

BusinessJet *interiors* INTERNATIONAL

JULY 2015

THE INTERNATIONAL REVIEW OF BUSINESS JET INTERIOR DESIGN AND COMPLETION

auto influence

WHAT HAPPENED WHEN LUFTHANSA TECHNIK AND
MERCEDES-BENZ STYLE TEAMED UP ON A VIP JET CONCEPT



 ALSO IN THIS ISSUE: LIGHTING CHALLENGER 650 FOUR SEASONS JET COMPLETION TRENDS BELL 429 GALLEY INSERTS VENEER

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Above & Beyond



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6 wheels up

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A LOT OF BUSINESS JET GALLEY INSERTS HAVE BEEN LAUNCHED RECENTLY – WITH COMPLETION CENTERS GETTING IN ON THE ACT, TOO



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EYE-CATCHING DESIGNS FROM OTHER SECTORS, INCLUDING A HOTEL SUITE INSPIRED BY A BENTLEY

automotives

"Think about the ways your automotive experience is changing and it's not difficult to spot trends we can expect to see in future generations of business jets," says Chris Hearne, vice president of jets and interior engineering at Textron Aviation, in a discussion of trends that you can read on our website.

He's not alone in seeing the fluidity between the automotive and aviation industries, driven by customer demand. As well as their technologies and materials, jets are also importing cars' design language. For example, in a feature on page 54, Brad Nolen of Bombardier cites automotive lines as a key influence on the new Challenger 650.

Then there is the cover story – a bold new design benefiting from Mercedes-Benz Style's design flair and Lufthansa Technik's aviation and engineering nous. The aviation industry's traditional approach to the ceiling, sidewalls and floor have been completely re-thought. The companies have also deliberately included 'visionary' things that they say are not currently possible on an aircraft – around 20% of the design. The idea is to push boundaries. One challenge is to translate the technology behind the digital dashboard of the S-Class car into black screens that cover the jet's windows and integrate touchscreen CMS controls. It is just this sort of technology that the companies believe will help create the seamless experience their customers are looking for throughout their journeys.

Elsewhere in this issue, Bell and MAG explain how their new VIP interior for the Bell 429 helicopter also takes up this idea of seamlessness. Their aim was to deliver the same technologies and finishes offered in cars and larger aircraft, without adding a weight penalty – a particularly sensitive issue for a helicopter.

Clearly each design discipline – automotive, jet, helicopter – has its own unique factors that preclude straight borrowing, but a lot of effort is going into translation.



Izzy Kington, editor



Cover image:
A concept by
Mercedes-Benz Style
and Lufthansa Technik

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THE LATEST DESIGNS, LAUNCHES AND LUXURY GOODS



CTM Design is designing a BBJ 787 with a dining/conference room that can be adapted into a majlis



A Lufthansa Technik design for a conference room on a wide-body aircraft



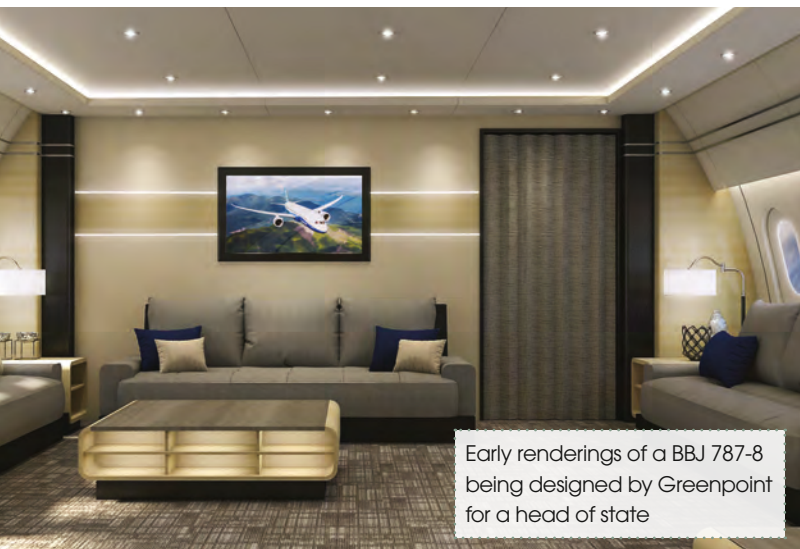
Andrew Winch Designs' Project Mayfair series for ACJ and BBJ aircraft



A concept by HAECO Private Jet Solutions for wide-body aircraft



An ACJ319 designed and outfitted by Airbus Corporate Jet Centre for an Asian customer



Early renderings of a BBJ 787-8 being designed by Greenpoint for a head of state



A wide-body design from the Jet Aviation Basel Design Studio

LAUNCHES

**Lufthansa Technik's
Fireless Fireplace**



**Alto Aviation has
a new range of
keypads, the Alto
Acapella series**



LUXURY LIVING

Pinto Paris Shanghai buffet plate, dinner plate, dessert plate and bread plate; €255 (US\$284), €240 (US\$267), €195 (US\$217) and €135 (US\$150), respectively



Porsche Design P'3135 solid gold limited edition fountain pen; €25,000 (US\$27,800)



To'ak chocolate bar; US\$260



Belgravia Butterfly Humidor from Katharine Pooley; £750 (US\$1,140)

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BEST OF THE WEB

A TASTE OF THIS QUARTER'S WEB-EXCLUSIVE CONTENT ON BUSINESSJETINTERIORSINTERNATIONAL.COM



"We've used carbon fiber on countertops, tables, galleys, lower duct areas, and even as the handrail on the valance areas in a Challenger. It can be used anywhere where wood veneer can be. We've also used carbon fiber paint for an aircraft's livery."

Debi Cunningham of West Star Aviation shares the joys and pains of integrating carbon fiber



"Aircraft interiors have, historically, had neutral color palettes, to cater to the resell market. Now, one of the things that we're seeing quite a lot of is customers making bolder statements with their interiors – opting for a bolder color palette and higher contrasts."

Tray Crow of Gulfstream Aerospace reveals trends in business jet interiors



"We are seeing demand for VIP finish applications exploding. Our customers have embraced carbon fiber for its adaptability, durability, and now for its aesthetic characteristics."

Brian Arni of Leading Edge Composites discusses the possibilities of incorporating carbon fiber in business jets



"Having seamless integration of design, engineering and manufacturing teams at the early stages of a project impacts every element of the aircraft – performance, cabin comfort and control, installation, operations – and ultimately drives value for customers and simplifies their ownership experience."

Textron Aviation's Chris Hearne discusses the company's holistic cabin design process

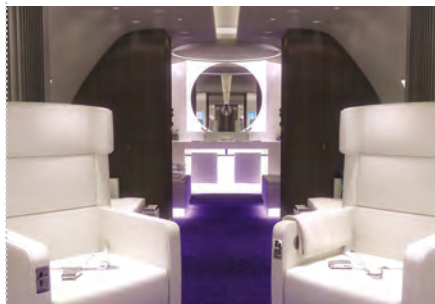
VIDEO

Greenpoint Technologies' Azure concept for the BBJ 787-9



VIDEO

A narrow-body cabin solution designed by Eric Jan of SR Technics



GALLERY

Design Q's retrofit concept for a Global 6000



Garrett Leather

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DUNCAN GIVES NEW LIFE TO 14-YEAR-OLD FALCON 900B

In 2014, Duncan Aviation was tasked by Francisco Angarita, chief pilot for Falcon 81 Corporation, with transforming a Falcon 900B that was manufactured in 2000. The aircraft will be used for frequent trips between North and South America and Europe.

The full refurbishment included the installation of a divan, new avionics and an upgraded CMS; modifications to the galley; the replacement of PSU panels, drink rails, tables and lower sidewalls; and a new exterior livery.

All the work was performed at Duncan Aviation's facility in Battle Creek, Michigan, USA. It took 12 weeks.



On the right-hand side of the galley, additional countertop space and storage was added. This modification included new Corian countertops in Bone, custom catering boxes, and a new oven from Zodiac Executive Aircraft Inserts. Extra storage space was also added to the left-hand side of the galley. All cabinets were re-veneered in an FSC-certified ebony and finished with new satin nickel paddle latches. A custom credenza was added with inserts for china, stemware and flatware.



Cabin entertainment was enhanced with the installation of SwiftBroadband, two 22in widescreen LCD monitors on the forward and aft left-hand side bulkheads, a Blu-ray DVD player, a speaker system from Alto Aviation, USB charging outlets and an Airshow 500 moving map from Rockwell Collins.



All club seats, divans and flight deck crew seats were reupholstered with Townsend leather in Nordic Gray.

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Q&A: NATE DARLINGTON, SENIOR COMPLETIONS SALES REPRESENTATIVE, DUNCAN AVIATION

WHAT WAS THE BRIEF FOR THE AIRCRAFT?

This project was more than a year in the making. I stayed in contact with Francisco as he took his time to find just the right aircraft for his clients. Once he found it, he came to Duncan Aviation knowing we could achieve his vision: to bring this Falcon's interior into the 21st century. Although the aircraft was 14 years old, the owners wanted it to feel new. They make frequent transatlantic trips between North and South America and Europe, so they wanted a comfortable and up-to-date cabin.

WHAT WAS CHANGED?

On the left-hand side at the aft, two club seats and a closet were replaced by a divan. This increased the seating capacity from 13 to 15. As well as this configuration change, the cabin's aesthetics were modernized. All of the cabin's hard lines and corners were softened with curves and radius corners, giving the cabin a more comfortable and modern feel. The cabin features new PSU panels, lower sidewalls and drink rails with a veneer splashback. In addition, the aircraft has new avionics and an upgraded CMS.

WHAT IS SPECIAL ABOUT THE AIRCRAFT?

The owners were very involved in picking colors, textures and fabrics for the cabin interior, so the final cabin definitely reflects their aesthetic preferences. The new divan, drink rails, credenza and PSUs are the focal point of the cabin. Also, with the new lines and curves, everything flows from forward to aft. Francisco thought the aircraft looked better than ever.

WHAT WAS THE MOST CHALLENGING PART?

The interior workscope changed completely, at the last minute, when the aircraft arrived at our facility. There was very little time to plan for the changes and nearly no time to account for material lead time. It was a massive amount of work, which we completed in a short amount of time. We delivered on time and squawk-free.

WAS ALL THE WORK ACHIEVED IN-HOUSE?

From engineering to the final completion, all aspects of this interior refurbishment were handled in-house at Duncan Aviation. We employ professional designers and structural engineers, and have cabinet, finish, upholstery and completion shops. Our capabilities include headliners, soft goods, custom cabinetry, articulating chairs and executive tables. Having all of these capabilities under one roof promotes collaboration across the different areas and makes it easier to resolve design challenges.



The cabin tables were outfitted with new mechanisms from Enflite, the aim being to make them easier to use.



The new interior lighting, from B/E Aerospace Lighting & Integrated Systems, includes LED upwash and downwash lights, reading lights and table lights.

COMPLETIONS ROUNDUP

THIS QUARTER'S ANNOUNCEMENTS FROM COMPLETION CENTERS AROUND THE WORLD

KIRKLAND, WASHINGTON, USA: Greenpoint Technologies renewed its AS9100 certification. It also obtained the first EASA STC for the BBJ 747-8 AeroLoft.

TULSA, OKLAHOMA, USA: BizJet International is to complete an ACJ319 cabin for a customer from China, in cooperation with the bespoke division of Hermès. Redelivery is planned for the spring of 2016. The interior comprises a dining and lounge area, a private master bedroom/office, and a master bathroom with a large shower. The VIP seats and divan will be designed and upholstered by Hermès.

FORT WORTH, TEXAS, USA: GDC Technics USA won its third BBJ 787 cabin modification contract. The company is expanding its USA operations into a 850,000ft² facility at Fort Worth, Texas. The company also announced plans to open a new facility in Morocco, providing modification and MRO services. Shabbir Pirmohamed will be CEO of the new company, GDC Technics Africa; and Kevin Casey will be CEO of GDC Technics USA.

SINGAPORE: Jet Aviation Singapore received FAA approval for its new interior shop and doubled the size of its team of interior craftspeople. The approval allows the company to certify refurbished interior components or entire interiors for aircraft rated by the facility.

PETERBOROUGH, CANADA: Flying Colours Corp is to install medevac interiors on three new Challenger 650s for a European customer. It is anticipated the first aircraft will enter service in the fourth quarter of 2016. The company also inaugurated its interiors facility in Singapore, appointed Paul Dunford as general manager of the facility, and began work on the first three CRJ200s for Sparkle Roll Technik.

COLUMBUS, OHIO, USA: Spirit Aeronautics installed a Steecon electric cabin door on a Challenger 604 as part of a refurbishment project. The company also refurbished a Cessna Citation 650 with an interior featuring carbon fiber inlays, blackened wood laminates, Corian countertops and brushed nickel plating. The lighting and IFE system were also upgraded. In other news, the company delivered its 11th King Air B300 to the FAA following an avionics upgrade and interior refurbishment.

COLUMBIA, SOUTH CAROLINA, USA: West Star Aviation hired Andy Waynick as director of interiors at its Columbia Metropolitan Airport (CAE) facility. The interior shop offers upholstery, panel recovery and carpet work.

XIAMEN, CHINA: HAECO Private Jet Solutions (HAECO PJS) unveiled an East meets West concept for wide-bodies, and a concept for the BBJ 2 – Xiao Yao. It obtained three STCs for a BBJ, for the installation of Emtec's eConnect system, an upgrade of the cabin's Honeywell satcom, and the integration of the two systems. HAECO PJS also signed an MOU with Asian Sky Group for closer cooperation on aircraft evaluation, sourcing, industrial design, engineering, certification, cabin completion and management.

TOULOUSE, FRANCE: Airbus Corporate Jet Centre delivered an ACJ319 to an Asian customer with a cabin 10% lighter than the contractual commitment. Tablets can be used to stream music and video via a new HD AVOD system. The cabin includes a double office and a lounge, a dining area, VIP bedroom and en-suite with a square shower.

EMMEN, SWITZERLAND: Ruag Aviation is to offer, in cooperation with Satcom1 and B/E Aerospace, an EASA-approved add-on solution for connectivity installations on Falcon 7X aircraft.

