation, Embraer, Pilatus and Singapore Airlines.

Comlux America

2910 South High School Road, Indianapolis, Indiana 46241, USA

Contact: Lauri Church (chief designer, interior design), lchurch@comluxaviation.us, +1 317 472 7370 extension 1208, +1 214 695 7426 (cell)

www.comluxaviation.com

Constant Aviation

17515 Engle Lake Road, Middleburg Heights, Ohio 44130, USA

Contacts: John Shirley (director, interiors), Lauren Brocklehurst (interior design), Gus Markou (interior sales); info@constantaviation.com; +1 216 261 7119

www.constantaviation.com

Constant Aviation is an interior completion and refurbishment facility offering in-house design services.

Duncan Aviation

15745 South Airport Road, Battle Creek, Michigan 49015, USA

Contacts: Lori Browning (design team leader), lori.browning@duncanaviation.com;

Patty Spiegelberg (senior designer), patty.spiegelberg@duncanaviation.com;

Kristen Cotugno (senior designer), kristen.cotugno@duncanaviation.com;

+1 269 969 8400

3701 Aviation Road, Lincoln, Nebraska 68524, USA

Contacts: Mary Lee (design team leader), mary.lee@duncanaviation.com;

Teri Nekuda (completions designer), teri.nekuda@duncanaviation.com;

Rachael Weverka (completions designer), rachael.weverka@duncanaviation.com;

Stephanie Kuhn (completions designer), stephanie.kuhn@duncanaviation.com;

Mykel Gossard (completions designer), mykel.gossard@duncanaviation.com; +1 402 475 2611

www.duncanaviation.aero

Duncan Aviation's aircraft interiors include custom designs by professional designers. Capabilities include reconfiguration, updating and recovering interior panels, custom cabinetry, fresh upholstery, custom carpets and paint designs.



Edése Doret Industrial Design

4720 Broadway, New York, New York 10040, USA

Contact: Edése Doret (president), info@edesedoret.com, +1 212 928 5431

www.edesedoret.com

Founded in 1991, Edése Doret Industrial Design is a New York City-based design consultancy initially focused on the design of consumer products, exhibitions and corporate interiors. The firm's first aviation project was the interior design of an Agusta A109E Power, in 2002. Its first fixed-wing project was an Embraer Legacy. Since then the firm has specialized in the design of aircraft and yacht interiors for heads of state, private individuals, governments, VIPs, VVIPs, corporations and airlines. Edése Doret has worked with clients such as Saudi Royal Flight, Royal Jet, Las Vegas Sands Corporation and PATS Aircraft Systems. Edése Doret has developed interiors for Gulfstream GIV, Gulfstream GV, Embraer 135, Falcon 900B, Agusta A109E Power, ACJ319, ACJ320, ACJ340-500, BBJ 737-300, BBJ 757-200, BBJ, BBJ 2, BBJ 747-SP, BBJ 747-400, BBJ 747-8, McDonnell Douglas MD-11ER, MD87 and Lockheed L1011 aircraft. Currently the firm has a staff of 12, comprised of designers, a 3D visualization artist, a materials specialist, a program manager and a press agent.

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16122 Saticoy Street, Van Nuys, California 91406, USA

Contact: nikki@extraord-n-air.com, +1 818 785 2577

www.extraord-n-air.com

Flying Colours Corp

901-120 Airport Road, Peterborough, Ontario, K9J 0E7, Canada

Contact: Kate Ahrens (director, interior design and business development),

kgillespie@flyingcolourscorp.com, +1 705 742 4688

www.flyingcolourscorp.com

Flying Colours Corp's in-house designers offer nose-to-tail design services for new aircraft completions and conversions on all aircraft types. The design team works in a dedicated design suite to fulfill each client's vision, enabling a seamless completion experience for the client under one roof.

GDC Technics

607 North Frank Luke Drive, San Antonio, Texas 78226, USA

Contact: +1 210 496 5614

www.goredesign.com

**Greenpoint Technologies**

4600 Carillon Point, Kirkland, Washington 98033, USA

Contact: Annika Wicklund (director of design), awicklund@greenpnt.com, +1 425 828 2777

www.greenpnt.com

The Greenpoint Design Team partners with clients to create an interior that reflects their individual tastes and requirements. The team oversees the entire completion process from concept development through delivery, to ensure the finished product meets the client's quality and design expectations. The team designs for all Greenpoint companies, working on wide-body, narrow-body and smaller business aviation interior programs. Recent projects include BBJ 787s, BBJ 747-8s, the Aeroloft, other BBJ interiors and development concepts. The photo shows team members Annika Wicklund, director of design; Ashley Moulton, designer; Madeline Tuesley, design assistant; and Marcus Bailie, senior illustrator.

**Infusion Design**

222 Oak Street, Bonner Springs, Kansas 66012, USA

Contact: Sean Elsner (president),

flight@infusion-design.com, +1 913 422 0317

www.infusion-design.com

Infusion Design is a multidisciplinary studio specializing in tailored VVIP luxury aircraft interiors. It has catered for the market for nearly 20 years. Platforms include the ACJ and BBJ families alongside a strong heritage in the OEM and completion center market.

**jcedesign**

7023 Perimeter Road South, Boeing Field, Suite 250, Seattle, Washington 98108, USA

Contact: Jean-Claude Estevenin (owner, senior designer), jc@jcedesign.com, +1 206 304 2840 (cell)

www.jcedesign.com

jcedesign has specialized in VIP, business and commercial aircraft interiors for more than 25 years, serving many heads of state and airlines. The company has created interiors for wide-body aircraft and designed its own seats, for which it holds patents.

King Aerospace Commercial Corporation

4444 Westgrove, Addison, Texas 75001, USA

Contacts: vvip@kingaerospace.com (VIP aircraft);

corporate@kingaerospace.com (corporate aircraft);

+1 972 248 4886

www.kacommercialcorp.com

L-3 VIP and Head-of-State Completion Center

7500 Maehr Road, Waco, Texas 76705, USA

Contact: +1 254 867 2525

www.l-3vipinteriors.com

For more than 25 years, the L-3 VIP and Head-of-State Completion Center has offered a full range of wide-body and business jet interior completion services for VIP and head-of-state customers. Its services include design, fabrication, installation, certification and post-delivery support. The company also prides itself on its expertise in complex technical modifications for both civilian and military aircraft programs. In addition to its interior completion solutions, L-3 offers its aircraft elevator system and Aircraft Threat Countermeasures Solution (ATCS).

Mauricio Cabal Design

10904 Northwest 61 Court, Parkland, Florida 33076, USA

Contact: mcabal@cabaldesign.com, +1 954 340 1332,
+1 954 234 6896 (cell)

www.cabaldesign.com

MBG International Design

1048 Pegasus Drive, Spring Branch, Texas 78070, USA

Contact: Nikki Gledhill (designer and CEO),

nikki@mbginternationaldesign.com,

+1 512 297 4845 (cell), +1 830 885 7078

www.mbginternationaldesign.com

MBG is a boutique aircraft interior design firm. It provides design assistance from initial layouts to conceptual design, as well as design representation during cabin outfitting. The company also works with clients on exterior livery design and in the procurement of cabin service items. Recent projects include ACJ320, ACJ330, Gulfstream and BBJ aircraft.

Patrick Knowles Designs

2030 Northeast 18th Street, Fort Lauderdale,
Florida 33305, USA

Contact: info@patrickknowlesdesigns.com,

+1 954 832 0108

www.patrickknowlesdesigns.com

PATS Aircraft Systems

21652 Nanticoke Avenue, Georgetown,
Delaware 19947, USA

Contact: info@patsaircraft.com, +1 302 253 6372

www.patsaircraft.com

**Point Innovation**

1826 Lakeway Drive, Lewisville, Texas 75057, USA

Contact: Jim Murphy (director of design),

+1 972 315 9207 extension 1338,

+1 561 302 7638 (cell)

www.pointinnovation.com

Point Innovation provides luxury VIP interior design and support for heads of state and international VIP clients. Kip Harkness, president of Point Innovation, brings more than 30 years of aviation interior design experience and has a diverse background in both design consultancies and directing design departments at Bombardier and Galaxy (now Gulfstream). Several of Harkness' designs have won awards.

RWR Designs

2300 McDermott Road, Plano, Texas 75025, USA
(business office)

1621 Camino de Cruz Blanca, Santa Fe, New Mexico
87505, USA (creative studio)

Contact: Rick Roseman (director, founder),

rroseman@rwrdesigns.com, +1 214 415 3492

www.rwrdesigns.com

SDesign

5309 East 7th Street, Tucson, Arizona 85711, USA

Contact: Bruce Shoemaker (owner),

bruce@sdesign.aero, +1 520 661 1333

www.sdesign.aero

SDesign offers interior design, client representation and completion management services for Airbus, Bombardier, Dassault and vintage aircraft.

Spirit Aeronautics

4808 East 5th Avenue, Columbus, Ohio 43219, USA

Contact: +1 866 284 6642 (toll free), +1 614 237 4271

www.spiritaeronautics.com

Strack & Associates

5924 Royal Lane, Suite 180, Dallas, Texas 75230, USA

Contact: cstrack@strack.aero, +1 214 352 8700

www.strackandassociates.com

**Teague**

110 Union Street, Suite 500, Seattle,
Washington 98101, USA

Contact: Chris Pirie, cpirie@teague.com;

info@teague.com; +1 206 838 4200

www.teague.com

Teague has a long-standing history in commercial aviation design. For nearly 70 years Teague has worked directly with airlines, OEMs and suppliers to design everything from custom-branded cabin interiors and architecture to IFE solutions, monuments, dynamic lighting and seats.

