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OCTOBER 2018

NBAA-BACE PREVIEW

The innovations
not to miss,
from page 72

Honda Jet ELITE

MICHIMASA FUJINO SHARES THE THINKING BEHIND
HIS LATEST WORK – AND WHAT HE'S TARGETING NEXT



GREEN MATERIALS

How environmental considerations are influencing the industry's materials offering

CITATION LONGITUDE

Textron Aviation debuts in the super-midsize category, promising swift turnaround time

CABIN AUDIO

The latest technologies and strategies to ensure amazing sound quality on board

HEATED STONE FLOORING

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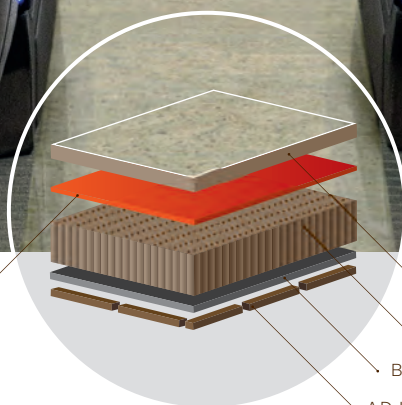


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Wheels up

Head down the runway with a selection of the latest cabin designs, product launches, case study news and completion announcements

- 008 **Pinboard:** The industry's hottest recent designs presented in one place
- 010 **News in Focus:** Flying Colours Corp Asia shares details of a recent Global XRS refurbishment, performed for a China-based customer at short notice
- 012 **Completions Roundup:** This quarter's announcements from completion centers around the world
- 014 **Design Brief:** Design Q discusses the creation of a production interior for HAV's Airlander 10 airship

Features

- 16** **CITATION LONGITUDE**
Textron Aviation explains how it can offer a quick turnaround from sale to delivery on its upcoming super-midsize jet
- 24** **INTELLECTUAL PROPERTY**
Careful planning and clear communication are the keys to protecting intellectual property without igniting acrimony
- 32** **GREEN MATERIALS**
Designers are pushing for greater use of environmentally friendly materials in the business jet interior industry
- 40** **HONDAJET ELITE**
In updating the HondaJet, its creator took the opportunity to add a galley, belted lavatory and speakerless audio options, while retaining what gave the original its charm
- 48** **AUDIO SYSTEMS**
Experts share their recent experiences creating optimum sound quality on board



- 56** **GLOBAL 5500 AND 6500**
The Global family is expanding with two new jets that capitalize on developments from the flagship Global 7500, with the addition of the exclusive Nuage chaise
- 64** **VIP DESIGNERS**
Ahead of NBAA-BACE 2018, five experienced designers based in North America share the lessons they've learned and the developments they'd like to see
- 72** **NBAA-BACE 2018 PREVIEW**
Product and service innovations not to miss at this year's show, to be held in Orlando, Florida, on October 16-18



087



098



102

- 085** **PRODUCTS AND SERVICES**
The latest product news from our advertisers
- 107** **INDEX TO ADVERTISERS**
- 108** **DESIGN SPY**
The best designs from other sectors, including a luxurious motorcoach interior

THE TEAM

EDITOR Izzy Kington
isabel.kington@ukimediaevents.com

ART EDITOR Anna Davie

DEPUTY ART EDITOR Louise Green

DESIGN TEAM
Andy Bass, Patrick MacKenzie, Craig Marshall,
Karin Rees, Nicola Turner, Julie Welby, Ben White

PRODUCTION EDITOR Alex Bradley

CHIEF SUB EDITOR Andrew Pickering

DEPUTY PRODUCTION EDITOR Nick Shepherd

SENIOR SUB EDITOR Christine Velarde

SUB EDITORS Tara Craig, Alasdair Morton

HEAD OF PRODUCTION & LOGISTICS Ian Donovan

DEPUTY PRODUCTION MANAGER Robyn Murrell

PRODUCTION TEAM
Carole Doran, Bethany Gill,
Frank Millard, George Spreckley

CEO Tony Robinson

MANAGING DIRECTOR Graham Johnson

EDITORIAL DIRECTOR Anthony James

ART DIRECTOR James Sutcliffe

PUBLICATION DIRECTOR Damien de Roche
damien.deroche@ukimediaevents.com

PUBLICATION MANAGER Julia Rogers
julia.rogers@ukimediaevents.com

CIRCULATION AND SUBSCRIPTIONS
MANAGER Suzie Matthews

published by UKi Media & Events,
a division of UKIP Media & Events Ltd
Business Jet Interiors International
Abinger House, Church Street,
Dorking, Surrey, RH4 1DF, UK
Tel: +44 1306 743744

Email: businessjetinteriors@ukimediaevents.com
Website: www.businessjetinteriorsinternational.com

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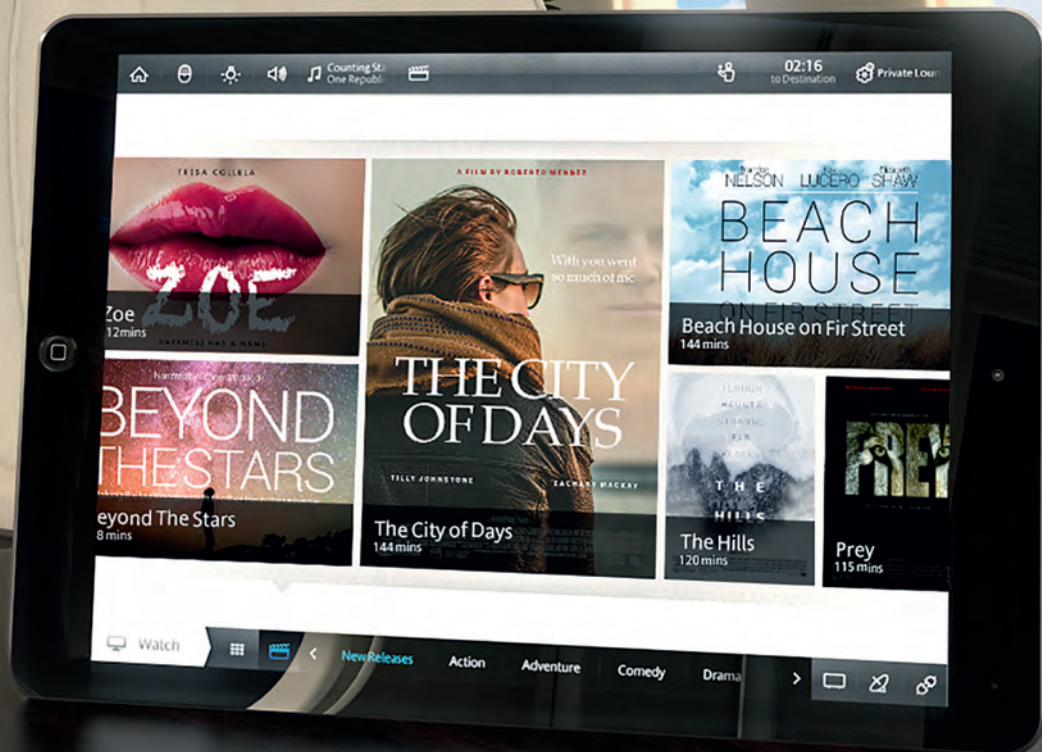
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FORWARD LOOKING

At this year's EBACE, I had the pleasure of meeting Michimasa Fujino, president and CEO of Honda Aircraft, who led the creation of the HondaJet and its update, the HondaJet Elite. Fujino is not the type of CEO to eschew the engineering heavy lifting; he has many innovations to his name.

It was fascinating to learn how cabin noise has been reduced, and all about the new functionalities that have been introduced on the HondaJet Elite – despite the original HondaJet's continued popularity (17 were delivered in the first half of 2018).

It was also great to learn how the company's automotive knowledge has been mined, for example to optimize manufacturing efficiency. You can read what Fujino had to say in the feature on page 40. It is pretty well summed up in his quote: "I don't want to accept that a light jet interior must be based on conventional or traditional ideas."

The feature on page 32 also investigates potential shifts in tradition, exploring environmentally responsible material choices. The designers we spoke to noted increased focus

on sustainability, organic products and local sourcing. They also pointed to possible uses for bamboo and moss, the rise of veganism, and a trend in the automotive arena for leather-free interiors. To all our designer readers out there, I'd be interested in seeing your ideas for how a fully vegan interior could look!

Another unmissable feature in this issue is the NBAA-BACE 2018 preview, starting on page 72. It is a massive tradeshow, so we've compiled some of the interior-related highlights for you.

I know the new members of our team – Julia Rogers, publication manager, and Damien de Roche, publication director – would be delighted to meet you at the show. The magazine is represented on booth 644.

Finally, I'd like to direct your attention to our website, www.businessjetinteriorsinternational.com, which has been completely revamped to provide a more modern, user-friendly way to keep up with all the week's industry news.

It's also a great resource for job posts, back issues, videos and a supplier directory – and even mini-features and fun quizzes. After all, we all must move with the times!

Izzy Kington, editor

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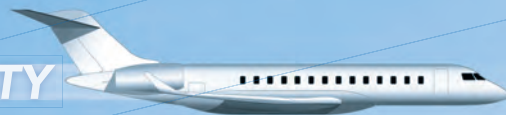
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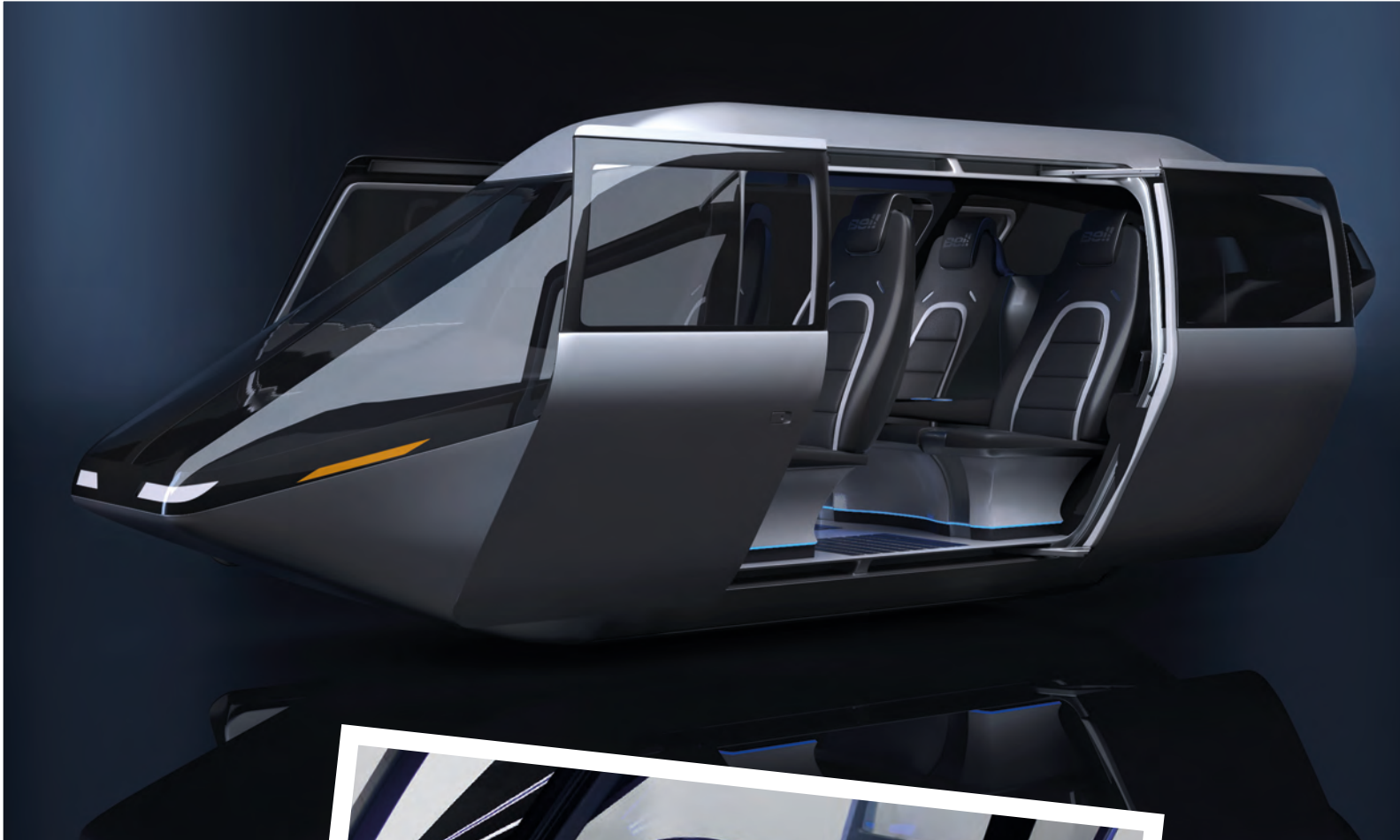


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WITH ITS NEW ON-DEMAND URBAN AIR TAXI CONCEPT, BELL IS EXPLORING NEW OPPORTUNITIES IN THE FUTURE OF AIR TRANSPORTATION WITH ELECTRIC AND HYBRID VTOL AIRCRAFT.

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GLOBAL JET HAS EXPANDED ITS CHARTER FLEET WITH ANOTHER GLOBAL 5000. THE AIRCRAFT ACCOMMODATES 12 PASSENGERS AND HAS THREE SECTIONS. THERE IS CLUB-FOUR SEATING, FOLLOWED BY A FOUR-PLACE DINING SETUP AND AN AFT DIVAN FACING A CLUB TWO. THESE CONVERT TO OFFER THREE SINGLE BEDS AND TWO DOUBLE BEDS.



THIS MEDEVAC G550 WAS DESIGNED AND DELIVERED BY GULFSTREAM FOR THE BEIJING RED CROSS EMERGENCY MEDICAL CENTER. LIFE-SUPPORT CAPABILITIES INCLUDE EXTRACORPOREAL MEMBRANE OXYGENATION, A BED DESIGNED TO ACCOMMODATE AN INFANT INCUBATOR, A POWERED GURNEY LOADING SYSTEM ON AIRCRAFT STAIRS, X-RAY VIEWING EQUIPMENT, AND REFRIGERATED MEDICAL STORAGE CABINETS.

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GLOBAL XRS REFURBISHED IN 90 DAYS BY FLYING COLOURS CORP ASIA

This 10-year-old Global XRS (renderings pictured) arrived at Bombardier Aerospace's Singapore facility for a pre-purchase inspection. After the China-based customer purchased the aircraft, a 120-month inspection was undertaken. With Flying Colours Corp Asia present at the Bombardier Seletar facility to support interiors work, a full interior refurbishment was possible. The total process took 90 days.

The work touched just about all parts of the cabin, and involved upgrading the functionality and styling. The project included a full cabinetry sand down and refinish, the refurbishment of seat and divan covers, and the installation of new Corian countertops (supplied by Dupont) with integrated bullnose moldings, for the lavatory and galley.

New materials included satin rose gold plating from Signature Plating and Ultraleather from Tapis, used for the cabin shell.





Q&A

Paul Dunford

GENERAL MANAGER, FLYING COLOURS CORP ASIA



The cabin is configured for 14 passengers. There are four berthable executive seats in the forward cabin. The mid-cabin features a four-place conference group with a hi-lo table, and an executive workstation with a fax/printer and a single executive swivel seat. The aft cabin features a two-place club and a three-seat divan. An aft lavatory includes a vanity wardrobe and cabinet.



The new camel-colored carpet was supplied by Red Rock Custom Carpets, and reflects the overall neutral, cream-dominated palette.



The refinished cabinetry features a high-gloss walnut burl veneer.



The reupholstered seats feature two tones of cream leather, both supplied by Townsend Leather. The look is finished with Fudge leather piping. The divans were also refreshed using fabric supplied by Pollock.



The large forward galley and galley annex are fitted with a TIA microwave oven, as well as a TIA high-temperature oven. There is also an Aerolux Nespresso coffee maker and chiller for cold storage.



The aircraft's enclosed crew area includes a berthable executive seat in the entry area and a jump seat aft of the flight deck.

Were any unusual aspects included?

We had very little prior warning that the refurb was to be done as it was a result of the sale and sort of dropped into our lap. This meant that the normal pre-planning process didn't take place, nor were any materials or design provided initially.

To expedite the project on time and on budget we met the owner, his PA and his personal design team in Beijing. We advised on materials, metal plating and veneer sheens to give a new, elegant look to the interior. A few years ago, the Asian market preferred to buy new, but we are seeing more purchasers looking to buy pre-owned and style it in their own look. This is a great example of the maturing market.

What was the most challenging aspect of the project?

Based on pre-meeting material color preferences, preparing material sample boards with readily available products and superior delivery lead-times was a difficult task. It was challenging working with international suppliers to ensure on-time delivery of soft goods.

It was our first complete refurbishment in Singapore. Our workscope normally involves repairing parts of the interior, and this was the first time we have refurbished pretty much all elements of the cabin.

At our other facilities we often undertake maintenance, upgrades and avionics changes while we do the interior. This is a great example of how we work closely with Bombardier in this region. Its team conducted maintenance work while we took the monuments into our workshop to re-cover, modify and upgrade them.

Did you call on the expertise of FCC's other locations?

With our head office in Peterborough, Ontario, we can pull on manpower assistance when required. The cabin seat complexities on this aircraft necessitated one additional senior technician.

We are now working on our third major interior refurbishment in Singapore, and the team is better equipped to tackle these worksopes. Our ability to produce results equal to the mature markets in North America and Europe is now well known to our Asia-based customers.

How are you positioned for the future?

With more than 300 Bombardier business aircraft in Asia, and many nearing their 96- and 120-month major inspection thresholds, BAS Singapore and Flying Colours Corp Asia are poised to take on the upcoming aircraft flow through its facilities. We are in a great position to support Bombardier and aircraft owners in minimizing downtime with our interior capabilities.

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COMPLETIONS ROUNDUP

This quarter's announcements from completion centers around the world

BASEL, SWITZERLAND

A privately owned Global Express XRS has arrived at AMAC for a 120-month inspection that will entail the full removal of the cabin and the installation of a Ka-band connectivity system and router. It is one of several recent Global Express contracts for the company. AMAC is also expecting a head-of-state A320 in October 2018 for a C-check and upgrades, including enabling streaming of HD content to PEDs and a Ka-band system. The company also secured an A340-600 contract involving a C-check, landing gear overhaul, a major cabin removal and mandatory fuel tank inerting system installation.

HAMBURG, GERMANY

The Lufthansa Technik Group has welcomed 158 new trainees. The company also plans to nearly double the number of training slots it offers in Hamburg and Frankfurt over several years, beginning in 2019. Applicants were able to choose between 12 professions and courses of study.

MUNICH, GERMANY

A multimission humanitarian version of the Dornier 328 will be developed by 328 SSG and AMC Aviation, working with Jetran and Jetcor Aviation Services. Initially three aircraft will be converted, with final delivery in early 2019. The 328s will be delivered with 12 interior options in passenger/passenger-cargo/medevac/casevac versions.

AMSTERDAM, NETHERLANDS

JetSupport achieved AS9110C certification for its quality management systems.

BORDEAUX, FRANCE

Sabena technics is building a 10,000m² (108,000ft²) hangar, to start maintenance and modifications operations in January 2020.

LUQA, MALTA

SR Technics is expanding its facility in Malta to increase capacity for heavy maintenance, C-checks and cabin modifications or retrofits for up to six narrow-body aircraft at a time.

MILAS-BODRUM, TURKEY

AMAC opened a 4,626m² (49,800ft²) wide-body hangar, offering VIP maintenance services in the summer.

PETERBOROUGH, CANADA

Ka-band connectivity has been enabled on a Gulfstream GV as part of a refurbishment and exterior revamp at Flying Colours Corp. The company installed a radome, tail antenna and cabin hardware. CMS and IFE were also upgraded to Rockwell Collins's Venue. The company has also been working on two Gogo L3 Avance installations on a Challenger 604 undergoing refurbishment of all soft goods, cabinetry and avionics and a Challenger 605 (in for maintenance and avionics upgrades in St Louis, Missouri).

CLEVELAND, OHIO

Nextant Aerospace secured an STC enabling it to install Gogo Avance L5 connectivity on Phenom 300 jets. Constant Aviation will outfit the upgrade. Constant Aviation also completed an application of the MicroShield 360 antimicrobial coating solution for Champion Air, a Part 135 operator. Aircraft application of the treatment is performed exclusively through Constant Aviation.

EAST ALTON, ILLINOIS

West Star Aviation completed its first Falcon 7X C inspection. The work was conducted along with a paint and interior transformation, and the installation of Honeywell Ovation avionics. The company also gained Brazilian (ANAC) approval for maintenance, installation, inspections and repair services.

PERRYVILLE, MISSOURI

West Star Aviation is developing its facilities in Perryville into its fourth full-service MRO, with four hangars and a 2,675m² (28,800ft²) paint facility. The company is also adding employees and capabilities at the site.

SANFORD, FLORIDA

Constant Aviation began work on the first of four Challenger 601/604 strip and paint events from a contract awarded by the FAA, marking the MRO's expansion into government contracting.

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change of pace



HAV is aiming to reincarnate the airship, developing a vehicle that can take off and land from virtually any flat surface and stay in the air for long periods, traveling very slowly or even hanging in the sky. Design Q was approached early in 2017 to help design the Airlander 10's cabin interior, and supported HAV in winning a design grant.

The design will be offered as a production interior, but the layout and style can be customized. "The brief was to cater for 18 passengers plus crew, providing space for dining, social groups and retreat spaces – within a maximum 10 tons total weight," says Howard Guy, founder and CEO at Design Q. "The first ship had to appeal to different types of customers with various backgrounds."

