

# BusinessJet *interiors* INTERNATIONAL

SEPTEMBER 2013

THE INTERNATIONAL REVIEW OF BUSINESS JET INTERIOR DESIGN AND COMPLETION



## gearchange

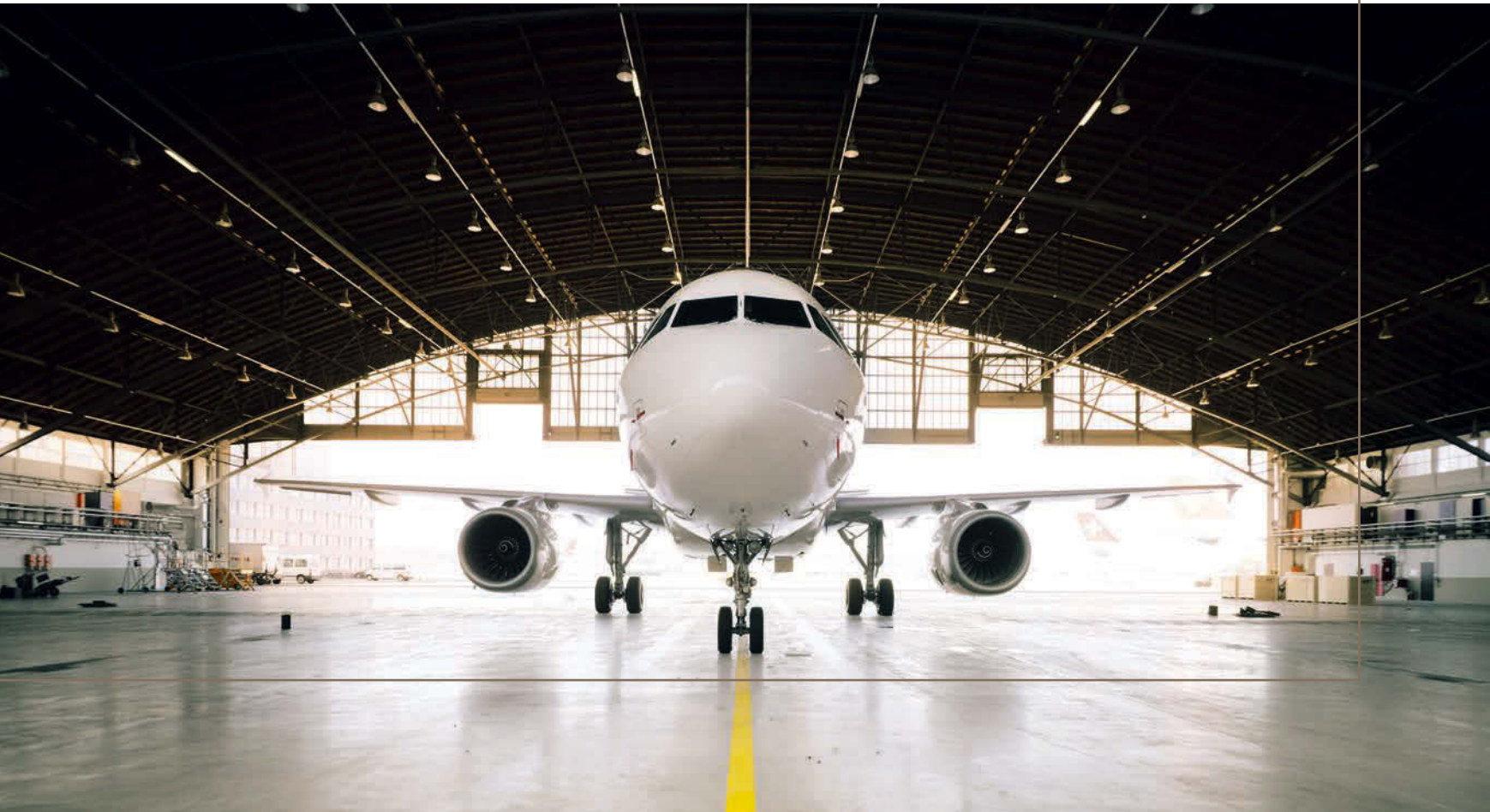
FIRST SIGHT OF THE SYBERJET SJ30  
INTERIOR DESIGNED BY SUPERCAR  
SPECIALIST JASON CASTRIOTA

**NBAA**  
SHOW ISSUE!

 **ALSO IN THIS ISSUE:** FALCON AT 50 **CUSTOMER REPRESENTATIVES** US DESIGNERS **CHALLENGER 350** VENEER ALTERNATIVES

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## insideinformation

As a glance at the publication bins at NBAA 2013 will confirm, there is a bewildering array of magazines with a toe in the business aviation sector. Congratulations on picking up the only one fully immersed in business jet interiors! While we do touch on the wider issues and relevant parallel markets, we will always be dedicated purely to business jet interior design and completion. Perhaps this is why SyberJet has chosen the magazine to unveil the beautiful interior it has created with Jason Castriota for the SJ30 light jet – turn to page 24 for pictures that, until now, have only been seen by those working on the project.

It's not the only futuristic-looking design featured in this issue. The metal inlays used in the sideledges on Bombardier's Challenger 350 (page 48) give a modern sculpted feel, while Jet Aviation Basel has gone minimalist with its open-plan Visionary concept (page 56). The latter incorporates an interesting new material made from recycled newspaper and has been promoted using a 3D movie and virtual reality. Further material developments – in particular, alternatives to real wood veneer – are investigated on page 70. Elsewhere in this issue, we examine the rise in use of customer representatives during the completion process (page 32); look back at 50 years of design development in the Dassault Falcon family (page 62); ask US-based designers what has caught their imagination lately (page 41); and preview some of the innovations you can see at NBAA 2013 (page 77).

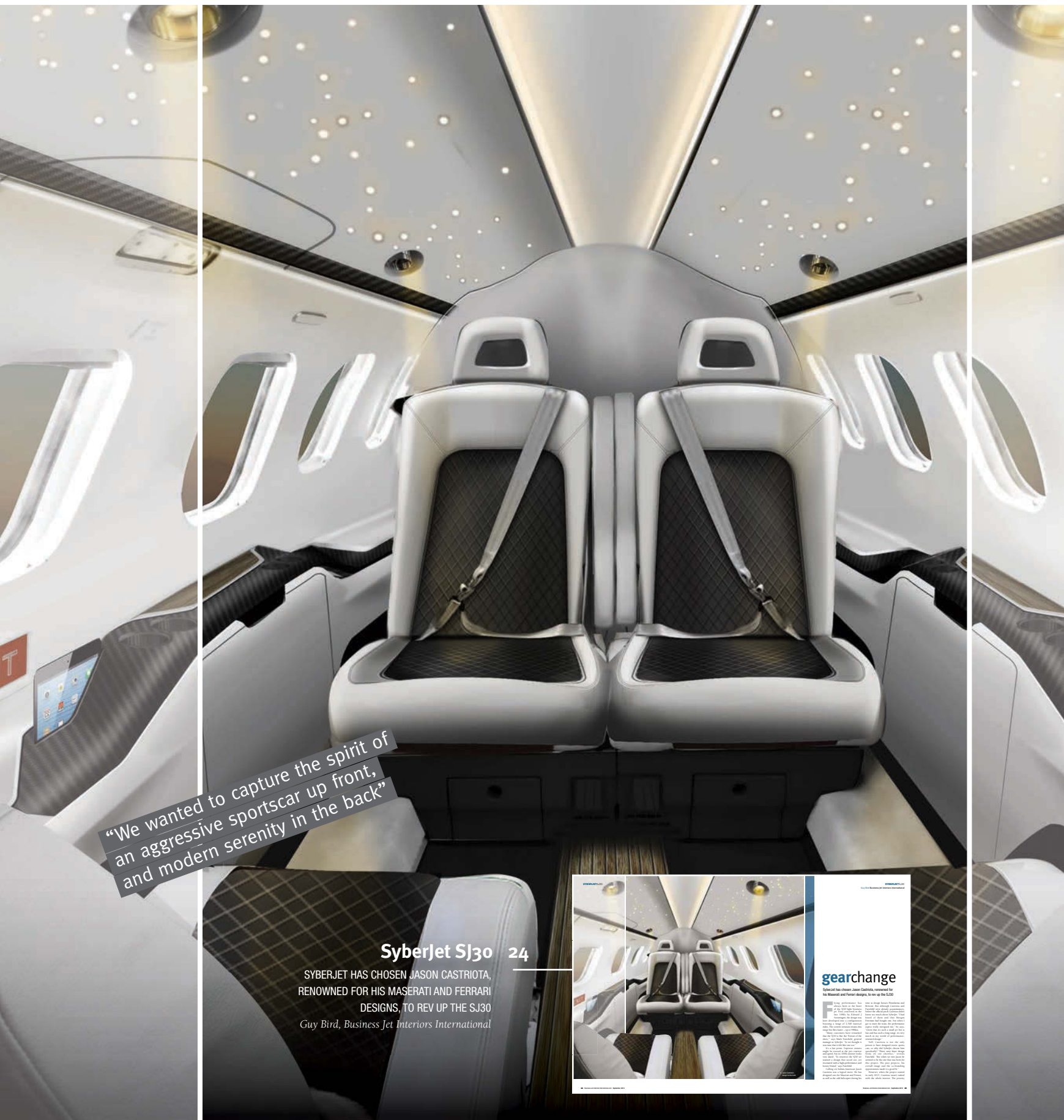
I look forward to documenting how the materials, technologies and roles examined in this issue evolve in the years to come. Only time can reveal what will become established – so watch this space! In fact we've just made it easier for you to do so, by launching the *Business Jet Interiors International* app. Available from the App Store for all tablets, it is completely free. As well as putting the latest news and back issues at your fingertips, it automatically downloads new issues, so you can read them offline at your leisure even before hard copies are available.

The magazine continues to grow in line with changing expectations. It is a niche industry with unique considerations, and its professionals deserve a specialised publication in which to share knowledge, news and views. We're sure the new app will make it easier to fit *Business Jet Interiors International* into your life.

Izzy Kington, editor







“We wanted to capture the spirit of an aggressive sports car up front, and modern serenity in the back.”

## SyberJet SJ30 24

SYBERJET HAS CHOSEN JASON CASTRIOTA, RENOWNED FOR HIS MASERATI AND FERRARI DESIGNS, TO REV UP THE SJ30  
*Guy Bird, Business Jet Interiors International*





8 news

THE RESULTS OF EUROCOPTER'S COLLABORATION WITH PEGASUS DESIGN; COMPLETION ANNOUNCEMENTS; THE LATEST BUSINESS JET CABIN DESIGNS; PRODUCT LAUNCHES; LUXURY LIVING

18 design brief

A SUPERSONIC CABIN INTERIOR CONCEPT TO ACCOMMODATE BOTH VIP AND CORPORATE PASSENGERS

20 design panel

THE EXPERTS TALK TABLES – WHAT CUSTOMERS WANT, HOW IT CAN BE ACHIEVED AND WHAT ELSE IS POSSIBLE



features



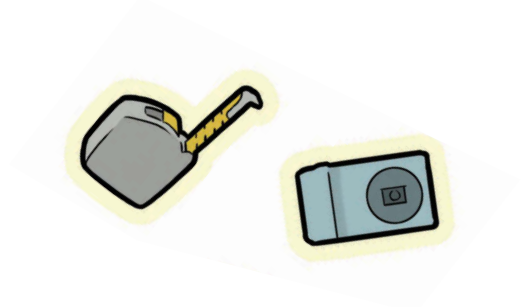
32 customer representatives

A REPRESENTATIVE WITH ALL THE RIGHT QUALITIES CAN ENSURE THAT AN AIRCRAFT BUYER'S VISION IS ADHERED TO AND THE COMPLETION RUNS TO SCHEDULE  
*Chris Colvin, Business Jet Interiors International*