BASEL, SWITZERLAND: Jet Aviation Basel is to complete a BBJ 787-9 with an interior designed by Andrew Winch Design, for a customer in the Middle East. The center is also to complete an ACJ319 and an ACJ330 for Alpha Star Aviation Services, and a BBJ 3 for another client in the Middle East – all three with interiors designed in-house. Jet Aviation Basel also unveiled a dishwasher and completed its first C-check on a Falcon 7X.

GENEVA, SWITZERLAND: Jet Aviation Geneva replaced the CMS on a Global Express with Honeywell's Ovation Select, and gained EASA STC approval for the installation. The project involved the redesign of the audio/video, JetMap HD and wi-fi systems, as well as the water, lights and air-conditioning.

BASEL, SWITZERLAND: AMAC Aerospace has been awarded the FAA Air Agency Certificate, enabling it to operate an FAA-approved repair station.

BERLIN, GERMANY: OHS Aviation Services is expanding its engineering services. In addition to minor changes (such as cabin refurbishment), OHS says its design organization will soon also be permitted to perform major changes to primary structures and STCs for all aircraft categories.

HAMBURG, GERMANY: Airbus Corporate Jets and Lufthansa Technik translated the predefined ACJ318 Elite concept to the ACJ319. Completion time will begin at six months. Lufthansa Technik also teamed up with Mercedes-Benz Style on a VIP concept, launched a dishwasher developed with hs2 engineering and a 'fireless' fireplace, and opened a new chemistry laboratory. In addition, the chair family of seats passed its 9g ETSO maximum payload tests.

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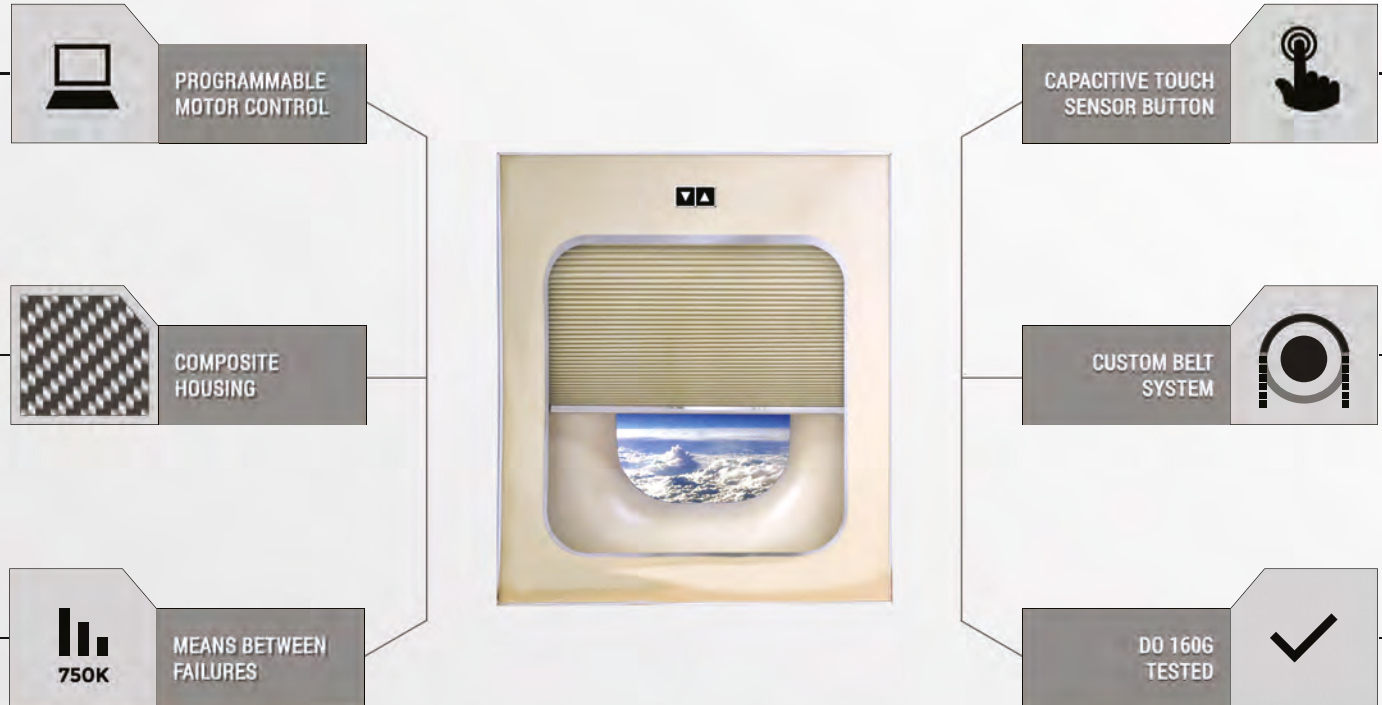
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workingwith WOOD

In this new regular feature, experts reveal the quirks and perks of working with a particular material, and how to get the most out of it; this issue we look at wood veneer



THE ARTISAN

Philippe Kuentz,
supervisor of the cabinet shop
at Jet Aviation Basel



THE DESIGNER

Lauri Church,
chief designer at Comlux



THE ARTISAN: PHILIPPE KUENTZ SUPERVISOR OF THE CABINET SHOP AT JET AVIATION BASEL

WHAT PROCESSES DO YOU GO THROUGH TO CREATE AN ITEM USING WOOD VENEER?

The first step is to present the customer with samples that meet their specifications. Once the customer has selected a veneer, we collaborate with the manufacturer to pre-select logs for three-ply veneer. A final sample must be approved by the customer before we commit to purchasing a veneer. Once assembled, veneered pieces have to be examined and cross-checked against the design definition and engineered 3D model. If we see any technical production issues, we consult with the design and engineering departments to adapt as necessary.

WHAT EQUIPMENT AND TRAINING DO YOU NEED?

For straight cabinetry, we require basic joinery equipment such as the circular saw, spindle molder, planer and router. To work more efficiently with the wood and to make curved cabinetry, we require the support of computer numerical control (CNC) machinery, as well as an automated edge filler and edge veneer finishing machine.

Some carpenters today are trained to manufacture cabinets with lightweight panels, but we work principally with qualified cabinet makers and then train them how to work with the rarest, highest quality materials. Depending on the skill and experience of the person, it is generally 12-18 months before any of our cabinet makers are allowed to work autonomously.

WHAT ARE THE MOST AND LEAST SUITABLE SPECIES?

A species is only unsuitable if it doesn't fit the client's specifications. The only constraint is that we need to build a three-ply veneer in which the first layer is a veneer backing, the core is aluminum or treated veneer, and the outer layer is the décor veneer. This is done to prevent cracks when we install it on the lightweight panel; the aluminum or treated veneer layer is needed to pass the burn test process according to FAR 25853.

WHAT ARE THE BEST VENEERS?

The highest quality veneer has a higher number of large leaves bundled in sequence, a regular pattern, regular color and no

defects. The rarest veneers are burl veneers, rosewood, ebony and all wood or veneer that is protected by international agencies such as CITES. The most expensive veneers are Amboyna burls from Southeast Asia, and burl veneer in general.

HOW DO YOU BRING OUT THE MATERIAL'S BEAUTY?

You need to select a high-quality veneer. It is then important to assemble it perfectly, matching the pattern and bringing it together seamlessly, and to build in line with the cabinet's constraints, such as door joints. Most veneers are flat cut, quarter cut, or rotary cut. Burl veneer is cut in accordance with the final wood structure. Matching techniques include book, slip and random matching. Burl veneer is generally assembled by diamond matching. Marquetry veneer is hand-carved or achieved with laser-cutting – both techniques require a high level of expertise. Finishes further bring out the beauty of the material.

WHAT ARE THE HARDEST THINGS TO DO?

The most difficult is to bend veneer on a small radius, on the square side of the wood grain direction. Bending the veneer to cover the surface of a 3D form is very difficult – if not impossible. Thus far, we've been able to bend the veneer of a flat surface to a curved surface with a minimum radius of 50mm. Other challenges include following a design with a groove, inlays or wooden patterns. In this case, you have to ensure that all lines turn through the room on the same level. It is also important to select the same sequence in veneer throughout the room.

WHAT'S THE MOST UNUSUAL PIECE YOU'VE CREATED?

One customer wanted us to replicate an old-looking wardrobe and credenza, complete with marquetry, an insect hole, a scratch, a dent and a crack, to blend with the same finish on the new cabinets. That was most unusual!

WHY DO YOU LOVE THIS MATERIAL?

Like snowflakes, each log is different, each is beautiful. I love working with something beautiful that nature gives us and creating something both beautiful and practical.

1-4. Cabinet makers at the Jet Aviation Basel completion center in Basel, Switzerland



1



2



3



4



THE DESIGNER: LAURI CHURCH CHIEF DESIGNER AT COMLUX

WHAT DO YOU LIKE MOST ABOUT WORKING WITH WOOD VENEER?

Wood veneer is great to work with because it allows us to use wood in compliance with the burn requirements that we have to adhere to in aviation design, and without the weight of solid wood. Using veneer rather than solid wood also means less material is required. Having the ability to use veneer in our designs adds a beautiful natural element to our interiors that gives a more warm and inviting atmosphere.

WHAT IS THE HARDEST ASPECT ABOUT WORKING WITH WOOD VENEER?

One task that can be particularly difficult is matching veneer from an existing aircraft, especially if it has been in service for a while. The problems usually stem from the fact that each tree is unique, so the veneer looks slightly different. The tree's size, environment and age all play a big part in how the veneer looks. Even looking at the same species, it can still be extremely difficult to match the existing veneer. Once a veneer has been selected, it's up to the designers, along with the craftsmen in the finish shop, to develop a stain that matches the natural patina

of the existing veneer. Even though this process might take a while, it's well worth the wait. Another challenge that can trip up the unwary is that different species have different natural properties. Some wood veneers are very porous, and in some – for example, wenge – crystallization occurs over time, naturally.

WHAT'S THE MOST UNUSUAL DESIGN YOU'VE CREATED USING VENEER?

We've done a few different designs that use veneer for the headliner as well as window overlays.

CAN YOU ENVISAGE WOOD VENEER BEING USED FOR APPLICATIONS BEYOND CABINTRY?

I like the idea of using wood veneer with back lighting. This creates a very bold design statement.

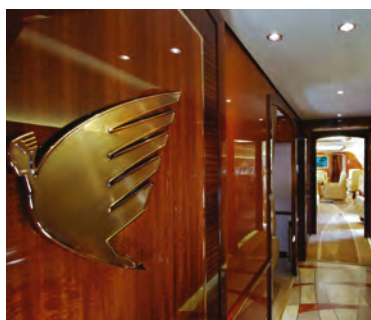
IF YOU WERE DESIGNING YOUR OWN JET, WHAT VENEER WOULD YOU CHOOSE?

I have always loved waterfall bubinga. I like how it looks three-dimensional; it's like seeing ripples in silk. To me, it truly is luxurious and mesmerizing.

5-8. Wood veneer applications on aircraft designed by Comlux



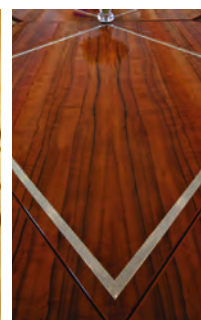
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6



7



8

THE SUPPLIER: BOOTH VENEERS PICKS SOME FAVORITE APPLICATIONS



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CYBER SPACE

This ACJ350 design was created by Studiosyn for a new generation of billionaires – those who made their money from the digital revolution.

“Although VIP jet travel might sound old-school for the digital generation, there is still a need to be present personally for business,” says Jörg Heuser, project manager at Studiosyn. “We asked how the leaders of today’s technology giants would like to travel on a VIP jet. I just can’t imagine Mark Zuckerberg, CEO of Facebook, sitting in an opulent wing chair; can you? A guy who conducts business in a t-shirt and jeans is not likely to want the traditional gold and wood interior. And what would be the right interior for somebody like Marissa Mayer, Yahoo’s CEO?”

Studiosyn set about creating an ultra-modern design that would be more in line with this group’s aesthetic and philosophical preferences. Heuser managed the project and Christine Rathmann created the industrial design and realization. They studied these leaders’ offices. “We noticed their offices lack clear visible hierarchies,” says Heuser. “Transparency is key; there is very little separation between work spaces. They also have light and fresh color schemes.”

This philosophy of transparency is embodied in the aircraft with a layout that is very open, with few partitions and no doors. “VIP jets usually have at least three clearly defined sections – such as the entourage’s area, the meeting area, and the owner’s area with a bedroom and bathroom,” says Heuser. “We separated these areas as little as possible.”

Heuser has no idea if the design will find customers. “We weren’t trying to create a ready-to-go product,” he says. “We wanted to untie the old package and to show how next-generation VIP travel could look.”

COLOR SCHEME

“Color and trim have an extremely strong influence on the acceptance of a design, maybe even stronger than the geometrical design,” says Heuser. “We created an ‘open source’ design: it has a fixed geometry, but endless variations can be achieved just by using different materials. Other color combinations created by Studiosyn include black, gray and white (pictured below right); olive green and gold; and pink, black and cream.



GUIDED TOUR

LOUNGE AREA

The cabin's design is based on a curved monument that flows through almost the entire cabin, enclosing and creating the cabin furniture. "This simple but ingenious design enables us to create the entire interior with just two elements," says Heuser. "The result is an extremely light and transparent atmosphere. The structure begins by dropping from half height to the floor, and rising up into the ceiling, creating an intimate lounge atmosphere. It not only provides a partial partition, but also high backrests for the lounge's seating. Curved tables extend from these benches, doubling as armrests. Below the tables there are charging points for passengers' phones, laptops and tablets. Simple and modern lamps are integrated into the partition."



SPOTLIGHTS

Spotlights above the lounge area help to demarcate this part of the open-plan cabin and add visual interest and brightness.

WOOD FLOOR

Adding to the clean and modern feel, light wood flooring is used throughout the cabin.

CONFERENCE AREA

The structure that created the lounge area extends into the middle of the cabin, integrating the ceiling structure. It then flows down, creating a partition with an integrated shelf, and then backward and into the floor, creating a conference table. This table can seat eight people for work or dining. The minimalist chairs reinforce the cabin's modern office feel.