TXS Industrial Design

3301 Matrix Drive, Suite 200, Richardson,
Texas 75082, USA

Contact: Tim Terleski, IDSA (president),

+1 972 783 2798 (office), +1 972 898 4021 (cell)

www.txdesign.com

Wendy Ulve Design Associates

2249 Carriage Drive, Rolling Hills Estates,
California 90274, USA

Contact: info@wendyulvedesign.com,

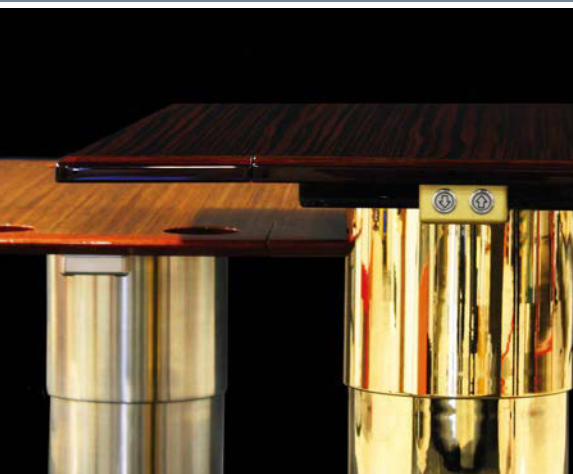
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For a directory of designers based in Europe, refer to the April 2014 issue:
www.businessjetinteriorsinternational.com/magazine_archive.php



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Photo: Glenn Watson



truebrew

Expectations of coffee have gone through the roof, but serving a gourmet caffeine hit in the air is a lot more complicated than on the ground

The growth of café culture in city centers worldwide took hold in the early 1990s, driven by big retail chains. It has turned the simple cup of coffee into a multinational, multicultural industry that is anything but simple.

While there are undoubtedly cultural differences in coffee consumption across the globe, the most successful international brands have managed to establish their name and products across a staggeringly vast

area. The biggest chain, Starbucks, has in excess of 21,000 stores in more than 65 countries. And there are also a plethora of independent outlets.

Coffee has become a big business around the world. Driven by the chains, and helped by the independents, the way we enjoy coffee and what we expect from a cup has undergone nothing short of a revolution. Consumers expect to be offered a choice of espresso, cappuccino, latte, macchiato, Americano or flat white – on even the

1



Photo: Glenn Watson

THERE ARE PLENTY OF COFFEE MAKERS DESIGNED FOR USE ON AN AIRCRAFT

2



Photo: Glenn Watson

Coffee-making tips for flight attendants

- Warm the cup before pouring the drink.
- Pay attention to presentation. For example, offer a caramelized biscuit on the side of the saucer or a chocolate for after dinner.
- Sprinkle chocolate or cinnamon on a cappuccino – but always ask the client first if they would like it.
- Use a stencil to achieve simple latte art.
- Consider extending the inflight coffee menu with some flavored syrups. For example, turn a cappuccino into a caramel cappuccino with a shot of caramel syrup.

1. An example of latte art, which involves making a design in the foam
2. An espresso machine on the ground
3. B/E Aerospace's Gourmet Beverage Maker for aircraft

aircraft, from suppliers including Aerolux, B/E Aerospace, Iacobucci HF, Ipeco and Zodiac Aerospace.

Aerolux's espresso coffee maker is available in 28V and 115V versions. The company also makes other beverage makers, and frequently tailors its products to meet individual requirements, creating one-off VVIP versions of its equipment.

B/E Aerospace is another supplier with a variety of machines tailored for this sector. "We supply machines that produce coffee by the individual cup, machines that produce coffee by the carafe and machines that produce espresso and cappuccino," says Brian Schmalz, director of sales and marketing for B/E Aerospace. "We have machines that use 28V DC power and machines that use three-phase 115V

3



humblest of menus. Meanwhile, artisan roasters have helped to uncover the depth of variety that is available with information about origins, how the roast can affect the taste and the subtle flavors to be found in different beans. Consumers have soaked it all up like a sponge. They know what they like and expect it to be readily available.

The perfect scenario On the ground, serving a superb speciality coffee menu begins with a well-trained barista, a carefully selected bean (or choice of beans) and a traditional espresso machine. The barista has complete control over the preparation and serving of the drink, including what setting to use to grind the bean, ensuring the coffee is tamped correctly, the extraction time, foaming the milk to perfection, assembling the final drink and choosing how to present it.

The world's top baristas are as skillful and creative as the world's top chefs, choosing different beans to create unique flavor profiles, sometimes with the addition of spices and other flavors – hazelnut, orange, cinnamon and chocolate are among the favorites.

The traditional espresso machine is a vital element in this optimum brewing situation. In the hands of a skillful and well-trained barista, it is the perfect tool to create a range of beautiful and delicious specialty coffees. In the hands of an amateur it can be disastrous, producing under- or over-extracted coffee with badly frothed milk.

Inflight machinery Although sadly it is not practical to recreate this ideal scenario in the air, there are nevertheless plenty of coffee makers designed specifically for use on an

Bon Appétit



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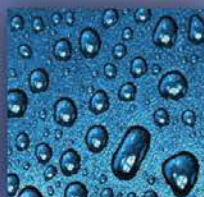


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- Replacement is immediate & reinstallation requires no preparation



Crystal Cabin Award Winner

Aerolux coffee machines

“Aerolux is undoubtedly the founder of quality coffee in the sky, having first entered the market some 20 years ago as the originator of the Nespresso-based and -branded coffee machine, which uses the world-renowned Nespresso coffee capsule delivery system,” says Tony Robinson, executive chairman and CEO of Aerolux.

The most recent innovation to this machine is the availability of a 28V system, which is ideal for many business jet operators. The machine is also available in a range of other voltages to suit all applications and has been installed by many of the world’s leading airlines.

During 2013, the Aerolux coffee machine was overhauled substantially to ensure that it complies with the very latest food safety requirements, which have changed dramatically in recent years. Extensive independent laboratory testing of all the plastic and metallic parts that come into contact with water and coffee has resulted in a new generation of machine. It is guaranteed free from – among other contaminants – bisphenol, a recently recognized toxic chemical that has been found to be present in many plastics, including those that are often in contact with packaged foods and drinks.

“The Aerolux Nespresso machine utilizes a loading system that has been perfected over many years and which in aviation circles has set the standard for reliability,” explains Robinson. “The machine is easy and intuitive to use, compatible with the wide choice of blends available in the Nespresso coffee range, and is easy for cabin staff to clean and remove if needed at the end of flights. It has also been comprehensively tested to withstand extreme cold during an aircraft’s downtime and can, if drained down (a swift process), withstand temperatures as low as -55°C.”

Aerolux has long-standing expertise in customization and as a result its machines can be specified with pretty much any finish to work with interior designs of all colors, shapes and sizes. Customers can specify the fascia to be finished in any color. Even gold plating is available for those who want a more exotic appearance.

The company has customers in every part of the world. They include royal families, musicians and leading corporate fleets. The Middle East is a particularly strong market.



AC power; machines that are plumbed to the aircraft potable water system and machines with a self-contained tank that can be filled with bottled water.”

For espresso and cappuccino, pod or capsule machines are the norm, perhaps supplemented by a filter machine or water boiler. When looked after properly, these machines should last for years. However, one common factor affecting machines on the ground and in the air is misuse. Failure to follow correct cleaning procedures or to de-scale the machine regularly are major causes of problems.

Coffee or tea? Other potential challenges to serving great coffee in flight include the altitude, which is known to have an effect on taste buds, and the training of flight attendants. While the basics of how to operate and clean the equipment installed on a particular aircraft are usually covered, that is often as far as training goes. There seems to be a bigger focus on how to serve tea.

OTHER POTENTIAL CHALLENGES TO SERVING GREAT COFFEE IN FLIGHT INCLUDE THE ALTITUDE AND THE TRAINING OF FLIGHT ATTENDANTS



4. Aerolux's Nespresso coffee machine
5. A B/E Aerospace beverage maker

Dietmar Duller, the founder of corporate flight training company Training Solutions, argues that tea is a more appropriate drink to serve on a business flight, because of its healthy properties and in particular, its ability to help keep the passenger hydrated. “Drinking coffee plays a minor role in business aviation,” he says.

The director of Corporate Flight Training, Yasmin Milner, disagrees: “We give flight attendants detailed training on wines, spirits, champagnes and even teas, so why should coffee be viewed any differently?” she says. “I do think coffee deserves more attention than it currently receives. After all, if a client has a very discerning taste for coffee,

Weird and wonderful coffees

KOPI LUWAK: This is also known as Civet coffee because before being made into coffee, the beans are consumed and excreted by the Asian palm civet.

JAMAICA BLUE MOUNTAIN: Certified by the Coffee Industry Board of Jamaica, this coffee is mild and without bitterness.

ESMERALDA SPECIAL GEISHA: This multiple award-winning coffee is from Hacienda La Esmeralda in western Panama.

GUATEMALA FINCA EL INJERTO: This is one of the smallest and rarest beans in the world.

BLACK IVORY: Another coffee to be consumed and excreted by animals before reaching the menu. The animals in this case are Thai elephants. It's claimed the benefit is that the bean ferments in the animal's system for 15-70 hours, reducing bitterness.



I am sure they would be far from impressed if they were served with over-brewed filter coffee. Having some choice in premium varieties of coffee other than the standard espresso pods and capsules, and a flight attendant with the knowledge to buy the products, advise a client about their choices on board and prepare the drink properly, would be very advantageous and add to the level of service offered."

Altitude sickness Studies by airline catering experts have found that altitude definitely has an effect on the taste and smell of food and drink. "Our taste of all foods and beverages while in an aircraft at altitude is directly affected by several factors – air pressure, cabin humidity, light, sounds, smell and the individual person's taste buds," says Paula Kraft, founder of Aviation Catering Consultants and Tastefully Yours. "The taste of a brewed beverage will also be affected by the water used, just as it is on the ground. As the aircraft increases altitude, the air pressure decreases and water boils at lower temperatures. Higher altitude is also prone to low humidity, which can cause the water to evaporate more quickly during brewing, affecting the strength or bitterness of the coffee."

6



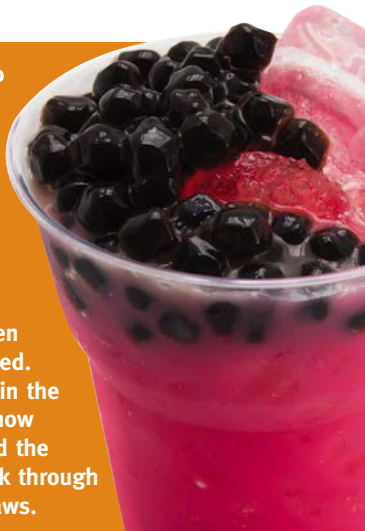
6. A barista at work

Photo: Glenn Watson

THE TASTE WILL ALSO BE AFFECTED BY THE WATER USED

Bubble tea

One beverage trend to look out for is bubble tea – also known as pearl or boba tea. This is a milky tea named for the tapioca balls it includes. It is usually served cold. Other flavorings, including fruit and even ice cream, can be added. Originating in Taiwan in the 1980s, bubble tea is now served in cafés around the world. It is often drunk through large and colorful straws.