US designers 41

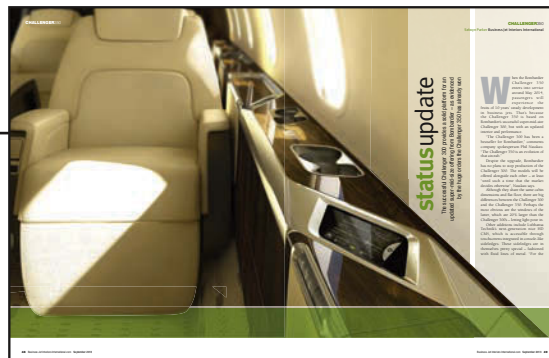
AHEAD OF NBAA 2013, THREE US-BASED DESIGNERS SHARE THE CHALLENGES FACING THEM AND THE WIDER INDUSTRY, PLUS THE MATERIALS THEY CAN'T WAIT TO USE ON BOARD  
*Izzy Kington, Business Jet Interiors International*





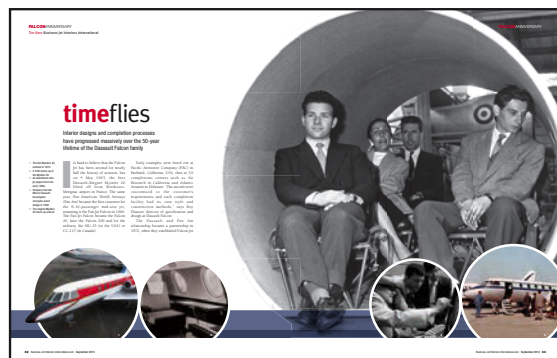
## Challenger 350 48

THE SUCCESSFUL CHALLENGER 300 PROVIDES A SOLID PLATFORM FOR AN UPDATED SUPER-MID-SIZE OFFERING FROM BOMBARDIER – AS EVIDENCED BY THE HUGE ORDERS THE CHALLENGER 350 HAS ALREADY WON  
*Selwyn Parker, Business Jet Interiors International*



## Timeless to Visionary 56

A DOUBLE CONCEPT SHOWCASES THE TALENTS OF THE DESIGN SIDE OF JET AVIATION BASEL'S TWIN OPERATION  
*Izzy Kington, Business Jet Interiors International*



## 62 Falcon anniversary

INTERIOR DESIGNS AND COMPLETION PROCESSES HAVE PROGRESSED MASSIVELY OVER THE 50-YEAR LIFE OF THE DASSAULT FALCON FAMILY

*Tim Kern, Business Jet Interiors International*





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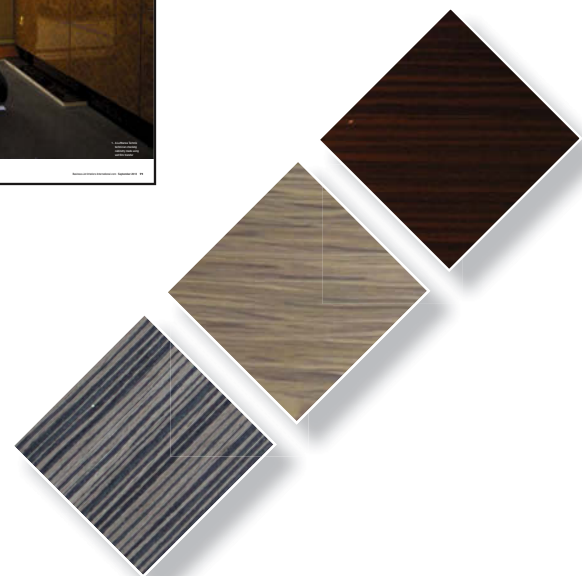
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## veneer alternatives 70

IS THERE A PLACE FOR WET  
FILM LAMINATE IN LUXURY JETS?

Chris Colvin, Business Jet Interiors International



## NBAA preview 77

HIGHLIGHTS TO LOOK OUT FOR AT NBAA 2013, WHICH  
TAKES PLACE ON 22-24 OCTOBER IN LAS VEGAS, USA

## products and services 85

NEWS AND CASE STUDIES FROM OUR ADVERTISERS

## design spy 116

EYE-CATCHING DESIGNS FROM OTHER SECTORS



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## index to advertisers

3D Viz.....	40	Business Jet Interiors World Expo 2014.....	12, 15, 16	PATS Aircraft Systems.....	100
Aeristo.....	11	Cascade Designs Ltd.....	43	Perrone Aerospace.....	83
Aerolux.....	27, 28, 31	Comlux the Aviation Group.....	47	PGA Electronic.....	Outside Back Cover
Aerospace Designworks.....	103	Corbis Global.....	91	RCO Engineering Inc.....	114
Air Cabin Engineering Inc.....	80	EMTEQ.....	96	Rockwell Collins.....	55
Aircraft Interior Products.....	44	Global Aviation Services Interior GmbH.....	75	Satcom 1.....	96
Aircraft Lighting International.....	100	Hillier Incorporated.....	88	SELA.....	36
Alto Aviation.....	104	IDAIR GmbH.....	5	Spectrum Aeromed.....	108
AMAC Aerospace Switzerland AG.....	35	Imagik International Corp.....	99	SR Technics Switzerland Ltd.....	Inside Front Cover
Ascending Design.....	Inside Back Cover	Innovative Advantage.....	114	Steecon Enterprises.....	95
Astronics Advanced Electronic Systems.....	110	Jet Aviation Management AG.....	61	Tapis Corporation.....	107
Boeing Business Jets.....	7	Lou Martin Associates.....	110	Taylor Deal Aviation LLC.....	76
Bucher Aerospace Corporation.....	113	Moore and Giles Inc.....	39	Technicon Design.....	79
Business Airport World Expo 2014.....	66	MSB Design Inc.....	87	TrueNorth Avionics.....	69
Business Jet Interiors International App.....	84	NBAA 2013 Annual Convention.....	52	VT Miltope.....	108
Business Jet Interiors International Online Reader Enquiry Service.....	65, 92	Optis.....	51	www.BusinessJetInteriorsInternational.com.....	72
				Yankee Pacific Aerospace Inc.....	23





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## EUROCOPTER LAUNCHES VIP AND EXECUTIVE VERSIONS OF EC175

At EBACE 2013 (held in Geneva, Switzerland, on 21-23 May), Eurocopter unveiled executive and VIP versions of its next-generation EC175 medium-sized twin-engine helicopter.

The cabins were created in collaboration with Peder Eidsgaard and his team at Pegasus Design, veterans of many business jet and superyacht designs.

The EC175 VIP is configured with two seating areas. The forward zone provides a lounge atmosphere with a club-four seating position, while an aft sofa-style seat accommodates three passengers. The forward zone also features a special domed roof designed to enhance the feeling of spaciousness overhead.

The EC175 Executive, which was represented with a full-scale mock-up at EBACE, was designed to offer an atmosphere conducive to both work and relaxation.



The first EC175 delivery is scheduled for 2015. Customers can choose from the four cabins already defined or create a bespoke one.



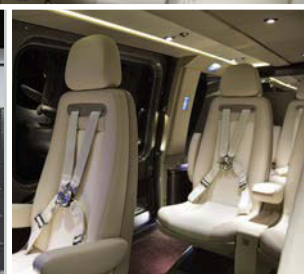
Options on the VIP version include an IFE system with audio and video interfaces and wireless connectivity via satellite communications links.



The EC175 VIP seats 6 to 8 passengers, while the Executive version accommodates 7 to 12.

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## Q&A: PEDER EIDSGAARD, FOUNDER OF PEGASUS DESIGN

### WHAT BRIEF DID EUROCOPTER GIVE YOU?

The idea was to make this large VIP helicopter look more like a private jet or even a superyacht, with an architectural and timeless appearance using highly sophisticated materials and detailing. Our approach was to create a background that was less rounded, more linear and thus more calm.

### WHAT IS THE RESULT?

We have created four designs – an executive version and three VIP styles. The background architecture is the same for all four cabins, except that the VIP models have additional decorative detailing that varies with each style choice. The seats in the VIP models are larger, with greater adjustability, similar to those on a private jet. Materials and colours have been carefully selected to create three distinct styles. Customers can also choose to work with Pegasus Design on a completely unique interior.

### WHAT WERE YOUR INSPIRATIONS?

The three VIP styles are Symphony, which is a timeless, elegant and chic design inspired by London and New York penthouses; Allegory, a classic and luxurious look influenced by the grand villas of Europe; and Rhapsody, a more modern and technical scheme that was inspired by design trends in the automotive market. Meanwhile, the EC175 Executive has a modern and stylish design inspired by the automotive world and incorporating particularly durable materials.

### WHAT WERE THE MAIN CHALLENGES?

Although Pegasus Design has been involved with a helicopter project in the past, this is the first time we have designed a helicopter interior from scratch. However, with our yacht and private jet experience, we are very well versed in creating designs for intimate spaces. The space limitations on even the largest private jets can be quite severe, and it's this understanding that enabled us to overcome the challenge set by Eurocopter.

### HOW DID THE COLLABORATION COME ABOUT?

The collaboration between the two companies was a natural one. The level of refinement and quality incorporated by Pegasus Design results from our experience and understanding of high-end customers. Conforming to those expectations has made the EC175 VIP helicopter a perfect extension of the finesse and sophistication typically found on board business jets and superyachts.

### WHAT INPUT DID EUROCOPTER PROVIDE?

To finish a cabin to the expected high standard is a complex task in terms of overall design and engineering. Production methods, installation, weight and safety are just some of the factors that must be considered. Eurocopter's expertise in those areas, combined with the quality standards set by Pegasus Design, was vital in taking the design from the concept through to completion of the mock-up.



All versions feature a climate-controlled cabin, even when the main rotor is stopped.



The EC175 has more window area than wall, providing panoramic views for passengers. Electrochromatic windows are optional.

# COMPLETIONS ROUND-UP

THIS QUARTER'S ANNOUNCEMENTS FROM COMPLETION CENTRES AROUND THE WORLD

## KIRKLAND, WASHINGTON, USA:

Greenpoint Technologies delivered its fourth AeroLoft, which provides eight private sleeping berths above the main deck in the aft section of the BBJ747-8. This is the first AeroLoft to be installed at the customer's facility. The company also contracted an airline interior manufacturing programme for eight Boeing 777-200s.

## ONTARIO, CANADA:

Flying Colours Corp has been granted an EASA STC for its CRJ ExecLiner corporate shuttle programme, complementing the STC awarded by Transport Canada in 2012. The latest interior is designed to accommodate 16 passengers. Interior options include coloured LED mood lighting, high-speed data and wi-fi solutions, IFE installations and updated galley and lavatory designs.

## LONDON, UK:

Jets has become an authorised service centre for Dassault Aviation, enabling it to undertake line maintenance on the Falcon 900 and 2000.

## MOSCOW, RUSSIA:

Jet Aviation Moscow signed an agreement with Kazan-based Tulpar Interior Group to offer scheduled interior refurbishment capabilities at Moscow Vnukovo Airport.

## MIRABEL, QUEBEC, CANADA:

L-3's MAS division will support a fleet of CC-150 aircraft for Canada's Department of National Defence. The aircraft, based on the Airbus 310 platform, are used for applications including VIP transportation. The scope of L-3 MAS's responsibility includes engineering support, maintenance and component MRO services.

## LINCOLN, NEBRASKA, USA:

Duncan Aviation installed and certified wi-fi on a fleet of three Citation CJ2+ aircraft, earning the 525A STC.

## BROUGHTON, UK:

Marshall Aerospace and Defence Group purchased Beechcraft's European MRO business, Hawker Beechcraft. The business will be known as Marshall Aviation Services.

## PARIS, FRANCE:

TAG Engineering Le Bourget has joined Bombardier's authorised service facility network, offering line maintenance for Bombardier business jets.

## TOULOUSE, FRANCE:

Airbus Corporate Jet Centre (ACJC) has signed a design and outfitting contract for an ACJ 319. The VIP cabin will be designed by Sylvain Mariat, head of the company's design studio, for the Asian market.

## ST LOUIS, MISSOURI, USA:

Jet Aviation St Louis' upholstery shop is now producing and installing custom items such as divan cushions and carpeting on aircraft that are not on-site.

## COLUMBUS, OHIO, USA:

Spirit Avionics delivered its sixth FAA KingAir B300 aircraft after avionics upgrades and interior refurbishment. The work includes new LED lighting, headliners, seats, sidewalls, cabinets and noise reduction insulation.