CONTACT:

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1. The Bell 429
with the
MAGnificent
interior



magnificent machine

VIP demand for the Bell 429 justified the development of a sleek new interior designed to meet the expectations of high-net-worth individuals without incurring a weight penalty

The Bell 429 light helicopter has been in service since July 2009. It has found particular sales success in Europe and in three roles – emergency medical service, law enforcement and VIP, the latter of which “has been a very big segment for us”, according to Patrick Moulay, vice president of global sales and marketing at Bell Helicopter. “Our installed Bell 429 fleet in Europe has grown from two aircraft to more than 50 aircraft in the last two years, and we have more than 20 operating in the VIP/corporate transport segment.”

Italian company Mecaer Aviation Group (MAG) certainly saw the rotorcraft’s potential. “The 429 is a great platform for VIP customers,” says Grayson Barrows, director of sales and marketing for cabin comfort systems at MAG. “It has wheeled landing gear, twin engines and great cabin space.”

Market response MAG designed the MAGnificent VIP interior for the 429, and unveiled it at HAI Heli-Expo 2014. “MAG believed they could bring value to us, because of their expertise, so they invested in a mock-up,” says Moulay. “The response from the market, even though it was only a mock-up, was absolutely outstanding and we knew that we had a winner.”

This kick-started a collaboration to bring the concept to market as a production interior. The companies have worked together before, but not on a VIP interior. Most notably, MAG designed the oil and gas production interior for the Bell 525, and provided the wheeled landing gear system for the 429 and the 525. “This was a natural progression,” says Barrows.

MAG’s designers worked hand in hand with Bell’s engineers on the VIP interior. “We shared data back and forth,” says Barrows. “It was a true team effort – they could not have done it without us and we could not have done it without them.”

The target was to achieve STC certification from EASA before EBACE

2015 (which was held on May 19-21, 2015). The helicopter was displayed at the show, having achieved certification the week before. “It took nine months from when we first spoke to EASA to when we got our STC,” says Barrows. “It’s very rare to do it that swiftly.”

Moulay adds that the project was also completed on budget. “We have been working together in a very efficient way,” he says.

Italian heritage MAG designed the interior in Rome, Italy; engineered, certified and manufactured it in central Italy; and its Italian crew installed it at Bell’s facility in Prague, Czech Republic. “It’s 100% Italian,” says Barrows. “We feel that in the luxury industry, that holds a lot of weight.”

The final interior certainly has a European feel to it. “There is an Italian/European mood to the interior, in the lines and the way the panels come together,” says Barrows. “And all of those soft lines – in the capsule and the headliners – also reduce noise.”

Internal wi-fi The cabin features two proprietary technologies. One of these is the In-Flight Entertainment Enhanced Lounge (I-FEEL), an IP-based IFEC system that enables passengers to select audio and video, a moving map and CMS functions using their PED as a controller. The IFE content can be displayed on two touchscreens. The size of these is customizable. “As long as it will fit, we can change the size of the screen,” says Barrows. Passengers can also stream content such as business presentations

2. Customizable features include a minibar, storage units, power outlets, USB and audio ports, and cupholders
3. A screenshot from MAG’s iPad configurator for the Bell 429 MAGnificent

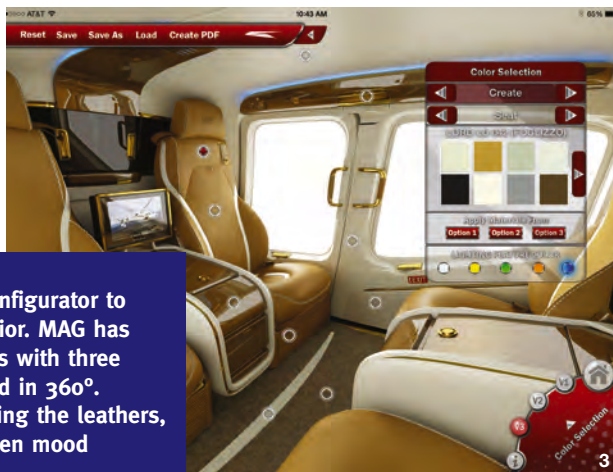


IT'S 100% ITALIAN. WE FEEL THAT IN THE LUXURY INDUSTRY, THAT HOLDS A LOT OF WEIGHT

iPad configurator

Potential customers can use a virtual configurator to play around with and visualize the interior. MAG has developed it for the Apple iPad. It comes with three pre-loaded themes, which can be viewed in 360°. The user can then touch features including the leathers, carpet, veneer, stitching, panels, and even mood lighting, and configure it to their taste.

The information is then sent by email to MAG, which will provide a quote based on the options chosen. “That information can become a statement of work at that point, with all the materials listed,” says Barrows. “However, when you’re dealing with high-net-worth individuals, it’s not that simple.” For now, he sees the app more as a starting point for customization.



and videos from their PEDs to the cabin monitors.

“This helicopter is the very first to have its own internal wi-fi system,” says Barrows. “High-net-worth individuals might change their phone once a week. But every time they come on to the aircraft, they simply connect their device to the wi-fi and they can control the ambient lighting, the electrochromatic windows, etc. We’ve set a new standard.”

Personalization The system even recognizes which seat the user is in, and personalizes that environment (for example, the tint of the window) accordingly. This can be overridden.

Passengers can stream audio independently of each other and listen to it through their devices, or using headphones paired to their devices, or headphones plugged in at the jack positioned at each seat.

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4. The helicopter has sliding windows and 60in side doors
5. The aircraft shown at EBACE will be used as a demonstrator for the time being

BELL 429 TIMELINE

February 2007

Bell 429 makes first flight

July 2009

Bell 429 certified by Transport Canada and FAA; enters service

September 2009

Bell 429 certified by EASA

October 2013

Bell 429WLG, a version with retractable wheeled landing gear, unveiled

January 2014

Bell 429WLG certified by Transport Canada and National Civil Aviation Agency of Brazil

February 2014

Bell 429 MAGnificent interior unveiled at HAI Heli-Expo

July 2014

MAGnificent interior configurator released

August 2014

200th Bell 429 delivered

November 2014

50th Bell 429 delivered in Europe

March 2015

First MAGnificent installation begins

May 2015

MAGnificent interior awarded STC; first customer announced



TO BE ABLE TO HAVE A SUSTAINABLE DISCUSSION WITHOUT HEADSETS IS QUITE UNIQUE IN THIS CLASS OF HELICOPTER

Talking without headsets The other big technological development is a passive noise abatement system called Silens. "It has reached a level we have never seen before," says Moulay. "To be able to have a sustainable discussion during your flight without headsets is quite unique in this class of helicopter. I've been flying in helicopters for a very long time and after 5-10 minutes, you feel you need a headset. With this aircraft, you don't, and that makes a big difference for VIP customers, for whom it's all about comfort."

The interior also addresses another of the helicopter industry's biggest design challenges – vibration. "By only connecting our Silens capsule to the floor of the forward and aft bulkheads, we create a cushion between the engine

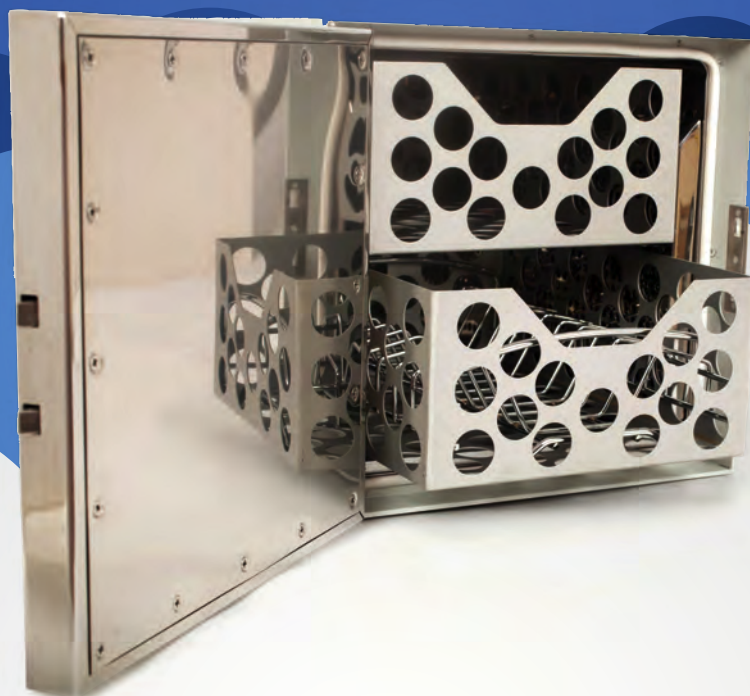
and the rotor system and the transmission; a pocket of air," explains Barrows. "This reduces both vibration and sound in the cabin."

The vibration issue also influenced the way components are attached to the airframe, although Barrows declines to "give away the recipe". The other project parameters were style, weight and cost. "We're on budget, which means we're competitive in the market place for this level of interior," says Barrows. "Regarding weight, it's about the same as other VIP interiors, so we didn't pay a price in weight to achieve the noise reduction."

Watching weight Barrows says weight is the biggest challenge on any helicopter.



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



“High-net-worth individuals arrive in a large fixed-wing VIP aircraft and travel in a limousine to the helicopter,” he says. “They want to see the same technology throughout their journey. To give that continuity without compromising weight is a challenge.”

“The smaller the aircraft, the more weight becomes sensitive,” adds Moulay. “In the light-wing segment, you have to be extremely sensitive to ensure weight does not compromise the performance of the aircraft.”

Layouts and customization The EASA STC covers three cabin configurations – a four-seat version with two center consoles and side armrests, a five-seat version with one center console and side armrests, and a six-seat version. Beyond the number of seats and the seat frames themselves, Barrows and Moulay say the interior is 100% customizable. “Every aircraft will be unique; that’s what VIP customers expect,” says Moulay.

“We spend a lot of time fine-tuning the design with the customer,” says Barrows. “You would be surprised how much detail we go into.”

This goes beyond colors and materials to details such as logos, stitching and the upholstery design of the seats; the finish of the door handles; and even the moving map, which includes a view looking forward from that aircraft’s cockpit. The aircraft shown at EBACE features Bell’s name illuminated on the floor – this is one of many details that could be personalized

6. The Bell 429 MAGnificant interior includes electrochromatic windows as standard
7. The Bell 525, for which MAG and Bell are discussing developing a VIP interior



Bell 429 MAGnificant

Cabin width: 5ft
Cabin height: 4ft 1in
Cabin length: 6ft 7in
Seats: 1 crew + 7 passengers
Range: 410 nautical miles
Max. speed: 155kts at max gross weight
Max. altitude: 20,000ft

Lost in translation?

Moulay is doubtful as to whether the MAGnificant interior could be translated into other helicopter types. “Every segment of the market is different,” he says. “Although nothing is off the table, we have to look at where it makes economical sense to develop a VVIP interior. The light-wing segment is quite large in terms of VIP demand, but as you go up or down in size, I’m not sure we have the same kind of demand to justify the development.”

However, one exception is the new 525, the biggest helicopter in Bell’s range, which has a cabin Moulay describes as “absolutely huge”. “It’s a 16-18-seat helicopter that we launched mainly for the oil and gas segment,” he says. “But to our surprise, a lot of VIP customers have started to inquire about it. So we have started to discuss the possibility of creating a VIP interior for the 525 with MAG.”



for a customer. “It’s only limited by your imagination,” says Barrows.

Build process Bell will work with each customer to determine their timeline and customization needs. The aircraft will be manufactured at Bell’s facility in Mirabel, Canada, but the final customization and delivery may take place at its facilities in Prague or Piney Flats, Tennessee, USA. “MAG will be part of the process early enough to deliver a customized and installed interior to meet the delivery schedule,” says Barrows.

The interior is available now, and in fact the companies have announced the first order – made by a Russian customer – bearing out Moulay’s faith in the European market. That aircraft will be completed in the same place as the first – Prague. **END**

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Mercedes-Benz Style has brought its design clout to a VIP jet interior, with fellow German company Lufthansa Technik on board to bring the vision to life





1. The concept blurs the boundaries between floor, sidewalls and ceiling



2

3

There is a new breed of VIP customer, according to Wieland Timm, executive director of sales for VIP and special-mission aircraft at Lufthansa Technik.

“They are younger, they are brand-oriented, they are using Mercedes cars and they want to experience the same lifestyle in the aircraft,” he says.

In other words, these customers want a seamless experience. Thus collaboration between the German completion center and Mercedes-Benz Style – on a modern concept for narrow-body ACJ or BBJ aircraft – was a natural step.

Land, sea and air For its part, Mercedes-Benz Style was keen to work on a VIP jet interior, having already created designs for a VIP helicopter interior (the EC145) and a yacht (the Arrow460 Granturismo). “Our founding father, Gottlieb Daimler, had a vision of universal mobility – on water, on land and in the air,” says Gorden Wagener, vice president of design at Daimler, the company behind the Mercedes-Benz brand. “Indeed, this was originally the meaning behind the three-pointed star of our logo. With Mercedes-Benz Style we are looking to establish our brand-defining design philosophy of sensual purity in high-end, luxury and non-automotive product sectors. Several years ago, we teamed up with Airbus Helicopters to design the interior of a helicopter. So now it was an inspiring challenge for us to work with Lufthansa Technik on the design of a VIP cabin – and thereby a much larger interior – for short- and medium-haul aircraft.”



2. The cocoon lounge, complete with daybed and floating divan
3. The throne chair section of the concept
4. The layout of the 10m-long portion that has been designed

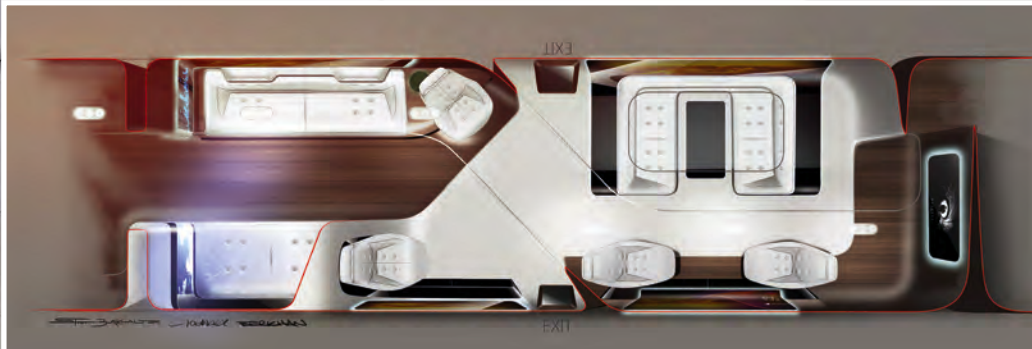
Wagener describes Lufthansa Technik as the “perfect partner” for this project. “In the VIP aircraft segment, Lufthansa Technik has more than 50 years of experience in the development and installation of solutions that meet the highest technological and aesthetic standards,” he says. “For this project, both partners are bringing their own particular areas of expertise to the table, uniting innovative design and engineering at the highest level.”