Machines such as Aerolux's Nespresso model are designed to counter the effect of altitude on the boiling point of the water by heating the water to the exact temperature required to make the perfect espresso.

Recommendations for inflight catering focus on offering food with extra spice and seasonings, bold and robust flavors and reduced acidity. The same applies to coffee. "The coffee in flight needs to be more robust, with a strong fragrance to increase the perceived taste," says Kraft. "Passengers may also feel they need a touch more sugar, as sweets are less sweet at altitude than on the ground." **END**

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Thanks to our cooperation with Boeing, we are showcasing a BBJ version of the SkyView™ Panoramic Window at MEBA 2014. We are currently evaluating opportunities for other aircraft types, because we believe this concept has the potential to be the new standard in aircraft interior design for both business and commercial aircraft.

We're looking forward to meeting you on our booth no. 600, where you can take a closer look at the SkyView™ Panoramic Window. If you're unable to visit the MEBA, please give us a call on +31 164 618 000. Or send us an email: sales.acc@fokker.com.

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Aircrafting



NBAA 2014

More than 1,000 exhibitors will be showcasing their wares at **NBAA 2014**, which will be held in **Orlando, Florida, USA, October 21-23**. We've picked some of the product and service highlights set to be displayed

1,100

exhibitors showed their wares at NBAA 2013

The new leathers from Moore & Giles come in 80 stock colors, but bespoke shades can also be created



THREE NEW LEATHERS

Moore & Giles will launch an extensive line of aviation leathers. The three new leathers – Ascot, Athens and Apollo – will be offered in more than 80 in-stock colors. In addition, a customization program will also enable designers and completion centers to create an “infinite” array of colors for the full-grain leather.

The company will also be offering more than 40 base colors in suede, with metallic and matte transfer patterns. The range is designed to create endless possibilities, while still meeting FAA flammability standards.

Additionally, the vintage Moore & Giles Airstream showroom will make an appearance at the event. Matt Buckley, senior vice president of sales, and Chad Evans, aviation director, will be on hand to demonstrate the latest products.

Window shades and doors

JBRND will showcase manual and electronic window shades designed for a variety of aircraft and helicopters. The company's newest window is for the BBJ 787-8.

Also debuting will be JBRND's Easy Install Pocket Door assembly. These manual and electric pocket doors come fully pre-assembled. The company says its standard electric model allows 70lb of trim to be added to a 30lb door, including LED lighting features and custom laminates and paint.

JBRND will also show its latest carbon fiber products, used in hi-lo tabletops, instrument panels and other applications; and LED cabin lighting that can be controlled through a CMS or JBRND's iPhone/Android app, using wi-fi. Showers, bidets and tables will also feature.



Corporate helicopter

Bell Helicopter will focus on the Bell 429, for which the company reports growing demand from corporate and VIP transport missions throughout the world. The company recently delivered the 200th of this helicopter type.

IFE deployment arms

Bucher Aerospace will unveil two products – a front-row video arm and a premium swing arm with stowing and deployment features.

The new IFE video arm solutions are modular and are designed to be easier to adapt to customer specifications. The

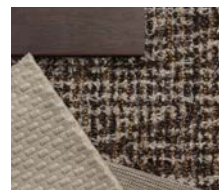


company says the monitors can be adjusted simply into multiple positions. In fact, depending on their requirements, customers have a choice of four latches for deployment release – a standard release lever, an arm latch, a top latch and a push button.

At the show, the new modular front-row video arm will be paired with Rockwell Collins' new 10.1in PAVES on-demand IFE system, while the armrest-stowing video arm will be displayed with Panasonic's 11.1in Elite smart monitor.

Carpet designs

Scott Group Custom Carpets will introduce a collection of carpet designs. Blending updated soft textures with bold patterns, the designs were inspired by the idea of a patina adding layers of color and texture



to a surface, gradually changing it. Through intricate construction techniques, the patterns in this collection are given a distressed appearance to reveal metallics and pops of color beneath the surface, and subtle asymmetries in the textures.



Large mock-up

Bombardier will feature its latest aircraft, including the Learjet 75 and Challenger 350 jets, as well as the Global 7000 mock-up.

The full-scale Global 7000 mock-up, which was unveiled at EBACE 2014, showcases the aircraft's four-zone cabin, large window area and Bombardier Vision flight deck. For more details, see page 22.

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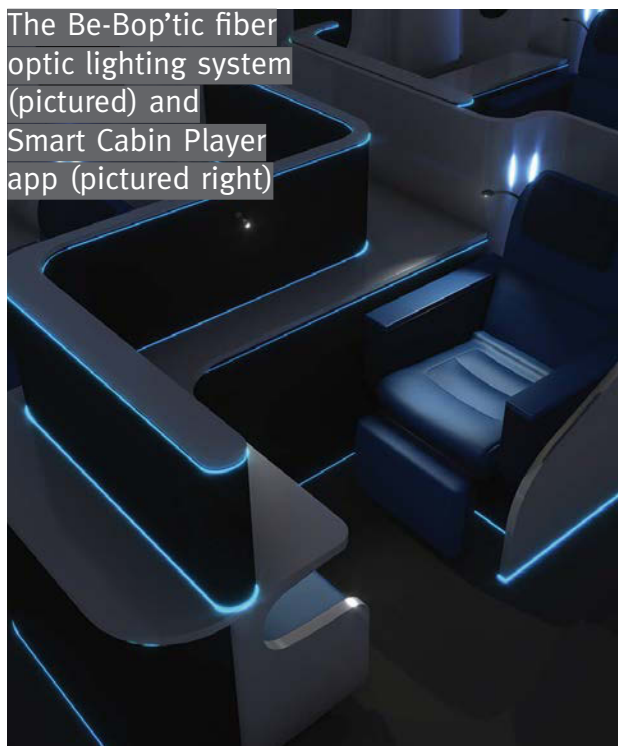
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The Be-Bop'tic fiber optic lighting system (pictured) and Smart Cabin Player app (pictured right)



ENTERTAINMENT APP

PGA Electronic will introduce its Smart Cabin Player app, which will be showcased on the company's 55in Xtra flat screen. This app enables passengers to enjoy all media stored in PGA's Full IP system, which includes AVOD, an HD media player, a USB media player, a moving map, and more. This graphical user interface (GUI) is available for all PGA's systems, including in-seat screens, VTS and large screens. The application is customizable through five defined themes.

The Full IP system now also enables access to interactive games – developed in partnership with DTI – through the IFE. Passengers can play with a USB or wireless gamepad.

PGA will also highlight the fact that Paramount Pictures and Universal Hollywood have approved the company's AVOD system, enabling



customers to enjoy HD early-window movies and music on-demand on screens compatible with PGA's Full HD system. Plus the company will showcase its Be-Bop'tic fiber optic lighting system, which enables cabin designers to play with variable colors and levels of illumination, to create custom scenarios and sequences. The company says that the product is flexible and small in diameter, enabling its integration into any type of mount. It also says RGBW technology enables color homogeneity throughout the cabin.

Interior refurbishment

Duncan Aviation will share details of a new turn-time offering for Falcon 900EX or 2000EX aircraft that need C checks. The company says it can cut seven days off its previous downtime. Operators can choose extra work to be performed with the inspection without increasing downtime. This can include



Falcon wing tank modifications, avionics installations, or interior items.

Increased capacity

Signature Plating will highlight the recent 100% increase in production capacity at its 15,000ft² facility in Cibolo, Texas, USA. In 2013 the company's sales increased by 50% year on year. "To ensure our continued growth, we were able to gain capacity by improving our process flow," says Frank McKnight, co-owner and CFO of Signature Plating.



Leather launch

Townsend Leather will show its new line of full-grain premium aniline leathers, Softina Cowhide. The company says the hides are produced with just enough finish to be nearly homogenous in color, but are made with softer topcoats and fat liquors to create a softer hand.



Softina Cowhide is made to order. Townsend says this is because the raw material is handpicked from the top 1% of hides in terms of quality.

83

fixed-wing aircraft were on static display at NBAA 2013

12

light aircraft and helicopters formed an indoor static display at NBAA 2013



Q&A:

Rhonda Lanier, creative director at Aircraft Interior Products (AIP)

What will you be showcasing at NBAA?

Our ability to provide a full range of interior finishes – including inventoried carpets, specialty fabrics, utility flooring and synthetic leathers. The feature attraction is custom precision-tufted carpets from our carpet mill, White Oak Custom Carpets. From one-off designs to assisting with inventoried items and tasteful coordination of the package, we aim to exceed the requirements of any project, without exceeding the budget.

What trends are impacting your business?

Owners and operators want fiscally responsible solutions, so we have used proprietary manufacturing methods to create value. For example, we are using our 'on the fly' pile height adjustment capabilities to place patterns in areas where luxury is desired, while, in the same carpet, placing a more functional texture under seats and next to cabinetry where clearance is an issue.

Can you detail a recent case study?

Recently, AIP provided a one-stop solution for a Gulfstream IV refurbishment. Our team met with the end customer to help specify the materials. Our customer purchased the materials in one order, we processed it, maintaining color accuracy for each surface application, and were able to deliver on time and on budget.



Flight Display Systems will show 23.8in and 39in UHD LCD monitor prototypes

IFE DISPLAYS

Flight Display Systems will take the wraps off of its ultra high definition (UHD) display prototypes at NBAA 2014. They can display 1.07 billion colors with a maximum resolution of 3,840 pixels x 2,160 pixels. Each will have three HDMI ports and one DisplayPort for video input. They support multiple resolutions from VGA to UHD at 56Hz to 75Hz.

"We were one of the first to market with aircraft-grade HD displays," commented David Gray, president of Flight Display Systems. "Now our team is developing 4K displays and the quality will blow you away."



Q&A:

Kevin Hayes, vice president of sales and marketing at ALTO Aviation

25,425

people attended NBAA 2013, from more than 90 countries

How have your products been used recently?

We are currently installing our Acapella amplifiers on one small and one medium-size jet; one system is designed with cabin audio only and the other with cabin audio and headphones. ALTO audio is now offered as standard equipment on almost all of the major OEM platforms. Demand is also increasing for aftermarket installations as customers realize they can add high-end audio at an affordable price.

What are the challenges in creating great audio?

Aircraft require very small and light loudspeakers, and efficient amplifiers designed to meet the strictest qualification requirements. ALTO approaches the challenge of installing loudspeakers in the optimal locations by working closely with our OEM and MRO customers. This ensures that each installation is customized and executed to provide the maximum level of performance. ALTO engineers visit the aircraft just before delivery to perform a complete acoustical survey and custom tuning of the system. Often the end-customer is involved in the process.