Guy says the airship breaks all the rules set by current commercial aircraft. "For example, each passenger gets 10 times more space than the most generous jet first class, and furniture can be reconfigured in flight," he says.

The Airlander 10 is to have a maximum altitude of 10,000ft (3,000m) so as to not require pressurization. "Because the ship is not concerned with speed – or height for that matter – the cabin can be designed and engineered in a simpler, robust way," says Guy. "In a 16g jet, monuments have to be fixed. With the Airlander 10 certified for 3g, TTL can be enjoyed from a sofa rather than a chair (although passengers must still be belted for TTL) and the massive space on board has enabled us to invent a new seating system. The Airlander is subject to the same fire and toxicity regulations as jets, but this does not compromise the design opportunities. Emergency escapes are also much easier because many of the windows throughout the cabin can open."

The biggest anticipated challenge is weight, partly because of all the items needed to cater for so many people over a three-day excursion.

Guy hopes that the Airlander 10 will be ready for service in two to three years. Special details are being registered and patented before being shown. "Only 50% of the interior has been revealed, so expect to see more breathtaking elements over the next year," he says.

WINDOWS AND SHADES

There are windows everywhere – sideways, forward, aft and even downward. Blackout blinds can be deployed from their hiding place in the PSU panel. "I do not believe there is a blackout inter-glass system that could cope with the size of these windows, which are eight times larger than on the largest jet," says Guy.

LUXE MATERIALS

Materials include wood and stone flooring from F/List and handmade silk carpets from Tai Ping.



The image shows the interior of a private aircraft. In the foreground and middle ground, there are several white leather sofas with dark piping and colorful throw pillows (yellow, blue, and grey). The floor is covered with a patterned carpet featuring a geometric design in shades of green, yellow, and grey. In the background, a galley/bar area is visible, equipped with a large commercial espresso machine, a sink, and a microwave. The ceiling is white with recessed lighting and a large, cylindrical pendant light hangs over the lounge area. Large windows on the right side provide a view of the sky.

GALLEY/BAR

The galley is the size required for top-level chefs to cater for 18 guests. It also works as a bar.

Equipment includes a large commercial espresso machine modified and certified for Airlander, fridges, sinks and microwaves/ovens.

ROTATING SEATS

The seating system, developed by Pitch Aircraft Seating, enables seats to be rotated so that the passenger can face into the cabin for socializing, or turn outward to enjoy the views.

tailor

TEXTRON AVIATION
EXPLAINS HOW IT
CAN OFFER A QUICK
TURNAROUND FROM
SALE TO DELIVERY
ON ITS UPCOMING
SUPER-MIDSIZE JET

Words by Izzy Kington

ed swiftly



Determined to make a big entrance in the super-midsize market, Textron Aviation is aiming to be best in class for several features on its clean-sheet Citation Longitude. For example, it claims the aircraft will have the quietest interior (66dB) and most legroom (30in in the double-club configuration) in its class. It also says the aircraft will have one of the lowest cabin altitudes (5,950ft).

The company is also aiming to differentiate on the speed with which customers can take delivery of their aircraft: they can expect to receive the aircraft three weeks after the purchase/specification if they opt for standard materials and furniture. The key to this flexibility is Textron Aviation's vertical integration, enabled by its 2015 purchase of UTC Aerospace, which is now called the Interiors Manufacturing Facility (IMF) and builds all the company's cabin furniture.

LAYOUT OPTIONS

In its standard layout, the aircraft will feature a forward galley, followed by two club-four groups, an aft lavatory and a walk-in baggage compartment that is accessible at any stage of flight. Buyers can replace two or four of the aft seats with one or two three-place divans, and/or shorten the galley to enable the inclusion of a side-facing seat for a flight attendant, opposite the entrance. The maximum passenger capacity is 12.

THE CITATION LONGITUDE WILL BE
TEXTRON AVIATION'S FIRST SUPER-
MIDSIZE BUSINESS JET

*Textron Aviation says
the Longitude will have
the longest maintenance
intervals – 800 hours or
18 months – in the
super-midsize class*

There are six standard color, trim and finish schemes, but full customization is possible. There are multiple seat options. "The Longitude can be customized efficiently because we complete the design, build-up and upholstery in-house," says Christi Tannahill, senior vice president of interior design and engineering at Textron Aviation. "The aircraft and all the standard furniture will already be built, so if customers select a standard specification, our team can stain the cabinetry, complete the upholstery, and install it all right away."

STOCKED UP

Elements from external sources include soft goods and the sinks, which will be held in stock. In terms of the seats, Textron Aviation works with suppliers for

"The Longitude can be customized efficiently because we complete the design, build-up and upholstery in-house"

Silence is golden

A selling point of the Longitude is the cabin's quietness – Christi Tannahill says the decibel rating yields nearly twice as quiet an experience as the closest competitor. "We're best in class, and the customers immediately notice it," she says.

This has also led Textron Aviation to work to minimize

other noises that would not otherwise be heard.

"For example, all the glassware and silverware is custom-made and slotted into its own spot, so nothing moves until you pull it out," says Tannahill. "When the cabin is that quiet, you can't have the jingling of silverware or wine glasses."

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Textron Aviation
expects FAA
certification for
the Longitude
in 2018



TOP AND LEFT:
THE DIVAN IS
STREAMLINED TO
BE IN LINE WITH THE
REST OF THE SEATING



INSET TOP: BAGGAGE IS ACCESSIBLE
AT ALL STAGES OF FLIGHT

INSET ABOVE: COMPONENTS SUCH
AS SINKS ARE HELD IN STOCK

completely changing a galley to special-missions configurations that involve reconfiguring the whole aircraft," says Tannahill.

Textron Aviation has the flexibility to do things quickly on all its models, but the three-week turnaround on standard materials and furniture is exclusive to the Longitude. "In this class, we also really wanted something to differentiate with," says Tannahill. "This was our opportunity to offer customization in a time period that's very beneficial to the customer."

CUSTOMER FEEDBACK

IMF has also enabled Textron Aviation to respond swiftly to customer feedback. From the start, a customer advisory board has been asked about everything from the placement of seats, windows and toilets, to the IFE systems they want. They have provided feedback on mock-ups and flight test aircraft, the design evolving with each round. Five aircraft are now flying as part of the certification program. "These aircraft are heavily utilized for demonstration flights so we continuously gather customer input," says

Tannahill. "We integrate the feedback and launch the aircraft back into the field for more demos. The five aircraft are configured with different interior schemes, showcasing a multitude of interior options. Through this

some of the plating and frame work, but does the rest in-house. Tannahill says the customization possibilities for seat tailoring are unlimited. "We have a lot of customers who want their designs, initials or company logos stitched onto the seats, and we do all of that in-house," she adds.

Textron Aviation's ability to offer the three-week turnaround will depend on normal circumstances, and standard materials and furniture. "Realistically, if somebody came in and ordered 15 aircraft at once, there wouldn't be the manpower to do them all in three weeks," concedes Tannahill. "However, we've got a good amount of inventory and a good labor force, so it would take quite a few aircraft before we hit the threshold of not being able to support it."

SPECIAL REQUESTS

Customers who have a bit more time and want something unique that has not been pre-engineered/certified can also be accommodated. "We have a specials group that supports customization, all the way from

SELF-SERVICE

Christi Tannahill's favorite part of the Longitude's cabin is the galley, which she describes as "very functional, but also very open and inviting". A key aim was to make sure there's room for everything anyone would need, and the things that they don't even know that they would need, while ensuring it is aesthetically pleasing.

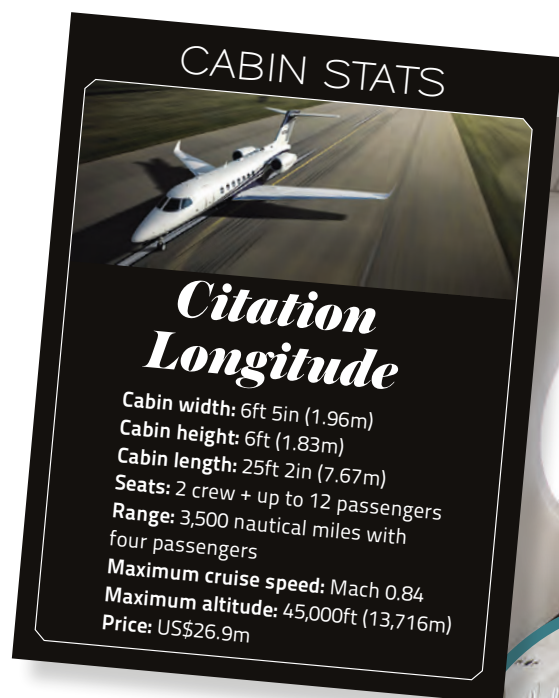
The galley is designed to be used by a flight attendant or by customers themselves. "If there's a flight attendant, we need to make sure that it's a very efficient area to work in, and if the passengers are getting their own drinks then we want to make sure it's intuitive to use," says Tannahill.

OUR LARGE FRIDGE, OR FREEZER, HOLDS A MASSIVE .17 CUBIC METRES/6.25 CUBIC FEET



A BESPOKE PRODUCT IN A MASS-MARKET WORLD

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approach, we have an optimal opportunity to ensure a superior product upon certification and delivery.”

The seat design, for example, has evolved. “Based on the extensive feedback we’ve gathered through the demonstration flights, we’ve since incorporated a one-piece footrest that completely extends out,” says Tannahill. “Another example is that early on in the program, we planned to have manual shades. After placing the Longitude in the field for some time, we found that people preferred the electronic shades. So, we were able to quickly work with our supplier and incorporate an electronic shade, which gives a sheer or blackout effect, which works very well.”

Feedback also led to the divan being available on either side of the aircraft, and to the availability of new material finishes for the sinks.

LIGHT RELIEF

The company’s human factors team has also tweaked the lighting a couple of times, for example changing the placement and adjustability of lights at each seat. Tannahill says lighting must be accessible, not overbearing, and support anything passengers want to do on board.

The lights, temperature and other CMS options can be controlled through a touchscreen in the galley, and there are manual controls for lights and shades at each seat. Passengers can control the CMS from any mobile device. As well as through the installed screens, passengers will be able to watch IFE on their PEDs. The aircraft has internet and Bluetooth. The latter enables passengers to connect their devices immediately upon entering the aircraft and play their own music through the aircraft’s speakers for example. “With cabin entertainment, we focus on what’s easy to use, reliable and what our customers want,” says Tannahill.

The CMS leverages a supplier (Heads Up Technology) and Textron Aviation design. This means the company can tweak it continually, so it is as up-to-date as possible and in line with feedback. “It’s good to be able to delay decisions around technologies,” says Tannahill.



MAIN: THE STANDARD LAYOUT HAS A DOUBLE CLUB CONFIGURATION

INSET ABOVE LEFT: SEATS ARE FULLY BERTHABLE

INSET ABOVE: ONE RESULT OF CUSTOMER FEEDBACK IS THAT NEW MATERIALS ARE AVAILABLE FOR THE SINKS

The addition of Bluetooth came about in response to customer feedback, future-proofing the aircraft against PED connector changes.

HANDHELD TRENDS

“Technology is going to change during the development, so you have to be very flexible,” says Tannahill. “You don’t want anything that’s built in, because when technology changes it’s very difficult or costly to change it out. People want the flexibility to use their handheld devices.”

This focus on evolution is partly why each aircraft in the company’s range has its own character. “There’s not a particular design signature, other than the quality of our products, because we continue to evolve in line with technology, design and customer requirements,” she says. ✕

THE FUTURE

Textron has a design team dedicated to exploring future technologies. “We’re looking at what windows look like and do they have to be there at all – maybe there will be screens instead,” says Christi Tannahill, by way of an example. “We

look at whether IFE can be displayed on the wall, or could your table actually be a computer? We continue to look at anything that’s fun to see if it can be incorporated into an aircraft. We investigate a lot of really neat ideas.”

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Words by Marisa Garcia. Illustration by Phil Hackett

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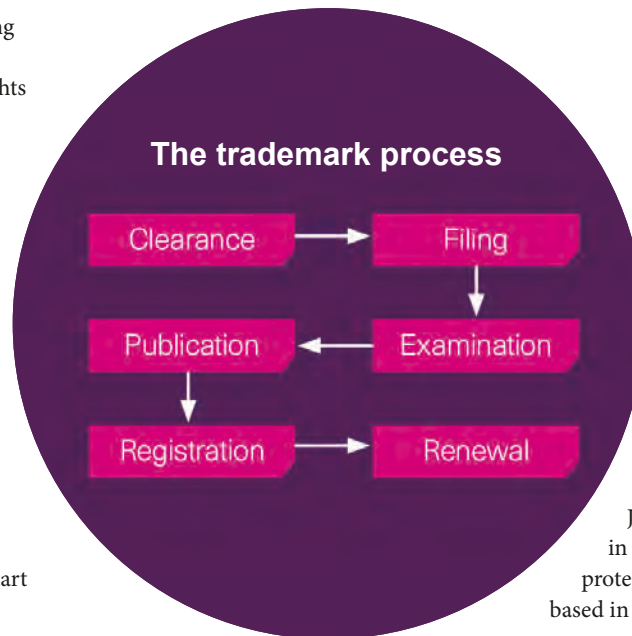


“It’s so important that you establish who is going to own the rights at the start of the project”

It’s difficult to create something new and unique. It may seem even harder to defend the rights of the creator, but with the right intellectual property (IP) protections, the industry’s designers, engineers and manufacturers can ensure that the product of their imagination retains its legacy and its value.

While there is a lot of independent innovation happening in the design of aircraft and cabin components and features, collaborative work is also common. If various parties are involved in a development, there is potential for confusion around who owns the idea.

“It’s so important that you establish who is going to own the rights at the start



LEFT: THE VARIOUS STAGES OF THE TRADEMARKING PROCESS



of the project,” comments Joanne Hopley, a specialist in patents and design protections at Keltie, an IP firm based in London, UK. “Things can run very smoothly between a designer and a manufacturer if the contract is clear from the start. The problem starts when two parties begin working together in open discussion on a new idea or design aspect and, before they know it, they’ve invented it together and nobody is sure how it arose. It’s difficult to unravel some of the ownership issues once you’ve gone beyond a certain point.”

PRECAUTIONARY PATENT

It may feel uncomfortable for the parties to begin with legalities before engaging in the work to hand, but it can avoid more uncomfortable situations later on. “There are steps to take to protect your ideas at the point of discussion,” says Hopley. “Even filing a quick patent application for something that you’ve thought through well, that you feel has legs. It doesn’t necessarily have to be fleshed out well enough that it ultimately grants you a patent, but it might be enough to give you a firm position to sit around the table with a bigger manufacturer. If you’ve already filed something that documents your position with the development, they can’t later claim that it is theirs.”

Hopley says such a patent application can be filed quite inexpensively and can be a worthwhile investment.

Emily Weal, also a specialist at Keltie, advises that potential collaborators take care to define and document background IP – what each party brings to the meeting



EXPERT OPINION

Both the specialists consulted for this article, Joanne Hopley and Emily Weal of Keltie, have a strong background of innovation in the sciences and are now legal advisors on patent and design.

Hopley has a doctorate in nuclear physics and got involved in patents after working with a government research agency, before joining Keltie, where she has been a partner for 16 years. Hopley is a chartered patent attorney, European patent attorney and UK and European design attorney.

Weal is a chartered patent attorney, with a doctorate in material sciences from the University of Cambridge. She specializes in patent challenges, freedom-to-operate and design rights.



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RIGHT AND BELOW: IT IS RECOMMENDED THAT COLLABORATORS DEFINE BACKGROUND AND FOREGROUND IP OWNERSHIP FROM THE OUTSET



“From a practical point of view, it’s so much easier if one party is in the driving seat”



beforehand – before engaging, then set up agreements for foreground IP – the product of a collaboration.

“The best thing anyone in this kind of collaboration can do is to clearly establish a line between what is background IP and what is foreground IP,” she explains. “You want to think, before you even go into a collaboration, ‘Do I need to protect anything with a patent or a design registration?’ If you decide that you are not at that stage yet, or you can’t afford to do it, then even if all you do is document the background IP for yourself, in a recordable, dateable way, then do it. Then after the meeting, you can write minutes or notes of what was discussed and what you think you brought into the collaboration.”

It is also possible for parties to decide to jointly own IP resulting from collaboration, but both Weal and Hopley agree it’s vital to define the parameters. “With joint ownership it gets tricky if you want to license or sell the IP to somebody else, because you need the agreement of all parties,” says Weal. “This needs exploring upfront.”

THE DRIVING SEAT

They recommend deciding, from the outset, which party will make decisions on the scope of the patent, where it should be protected and who will pay for the process. “Often, the decisions and the costs go hand in hand,” says Weal. “Whoever makes the decision will often pay the bill, but it doesn’t have to be the case.”

“From a practical point of view, it’s so much easier if one party is in the driving seat,” says Hopley. “The other party still retains the rights to exploit the invention, but you have one decision maker. It can become unworkable if you have two parties with totally different views on how to go about things – it can be very troublesome and add to the cost.”

FREEDOM TO OPERATE

There may be multiple IP components in a single product. For example, aircraft seats might have IP-protected mechanisms and lighting features, plus various design registrations for aesthetic elements, materials and finishes.

A manufacturer or designer might also innovate on an existing component, modifying it so that it performs better. This could create opportunities for new IP filings, or perhaps conflict with existing IP protections. Hopley and Weal recommend freedom-to-operate studies to determine whether such variations constitute a novelty or an infringement.

“You need to explore these issues in the early stages of development, so that you avoid a particular design route that is going to get you into trouble, or so that you can make the necessary inquiries to make sure that you are cleared before you get to the design validation stage,” says





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ABOVE: A FREEDOM-TO-OPERATE STUDY CAN DETERMINE POTENTIAL IP CONFLICTS BEFORE TIME AND MONEY IS SPENT ON DEVELOPMENT

BELOW: APPLE GAINED DESIGN PROTECTION FOR THE LOOK OF ITS RETAIL STORES

A SELLING POINT

It is also possible to use design protections as a marketing tool, says Emily Weal. For example, the exclusive design rights for a business jet cabin interior can be signed over to the owner/operator of the aircraft.

"IP is merging into more commercial and marketing aspects," says Weal. "There's nothing to stop you giving that design right over to the owner of the jet. You can say to the potential customer, 'I will give you the registered design rights to the particular color combination used for the seats', for example. This can be a powerful marketing tool. Of course, it stops you from using the color combination elsewhere, but if it is important to the customer that this is unique to them, you probably don't want to use it again anyway."

"You certainly have to exercise great caution in threatening your competitors if you feel that your patent is infringed"



Hopley. "Don't leave it too late, after you've spent a huge amount of money developing something that you may not be entitled to use."

LICENSE TO INNOVATE

Hopley and Weal also point out that discovering an extant patent that might conflict with the innovation should not stifle designers and engineers from innovating. At times, they say, the original patent holder may be happy to license use of the patent for a new application.

"It's something that needs professional input, usually," says Weal. "You certainly have to exercise great caution in threatening your competitors if you feel that your patent is infringed. You have to be very careful with IP, but once the question is asked, it can lead to a more positive outcome for both parties."

AESTHETIC PROTECTIONS

While the IP of mechanics, structures and materials may get a lot of attention, it is also possible to protect

aesthetics. "Design protections can cover the shape or configuration, colors and patterns, materials and textures, and the layout or 'get-up' – a general impression of what the whole of an interior looks like," Weal explains.

This is a more delicate IP protection, but it has been used effectively, for example with the design of the Apple Store. The company protected the overall feel of its shops – the visual and physical impact – as part of its trademark.