The companies began talking in earnest about the idea in October 2014, and set the target of creating the initial design images to bring to EBACE (held on May 19-21, 2015), where they

could be shown to potential customers for feedback.

Wagener says the arrangement gave Mercedes-Benz Style a great deal of freedom in the creative process. The company took advantage of this to create a design that Timm describes as “totally different from what has been done before in other aircraft”.

Design DNA The most striking aspect is the shape of the space. “We wanted to develop a completely new concept of space that transcends traditional cabin design and accentuates all aspects of the typically Mercedes take on modern luxury,” says Wagener. “We envisioned



4

5

materials
have been
used

40%

of the cabin
has been
designed

80%

of the cabin
is "realistic",
according
to Lufthansa
Technik

20%

is currently
"visionary"



Light work

Light has been used to accentuate several of the cabin's defining features – notably to create the floating effect of the divan, and to create a halo around the edges of the window panels. The latter effect is created by the integration of LED lighting behind the panels.

Another eye-catching use of light is the illuminated dome over the dining area. The LED mood lighting used for this is a technology already offered by Lufthansa Technik.

At each window seat there is what Ulf Seehusen of Lufthansa Technik describes as a "little mushroom-type lamp". There are also a few pop-out lamps. "When you push the dock apart, it pops out and then the outer ring starts to shine," says Seehusen.

an interior that flows throughout the cabin like a spiral, a DNA helix."

The spiral shape is achieved by breaking down the traditional definitions between ceiling, sidewalls and floor – which instead flow into each other – and through the use of contrasting materials.

"This dynamic, spiral-shaped layout gives rise to independent spatial zones without the typical arrangement of seat and wall elements," explains Wagener. "The individual zones flow into each other, which gives the impression of being in a single organic unit. This innovative sense of space is reinforced by Mercedes' typically strong emphasis

on contrast in terms of material, color and lighting."

Fab five The concept features only five materials: an off-white silk carpet, which extends to where the kick-strip recess would traditionally be; a suede-effect microfiber, used for the white parts of the sidewalls and ceiling; a real wood veneer, used for the dark parts of the floor, sidewalls and ceiling; white Napa leather, used for the seating; and brushed aluminum, used for the latches and also to cover material splits, for example where wood meets carpet.

The images show a 10m-long portion (about 40%) of the aircraft.

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Customization

Lufthansa Technik's Ulf Seehusen says that as this is a conceptual design, and of only a 10m-long section of the aircraft, it is ripe for customers to tailor it to their needs. "This is not a modular cabin, it's just a concept, and if the client likes the style we will accommodate their operational needs," he says. "For example, when we talk to a customer, they might tell us, 'I have an entourage of 19, I want catering five times during my 10-hour flight and I need two bedrooms'."

The design will also depend on the type of aircraft chosen – Lufthansa Technik and Mercedes-Benz Style have only said it should be a narrow-body ACJ or BBJ. Timm says the concept could also translate to larger aircraft, but not smaller ones. "Smaller aircraft don't have enough space to enable this design to be realized," he says.



6



5

WE CAN PROVIDE CUSTOMERS WITH A SEAMLESS DESIGN EXPERIENCE

Panel show One of the strongest embodiments of the Mercedes-Benz style is the application of black panels in front of the windows. "These are inspired by the dashboard screen design of the Mercedes-Benz S-Class," says Wagener. "Using the innovative Mercedes-Benz Magic Sky technology, these electronic glass panes can be turned from black to transparent at the touch of the button. We believe that high-tech details are very important if a product is to embody all the facets of modern luxury."

In the concept, the panels also integrate touchscreen surfaces that passengers would use to control the IFE and CMS – replacing PCUs. "We showed this to some customers and they were really inspired by this aspect because nobody has done it before," says Timm.

For Seehusen, the panels are a great example of the seamless experience they were aiming for. "We can provide customers with a seamless design experience along their journey – from

Areas such as a bedroom, galley and bathroom are still being developed. "Everyone we show this to asks what the bedroom and the bathroom will look like," says Ulf Seehusen, senior project manager for specification and design on VIP and executive jet conversion and completion projects at Lufthansa Technik. "They want to see the whole aircraft, because what we are showing is so exciting and unique."

Comfort zones The section shown is the social area. There is the 'yacht lounge', a dining area for four people, with a floating table inspired by the deck of a Riva boat. Opposite this is a club-two setup.

Beyond that zone is the 'throne' chair, which is angled at a diagonal,

looking forward. There is also another seat on the other side of the cabin in this area.

Moving further aft is the 'cocoon lounge', which consists of a day bed and a 'floating' divan – a three-seat divan with lighting integrated in the recesses below to create the illusion that it is floating. "The way the divan is set up, with the headrests on poles, is a new interpretation of a traditional Chesterfield design," says Seehusen. There are also two aquariums, included to make the area feel "like a chill-out lounge", says Timm.

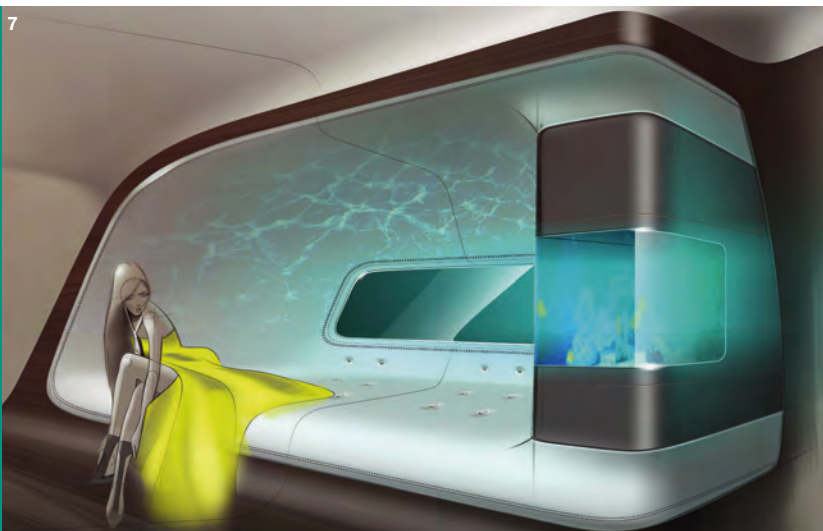
Wagener says all the furniture was designed to embody "sensual and pure forms", and that it was also important for it to all "merge seamlessly with the cabin interior".

5. Touchscreen black panels in front of the windows could be used as IFE and CMS control points
6. The floating impression is created by lighting integrated underneath the divan

A learning opportunity

Mercedes-Benz Style approached this project as an opportunity to learn about a new design discipline. “Automotive design is undoubtedly one of the supreme disciplines of industrial design,” says Gorden Wagener. “It’s hard to think of a more complex product that unites so many different design disciplines. Our design unit possesses more than enough expertise in all the areas needed for this. The challenge lay in applying these skills and our design language to the proportions and specific requirements of an aircraft. And it is exactly this, of course, that is having such an inspirational impact and further extending the creative spectrum of our designers.”

Wagener says that while the company is “always open to new and exciting challenges and innovative strategic partners”, there are no concrete plans at the moment to create further VIP aircraft cabin designs.



the car into the air and back into the car. You have the same connectivity, you have the same user interfaces.”

Aviation nous Lufthansa Technik’s focus during the development has been on how the concept might be brought to life. For example, Seehusen’s input led to the integration of the necessary air inlets and air return holes, as well as PA speakers. “My goal over the last six weeks [before EBACE] was to bring this from being a fully visionary thing into something that is 80% realistic and 20% visionary,” says Seehusen.

The design incorporates several products that are already offered by Lufthansa Technik, including its nice HD IFE and CMS system, its lighting, and its chair family of seats. “You can’t

7. The aquariums are one of the concept’s “visionary” aspects
8. Mercedes-Benz Style collaborated with Silver Arrows Marine on a design for the Arrow460 Granturismo yacht
9. The EC145 Mercedes-Benz Style interior, for which the company worked with Airbus Helicopters

achieve this seat design with any other product on the market,” says Timm.

Other features will have to be developed if the design is to be fully realized. One thing currently in the visionary 20% are the aquariums. Integrating touchscreen functionality into the black panels will also be challenging. “It’s visionary from today’s point of view, but I see it happening in the very near future,” says Seehusen. “The technology is already in the

S-Class, where you have a black-panel dashboard displaying your speed, revolutions per minute, and oil temperature. This technology is now being fed into this proposal.”

Seehusen also says local adjustment of split lines in the sidewalls and ceilings would be needed, to cope with the movement of the aircraft, and that the dining table, which is only attached at the sidewall, would need a post.

Design and engineering Mercedes-Benz Style and Lufthansa Technik are working very closely to strike the right balance. “On the one hand, in the end you have to see it is the Mercedes-Benz style; on the other hand, it must be a design that can be implemented on an aircraft, so it is vital for both parties to work together closely, right from the beginning,” says Timm.

Whether or not the design will ever be installed depends on demand. “We have to evaluate the level of customer interest in the VIP market and we will then discuss the next steps with Lufthansa Technik,” says Wagener.

However, the companies are pressing forward with work on a mock-up, which Seehusen believes will prove that 80% of the design can be built using techniques in use today. “When we build a mock-up, we use the same engineering techniques as when we build a cabin, if not the same materials,” says Seehusen. “There are some new design principles, but the way we install monuments on the floor, sidewalls and frames will be the same. I’m not saying this can be certified now, but we are on the way to it.” **END**



8



9

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seasonalvariety

Travellers embarking on luxury around-the-world tours with Four Seasons can now fly on an aircraft befitting the occasion



1

3

2

1-3. The Four Seasons Jet features customized lie-flat seats from Iacobucci HF Aerospace

Each year, TCS World Travel organizes around 24 highly customized around-the-world tours for its demanding high-net-worth clientele, more than 50% of whom are repeat customers.

Recently, the company took on the operation of branded tours for luxury hotel chain Four Seasons Hotels and Resorts. One such tour, which will last 24 days and cost US\$132,000 per person for a double occupancy, will take in Los Angeles, California and Kona, Hawaii, USA; Bora Bora, French Polynesia; Sydney, Australia; Bali, Indonesia; Chiang Mai, Thailand; the Taj Mahal and Mumbai, India; Prague, Czech Republic; and London, UK.

As, over the course of such a trip, passengers will spend approximately 50-70 hours in the air, with individual flight segments that can be as long as eight hours, it was decided it was necessary to elevate the air travel experience to measure up to the grand experiences on the ground.

In October 2013, TCS World Travel approached TAG Aviation to obtain, convert and operate a Boeing 757 for use on co-branded global luxury tours – not only with Four Seasons, but with other organizations, including the National Geographic Society.

Through its five operating centers, TAG Aviation manages a fleet of more than 120 business jets worldwide and runs MROs and FBOs. Most of the

business jets it operates are of the traditional variety, such as Falcons and Gulfstreams, but there are a handful of ACJs and BBJs.

New life Although TAG Aviation had never operated an aircraft as large as a Boeing 757 before, the company felt the mission was not outside its comfort zone. It obtained a late 1990s Boeing 757-200ER on a six-year lease and collaborated with TCS World Travel, Four Seasons, Factorydesign and Monarch Aircraft Engineering to develop an ultra-lux global cruiser.

“In many ways, it was a labor of love,” explains Graham Williamson, president of aircraft management and charter services at TAG Aviation

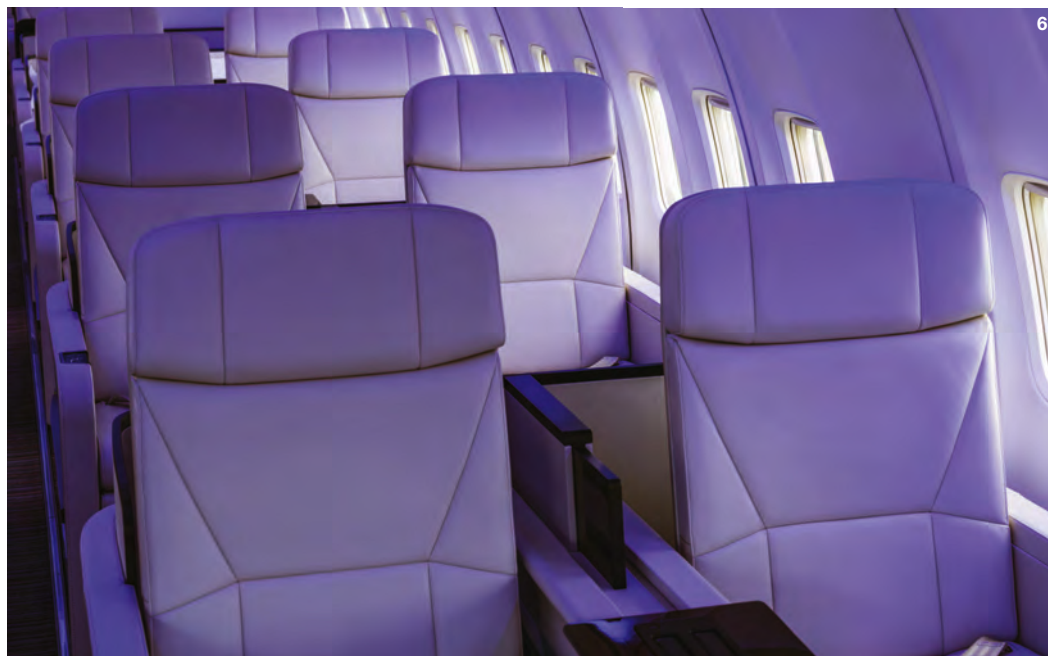


4

4-5. The black livery is finished with Four Seasons branding
6. The aircraft now seats 52 passengers



5



6

Four Seasons service

It was vital to develop 5-star inflight service to match the aircraft's luxury accommodation and glamorous itinerary. On Four Seasons tours, the cabin crew includes three pilots, two flight engineers, eight cabin attendants, a doctor, an executive chef, a sous chef, a Four Seasons concierge and a global guest services manager, whose job is to personalize the journey.