## GEORGETOWN, DELAWARE, USA:

PATS Aircraft Systems has redelivered a BBJ 3 (737-900ER) following the completion of its interior, to clients based in the Middle East. The interior includes a highly customised IFE system with active video on demand to 70 aircraft locations and a mobile phone system. The project was certified by PATS' on-site ODA.

## CAHOKIA, ILLINOIS, USA:

Jet Aviation St Louis welcomed its first Embraer Lineage for a 36-month inspection and applicable service bulletins

## BERLIN-SCHOENEFELD, GERMANY:

Lufthansa Bombardier Aviation Services has opened another hangar. The additional capacity means that the MRO provider can now handle one Bombardier Global and four aircraft up to the size of a Bombardier Challenger 850.

## BASEL, SWITZERLAND:

Jet Aviation Basel has been retained to design and complete an ACJ340-600 cabin. The configuration includes dining and lounge areas, two VIP bedroom suites with adjoining bathrooms, office and executive seating areas as well as high-density seating at the back of the aircraft. Work is due to commence in the first quarter of 2014. The centre has also been contracted for a BBJ 1 completion. That green aircraft is due to be delivered in the first quarter of 2014.

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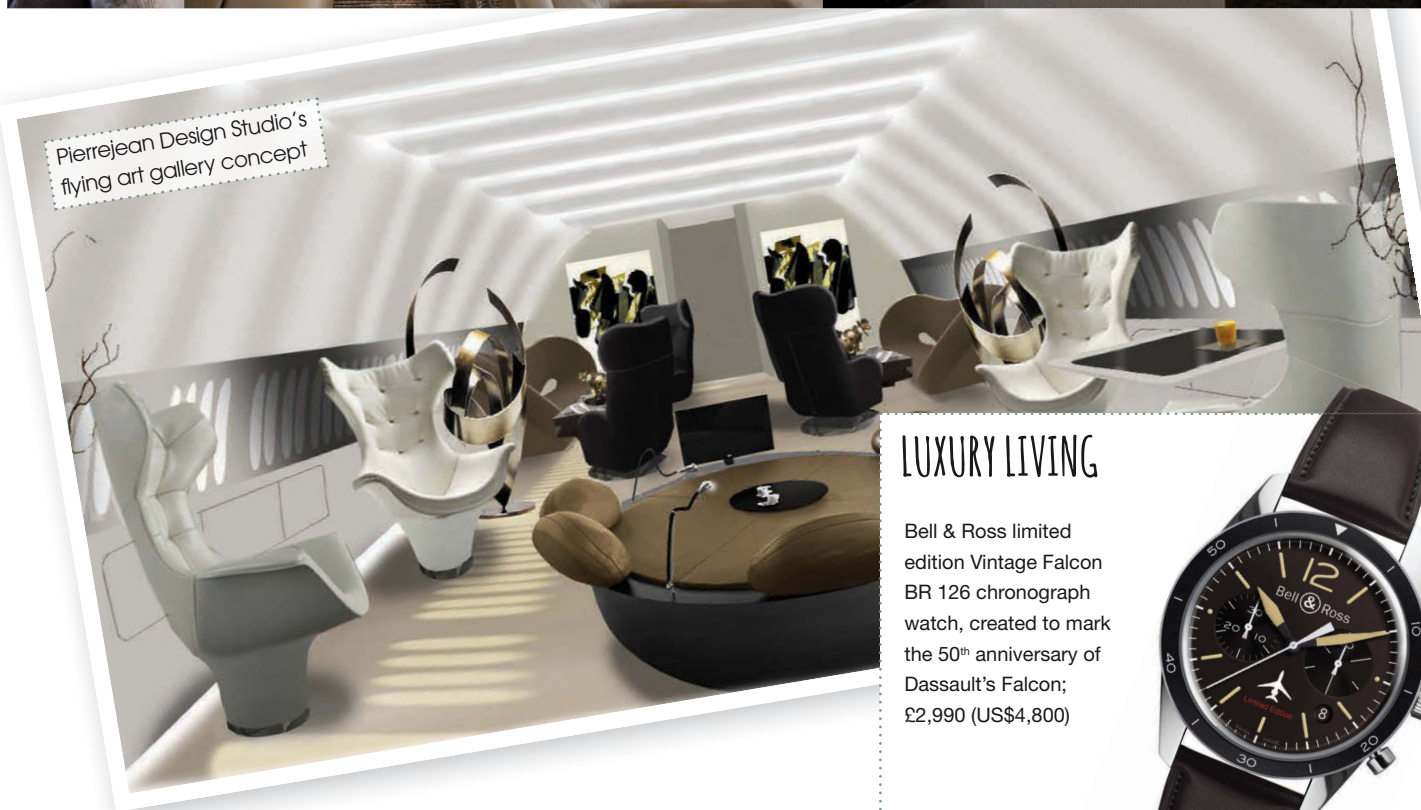
# PINBOARD



A Global Jet Falcon 50EX, recently refurbished by Burnet Interiors



A contemporary concept by M&R associates design for a single-aisle aircraft



Pierrejean Design Studio's flying art gallery concept

## LUXURY LIVING

Bell & Ross limited edition Vintage Falcon BR 126 chronograph watch, created to mark the 50<sup>th</sup> anniversary of Dassault's Falcon; £2,990 (US\$4,800)



Porsche Design P'3135 Solid titanium fountain pen; €795 (£670; US\$1,080)



## BEST OF THE WEB

To celebrate 50 years of Dassault Falcons, why not cut out and assemble your very own paper 2000S or 7X?

[www.dassault-aviation.com/en/passion/fun/goodies/origami/](http://www.dassault-aviation.com/en/passion/fun/goodies/origami/)

Read more on the role of customer representatives during the completion process:

[www.businessjetinteriorsinternational.com/articles.php](http://www.businessjetinteriorsinternational.com/articles.php)

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AirJet Designs incorporated an aquarium into this 'Acquario' ACJ320 design for a scuba diving enthusiast



An ACJ319 with which commercial airline Emirates has launched a private charter service, Emirates Executive



A G550 that joined Gama Aviation's European charter fleet recently

## LAUNCHES

A free app that automatically downloads the latest issue of *Business Jet Interiors International* to your tablet weeks before the hard copy is available



Metrojet's new cabin crew uniforms, created with Hong Kong-based fashion designer Dorian Ho



A Russian menu from Alison Price On Air, created in partnership with London's Mari Vanna restaurant



An iPad app from Jet Aviation St Louis that enables customers to choose colours, fabrics, design themes and floorplans for their cabins, as well as designs and colours for the livery

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# FAST LIVING

This concept was created by Yelken Octuri to show what might be possible in the SonicStar, a supersonic aircraft being developed by HyperMach. Taking an experimental approach, Octuri jumped straight into the design without prior research or specifications, working in his sketchbook and trying out the results using 3D software. "I was in control of everything – the design, colour and trim, lighting and 3D – so I was free to define my own way of working."

Feeling that the aircraft would appeal to both VIP and corporate clients, Octuri created a cabin to accommodate both. "This is my first approach," he clarifies. "A full VIP cabin is certainly possible, as is a fully corporate one." This design seats 16 passengers. If equipped as a corporate shuttle, Octuri believes the SonicStar might accommodate 24.

The aircraft's supersonic mission has influenced the design in a couple of ways. Firstly, as flights would be no more than a couple of hours long, Octuri saw no need for fully reclining seats or a bedroom. Secondly, the windows are circular and smaller than those of a subsonic aircraft. "I had to make the windows seem wider," he says. "I tried several solutions, checking them using 3D software. Finally I decided on a simple circular solution, perhaps reminiscent of a spaceship. To create the glowing effect, I incorporated an LED light strip in the circular recess around each window."

Regarding colour and trim, Octuri says he was aiming for a sober look: "I was determined to avoid tacky stuff, which can sometimes make its way into VIP aircraft." Materials include a wool cut pile carpet with a shaded effect in the central social area, wool for the seat covers, suede for the side panels, tinted locust wood for the seat shells, and steel and copper on some vertical panels.

## SIDEWALLS

The lines are designed to express speed and fluidity. "I had to find a good balance," says Octuri. "If the lines are too straight, you can't feel the speed. I also wanted to avoid a repetitive pattern. I made several trials, drawing in one type of software, then checking the result in 3D software."

## SEAT COVERS

The embossed effect is created using boutis, a traditional stuffed quilting technique originating from Provence, France. "Traditionally, cotton or linen is used for boutis," says Octuri. "I had long conversations with friends to find a compromise suitable for an aircraft. In the end, I decided wool was best for a woven seat cover."



## GUIDED TOUR

## VIP PASSENGER

"I didn't want to showcase the concept using a typical businessman, so I decided to put in a picture, taken by Sophie Larochelle, of a charismatic old lady smoking a cigar on the streets of La Havana, Cuba," says Octuri.

## GALLEYS

The main galley is at the front. "It's the best place for this fuselage," says Octuri. "I defined the cabin layout first, before investigating the finer points of design." A lavatory and second galley are positioned at the rear of the aircraft.

## VIP SEATING

The front part of the cabin features four VIP seats in two club-two setups. Although he felt no need to factor in recline, given the short flight times, Octuri did want to enhance privacy for passengers, hence the addition of lateral 'ears' to the headrests.



## SOCIAL AREA

Two fluid-shaped divans create a social area in the middle of the aircraft, also acting as a transition zone between the VIP seating of the front and the more corporate layout at the rear. Although the sidewalls throughout the cabin are decorated with lateral lines, in this area they are intersected by more curved ones, visually compensating for the lower height of the divans.

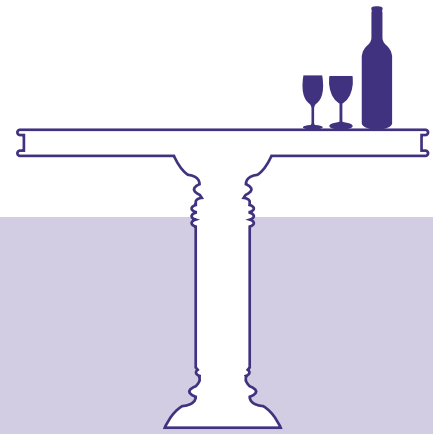
## CORPORATE SEATING

The rear of the aircraft is more geared towards corporate use, with a club four followed by four forward-facing seats. Octuri says the club four was added to enable working sessions and dining.



## CONTACT:

[www.octuri.com](http://www.octuri.com)



# DESIGN PANEL: TABLES

HOW TO DEAL WITH CUSTOMER DEMAND FOR TABLES THAT ARE STABLE, STRONG, MULTIFUNCTIONAL, SAFE, ERGONOMIC AND AESTHETICALLY PLEASING

**CINDY HALSEY:** The real challenge is utilising the available space and integrating the table with systems such as the air distribution ducting, electrical wiring, CMS and IFE equipment, while also taking seat positions and head impact criteria into account. The success of a table is based on seat positioning, table size and meeting the customer's intended function. A table can be a space to work, play or dine, therefore ergonomics can be difficult – each function requires different heights and potentially sizes.

**SONY BOUDREAU:** The stability and beauty of the table are a big part of the passenger's experience, because they will interact directly with the table on every flight. Meeting the exceptional quality demanded by the customer, incorporating desired features and maintaining the integrity of the product, while still recognising that business jet owners – like any consumers – want value for their money, can be challenging. Communication is key to the success of any design project and we have found an excellent balance between understanding and exceeding the expectations of customers while still keeping our pricing in line.

## WHAT ARE THE MAIN CHALLENGES IN DESIGNING TABLES FOR BUSINESS JETS?

**CHRIS STEEL:** Striking the right balance between the design concept, the engineering reality, customer expectations and safety requirements. Owners are always looking for something unique – in features as well as appearance. For example, coffee and dining tables are not simple or stationary any more; their functionality has become quite complex. They must adjust up and down, tabletops need to translate back and forth, rotate, expand in size, be extremely sturdy without looking too bulky or heavy, potentially support sleeping passengers, operate effortlessly and look stylish, all within the strict confines of weight and safety restrictions. Another critical task is meeting tight delivery deadlines. The completion centres that we work with usually have demanding schedules placed on them, which they in turn pass on to us. There are multiple milestones in the overall table production process, which adds complexity and time. Due to the prevalence of custom table designs, drafting the initial engineering and subsequent customer-approval process can take several weeks. Then there is structural analysis, parts manufacturing, assembly, parts plating, physical testing and certification to complete.