How rapidly is technology developing in this sector?

The consumer market is surging with new technologies every day, and customers want to be able to listen to their personal media devices on board. Our commitment is to make this integration as simple and efficient as possible. ALTO is constantly researching and developing new lines of products to better serve every customer's needs.



Expanded palette

Garrett Leather will show its Caressa and Avion aviation leather collections, to which it recently added a number of new colors. The Luxury Leathers range includes colors inspired by champagne, diamonds, private jets, pearls, gourmet cheese, cigars, cordials, chocolate truffles, show horses and caviar.

The company says the Luxury Leathers offer a soft hand and durable finish. All these colors are in stock and available for immediate shipment.

Refurbishment services

Air Capital Interiors of Wichita, Kansas, USA, will celebrate the start of its second year in business. Since it announced its opening at



NBAA 2013, the company has provided refurbishment services for more than 60 aircraft, spanning more than 25 models – ranging from single-engine piston aircraft through large-category business jets.

Audio systems

Alto Aviation will demonstrate its audio systems in three mock-ups: a large VIP cabin; a medium jet cabin; and a small jet cabin. In particular, the company will highlight its new Acapella series amplifiers. The product supports four- and eight-channel high-powered loudspeaker outputs, six headphones and discrete control inputs. Alto proposes it as particularly suitable for small aircraft that do not have IFE systems installed. The installation has been simplified to enable customers to interface with the legacy IFE systems with minimal changes.



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INAIRVATION

INTEGRATED CABIN INNOVATION



Lufthansa Technik's niceHD system, installed on a Challenger 350 (pictured), and chair (pictured left)



IFE AND SEATS

Through its cooperation with IDAIR (a joint venture between Lufthansa Technik and Panasonic Avionics Corporation), Lufthansa Technik's Original Equipment Innovation division will feature a new content media service offered on all niceHD-equipped aircraft.

In addition, Original Equipment Innovation will show its multipurpose chair. The seat is based on one certified

structure, but can be customized in a large variety of shapes and sizes to fit individual tastes and needs.

The new Original Equipment Innovation division has more than 80 interdisciplinary employees, led by Andrew Muirhead.

Lufthansa Technik's joint venture with LIST components and furniture, known as Inairvation, will also be featured.



Adjustable table

MSB will showcase its infinite-height single-pedestal conference table, which has been selected by a second OEM for a major platform, to be unveiled at the show. The table

is supplied with a plated pedestal and green, ready-to-finish tabletop. It is designed to address issues such as veneer warping, insert pulling and final installation adjustments. MSB will also display samples of china, crystal and flatware inserts.



Metallic leathers

Edelman Leather will show the new colors it has developed for its Metallic Dream Cow line of leathers. There are four new standard colors, inspired by ores, iron and minerals – Whitestone, Brushed Steel, Pearl and Seal Rock. The company has also created some custom colors, which are more future-

looking – Coastal, Magenta, Sea Glass, Glow and Caipirinha.

BBJ 787-9 design

Greenpoint Technologies will debut a 1/20th-scale model with a new interior design for the BBJ 787-9. The Azure interior is detailed on page 16. The company inducted its first BBJ 787



in 2014 and is due to welcome a second in 2015. Fellow Zodiac Greenpoint companies Greenpoint Aerospace and Odyssey Aerospace Components will also be exhibiting.

1,000+
exhibitors will be
at NBAA 2014



Q&A:
Mario Sevigny,
co-president of MSB

What will you exhibit?

Hi-lo tables, china, crystal and flatware inserts, as well as our manufacturing capabilities. We will be unveiling our latest conference table. In development for two years, this table incorporates the best of MSB's current table functionality, stability and performance. We have added features developed with our latest OEM client.

Can you detail a recent project?

Recently we provided a versatile solution to protect multiple patterns of china and crystal in an impressive dining room. With a relatively short lead time, MSB provided a layout design incorporating 20 individual inserts for multiple china patterns. MSB coordinated with the completion center, the aircraft owner, as well as the china supplier.

How are your products being used?

Customers are insisting on highly functioning products that can withstand real-world abuse. We've met the growing desire for single-pedestal table models that are designed to maximize foot clearance, while being capable of withstanding the weight of being used for berthing and impacts. These tables operate smoothly, with minimal effort, a common demand from aircraft owners. We are also investigating new ways of incorporating smart technology, and allowing for more customization.

Nearly
100
aircraft will be
on the static
display at
NBAA 2014



Stevens Aviation finished installing this custom S-shaped galley in September 2014

INTERIOR REFURBISHMENT

Stevens Aviation will highlight its wide range of services, which include aircraft maintenance, modification and refurbishment; aircraft sales; flight services; and fixed-base operations. The company recently custom-built an S-shaped galley for a Bombardier Challenger 601-3A, replacing a standard straight galley, because the customer wanted more room in the entryway.

Stevens Aviation specializes in servicing Beechcraft, Bombardier, Cessna, Embraer, Gulfstream, Piaggio, Pilatus and TBM aircraft.



Q&A:

Bill Weaver, CEO of Custom Control Concepts (CCC)

25,000

attendees are expected at NBAA 2014

What technologies and trends are driving change?

Customers want system flexibility and large bandwidth to support video streaming and 4K content, so CCC is introducing an enhanced fiber optic architecture. Another trend is 3D printing, which we use for R&D, prototypes, mock-ups, and in production. 4K ultra HD, curved and smart displays are also having an impact – we are developing 4K ultra HD systems and curved displays and introducing touchscreen technology on large-format displays. Customers also continue to request smaller and lighter systems with fewer boxes. We will display monitors at NBAA that deliver weight savings of 30-50%, plus our SkyOne product, which combines the equivalent of 10 boxes in one.

What will be the next frontier for IFE/CMS?

The next frontier is greater connectivity, probably in ways that have never been considered. One of our latest products, Direct Connect, allows any device with audio/video out (for example, phones and tablets) to display content over the IFE system. The ability to control the cabin using voice commands is not far off, and by recognizing individuals, preferred settings could be deployed automatically. Motion control and wearables are other areas where we see potential.

How do you meet customer expectations?

Our VIP clients have exquisite taste and specific requirements for their IFE and CMS. Everything from graphics and user interfaces on the iPlane app, to bezel designs and plating, software configuration and project-specific hardware is customized.



IFE giveaway

Custom Control Concepts will give away a personal IFE setup to promote its LinkedIn, Twitter and Facebook social media pages. To enter, visitors can simply like or follow any or all of the pages. One winner will be selected from CCC's followers and notified via social network on the last day of the show.

The company will also display its latest full VIP IFE and CMS product lines. This year it is adding new BBJ 787 technologies, SkyOne and Sky-Fi wireless ICS systems for VIP helicopters and light jets. Products include lightweight monitors, large-format touchscreen displays and the new 'all-in-one' SkyOne IFE/CMS system. The company says these products offer big weight reductions through optimized design and box count reduction.



New leadership

Sabreliner Aviation will introduce its new president, Greg Fedele. Located near St Louis, Missouri, USA, Sabreliner Aviation offers airframe and engine MRO, paint, interior refurbishment, and avionics repair and installation services.

Testing facility

Skandia will highlight its new smoke and heat release lab, which offers flammability, smoke and heat release testing.

Skandia also plans to unveil its new 9g EC (Engineered Comfort) seat foam replacement program, which is specifically for aircraft certified under 9g parameters.

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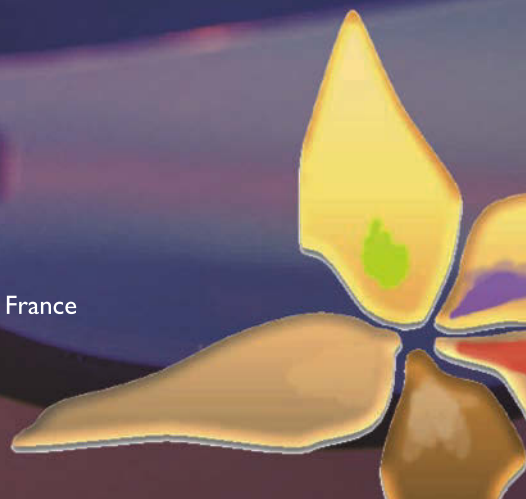
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MEBA 2014

Middle East Business Aviation (MEBA) will be held in a 72,000m² space at Dubai World Central in Dubai, UAE, on December 8-10, 2014. More than 8,000 visitors are expected. Here are some of the innovations set to be on display.

7,549

people from 84 countries attended MEBA 2012

Fokker Services aims to have its SkyView Panoramic Window modification certified by the second half of 2015



PANORAMIC WINDOW

Fokker Services will show the SkyView Panoramic Window, which is designed to make the most of the view from an aircraft. The concept was introduced to the public at EBACE 2014 on a cabin section mock-up based on the BBJ1. The window will be 54.5in wide, slightly larger than three typical window bays, and 19.5in tall, approximately 30% taller than existing windows. Four SkyView windows can be installed on each aircraft – for example, one on each side of the dining area, and one on each side of the bedroom. Installations don't have to be perfectly symmetrical, and single application is possible.

The window is being developed with Boeing, so will be offered first to owners and operators of BBJ 737-series NG aircraft. Fokker Services is also exploring other platforms with Boeing, such as the BBJ 777 and BBJ 747, and intends to explore ACJ market opportunities as well.



Interior upgrades

Ruag Aviation will show new solutions for aircraft cabins, such as the Astral Design Series concept, developed by Yasava. This features a day lounge that converts into a bedroom, with a double bed and access to a lavatory with a full-size shower; up to eight 16g electrically articulating and swiveling aiana seats, convertible into 2m-long beds; and a galley.

Ruag Aviation will also share its adjustable LED lighting systems and polarized window shades, as well as its abilities in the field of wireless CMS and IFEC integration.



Training program

Satcom Direct will announce a new training program consisting of technical, operational and commercial courses available for all customers via classroom, e-learning,

webinars and lab-based training. The company offers training classes and technology seminars on industry trends, Inmarsat and Iridium networks, hardware configuration and troubleshooting. Customers can request training on Satcom Direct's portfolio via sales/support teams.



Site expansion

Flying Colours will talk up its expanded capabilities following completion of the first of a three-phase expansion project at its headquarters in Peterborough, Canada. The new hangar enables work on

narrow-body business jets and buoys up the company's increasing special-mission capabilities.