“Along with the core objectives of comfort and functionality – and adherence to strict aircraft safety standards – we wanted to create an exceptionally luxurious ambience, and champagne and caviar became our inspiration,” says Dana Kalczak, vice president of design at Four Seasons.

A lot of attention has been paid to designing and planning the onboard menus for the Four Seasons trips. “Our aim is to recreate the hotel experience on the Four Seasons private jet, which means creating innovative meals using fresh ingredients, served on the finest tableware and linens, all with impeccable Four Seasons service,” says Kerry Sear, director of food and beverage/executive chef at TCS World Travel. “The only real difference is that occasionally we have to do a little juggling when there's turbulence!”

Europe. “The aircraft is flying around the world so we need it to be self-sufficient in many ways.”

Air Livery, based in the UK, painted the aircraft a shade that Williamson calls ‘black pearl’ and finished it with the Four Seasons logo. The aircraft was then delivered to Monarch's completion hangar in Birmingham, UK.

Complete refit Over the next seven months, the interior (including its 233 standard seats) was gutted, to be replaced with equipment including 52 lie-flat electromechanical seats, two galleys, sleek sidewalls and headliners, more sculpted overhead bins and an internal wi-fi network. “In my opinion, this is the prettiest Boeing 757 in the world,” says Williamson. More than 90 vendors were involved in the project.

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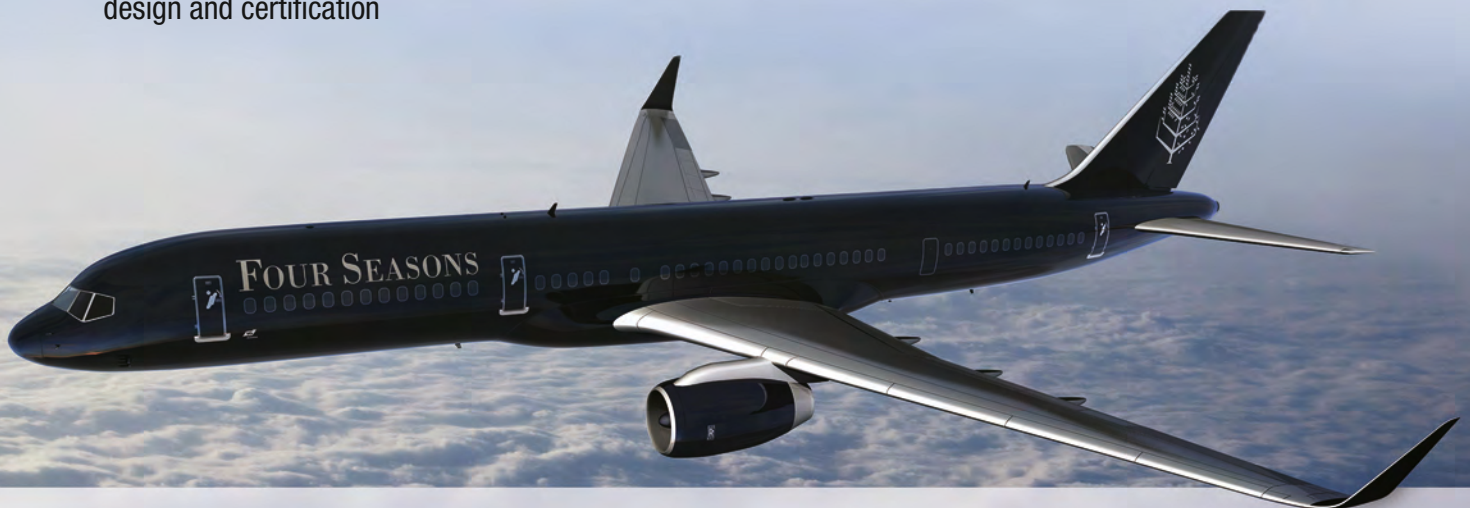
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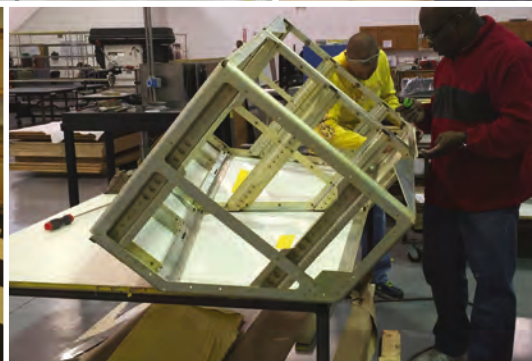
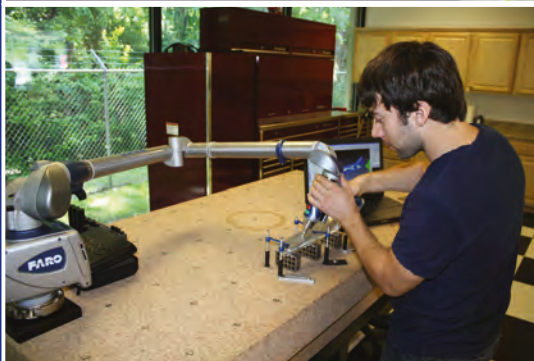


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Iacobucci HF Aerospace provided the new seats, which were designed in collaboration with Factorydesign. The VIP seats are 74.7in long when fully flat, have a 21in-wide seat cushion and boast a 78in pitch.

The seat offers a wide range of pre-set or personally adjusted movements, all managed by software, allowing configurations ranging from upright to fully flat which can be achieved with the press of a button. They feature privacy screens, dedicated ottomans with personal stowage compartments, two PC power outlets, USB chargers and beverage holders.

“We have developed a product tailored to the customer, who wanted the ultimate in terms of comfort and luxury,” says Lucio Iacobucci, president and CEO of Iacobucci HF Aerospace. “It was not easy, but we succeeded in realizing, in a single seat, the highest standards in craftsmanship and technology, made in Italy.”

The seats are also fitted with mood lighting, which can be adjusted by the crew to create an overall ambience for the cabin.

Entertaining guests Before their trip, passengers are issued with iPads that they can keep afterward. Each iPad is loaded with information about the tour and can also be used to access, over an internal wi-fi system, the aircraft's IFE

- 7. The aircraft's IFE content can be accessed on iPads
- 8. The aircraft was completely refitted, including new sidewalls, headliners and overhead bins from Zodiac Aerospace

content. The iPads clip onto arms that attach to each seat. Passengers on some tours (not Four Seasons trips) are also treated to lectures and cultural presentations from university-level experts which are presented live and streamed to iPads and headphones.

TAG turned to Zodiac Aerospace for new headliners, sidewalls and sculpted overhead bins. Zodiac Aerospace developed the bins for retrofit on commercial airliners; they are designed to be sleeker and less

WE HAVE DEVELOPED A PRODUCT TAILORED TO THE CUSTOMER, WHO WANTED THE ULTIMATE IN TERMS OF COMFORT AND LUXURY

7

month refit

90+

vendors

52

seats

50

hours in the air per 22-day trip



9-11. Passengers can adjust the lacobucci seats to various positions, ranging from upright to flat



9

The Boeing 757

The twin-engine Boeing 757 enjoyed a 23-year production run that began with its first flight in 1982 and ended with its final delivery in 2005. Overall, 1,050 Boeing 757s were produced.

The lion's share of these were 757-200s, which, in airline configuration, can seat 200-228 passengers and deliver a range

of approximately 3,200 to 4,500 nautical miles. The 757-200 is 155ft 3in long, with a span of 124ft 10in, a gross weight of 255,000 lbs and ceiling height of 42,000ft.

A variant of the 757, the 757-300, was launched in 1996 and first delivered in 1999. That aircraft could accommodate 280 passengers as an airliner.

THE AIRCRAFT WILL BE MADE AVAILABLE TO THE CHARTER MARKET WHEN NOT ON TOURS

intrusive than the ones they replaced on this aircraft.

There are two lavatories in the forward cabin and two amidships. The lavatories are reminiscent of those on the supersonic Concorde, and have a thoroughly modern look featuring carbon fiber.

Hard-working galleys The two galleys, at the front and rear, were provided by the UK's Thomson Airways. The main galley is in the rear of the aircraft, along with seating for the cabin crew and ancillary personnel. This rear galley is capable of providing two main meal services and is equipped with chillers, steam ovens, coffee and espresso

makers as well as plenty of stowage. Additional stowage is available in the aircraft's generous baggage hold.

TAG envisions flying the aircraft for around 680 hours a year. Williamson says that the company plans to add two more Boeing 757s to its fleet between now and 2017, based on the popularity of this initial ship. They will be made available to the charter market when not on tours, for missions such as conveying sports teams.

TCS World Travel and Four Seasons flew their first branded global trip using the Boeing 757 in March 2015. TCS World Travel reports it received the highest level of positive customer feedback of any tour to date. **END**



10



11



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bigpicture

Completion centers report on demand for narrow- and wide-body VIP aircraft, and how they are developing new cabin features to cater for the discerning owners of these jets



In Europe at least, larger aircraft types are growing in popularity. Research commissioned by Gama Aviation in April 2015 (which involved an analysis of JetNet data by Citigate Dewe Rogerson) found that 57% (475) of the 830 business aircraft delivered in Europe between 2010 and 2014 were medium, heavy or big iron (airliner) jets, whereas the percentage of medium,

heavy and big iron jets in the existing fleet was 41%.

But do completion centers around the world expect demand for big iron VIP aircraft to continue? Many are currently occupied with the completion of wide-body types including the BBJ 787-8 and the BBJ 747-8. And now the BBJ 787-9, a stretched version of the BBJ 787-8, is off the benches, with the first completion announced at EBACE

1. A BBJ interior concept by Aeria Luxury Interiors, a BBJ completion center in San Antonio, Texas, USA





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in May 2015. Jet Aviation Basel will complete the first BBJ 787-9 for a customer in the Middle East. It should be delivered to the completion center in 2015 and redelivered in 2018 following the fitting of a cabin interior designed by Andrew Winch Design.

Boeing Business Jets announced two orders at EBACE – a BBJ and a BBJ 787-8. Then in June 2015, the OEM announced its first BBJ MAX 9 order. It has four orders for the BBJ MAX 8.

Wide and narrow According to GDC Technics' general partner, Mohammed Alzeer, approximately 30% of the VIP market, "which is still healthy and vibrant", is for wide-body aircraft.

Wide-body jets are typically favored by head-of-state customers. "Private individuals still prefer the narrow-body Airbus and Boeing platforms," says Matt Woollaston, vice president

of completion sales and marketing at Jet Aviation Basel. "But even private individuals are beginning to see the requirement for larger aircraft."

However, Christine Hadley, senior marketing manager at Greenpoint Technologies, paints a different picture. "The Boeing wide-body completion market is slow as BBJ 747-8s continue to hold hangar capacity and BBJ 787s begin the completion phase," she says. "In addition, clients are delaying

3



2. A BBJ 3 concept developed by Jet Aviation Basel
3. A lounge concept by Comlux for a Boeing aircraft

JET AVIATION BASEL WILL COMPLETE THE FIRST BBJ 787-9 FOR A CUSTOMER IN THE MIDDLE EAST

completions, pushing opportunities to the right due to a number of factors, among them oil prices impacting the Middle East and certain regulatory restrictions in Asia."

Meanwhile, Airbus Corporate Jets has been busy redefining its narrow-body offering. "We are planning for growth, working on new models, and we do see new opportunities," says David Velupillai, director of marketing at Airbus Corporate Jets.

At EBACE 2015, the OEM launched the ACJ319neo and the ACJ320neo, which are designed to offer increased range and fuel efficiency along with a lower cabin altitude over the aircraft



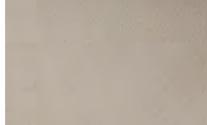
Seat advances

There are several new choices for VIPs when it comes to aircraft seats. Lufthansa Technik has entered the seat market recently with a new line – chair – which will offer a multitude of configurations. The primary structure can be customized with seatbacks of various heights, custom-contoured ribs, customized upholstery in any desired thickness, and armrests. ETSO 9g tests have already been completed for chair, and Lufthansa Technik expects EASA 9g and 16g certifications later in 2015. The seats will be manufactured by Dräxlmaier.

Italy's Iacobucci HF Aerospace ventured into aircraft seating about five years ago and most recently introduced a certified line of shell seats, which is available in a range of configurations, functions, styles and finishes. The latest was installed on the new Four Seasons Jet (see page 36).

Meanwhile, Yasava Solutions, which was formed in 2013, launched its latest seat at EBACE 2015. Aiana Wave uses gravity rather than an electrical actuation system. It will be manufactured by Optimares. Yasava has already signed six letters of intent for the seat, which is part of its Astral Cabin Design for long-range, large-cabin business jets. The Astral Cabin will be installed by MROs selected carefully in close consultation with the client.

Aero Seating Technologies of Irwindale, California, USA, has its own take on the executive seat with an integrated audio feedback massage feature that interacts with the aircraft's IFE system. The company's new Master Class seat features adjustable massage with heat and memory presets, "for the ultimate in craftsmanship and luxury".



4. An ACJ319 cabin to be completed by Lufthansa Technik's US subsidiary, BizJet International, in cooperation with Hermès
5. The ACJ319 Elite
6. Yasava Solutions' Aiana Wave seat



they replace. Acropolis Aviation is the launch customer for the ACJ320neo.

Predefined cabins Airbus Corporate Jets has also been working to translate its predefined ACJ318 Elite cabin design to the ACJ319, in cooperation with Lufthansa Technik, which completed the 19 ACJ318 Elites delivered to date.

Walter Heerdt, senior vice president of VIP and executive jet solutions at Lufthansa Technik, says the ACJ318 Elite's layout was kept because of "huge market recognition", but the ACJ319 gives more space to play with. The partners say the predefined approach should enable ACJ319 completions as short as six months.

The ACJ319 is also available with a modular cabin (the ACJ319 Elegance) from Airbus Corporate Jet Centre (ACJC), or with a fully customized interior from the completion center of the customer's choosing.

Refurbishment business Going by numbers from Airbus and Boeing, the total worldwide fleet of narrow- and wide-body VIP jets in service is approaching 350 aircraft. As these aircraft age, required maintenance forces them back into completion centers, where cabin interior upgrades often become part of the package.

"Many of our customers combine scheduled maintenance checks with cabin refurbishment work, especially upgrades in high-speed internet connectivity, CMS and IFE," says a spokesman for Lufthansa Technik.