"This would definitely be protectable as a registered design in Europe," comments Weal. "In fact, Apple managed to get it trademarked. So there is precedent that the layout of a retail store is, in principle, protectable as a trademark, and this could well be applied to an aircraft interior too, as long as it is sufficiently distinctive." ☒





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DESIGNERS ARE PUSHING FOR GREATER USE
OF ENVIRONMENTALLY FRIENDLY MATERIALS
IN THE BUSINESS JET INTERIOR INDUSTRY

Words by Rob Copping

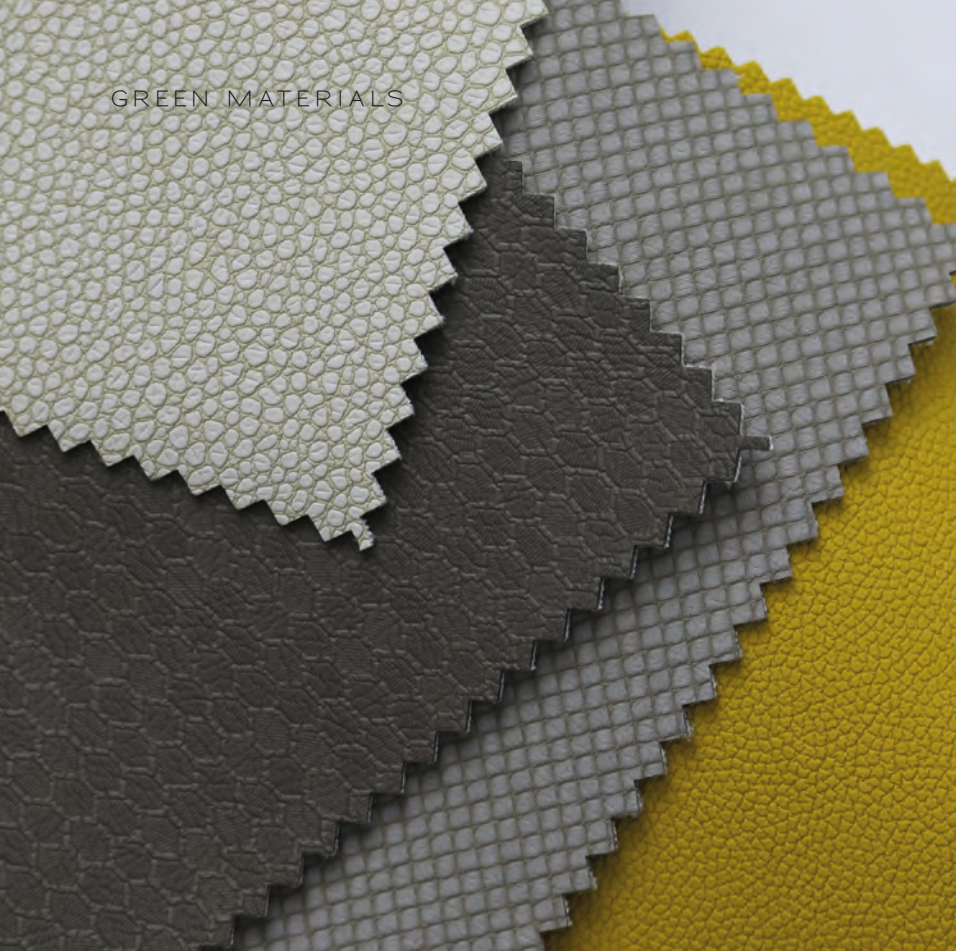
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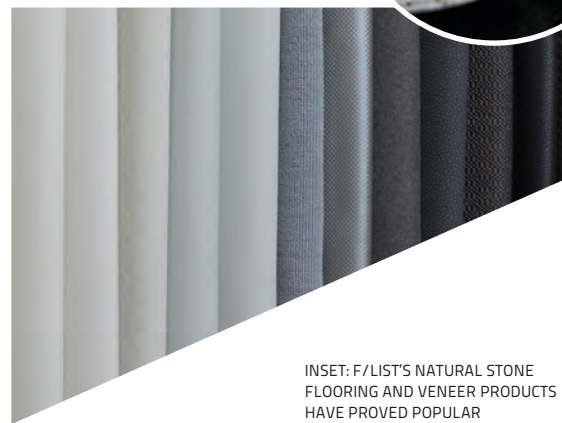
Are we seeing a trend for greater environmental responsibility when it comes to cabin materials? Greig Jolly, senior project manager and designer at Winch Design, certainly thinks so. "The industry is becoming more ecologically aware and our clients are now more interested in ensuring that their aircraft is as environmentally friendly as possible," he says. "At Winch Design we have made environmental decisions a priority."

Natural products such as leather and wood have long been used in cabins, but there is more interest now in making sure they come from renewable and sustainable sources. Robin Dunlop, team leader at CTM Design, notes he was asked 10 years ago to source a specific wood from the Amazon, but he adds that it is not something he would do now. For him, choosing more sustainable materials is a designer's choice; he has seen less interest from some jet owners. "Customers don't care," he says. "As designers we incorporate more green materials."

Renewable, sustainable options are also available for lacquers and other finishes. "If we select a special finish, such as mother of pearl, we want to ensure it comes from



LEFT AND BELOW: TAPIS'S FAUX LEATHER AND SUEDE – TWO OF THE INDUSTRY'S REALISTIC ALTERNATIVES FOR PEOPLE WHO DON'T WANT TO USE ANIMAL PRODUCTS



INSET: F/LIST'S NATURAL STONE FLOORING AND VENEER PRODUCTS HAVE PROVED POPULAR

“We question our suppliers to ensure their production processes are modern, efficient and safe”

a sustainable source and that it has the correct certification to show its provenance,” says Jolly.

Winch Design aims to source finishes from companies with ethical approaches and local products – the latter to reduce the supply chain's carbon footprint. The company only selects wood species that are rapidly renewable and avoids using rare or endangered species. Dunlop agrees that veneers must be from an environmentally friendly source. Both Jolly and Dunlop also consider the glues and lacquers they use. “Where possible, we use natural materials with environmentally friendly glues and lacquers,” says Jolly. “There are many excellent products on the market.”

NOTHING TO HIDE

Picking a leather can also entail various environmental considerations. “We question our suppliers to ensure their production processes are modern, efficient and safe,” says Jolly. “Are they using ecologically safe dyes and chemicals? Do they make efforts to lower material wastage? What's the carbon footprint of the leather? Are they doing all they can to reduce this?”

FASHION FORWARD

Is the tide turning in the wider luxury industry? In September 2018, fashion brand Burberry announced it would no longer destroy its unsaleable products – instead committing to reusing, repairing, donating or recycling them wherever possible within regulatory constraints. The company is also to stop using real fur.

“Modern luxury means being socially and environmentally responsible,” commented Marco Gobetti, CEO. “This belief is core to us at Burberry and key to our long-term success.

We are committed to applying the same creativity to all parts of Burberry as we do to our products.”

The company's other initiatives include working with Elvis & Kresse to transform leather offcuts into new products, and the establishment of the Burberry Material Futures Research Group with the Royal College of Art – to invent new sustainable materials.

The company is aiming to make its own operations carbon neutral by 2022, and claims it is more than a third of the way there.



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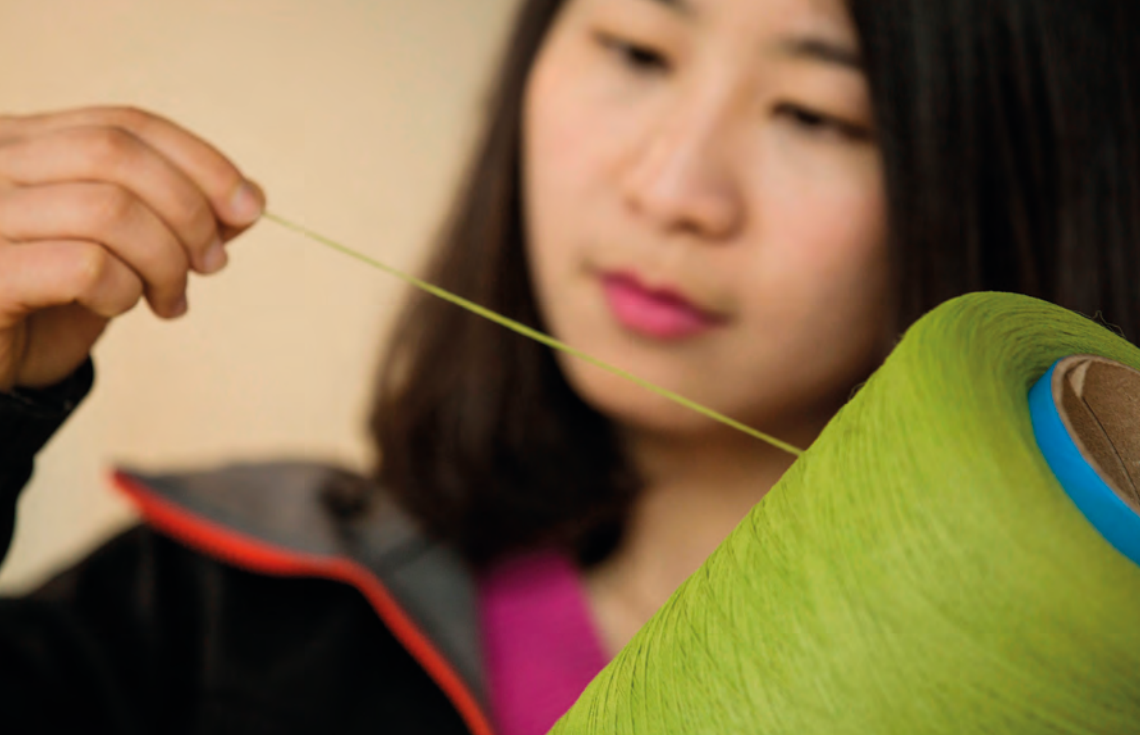
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"It looks like a bamboo version of carbon fiber," says White.

HEIR APPARENT

White also sees the potential to use another natural material on board: moss. He says it could be used for air filtration instead of a synthetic filter produced with various chemicals. Moss has already been used in the car industry. In Sono's Sion, it is incorporated into the dashboard.

"There's this super sleek technology finish and then a glass panel and behind the panel is Icelandic moss; little clumps of what look like broccoli," explains White.

The moss acts as an organic air filter. It has also been used in architectural applications. "Pollution and cabin air quality; there's been an awful lot to say," says White. "That's been the equivalent over the last couple of years of when everyone was talking about deep vein thrombosis a decade or so ago."

ABOVE AND TOP RIGHT: FORD IS INVESTIGATING HOW BAMBOO COULD BE USED IN ITS VEHICLES

BELOW: RANGE ROVER OFFERS A LEATHER-FREE INTERIOR OPTION FOR THE VELAR SUV

"Some advances are about rediscovering things that are in fact organic"

Adam White, director at Factorydesign, agrees with Dunlop that another natural material, wool, is an environmentally friendly, renewable, addition to the cabin. "You won't find a better fiber to put in a cabin because of its natural properties, fire resistance, etc," says White. "Some advances are about rediscovering things that are in fact organic."

Silk is another of nature's resources that can be used in the cabin, for carpets or decorative features. "Bamboo-silk carpets are natural, durable and feel luxurious," says Jolly. He also points to organic cotton as a good option for cushions, bedding and accessories. Organic fibers are grown without harmful pesticides and synthetic fertilizers.

Meanwhile, the strength of bamboo, and the fact it grows quickly, could make it a rising star. It has already been used in cars, as a component of a composite material for non-critical structures – for example, seen in 2014 with the Fiat 500L Trekking's wing mirror frames.



Vegan interiors

Another trend affecting material choices, noted by Adam White, director at Factorydesign, is the rise of veganism. This involves abstaining from the use of animal products – not only those obtained by killing animals, but others on welfare grounds. The list of non-vegan materials therefore includes silk, leather, exotic skins, fur, shearling, down/feathers and wools including mohair, cashmere, perino, angora and vicuña.

One widely used alternative is faux leather, which has been around for some time in the aviation industry, and can offer a realistic aesthetic and softness.

The trend to eschew leather at least can be clearly seen in the luxury automotive sector. For example, the new Range Rover Velar won World Car Design of the Year 2018 with a leather-free interior. "A lot of the big car manufacturers have been developing leather-free interiors," says White. "It's been working its way through the automotive industry. The trend has been going on for perhaps two years now. Bentley, Tesla, Range Rover – those kind of brands have been leading the way."



“People have been just a little bit more sensitive to environmental issues in the last year or two”

White expects to incorporate moss into aircraft air filtration systems, “soon, frankly”. His approach is to talk about such developments early rather than keep them as private, hidden projects.

NATURAL STAMINA

Of course, there are many other factors involved in choosing cabin materials – an important one being the need for something hard-wearing. In the past, Dunlop saw customers refresh their interiors every five to eight years, but says interiors with a more natural look can stand the test of time better, delivering environmental savings in terms of materials and energy expended refitting the aircraft.

Marble is a good example of a hard-wearing natural material, and is now available in 1-2mm-thick panels attached to a honeycomb backing. Dunlop has had customers ask for marble throughout an aircraft.

Other environmental factors that may play into material review include end-of-life recyclability, supply chain efficiency and manufacturing challenge.

Overall, while the designers feel that they are doing much of the pushing in moving interiors in a greener direction, they see a slow rise in awareness of the benefits. “People have been just a little bit more sensitive to environmental issues in the last year or two,” says White. “It’s about pushing the right buttons. People who fly in private jets and around the world doing business become much more sensitive once things have hit the public consciousness.”

Q&A



Tray Crow

DIRECTOR OF INTERIOR DESIGN, GULFSTREAM

Is there growing interest in environmentally conscious materials and technologies?

Gulfstream customers frequently express interest in environmentally friendly aircraft operations and interior elements. Much of our focus on improving sustainability has been through the use of technology, both inside and outside the aircraft.

On the all-new G500 and G600 we have introduced a number of technologies that improve efficiencies. Inside the aircraft, the new data concentration network considerably reduces the amount of wiring required for the cabin, galley and flight deck systems to work. The new engines on these aircraft are also the most efficient in their class – the advanced technology in them results in lower fuel use throughout all phases of flight.

Where is demand coming from?

A significant number of Gulfstream’s customers are corporations, and we are seeing more and more companies around the world aligning their business jet operations with their corporate sustainability and responsibility goals.

What solutions do you offer?

We incorporate many renewable resources into our cabins, from the carpeting to the bulkheads, using wools, silks, cotton and some composite materials. The incorporation of composite materials also enhances some interior designs, thanks to the visual contrasts they provide.

Natural latex and composite veneers are also used in Gulfstream interiors and derived from renewable resources. A number of customers ask for composite veneers over natural logs; composites also create a more consistent look, with less variation in color and pattern.

In terms of lighting, LED technology is the primary choice in our cabins.

What other opportunities are there to investigate further?

We are always investigating new technologies and alternatives that incorporate sustainable materials and processes. Many of these opportunities inside the aircraft are in places that don’t always come to mind – those hidden areas behind the walls, under the floors and inside the furnishings.





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IN UPDATING THE HONDAJET, ITS CREATOR TOOK THE OPPORTUNITY TO ADD A GALLEY, BELTED LAVATORY AND SPEAKERLESS AUDIO OPTIONS, WHILE RETAINING WHAT GAVE THE ORIGINAL ITS CHARM

Words by Izzy Kington



“We fine-tuned the design to reduce a specific high-frequency tone that is annoying”

Michimasa Fujino, president and CEO of Honda Aircraft Company, has many awards under his belt for his aerospace innovations. His latest work is the HondaJet Elite, an upgrade of the original HondaJet light jet. It was unveiled in May 2018, with FAA and EASA certification already granted.

The Elite sports a 17% range boost and upgraded avionics. As well as material and aesthetic updates in the cabin, new interior options include two-tone leather seat upholstery, a belted lavatory and a galley with a coffee maker.

BUILDING ON THE ORIGINAL

“The original HondaJet interior was very well received,” says Fujino. “Therefore our aim was not to change the fundamental design, but to modify the original concept by adding more options – for example leather textures and different stitches – and additional features like a full-service galley.”



CABIN STATS



HondaJet Elite

- Cabin width: 5ft (1.52m)
- Cabin height: 4ft 8in (1.42m)
- Cabin length: 17ft 8in (5.38m)
- Seats: 1-2 crew + 5-6 passengers
- Range: 1,437 nautical miles (NBAA IFR)
- Maximum cruise speed: 422ktas (782km/h)
- Maximum altitude: 43,000ft (13,106m)
- Price: US\$5.25m

ABOVE: SEAT CUSHIONS AND UPHOLSTERY HAVE BEEN UPGRADED

RIGHT: AVIONICS UPDATES INCLUDE MORE PERFORMANCE MANAGEMENT, AND AUTOMATIC STABILITY AND PROTECTION FUNCTIONS



MICHIMASA FUJINO

Having joined Honda R&D in 1984, Michimasa Fujino began leading the clean-sheet design of the HondaJet in 1997 and founded Honda Aircraft Company in 2006, becoming CEO. Key features he developed for the aircraft include its Over-The-Wing Engine Mount, a natural laminar flow wing and fuselage nose, and hybrid composite fuselage. He also serves as a managing officer at Honda Motor.

Fujino holds a Bachelor of Science and doctorate in aeronautical engineering from the University of Tokyo, and has been recognized with the ICAS Zhukovsky Award for Innovation in Aeronautics, an American institute for Aeronautics and Astronautics (AIAA) Aircraft Design Award, and the Society of Automotive Engineers (SAE) Clarence L (Kelly) Johnson Aerospace Vehicle Design and Development Award.

Fujino is a fellow of the AIAA, SAE, the Royal Aeronautical Society and the Japan Society for Aeronautical and Space Sciences, as well as being a foreign member of the National Academy of Engineering.

The original HondaJet was the most delivered light jet in 2017

He is also proud of the amount of natural light afforded by the cabin windows and the skylight in the lavatory; and the “large, solid table”; and the seat structure.

SOLID STRUCTURE

The seat frames remain the same, but they now sport three-layer cushions and two-tone leather upholstery. “Each layer of the cushion has a different density, for different levels of stiffness,” says Fujino. “I tried many combinations to find the one that makes me feel best on the ground and in the air. HondaJet seats are more like an automobile-type seat, designed for three or four hours’ comfort. It’s very different from a couch potato type seat with very soft cushions. It’s very solid. We also introduced

premium leather and a two-tone design, so the aesthetic is more modern, and we slightly tailored the colors.”

PEACE AND QUIET

Cabin sound was another big focus of the development. “Everyone has said the original HondaJet is very quiet, and the fatigue level is very low compared with others,” says Fujino. “The reason is the engine configuration – the noise level is below 200Hz, very low compared with other business jets.”

The Elite builds on this with a new engine inlet structure. “We fine-tuned the design to reduce a specific high-frequency tone that is annoying,” says Fujino. “Using new technology, the perforated inlet, we suppress this tone and can even reduce sound insulation for the fuselage; so we not only reduced noise levels, but also weight.”

WALL OF SOUND

The aircraft also has a new speakerless Bongiovi audio system option. “This is the first aviation application for this system,” comments Fujino. There are no speakers; instead 24 small transducers are attached to the back of the cabin’s interior panels, and when they resonate, they create pressure in the air that translates into sound. The transducers are calibrated at more than 100 points, just like a home surround-sound system.”

Fujino says the system creates an immersive audio experience that goes beyond a 3D effect: “For example, say I am watching a movie on a tablet; if a monkey moves from my back to my front, that effect is really realized by the audio system.”





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THE NEW GALLEY OPTION WAS DESIGNED TO SQUEEZE MAXIMUM UTILITY FROM THE AVAILABLE SPACE

“The HondaJet design has partially come from an automobile design philosophy – how you can make the most of unused space”

Entertainment is purely tablet-based. The aircraft has a wi-fi/communication system that can be used for simultaneous voice calls, texting and internet access. The wi-fi, lights, temperature and other settings can be controlled from PEDs by downloading an app.

GALLEY GAINED

A big change from the original HondaJet is that customers can opt for a galley, sacrificing a side-facing seat or luggage storage area. The galley fills the space from floor to ceiling and was designed to offer great practicality as well as aesthetic design.

“The galleys on other aircraft of this size are generally not so large,” says Fujino. “They may have a shelf, but it might not be suitable for many purposes. The HondaJet full-service galley is designed for more realistic use. We’ve thought about how many dishes, cups, cans and bottles are needed, and what capacity is required for the trash can. Customers really want to have their dishes or glasses, so there is space to store those.”

A nice detail is that there is an internal shelf inside the drawer. “When you have a very deep drawer, sometimes people may not use the entire height,” says Fujino. This detail was inspired by the way every possible space is mined in automotive design. “If you take a look at automobile design, every space can be used for any purpose,” says Fujino. “They have storage for sunglasses in the ceiling, or make use of a small space for cupholders. The HondaJet design has partially come from an

The Elite will replace the original HondaJet eventually, but for now there are two models on the production lines

automobile design philosophy – how you can make the most of the unused space.”

AUTOMOTIVE INSPIRATION

As well as his role at Honda Aircraft, Fujino is a managing officer at its parent company, Honda Motor. Although he stresses that the unique crashworthiness, fireproofing and emergency exit requirements of the aircraft world mean many functions can’t be translated from the automotive industry, some of the design philosophy can be used.

The HondaJet incorporates certain techniques used in the automotive industry to create a quality look without over-complicating each component, which would introduce an unacceptable delay on the production line, which produces maybe 500 cars each day.

“Assembling an aircraft interior is more like building a house – you can spend many hours checking fit and finish, and adjusting it,” says

IF IT AIN’T BROKE...

Michimasa Fujino’s favorite detail in the HondaJet Elite is actually one that also featured in its predecessor. “I like the skylight very much, because nobody had done it before,” he says. “The idea of putting in a skylight is kind of radical. From an engineering perspective, people said a skylight was not needed, or would just be a weight penalty. It’s always a trade-off between passenger comfort and engineering.”

Fujino is also proud of the original’s built-in airstairs. “The HondaJet has very good steps,” he says. “Even high heels fit on the steps, from toe to heel, so there is no stress or difficulty in boarding.”

The spring-loaded table is another favorite detail. “It can be deployed with only one hand, and it’s very light and solid,” says Fujino. “In many small business jets, tables are stored in an enclosure that interferes with your knees. But the HondaJet table is extracted vertically, so there’s no interference. Also the height adjustment component has a special bracket and hinge shape, so if you are very tall there is no interference between the knees and the table. It’s a very small ergonomic detail, but people will notice if they have experienced that in other business jets. If you pay attention to the small details, the entire experience is very different.”

Fujino. "If you design using a special technique, you don't have to adjust each part to make it look good.

Where two panels meet, an overlapping joint is used instead of a butt joint. "If you use a butt joint, if you have even a small tolerance or discrepancy in a panel, you can see the gap," says Fujino. "Many people think that to make an aircraft interior look good, you must increase accuracy and cost. But there are many ways to make aircraft look good with special engineering techniques. That is one of the secrets of an automobile company, and we can take advantage of that know-how for the HondaJet design."

STANDARDIZATION MODEL

Another similarity to the automotive world is that customers choose options for the interior, rather than having a completely bespoke design. "We try to standardize as much as possible," says Fujino. "Our business model is not to make aircraft highly customized for each individual, but to offer options so that the customer chooses combinations."