Flying Colours has already delivered its first special-mission CRJ ExecLiner conversion – which combined medevac options with a charter configuration – to the Middle East, and will be promoting this expanding area of its business to delegates. The company has completed 11 of these conversions globally.

The team will also detail its expertise in connectivity. In late 2013, Flying Colours was appointed as an authorized Honeywell distributor, enabling it to include Honeywell's Ovation Select CMS in its completion projects.



Design and completion

AMAC Aerospace – a completion, MRO and refurbishment provider – will promote its bespoke design services and expanding maintenance offering.

"The Middle Eastern region is particularly important for AMAC, as much of its expertise extends to wide-body aircraft, which are very popular in the region," says Mauro Grossi, chief financial officer at AMAC.

AMAC will also detail its maintenance services, which include heavy checks and inspections, modifications, major overhauls, AOG requests, and avionics repairs, installations and upgrades.

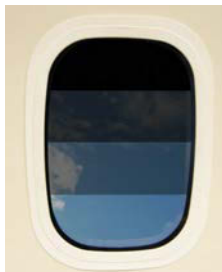


Boutsen Design's display will include products by Loro Piana Interiors (far left) and a glowing cushion (left)

DECORATIVE ITEMS

Boutsen Design, which is co-exhibiting with Boutsen Aviation, will highlight its collaboration with Loro Piana Interiors, an Italian supplier of fine cashmere and wool fabrics. The company will also display accessories, gifts, tableware and comfort items, to include the latest Loro Piana Interiors collection.

Meanwhile, a bespoke product that has generated a great deal of interest recently, especially from Middle Eastern clientele, is a customizable 'glowing' cushion (pictured covered in a signature Hermès fabric). The glow is provided by fiber optic lights powered by a battery pack, all concealed inside the cushion. Cover fabric and color customization of the cushion are available.



Windows and IFE

Vision Systems will present shading systems including its latest electronically dimmable window, Nuance. The window has zones that can be controlled independently. Each section of the window dims in less than five seconds from completely clear to fully dark.

The company will also present its scalable and customizable IFE system, Visi VIP. Various configurations are possible with a single box and multiple screens. A connectivity option enables internet, email, video conferencing and smartphone use over VoIP (through a Satcom 1 receiver). Options include HD support.



Refurbishment services

TAG Aviation will promote its maintenance and engineering services, which it offers in six locations – Geneva and Sion in Switzerland, Farnborough in the UK,

Madrid in Spain, Paris in France and Lomé in Togo. The company is certified to work on more than 60 types of aircraft. It offers four core services – airframes, avionics, troubleshooting and ramp services – and 10 specialist workshops, with services such as interior refurbishment, paint and logistics.

In January 2014, TAG Aviation, as a main shareholder, acquired the whole capital of Burnet Interior, a company based at Geneva Airport that has specialized in aircraft cabin refurbishment and modification for almost 50 years.

TAG Aviation's maintenance team in Geneva is currently working on the full interior refurbishment of a Global Express and Falcon 900, and also has a Challenger and other small projects on order.

385

exhibitors
showcased
their offerings
at MEBA 2012

Interior refurbishment

Marshall Aviation Services will make its MEBA debut, showcasing its interior and exterior refurbishment services. The company can work on aircraft ranging from midsize jets to Global and Gulfstream-sized aircraft, while its parent company caters for larger aircraft, from the BBJ737 to wide-body airliners.



Facility expansion

Associated Air Center (AAC) will highlight its completion, refurbishment and maintenance services. In January 2014, the company signed its first BBJ 787-8 custom interior completion contract with a head of state. AAC expects the BBJ 787 to arrive at its facility in Dallas, Texas, USA, later in 2014.

AAC has also been investing in facilities and expanding its hangars to accommodate current ACJ330 and BBJ 747-8 projects. The investment includes the addition of a 7,200ft² mobile tail enclosure, and an extension of its wide-body hangar to provide full cover to the largest VIP completion projects.



VIP charter

Comlux will highlight its VIP charter division, Fly Comlux. In May 2014, Fly Comlux signed a management contract for an ACJ318 based in the Middle East.

"Comlux has been established in the Middle East since 2010 and we already have several aircraft based in the region, such as the BBJ 767 and the ACJ320," says Andrea Zanetto, CEO of Fly Comlux.

The group's other services include aircraft management, sales and acquisition; cabin design and completion; and maintenance and engineering.

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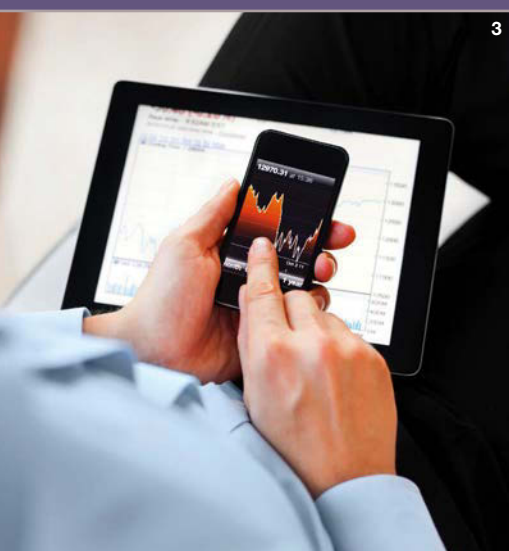
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informed choice

Coverage, capabilities and future growth should be the key considerations when choosing onboard connectivity, according to TrueNorth

1-3. TrueNorth's Simphone OpenCabin solution enables inflight voice, fax, wi-fi, email and mobile connectivity services



In recent years, the definition of onboard communications has changed, according to Mark van Berkel, CEO of TrueNorth Avionics. "In the past, making a call while flying was a big deal," he explains. "Now with personal devices, and applications like social media driving passenger behavior, inflight communications have broadened to include both information and entertainment. IFEC is the latest buzzword for this topic."

For many business jet operators, inflight connectivity has become a requirement. "The value lies not only in passengers' ability to stay connected and effective, but also for emergencies," says van Berkel. "Business jet passengers and crew have come to expect connectivity that mirrors their offices and homes, and luckily, technology has leapt forward to offer this experience."

Selecting a system that fits the needs of the owner, passengers and crew can be difficult – the market offers many solutions. However, van Berkel contends that there are three main considerations – the coverage area, system capability, and opportunities for future growth. "Focusing on these issues will help designers lead their clients to a better-informed decision," he says.

One of the first things to ask the customer is where the aircraft will fly. Today's aviation connectivity marketplace offers a broad range of systems, including air-to-ground (regional) and satellite-based (global and regional) solutions. "Long-range aircraft flying oceanic routes generally require satellite systems with global coverage," says van Berkel. "Other regional missions will benefit from air-to-ground or regional satellite systems. Popular global satellite-based systems include offerings from Iridium and Inmarsat. But designers need to remember that the connectivity landscape is constantly changing, with new systems – both satellite and air-to-ground varieties – and the associated onboard equipment evolving."

Once the designer has determined the aircraft's mission, van Berkel says they need to understand passengers' needs and lifestyle.

"Do they need internet access, fax, telephone or streaming media?" he asks. "Will they need wi-fi? Do they expect to use their own device? How many users will be on the system at any one time? Understanding what it is the passengers want to do during flight is key to selecting a suitable system." He also earmarks customization opportunities as another consideration. "Tailoring the system and its components – for example, handsets – to complement the cabin interior is important in high-end completions for VVIPs."

In terms of the future, van Berkel concedes that no-one knows exactly how business jet passengers' expectations of connectivity will evolve. "But designers can make choices today that will make the future friendlier when it gets here," he adds. "Helping the client select a system that is inherently future-proof, that allows the addition of new capabilities via software, versus a complete rewire of the aircraft, means the client will see a much greater return on their inflight connectivity investment over the long haul."

Finally there is the issue of airworthiness. "Giving the client's chosen installer the ability to get the system on the aircraft easily, with room for future growth, is important to a great communication system," says van Berkel. "A recent report suggests that most, if not all, new green aircraft have some type of connectivity on board, but the designer may be in the position of replacing a system. Choosing the right aftermarket solution for the client makes for effective, satisfied passengers, and happy aircraft operators."

TrueNorth Avionics

Reader Inquiry No. 501

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latest leather

An ink-resistant version of Ultraleather and customization options for Ultrasuede are the latest developments from Tapis

1. Ultrasuede, which can now be customized with patterns produced by laser etching
2. Ultraleather, which now comes in an ink-resistant version



1

Custom-matching capabilities have been offered by Tapis for many years. The company is also always pursuing innovations through research and development, based on feedback from customers. One of its recent developments is an ink-resistant version of its Ultraleather range.

Ultraleather Pro is designed to be supple and soft to the touch, while also offering enhanced ink and stain repellency, and antimicrobial protection. The stain-resistant technology is incorporated directly into the polyurethane manufacturing process rather than added after production, which the company says translates into permanent resistance throughout the life of the product.

Ultraleather has been produced since 1966, using polycarbonate resins. "Each product undergoes rigorous hydrolysis testing (as per test methods ISO 1419 Method C and ASTM D 3690-02 se. 6.11), ensuring that it meets our premium standards for durability, as well as heat, moisture and UV resistance," says Jason Estes, director of sales at Tapis.

Ultraleather is designed to be much lighter than traditional leathers, the aim being to reduce fuel consumption and costs. "There is also less shrinkage than with traditional leathers," says Estes. "The product offers 100% yield. In

addition, Ultraleather maintains a consistent color and texture throughout the entire production run."

Tapis has also recently developed the ability to customize Ultrasuede through laser etching and resin printing. The custom laser-etching process adds a pattern to the fabric using a laser, without requiring a screen or roller for printing. "This laser system has been designed to transform Ultrasuede to fulfill clients' visions, and the technology guarantees extraordinary results without compromising the quality and durability of the product," says Estes.

The laser process can be used on the full width (54in) of Ultrasuede in a continuous mode from roll to roll. The average roll size is 33 linear yards. The process can even be used to duplicate a pattern from a photo. "There is no environmental impact, as no water or chemical products are necessary to run the system and no waste is produced that requires disposal with special processing," adds Estes.

Meanwhile, the Ultrasuede resin capability involves using screens and various resins to control multiple colors and detail. "As with laser etching, this gives designers an open canvas with which to work," says Estes.