**JIM DIXON:** Not only does a table need to fulfil its obvious requirement, but given the limited space on board, it often has to convert into other functional pieces of furniture – such as a bed or an ottoman – easily and safely. We have to ensure that the mechanisms to change the purpose of a table are easy to operate. It must also be lightweight.



## THE PANEL

**JIM DIXON:** Recently our team designed a bespoke dining table for a BBJ. The client, a keen host, enjoyed preparing sushi for his guests and dining with them in flight. We incorporated a bespoke sushi bar and an eight-place dining table into the design. A sophisticated electronic system allowed the table to extend or reduce in size at the touch of a button. To deliver the client's dream, it's vital to work closely with the completion centre throughout the entire design and build process.

**CHRIS STEEL:** When evaluating custom specifications, we look for an evolution of design; one that allows us to introduce new features into a proven design rather than start completely from scratch. Creating 'new' tables based on existing engineering also reduces the time spent on development and structural analysis. Another important factor is that we manufacture 98% of the components used in our mechanisms in-house. Our engineers can quickly design a part, create the fabrication program and walk out into the shop a few minutes later to retrieve the machined part at any time. In the initial design stage, this affords us virtually instantaneous feedback and the flexibility to make changes quickly.

## HOW DID YOU OVERCOME THESE CHALLENGES DURING RECENT PROJECTS?

**SONY BOUDREAU:** Our in-house R&D team spent more than a year developing a table designed for real onboard life: tables are leaned on when standing, people will sit on the inboard edge, they are used in a berthing position and they are operated by people of varying strengths and heights. For strength and stability, our hi-lo table has a single pedestal, rigid tabletop and leaf design. We made it possible to operate using a single hand and not much effort, and it locks at any height for flexibility. We also made installation and repair easy. To ensure quality, we subjected the table to rigorous in-house and third-party tests, so we can meet certification requirements and provide an excellent warranty with confidence. These efforts were in line with the needs of our major OEM customers, and were the basis for our table product launch.

**CINDY HALSEY:** Each project demands a lot of thought, collaborative planning with our project teams, conceptual renderings and many, many mock-ups to strike the right balance of ergonomics, aesthetics, systems integration and certification. At Cessna, whether we partner with a supplier or use our own in-house table design, certification compliance is not a big issue. Depending on the model and design, certification is completed by analysis or testing. However, we impose stringent requirements and testing for our tables to go above and beyond certification requirements. These tests include internal criteria for stow and deploy forces, abuse loading, extended table leaf loading and cyclic testing to ensure we provide a robust and reliable table.



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



**SONY BOUDREAU**  
co-president of MSB Design



**JIM DIXON**  
aviation director at Andrew Winch Designs



**CHRIS STEEL**  
president of Steecon



**SONY BOUDREAU:** Customers will continue to ask for ways to improve legroom under the table and for innovative tabletop designs to make their aircraft unique. We want to be open to new ideas and are prepared to investigate any challenge our customers can give us.

**CINDY HALSEY:** Table design will continue to evolve and take a more prominent role in enhancing the individual user experience. Flexible positions, integrated IFEC, CMS controls and even touchscreen surfaces are quickly coming into reach. The table will no longer just be a table. Anything is possible when one focuses on providing an exceptional passenger experience.

## WHAT DO YOU THINK THE FUTURE HOLDS FOR BUSINESS JET TABLE DESIGN?

**JIM DIXON:** The class and safety rules are there for a reason: to protect those using the aircraft. These rules are getting tighter and the result is that we are already aware that certain materials could never lend themselves to table design. Fragile and potentially dangerous materials such as glass are unlikely ever to be authorised as appropriate materials. If I had the opportunity to do something really different, it would be fun to combine a functional table with some form of entertainment, such as casino gaming. A roulette table requires a perfectly horizontal platform. This is achievable – even in the air – but some technical assistance would be required. By linking the table's electronic system to the aircraft's avionics system, the table's stabilising feature could work in tandem with the aircraft. As the aircraft's movement changed, the table would automatically level itself.

**CHRIS STEEL:** Custom requirements will continue to expand. I also believe the demand for increasingly lightweight yet incredibly strong tables will continue as new materials become available. I hope we see more orders for motorised/electric tables. For a little more money than a manually operated table, the owner can enjoy truly effortless table operation. If I had my own aircraft, that is what I would want.



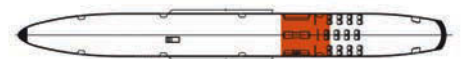
A HI-LO TABLE ON A BBJ  
DESIGNED BY ANDREW WINCH  
DESIGNS AND OUTFITTED BY JET  
AVIATION BASEL IN 2009



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1. Jason Castriota's design for the SJ30

# gearchange

SyberJet has chosen Jason Castriota, renowned for his Maserati and Ferrari designs, to rev up the SJ30

**F**lying performance has always been at the heart of the SJ30 light business jet. First conceived in the late 1980s by Edward J Swearingen, the design was later developed into a configuration boasting a range of 2,500 nautical miles. The current iteration retains this range but flies faster – up to 486kts.

“Many customers have remarked that the SJ30 is like the ‘Ferrari of the skies,’” says Mark Fairchild, general manager at SyberJet. “So we thought it was time that it felt like one too.”

It’s a fair point. Supercar owners might be excited at the jet’s exterior and speed, but its 1990s interior looks very dated. “To resurrect the SJ30 we wanted a design that stood out, yet resonated with a high-performance and luxury brand,” says Fairchild.

Calling on Italian-American Jason Castriota was a logical move. He has designed cars for Maserati and Ferrari, as well as the odd helicopter during his

time at design houses Pininfarina and Bertone. But although Castriota and Fairchild were already acquaintances, before the official pitch Castriota didn’t know too much about SyberJet: “I had heard of them and that Morgan Freeman had bought one, but when I got to meet the team, the performance aspect really intrigued me,” he says. “Given that it’s such a small jet but is fast and has such a long range, it’s very much in my world of performance-oriented design.”

Still, Castriota is not the only person to have designed exotic sports cars, so why did SyberJet choose him specifically? “There were three design firms on our shortlist,” reveals Fairchild. “But when we met Jason he seemed to be the one that was born for this project. His past projects, his overall image and the co-branding opportunities made it a good fit.”

However, when the project started in early 2013, Castriota wasn’t tasked with the whole interior. The priority

# WE WANTED TO CAPTURE THE SPIRIT OF AN AGGRESSIVE SPORTSCAR UP FRONT, AND MODERN SERENITY IN THE BACK

was to replace the Honeywell Epic/CDS pilot control system with a new avionics kit called SyberVision. This features four 12in LCD screens and new Honeywell technology, including SmartView and interactive navigation.

“Many of SyberJet’s clients fly their own aircraft – they’re aircraft enthusiasts,” explains Castriota. “So the cockpit was the priority, but when we got into it we realised that we really should be doing everything. It went through an awkward period where they had a think about it, but then they decided on a full redesign.”

**Double act** Having committed to a new interior, SyberJet set a clear brief. “They wanted an aircraft of two souls,” recalls Castriota. “The cockpit needed to be very driver- and performance-oriented, and in the rear the brief was to redefine luxury. They wanted to get away from what had been *de rigueur* in business jets – the walnut panels and tanned leather – and have a more minimalist design, with bone or white leathers, matched with high-contrast lacquers

and more exotic woods; plus carbon fibre and other high-tech materials you find in luxury vehicles. We wanted to capture the spirit of an aggressive sportscar up front, and modern serenity in the back.”

As an upgrade rather than a ground-up design, and to try to minimise the number of new approvals needed, changes to items like seat structures and basic cushion shapes were largely out of bounds, but some major changes were still made. Perhaps the most obvious is the cockpit. In the course of his research, Castriota spoke at length with Fairchild and another

## Light entertainment

SyberJet is targeting a 175 lb (79kg) weight reduction for the aircraft – at least 100 lb (45kg) of which should come out of the interior.

One area that is already earmarked for the cut is the integrated IFE. SyberJet believes its pilot customers would prioritise reduced weight over technology that can date quickly. Instead, the aircraft will have a wireless network that will enable passengers to use their own tablets and smartphones.

“The systems on the previous SJ30 were heavy, cumbersome and, frankly, out of date by the time they were installed,” says Castriota. “Instead, we are providing nooks by the window where you can store a tablet. It’s all wireless.”

2-3. The completely redesigned cockpit, complete with carbon fibre, four large displays and contrast stitching

pilot who had logged many hours flying the SJ30. The new cockpit is dominated by the displays, which Castriota concedes “created small headaches to package around”, the upside being the chance “to do away with many of the physical controls and be more aesthetically clean”. Clad in carbon fibre with contrast stitching, it’s a world away from the old cockpit.

Another big change was to the entrance area. “Previously, upon boarding, you faced a small jump seat that doubled as a lav,” says Castriota. “We made it forward-facing and added a belt so it’s more useful. Now you can seat another passenger, steward or co-pilot comfortably. The other benefit is that it allows a hard door closure that creates more privacy in the lav area.”

**Another door opens** The privacy door is designed to be simple both to make and to operate. Comprising a thin honeycomb aluminium panel out of which parts slide up and down manually to enable full closure, it’s a big step up in quality. “The existing door is a more traditional sliding one,” says Castriota. “It’s very heavy and yet doesn’t close the area off fully, so it fails on two levels.”

Beyond the lav seat is a club-four setup complete with diamond-stitched upholstery. The two rear-facing seats are slimmer than the front-facing ones, for ease of access and egress.

Other nice flourishes in Castriota’s design include bamboo flooring and a starry night LED lighting effect on the ceiling. But he’s keen to stress that the latter is “not definitive” and is “under evaluation”. It was included more to show potential customisation options.





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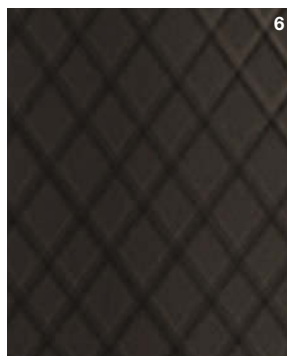
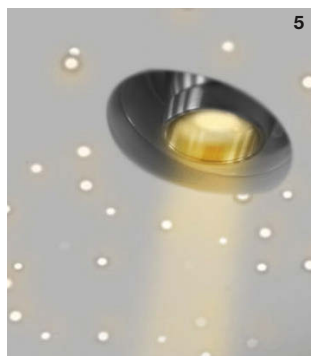


An aspect much more likely to make the final cut is the recessed lighting in the central ceiling section. "On the old jet, the lighting consisted of lights set within a small frame, which was then set within the canopy – so you had multiple gaps, radiuses and materials," says Castriota. "Now we have LED lights with a cove and strip that hides these problems."

**Personal touches** There's room for customisation too. "We can use a lot of different finishes," Castriota says. "In these renderings there's a lacquered finish for the privacy screen, for instance, but if someone wanted carbon fibre trim or wood veneer we could do that as well. We can shift the look and feel easily with colour and trim. If you have the means to buy your own private jet, it should be tailored to your personal taste."

4. A forward-looking view with privacy door partially deployed
5. A starry night effect is being considered
6. Seats are finished with diamond stitching

Despite the scope for customisation, the team hopes to cut installation time dramatically. "The current interior build time is far too long," says Castriota. "We're looking to cut the process in half – from four weeks to two – so SyberJet can finish twice as many jets in the same time. It's a very ambitious target, but that's just in terms of the interior mountings."