Fujino says that this standardized approach is aimed at expediting the delivery time and maintaining quality. "I want to keep relatively standard options, and also offer upgrades that can be chosen from our optional equipment," he adds.

"I don't want to accept that a light jet interior must be based on conventional or traditional ideas"

Honda Aircraft puts a lot of emphasis on continuous research and development. "Interior design is very important," explains Fujino. "If you look at automobiles, there are many different features compared with 10 or 20 years ago, and automobile engineers are competing, spending a lot of resources to develop interior features. I want our research activity to be similar, using outside-of-the-box thought processes. I don't want to accept that a light jet interior must be based on conventional or traditional ideas."

The HondaJet team are always working on new features – Fujino says he has ideas for new seat mechanisms and a door mechanism. "There may be some opportunity to implement new functionalities in the future," he adds. "Aesthetic design is very important, but exploring functionality is another of my strong interests." ●

GREEN SHOOTS

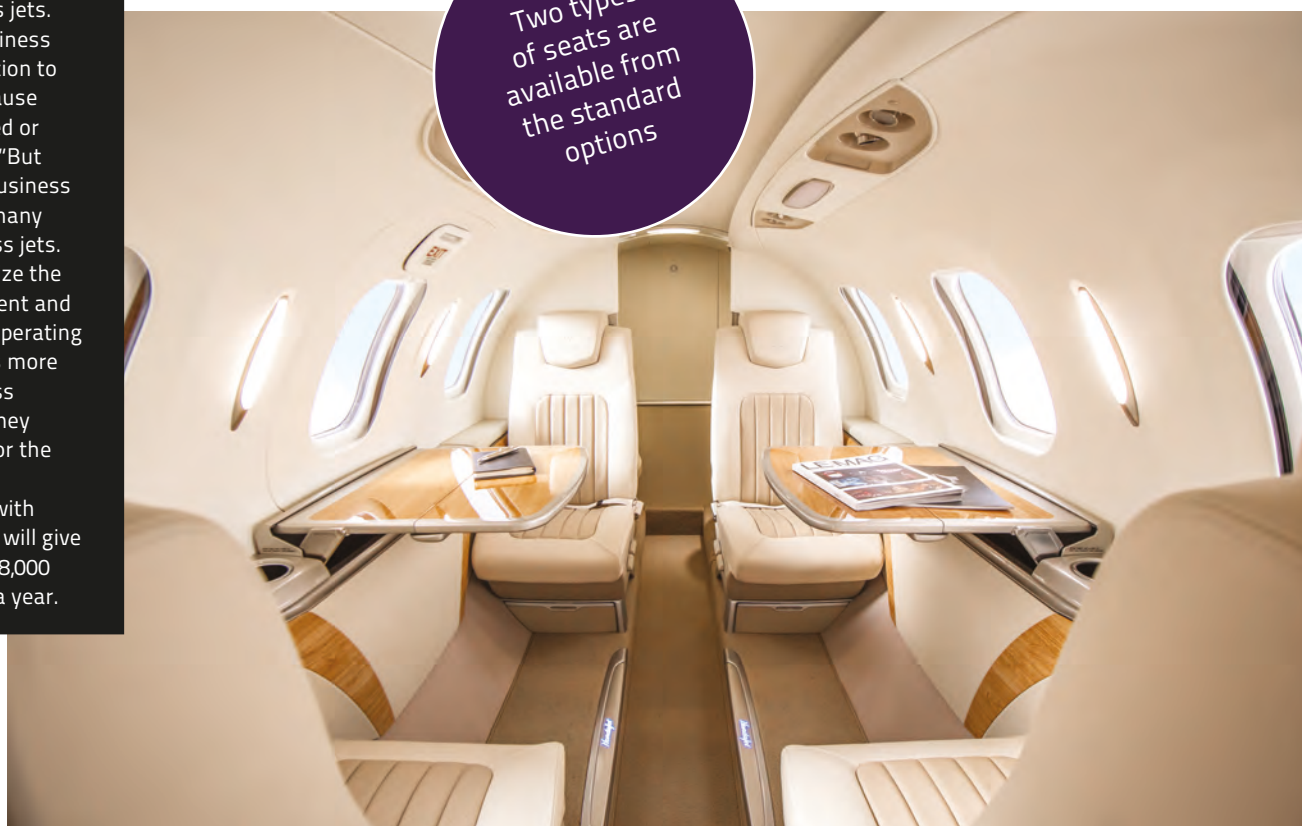
The HondaJet is billed as having best-in-class fuel efficiency and emitting less greenhouse gases than similar sized business jets.

"Currently not many business owners or users pay attention to environmental things, because their focus is more on speed or convenience," says Fujino. "But our goal is to expand the business jet market; I want to help many people start to use business jets. That's why I try to emphasize the HondaJet is very fuel-efficient and therefore has reasonable operating costs. At the same time, as more people start to use business jets, they will realize that they have some responsibility for the environment as well."

He says that compared with other light jets, a HondaJet will give a fuel saving of more than 8,000 gallons over the course of a year.

Two types of seats are available from the standard options

THE TABLE DEPLOYMENT MECHANISM GIVES MAXIMUM LEGROOM FOR PASSENGERS



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sound advice

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ON BOARD

*Words by Marisa Garcia
Illustration by Sean Rodwell*

“Some of the latest consumer trends include more advanced surround sound, wireless audio and voice control”

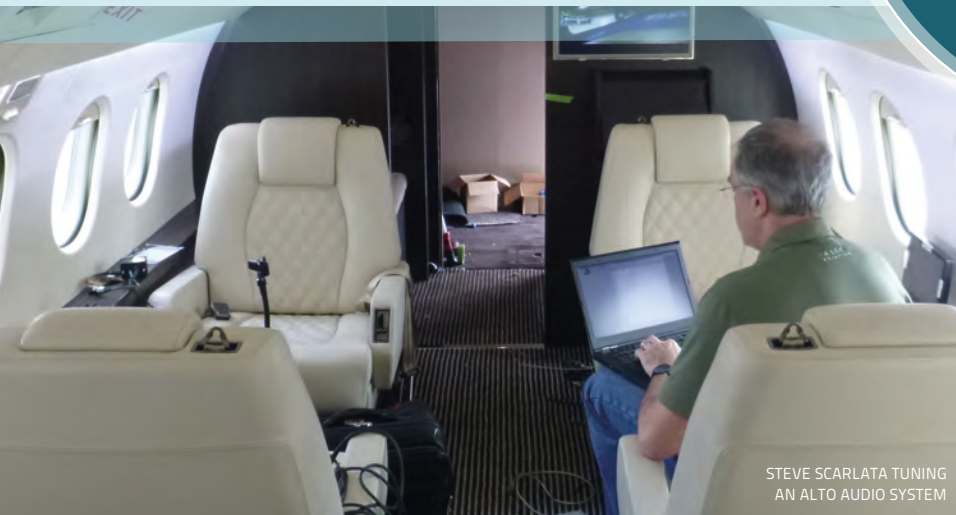
Consumers around the world allow a sizeable share of their income to travel and entertainment. In China, for example, consumers now spend as much of their income on this category (14%) as they do on housing, only slightly less than they spend on food (20%), and more than they spend on clothing (9%), according to a recent survey by Credit Suisse. Ratings firm Nielsen describes China as “a music market of enormous potential”. Among the most affluent consumers, 83% listen to music for an average of 16 hours a week. Most of these listeners – 71% – rely on a streaming service. Sound quality is also very important to them, with 24% of all Chinese consumers and 28% of millennial consumers investing in high-end, specialized headphones.

DEDICATED FOLLOWER OF FASHION

Steve Scarlata, vice president of engineering and R&D at Alto Aviation, a specialist in private jet sound systems, sees growing demand. “Some of the latest consumer trends include more advanced surround sound, wireless audio and voice control,” he adds.

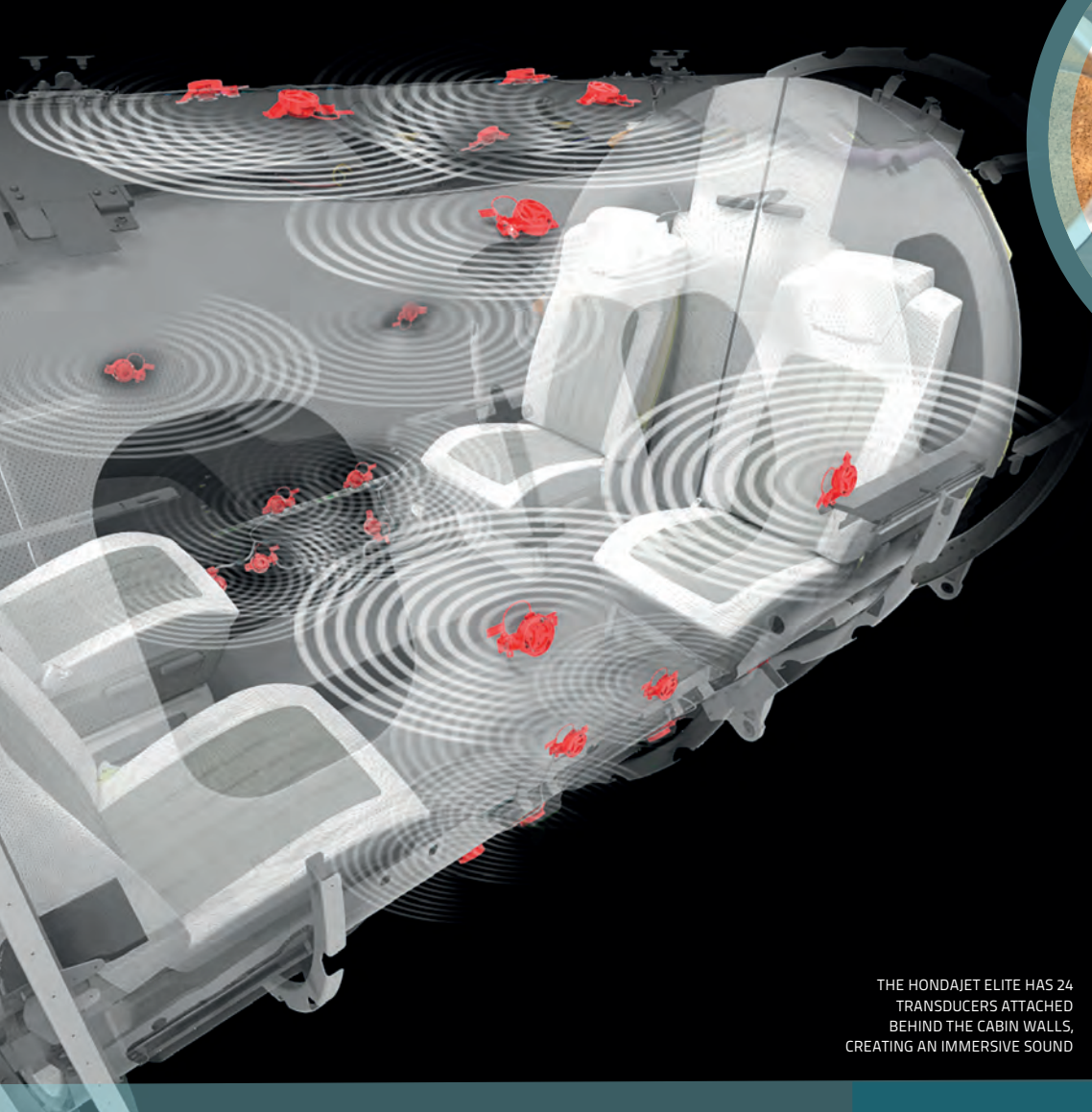
However, the biggest trend Alto has seen relates to the use of PEDs. “This is being driven by the widespread adoption of cell phones and tablets as the main source of entertainment,” says Scarlata. “Customers like to support and stream content from these devices, so the sound system needs to provide easy interface and high-quality sound. Alto Aviation has experienced a marked increase in the installation of systems providing full cabin audio with just an auxiliary input panel providing line input, USB charging, Bluetooth audio or HDMI connection. This can eliminate the need for a full, complex CMS.”

A version of the Bell 429 Group (pictured below right) includes a passive noise abatement system called Silens, and a touchscreen-based IFEC system. Bluetooth technology enables passengers to listen to music from their PEDs and take phone calls during flight. Bose headsets are powered by the aircraft, so passengers don't have to worry about batteries



STEVE SCARLATA TUNING
AN ALTO AUDIO SYSTEM





THE HONDAJET ELITE HAS 24 TRANSDUERS ATTACHED BEHIND THE CABIN WALLS, CREATING AN IMMERSIVE SOUND



ABOVE: ALTO'S CADENCE SWITCH PANEL FOR BLUETOOTH INPUT SELECT AND VOLUME CONTROL

BELOW: AN ALTO DX-135 INSTALLATION ON A LEARJET 60



The Alto R&D team has also been challenged to accommodate unique requests several audiophile customers who demanded a system with performance far above the standard offering.

REBEL YELL

Aesthetics are also influencing installations. "We are seeing some avant-garde cabin designs that really deviate from the traditional styling of the above-seat PSU rail," says Scarlata. "The conventional locations for speakers are often dramatically re-styled or eliminated completely. On a recent project, we worked closely with the MRO to find ways to scale up the installation and optimize the loudspeakers and amplifiers while still meeting all the certifications and weight requirements."

As technology advances, there are new tools available to deliver high-end, custom sound systems. "Advanced materials such as graphene and composites, when applied to loudspeaker and enclosure design, promise

It's my IFE

The recently launched HondaJet Elite cabin features a Bongiovi Aviation speakerless in-cabin sound system, which is integrated into the interior panel.

The system adapts to various flight conditions and the content being

enjoyed, creating an immersive audio experience throughout the entire cabin.

There are 24 tiny transducers strategically bonded to the backside of the cabin walls, vibrating them to produce "bold, immersive sound".

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For the Global 7500, Bombardier used new acoustic materials and a special layering and assembly method to cut cabin noise

Metal guru

On Embraer's new Phenom 300E, the Lufthansa Technik nice HD CMS/IFE system was engineered to ensure the best sound quality while optimizing cabin design.

"Solid billet aluminum machined to .071 mm of material thickness helped provide a resonating sound in addition to the perforated holes of the speaker," says Jay Beever, vice president of interior design

at Embraer Executive Jets. "By consolidating redundant systems on each side of the cabin into the backbone of the airframe, we achieved a reduction in parts count and weight, in addition to increasing cabin space with better, reduced packaging."

Phenom 300E customers can also opt for a subwoofer, to give a bolder and more balanced sound.

"The audio quality and balance is tailored to the configuration of furniture and amenities of the space"

to improve sound quality and acoustic efficiency while reducing weight," says Scarlata. "Advancements in digital signal processing and electronics open many opportunities for enhancements in sound performance and the addition of features."

ON THE ROAD AGAIN

The pursuit of audio excellence is not limited to one-off cabins; it is also a consideration for line-fit models. For its Global 7500, Bombardier challenged itself to deliver a high-end sound system that would match what customers expect in their homes and cars. The OEM turned to new digital technology, cabin soundproofing, and new speaker arrangements. The audio solution was developed in conjunction with Lufthansa Technik as part of the niceTouch CMS/IFE system.

"The sound system on the Global 7500 is completely new and features digital technology to provide the ultimate audio quality," explains Tim Fagan, manager of industrial design at Bombardier Business Aircraft.

Speakers are placed carefully throughout. "Each cabin suite has a specific arrangement of speakers and software to ensure that the audio quality and balance is tailored to the configuration of furniture and amenities of the space," says Fagan. "These speakers cover a very broad frequency range, to provide crisp and clear sound."

Bombardier created audio zones throughout the aircraft to ensure that the sound quality does not deteriorate even as passengers move

around. "Each audio zone is also equipped with its own subwoofer, dedicated to the reproduction of low-pitched sounds," says Fagan. "Located in a bulkhead or under the divan, the subwoofers are equipped with a combination of active and passive drivers depending on cabin configuration"

The audio system in the entertainment suite is designed to rival high-end home theater systems. "Depending on the configuration, this zone features a large TV screen and a divan, complemented by enhanced audio features to provide a cinematic experience, including available 5.1 surround," says Fagan.

ABOVE: TO OPTIMIZE AUDIO QUALITY IN THE GLOBAL 7500'S ENTERTAINMENT SUITE, THERE IS A SOUND BAR UNDERNEATH THE TV SCREEN, COMPLEMENTING THE PSU-MOUNTED SPEAKERS

BELOW: GLOBAL 7500 PASSENGERS CAN ADJUST VOLUME THROUGH TACTILE ROTARY CONTROLS





Bombardier's engineers tested the Global 7500's new sound system in a full-scale mock-up and on the fourth flight test vehicle, which is dedicated to validating the cabin systems

LEFT: ALTO SAYS TUNING IS THE MOST IMPORTANT PART OF AN AUDIO SYSTEM INSTALLATION

BELOW: ALTO'S VERIFIER MEASUREMENT COMPUTER IN ACTION DURING TUNING

Each passenger service unit (PSU) speaker housing has a mid-range speaker, a tweeter (a high-frequency loudspeaker) for special effects and percussions, and an extra passive speaker to add depth. "The PSU speakers feature high-quality acoustical fabric to allow for better sound transmission, while also blending with the aircraft's luxurious environment," says Fagan. "The subwoofer in the entertainment suite has a large resonance chamber for an especially powerful delivery."

A sound bar is placed under the television monitor to act as a center speaker and to complement the PSU-mounted speakers. "The sound bar is inspired by high-end residential systems and rotates with the television to always provide a direct and ideal projection of the sound," says Fagan. "This is especially important for higher-frequency sounds and to ensure that the audio is spatially coherent with the action."

The sound system also features dynamic compression. "This will modulate volume changes that can happen in a movie from one scene to the next, while maintaining nice contrasts and expression," says Fagan.

EVERYBODY'S TALKIN'

Bombardier has also improved critical communications with the flight deck. "The passenger address speakers, which are used for pilot announcements, were designed to transmit clear messages from the cockpit without distortion," says Fagan. "The passenger address speaker grille openings form a Fibonacci spiral, an elegant pattern that can be seen in sunflowers, but that is also used in high-end automotive audio systems."

These grille openings feature dozens of perforations milled out of a solid block of aluminum.

The company is not done innovating to improve entertainment on its aircraft. "We are keeping an eye on new trends in cinematic sound and theater experiences," says Fagan. ☒



High-flying bird

A "very sophisticated audiophile" recently contacted Alto Aviation to improve the sound quality in his new late-model Falcon 2000. He also wanted to be able to connect his PEDs to the aircraft's audio system using Bluetooth technology.

After surveying the aircraft and reviewing existing wiring diagrams, Alto designed an audio system that doubled the amount of subwoofers and mid/high speakers in the aircraft. The design also included replacing an existing analog audio amplifier with two new Alto digital amplifiers to provide 12 channels of entertainment audio to speakers dedicated to each channel. Emphasis was placed on speaker location in the forward cabin for optimum sound quality in the club seating area.

To provide an alternate audio source independent from the existing CMS, a Bluetooth receiver was installed and interfaced directly to an Alto DX-135 switching amplifier. A second Alto DA-230DC amplifier was also installed to provide the additional output channels required.

The amplifier was wired to an Alto Cadence switch panel to enable the owner to switch between the audio sources provided from the existing CMS and the newly installed Bluetooth receiver paired to his PED. Volume control and a speaker mute function were also included in the new switch panel.

As with every Alto audio system installation, an Alto engineer traveled to the MRO's facility to tune the system prior to the aircraft being delivered to the customer. The company says tuning is the most important part of the installation. The process includes acoustical mapping of the cabin using proprietary software, the aim being to determine the optimal system configuration. Acoustical engineers then fine-tune the digital equalization (EQ) within the amplifiers to suit the interior. "As speaker positions, the size of cabin, cabin fixtures and density of the carpet vary in every aircraft, it is extremely important to customize the EQ settings to achieve the best audio performance," says Steve Scarlata of Alto Aviation.



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THE GLOBAL FAMILY IS EXPANDING WITH TWO NEW JETS THAT CAPITALIZE ON DEVELOPMENTS FROM THE FLAGSHIP 7500, WITH THE ADDITION OF THE EXCLUSIVE NUAGE CHAISE

Words by Izzy Kington





family





*The Global 5500
and Global 6500
development program
was launched
in 2012*

The four-zone Global 7500 is on course to achieve certification in 2018, but it is not the only new large-category business jet under development at Bombardier. The company recently announced two additions to its Global family – the Global 5500 and Global 6500. The aircraft are based on the Global 5000 and Global 6000, with fresh cabins and performance enhancements including 500 and 600 nautical miles extra range respectively.

The idea is to create an expanded product range to “suit more diverse needs”, says Tim Fagan, manager of industrial design at Bombardier. “Our aim was to align the cabin experience and aesthetic across the Global platform and take maximum advantage of the advances we are making on the Global 7500 development.”

MODEL DIFFERENCES

Fagan says the Global 5500 and Global 6500 will have the largest cabins in their class. The cabin dimensions, functionalities and aesthetics of the Global 5500 and Global 6500 are virtually identical to each other, but the Global 6500 is slightly longer, fitting in a dedicated crew area in the entrance suite. The Global 5500 has a split galley configuration. Both aircraft also feature a lavatory and a wardrobe in the entrance area.