Headquartered in Armonk, New York, USA, Tapis has another facility in Dallas, Texas, USA, as well as a distribution network that spans the globe. The company is a qualified vendor for Airbus, Boeing, Bombardier, Cessna, Dassault, Embraer and Gulfstream, as well as completion centers including Duncan Aviation and Jet Aviation. Tapis's operations are certified to the AS9100 and ISO 9001 International Quality System standards.



2

Tapis

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Meeting the demand for constant connectivity in an aircraft is a specialist job, says Satcom1

"Access to high-speed internet, emails, corporate virtual private networks, phone, fax and other business tools are increasingly considered must-have services for corporate aircraft," says Karina Larsen, co-founder and vice president of partnerships at Satcom1. "But a business jet, which might travel at 42,000ft and 480mph, is a far more challenging environment for broadband than a home, office or even a moving car. Sustaining connectivity at that speed and altitude, while retaining quality despite electromagnetic emissions from various sources in the aircraft, is not easy."

However, it's this challenge that created an opportunity for companies like Satcom1 – satellite communication service providers for business jets. "I have witnessed the emergence of broadband connectivity during point-to-point flight, and some of its failures," says Larsen. "I saw that the business aviation industry needed a company that could act as the glue between the hardware installer, satellite provider and airframe manufacturer, a company that could help these parties deliver a rich, full-featured communications solution."

Satcom1 provides not only airspace (Inmarsat, Iridium, Ku-band and cockpit datalink services), but also a cabin software suite called AvioIP. This is the aircraft's link

between the aeronautical local area network (LAN) and the wide area network (WAN), designed to deliver stability and reliability, enhancing other systems' provision of internet access, email, video conferencing, TV streaming and other services. The router platform handles a range of tasks – steering the onboard network, profiling and also providing redundancy if the aircraft is equipped with a back-up satcom system.

The AvioIP license is built up of modules that are chosen by each customer. It is in use on aircraft ranging from King Airs used by coast guards, to BBJ 747s and ACJ340s used by heads of state.

"The first satcom system was introduced in 2002, bringing internet and email on board aircraft, and that was a defining moment in aviation," says Larsen. "Many aircraft purchases resulted from that development; it changed how jets could be used."

Today, Satcom1 delivers customized communications solutions to more than 800 terminals in 50 countries, in 10 languages. "The demand for satcom solutions grows year by year," says Larsen.

Satcom1 Reader Inquiry No. 503

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1-3. Satcom1's customers include sheikhs, presidents, royalty and businesspeople, as well as European government and military institutions

streamtime

KID-Systeme's latest product is designed to ensure passengers can use their personal electronic devices in the air as they do on the ground

1-2. SKYfi packages can include internet, phone and PED streaming services

In 2013 KID-Systeme launched its SKYfi brand, a software application based on the Airline Network Architecture (ALNA) connectivity platform pioneered by Airbus and KID-Systeme in 2007. SKYfi is available in packages ranging from simple GSM telephony and data systems to top-of-the-line systems offering telephony, internet and the ability to stream content to personal electronic devices (PEDs).

Modules include SKYfi Club, which enables content to be streamed to PEDs, providing access to IFE content such as films, e-books and e-magazines.

SKYfi Web provides a wireless local area network (LAN) in the cabin, which passengers can use, via wi-fi, on their PEDs. The system can connect to the ground using existing satellite equipment.

SKYfi Phone enables mobile phone use, including calling, SMS texting and use of GPRS data, via a multiband network in the cabin.

SKYfi Geo enables passengers to follow the flight's progress in real-time.

The SKYfi Services module gives 24/7 access to support staff, who are there to answer queries and iron out any issues. In addition, KID-Systeme operates service centers in Buxtehude, Germany; Beijing, China; Dallas, Texas, USA; Seattle, Washington, USA; Dubai, UAE; and São Paulo, Brazil. Each center provides full servicing and 24/7 spares facilities and aircraft-on-ground support.

"SKYfi provides a seamless transition from ground to air for passengers using smartphones, tablets and laptops, in an age when they expect instant and constant access to social networks, entertainment, infotainment and information," says Manfred Brunke, product manager, connectivity, at KID-Systeme.

SKYfi has been chosen by more than 40 airlines; in fact 500 shipsets are flying. System security includes segregation of domains and connected systems via routing, VLANs, VPN, IDS and firewall.

KID-Systeme also offers an in-seat power and cabin power management system called SKYpower, which entered the market in 1999. The company says both SKYfi and SKYpower can be installed by STC on most aircraft types. "SKYfi's lean system architecture features certified hardware and uses different communication interfaces, making it very flexible," says Brunke.

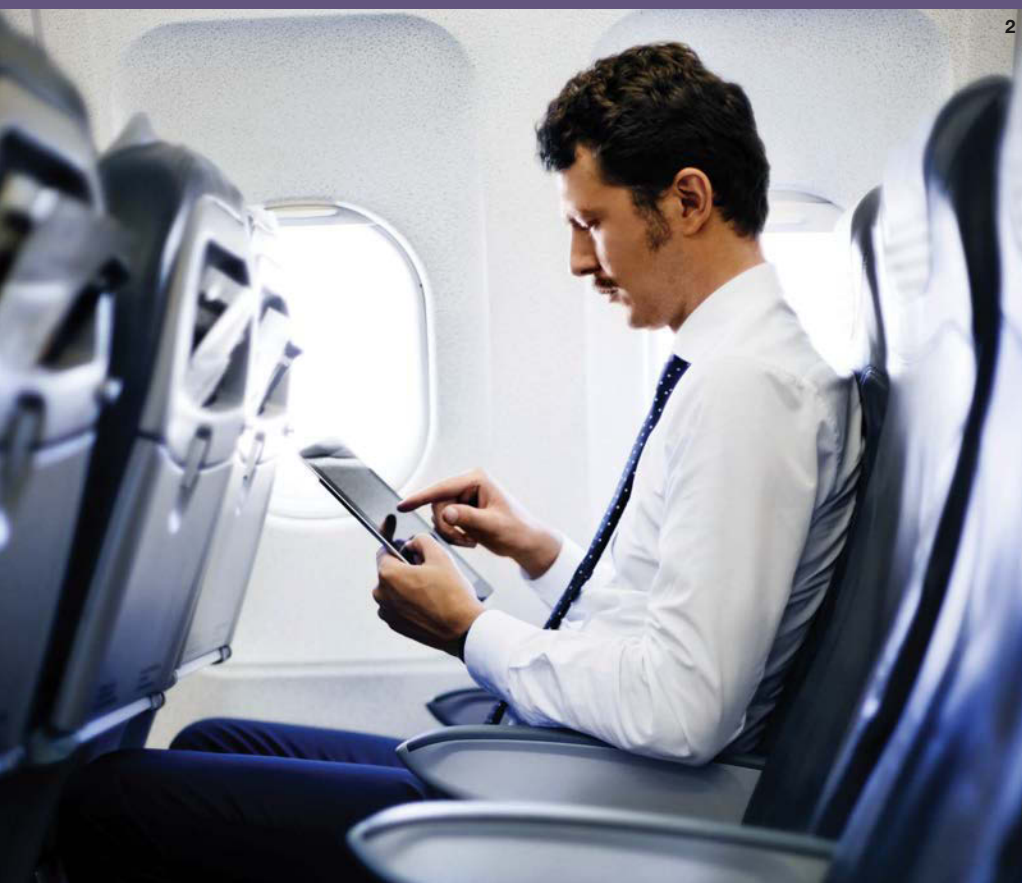
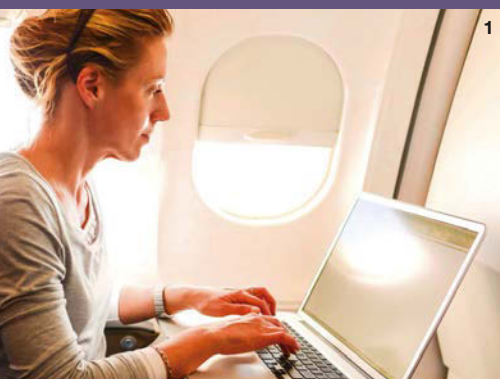
KID-Systeme is a 100% subsidiary of Airbus but operates as an independent company. It designs and makes its products at its headquarters in Buxtehude.

KID-Systeme

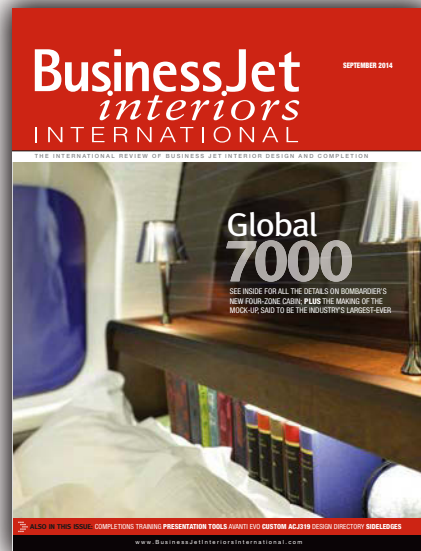
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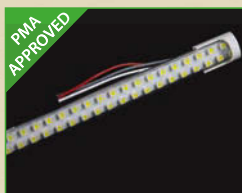
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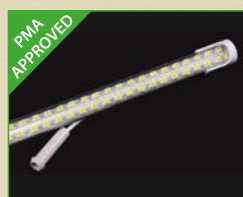
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moving pictures

3D Viz is now catering for designers who need renderings urgently

1. Ascending Design's BBJ lounge proposal being rendered at 3D Viz
2-3. The final images



For about a year, 3D Viz has been implementing a service specifically designed to attack the problem of rush jobs. The company invites designers who need renderings 'yesterday' to pack their suitcases with material samples and head down to its facility in Miami, Florida, USA. There, the company says the designer can design the customer's aircraft in almost real time, working with a team of 3D professionals and the latest computer technology.

The designer – and even the customer – can work side by side with 3D artists to produce renderings in a few hours or days. The company says that compared with the traditional method – whereby a design is completed and then sent to a rendering facility – this approach saves a lot of time. The designer can even keep on working on other parts while monitoring the progress of the renderings.

One designer who has already used the service is Jeannine Ohrmundt of Ascending Design. She received a call from a customer on a Friday, asking if she could produce a design and renderings for the following Monday. She took a flight from Dallas that afternoon, arriving at Miami International Airport the same night. 3D Viz's facility is just 15 minutes from the airport. By the Saturday morning Ohrmundt was working with a team of three artists. By the Monday, a design and renderings had been

created for a BBJ lounge. Her customer had the renderings in his hands by the Tuesday morning.