In 2014, Jet Aviation Basel performed two complete CMS and IFE system replacements on BBJs and a configuration modification on yet another BBJ. Vincent Rongier, head of refurbishment, modification and upgrades at the center, says that this year, the company is already working on several BBJ refurbishment projects, as well as an ACJ.



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9



7



Rongier says the center has also upgraded its facility to meet increasing demand for refurbishment services. These upgrades range from the addition of new spray guns in the paint hangar to a new carpet-edge sewing machine in the upholstery shop.

Building work It is not the only expansion going on in the industry. Comlux America is expanding its VIP completion hangar from 128,000ft² to 157,000ft² so it can accommodate one wide-body and four narrow-body VIP aircraft simultaneously. The move was made in direct response to an ACJ330 green completion contract that was signed in December 2014.

GDC Technics, which has its headquarters in San Antonio, Texas, USA, also plans to open a facility at Alliance Airport in Fort Worth, Texas. The company will take over a former

Geographical trends

Ron Soret, vice president and general manager of completions at Aeria Luxury Interiors, has noted a geographical shift in demand for large VIP aircraft.

“The market in Asia is not emerging as quickly as we anticipated,” he says. “We continue to see most demand from Eastern Europe and the Middle East.”

Meanwhile, according to Jet Aviation Basel’s Woollaston, “Our traditional markets remain sound and we see encouraging trends in emerging geographic regions that should continue feeding demand for our services over the coming years.”

American Airlines complex on a 25-year lease and make “major capital improvements and upgrades” to the 840,000ft² space. According to Alzeer, GDC Technics will offer commercial and VIP aircraft modifications, engineering solutions and some interior component manufacturing, focusing mainly on VIP work.

Greenpoint Technologies recently completed a vertical integration, merging with its sister companies – Odyssey Aerospace and Greenpoint Products and Services – to form an expanded Greenpoint Technologies at its headquarters in Kirkland, Washington, USA. The move unites the cabinetry and machining facilities of Odyssey in Denton, Texas, with Greenpoint Products and Services’



10

manufacturing and testing expertise in Marysville, Washington.

Steam clean Completion centers are also expanding the list of equipment that they offer to install on board. For example, in 2014 Lufthansa Technik unveiled a steam generator that enables the installation of a steam shower on green or retrofit aircraft. The self-contained unit has an empty weight of 39.6 lb and doesn’t need to be connected to the existing water supply. The unit was developed from an off-the-shelf device made by Duerr Technik. It is 12.6 x 14.2 x 17.3in.

Lufthansa Technik also offers an oxygen generation system, Oxyfly, that it claims delivers an unlimited supply of therapeutic oxygen on board. The system is intended to help passengers with respiratory issues. The unit measures 2 x 10 x 18in, weighs 67 lb,

WE CONTINUE TO SEE MOST DEMAND FROM EASTERN EUROPE AND THE MIDDLE EAST

THE OVERALL INTERIOR MUST BALANCE WORK, FAMILY AND LEISURE



11



12



13

and can be installed in aircraft as small as a mid-size business jet.

Another new product from Lufthansa Technik is the Fireless Fireplace, which is designed to simulate a fire by illuminating water mist combined with an illuminated imitation of burning wood. Heat, sound and the intensity of the flame can be adjusted by a remote control. The product weighs around 30kg excluding the surrounding interior design, and power consumption is up to 1,300W.

Washing up Meanwhile, Lufthansa Technik and Jet Aviation Basel have both recently unveiled dishwashers. Lufthansa Technik describes its Dishwashair as being “of professional quality”, featuring complex safety mechanisms and has two cycles to choose from – two or six minutes. Maximum water consumption is 3 liters per cycle. The dishwasher attaches to available connections for fresh and wastewater and aircraft vacuum systems, and a single fill-up of

the two required cleaning agents is enough for 40 wash cycles.

Developed in collaboration with hs² engineering of Ulm, Germany, the Dishwashair was created for use on business jets and commercial airliners – although the initial contracts have been from owners of larger VIP business jets.

Jet Aviation Basel’s model is called the Advanced Aviation Dishwasher (ADW), and the center says it can be made to fit any galley. It has a three-minute wash cycle and uses 3 liters of water. “Traditional industrial dishwashers have a short wash cycle, but tend to use chemicals that are too corrosive for use in aircraft,” says Matthias Mueller, project manager for cabin modifications and upgrades at Jet Aviation Basel. “Our state-of-the-art ADW is compatible with an eco-friendly soap that is gentle enough for the most delicate dishes.”

Other innovations that have already made their way on to VIP aircraft, reported by Greenpoint’s Hadley, include electronic door sensors, organic

Weighty issue

Some completion aims are perennial – reducing cabin weight being a prime example. A recent development from Jet Aviation Basel is a new acoustic insulation material and installation method that “enabled us to reach acoustic levels expected of a VIP aircraft”, says Woollaston, while achieving a 30% reduction in weight over older material and installation techniques.

Likewise, ACJC recently delivered an ACJ319 to an Asian customer for whom range, and therefore cabin weight, was very important. The final aircraft is actually 10% lighter than contractually required. This was achieved thanks to a wireless CMS/IFE architecture, slimmer cabin linings and other measures, including the use of composites for the dining table stands.

11-12. ACJC’s recent ACJ319 completion
13. HAECO Private Jet Solutions collaborated with a fashion brand for this wide-body concept

light-emitting diode (OLED) digital walls, hand-painted gold leaf ceiling covers and “organic chandeliers”.

“For personal cabin designs, demand remains focused on high-speed connectivity and wireless streaming IFE,” comments Hadley. “The overall interior must balance work, family and leisure, offering all the pleasures and conveniences of home.” **END**



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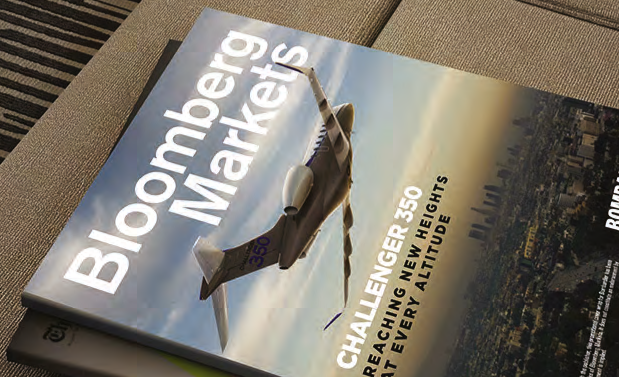
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The latest incarnation of the Challenger 600 series, the Challenger 650, features automotive-inspired details, new seats and IFE/CMS – and a strong resemblance to the Challenger 350

1. The Challenger 650, in a 12-seat configuration





The Challenger 600 series is now in its fourth decade and nearing its 1,000th delivery. The Challenger 600 was certified by the FAA in 1980. Out of the Challenger 600 rose the Challenger 601 (certified in 1983), out of that the Challenger 604 (certified in 1995) and from that the Challenger 605 (certified in 2006). In October 2014, Bombardier announced it was reinventing the platform again – replacing the Challenger 605 with the Challenger 650. The Challenger 650 is expected to gain certification and enter service in the second half of 2015.

The Challenger 650's main upgrades over the Challenger 605 include new avionics (Rockwell Collins' Pro Line 21 Advanced), a completely new interior, and new engines that enable longer range missions out of short take-off fields. The aircraft's range will be 4,000 nautical miles with six passengers.

Shared DNA Everything in the cabin is new – including seats (a Bombardier design on a B/E Aerospace frame) that are about 1in wider, sideledges, IFEC/CMS equipment and the overall aesthetic. The designers worked to create a shared feel for the Challenger family, which also includes the Challenger 350, itself an updated version of the Challenger 300. The Challenger 350 was certified and entered into service in June 2014; 52 are already in service.

"I'm proud that the look in general is aligned with the look on the Challenger 350," says Brad Nolen, director of product strategy and market development at Bombardier. "The discerning eye would also notice commonalities with the Learjet 75. Bombardier is successfully creating a unique DNA. That is not something our competitors have been able to achieve yet. When you walk on board this aircraft, it's recognizable as a Bombardier product."

In common with the Challenger 350, automotive design is a key

**HAVING THE TABLE DEPLOY
OUT OF THE DADO PANEL
ALLOWS CABIN CONTROLS
AND CUP HOLDERS TO
BE PROPERLY LOCATED
AT YOUR FINGERTIPS**



influence. “You can see that in the contours of the seats, for example, and in the sweeping metal that runs down the sideledges,” says Nolen. “That last detail is carried over from the Challenger 350. It was inspired by the brightwork on Bentley and Rolls-Royce cars.”

Entertainment Also in common with the current Learjets and the Challenger 350, the Challenger 650 will feature Lufthansa Technik’s nice HD CMS/IFE system. “The cabin control touchscreen is at your fingertips, the system is always on, and it’s really easy to use,” says Nolen. “The GUI is similar to an iPhone in terms of navigation and ease of use.” Passengers can also control the cabin from Apple and Android devices.

The system includes AVOD as standard. Passengers can play their own media for free, or take out

a subscription with IDAIR for DRM-protected early window content, such as Hollywood movies, refreshed every quarter and delivered via a USB key.

Content can be displayed on the bulkhead HD monitors (which are 2in larger than on the Challenger 605). Private content can be streamed from the aircraft’s media server to passengers’ tablets. The cabin is wireless and can also be fitted with an optional Aircell wi-fi system for use over the USA, and a SwiftBroadband system for elsewhere.

There are USB, HDMI, Bluetooth and other ports for iPods, iPads, PCs and smartphones. Nolen thinks offering Bluetooth audio pairing as a standard feature is a first for the industry. “It’s just like at home where you can link your iPhone to a Bluetooth speaker,” says Nolen. “You can do that inside the aircraft –

JUST LIKE AT HOME YOU CAN LINK YOUR iPhone TO A BLUETOOTH SPEAKER



Winning over pilots

The Challenger 605’s Pro Line 21 avionics have been updated to Pro Line 21 Advanced on the Challenger 650, the main additions being synthetic vision on the main displays and a new weather radar. Bombardier has also made visual improvements to the cockpit – changing the paneling and seats to align with its Global Vision Flight decks.

The company takes a holistic approach to design, and pilots’ views are taken into account alongside those of passengers, crew and other groups. “From a pilot’s perspective, this is a really welcoming environment, where they want to work,” says Nolen. “This is really important because when it comes to buying an aircraft, a lot of decision making, particularly in the USA, can be driven or influenced by pilots.”



although you won’t see a speaker anywhere on board. Transducers are fastened to the back of the sidewalls, allowing the entire cabin to act as a surround sound speaker.”

Ergonomics Standard equipment in the galley includes a coffee maker or an espresso maker (depending on customer preference), a microwave and a warming oven that is 70% larger than the warming oven on the Challenger 605. Feedback from flight attendants has resulted in the appliances being positioned higher, at arm’s height.

Ergonomic attention to detail is also evident at the club seating positions, where the tables deploy out of the dado rather than from the top of the sideledge. “That’s important because when you have a table deploying out of the top of the sideledge, it means your cup holders and cabin controls must be positioned behind you, in an un-ergonomic location,” says Nolen. “Having the table deploy out of the dado panel allows cabin controls and cup holders to be properly located at your fingertips.”

In addition to the cabin control touchscreen, there is a quick-access

2. The sideledges feature metal trims that are inspired by luxury cars
3. The new cockpit
4. Flat panel speakers from Lufthansa Technik are installed to the back side of the sidewalls

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scroll wheel for navigating lists of media, and quick-access switches to control tables and reading lights and to call a flight attendant. The same switch design is used on the Challenger 350 and Learjet 75.

Nolen concedes that the cabin's complex shapes, such as that of the sideledges, are challenging to create. "Our designs now are much more automotive inspired, so the parts are more complicated – there are more complex, 3D shapes – and making sure both suppliers and our own team can achieve that level of complexity is always a challenge," he says.

To iron out these potential wrinkles, Bombardier always builds a first article aircraft ahead of an entry into service. It was this prototype Challenger 650 that Bombardier showed on the static display at EBACE in May 2015. "It's to really make sure that we get all the finer details of the interior just right, so that when we deliver our first aircraft to a customer, it's just perfect," says Nolen. The aircraft is also used as part of the certification process.

NetJets The aircraft displayed at EBACE features a forward galley, a club four, a four-place dining table faced by a four-place divan, and a large lavatory. This is the 12-passenger configuration launch customer NetJets has chosen for its Signature Series Challenger 650s. The fractional ownership company has placed 25 firm orders and has 50 more options for this aircraft (it was also the

OUR DESIGNS NOW ARE MUCH MORE AUTOMOTIVE INSPIRED, SO THE PARTS ARE MORE COMPLICATED

launch customer for the Challenger 350 – with 75 firm orders and 125 options). The Signature Series Challenger 650s will be identical to each other, with a customized selection of materials unique to NetJets.

Other floorplan options include a smaller lavatory that gives a bit more seating space, and the replacement of the conference/dining grouping with



5. Tables deploy directly from the dado rather than the sideledge, leaving more space for IFE controls and cup holders
6. The seats are a new Bombardier design based on a B/E Aerospace frame

CHALLENGER 600 SERIES TIMELINE

November 1980

Challenger 600 granted FAA certification

March 1983

Challenger 601 granted FAA certification

January 1993

Challenger 850 granted FAA certification based on CRJ200 series airliner

November 1995

Challenger 604 granted FAA certification

February 2001

Challenger 870 granted FAA certification based on CRJ700 series airliner

October 2002

Challenger 890 granted FAA certification based on CRJ900 series airliner

June 2003

Challenger 300 granted FAA certification

October 2006

Challenger 605 granted FAA certification

January 2007

First Challenger 605 delivered

May 2013

Challenger 350 launched

June 2014

Challenger 350 granted FAA certification

October 2014

Challenger 650 launched

Second half of 2015

Expected certification and entry into service for Challenger 650



Bombardier Challenger 650

Cabin width: 7ft 11in (centerline)

Cabin height: 6ft

Cabin length: 25ft 7in

Seats: 2 crew + 10 passengers

Range: 4,000 nautical miles with six passengers, NBAA IFR fuel reserves, ISA conditions and standard basic operating weight

High-speed cruise: Mach 0.82

Max altitude: 41,000ft

Price: US\$32.5m

two larger facing seats, like those at the front of the aircraft.