ABOVE: THE CLUB SUITE ON THE GLOBAL 5500

BELOW: BOTH AIRCRAFT WILL HAVE THREE MAIN LIVING AREAS



“We were inspired to create something completely different in aviation, but instantly familiar to our passengers”

BELOW: THE AFT PRIVATE SUITE
ON THE GLOBAL 6500

The Global 6500's crew area features a berthable seat, power outlets and storage

Whereas the larger Global 7500 has four main living spaces, the Global 5500 and Global 6500 both have three, each 9ft long. In standard configuration these are a club suite with four Nuage seats and concealable side tables; a conference/dining suite built around a height-adjustable single-pedestal table; and a private suite that includes a three-place berthable divan, two Nuage seats, a lavatory and a wardrobe. Multiple floorplans are available for the conference and private suites.

NUAGE CHAISE

A new option for the conference/dining suite, exclusive to the Global 5500 and Global 6500, is the Nuage chaise. “We were inspired to create something completely different in aviation, but instantly familiar to our passengers – offering the flexibility of different functionalities,” says Fagan.

Bombardier is pursuing a patent for the chaise. It can be used as a lounge chair or converts into a flat



CABIN STATS

Global 6500

Cabin width: 7ft 11in (2.41m)
Cabin height: 6ft 2in (1.88m)
Cabin length: 43ft 3in (13.18m)
Seats: 2 crew + 17 passengers
Range: 6,600 nautical miles
Maximum cruise speed: Mach 0.88
Maximum altitude: 51,000ft (15,500m)
Price: US\$62.3m

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LEFT: THE NUAGE CHAISE OPTION

ABOVE: THE SAME SPACE CAN ALSO BE USED FOR A CREDENZA

“When the baggage door or shower door is open, the shower stops”

The aircraft will have a walk-in baggage compartment that is accessible throughout the flight

surface for sleeping or to seat extra people at the table. It sits on top of a storage credenza, facing the conference table. “This design originated in comments from company executives who noticed that people tend to perch on the credenza to join a conversation at the conference group,” says Fagan. “We’re excited about the flexibility and comfort it delivers, and the open and welcoming impression it creates.”

WATER FEATURE

One feature shared by the Global 7500, Global 5500 and Global 6500 is the stand-up shower, incorporated following in-depth research and testing to refine water pressure, the shower environment and how long it can be used. The system will provide 40 minutes of shower time per flight.

“The sealing arrangement of the shower enclosure and environment was carefully considered, and the system incorporates special extraction to remove moisture during shower use,” says Fagan. “The shower system and tank are separate from the main cabin water system. Smart components enable the system to read information from various sources – such as the shower heater, shower fan, baggage door and lavatory door – and respond accordingly. For example, when the baggage door or shower door is open, the shower stops.”

Seat innovations

Features translated from the Global 7500 include the Nuage seat. The result of years of research and development, the Nuage seat has a completely new architecture with features including a deep recline position. “Unlike traditional aircraft seats, where only the back reclines, pushing the body forward and leading to discomfort, the Nuage has a patented tilt link system that dips the seat as the back is reclined, keeping the body fully supported with no added pressure on the legs,” says Tim Fagan.

The Nuage seat has a patented floating base, which is designed to enable it to track and swivel effortlessly and without visible floor rails. “The fluid movement system also includes a center swivel axis for an intuitively centered point of rotation in any position,” says Fagan.

It also has a tilting headrest. “This adjustable headrest provides optimal neck support in every position while helping to maintain an effortless line-of-sight when watching TV or reading in a reclined position,” says Fagan.



LEFT: THE GALLEY HAS BEEN COMPLETELY UPDATED

ABOVE: THE CABINS FEATURE BOMBARDIER'S NEW NUAGE SEAT

appliances to give flight attendants more flexibility to prepare amazing meals in flight, optimize space and provide an aesthetically pleasing layout. The goal of the new design was to give it a similar feel to, and be ergonomically consistent with, the flagship Global 7500."

Bombardier expects to achieve certification and service entry for the Global 5500 and Global 6500 in 2019. Global completions will be conducted in Montreal, Canada. ✕

Performance enhancements over the Global 5000 and Global 6000 include additional range and speed, more efficient fuel burn and steep approach capability

Fagan. "Three temperature control zones enhance the regulation of temperature throughout the cabin."

Passengers can control temperature, lighting and other CMS options using their own PEDs. They can also stream movies, watch live TV and stay connected with the office and home using their own devices, by pairing with the available Ka-band connectivity. Bluetooth functionality enables them to stream music wirelessly.

The IFEC and CMS system is a customized version of Rockwell Collins's Venue, upgraded to enable 4K content to be distributed throughout the aircraft. There are 24in (61cm) 4K bulkhead monitors, with an immersive surround sound feature in both the club and private suites.

WHAT'S COOKING?

Updates in the galley include new cabinets and countertops that offer expanded styling options, and exposed dual-function appliances, including a steam oven, dual convection/microwave ovens and coffee/espresso machine. In designing the galley, Global flight attendants were consulted to add their perspective based on their experiences.

However, as is the case throughout the cabin, the feel of the galley is in keeping with other Globals. "One important consideration when developing new updates on our aircraft is to ensure we seek to innovate while still preserving the functionality and experience that have made our aircraft so successful with customers," says Fagan. "For example, with the Global 6500 galley design we have preserved the core galley layout of the Global 6000, even though we are introducing new

Fabric upholstery

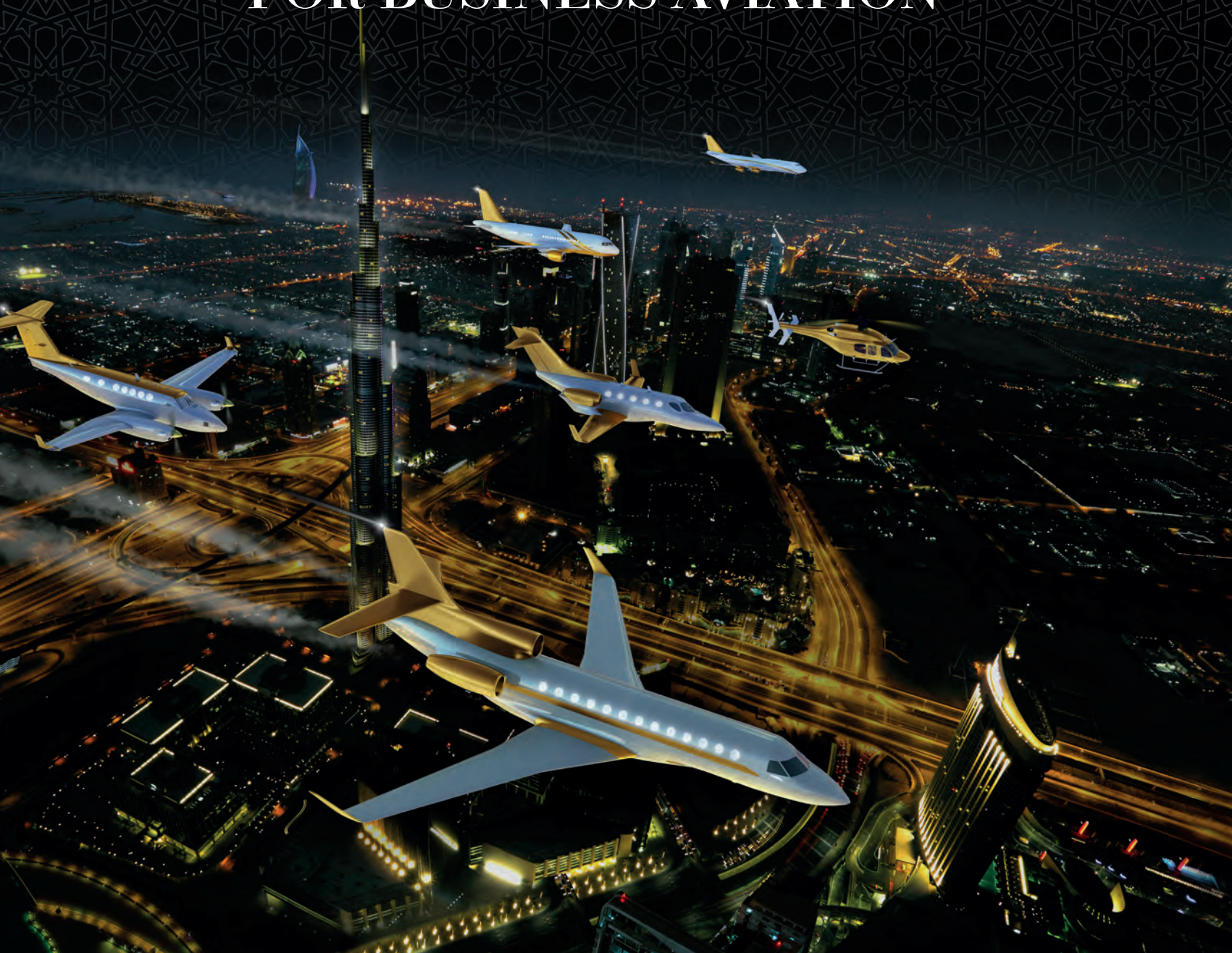
Customization opportunities in these cabins include everything from seating arrangements to materials, china and trim colors. "There are hundreds of types of veneer and leather to choose from, and Bombardier can incorporate countless options for blending corporate branding into the design – be it in the carpet, furniture and more," explains Tim Fagan. "Leather color choices run a wide gamut, with the team able to match an endless number of options."

The Nuage seats are offered in a vast selection of leathers, fabrics and finishes. "While in the past several years most business aircraft seats have been finished in leather – with fabric reserved for divans – we are excited to also offer fabric seat upholstery," says Fagan. "Fabric seats are excellent for breathability and comfort, and give customers an expanded material palette to express their personal style. We will of course continue to offer leather, but we are pleased to be able to use a traditional material in a fresh new way."

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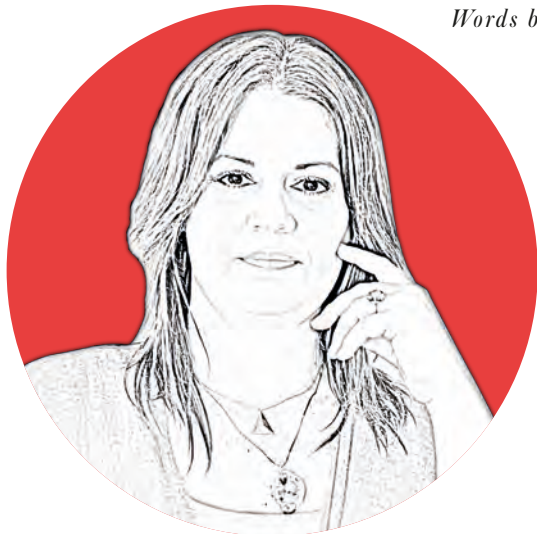


Lessons LEARNED



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DESIGNERS BASED IN NORTH
AMERICA SHARE THE
LESSONS THEY'VE LEARNED
AND THE DEVELOPMENTS
THEY'D LIKE TO SEE

Words by Izzy Kington



WHAT ARE YOUR PRIORITIES?

Design is about executing creative solutions tailored to clients' needs. My priority is always to ensure that we propose ideas that exceed our clients' expectations.

WHAT'S THE MOST IMPORTANT LESSON YOU'VE LEARNED?

Aviation interiors are a team effort. We can only succeed by working together to execute our vision, and we cannot do that without consistent contact with our customers during the design process. We get to know our clients personally to create the design environment they want and need.

At Gulfstream, our team is not limited to designers – we work closely with our partners throughout the company to develop and test new cabin concepts and materials. On the G500 and G600, for example, our interior design, industrial design, and research and development teams collaborated to create the latest in cabin comfort. The seats on the aircraft, for example, were developed by our industrial and interior designers to combine comfort, ergonomics and aesthetics.

Once the design plans are developed, the craftsmen and women in our wood and upholstery shops make the concepts a reality with a painstaking attention to detail. Even with all the innovation and technology behind the designs, each aspect of a Gulfstream interior is hand-finished in the same tradition as the finest artisans.

WHAT'S YOUR FAVORITE PROJECT?

Narrowing our catalog of aircraft down to one favorite is next to impossible – the variety and complexity of the projects we execute for our customers keeps every one-of-a-kind cabin just as exciting and fulfilling as the next.

Designing the cabins for the G500 and G600 has been very exciting. Our fully outfitted G600 production test aircraft was awarded an International Yacht and Aviation Award, in the private jet design category. This design features a mirrored bulkhead, which was a bit of a departure for our demonstration aircraft, and was inspired by a trend we are seeing of incorporating various surface materials in cabin design. The mirror, lacquers and veneer play off each other and add depth to the overall design.

WHAT'S THE BIGGEST CHALLENGE YOU FACE TODAY?

Keeping up with my amazing team of interior and visualization designers that travels around the world to meet with our clients certainly keeps me on my toes.

Business jet travelers want the same technology they use on the ground available to them in the air, and this presents some interesting challenges. Personal devices have changed the role of monitors on board, which can lead to more surface area on the bulkhead, for example. This also affects the role of lighting in the cabin, as a monitor, or the area once occupied by the monitor, is dark when not in use.

How we want to incorporate or hide technology is also a question we like to ask when designing a high-tech interior with custom-made furniture, walls and other surfaces.

WHAT WOULD YOU LIKE TO SEE DEVELOPED? IS THERE ANYTHING YOU'D LIKE SUPPLIERS TO ADDRESS?

The business jet industry has come quite far in terms of the surface materials we use on board, and we still have more opportunities for innovation. I would like to see more developments in veneer and other hard surface treatments. Designing the most flexible and versatile cabin in the industry is also a top priority and, to that end, we could benefit from more materials that can incorporate continuously evolving technology.



Tray Crowe

Director, interior design, Gulfstream



Julie Mandrell

Principal and designer,
Jules & Peabody

WHAT ARE YOUR PRIORITIES?

Jules & Peabody is committed to the art of design, curating beautiful spaces for luxury travel and modern living. We are driven by our clients' vision to create sophisticated, functional environments. We believe the interior should be a collection of details that are special, thoughtful and unique to the client. Our goal is to always exceed our clients' expectations.

WHAT'S THE MOST IMPORTANT LESSON YOU'VE LEARNED?

We believe it's paramount to surround yourself with an array of brilliant artists and suppliers. As a designer, it's our responsibility to make the dream a reality. From upholsterers and cabinetmakers to metalsmiths and the occasional jeweler, these are the craftsmen and women bringing the vision to life for your client. We never miss an opportunity to meet a new vendor, no matter what the relationship is to the finishes and styling. It's an opportunity to be informed and better serve your client.

WHAT'S BEEN YOUR FAVORITE PROJECT TO DATE?

Each project generates its own set of challenges and rewards that makes it distinctive. Conceptual assignments are attractive due to the creative freedom and generous lead times. I designed an ACJ350 concept

interior at Associated Air Center (AAC) that was shortlisted for the International Yacht & Aviation Awards in 2017. The renderings were stunning. It was like standing in a mid-century modern boutique hotel; it felt more like a residential design than an aircraft.

I also appreciate working alongside outside designers. The approach and perspective of another artist is inspiring. It's another opportunity to discover and develop your own ideas. I've been extremely lucky to have collaborated with brilliant, reputable interior designers during my career and created lifelong friendships in the process.

WHAT'S THE BIGGEST CHALLENGE YOU FACE TODAY?

I have quoted fashion designer Alexander McQueen in the past and his words are still relevant today: "Give me time and I'll give you a revolution." Time has always been a big challenge. Prior to leaving AAC, we were preparing to design a complete wide-body interior in nine weeks, creating styling, color boards, elevations and renderings for the first meeting. It seems the window of time for creating and building grows smaller and smaller as the world advances in technology. The majority of what Jules & Peabody does is exclusive. Custom and bespoke projects are laborious. It takes time to certify and manage those important details to a superior level of quality for our clients.

WHAT WOULD YOU LIKE TO SEE DEVELOPED? IS THERE ANYTHING YOU'D LIKE SUPPLIERS TO ADDRESS?

It would be exciting to see a supplier focus solely on certifiable bespoke hardware and lighting. We modify decorative pieces continuously to fit our requirements. It requires an incredible amount of time to build and certify custom fixtures and latches. A supplier with a thoughtful, modern line already established, as well as the ability to manufacture custom items, would be a considerable asset.

WHAT ARE YOUR PRIORITIES?

I focus on three main steps: in order of priority they are ergonomics, craftsmanship and design. The fun begins when we sit with customers and discuss their design or personal interests. That's the point when they can start to see the personalization opportunities. As a private aircraft interior designer, I most value the connection and opportunities working with our customers. It's a rare business in that you get to know the customer really well in an environment that's outside of their day-to-day life, which provides opportunity for exploration and discovery, which excites everyone.

Designers are creators and they thrive on building things and developing projects. In this regard, it's very rewarding to see new products that my team and I have worked on unveiled to the market in a quick timeframe.

During my 15 years in the automotive industry I rarely had the opportunity to work with customers directly. We're often working in an R&D environment, which is separate from the rest of the world. Although I love and miss the automotive design experience, I truly love the way customers interact with our products. It's truly magical how, through the product quality process, the customer becomes the designer.

WHAT'S THE MOST IMPORTANT LESSON YOU'VE LEARNED?

The most recent and relevant lesson has been to learn when to give up. Focus is critical to execution to fulfill commitment. Giving up doesn't mean you stop designing; rather you stop pushing and preserve and value the design created, understanding that the timing

might only become right for execution at a later point. This doesn't mean that the idea is bad, only the timing. Pushing at the wrong time could actually kill a design.

WHAT'S YOUR FAVORITE PROJECT?

I have two – the Embraer Phenom 300E and the Ford Mustang project of the early 2000s; both are icons of national passion for the [Brazilian and USA, respectively] teams who created them. In both cases, the excitement and engagement of a collective group of people energized me and the team to accomplish a superior goal. This gave me the deepest sense of fulfillment, from a human experience standpoint, and in the end result. The soul of the product comes from the team's passion – an unstoppable source of energy!

WHAT'S THE BIGGEST CHALLENGE YOU FACE TODAY?

Internal sales. Design is not always easily accepted; it has to be sold. So often, the more complex part of my role is convincing colleagues and team members to believe in an idea that might seem difficult to achieve. On the other hand, it's also difficult to realize that perhaps my idea is not a good one and to back off when necessary. It's important not to become inflated in your own mind and to make sure you are always part of the team – a collaborative group. When others believe in the mission it becomes easier to accomplish because all are putting their hearts into the end result.

WHAT WOULD YOU LIKE TO SEE DEVELOPED? IS THERE ANYTHING YOU'D LIKE SUPPLIERS TO ADDRESS?

I'd like to see materials and technologies for the interior to advance and become vectors of new developments to further elevate the passenger experience, just as they have for the airframe. Maybe there could be investigations into how 3D printing could be implemented with soft goods, not just metals. Also, perhaps there could be advances in transparent materials that could be used in a structural way.



Jay Beever

Vice president of interior design,
Embraer Executive Jets

WHAT ARE YOUR PRIORITIES?

We are always looking for ways to improve the flying experience – how the aircraft look on the ramp, the experience of boarding, the comfort of the seats, creating amazing dining experiences, delivering a great night's sleep, keeping passengers connected to their businesses and families, creating beautiful and serene environments, and designing hidden details that make our clients feel like they are really being taken care of.

WHAT'S THE MOST IMPORTANT LESSON YOU'VE LEARNED?

For our design team I think the most important element of the design process is prototyping and testing. Building mock-ups and prototypes lets us validate through direct experience – to confirm design decisions, make corrections where needed, and even discover new possibilities that we hadn't considered.

From simple ergonomic mock-ups early in the process, to full production-representative prototypes for final validation, prototyping and experience testing always add value to the product. It has become a core part of our design process at Bombardier.

WHAT'S YOUR FAVORITE PROJECT?

The Global 7500 project has been an incredible journey for the industrial design team. We have been involved since the early stages of the program, from sizing and placement of windows, defining fuselage dimensions, establishing the floorplan variability and cabin modularity model, to defining ergonomic, functionality and aesthetic details for the cockpit, every cabin monument, seating, lighting, appliances, CMS and IFE. Designing the cabin experience of our new flagship has enabled us to enhance our design knowledge and solidify our design process and tools, ultimately helping us make all of our future products better.

Another amazing project that was extremely rewarding was the design of the Olympic Torch for the 2010 Winter Games in Vancouver. As part of Bombardier's sponsorship of the event, we designed and manufactured the torches for the torch relay. Working

with the Olympic organizing committee and the torch relay teams to create an iconic object was really a once-in-a-lifetime opportunity.

WHAT'S THE BIGGEST CHALLENGE YOU FACE TODAY?

One of the challenges for design in aviation is the time and investment required to bring new products and updates to market. Regulations and certification are critical for passenger safety, but meeting these requirements adds complexity and time to product development. This drives us to continue upgrading our ability to bring new products to market quickly, and continue with long-term strategy and planning for new innovations, to help keep our leadership position in the market through good design.

WHAT WOULD YOU LIKE TO SEE DEVELOPED? IS THERE ANYTHING YOU'D LIKE SUPPLIERS TO ADDRESS?

One of our continuing focuses is making sure our aircraft can smoothly accommodate the rapid rate of change in consumer technology that passengers bring on board. Bombardier has been a leader in inflight connectivity and this is an important area of continued development.

The use of composite materials and new low-volume manufacturing technologies to replace traditional materials in the cabin is an area of innovation that could help reduce weight, allow more flexibility in design (both in form and functionality), and improve how quickly we can bring new products to market. This is an area of opportunity that has a lot of potential.

Tim Fagan

Industrial design manager,
Bombardier Business Aircraft



Nikki Gledhill

Designer and CEO,
MBG International Design



WHAT ARE YOUR PRIORITIES AS A CABIN DESIGNER?