In other instances, 3D Viz says its services are useful to designers who are handling clients that are having a hard time deciding on materials, as it is geared up to host customers. "We have a dedicated customer area where both designers and owners can come and see changes being applied, make comments and see the results in real time," says J P Magnano, director at 3D Viz. "Also, the location of our office is ideal for customers who need to get on with their lives quickly. We are right on the I-95 off-ramp, minutes away from basically everywhere in Miami. Plus, our building has all the amenities usually found in larger facilities, like valet service and restaurants."

In one case, Dassault Falcon Jet designer Kingsley Simendinger had an undecided Falcon 900 customer. The aircraft was ready for a new interior to be installed, but the materials were not yet selected. As the client was based in Miami, he came to 3D Viz's customer facility and worked directly with an artist to resolve the issue in a couple of meetings. The customer and his family were able to see, on a large TV, the result of each color scheme as it was applied, and were able to comment and ask for changes on the fly. When the final few designs were decided upon, the client took home large glossy prints.

3D Viz

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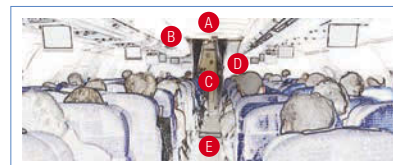
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oldandnew

A new generation of business fliers is being catered for at Moore & Giles, with extra colors and customization alongside more traditional options

Luxury leather company Moore & Giles is making a major investment to meet the demands of a new class of younger business travelers. This autumn, the company will launch a new line of three aviation leathers – Ascot, Athens and Apollo. These leathers will be offered in more than 80 in-stock colors. In addition, a new customization program will provide an infinite array of colors.

“Designers and completion centers both want something fresh, something new and creatively forward-leaning,” comments Matt Buckley, senior vice president of sales at Moore & Giles. “That’s where we are focusing; on offering a broad range of exquisite natural leathers that will influence the design process.”

The company has noticed a shift away from beige and gray. “In addition to comfort, aesthetic appeal and colorful design, younger jet travelers crave exclusivity,” says Buckley. “They are looking for pieces that evoke an emotion and demand a response. Thus Moore & Giles offers more than 40 base suede colors with metallic and matte transfer patterns, creating endless possibilities, while still meeting aviation testing requirements.”

The company’s goals are not only to offer the highest quality and luxury in aviation leather, but to inspire through color and texture – to be a design resource for aviation interiors. It is also preparing to offer swift service. “Our aviation clients can expect fast turnaround on custom colors with the launch of this program,” says Chad Evans, director of aviation at Moore & Giles.

For the traditionalist, however, beige and gray have been the long-standing go-to. Keeping with the clean look and fresh appeal of neutral shades, two-tone leather has been a popular compromise.

“Our goal is to offer an assortment of neutrals with fashion-forward colors, textures and designs that complement them for a touch of added luxury,” says Brooks Morrison, vice president of product design and merchandising at Moore & Giles. “Many of the company’s more fashion-forward leathers can be treated to meet aviation technical specifications – a key differentiator since aviation designers are beginning to diversify their portfolio and infuse aircraft interiors with more innovative elements of design.”

The company also emphasizes that business travelers will not compromise quality for color. Moore & Giles has more than 80 years’ experience in the natural leather industry. “The company understands the expectations of the private jet business traveler and we will provide the extra attention to detail to match the expectation with the experience,” says Sackett Wood, president of Moore & Giles. “In leather, as in most businesses, there is often a fine line between contrived and authentic. We believe our focus on producing the finest leather in the world is an authentic endeavor that expresses our passion for what we do.”

Moore & Giles **Reader Inquiry No. 506**

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1-3. Moore & Giles' new ranges include transfer patterns and textures



neatseats

New certifications, customers and product developments are keeping seat and divan manufacturer AST busy

1. A power-assisted seat from the Next Generation range
2. A Next Generation electric seat
3. A Next Generation divan



1



2

At the end of 2013, Aero Seating Technologies (AST) completed certification and delivery of its new VIP electric seat for the ACJ319 platform. The project also included the delivery of forward-, aft- and side-facing divan units configured in an L-shape.

Earlier that year, AST delivered VIP seats for the BBJ 757 platform. These boasted vertical lift, in-arm phones and IFE controls. The company continues to deliver additional shipsets for this platform.

AST also provided 16g seats and divan units to Comlux Aviation in 2013, for a CRJ-200 VIP conversion. Another big customer is Embraer Executive Jets: AST is now supplying a complete set of cabin seats and divans for the Lineage 1000E. As of September 2014, AST had delivered five Lineage 1000E shipsets. The company is also scheduled to deliver a complete shipset of seat and divan units to Altitude Aerospace, for installation on a BBJ.

AST offers a wide range of certified 16g products featuring vertical-lift and full-flat berthing. "We continue to enhance our products so we can offer the ultimate in comfort and flexibility for passengers," comments Pete Perera, president of AST. "We recently introduced several new features to our Next Generation family."

This product line features a fully electric seat with wireless iPad controls for seat movement and optional features such as a massage system; and an electric-assisted seat with touchpanel controls for seat movement and optional comfort features including an audio-response massage system and passive cooling technology combined with heating elements.

"Our products are certified for business jets as well as narrow- and wide-body airliners," says Perera.

The 16g and 9g divans are available in single-place and two-place modules and can be combined to offer however many places are required. "The divan is highly flexible in terms of installation," comments Perera. "It can be installed in various aircraft platforms and in many different configurations. The cushion designs are also flexible, to meet various upholstery requirements."

The divan also offers a stowage drawer and compartment with doors. So as not to obscure cabin windows, the shoulder harness is fixed at a height of 34in, even in TTOL mode.

Aero Seating Technologies

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3



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rapid response

Quick-change medical interior solutions maximize operational efficiency, says Spectrum Aeromed

1. The Spectrum Aeromed team at its facility in Fargo, North Dakota, USA
2. A medical installation in a corporate aircraft



Throughout the world, private aircraft are being converted into air ambulances for VIPs, government agencies and heads of state. Spectrum Aeromed, based in Fargo, North Dakota, USA, offers quick-change solutions and modular medical interiors solutions to convert corporate jets into air ambulances quickly.

"Spectrum Aeromed products are designed with multipurpose aircraft in mind," says Matthew Christenson, vice president and account representative at the company. "Many of our customers are dignitaries who have aircraft, but do not have access to an air ambulance. We can train pilots and crew members how to quickly install our systems."

Spectrum Aeromed holds numerous FAA, EASA, Canadian and other international certifications for various types of aircraft. Fully equipped medical interiors can include medical walls, cabinets, articulating stretchers, infant transport systems and other equipment. The company's equipment can be installed in various types and sizes of aircraft, including Beechcraft, Pilatus, Hawker, Boeing, Cessna, Gulfstream, Dassault and many other models. Spectrum also offers equipment for a wide array of rotorcraft, and has STCs for both fixed-wing and rotorcraft.

Spectrum Aeromed has provided customized solutions for numerous global customers,

including Alpha Star, Royal Jet, FAI, Asia Pacific Jets, Pacific Flight Services, Asia Jet Air Ambulance, Air Charter Service in India, and many other private and government agencies.

"If a customer does not have an STC for an aircraft or we do not have an STC for an aircraft, we will work closely with the customer to obtain the necessary approvals and paperwork," says Justin Mahler, director of engineering at Spectrum Aeromed. "We try to find the solutions that enable customers to meet all of their medical interior needs."

"Every client's need is different and every country has its own requirements," says Horst Heinicke, vice president of international marketing. "Our experts not only want customers to understand the equipment they are purchasing, but also how to install and maintain it, and make it as easy to use as possible. We have customers in the Middle East, Europe, Latin America, Asia, Australia, Africa and North America. They have all come to expect consistent quality and professional service."

In 2012, the company received AS9100 Rev C quality assurance certification. "Our processes and standards build on lean manufacturing principles that are applied in every department," says Mike Gallagher, vice president and director of production at the company. "We work diligently to make sure every product meets our internal quality standards, which exceed AS9100 standards."

Chad Kost, chief operating officer at Spectrum Aeromed, sees demand for medical interiors across emerging markets. "Parts of Asia, Africa, Australia and South America continue to have government agencies that are converting fleets into multipurpose air medical transports," he says. "With our resources and sales team around the world, we will continue to offer the best products to support our customers' mission to save lives."



Spectrum Aeromed

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powertrip

To ensure passengers can use a jet for business, Astronics recommends the installation of power outlets

On a business jet, passengers often want to prepare presentations, crunch numbers, write reports and close deals. When the work is done, they might want to watch a movie or play a game. All these activities require power.

"Laptops, notepads, iPads and smartphones are the business, social media and entertainment tools of the day," comments Christine Ellis, director of business development at Astronics. "Charging while in flight can make the difference between a productive trip and lost work time. And even if passengers board the aircraft with fully-charged batteries, who wants to arrive at the destination with little charge remaining to get through the rest of the day?"

Ellis believes passengers have come to rely on their portable devices. "This is precisely why airlines around the world are adding connectivity and outlet power at almost every seat," she says. "Whether the aircraft is operated by a single owner/operator, a corporate flight department or an international fractional operation, passengers and customers need outlet power to make the aircraft an extension of the office, to stay on top of their game, and ahead of the competition."

Astronics' EmPower system is designed to deliver a safe and efficient off-the-shelf solution that can be integrated seamlessly onto an aircraft. The power outlets are installed in more than 600,000 seats for more than 180 OEM and airline customers.

"Each in-seat power supply contains redundant circuitry, making each power

supply independent from the rest, and protecting passengers with internal GFI and other safety features," says Ellis.

"EmPower products are TSO-certified, and meet or exceed FAA requirements. Each system is available in various AC and DC configurations with up to 175VA per outlet, enabling passengers to power even the most modern laptops."

The most recent addition to the product line is a system that incorporates USB outlets, so passengers can charge their USB devices while also using the 110V AC outlet for a laptop or other personal electronic device. The AC/USB outlet provides enough power to simultaneously operate and charge iPads and other tablets that require additional power over traditional USB ports.

"Outlet units are an easy and essential upgrade to any aircraft," says Ellis. "By adding outlets, a flight can be transformed from a potentially stressful and unproductive environment, to an extension of the home or office. Business travelers can make use of travel time by working on their laptops or tablets worry-free for hours, as well as charging their phones and listening to their MP3 players. Vacationers can relax on their flight and use all of their favorite electronic devices. Acquisition is also fast and easy through a worldwide network of authorized installing dealers."