## SJ30 TIMELINE

### Late 1980s

Swearingen begins development of SJ30

### 1991

First flight of SJ30 prototype

### April 1995

Sino Swearingen Aircraft Company (SSAC – a partnership of Swearingen Aircraft and Sino Aerospace Investment) formed to develop the SJ30

### October 1995

SJ30-2 announced

### November 1996

First flight of SJ30-2 prototype

### December 1997

Sino Swearingen completes 87,500ft<sup>2</sup> manufacturing facility in Martinsburg, West Virginia, USA

### March 1998

The FAA grants SSAC an exemption, allowing it to certify the SJ30-2 to Part 23 Commuter Category regulations

### November 2000

First production SJ30-2 makes its first flight

### October 2005

FAA type certification

### July 2006

Interior certification

### October 2006

Delivery of first SSAC-branded SJ30

### June 2008

Emivest Aerospace Control (Emivest) gains 80% controlling interest in SSAC

CABIN  
STATS**SJ30****Cabin width:** 4ft 8in**Cabin height:** 4ft 4in**Cabin length:** 12ft 6in**Seats:** 1 crew + 5 passengers**Range:** 2,500 nautical miles**High-speed cruise:** 486kts**Max altitude:** 49,000ft**Price:** US\$7.25m (£4.64m)

7. The outgoing interior  
8. When fully deployed  
the privacy door  
completely closes off  
the lav from the rest  
of the cabin



## SJ30 TIMELINE

**October 2009**Delivery of first  
Emivest-branded SJ30**October 2010**Emivest files for Chapter  
11 protection**April 2011**SyberJet Aircraft  
purchases assets  
of Emivest**June 2013**Jason Castriota Design  
announced as interior  
designer for SJ30;  
selection of Cedar City,  
Utah, USA, as final  
assembly location**Late 2014**Expected certification  
for SyberVision and  
new interior**Early 2015**Expected delivery of  
first SyberJet-branded  
SJ30 with new interior

## WE'RE MILLING THE FIRST PROTOTYPE PIECES TO DO OUR CHECKS AND BALANCES

Castriota believes this can be achieved by making disparate teams more integrated, and through the use of CAD during the design stage. "In the car design world we've achieved a real integration of design and engineering over the past 10 years – engineers and designers sit side by side, working out architecture, packaging and fit and flush together," he says.

The team is now in the data phase of development. "We're milling the first prototype pieces to do our checks and balances for aesthetics, fit, ergonomics and build," says Castriota. "We're using experience from the automotive world to make sure we create panels that can be taken in and out of the aircraft more easily and at a higher quality than before. It's important the design is as

modular as possible too, as in the future there could be other variants, like an air ambulance or a two-seat business jet with a larger work area."

SyberJet has chosen a new assembly centre in Cedar City, Utah, and is aiming to produce 24 aircraft a year at US\$7.25m (£4.64m) each – the same price as the outgoing model. The design should be completed by the end of 2013, with a full-scale mock-up following in the first half of 2014. If they can get close to the renderings – and Castriota's history suggests they should – maybe Fairchild really can achieve his 'supercar of the sky'. **END**

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# perfectfit

A representative with all the right qualities can ensure an aircraft buyer's vision is adhered to and the completion runs to schedule

**B**uyers of VIP aircraft are typically very busy people who do not have the time – nor perhaps the specialist technical expertise – to keep a close eye on the interior completion process and ensure that their investment takes form on time and on budget. Many find the answer is to hire a representative to work with the completion centre on their behalf.

Richard Plourde of JEM Aviation, a completions management provider, explains that a rep can oversee a project from the initial design through to the delivery, providing regular

reviews and inspections. “Our services include assisting in the selection of systems, layout, finishes and fabrics; regular quality inspections at the completion centre followed by detailed reports; and oversight of the final aircraft delivery, including the cold soak flight, ground inspection and documentation review,” he says.

The rep can make periodic visits to the centre or remain on-site, in some cases for the entire process. This can mean employing someone for up to two years, depending on the size of the aircraft and the scope of the project, but it can be a shrewd investment if it prevents costly rework and delays.

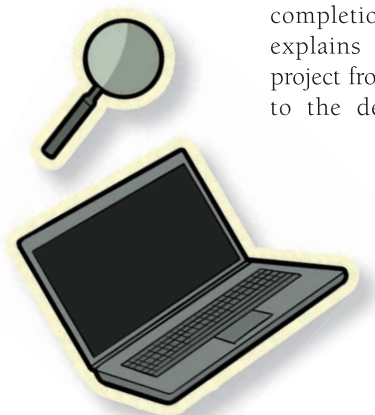






Illustration by Kyle Hilton





### Services a customer rep can provide

- Inspection and acceptance of the green aircraft before delivery to the completion centre;
- Inspection of the aircraft during the infrastructure build process – for example confirming that cabin pressurisation is correct, that the fuselage is sealed properly before going to the paint shop, that the electrical wiring is not damaged and is installed securely before the walls are sealed, and that cockpit instrumentation and displays work;
- Reviewing interior completion drawings and ensuring they respect all contractual requirements;
- Ensuring that the aircraft interior is built in accordance with the customer's specification;
- Ensuring that the paint shop is faithful to the livery design, and that the job is of superior quality;
- Monitoring build progress against the production schedule to ensure the aircraft is delivered on time, or with minimum delay;
- Verifying that the OEM collates all the necessary technical documentation, aircraft build lists and certification data in advance of the delivery date;
- Flying on pre-delivery test flights to ensure all systems are functioning properly.

Rene Roberge, co-owner of Aero RK Canada

“Customer reps play a very important role in the smooth running of a completion,” says Matthew Woollaston, head of VIP business for Altitude Aerospace Interiors, a completion centre in New Zealand. “Their key role is liaising between the completion centre and the customer. They provide regular progress updates to the customer and ensure that work runs to plan. They communicate customer feedback and requests to the completion centre, and send the centre's queries in return. Customers also usually rely on their rep to explain technical processes and the implications of decisions.”

About 80% of Altitude's completion clients employ a rep. At Lufthansa Technik's completion centre in Hamburg, Germany, that percentage rises to 100%. Wolfgang Reinert, Lufthansa Technik's spokesperson, says this makes completions more efficient, particularly when clients request design modifications after concept design review. “The number of change orders

## CUSTOMERS USUALLY RELY ON THEIR REP TO EXPLAIN TECHNICAL PROCESSES

1. An Altitude cabin
2. ExecuJet has supervised the completion or refurbishment of more than 40 aircraft interiors





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## How do reps benefit the client?



are truly happy. An important example is an apparently minor detail – selecting crystal, china and flatware. Few first-time buyers consider these important components. We assist our clients

Andrew Broccoli, AP Completion Services

“Paying the same level of attention to details big and small is the only way to ensure clients in selecting the appropriate sizes and quantities to satisfy their operational needs. In the scheme of things this may seem like a minor detail, but if overlooked clients can end up genuinely unhappy. Imagine a client’s embarrassment or anger should there be an insufficient number of glasses or plates to cater for all his guests, or perhaps they have broken because they haven’t been stored properly.”



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Herbert J Artinger, Aircraft Conformance Engineering Services



“Expert advice at the initial design phase can prevent unfortunate mishaps or needless costs later in the project. I have found discrepancies during the completion process that took hours to resolve but would have grounded the aircraft for days if not weeks in service.”

Richard Plourde, JEM Aviation



“Owners have profited greatly from our in-depth specification reviews and reporting, as they can see a comparison of what was ordered and what was added to the specification by the manufacturer. Also we have negotiated costs to get the owners the best price.”

Roman Aerne, ExecuJet

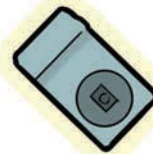


The rep should be on board from day one, once a purchase decision is made, because even the owner’s

Rene Roberge, Aero RK Canada

“Unfortunately, some owners consider on-site reps as just an expense, but reps do protect their investment. attorney often does not understand the nuances of the agreement. Also, defects that are not found at the completion centre will be deferred to the warranty department for rectification away from the production line, which is problematic, because it can take years to find a slot to resolve the problem.”

## CHANGE ORDER MANAGEMENT IS MUCH LESS TIME-CONSUMING IF A GOOD REP IS ON-SITE



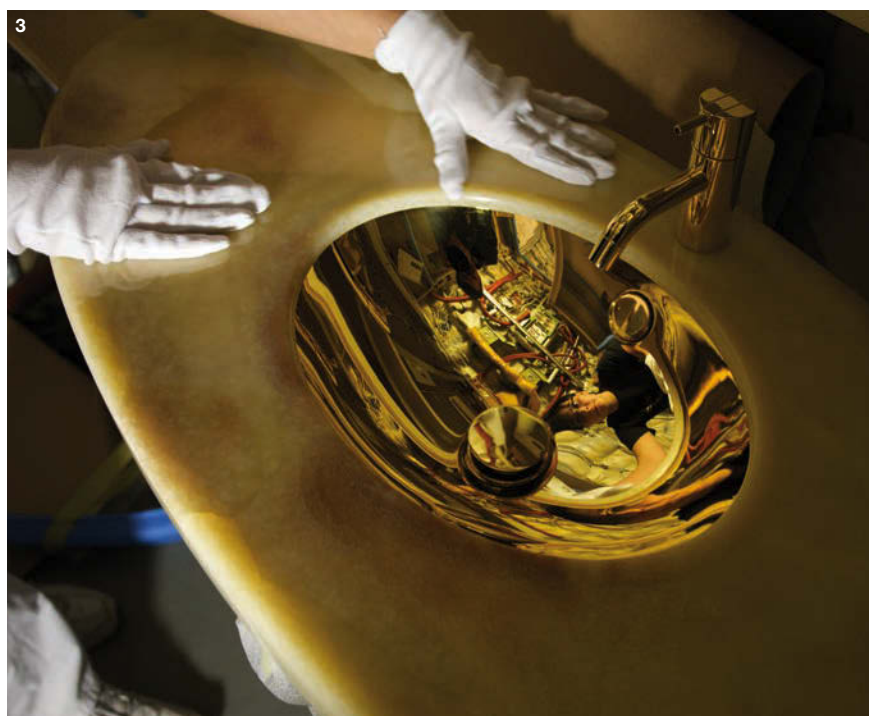
is not affected by their presence, but the change order management is much less time-consuming if a good rep is on-site,” he says. “A rep should be able to expedite responses from the client. They should also be able to carry out inspections, so that work on the project can continue seamlessly.”

Woollaston thinks the key to avoiding change orders is to ensure the specification is right before the completion begins, by involving the rep fully in that process. “Having a customer rep on-site during a fit-out shouldn’t impact on whether a programme has more or fewer change orders,” he says. “Because of the size, duration and nature of a green BBJ completion, change notices are common. The key to reducing them is frequent and clear communication with the vendors, customer reps and the completion centre.”

**About time** Reps aren’t always involved for the entirety of a project; many clients instead choose to deploy them at critical stages. For example, Roman Aerne of ExecuJet, which offers completions consulting among other services, says the company doesn’t usually base its reps at completion centres full-time; instead they visit for the big milestones. “The number of visits is based on the contract, but once a month is the average,” he adds.

“Some reps are involved throughout the process and are at our facility on a daily and weekly basis,” says Sean Gillespie, executive vice president of sales and marketing for Flying Colours Corp, a completion and maintenance centre in Peterborough, Ontario, Canada. “Others have been hired at the end of the process to complete the final acceptance and entry into service.”





### What to look for in a rep

"Typically, reps come from the private aviation industry with hands-on technical and project management experience," says Woollaston. Reinert adds that a rep's technical competence will ideally extend to a mechanic's licence: "Preferably there is an airframe and powerplant licence or equivalent qualification in the background," he says. "Experience on other VIP completion programmes is also a good reference."

So what makes a rep good or bad? "Being able to communicate in a positive manner is very important, as is being able to manage customer expectations," says Gillespie. "Reps can assist in explaining aircraft-related information to the owner, who might not be as knowledgeable in this specialist field. It can help if an issue is explained by a third party. Undesirable qualities include bad communication skills and personality traits. For example, we have dealt with reps that were hired mid-project and tried to change an accepted design based on personal opinions, slowing down the production cycle."

Woollaston says diplomacy is key. "A good rep will be attentive and responsive to the customer, while having a full understanding of the intricate technical aspects being undertaken by the completion centre to achieve the best result," he says. "The ability to relate to and communicate well with each party is paramount. They also need to be flexible in their approach and absolutely dedicated to achieving the same goal as the completion centre – delivering a state-of-the-art aircraft to the customer in the agreed timeframe and budget."