Materials including the sidewall and seating leathers, wood veneer, divan fabric and carpet can be customized by the client. “We have a library of choices and if there’s something specific that we don’t have, we would go and find it for our customers,” says Nolen. “There are certification requirements from a flammability perspective, but usually we find a material that meets those requirements and is close to what our customers are looking for.”

Selling points Nolen says a key selling point with this aircraft is value for money. “The Challenger 650 has the same cabin width as our Globals, and costs US\$32.5m – much less,” he points out. “Twice as many Challenger 600 series aircraft are sold compared to its nearest competitor every year. In addition to the cabin size, the aircraft’s popularity is driven by the fact

that it’s an incredibly reliable aircraft and it has low operating costs.”

Nolen says these last two points are particularly appealing to corporate flight departments and charter and fractional ownership companies. This makes durability a strong focus. “The most demanding customer in terms of durability and quality is NetJets,” says Nolen. “We have specific tests that we conduct with them – for example, to make sure that the metal trim can withstand abuse from keys and pens. We have to meet their requirements – and they’re very strict.” **END**

Steering board

Bombardier always has a steering board for new products. Typically three groups are asked for feedback – pilots regarding aircraft performance and avionics; maintenance personnel to ensure easy maintenance is built in from the start; and principals and flight attendants with respect to interior aesthetics and functionality.

“We usually build three aesthetic designs and take those to the clients’ homes or places of business – it’s unusual for them to come to us,” says Nolen.

“Customers tend to like to be more involved in the process than having one particular design put in front of them. For this aircraft we took three unique designs forward, and each proposal included select elements that our clients felt had strong merit. The final design is always a blend of aspects of the original proposals.”



7. There are several layout options, and materials and colors are fully customizable

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glowingreport

Cabin lighting has undergone a revolution in recent years, driven by improvements in LED technology. Now the emphasis is on optimized control and new applications





LED technology has become the standard in business jet cabin lighting. Tim Fagan, industrial design manager for Bombardier's business aircraft division, explains why: "It's a tremendously versatile technology that's very reliable, doesn't require a great deal of power and can be very small, so you can squeeze lights into small spaces – and they're lightweight," he says.

There are challenges, of course, including color quality. "The quality and consistency of light output has come a long way in the past couple of years," comments Fagan. "The color

1. B/E Aerospace
Lighting &
Integrated
Systems'
Quasar Flex
mood lighting



rendering index (CRI) is among the most important measures of light color quality, describing how complete a color spectrum a light source offers. Natural white light comprises a full color spectrum, with a CRI of 100. In older LEDs, the white light didn't contain all the colors, so materials selected in natural light suffered a color shift in the cabin. The latest LEDs have improved CRI of up to 90 – so that cabin colors look bright and pop.”

Nevertheless, inconsistencies in color output remain a factor over time.

Inairvation, the joint venture of Lufthansa Technik and F/List, works with preferred partners Schott and DesignQ on new lighting. Its approach to the problem is based on Schott's HelioJet technology. “With HelioJet Spectrum we've overcome the fact that LEDs change color temperature with a sensor technology that measures and controls each and every LED involved,” says Edgar Jaumann, senior manager of sales at Schott Aviation. “It's the only way to secure homogenous color and brightness over time.”

2. Different ambiances achieved with B/E Aerospace's Quasar II mood lighting system
3. Inairvation is working to integrate lighting in cabin elements including cabinetry and flooring
4. Lighting can be used to emphasize design details – such as this textured bulkhead on the Bombardier Global 7000

Other technologies Looking beyond LED, organic light-emitting diode (OLED) and fiber optic technologies are primary areas of interest. “With OLED we're able to light any surface, including curved linings and monuments,” says Thierry Toulouze, head of electrical and mechanical systems in the design office department at Airbus Corporate Jet Centre (ACJC).

B/E Aerospace is also excited about the possibilities. “We're exploring technologies including panelized lighting,” says Rachel Bahr, director



Magic carpets

Lighted accents have even been added to carpets using fiber-optic filaments. The effect is dramatic, but there are certain things designers need to bear in mind when implementing them. “Although the fibers are flexible, they retain a certain rigidity, which means they're perhaps not ideal for a main walkway area,” says Tim Fagan of Bombardier. “You can feel them as you walk over them and we're careful not to compromise the comfort and sumptuousness of the carpet.”



of sales and marketing at the company. “This takes many forms, of which three stand out: OLED, electroluminescent and quantum dot (Qdot). The idea is to further increase the homogeneity of color and brightness in the cabin, creating a more natural look.”

Fiber provider Fiber-optic technology also offers new possibilities, although Bahr thinks perhaps not yet for use as a primary light source. “There is a trend driving lighting technologies to become smaller and to integrate into the cabin in the most discreet way possible,” says Bahr. “We see potential for a future where fiber-optic lighting seamlessly ties lighting into the design elements of the aircraft, integrated into composites, veneers or soft goods. Fiber-optic systems and light pipes are optimized for accent type lighting, however, traditionally falling short as general cabin lighting applications. Being a line source limits their projection distance, or throw. Their intensity falls off drastically versus direct LED Lambertian emitters.”

Fabio Molina, Inairvation’s business development director, sees similar potential in fiber optics. “The integration of LED and fiber optics allows us to offer new possibilities,” he says. “For example, using fiber optics we can integrate light into floor panels,



CABIN LIGHTING

sideledges and table edges. Schott’s lighting systems allow us to use the same light source to deliver multiple features and functions. Since the light is mixed in the glass rod, we can close down lighting trenches, improve fit and finish and hide the light source, without risking lighting hot spots. We can also shine light through materials, setting moods and directing passengers to concealed switches.”

PGA also offers a fiber-optic system, Beboptic. “The system is dedicated to creating bright areas of decoration, highlighting the details of seat shells, doors, windows and so on,” explains Quentin Pillet, motion and lighting product manager at PGA. “It enables different cabin ambiances to be created through varying the color and intensity of illumination. Passengers can even design and display their own personalized color sequences.”

Complete control Lighting control has become a key consideration. “There has been a trend toward zone control of cabin lighting, for example allowing passengers in the front of the aircraft



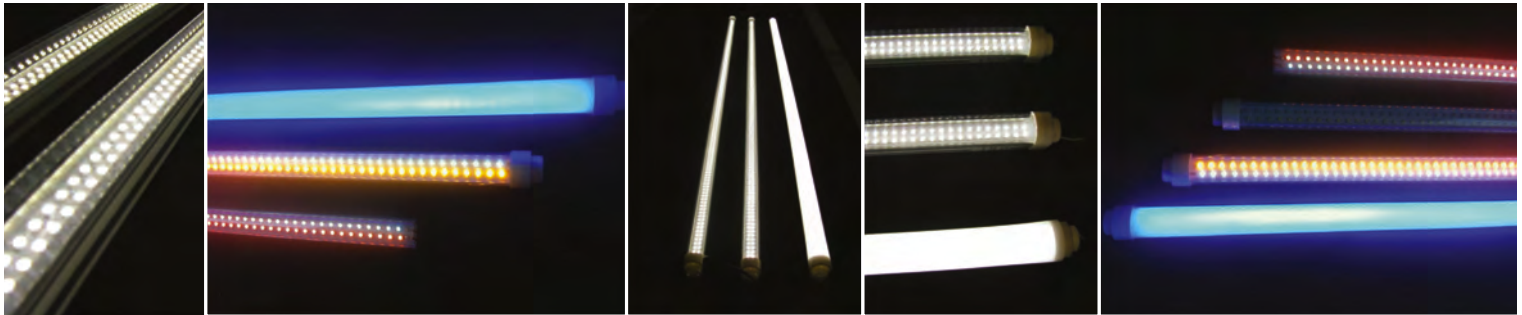
5-6. PGA’s fiber optic Beboptic system can be used to highlight cabin features

to enjoy a warm white light for eating, while passengers in the back prefer a rosy glow more conducive to a light nap,” says B/E Aerospace’s Bahr. “We believe that the most important feature of lighting control is the passenger or crew interface. In some cases, learning to use and take advantage of the lighting control system is a major hurdle for passengers and crew. The interface needs to be intuitive; in fact it needs to be nearly effortless for passengers and crew to employ the system’s full functionality. This trend has been growing and evolving – passengers want better, more intuitive control of their environment.”

Bahr believes this is mostly down to passengers’ experiencing automated and adjustable lighting systems in their homes. “We see a trend toward hyper-personalization, another step toward

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7. Lighting and cabin shade systems are integrated on the Global 7000
8. ACJC installed lights underneath the bed to create a floating effect on this recently completed ACJ319
9. Vision Systems' Nuance Touchless EDW system features gesture control

sleep when it is full daylight outside. How we provide the control to allow that is important."

Fagan also says there are many other ways in which lighting can be integrated with other cabin systems. "Passengers selecting a movie from their tablet and sending it to a cabin monitor will be offered a movie lighting preset," he says. "The system recognizes the entertainment mode, offers the preset, then puts the shades down and dims the lights for a cinema-type movie setting."

Joined-up approach Integrating lighting modes with other cabin systems clearly offers opportunities for new features and customization. Some integration-ready line and retrofit systems are available now. One such system is B/E Aerospace's Quasar. "It functions on a digital signal rather than an analog one, allowing for easier communication and integration with CMS," says Bahr.

With this kind of integration, optimized installation downtime and affordability are key aims. "We're working toward ease of integration by developing products that are versatile and work well for multiple applications," says Bahr. "With one of our recent RGB lighting products,

completely effortless control of cabin systems, including lighting," says Bahr. "We envision a not-so-distant future where passenger preferences are recognized and lighting and other cabin systems adjust automatically in line with these."

Natural light Some business jet manufacturers are also focusing on allowing more natural light into the cabin, by increasing the size of

windows. What does this trend mean for lighting systems? "The Global 7000 has 80% larger windows than on the Global 6000 and in many ways we now consider window shades and lighting to be a common system, managing light in the cabin," says Bombardier's Fagan. "Global 7000 passengers will almost certainly travel between time zones, which affects the lighting required. For example, they might want the shades down so that they can



Gesture control

Electronically dimmable window (EDW) systems have been available for a while. They enable passengers to change the tint of the window electronically, controlling the amount of light that comes in to the cabin. Recently the technology progressed with the addition of gesture control – which enables EDWs to be controlled without touching any interface, using gestures similar to those used to operate a smartphone.

Research Frontiers licensee Vision Systems unveiled Nuance Touchless, an enhancement to its SPD-Smart EDW line, in April 2015.

Passengers can change the tint of the entire window, or sections of it, by moving their hand from side to side or up and down in front of the window.





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First fruit

B/E Aerospace expanded its lighting business in June 2014 with the acquisition of Emteq, which has now been integrated into the company under the name B/E Aerospace Lighting & Integrated Systems.

“Demand for comprehensive and integrated solutions for power management, lighting and connectivity within the aircraft cabin is growing,” said Amin Khoury, chairman and CEO of B/E Aerospace, when the deal was announced. “The combination of our lighting and power management systems business with Emteq’s highly complementary lighting, cabin management and power systems businesses, as well as their electrical and connectivity expertise, will allow us to expand our product and service offerings in the commercial airliner and business jet markets.”

The first fruit of this combined force is 3X Nano, a 28VDC wash light that is suitable for line and retrofit. The product is 0.41 x 0.31in and weighs 1.5oz/ft. It can be installed using wiring and controls already on the aircraft and has integrated Ballast-Logic. Various versions allows either step dimming or PWM dimming for both white and multi-white color options. The white temperature can be set at installation or controlled and mixed in flight – from 3,500K to 5,700K. The system has an intensity of 10fc at full brightness.



13

- 10. Passengers on Gulfstream aircraft can control lighting on their smartphones
- 11. Extensive controls are available in the G450’s galley
- 12-13. B/E Aerospace’s 3X Nano



11

operators can use the same light for the ceiling and sidewall wash, as well as toe kick and other flexible accent applications, meaning they only have to integrate and wire for one system.”

Trial and error Resilience, safety and weight are also vital factors. “There are always challenges with advancing technologies, but the aviation industry provides unique challenges,” says Naveed Aziz, director of cabin research and development at Gulfstream. “The products in an aircraft not only have to provide functionality, they also have to meet weight and certification requirements. On all new programs, we trial the products in our test facilities and on flying testbeds to ensure the technology is mature before it reaches our customers. With the G500 we took that a step further, creating a full-size cabin integration test facility, where we test the functionality, design and comfort of the G500 cabin, including the lighting system.”

Lighting products are subject to all the regular certification requirements, while their rapidly developing technology can present challenges, as PGA’s Pillet comments: “Evidence of maturity and reliability is needed before some new technologies can be installed. Certification requirements, and the limits on introducing such

technology, require detailed discussion with the authorities, since current certification requirements may not be relevant to such specific and very new technologies.”

Crystal ball Looking to the future, ACJC’s Toulouse points to the possibilities of li-fi, a data transfer system that uses the visible light spectrum as an alternative to radio waves. “With li-fi we can produce an amazing lighted communicating environment, whatever the surface,” he explains.

Molina of Inairvation expects increasing automation and a focus on flexibility. “Accent lighting has been used to reinforce design signatures and focus passenger attention on specific features,” he says. “This trend will continue, as our future systems deliver light in more subtle ways and react to the changing environment during flight. Lighting control systems will be more sophisticated and link with other functions to deliver optimized lighting solutions under a wide range of scenarios. This will be delivered to the customer in a seamless and automated way, making small decisions on the customer’s behalf, while providing choice through a clear and simple interface, rather like a modern-day butler.” **END**

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DISHWASHAIR

Lufthansa Technik unveiled the Dishwashair dishwasher in April 2015. Users can select from two- or six-minute wash cycles. The maximum water consumption is 3 liters per cycle. The unit is in production and has been chosen by some VIP customers. It was developed by hs2 engineering under the guidance of engineers from Lufthansa Technik.

The companies say that Dishwashair features complex safety mechanisms and that it can be attached easily to the fresh and wastewater or vacuum systems in the aircraft galley. The unit uses two cleaning agents. The companies say a single fill-up can last 40 wash cycles.