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1. Astronics' EmPower range of electrical charging products





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streamcometrue



Dave Garing, vice president of business development at Innovative Advantage, has noticed growing demand for streaming content. "People can listen to music stored on their phone through their car's audio system, and at home they can use an Apple TV, Roku, Google or similar streaming player connected to their television," he says. "You can put these devices on an aircraft, but they can be troublesome to install and they are not designed for the aircraft environment, where connectivity might be intermittent."

For aircraft, Garing believes Blu-ray is still the best way to display an HD movie, and in some cases it is the only way to watch new releases. "But in flight, it is not practical to stream or download a Blu-ray film onto a PED using the internet," he says. "Even on the ground a Blu-ray film can take two to five hours to download."

Several companies are developing video servers designed specially for aircraft. A local server on the aircraft functions as a library, and content from it can be streamed

to phones and tablets. "We're seeing new generations of video servers," says Garing. "Pricing models are being tweaked, portals for purchasing movies are being developed, and providers are fighting the challenge of quality versus download time, as well as airborne connectivity issues."

Innovative Advantage has a +28V DC Streaming Media Player that works with the aircraft's wi-fi system to play content from video servers and non-protected content from phones and tablets. It enables passengers to select an app on their phone or tablet, listen to their music through the aircraft's sound system, play movies from a server, and watch non-protected video on the aircraft's display. "A well-fitted aircraft today has a Blu-ray player, a Streaming Media Player, a video server, an HDMI port and maybe an Apple TV," says Garing.

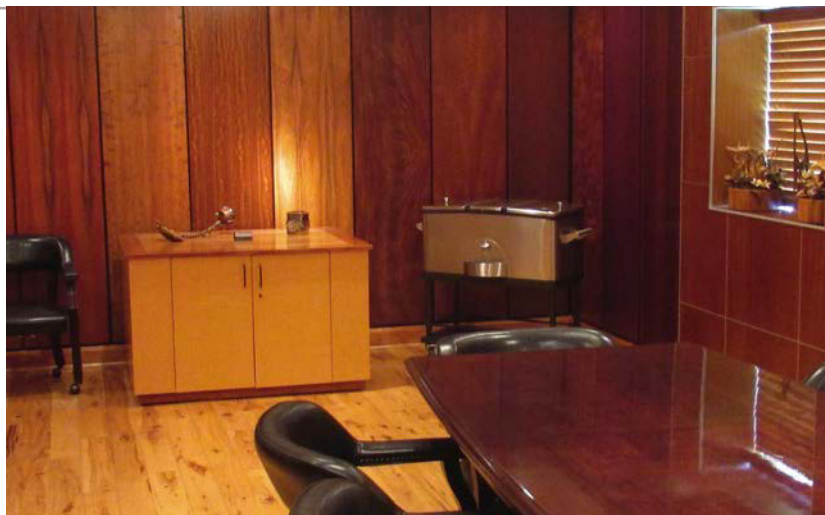
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topofthetree

With the aim of revolutionizing veneer applications for the aviation industry, veneer specialist Jason Crapo established Hi Tech Veneer in 2006. The company's proposed solutions to many of the challenges of working with ever thinner veneers are C1 Isolating Composite Core and C1 Ultra Lite Composite Core.

"One of the most predominant issues with traditional poplar inner ply is telegraphing, which is completely eliminated with C1, ensuring that sanding of the finished product will be more efficient and productive," says Crapo. "C1 also offers four to five times lower flexural modulus, allowing this product to cover tight radiuses and curves without adding moisture, and minimizing breakages in application."

C1 is designed to extend product life over that of traditional poplar inner ply. "Wood is susceptible to moisture absorption, resulting in faster natural decomposition," comments Crapo. "This causes degradation of the center ply, attacking the finished surface layer and resulting in checking, hazing and delamination of the wood veneer. C1's synthetic, non-woven design provides ventilation, preventing moisture build-up and decomposition."



C1 was also developed for great flammability performance. "Its char length is up to 15% shorter than with traditional three-ply systems," says Crapo. "Another impressive property of C1 is its low weight. A shipset of veneer with C1 Ultra Lite Composite Core is on average 17 lb lighter than traditional poplar-center ply."

Hi Tech Veneer	Reader Inquiry No. 511
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cleanplate



One of the key elements of a luxurious business jet is the decorative plated hardware. Hundreds of options are available, providing a striking final touch to the interior. "Sitting on board for hours at a time, passengers are able to detect even the slightest flaws in interior workmanship," says Rick Niefield, vice president of sales and marketing at HighTech Finishing. "Poor fittings, misaligned cabinetry and cloudy finishes can ruin the overall experience."

That's why HighTech performs multiple quality inspections before parts are delivered. "The demanding business jet customer expects the absolute best and flawless plated hardware is no exception," says Niefield. "We ensure every part on every order meets our own high level of scrutiny, because our customers expect zero-defect, on-time delivery every time. It has to look amazing."

At HighTech, every part is processed by hand by skilled craftspeople – the company does not use high-volume machines or mass-production runs. Niefield contends this leads to a higher quality product and ensures any imperfections are caught early.

"We have many sets of eyes on the parts as they pass from station to station and we can easily spot problems well before final processing," he says. "This attention to detail means our customers always receive a superior, quality part. Our documented warranty return rate of <1% reflects that."

Niefield also says that HighTech uses the newest plating technologies available. "Precision measuring tools, chemical analysis equipment and an in-house laboratory ensure plating baths and processes meet ISO9001:AS9100 standards," he says. "It's a combination of art, science and uncompromising attention to detail that drives our business."

HighTech has been supplying decorative metal plating for interior hardware and trim parts to business and head-of-state aircraft operators for more than 25 years. It offers more than 130 standard finishes and custom capabilities.

HighTech Finishing

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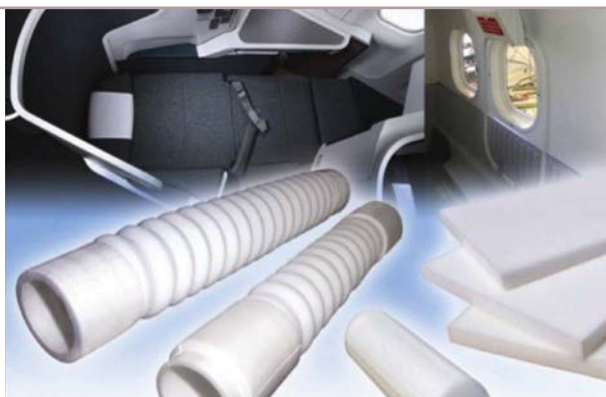
weightyissue

In conjunction with Technifab, Zotefoams will show its Zotek F polyvinylidene fluoride (PVDF) range of foam materials at NBAA 2014, to be held in Orlando, Florida, on October 21-23. Zotefoams uses a nitrogen-saturation manufacturing process to produce closed-cell foam materials designed to have a consistent cell structure and be lightweight, pure and low in odor.

"The Zotek F OSU range has outstanding flame, smoke and toxicity performance characteristics and exhibits exceptionally low heat release, meeting FAR 25.853(d) and offering lighter options for aircraft interior 'soft touch' finishes," says Glenn Sievwright, business development manager for Zotek F at Zotefoams.

"These exceptionally low heat-release values enable greater flexibility in soft touch trim make-up. Zotek F can be laminated to a wide variety of synthetic and natural materials to provide a more tactile surface, but in some applications it has been molded with a sealed, textured surface finish, so lamination isn't needed."

In terms of weight, the Zotek F foam range starts at 33kg/m³. "They are fast becoming essential materials for aircraft systems suppliers," says Sievwright. "These foams deliver up to 50% weight savings in environmental control systems, can reduce



the weight of a seat by up to 2kg, and when used as carpet underlay can offer savings up to 1.5kg/m²."

Siewwright also says that Zotek F foam is easily fabricated into complex shapes. "This is because it has a cross-linked, closed-cell structure that allows for multiple techniques to be used in manufacturing, such as machining, welding and thermoforming," he explains.

Zotefoams and Technifab will display various aviation components at NBAA, and design specialists will be available to discuss future applications.

Zotefoams

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Time	Test	Result
12:33	ZOTEK F PVDF FOAM	Landed
12:38	LIGHTWEIGHT	Confirmed
12:40	FAR 25.856 (a)	Confirmed
12:40	FAR 25.853 (d)	Confirmed
13:02	THERMOFORMABLE	Confirmed
13:56	LOW OUTGASSING	Confirmed
14:10	LOW WATER ABSORPTION	Confirmed
14:27	UV RESISTANCE	Confirmed
14:47	TEMPERATURE RESISTANT	Confirmed
14:57	CHEMICAL RESISTANT	Confirmed

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playtime

A golfer's retreat in South Africa,
styled by Studio Piet Boon



Studio Piet Boon was tasked with styling this villa, which is set on a beautiful golf course in South Africa. The client is a busy entrepreneur who considers this house as a holiday home, a place to rest and relax with family and friends. His main activities during a stay are sport, relaxation and enjoying the outdoor life, so the house has been equipped with these uses in mind. After a day playing golf, the client can take a shower, then go on to a sauna and hot tub, and from there onto the terrace, where he can enjoy drinks and a barbecue.

Everything is customized, and thought through to the smallest detail, so that the owner doesn't have to worry about furnishing and decorating a house in a different country. Local materials and carefully selected African art were used to create the ambience of an African lodge. Studio Piet Boon also collaborated with the architect on the exterior design.

OTHER EYE-CATCHING DESIGNS FROM VARIOUS INDUSTRIES...



The cabin of Embraer's new single-aisle commercial jet, E2, designed with Priestmangoode.



This glass staircase was created by Glass Deco for a German client, and installed in a private house. It features triple-layered tempered laminated float glass.



The late 19th century Hotel Majestic in Paris has been renovated. The newly named Peninsula Paris has a new interior design and restored architectural features.



Rather than using leather for upholstery, Nikolaj Steenfatt has used it to create a hard, self-supporting structure. The method is the same as that used historically to make leather armor.

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The two large hangars comfortably accommodate multiple narrow and wide-body aircraft, Boeing B747s, B777s, B787s, Airbus A340s, A330s and extend to service an A380. The smaller hangar simultaneously serves two narrow-body aircraft, Boeing Business Jets and/or Airbus A318, A319, A320 or Gulfstreams and select Bombardier jets.

We are proud to offer our esteemed clientele the chance to experience AMAC professionalism and we look forward to welcoming you!

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