## THE END RESULT SHOULD BE AN INFORMED AND HAPPY CLIENT, WHICH IS A GREAT RESULT FOR ALL INVOLVED

"Usually a rep's involvement will change and evolve throughout the programme to reflect the progress of the aircraft itself," says Woollaston. "There are times when the programme will require minimal input from the rep and there are other times – such as key design reviews, compliance testing or key monument installation – when the customer may request that their rep be present to provide them with daily feedback and assurance."

Lufthansa Technik finds that most of its customers deploy reps for the entire process. "The majority of reps are sited permanently at the completion centre," explains Reinert.



"When a rep can't be there, we establish direct communication with the client's home office. In rare cases a part-time replacement is hired."

JEM Aviation's Plourde points out that the size of the aircraft is often the deciding factor in whether a rep is employed on a full- or part-time basis. "With large-scale projects such as BBJs and ACJs, there may be a need to have a full-time dedicated individual on-site to provide constant monitoring," he says. "For all other projects, weekly or bi-weekly visits are usually sufficient."

Herbert J Artinger, president and owner of Aircraft Conformance Engineering Services (ACES), notes that both scenarios are valid, but believes full-time on-site presence ensures maximum control. "We've had some clients who opted for part-time representation on their first project but chose a full-time on-site rep on subsequent ones," he says.

Ultimately it comes down to peace of mind. "Employing a rep provides assurance that the aircraft is in good



3. All Lufthansa Technik projects involve a customer rep
4. Flying Colours Corp finds customer reps are involved in about 50% of its projects
5. At Altitude, 80% of clients employ reps

hands and milestones are being met," says Woollaston. "With this regular communication and assurance, the customer can continue with as few disruptions as possible to their regular business activities. For a completion centre, the end result should be an informed and happy client, which is a great result for all involved." **END**



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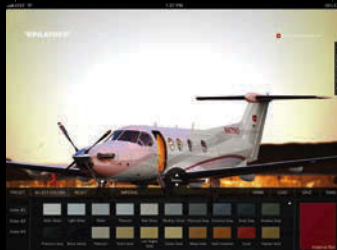
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This spec tool is currently being used by OEMs and designers to configure materials and paint schemes.



Interiors



Exteriors



iPad Native

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# stateofthearts

Ahead of NBAA 2013, three US-based designers share the challenges facing them and the wider industry, plus the materials they can't wait to use on board



**JULIE MANDRELL**

We find inspiration in unconventional places and at non-aircraft-related events such as NeoCon and Metrocon



**HAVILANDE WHITCOMB**

With cabin electronics, elegant solutions that are seamless and anticipate future flexibility will always be most desirable



**LAURI CHURCH**

The biggest challenge I recall was when a customer fell in love with a wide-body interior and wanted it duplicated in a narrow-body





## JULIE MANDRELL

Senior design coordinator at  
Associated Air Center (AAC)  
in Dallas, Texas

### WHAT'S CAUGHT YOUR EYE RECENTLY?

AAC is committed to maintaining a fresh approach to textiles and finishes, which includes stocking our library with many non-traditional aircraft materials. We are constantly challenging the industry by finding inspiration in unconventional places and at non-aircraft-related events such as NeoCon and Metrocon. This commitment entails extra certification work for us when we add something to our library. Designers work alongside the certification team to ensure that our library is both unique and airworthy. The biggest challenge that I have on all of our projects is editing ideas. We have a very creative design team at AAC: we are constantly brainstorming new ideas and unique concepts. Choosing the right combination of elements to create the perfect environment can be challenging.

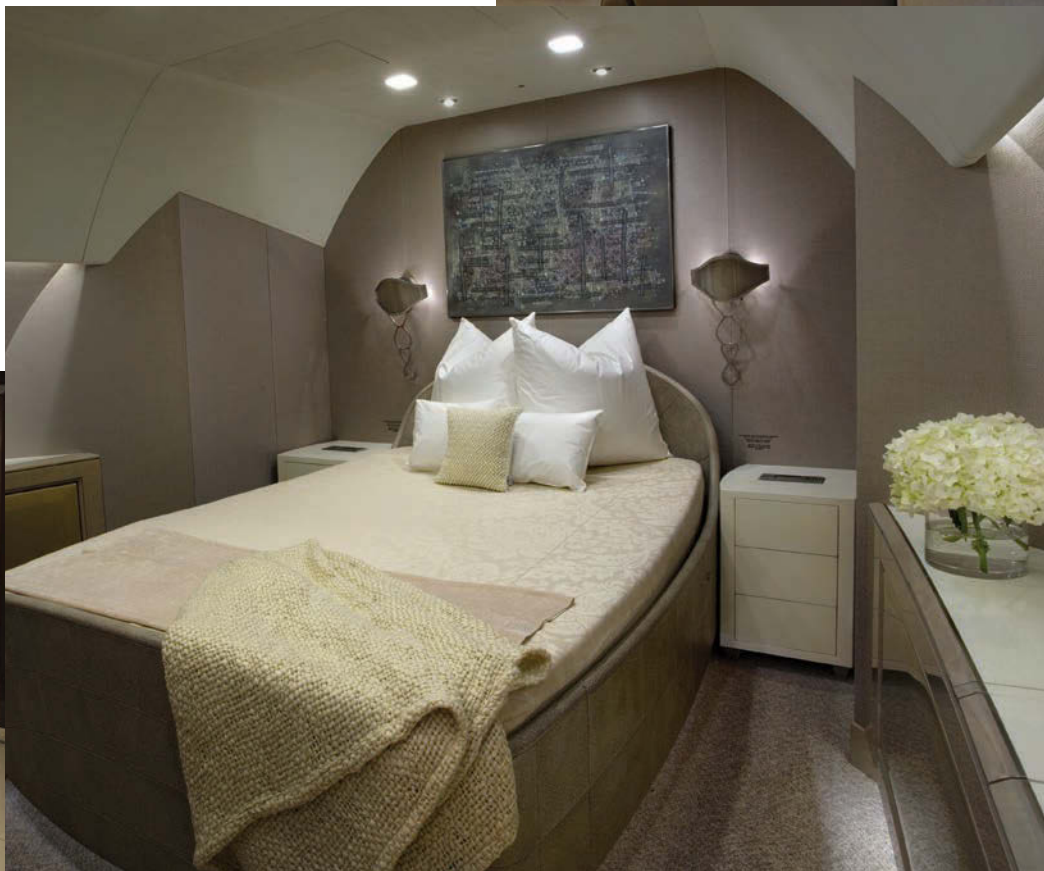
### WHAT WOULD YOU LIKE TO CHANGE ABOUT THE INDUSTRY?

How it views time. The majority of what we deliver is custom made; one of a kind. Executing the elements required to the highest level of quality demanded is a time-consuming process. Time is always at a premium in this industry – the completion window rarely increases and often decreases. The completion schedule stated in a bid can shortlist a company or serve as a barrier

to further consideration. Therefore, changing how our industry views time would be a welcome change. To quote the late fashion designer Alexander McQueen, "Give me time and I'll give you a revolution".

### HOW DO YOU DEAL WITH CUSTOMERS WHEN THEY ASK FOR THE IMPOSSIBLE?

Part of our job as designers is to make the impossible possible. As a designer, it is exciting to be able to reinterpret a customer's vision into three-dimensional reality. Of course there are specific compliance guidelines that we must all work within and I have found customers to be very reasonable with regards to safety and certification issues. Maintaining a creative, open-minded approach guarantees that nothing will ever feel impossible.





# Skylounge

## Cabin Sleep System

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- **Easy to use:** *user friendly set up and packaging*
- **Comfort:** *self regulated comfort*
- **Stability:** *minimal rocking during flight*
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- **Value:** *the most competitive price on the market*
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Mattress in Equipment Bag.



1. Set seat configuration.



2. Open valves on mattress & fit.



3. Finished dressed beds.

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## HAVILANDE WHITCOMB

Principal and designer at  
Aviation Aesthetics in  
Southport, Connecticut

### WHAT MAKES A GREAT COMPLETION CENTRE?

The best completion centres have people with in-depth knowledge of the type and model of aircraft you will be sending them. Designers are the conduit between the owner and the completion centre; ideas are the most important thing we generate and they must be executed perfectly. An excellent completion centre is like a team of specialised surgeons who must perform the work with a high degree of skill and artistry – whether it's paintwork in a complex pattern that wraps around a curved surface, cabinet work in the galley utilising every millimetre of storage, or customising a seat to fit the owner's body like a glove. The best centres have patient, creative people who know that everything they do is special. Highly organised project managers who plan every hour that the aircraft is spent at their facility minimise the downtime and ensure delivery on time and budget.

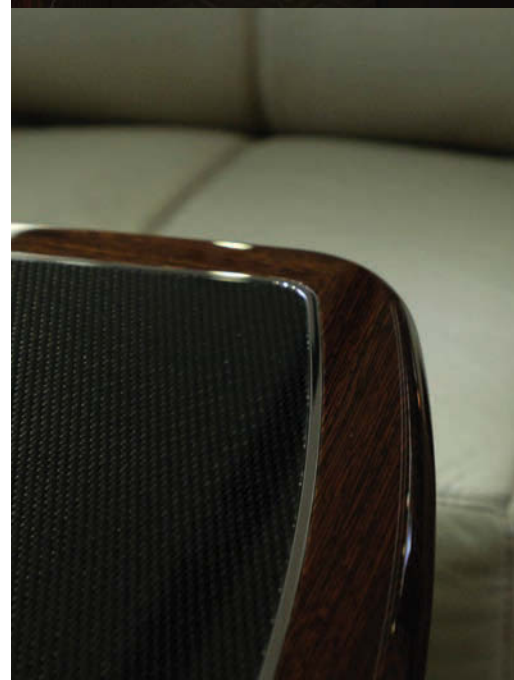
### WHAT HAVE YOU FOUND CHALLENGING RECENTLY?

For maintenance reasons, it's usually not recommended to paint the whole body of an aircraft in metallic paint. However, as an owner asked me, "All my cars have metallic paint and it looks great, so why can't I have that on my aircraft?" This

request has been cropping up quite a bit lately. The challenge is that it's very difficult to get a perfect application on something that is much larger than a car. In addition, it's difficult to maintain with touch-ups after panels are removed. Through meticulous preparation of the surface and very careful application, we have delivered two aircraft with metallic paint finishes with stunning results. If metallic paint is something that more aircraft owners want and the completion centres are willing to provide it, the aviation paint companies need to produce paint that is more suitable for larger surface applications.

### ARE THERE ANY NEW PRODUCTS YOU ARE LOOKING FORWARD TO USING IN YOUR DESIGNS?

The most exciting innovations right now are in cabin electronics. Designers are challenged to incorporate this technology and determine how it is to be used and stored, and how it will interface with the user. A lot of money is spent on these items, and it can be frustrating to plan for one technology that may be obsolete shortly after modifications have been made to accommodate it. With cabin electronics, elegant solutions that are seamless and anticipate future flexibility will always be most desirable.





## LAURI CHURCH

Head of Comlux Creatives in Indianapolis, Indiana

### WHAT WAS YOUR MOST CHALLENGING PAST PROJECT?

One of the first challenges I can remember as a brand new designer was not knowing what shagreen was. When I was told to go and get shagreen options, I had no idea what I was looking for, and at that time we didn't have the internet to find answers quickly! The biggest challenge I recall was when a customer fell in love with a wide-body interior and wanted it duplicated in a narrow-body aircraft. It was a humongous challenge to take a design from a considerably larger aircraft with so much more space and reduce it to fit in the narrow-body. In the end, we were able to accomplish the job and the customer was extremely happy. One of the biggest challenges that we face designing narrow-body aircraft is the spatial limitations. Incorporating your vision can be very difficult because you have to translate it into a narrow tube. We try to avoid saying no to customers. We see 'impossible' desires as challenges that allow us to use our creativity collaboratively. We encourage the difficult and more complicated requests for this reason.