My foremost priority is always meeting clients' style and need requirements. As a part of our design developments, I also like to introduce new and innovative materials and applications, while balancing trendy designs and colors with more timeless styling.

WHAT'S THE MOST IMPORTANT LESSON YOU'VE LEARNED?

To expect the unexpected – always.

WHAT'S BEEN YOUR FAVORITE PROJECT TO DATE?

Every project is my favorite; each one is unique and exciting with different levels of difficulty in design and engineering. I do enjoy projects with more color and texture variations to plain beige interiors, which I am sure is the case with most designers.

WHAT'S THE BIGGEST CHALLENGE YOU FACE TODAY?

The biggest challenge for me today is the market, both in refurbishments and green completions. The demand

for larger business jets, such as Boeing and Airbus types, has become quite stagnant. I'm hoping with the new ACJneo and BBJ Max types beginning to come out of production, the workload will start to return.

WHAT WOULD YOU LIKE TO SEE DEVELOPED? IS THERE ANYTHING YOU'D LIKE SUPPLIERS TO ADDRESS?

I would like to see more options for full-height room-dividing panels. We often use solid bulkheads to close off rooms, which can lack in styling and usable space. I would also appreciate more options for light fixtures that are not flush-mounted in the headliners.

Havilande Whitcomb

Design director and CEO,
Aviation Aesthetics



WHAT ARE YOUR PRIORITIES?

As an independent designer, my priority is always to be an advocate for my clients in the process of implementing a new design for their aircraft. These projects are complex and time-sensitive and involve large numbers of people and teams. In the process, our firm creates visually stylish interiors and exterior paint schemes, using durable yet beautiful materials for intensive use, installed with the highest level of craftsmanship and delivered on time and on budget.

WHAT'S THE MOST IMPORTANT LESSON YOU'VE LEARNED?

In aviation, the most expensive part of the project is the labor. Therefore, it doesn't make sense trying to save money by choosing less expensive materials that are inferior. Having the best materials is key to achieving the highest-quality results with the longest lifespan. Not surprisingly, this will be a sound financial decision.

WHAT'S BEEN YOUR FAVORITE PROJECT TO DATE?

This would be the complete overhaul of a vintage G1, circa 1969, for an adventurous owner. The project was fun, super creative and the outcome was very cool. However, I still love being able to work on a bespoke private aircraft for a very discerning client, creating something that is comfortable, beautiful and carefully crafted with every amenity and detail considered.

WHAT'S THE BIGGEST CHALLENGE YOU FACE TODAY?

The challenge I often face is having the client understand that the earlier I can start on a project, the better the result will be – particularly a refurbishment from the secondary market, which is a big part of our business. The ideal scenario is to be able to do the complete design and make decisions with the owner in advance and then present that package to different completion centers for competing bids. Then decisions can be made with enough time and there is no pressure to compromise because of deadlines. Having said that, we do excellent work on very short deadlines as well!

WHAT WOULD YOU LIKE TO SEE DEVELOPED? IS THERE ANYTHING YOU'D LIKE SUPPLIERS TO ADDRESS?

My current wish is for a window shade that could alternate between blackout and translucent – still giving some sun screening – and could change colors, or be so neutral that it blends with any surroundings. I'd also like to see CMS solutions that do not compromise the cabinetry and which are not so complicated to install. ☒



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NBAA-BACE *preview*

This year's NBAA Business Aviation Convention & Exhibition (NBAA-BACE) will be held from October 16-18, 2018, at Orlando Executive Airport in Orlando, Florida. More than 1,100 exhibitors are expected – this guide will give you a starting point for the interior innovations on display

Retrofit CMS solution

A new CMS, designed in-house, will be demonstrated by Alto Aviation. It is designed to offer the retrofit aircraft market a budget friendly solution in cabin management. Alto says its new CMS is based on simplicity, without compromising excellence in terms of performance or features.

This fit-compatible solution from Alto preserves existing furnishing and veneers by directly replacing old switches with the versatile and customizable new Alto Cadence Switch System (CSS), consisting of modular switch panels using discrete logic that don't require complex software.

"One of the key features of this CMS is modularity," says Kevin Hayes, vice president of sales and marketing at Alto. "This approach allows us the ability to phase the upgrades based on scope and budget."

The switch panels can also be upgraded to include USB charging and HDMI input. Alto's

Cadence Switch System controls every aspect of the cabin systems including audio, HD video, temperature, lighting, window shades, attendant call, galley and lavatory functions, and more. A smartphone/PED app is in development that will provide a full-featured graphic interface to all components.

The Alto team will also highlight its premium cabin audio systems and passenger controls.



Designers looking for new leather options should head to Edelman's stand, where they can see Stella, a tight-grained leather designed to have a durable, wear-resistant finish.

Developed in a palette of 34 colors, including white to black tones, taupes, greens, blues, pinks/reds and browns, Stella provides tremendous versatility.



More than
25,000
industry professionals
are expected to attend
NBAA-BACE 2018

LIGHTS AND SHADES

In 2019 Elliott Aviation will be manufacturing LED cabin lighting and electronic window shades manufactured by the Elliott Technologies division.

The PRIZM cabin lighting system is a multi-color cabin LED lighting system with applications including for upwash, downwash and window lighting, cup holder lighting lower accents, and more. It can be controlled through existing cabin controllers or an embedded wi-fi app, which includes customer-configured preset light moods and optional logo.

The Smart Vision Shades replace existing inner window panes with electronically controlled dimmable versions. They are available in a variety of dimmable shade colors.



PLASTIC PLATING

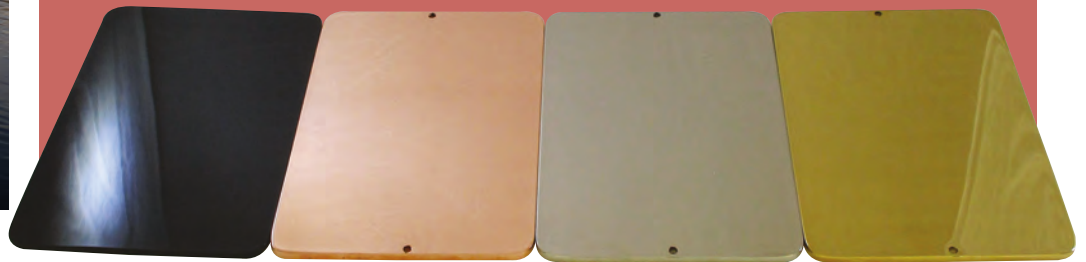
Responding to growing demand to reduce the weight of cabin components, Signature Plating can now plate plastics in-house, enabling suppliers and designers to design and install lighter aircraft components requiring decorative plating.

It was the collaborative effort of several specialty companies over many months to install this plastics plating line.

To ensure the line runs efficiently, the company has a dedicated staff consisting of chemist and line operators groomed to support this process. Signature Plating says the process of plating plastic is very technical and time sensitive. Its plating technicians

have been trained by plastics plating industry experts as to how best operate the equipment and maintain the consistency of the plated parts. The company's quality process includes inspections that are carried out at every interval to ensure the highest level of quality and color continuity. This is followed up with a final inspection for part approval and release to the customer.

With the plastics division now on line, there is sufficient capacity to start work on programs and to produce samples for customer evaluation. Signature Plating is looking for opportunities to fill its available capacity in the short term.



Quilted leathers

Several new products and capabilities, geared toward the interior designers in attendance, will be launched on Townsend Leather's display. For example, the company will debut quilted leathers produced and stitched in Johnstown, New York. Townsend recently acquired machinery that enables it to create standard and one-of-a-kind pattern seat inserts and panels featuring decorative designs made through a combination of technical stitching and custom perforation.

Quilted leathers can be produced from any of Townsend's in-stock, standard or custom colored leathers. These are all produced at an Upstate New York facility.

"It is wonderful to be able to offer our customers this capability of quilted and perforated leathers and to feel confident in knowing we are providing this service in-house where we can be in complete control over quality and attention to detail," says Sherry Cocker, aviation sales and customer service representative at Townsend Leather. "It is really exciting for our business and customers' businesses to have a capability like this at our fingertips."

Townsend Leather is a third-generation, USA-based family business specializing in the manufacture of upholstery hides and decorative leathers, supplying various sectors internationally.

Q&A



Jarid King



PRESIDENT, KING AEROSPACE COMMERCIAL CORPORATION (KACC)

What services will you highlight?

Our Oklahoma-based, AS9110-certified company offers MRO and exterior paint services for VIP and VVIP aircraft, specializing in the BBJ. As we enter our 25th year, our company has never been stronger or had better services to offer.

What investments have you made recently to expand your offering?

This spring, we completed the industry's first BBJ Gogo Biz 4G installation as well as a Satcom Direct Router system upgrade and a heavy maintenance check. We train constantly and have made big investments in our tooling, equipment and facilities.

What trends have you noticed?

The marketplace wants high-quality, but also value-priced solutions. Supporting both

corporate jets and VVIP aircraft enables small fleet operators with both classes of aircraft to turn to us. We routinely perform work for Boeing, Cessna and Bombardier aircraft. Future investments will help us deliver more, while keeping prices down.

What is the industry's biggest challenge right now?

Business aviation's cyclical nature can make it hard to keep pipelines full, teams adequately staffed and bottom lines healthy. Our corporate culture addresses each of these. Our environment of no excuses, proactive problem solving and quality in everything makes team members part

of something bigger and customers happy.

What's unique about KACC?

The ability to both paint VVIP aircraft and provide interior refurbishment and maintenance makes King Aerospace the only privately owned company to offer this capability, and one of only five suppliers worldwide to serve this market niche.



Veneer facility

F/List will promote its first manufacturing plant outside of Austria, which it opened in the Greater Montreal area. The new 59,000ft² (5,480m²) production facility provides finishing and assembling of interior components, refurbishment of interiors, product and customer support, and wood veneers treated with a specially developed REACH-compliant flame-retardant formula.

With many years of experience as a veneer supplier, F/List covers all the necessary steps – from sourcing to consulting to processing – to create a versatile product that matches the

customers' specifications. Its offerings include Microlumber, a multi-layered veneer designed to match the solid wood look.

Depending on the final purpose of the veneer, F/List's experts create digital layout schemes for the customers to see exactly what the finished surface will look like.

The Montreal facility also has a showroom and a veneer selection area as part of its designation as F/List's Veneer Competence Centre for flame-retardant wood veneers. The show booth will feature exclusive veneer samples, many available with live-log samples.





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PILOT HEADSETS

The recently introduced ProFlight aviation headset will be demonstrated by Bose. ProFlight is designed to be the industry's smallest, quietest and most comfortable active noise-canceling communication headset for professional pilots. Bose says it is ideal for the low to moderately noisy cockpits found in pressurized, turbine-powered aircraft.

With more than 30 US design and utility patents, the ProFlight headset features an in-ear configuration, three user-selectable modes of active noise cancellation, and a tap control for talk-through communication function that enables pilots to hear anyone on the flight deck that is not connected to the intercom – without removing the headset or an earbud. The headset is FAA TSO C139a and EASA E/TSO C139a certified.

With an on-head weight of 4.9oz, the headset combines a lightweight headband for stability with an earbud configuration designed to rest lightly yet securely in the bowl of the ear. Other features include a quick release, side-swappable down cable and microphone, and Bluetooth connectivity.

Connectivity installations

In June 2018, StandardAero received EASA approval for an STC for installing Honeywell's JetWave satellite communications systems and associated Ka-band radomes on EASA-registered Gulfstream GV/GV-SP aircraft. This is the company's second STC for installing JetWave systems outside the USA.

In December 2017, StandardAero completed the first STC program using JetWave and Inmarsat's Global Xpress Ka-band satellite network for USA-based Gulfstream GV and GV-SP operators – which also included the terminal, router and purposely designed direct replacement Ka radome.

Installation services are available at StandardAero's Springfield, Illinois, facility.

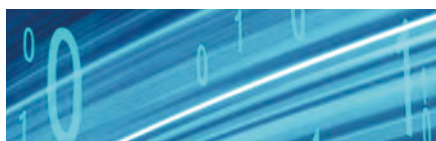


CONNECTIVITY NEWS

Visitors can expect updates on Inmarsat's wi-fi solution, Jet ConneX, which now has more than 40 STCs and is offered by all major manufacturers and aftermarket dealers. This global, high-speed Ka-band solution has now been installed on more than 300 business jets. Demand has grown even more since Inmarsat added new data plans for Dassault jets and received G550 certification.

Inmarsat will also be discussing its European Aviation Network, a hybrid of S-band satcom and 4G LTE connectivity, developed with Deutsche Telekom and scheduled for introduction in early 2019 over Europe.

The team will also announce upcoming features for the SwiftBroadband-Safety L-band network.



KA-BAND EXPERTISE

Satcom Direct (SD) will showcase its Jet ConneX expertise – it lays claim to supplying the Ka-band service to more than 70% of the global business jet fleet.

Jet ConneX powers streaming video, live TV and broadband connectivity supporting voice, web and texting. During NBAA, SD will distribute its new white paper, which outlines how to maximize the service throughout the cabin using SD's performance guarantee and speed selection option.

SD will also showcase enhancements to its cybersecurity offering, and launch products to streamline flight operations and enhance connectivity options.

CMS/IFE SOLUTIONS

After making its worldwide debut in May, Lufthansa Technik's nice Touch CMS/IFE system will be on display at NBAA-BACE. The latest version of the nice system was designed with Bombardier, and is now found exclusively on the Global 7500.

Lufthansa Technik says the system introduces industry firsts including the first plastic OLED display certified for flight. It also has a new UX that combines a telescoping dial at the seat.

The next generation of Lufthansa Technik's nice is also in the starting gates. Building on the core nice architecture, nice2 is designed to provide unprecedented personalization.



Branching out

The focus on Flying Colours Corp's stand will be the increased variety of interior completion projects coming through its facilities in Canada and USA. VVIP, medevac and technically challenging special-mission interior projects are regularly moving through the hangars as aircraft undergo major refurbishments or completions.

This has resulted in expansion at both Flying Colours' facilities, with its St Louis site opening a 60,000ft² (5,570m²) dedicated cabinetry and upholstery shop to support increased demand for customized monuments. The Peterborough site is laying out plans for a fourth hangar in the fourth quarter of 2018, which will support increased demand for mid-to-large jet interior completions and heavy maintenance projects.

The company's capabilities for installing high-tech connectivity services are also expanding with Gogo Avance L3 and L5, Ka-band and Ku-band connectivity systems regularly appearing on work scopes. With the US mandate for ADS B Out approaching, Flying Colours will detail the most time- and cost-efficient way to install the equipment ahead of the final deadline.



More than
1,100
indoor exhibitors
are expected at
NBAA-BACE 2018

LED LIGHTING

A newly FAA-PMA-certified L5800-XXX-YY LED system will be displayed by Aircraft Lighting International (ALI). The L5800 LED Lamps are plug-and-play direct replacements for the B/E 5800 LED lamps; no rewiring is necessary for installation.

"We received many inquiries from G200, G450 and G550 owners and operators who were looking for technical support and replacement lamps for failing B/E 5800 LED systems," says David Mou, counsel at ALI. "It became apparent to us that an FAA-PMA-certified solution was needed."

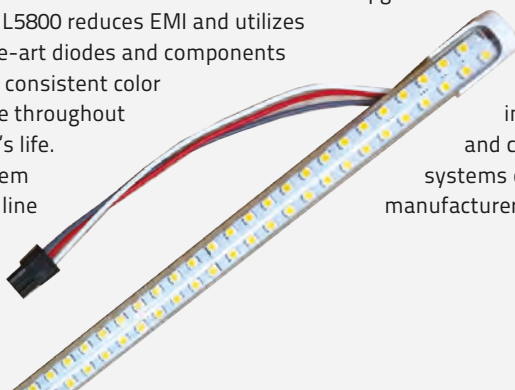
ALI says L5800 reduces EMI and utilizes state-of-the-art diodes and components that ensure consistent color temperature throughout the product's life.

The system joins a long line

of LED cabin lighting solutions designed and manufactured by ALI. The certification of the L5800 LED system comes on the heels of ALI's recent certification of the A-Series, an 115VAC, 400Hz LED system. Officially announced at EBACE 2018, the A-Series is a self-ballasted LED system operating directly off of 115 VAC aircraft power for a wide range of aircraft, including the Bombardier Challenger 604 and Global Express.

All ALI's LED systems are designed to enable a straightforward and cost-effective upgrade from existing lighting systems,

without having to modify the CMS. ALI's PMA-certified LED systems integrate into existing wiring and controls. All ALI's LED systems come with a three-year manufacturer's warranty.



METALLIC LEATHERS

To mark its 30th anniversary, Garrett Leather has created two new leather collections: Jubilee and Jubilee Gem. The Italian semi-aniline leathers have a metallic, high-sheen finish. Jubilee has a consistent grain, while Jubilee Gem is embossed with a pebble pattern. Both ranges are sold by the half hide and may be treated to pass FAR flammability requirements. Hide sizes vary between 20-30ft² (1.8-2.8m²). All 10 stock colors can be shipped immediately.

The company will also display its new Denizen collection, created with Wrapped, a fine art studio. There are 30 designs – 10 patterns each in three colorways. The process begins with core analog pieces that are hand-painted or drawn. The designs are digitally printed in the USA on to center-cut pieces of leather.



THREE-LAYER MATTRESS

The 500 Series mattress, JetPedic's flagship model, has three layers of support. First, a honeycomb base designed to allow the mattress to feel comfortable across firm and soft platforms. Next, a layer of Micro Pocket Coils. The top layer is a Talalay charcoal-infused graphite latex intended to relieve tension while channelling heat and moisture from the body. The three layers are covered in a cashmere quilted cover.

JetPedic's beds are customized to fit club seats, conference and divan areas.

They are designed to be low profile and lightweight, with custom hinge-folds for quick deployment, easy assembly and compact storage.





INTERIOR COATINGS

Mapaero and Atlanta Aviation International (AAI) will focus on their recently inked contract that grants the latter distributorship of Mapaero's interior coatings in North America.

"We look forward to offering unmatched service with US stock, short lead time and color matching capability," says Gaétan Guibert, North America director for Mapaero.

The first half of 2018 saw Mapaero obtain Embraer qualifications for its complete cabin coatings line and a triple qualification by Boeing, Bombardier and Embraer for its Di-Tex 50 top coat.

AAI is targeting to have a tint line for Mapaero's FR2-55 water-based topcoat operational by November 2018. Orders placed in the meantime will be shipped from Pamiers, France.

NBAA-BACE 2018 is the third largest trade show in the USA

CARPET COLLECTION

Scott Group Studio will introduce a new aviation collection, focusing on dimensional patterns and textures, interesting line-weights and thoughtful color palettes.



Conference tables

A new conference table described as a piece of decorative luxury furniture for VIP cabins will be debuted by Bucher. Without a pole, the mechanism is hidden on the wall side and its motions are engineered to be soft and gentle. The surface of the tabletop doubles by folding out the two table leaves.

The company's second premiere will be



the Savannah divan table. Bucher says the manual deploy is smoother than any other divan table in the market, the motions are managed to follow the desired path, and the look is impeccable. This table and its mechanisms turn the divan into a place to work, dine or relax.

Bucher will also show other signature products for VVIP aircraft: Québec, a fully automatic, large side-deploying table mechanism; Bern, a semi-automatic first class table mechanism; and different tablet holders for VIP cabins and even for cockpits.

Bucher also designs and manufactures other mechanisms, ranging from video arms to sliding doors with or without bulkheads.

PLUG-AND-PLAY LED LIGHTING

The latest cabin lighting from DPI Labs is designed to be versatile, universally compatible, and offer much increased reliability over other lighting products.

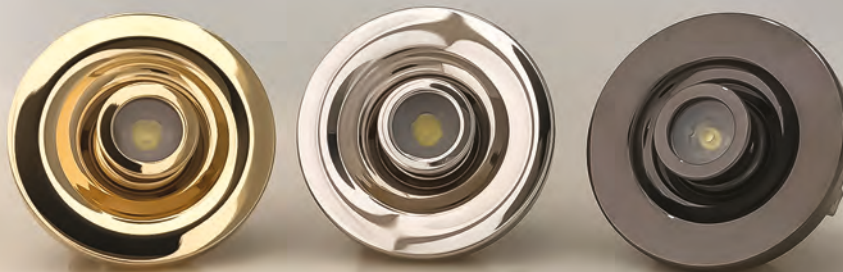
"We've taken lighting to a new level by integrating all of the control and installation variables directly into each SmartLight LED," says Scott DeSmet, director of communications at DPI Labs. "From personal seat lights to dome and accent lighting, our lighting elements are plug-and-play into any cabin system."

DPI Labs says its SmartLight LED units install easily with no wiring modification required. The smart lighting elements automatically work with any

cabin control or discreet system including passive or active trim pots, a wide range of PWM control methods, and even two-wire halogen dimming.

SmartLight LEDs are available in numerous color temperatures and beam spreads with full dimming features. Dome lights are offered with a bi-color option and all SmartLights feature built-in and fully customizable emergency lighting capability, operating from 6-28V DC power source.

DPI Labs LED units are direct drop-in replacements for prior generation DPI Labs halogen lighting, as well as most units from other manufacturers.





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Q&A



Tim Pallay

DIRECTOR OF SALES AND MARKETING, DURACOTE

What will you highlight?

Duracote will unveil a decorative non-textile flooring, Nexflor. The initial offering will be four wood grain patterns of assorted colors, built to withstand the traffic of private and commercial air transit. The range can be customized to fit the needs of small or large aircraft. This line of flooring brings anti-static, antimicrobial, hydrophobic and flame-reactive capabilities and is lightweight and easy to install. It will be offered with foam and non-woven backing options, as well as a construction with no backing. Duracote is also willing to work on custom/exclusive patterns or constructions to meet the most stringent specifications.