“Long-haul aircraft in particular take along lots of dishware,” says Oliver Thomaschewski, head of seating and structures in the Original Equipment Innovation product division at Lufthansa Technik. “Now our Dishwashair makes it possible, even in an aircraft, to bring along only the amounts actually needed to provide service.”

www.lufthansa-technik.com



ROBUSTA

The latest coffee maker from Italian supplier Iacobucci HF Aerospace is called Robusta. It dispenses coffee, tea or hot water at the touch of a button. In fact, it can brew 1.6 liters of the user's choice of coffee or tea in less than 150 seconds, and needs no recovery time between cycles. The company says the coffee brewed by Robusta is “of a darker color, with a more intense aroma”, thanks to an “innovative brewing technology and extraction process”.

The unit comes in Atlas and Arinc versions and is mounted on a rail. It weighs 7.5kg. As its name suggests, Robusta was designed to be highly reliable. Iacobucci HF Aerospace also worked to make it easy to install and remove, quiet in operation and power-efficient. Ease of use was another key design aim, and so the unit has a control panel without a handle.

“I strongly believe the market is ready for a newly developed coffee maker that, on top of being reliable and low in weight, makes good coffee in all cabins,” says Lucio Iacobucci, president and CEO of Iacobucci HF Aerospace.

www.iacobucci.aero

galleygoods

A lot of business jet galley inserts have been launched recently – with completion centers getting in on the act too



SKILLET

Recently, a completion center approached Aerolux because its customer wanted to cook eggs on board. “Being a supplier to airlines for their first and business cabins lends itself to supplying the private jet market with high-end units you would not normally see in OEM catalogs,” says Rob Shelton, sales director at Aerolux. “Our skillet is ideal if you have an onboard chef and want eggs cooked in flight. It is already used in Etihad’s first class cabin, so it is a natural crossover into the private and business jet market.”

The skillet is a self-contained hotplate unit that is mounted on a worktop. It is specifically designed for cooking eggs. The hotplate itself is made from high-temperature 6mm-thick ceramic glass, which is toughened for strength, permanently bonded in place, and fully sealed to prevent moisture ingress. The unit’s body, cover and pan retainer are made from food-grade stainless steel. A Teflon-coated frying pan is provided.

The skillet runs on a 115VAC 400Hz power supply and takes six minutes to warm up. Fixed temperature settings and a timer switch are provided for ease of use. Safety features include a locking device and covering lid on the pan retainer, and an illuminating overheat/fault indicator.

Aerolux has 25 years of expertise in manufacturing galley inserts.

www.aerolux.co.uk



GOURMET BEVERAGE MAKER

B/E Aerospace updated its coffee maker offering in 2013, with the Gourmet Beverage Maker. It uses a 15-bar pump and a thermoblock heating system to produce single servings of regular coffee, espresso, cappuccino and hot water for tea.

The unit was designed to be reliable, aesthetically elegant and intuitive to use. Its controls include a one-touch cappuccino function.

The Gourmet Beverage Maker is compatible with widely available coffee and espresso pods. It also has a tank for bottled water, meaning it can be used even on an aircraft that doesn’t have a plumbed galley.

www.beaerospace.com



ADVANCED AVIATION DISHWASHER

Jet Aviation Basel has unveiled its Advanced Aviation Dishwasher (ADW). “The ADW reduces the number of dishes required on board, provides additional storage space, and can even be used to heat up dishes,” says Johannes Turzer, vice president and general manager of the Basel maintenance center.

The dishwasher has a three-minute wash cycle, requires 3 liters of water and has a maximum power consumption of 3kW. Two unit sizes are available: the larger one is 602 x 814 x 615mm, the smaller one is 450 x 750 x 550mm. Jet Aviation Basel says that the product is qualified for taxi, take-off and landing with up to 20kg of dishes inside. The standard front material is stainless steel, but this, along with the door handle, can be customized. The product has an integrated drip pan.

“The ADW is a very robust dishwasher, inspired by a model used in the ETA German railway cars. We developed it in line with published EASA design and performance standards for aircraft galley equipment, as well as Airbus and Boeing specifications,” says Matthias Mueller, project manager for cabin modifications and upgrades at Jet Aviation Basel. “The ADW is compatible with an eco-friendly soap that is gentle enough for the most delicate dishes.”

The ADW is available for installation or retrofit at Jet Aviation Basel.

www.jetaviation.com/basel

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designerchic

Two new cabin concepts from HAECO Private Jet Solutions demonstrate the completion center's design capabilities

1. An area for drinking tea on the Xiao Yao BBJ 2 concept
2. The East meets West wide-body concept
3. The Xiao Yao cabin's daybed area



The first chapter of the classical Chinese text Zhuangzi is Xiao Yao You, which translates as 'wandering beyond'. The idea is that people should explore the unfamiliar to achieve oneness with nature. The word xiaoyao has evolved to mean "at ease, leisurely and spontaneous". One connotation is of leaving behind the city life for a more tranquil one in the countryside. It is this spirit that HAECO Private Jet Solutions (HAECO PJS) has tried to achieve in its latest BBJ 2 concept.

The company's services for private jets include cabin interior design, engineering, certification and cabin completion. HAECO PJS's headquarters are in Xiamen, mainland China, and it also has a satellite office in San Antonio, Texas, USA. The Airbus-approved and Boeing-licensed cabin completion center has completed three green ACJ319 cabins and refurbished one BBJ 737-300 since opening in 2008. It holds Part 21J Design Organization Approval from the Hong Kong CAD, and is a CAAC-approved Designated Modification Design Organization Representative.

The main aim with the Xiao Yao cabin was to create a haven of tranquility. In keeping with its name, the cabin is not laid out in straight lines, but rather has various areas (including spaces in which to play Mahjong and drink tea) that are linked by a fluid walkway.

The layout is also influenced by feng shui: the company says it was designed to generate and

retain maximum qi (life force). The living areas symbolize different parts of an "ideal" landscape, and the walkway represents a gentle stream circulating between them. The design also incorporates the Wu Xing (five elements) – wood, fire, earth, metal and water. According to Chinese astrology, every person has their own Wu Xing profile. The cabin design can be tailored to each customer's Wu Xing through colors, shapes and materials.

Overall, HAECO PJS aimed to produce a timeless but modern look that would appeal to people of all cultures. As its engineering department was involved in the project from the start, certification has also been taken into account – the company says the LOPA complies with the most stringent safety requirements.

The mix of Asian heritage and modern aesthetics is also evident in another design unveiled by HAECO PJS recently – an East meets West concept for wide-bodies that was developed in collaboration with a fashion brand.

Classic eastern lattice patterns are used in an otherwise modern western setting. The color scheme is mainly neutral, but pale green and matte gold are used to inject some bold color. Design highlights include hand-woven and painted wallpaper, a sushi bar and lattice frame dividers. The latter were chosen to provide the illusion of more space in the cabin and to add to the feeling of modernity.

HAECO Private Jet Solutions Reader Inquiry No. 501

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window of opportunity

Orders are mounting for JBRND's latest development
— business jet window shades designed to last

JBRND has been in the aerospace research and development business for nearly 25 years, and recently turned its attention to the research and development of aircraft window shades. A year ago, the company opened a 6,000ft² building to house a new windows department. After a few years of research, JBRND has finalized a new electric window system called SyncDrive.

"The dilemma for aircraft owners and service centers has always been that typical window shade systems require frequent, inconvenient repairs," says Les Heifner, director of marketing at JBRND. "The primary cause of these repairs is the string-based systems inside."

JBRND says SyncDrive has eliminated the need for strings inside the unit. "In testing, the new electric shade system has performed well over a million cycles to date without a failure," says Heifner.

A USB port controller enables the system to be programmed to the customer's requirements. JBRND's electric window shades can be controlled through an app or through the aircraft's CMS and can feature a lever for manual override. As with the company's manual window shades, there are many color options for both shade and mask, plus two-tone trim accents. The windows can also be completed

with integrated LED accent lighting — offering various shades of white and adjustable RGB colors. This is also controlled using an app or via the CMS, and operates on 28VDC.

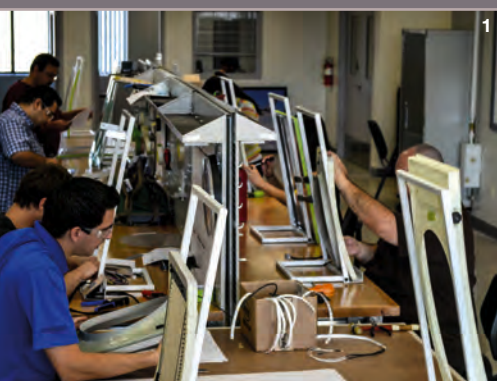
"We didn't just spontaneously decide we were going to get into the windows market," says Heifner. "When it comes to aircraft window shade systems, there are currently two extremes. On the one hand there are blinds that have essentially stayed the same for decades and are maintenance heavy. On the other, there have been some major advances in window shade technology in the last few years, which has led to some space-age technologies such as electrochromatic windows — but these are cost-prohibitive in a lot of cases."

JBRND wants to provide a high-quality and extremely low-maintenance middle ground. "This is exactly the kind of innovation everyone has been hoping for, and you can put it in any aircraft," says Heifner. "As a result, window orders at JBRND are coming in really fast."

JBRND has announced eight contracts for SyncDrive so far, and reports there are more in the pipeline. "We're working on a BBJ, two BBJ 787s, two BBJ 777s, an A319 and an MI-17 helicopter, as well as the Nextant 400 XT and G90 series," says Heifner. "If orders keep up like this, we're going to need another building, and maybe another campus altogether."

Heifner believes that JBRND's long background in research and development is the key to its success. "We're in a unique position with a very talented team, the right equipment, the ingenuity and the infrastructure, based in aerospace innovation, to do far more than your average window maker, and we're just getting started," he says.

1-2. JBRND's new windows department



JBRND

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performanceart

The business jet industry has a unique set of requirements when it comes to leather

For aviation leather, performance is key. Green Hides says that when choosing a leather for a business jet interior application, customers have a long list of requirements – great flammability characteristics, durability, lightfastness, color consistency, availability, softness and beauty.

“Our clients aren’t just looking for VIP interiors, but for VVIP interiors,” says Simone Lagnerini, president at Green Hides. “We want to give them the best, technically and aesthetically. That’s why, in 2010, Green Hides set out to develop the best luxury business aviation leather in the world.”

For the development, Green Hides’ leadership team drew on its decades of experience in leather development and the aviation industry, as well as the engineering expertise of its partner, an Italian tannery. The partnership enables Green Hides to create 5,000ft² of leather at a time, which it says ensures color consistency and improves availability across its aviation line.

Aeronautica was born in this controlled, industrialized setting. It was intended as an

aviation leather from the first day of production. The leather undergoes two flame treatments, one being a flameproofing process in the drum. In addition, the company says specially formulated finishes optimize finish adhesion, abrasion resistance and lightfastness – which it says are vitally important in a business jet.

“We designed Aeronautica to be an aviation leather from a technical aspect, but also from a luxury aspect,” says Keith Hill, vice president at Green Hides. “Every hide is hand-selected, numerous times, from the grain side and the crust side. Full-grain and vacuum-dried, it has the silky smooth, soft hand of a luxury leather. The best compliment I get is when an aircraft returns after a year, and the customer tells me how great the leather looks and how well it is holding up.”

Green Hides

Reader Inquiry No. 503

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2

1-2. Green Hides offers many color and perforation choices within its Aeronautica range



treadlightly



Lightweighting has clear benefits in an aircraft and is a common aim on cabin interior completion and refurbishment projects. Once the obvious targets have been taken care of, the search for additional weight savings can turn to less visible, lower profile corners of the aircraft. Zotefoams suggests that designers consider looking underfoot.

"Carpet underlay might not be the most exciting component to consider when fitting out an executive aircraft," says Glenn Sievwright, Zotek F business development manager at Zotefoams. "However, beyond creating a luxurious feel underfoot, additional benefits of underlay include increased thermal and noise insulation, the extension of the carpet's life and better aircraft hygiene. We created Zotek F to optimize all these benefits, and to offer weight savings of up to 1.25kg/m² over conventional aviation underlays."

Depending on the type of business jet, Zotek F can save up to 300kg in weight. "Its closed cell construction delivers increased durability and ease of cleaning because it resists penetration by moisture

and spillages, and is even resistant to a wide range of chemicals too," says Sievwright. "On a recent long-term inspection of an ACJ318, Zotek F carpet underlay was considered to be still in an as-new condition after having been in service for four years. It was a real testament to the longevity of Zotek F carpet underlay."

The product is also designed to be kind on the nose. "Its chemical purity means that at least the underlay won't contribute to those new carpet odors," says Sievwright. "And with its excellent flame, smoke and toxicity properties, Zotek F also delivers established performance enhancements for a growing range of commercial aviation applications, including ECS ducting, plenums, flexhoses, window seals and mounts, and soft touch trim. These applications are now available for business jet applications too."

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A luxury suite inspired by the Bentley Continental GT



This is the second Bentley Suite to result from the collaboration of St Regis Hotels & Resorts and Bentley. It was designed by Wimberly Interiors, for the St Regis Istanbul hotel in Turkey. The 1,345ft² suite has a foyer, a bedroom, a living area with a curved sofa, a bathroom, dressing room and powder room, and a large balcony where guests can dine al fresco.

Wimberly Interiors says the aim was to create a beautiful space inspired by the Bentley Continental GT, but to avoid overt use of Bentley's logo or specific branding elements.

One lovely detail is a ribbed glass light fixture that is evocative of the Continental GT's headlights. Its curves reflect those of the Adenauer Forest section of the Nürburgring in Germany, where Bentleys are test-driven.

The curves of the car itself are reflected in elements including the carpet and the sofa. The pattern of the carpet was inspired by the car's front grille, while the sofa is upholstered in Bentley leather. There is also a wet bar reminiscent of the car's dashboard, which, among other items, houses a humidor that was made in Bentley's woodshop.

OTHER EYE-CATCHING DESIGNS FROM VARIOUS INDUSTRIES...



Volvo developed the Lounge Console concept to meet the needs of chauffeur-driven businesspeople. The console replaces the front seat. As well as offering a table and a 17in media screen, it opens to reveal an illuminated mirror with storage. There is also a lockable storage box.



Intrepid Design created this coffee table using a Rolls-Royce engine fan taken from a Sea Harrier jet. The fan comprises 26 polished titanium blades, in their original hub.



The Hotel Can Mostatxins is a 15th century tower house in Alcúdia, Mallorca. In restoring it into a boutique hotel, care was taken to retain its gothic style and features, while adding glass walkways and a pool.

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