### WHAT INNOVATIONS ARE YOU LOOKING FORWARD TO INCORPORATING?

I am really impressed with the new veneer from Hi-Tek. What really caught my eye was its incredible flexibility, which would allow us to use it in more complex designs. It also reduces the amount of hardwood needed. I always enjoy

seeing new, creative and inventive ways of doing things and new products on the market, which is why I'm looking forward to NBAA. No one goes away from the event without feeling great about the things they've seen and looking forward to using them in future designs – so I hope this year brings that again.

### WHAT WOULD YOU LIKE TO CHANGE ABOUT THE INDUSTRY?

I think one of the biggest obstacles in this industry is the rate at which products are delivered to us. The industry is small, but incredibly busy, and because of this, many vendors have long lead times in getting things to us. Additionally, because it is such a specialised field, there are only a limited number of vendors to choose from.







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# statusupdate

The successful Challenger 300 provides a solid platform for an updated super-mid-size offering from Bombardier – as evidenced by the huge orders the Challenger 350 has already won

When the Bombardier Challenger 350 enters into service around May 2014, passengers will experience the fruits of 10 years' steady development in business jets. That's because the Challenger 350 is based on Bombardier's successful super-mid-size Challenger 300, but with an updated interior and performance.

"The Challenger 300 has been a bestseller for Bombardier," comments company spokesperson Phil Nasskau. "The Challenger 350 is an evolution of that aircraft."

Despite the upgrade, Bombardier has no plans to stop production of the Challenger 300. The models will be offered alongside each other – at least "until such a time that the market decides otherwise", Nasskau says.

Although they share the same cabin dimensions and flat floor, there are big differences between the Challenger 300 and the Challenger 350. Perhaps the most obvious are the windows of the latter, which are 20% larger than the Challenger 300's – letting light pour in.

Other additions include Lufthansa Technik's next-generation nice HD CMS, which is accessible through touchscreens integrated in console-like sideledges. These sideledges are in themselves pretty special – fashioned with fluid lines of metal. "For the



## Technological leaps

Lufthansa Technik is proud of the CMS it supplied for the Challenger 300. But the Challenger 350 will be the beneficiary of a decade of development in technology.

One decision made early on was to base the nice HD CMS system on a wired and wireless Ethernet network. The next guiding principle was to consider the passengers; what they want and how they would operate the system. “They shouldn’t need an IT degree to be able to use it,” says Dave Crossett, principal executive for strategic sales and marketing at Lufthansa Technik’s Innovation unit.

One requirement from Bombardier was a system with a unique look and feel that would set the aircraft apart from its peers. An earlier generation was developed for the Learjet 75 and Learjet 85, but the user interface for the Challenger 350 has its own distinctive features.

Passengers can watch AVOD content on 22in bulkhead monitors and there are controls at each seat, but the system is also compatible with Apple, Android and Windows 8 mobile devices. “Bombardier wanted to move away from individual monitors at every seat to wireless distribution,” explains Crossett.

The system comes with a Blu-ray player as standard, but can be upgraded with an onboard server for on-demand Hollywood-licensed movies. Other highlights include the niceview 3D moving map system, USB ports, universal power outlets, Iridium satellite phones and optional wi-fi.

sideledges we broke away from the wooden frame,” explains Stephane Loubert, who headed the development project at Bombardier. “We borrowed the idea for the metal strip inlay from the automobile industry and worked with Jaguar Land Rover on it.”

There were practical and aesthetic reasons for doing so. Bombardier says the metal was easier to work with than hard wood – giving designers more options in shaping the ledges. The angles also help to break up the tubular effect of the interior. And because of

the metal’s malleability, the CMS controls could be set at a more ergonomic angle beside the passenger – so they are easier to see and within easy reach.

Another advantage is the metal’s resistance to wear and tear. “If you have hard materials against soft ones such as veneer, they can work against each other and cause damage,” says Loubert. “It’s a particular problem when the materials expand and contract at altitude.” In addition, the edges of the console are lined with the metal, to

1-3. Windows are 2in taller than on the Challenger 300, letting lots more natural light into the cabin





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offer more protection against chipping and banging.

**Business plans** A lot of effort has also been made to maximise executive productivity. The seats – redesigned with new materials – provide firm support for the back and feature generous side pockets. When the tables are folded out they are level with the sideledge, which is convenient for spreading documents around. There is a storage box and drink holder beside each seat. If a passenger has left a much-needed document in their luggage, the 3m<sup>3</sup> baggage compartment can be accessed whenever they want during the flight. And when the work's done, the seats recline to fully flat.

Creature comforts are also catered for in the modular galley. There's more storage space than in the Challenger 300 and the materials are more robust.

75

Firm orders for the Challenger 350 from NetJets

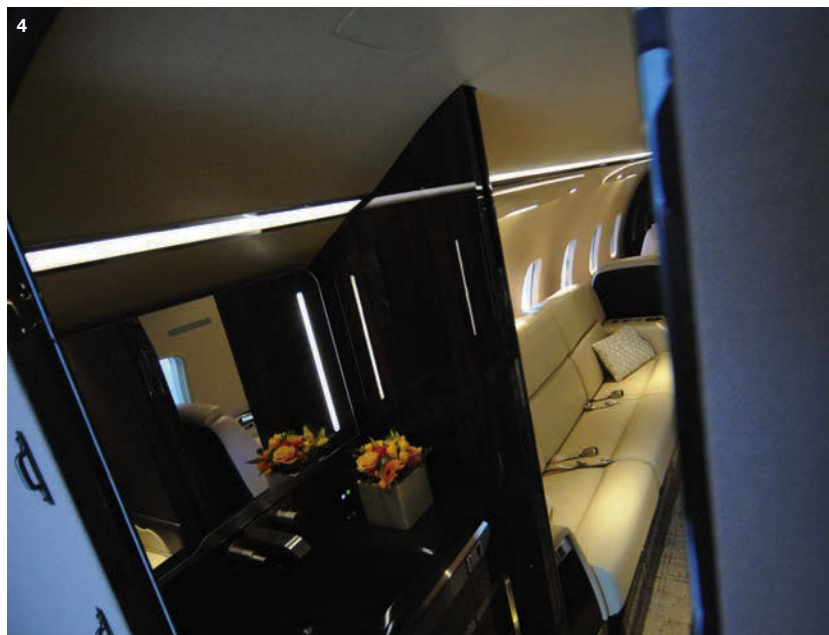
125

Options for the Challenger 350 from NetJets

US\$7.3bn

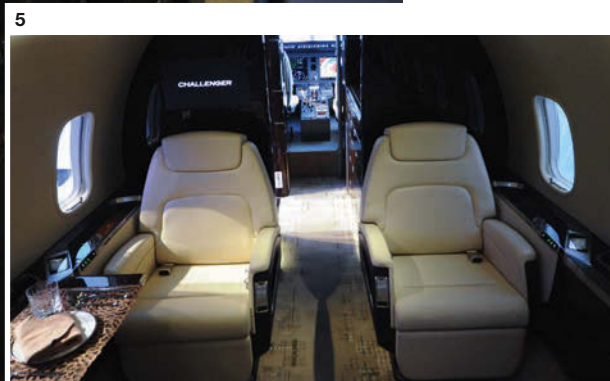
Value of NetJets' order if all options are exercised (also including 25 Challenger 605s)

## WHEN THE TABLES ARE FOLDED OUT THEY ARE LEVEL WITH THE SIDELEDGE



4-5. The mock-up that Bombardier used to launch the Challenger 350 at EBACE 2013

6. NetJets' Signature Series Challenger 350 cabin

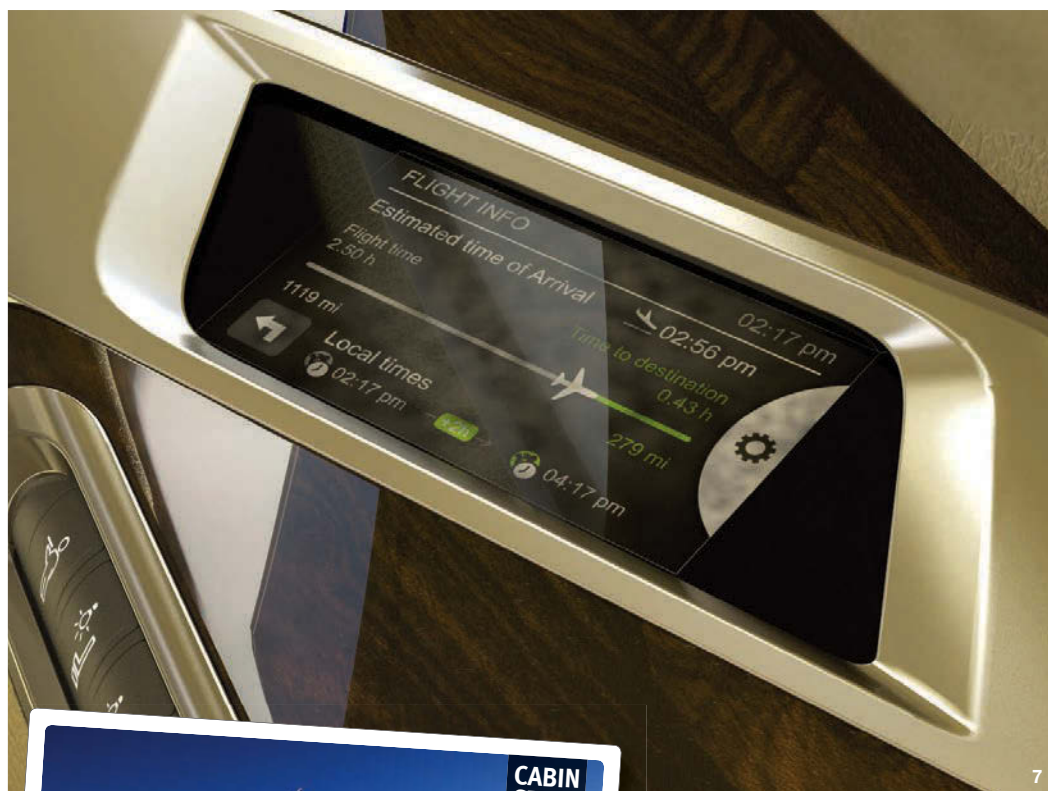


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The galley comes with an ice drawer, microwave and coffeemaker as standard, but its modularity enables customers to upgrade it to a space for preparing full meals if required.

Compared with its predecessor, the Challenger 350 comes with a higher standard of baseline specifications, to reflect its higher price – US\$25.9m (£16.1m) as opposed to US\$24.9m (£15.5m) for the Challenger 300. Loubert says the specification not only delivers greater comfort, but makes life easier in the manufacturing process: “It gives us more stability and constancy on the production line,” he says.

Good as the standard interior already is, fleet buyers are working closely with Bombardier on their own



**20** Firm orders for the Challenger 350 from VistaJet

**20** Options for the Challenger 350 from VistaJet

**US\$1.035bn** Value of VistaJet's order if all options are exercised



### Challenger 350

**Cabin width:** 7ft 2in

**Cabin height:** 6ft 1in

**Cabin length:** 28ft 7in

**Seats:** 2 + 1 crew + 10 passengers

**Range:** 3,200 nautical miles with NBAA reserves, eight passengers and two crew

**High-speed cruise:** 470kts

**Max altitude:** 45,000ft

**Price:** US\$25.9m (£16.1m)

7. Using metal in the sideledge enabled Bombardier to set CMS controls at an ergonomic angle

## COMPONENTS HAVE TO BE RAPIDLY REPLACEABLE AND EASY TO MAINTAIN

requirements. In high-traffic areas such as the galley, for instance, they have specified extra coats of protective paint and layers of Teflon strips on harder-worked edges and surfaces.

With rapid turnarounds the order of the day, launch customer NetJets specified early on that components have to be rapidly replaceable and easy to maintain. The company has also ordered customised coffeemakers, iPad integration in armrests, seats of a specific colour and other tailored aesthetics. Its wish is that the interior, with its hand-selected wood veneers, carpeting and colour schemes, “ensures a modern, clean and consistent look across the entire Signature Series fleet”. The cabin will be configured for a maximum of 10 passengers.