How are you responding to market trends?

Duracote has received many inquiries about a new flooring line from both OEMs and distributors to bring a stagnant market into the next generation. Non-textile flooring is becoming a larger need for aircraft

manufacturers and MROs as they are constantly replacing carpet in the cabins due to spills, stains and bacterial growth. Our product has coupled new technology with past innovation to provide a solution addressing all these issues.

In addition, designers have been urging flooring manufacturers to come out with new decorative patterns for the VIP and private aviation markets. Our product line brings both classic and contemporary patterns as well as modern luxury to fit any need.

What else is in the pipeline?

We have developed a burn-through material, covering film and FR coatings and adhesives that are on-par or outperform any competition. Through

our Invent process, we are willing to take on any challenge and create custom products for all interior aircraft material needs.

We are also an FAA-approved radiant panel testing facility and are able to partner with clients to provide test results many others cannot.

We have all the technology and resources of those who are larger than us and continue to work on our branding and reputation as a high-quality supplier.



Storage and tables

Savannah-based MSB Aerospace and Montreal-based MSB Design will showcase the latest hi-lo tables, which are offered in single, dual or quadruple pedestal options. These raise or lower single or multiple cabin dining, work and coffee tables as needed, either mechanically or through Bluetooth technology.

As the number of PEDs used in the cabin grows, so MSB continues to develop solutions to maximize stowage

unobtrusively and support functionality. A number of the latest customized storage products will be on show, as well as crystal, china and flatware inserts showcasing the latest texture and palette trends.

Representatives from MSB Global Resources will help delegates and exhibitors solve the ongoing recruitment puzzle for design engineers, interiors experts and any type of specialist a business aviation organization may need.





Pearlescent leather

A luxurious natural leather will be introduced by Moore & Giles. Crafted on "the finest selection of European raw material", Celeste is a semi-aniline leather marked by its pearlescent finish. Available in a palette of soft and subtle neutrals, it was designed to help infuse aircraft interiors with illuminating dimension and modern-day appeal. Designers also have the freedom to create custom colors to complement their existing cabin schemes.

There are 10 standard colors: Moonbeam, Shimmer, Iced Gold, Burnt Sugar, Horizon, Snowflake, Milkyway, Galaxy, Diamond Dust and Gunmetal. All hides are treated to pass FAR 25.853 (i) (ii).

The NBAA-BACE 2018 static display will feature nearly 100 aircraft

EFFICIENCY AND EXPERIENCE

Astronics will display a variety of power, connectivity, data, lighting and safety solutions designed to improve operational efficiencies while delivering exceptional VIP passenger experiences.

Beginning with a business jet's infrastructure, Astronics will demonstrate its CorePower solid-state power generation, conversion and distribution systems, which it says dramatically reduce wiring and weight. Moving to connectivity infrastructure, Astronics will showcase its certified Ku-band FliteStream satcom antenna system plus new Summit Line IFE system components, including CWAPs, wireless IFE and media loaders. Finally, Astronics will exhibit exterior solutions, including landing and taxi lights, plus an enhanced vision system that aids landing in challenging conditions.

Astronics is also bringing new solutions to enhance the VIP experience. Visitors can preview 4K screens featuring early-window DRM content and power over Ethernet speakers, all controlled by tablets and handsets. They can also experience Carat seat motion systems in a divan. Nuancia fiber-optic ambient lighting, Mila task lighting and overhead Spectrum lighting will also be shown.

SUNSET SUPPORT

Mente Group will address the 'sunset' business jet operators experience when the OEM announces support for their CMS will end. In this case, their need for spare parts, technical service or an economical upgrade path within the already installed system architecture outlasts the OEM's willingness to support the product.

Should operators hold on, hoping the system will not fail until the next planned upgrade? Should they invest unplanned resources into an aircraft they plan to transition out of? What would be the wisest investment?

Mente Group says that a trusted advisor can assist in navigating risk, sunset and upgrade timing – cost and final value impact determines the difference between planning for sunset or being a victim of it.



MRO EXPANSION

West Star Aviation recently expanded its facility in Chattanooga, Tennessee, with a new 48,380ft² (4,495m²) paint facility large enough to house aircraft up to the Lineage 1000. The expansion will also include 90,600ft² (8,420m²) of extra shop, office and maintenance space. This project is due for completion in the fourth quarter of 2018.

The company also recently announced plans to ramp up its newly acquired Perryville, Missouri, location, as its fourth full-service maintenance facility. The facility will expand to over 120,000ft² (11,150m²), which includes a 28,000ft² (2,601m²) paint facility with a downdraft filtration system.

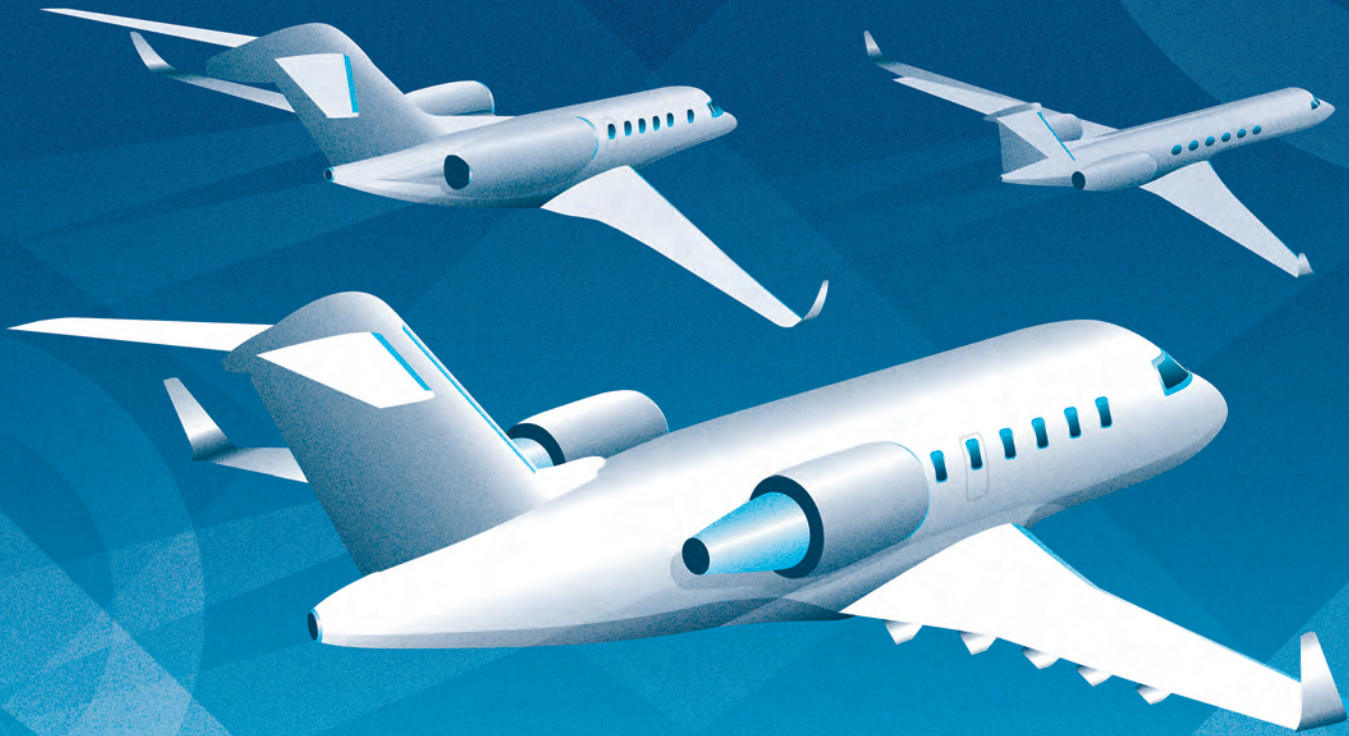
NATURE-INSPIRED CARPET

Among the carpet collections at this year's NBAA-BACE is Reverence, the result of a collaboration between Tai Ping's artisan brand Edward Fields and furniture maker Fernando Mastrangelo. For this collection, Fernando created pieces that crack, break and flow to evoke a kind of realism that floats between abstraction and photography, watercolor and pastels. The palette of neutrals blends seamlessly into ombre colorations. Each fiber is planned and hand-sculpted by artisans at Edward Fields, from blended silk and wool yarns to shag with low-pile contrasts, to edging that – like nature – defies right angles. ☒



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Contents

087

Astronics explains how its products can keep business jets truly connected

088

Engineered materials are trending in the car and business jet worlds, says Tapis

090

Actron unveils a product to reduce the side-to-side racking of aircraft drawers

093

True Blue Power outlines its solutions to increasing power requirements

094

New United Goderich presents its maintenance, refurbishment and modification abilities

097

EAST reveals how it has accelerated time-to-market for new business jet models

098

An insight into space-maximizing product developments at MSB

101

How 3D printing is being put to use at Aeria Luxury Interiors

102

Dahlgren Duck & Associates explains the importance of details

105

Aircraft Lighting International presents its latest innovations

105

How working with Gulfstream led Infinity to enter the aviation market

107

Humidification expert CTT shares its success with the new ACJ320neo and BBJ Max types

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FUTURE FOCUSED

Connecting tomorrow's business jet will be easier and more efficient thanks to innovative power, lighting, entertainment and connectivity systems

Today, the fully connected aircraft is more than just a wi-fi and IFE scenario. It is about a broader set of technologies that power, connect and light the aircraft.

Connecting the aircraft starts with power systems, where the demand is to continually increase power while reducing weight and cost. Astronics' solid-state power generation, conversion, distribution and control systems are designed to make it easy to configure and integrate efficient power systems.

When quickly implemented with easily integrated components, modern power systems result in cost efficiencies.

Astronics considered this when creating airframe power systems that incorporate its new electronic circuit-breaker units (ECBU), replacing traditional mechanical switch panels with distributed power. The company says this delivers cost and weight benefits. Astronics takes a similar, low-risk approach with its regulated power conversion units (RPCU), which it says are lighter, smaller and more efficient than traditional analog transformer rectifier units.

DELIVERING CONNECTIVITY

Connecting the jet for internet and telephony access is always a moving target, demanding higher bandwidth and faster speeds. "Reliable wi-fi on business jets begins with certified antenna systems, which need to be ready for the next generation of high-throughput satellite systems," says Mark Peabody, executive vice president at Astronics.

One of the first available systems is Astronics' FliteStream T-Series, a flight-proven Ku-band solution. "Transmitting a reliable signal through the cabin on the smaller jets is more affordable and secure than ever with new portable IFE servers and cost-effective cabin wireless



The new ECBUs and RPCUs are certified and flying, available for retrofit and forward-fit

access points," comments Peabody. "Meanwhile, cockpit connectivity is improving with innovations like Astronics' webCS, an integrated AID/server/router that bridges avionics data with networks on board for safety and operational efficiency."

PEOPLE PLEASERS

With a business jet powered and plumbed for high-speed connectivity, providing passenger information, entertainment and comfort becomes paramount. For entertainment options, the goal is to provide passengers an at-home experience with the most cost-effective, lightest, smartest hardware available. In addition to high-definition 4K screens and early-window DRM content, Astronics' IFE systems employ Ethernet backbones to reduce the weight of wiring throughout the cabin. "Even the speaker systems save weight and wiring with innovations including 3D-printed speaker housings and power over Ethernet, while delivering the premium sound quality that audiophiles expect," says Peabody.

Lighting too can make or break a cabin environment. "Designers now have a plethora of efficient, controllable lighting options, such as Astronics' Nuancia fiber-optic ambient lighting, the new Mila at-seat lights, and solid-state, LED, high-reliability cabin lighting including information signs and emergency lights," says Peabody.

Providing passengers and crew with controls for lighting, window shades, entertainment – even ordering from a menu – is now easier than before with smart handsets and tablets linked up via wi-fi. Astronics personalizes these systems with software interfaces, languages and hardware finishes that integrate with the designer's vision.

Finally, the company says its innovations in passenger power options – certified EmPower systems including 110VAC, USB Type-A and Type-C, and even embeddable wireless charging modules – offer future-proofing. ☒

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TECHNOLOGICAL TREND

Engineered products from Tapis are being used to create performance-driven luxury in the automotive and business jet markets

Demands for luxury are being met by material innovations. "The performance advantages of engineered products uncover opportunities for new products to replace tradition," says Jason Estes, vice president of sales and marketing at Tapis. "This trend is evident across various industries and may be most evident in the automotive seating and interiors market."

Estes notes that certain high-end car manufacturers are looking to innovative engineered products to meet increasing consumer demand for luxury. "Two flagship products offered exclusively to the aviation market by Tapis are taking the automotive and transportation markets by storm," he says.

Ultraleather Pro and Ultrasuede are both specified products across new luxury car models. "The innovative engineering and technology used to manufacture these products offers unparalleled performance advantages to deliver the most comfortable yet luxurious interior solutions," says Estes.

ALL-WHITE INTERIOR

Ultraleather Pro was most recently selected, primarily for its ink- and stain-resistant technology, by a high-end electric car manufacturer designing an all-white interior. The company specified Ultraleather Pro in various interior applications, including for seats and door panels. The technology was developed to resist the most difficult stains, including ballpoint pen and denim transfer, and provide lasting stain resistance that does not fade over time.

The product has already made an impact across the business jet interiors market. Tapis reports that some of the largest corporate fleet operators worldwide are replacing traditional



textiles with Ultraleather Pro across numerous interior applications. "Its unparalleled performance and ease of care makes it an ideal product for all applications, including seating, headliners, window panels, and more," says Estes.

Ultraleather Pro is also manufactured with EPA-registered antimicrobial protection, making it a great solution for medevac and air ambulance applications.

Duncan Aviation, a leading completion and refurbishment center, always recommends Ultraleather Pro to its clients. "Finding a product that resists difficult stains has always been difficult, but Ultraleather Pro consistently exceeds

this expectation and allows us to offer a reliable solution to our clients," says Mary Lee, senior completion designer at Duncan Aviation.

SYNTHETIC SUEDE

Tapis continues to innovate across its synthetic suede lines as well. "Ultrasuede, a richly complex non-woven fabric, offers a combination of luxury, performance and ease of care for an array of applications," explains Estes.

The company can incorporate custom patterns and textures into the suede using laser technology, resin printing, dye sublimation, embossing and other techniques, all while maintaining the soft feel expected of premium suede. ☒

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SMOOTH OPERATOR

Actron has a solution to reduce the side-to-side racking of aircraft drawers when in the extended position

Recently, Actron was challenged to help a leading business jet manufacturer address the racking of drawers when fully extended.

During discussions with the manufacturer, engineering management described a scenario in which drawers move from side to side while in the extended position. The current options include rolled steel slides incorporated with a stabilizing bar (with plastic components), or a third unit mounted under the drawer, acting as a linear rail.

Upon understanding the challenge, the Actron engineering team worked to develop an aerospace aluminum slide that provided a refined solution. Rather than the standard rolled steel, the A5295XR drawer slides are extruded from aerospace-grade aluminum.

RIGID AND LIGHT

"Using the Actron A5295XR drawer slides, the manufacturers of interiors for VIP and head-of-state aircraft, as well as superyachts, can refine their interiors to include drawers that provide excellent rigidity when extended in the open position," comments Jason Rechberg, vice president at Actron. "Aluminum slides provide weight reduction and color anodize options that are not typically found with steel slides."

The A5295XR drawer slides incorporate a ball carrier, which encompasses stainless-steel ball bearings and pin rollers. Rechberg says that this setup creates a smoother, more fluid motion.

HIDDEN GEM

"From an aesthetic point of view, the Actron A5295XR is an undermount design, providing that upscale out of sight look found in high-end kitchens," he adds. Then from a pragmatic



perspective, two of the A5295XR drawer slides provide greater rigidity and eliminate the need for a third slide. Fewer slides reduces installation time and cost, while delivering on a business case return-on-investment."

Actron engineers are now busy working on the next-generation undermount slide, which is expected to provide a lower profile and 25% weight savings over the first-generation slides. The slide will feature noise dampeners (open and closed position), a soft-closing option, and a PTFE-impregnated anodized finish. ⓧ

Actron's offering also includes latches, retainers, coat hooks and wire strikes

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POWER TRIP

Enabling the use of a plethora of power-hungry devices on board, True Blue Power has a power solution for every application

From accessing charts and up-to-date weather data to downloading passenger information, pilots and crew members are turning to tablets, electronic flight bags (EFB), point-of-service card readers and other electronic devices more than ever. The increase in technology, plus the traditional need to power galley equipment, means pilots and crew members are in need of reliable USB and wall-outlet power.

True Blue Power offers inverters, voltage converters, AC outlets and USB charging ports to support these requirements. Supplying much-needed power, they are designed to be compact and highly efficient.

TSO/ETSO-certified, and typically installed as a minor alteration, the products offer non-stop productivity on the fly, providing power to the crew and passengers.

INVERTER SOLUTIONS

The TI250 delivers 250W of AC power from the aircraft's 28VDC input. The 250W inverter is ideal for powering AC outlets in the cockpit and cabin. "Engineered to run cooler and featuring a fanless design, the highly efficient TI250 saves energy and reduces weight," says Erik Ritzman, director of the True Blue Power division.

Another product, the TI2000 inverter, provides 2,000W of wall-outlet power to cabin and galley equipment, including PEDs, microwave ovens and coffee makers. "This 2,000W inverter is smaller, lighter and more efficient than competing products," says Ritzman.

DC POWER PRODUCTS

For those looking for DC power products, True Blue Power has several options available. Weighing 2 lb (0.9kg), the TC280

delivers enough energy to power nine dual-port USB chargers or landing lights, for example.

For higher power requirements, the company offers the TC2000. This solution delivers 2,000W of DC power for IFE systems, interior and exterior lighting, and in-seat cabin USB power. The voltage converter is designed to be lightweight and easy to install.

USB CHARGING PORTS

In addition to being TSO/ETSO-certified (like all True Blue Power's products) the company's USB charging ports are RTCA DO-160G qualified.

The solutions include the TA202 high-power USB charging port, described by Ritzman as "a cutting-edge power source for current and next-generation devices".

A limited lifetime warranty applies to new TA102 and TA202 series USB charging ports



With the option of single and dual, USB Type-A and Type-C configurations, each unit delivers 3.0A per port.

Finally, the TA102 USB charging port is capable of charging two USB devices at full power simultaneously. "Tablets, iPads and EFBs stay fully charged and connected," comments Ritzman. "The sealed units offer water-resistant protection against spills and surface cleaning solutions."

All units can be customized to complement the aircraft interior; a variety of faceplates, adaptor plates and mounting options are available. ☒

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FULL HOUSE

With a heritage dating back to 1993, New United Goderich has evolved to become a one-stop maintenance, refurbishment and modification facility

From its beginnings as a paint shop catering to small aircraft operators within Canada and the northeast USA, New United Goderich has progressed into a full-service facility offering maintenance services on various aircraft types, followed by extensive refurbishment and interior conversion programs. "More than 25 years of industry experience have taught us to provide a quality crafted product with an unrivaled focus on aviation safety," says Luc Masse, business development manager at the company.

One distinctive offering is the ability to convert Bombardier CRJ and Embraer ERJ interiors from a typical airline configuration to business commuter or VIP interiors. The company has an FAA/EASA-approved STC for a 30-seat business class interior for ERJ-135/145 aircraft. A number of converted aircraft are in service both in North America and Europe. A company developed and owned ADS-B STC is part of the conversion program. This STC is applicable to all ERJ-135/145 and Legacy 600/650 fleets.

CRJ200 CONVERSION

The company has also successfully converted a fleet of CRJ200 aircraft into 15-passenger VIP aircraft for a charter operator in Asia. "The project presented a number of challenges, from corrosion to foreign certification issues," says Masse. "In the end, the aircraft represented the finest craftsmanship the company can offer. From a new smooth-line shell kit to satin-finish veneer cabinetry and bulkheads, and new B/E Aerospace VIP seats, the aircraft were completely transformed to a VIP standard the industry has come to expect."

This level of refurbishment and update is also offered to operators of large business aircraft. New United Goderich



has developed an expertise on Bombardier Challenger/Global, Gulfstream G-IV/G-V/450/550 and Embraer Legacy 600/650 products. New United Goderich is a Honeywell, Gogo and Satcom Direct dealer and can offer the latest CMS and connectivity solutions. Services are offered to operators globally, with repair station approvals from Transport Canada, the FAA, EASA, the Brazilian National Civil Aviation Agency, Bermuda Civil Aviation Authority, and the Civil Aviation Administration of China.

CAPABILITIES AND FACILITIES

The vertically integrated facility is located on its own 5,000ft (1,524m) airstrip (ICAO: CYCE, IATA: YCE) in southwest Ontario, Canada. The modern multi-hangar facility contains two large paint bays, an interior refurbishment workshop, a composite/structures repair workshop, a custom cabinetry workshop, an avionics diagnostic department and an

The company has experience on models from Boeing, Bombardier, Embraer, Gulfstream, Dornier and other OEMs

engineering department. The facility accommodates aircraft up to the size of a B737 or A320.

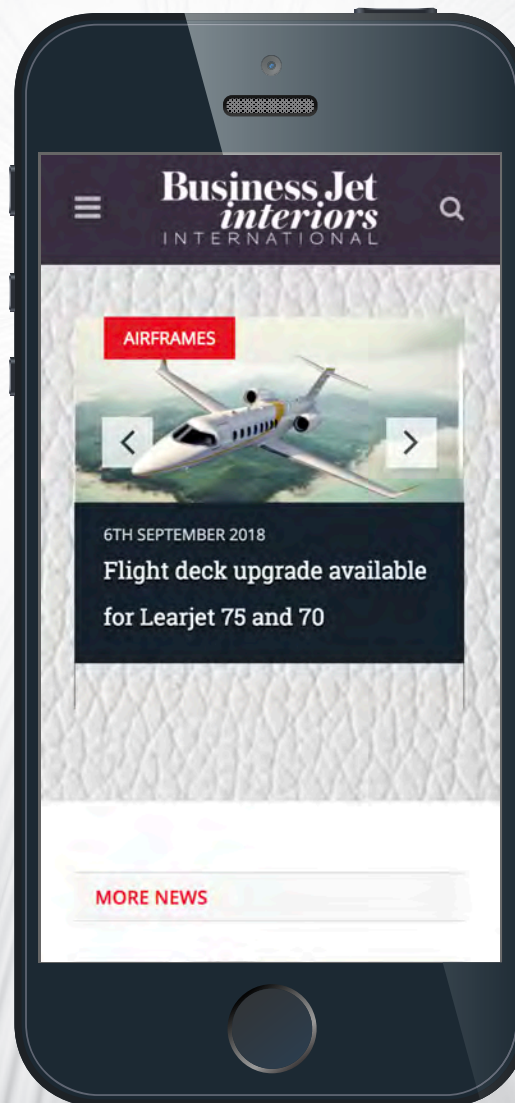
"Our facility is within easy access of all points within North America and beyond, and being located away from a major center also has its advantages," says Masse. "The airfield is used almost exclusively for New United Goderich purposes. This affords a level of privacy to operators that would not be possible at most airports. Our location also offers a community-oriented quality of life for our employees. Many of our employees have been with the company for more than 15 years. We are fortunate to have a good mix of experienced craftspeople and young dynamic employees looking forward to a long rewarding career in aviation." ☼

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SUPPORTING ROLE

Developing a new seat system has enabled Embraer Aero Seating Technologies to accelerate time-to-market for new business jet models

1 In October 2017, Embraer launched the Phenom 300E, an upgraded model of the Phenom 300, which has been the most-delivered light business jet for six years running. For the first time in the company's history, a new aircraft model was announced and revealed simultaneously. Less than five months later, in March 2018, the new aircraft entered the market, having received certification from three global aviation regulatory authorities, the USA's FAA, Europe's EASA and Brazil's ANAC.

The new business aircraft is designated 'E' for 'enhanced' in reference to its entirely redesigned cabin interior and the addition of Lufthansa Technik's nice HD CMS/IFE system.

EMBRAER DNA DESIGN

The Phenom 300E inherits the Embraer DNA design, first introduced in its larger siblings, the Legacy 450 and Legacy 500 medium-cabin business jets. The application of this design in the Phenom 300E rendered a more spacious cabin with more customization options and ease of maintainability. Embraer's DNA design philosophy prioritizes ergonomics, based on the belief that comfort is human and not technical. Craftsmanship and design follow, complementing comfort with appealing aesthetics.

This belief system places the seat design front and center in the overall Phenom 300E design. Along with the new table, sideledge, sidewall and valance designs, the seat profile – with its enhanced headrest and retractable armrest – gives expanded aisle clearance and increased cabin space.

The new seats feature broader backs for greater support, extendable headrests with bolsters, and extendable leg rests for improved ergonomics. The seats were

As well as Embraer's production line, EAST supplies 9g and 16g seats for a wide range of projects



designed by Embraer and engineered by Embraer Aero Seating Technologies (EAST). They are being produced in Titusville, Florida.

Embraer's acquisition of Aero Seating Technologies has enabled it to achieve greater speed-to-market for the launch of new business jet models. It has also proved to be a strategic addition of seating design, development, engineering and manufacturing capabilities – diversifying Embraer's business portfolio and broadening its customer base into new markets.

LATEST FEATURES

Among the first investments made by the newly formed EAST was the development of a seat system that expanded the company's abilities in the development of serial production seating solutions for both the commercial and business aircraft markets.

EAST's seat innovations include a vertical lift feature for an enhanced

dining or meeting experience, and air bladders to enable fine adjustments to cushion comfort. Power-assisted track and swivel technology emulates common capacitive touch controls with press-and-hold operation.

A variety of headrest styles are viable to accommodate regulatory limits or personal preference, including integral, plug-in, low back and flex-wing options. Passenger comfort is further enhanced by the use of active cooling technology.

Now, with even greater versatility, EAST continues to deliver on its seat and divan installation integration capabilities across the spectrum of aircraft platforms, ranging from light to ultra-large business jets, in addition to narrow- and wide-body VVIP aircraft, including for head-of-state clients. ✕

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SPACE SAVERS

The various product developments underway at MSB are united by the aim of maximizing space, invisibly

MSB's clients include OEMs, completion centers and design houses

Ever since production began at MSB Aerospace's facility in Savannah, Georgia, USA, early in 2018, the team has forged ahead with several interior component developments that are aimed at delivering reliable innovation with built-in quality. "Our products are varied, but the common denominator is that through intelligent engineering they contribute subtle, almost invisible, functionality, which maximizes cabin space," says Shannon Gill, managing director.

The portfolio includes hi-lo tables that convert for different uses as needed. A recent project has seen the single-pedestal table evolve to a four-pedestal unit that accommodates up to 10 diners. The engineering team synchronized the four pedestals to move simultaneously. Installed on a business airliner, the table operates mechanically or is controlled through the aircraft's Bluetooth system.

"We are continuing to evolve our tables to fit increasingly complex requirements," says Gill. "Our engineers focus on maximizing space while retaining form and functionality, and this need is amplified as we see passengers carrying more personal items on board."

DIGITAL RESPONSE

MSB engineers are developing systems to stow digital devices conveniently yet enable maximum use. Current projects include a monitor that folds in and out of the table to provide a big screen to synch with handheld devices. A system enabling wireless charging of smart devices on part of the table surface is also in development.

MSB stowage solutions also include tailor-made drawer and cabinet inserts designed to protect crystal, china and flatware, and safeguard valuable items. The company has seen an increase in the



variety of insert types requested. "Traditionally we made inserts for regular dinner settings," says Gill. "Now we are asked to create inserts that stow dishes used to serve Oriental and Middle Eastern meals, as well as a mix of cocktail glasses. As galleys become more sophisticated, passengers expect variety in terms of the wining and dining experience, resulting in an increase in insert numbers, especially on large jets."

Gill says VVIP airframes have become a key market for MSB. The company has just begun work on a VVIP set that will incorporate more than 150 items.

Another trend Gill has seen is for the owner's personal preferences to spill into all elements of the cabin design. She notes demand for grayscale palettes and more tactile textures. "We've produced insert finishes that look like hammered metal or carbon fiber," she says.

Lighting is also playing a part in cabin ambience and MSB's initial contribution is the production of glass racks up-lit by LEDs. "Lights can be bright to work by, or subtle," says Gill. "We've designed ours to be versatile, functional and stylish."

MSB's customer base has grown rapidly since opening in the USA. "Our expansion puts us in a much stronger position to respond quickly to our US customer needs," explains Gill. "We can service their requirements in a timelier manner and are better positioned to think creatively about their future needs."

In fact, Gill is already eyeing additional building space for future expansion. ☒

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PRINTS CHARMING

3D printing is being put to use by Aeria Luxury Interiors, to add value to its solutions and products

Aeria is rated on most current Boeing and Airbus model aircraft

Ron Soret, vice president and general manager of Aeria Luxury Interiors, notes that the company began exploring the use of 3D printing in 2014, after recognizing the potential the technology has in advancing not only VIP completions, but the whole aviation industry.

"Utilizing 3D printing allows the Aeria team to focus on the innovative possibilities that could come into play, not only from a design perspective, but for engineering as well," he explains. "We have been investing in technologies to ensure that we remain at the forefront of the completions industry."

After careful consideration, the company selected the Stratasys Fortus 900, which Soret believes offers the largest print envelope available. "This leads to big savings in the overall weight of the aircraft, without sacrificing craftsmanship and quality," he says.

TRAINING

The vendor provided on-site training to enable the team to make the most of the equipment. Aeria staff have also visited Stratasys' facility for advanced training on programming software.

"3D printing is an excellent tool that allows Aeria to try out new ideas and validate parts within a matter of hours instead of waiting for weeks to create a prototype using the conventional method," says Soret. "This has the benefit of saving valuable time, to meet project schedules."

However, there are some aspects that will continue to be performed in the traditional way. "While we are always exploring new methods and technologies to improve our offering, it will always be necessary to ensure that we fulfill what our customers want – to their utmost satisfaction," says Soret.



Located in San Antonio, Texas, Aeria Luxury Interiors occupies a 100,000ft² (9,300m²) hangar, able to house two wide-body or four narrow-body aircraft. The company offers turnkey aircraft solutions to VIP customers seeking to outfit or refurbish their Boeing or Airbus aircraft. Capabilities include maintenance services, avionics upgrades, cabin refurbishments and complete outfitting.

RECENT CONTRACTS

Soret reports that the company recently signed agreements for cabin interior refurbishments, heavy maintenance and installation of Honeywell's MCS 8000 Ka-band communication system on several BBJ 737s.

Aeria received its own FAA Repair Station Certificate in late 2017 and recently received civil aviation authority approvals to perform maintenance on EASA- and Bermuda-registered aircraft.

The company plans to add new machines with increased capabilities



PHOTOS: AERIA LUXURY INTERIORS

as it improves and expands its operation. "3D printing technology is on the fast track to replacing some of the conventional methods of fabrication," comments Soret. "We are committed to quality and craftsmanship and operate in an environment that demands only the best. Aeria will continue to offer customers the most advanced options available for their aircraft." ❖

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To request more details from Aeria Luxury Interiors, visit www.ukimediaevents.com/info/aimbj

RECIPE FOR SUCCESS

The devil is in the details when creating a divine experience, explains Dahlgren Duck & Associates

The company supplies china, crystal, flatware, linens and other cabin amenities

Regardless of how the interior finishes reflect an owner's personality and needs, every private aviation project shares one common denominator: details. As fashion designer Giorgio Armani has said, "To create something exceptional, your mindset must be relentlessly focused on the smallest detail."

Dahlgren Duck & Associates has built its reputation by focusing relentlessly on the smallest of details, to deliver an experience exceeding client expectations. That can involve sourcing custom fabrics and leathers for seating, finding just the right linens for the sleeping experience, and seeking the single source trusted to engrave a client's corporate logo on bespoke crystal.

UNDERSTANDING CLIENTS

Each aviation project is as unique as the passion and personality of the client. It takes a talented design team to extract what is unique about a family, individual or corporate team's needs and translate that into the creature comforts that will enhance their luxury travel experience.

"You may think that each interior design project begins with sketches, pencil and paper, or even heading straight for the computer, but in reality, every project starts with listening and truly understanding the client's needs," comments Scott Ritter, CEO of Dahlgren Duck & Associates. "We work to capture



the soul of each project and bring that alive in the sky."

Ritter says that understanding is critical to getting the details right. "Knowing which type of crystal will meet the demands of a single-malt aficionado and understanding the request for durability from a fleet manager helps shape the experience from the very first client engagement," he adds.

The designer's job then becomes finding the right blend of artisans, brands, products and passions to create an exquisite inflight experience.

FLATWARE FLAVOR AND FEEL

A surprising amount of scientific research has gone into the relationship between flatware materials and food flavor. Other research strongly suggests altitude affects taste and texture. Therefore, cuisine preferences, favorite flavors and frequent destinations can all affect the flatware chosen for each aircraft.

"For example, sterling silver may not provide the perfect tug at the lip when taking a bite from the tines," says Ritter. "Then, there's the weight in the hand, and the balance of each piece. Every detail affects the feeling. Tying all of these

insights and preferences, scientific and personal, creates the ideal dining conditions while cruising at 45,000ft."

DEVILISH DETAILS

"We have appointed aircraft that essentially served as backstage parties, as well as those that set the stage to ink business and political agreements," says Ritter. "Every project is unique. Achieving success hinges upon nailing the details – color, weight, fabric, optics, scent and experience. Accounting for and stimulating all of the senses in every request becomes the goal."

Understanding the questions to ask means clients have confidence their vision will come to life as expressed. "We pride ourselves on instilling confidence in our clients," says Ritter. "It's imperative they understand we know exactly how important it is that we define the devil in each individual detail, and use that to create a truly unique expression of each client's divine experience." ❁



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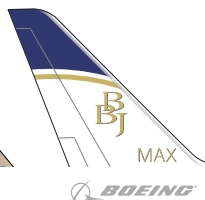
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SHINING EXAMPLES

The latest lighting developments at ALI include a full-spectrum RGBW mood LED system with Bluetooth control

For 20 years, Aircraft Lighting International (ALI) has provided aircraft interior lighting systems, its mission to offer the highest quality product, with the shortest lead times, at competitive prices. A key enabler of this is that the company can conduct engineering, prototyping and manufacturing on-site in New York State. The company also credits its ingrained, person-to-person approach to customer service and technical assistance.

As customers seek complete control and customization, ALI has developed a full-spectrum RGBW mood LED system with by a proprietary Bluetooth controller. The system brings the colors of the rainbow to the passengers' fingertips in any cabin through an Apple iOS or Google Android device. It has

already been installed on a number of business aircraft.

"Our mood LED system opens up a new realm of customization and opportunity for our customers," says Shervin Rezaie, general manager at ALI.

The mood LED system complements ALI's efforts to expand into more specialized products, including infrared and night-vision technology, which are also available.

ALI now offers a full range of LED replacement solutions with FAA Parts Manufacturer Approval, including the L5800 LED, A-Series 115VAC LED and L-Series 28VDC self-ballasted LED systems. The LED system is designed to last well over 60,000 hours, comes with a three-year manufacturer's warranty and can be integrated with existing wiring.



A full range of LED solutions will be on display at NBAA-BACE in Orlando, Florida, October 16-18, 2018, at Booth 3618. ☒

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BUILT TO LAST

A partnership with Gulfstream led Infinity to develop its resilient Luxury Woven Vinyl for the business jet market

Infinity's Luxury Woven Vinyl (LWV) has a heavy-traffic-rated vinyl backing system to enable its use for both indoor and outdoor spaces. Following great success in the marine, recreational, residential and hospitality industries, the company has now designed a floor covering for jets. The specially designed solution came about through a three-year partnership with Gulfstream Aerospace.

With its heavy-traffic-rated backing system, antimicrobial properties and stain-resistant technology, Infinity's flooring is well suited for aircraft use. The company has a 10 x 22ft (3 x 7m) cutting capacity and says it can handle the most difficult templates while providing the precision expected. "This cutting capacity makes it easier and faster to replace



existing flooring in aircraft, no matter the size," says Warren J McCrickard, director of business development at Infinity.

The LWV range incorporates more than 25 collections and 180 colors, with designs inspired by everyday textures.

Infinity offers three types of cushion backing options – Ultra Thin, Compact Cushion and Heavy Duty. "The unique vinyl-on-vinyl construction of the backing means the flooring can withstand all environments in various markets, while being more lightweight than traditional carpet," says McCrickard.

Infinity has put its flooring through harsh tests and conditions to ensure that the product is both resilient and safe. "LWV is backed by one of the strongest warranties in the industry and is proudly made in the USA," adds McCrickard. ☒

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FRESH AIR

The Cair humidification system from CTT has gained six orders for the new ACJ320neo and BBJ Max types

As the new ACJneo and BBJ Max families approach market entry, cabin humidity-control specialist CTT Systems is accumulating orders for its Cair humidification system to be installed on the new types. So far, it has six orders from four completion centers. AMAC Aerospace has specified the system for a BBJ 747-8 and an ACJ320neo, Comlux Completion for a BBJ Max, Jet Aviation for a BBJ Max and an ACJ320neo, and Fokker Technik for an ACJ319neo.

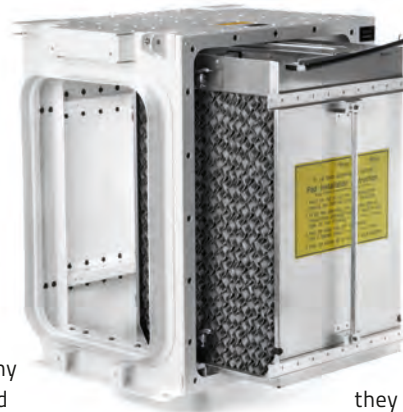
"It is both gratifying and a privilege to receive repeat orders for our humidification system from valued business partners," says Peter Landquist, vice president of sales and marketing at CTT. "We already have more than 90 Cair systems in service globally, on business jets from the A320 and B737 families, through intermediate-sized platforms up to B747s. In all cases, performance and reliability have been very good.

"All these aircraft are capable of operating over very long distances

and at high altitudes, where the air is cold and dry," continues Landquist. "This combination leads to passenger and crew discomfort, which is easily rectified by our solution."

CTT's system maintains cabin air humidity in the human comfort zone of around 20% relative humidity, which the company says reduces dry-air-related problems for passengers and crew alike. "These include fatigue, jetlag, red eye, dry skin and the risk of catching viruses and diseases," comments Landquist. "Food and drink taste better. Cair is based on evaporative cooling technology and uses a method that effectively reduces the transfer of bacteria. Overall well-being and sleep patterns are greatly enhanced."

Now in its third decade, CTT Systems is established as a leading provider of



systems that maintain the humidity of passenger cabins, flight decks and crew rest areas at pleasant levels. Its solutions include moisture control, to prevent corrosion of the fuselage. "Our solutions improve passenger well-being and crew efficiency and can result in busy executives arriving at their destinations in better shape than when they took off," says Landquist.

Cair can be installed on the production line or retrofitted, and CTT contends it increases the aircraft's value. Cair is offered as standard or optional equipment for flight deck, crew rest and first/business class areas on types such as the B787, B777X, A380 and A350. ✕

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INDEX TO ADVERTISERS

Actron Manufacturing Inc	91	CTT Systems AB.....	104	Moore and Giles Inc.....	60
AERIA Luxury Interiors.....	13	Dahlgren Duck	36	MSB	27
Aeristo	Inside Back Cover	DPI Labs	Outside Back Cover	MSB Global Resources.....	29
Aerolux	19, 21, 23	Duncan Aviation	84	New United Goderich Inc.....	79
Air Cabin Engineering Inc.....	100	Duracote.....	103	Perrone Aerospace.....	75
Aircraft Cabin Systems.....	80	Embraer Aero Seating Technologies	5	Saint Louis Designs Inc.....	104
Aircraft Lighting International	99	F & E Aerospace	63	Sealth Aero Marine	100
Alto Aviation	55	F/LIST GMBH.....	Inside Front Cover	Signature Plating.....	106
AMAC Aerospace Switzerland AG.....	31	Flying Colours Corp	71	Smartsky Networks	83
Astronics Corporation.....	6	High Tech Finishing.....	99	Tapis Corporation	89
Bucher Aerospace Corp	96	IDAIR GmbH	3	Townsend Leather Company Inc.....	44
Business Jet Interiors Online Reader Inquiry Service	86	Infinity Woven Products LLC.....	96	True Blue Power	92
Cascade Designs Ltd.....	47	Innovative Advantage.....	103	Zodiac Executive Inserts.....	52
Comlux the Aviation Group	39	JCB Aero.....	35	www.businessjetinteriorsinternational.com	95
		King Aerospace Inc.....	106		

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On the road

A PRIVATE JET DESIGNER TURNED HER TALENTS TO THE MOTORCOACH WORLD TO CREATE A LUXURIOUS VEHICLE TAILORED FOR THE NEXT ADVENTURE

This luxurious motorcoach was converted by Featherlite Coaches with an interior designed by Jules & Peabody. It was completed in April 2018.

"Our objective was to curate a versatile, neutral palette that could be transformed by simply modifying the accessories for a more personalized space," notes Julie Mandrell, principal and designer at Jules & Peabody.

The motorcoach features a triple slide floorplan including a 60in LCD Samsung HD TV, Sonos sound system, AppleTV, an exterior entertainment system and Viking appliances. Materials include Ann Sacks tile back splashes and vanity flooring, Wilsonart quartz countertops,

custom laminate cabinetry, heated hardwood flooring and fabrics and leather from Larsen, Pierre Frey and Moore & Giles.

"Each interior we create is unique," says Mandrell. "Typically a material or finish catches my eye and the design process begins there. However, this motorcoach was truly inspired by the modern traveler with a global familiarity."

Mandrell's favorite parts are the window columns. They are wrapped in an intricate linen texture by Larsen and offset by a soft, platinum faux suede. ✕



PHOTOS: HARRY R HINDMARSH

OTHER EYE-CATCHING DESIGNS FROM VARIOUS INDUSTRIES...



- 1 The second in the Amels 242 range, the New Secret yacht has a contemporary interior conceived by Winch Design. The scheme is characterized by variable-width oak, finely polished agate slices and soft, sculptural surfaces.



- 2 Bugatti's new €5m (US\$5.8m) super sports car, Divo, is limited to a series of 40 vehicles – all already sold. The distinctive Divo Racing Blue color is used almost exclusively in the driver's section, and for accents in the passenger's space. The seats are designed for better lateral support.



- 3 The second largest yacht to ever leave the CRN yard, the 74m (243ft) Cloud 9, features interior and exterior living spaces by Winch Design, and exterior styling by Zucco International Project. The interior, which totals in excess of 1,000m² (10,800ft²), has a contemporary beach theme.

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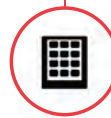
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