Another big customer, VistaJet, is still working on its interiors. But already decided is a jump seat for the flight attendant, unique to VistaJet; a pocket door for additional privacy between the galley and crew zone and

the main passenger cabin; and a double-club layout. “One thing that is important to our service is that passengers have a seamless cabin experience, no matter which VistaJet aircraft model they board,” says Danielle Boudreau, executive vice president for marketing, branding and public relations at the company. “Therefore the colour scheme and materials used in the cabin will be the same as on our other jets.”

With these two huge orders under its belt, Bombardier is confident the Challenger 350 will become the default jet for those missions for which it is designed – corporate and charter flights for up to eight passengers within a range of 3,250 nautical miles. “We expect it to appeal to operators and owners the world over, in any climate,” says Nasskau. **END**

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1. The aft section of Visionary
2. Visionary cabinet tops are finished in a material made from recycled newspaper

# dualjewel

A double concept showcases the talents of the design side of Jet Aviation Basel's twin operation

**T**he completions side of Jet Aviation Basel's business has enjoyed a high profile over the years, but from its inception back in 1977, the company has always fostered design talent too. This aspect of the business was formalised in 2001, with the creation of the design studio, led since 2009 by Elisabeth Harvey.

It means clients can choose to have their aircraft designed and completed by the same company if they so wish,





1

2

although it is by no means mandatory if the client prefers to bring in their own designer. The team can also support with feasibility studies and design management. A key strength is the close relationship the designers have with their completion centre colleagues. These are designers who are in touch with the realities of aircraft engineering, and have the resources and know-how to push for innovation.

The latest demonstration of this, a double concept called Timeless to

Visionary, was unveiled at EBACE in May 2013. The team started thinking about the idea in October 2012, but only embarked on it fully in January 2013. It was a tight timescale in which to produce two concepts, which were showcased in multiple formats – computer-generated renderings, a 3D movie, a virtual reality application and a coffee table book.

“We started by developing concept boards and sketches as a team. From those ideas we developed detailed



## Technology trends

The way Jet Aviation Basel presented these designs at EBACE is interesting in itself, as the company employed technology ranging from the ancient and tactile (a book) to the futuristic and immersive (virtual reality).

The starting point was the creation of computer-generated renderings. "This technology has really advanced a lot in recent years in terms of quality," Harvey says. "You can show almost life-like representations at a very early stage of a project now. Sometimes it is hard to tell the difference between a rendering and a photo of the final interior."

After the renderings came the 3D film. "3D is used widely in the aviation industry, particularly within the engineering phase with programs like CATIA, but we've never used cinematic 3D to show an entire interior before," says Harvey. "It's not something we would do for every project, but certainly the capability is there and it really does make you feel closer to the end result. As our audience becomes accustomed to using this technology in other areas of life, I think it will also become expected in our industry. With this campaign we wanted to show we are thinking about what clients will want in the future."

Likewise, Harvey feels that virtual reality has great potential. "These technologies are really progressing in terms of capabilities," she says. "Whereas before we would do life-size mock-ups if requested, in certain cases now, virtual reality could step in to give a true feeling of the space."

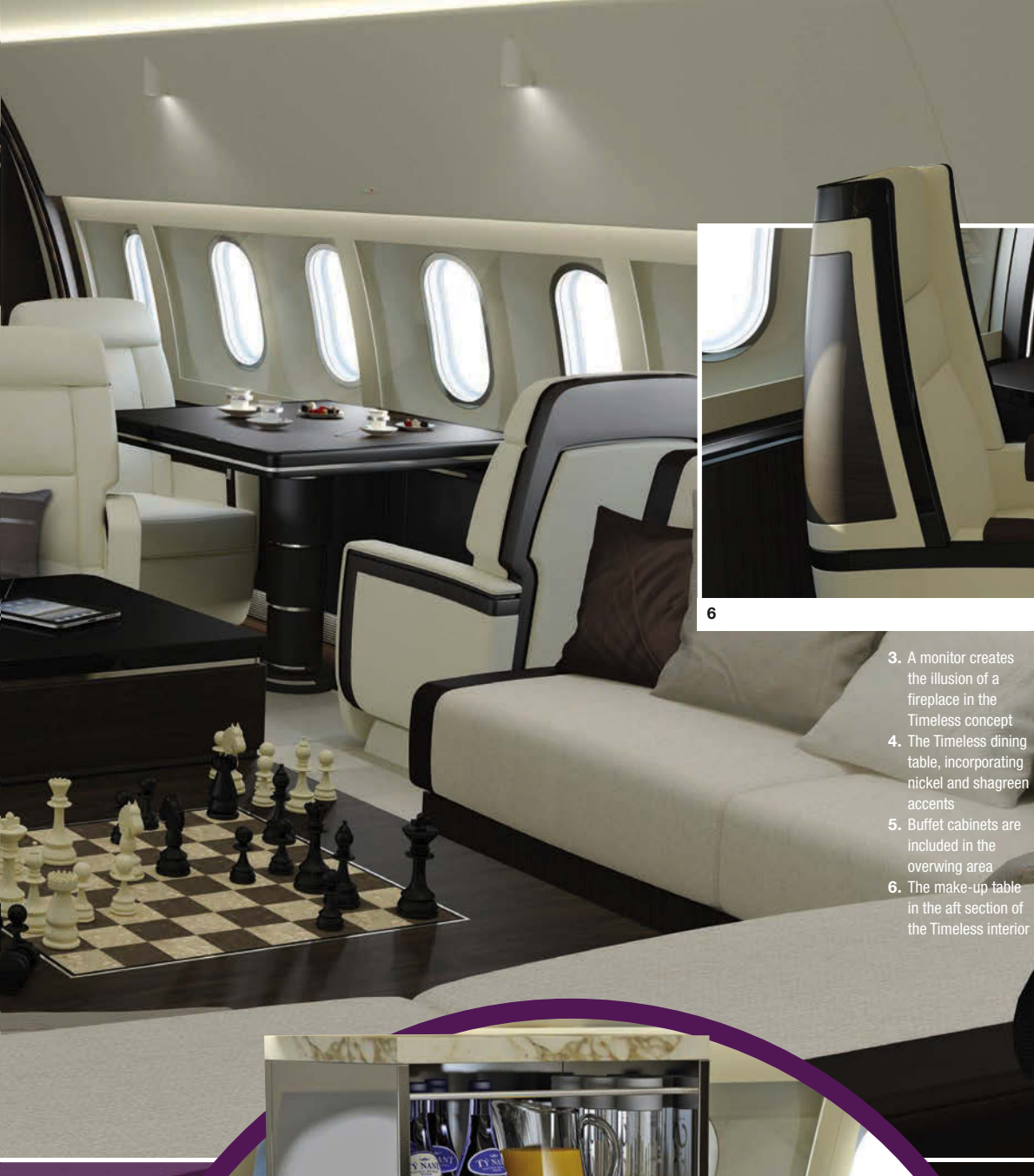
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4

AutoCAD drawings, which were submitted to a company that created the computer-generated renderings," says Harvey. "Our intent was to show a valid solution for customers who would appreciate one key contact; somebody not only to design the interior, but also to work within the completion centre from start to finish. Of course, if a customer has a preferred designer, we are very happy to support them with technical feasibility studies and design management, but these concepts are intended to showcase what we can do as a design studio."

Both Timeless and Visionary are designed for a wide-body aircraft the size of an ACJ330 or BBJ 787. "We had to pick an airframe for the design and engineering inputs, so we used the BBJ 787 airframe, but the concepts would work equally well for any wide-body Airbus aircraft," says Harvey.





6

3. A monitor creates the illusion of a fireplace in the Timeless concept
4. The Timeless dining table, incorporating nickel and shagreen accents
5. Buffet cabinets are included in the overwing area
6. The make-up table in the aft section of the Timeless interior

The designs are based on similar layouts, as they were designed for the same hypothetical customer. Based on its experience of what is popular, Jet Aviation Basel decided this customer would want to accommodate up to 19 passengers and require a private bedroom and bathroom, plus areas for guests, staff, dining and entertaining.

**Artistic differences** Although the functionality is similar, the design philosophy behind the concepts is very different. “Timeless is designed to be contemporary but with a longevity to it,” says Harvey. “We thought a lot about classic proportions, taking reference from historical styles but not recreating specific ones.”

Visionary has smoother forms and a more open, pared-down feel. “We wanted to create a minimalistic design that was very comfortable; an intimate space in an open-plan environment,” says Harvey. “Whereas Timeless is characterised by traditional forms, straight lines and structures that in some ways disguise the airframe, Visionary was designed to show it off. By incorporating only the most essential furniture, the abundance of space offered by a wide-body aircraft is fully highlighted.”

Both schemes feature some lovely functional elements. Timeless has a coffee table (with a built-in chessboard) that can be adjusted to create an ottoman. A large pop-up monitor turns the divan area into a cinema. The aft bedroom and bathroom suite in both concepts have been designed with a couple in mind. The right-hand side is dedicated to a gentleman, with watch and tie storage and a desk area; on the left-hand side, designed for a lady,



5

**WE THOUGHT A LOT ABOUT CLASSIC PROPORTIONS, TAKING REFERENCE FROM HISTORICAL STYLES**



8



- 7. Pop-up speakers are integrated into Visionary's U-shaped divan, and retract when not in use
- 8. Visionary's accents are provided by light rather than colour
- 9. Thoughtful storage solutions in the Visionary interior include this umbrella stand by the entrance



9



## Material differences

Timeless features rich materials such as fabrics from textile houses Lelievre, Sahco Hesslein and Romo. Embossed leathers have been used not only on seats, but also on bulkhead panels and cabinets, with contrast stitch detailing. The primary wood is flat-cut ziricote in a satin finish, accented by macassar on smaller monuments.

A particularly elegant feature in the Timeless concept is the dining table, which features a top finished with nickel inlays and a central section inset with shagreen leather. The table is accented by the decorative raised ceiling above, which has an integrated panel of cracked mirror. Another nice touch is the chessboard, made from white and brown mother-of-pearl.

Visionary relies on natural and accent lighting to accentuate its more minimalistic interior. Cabinetry is finished with a high-gloss lacquer enriched by platinum-plated inlays. A pure silk hand-tufted carpet adds softness.

An especially interesting material used in Visionary is the NewspaperWood used on the tops of cabinets and tables. Created by Dutch designer Mieke Meijer and design studio Vij5, NewspaperWood is made from recycled newspapers, the layers of paper appearing like wood grain. Harvey says the material has not yet been used in the aviation industry, but has responded well to Jet Aviation Basel's preliminary testing. She likes the way the material reverses the traditional production process; usually paper is made from wood, rather than wood from paper. "We wanted to challenge traditional thinking and create an interior that had no wood veneer in it at all," Harvey says. "One of my team was inspired by seeing the material used in a concept car. We are always looking at what materials are being introduced in different design fields."

there is a make-up table and dedicated storage for jewellery.

Meanwhile, in the minimalistic Visionary interior, elements such as the bar area and high-end speakers are designed to retract out of sight when not in use. The latter are integrated into the U-shaped divan and when stowed are flush with the divan's top.

Adding to the uncluttered feel in this concept is the use of hidden latches in certain cabinets. "We worked with our engineering team to understand the limitations of weight within these cabinets, to allow us to use hidden latches, which we see in residential interiors," says Harvey.

**Reality check** Everything in the designs "could be achieved tomorrow" says Harvey. "We always design with the aircraft itself in mind. We understand and respect all the certification and engineering requirements and design within these parameters from the outset. As a design studio within a completion centre, our knowledge base for these requirements is extremely well developed. Added to this, we are

extremely fortunate to have access to the engineering and certification teams in the early concept phase. They help to validate our design assumptions, which is especially helpful when we are designing for new aircraft types."

An example of this approach is the way the team has designed carefully around the expansion joint on the overwing area, deliberately creating a symmetrical dining configuration of buffet cabinets. "Another example of our close collaboration with the engineering team can be seen in the Visionary interior, where the furniture does not appear to be attached to the exterior frame. This can be achieved by using very discreet sidewall attachments behind the cabinets."

Harvey says she was fascinated by customer response to the designs at EBACE, as people were split fairly equally with regard to their favourite – suggesting clients are more open to new design philosophies than might have been expected. **END**

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# TIMELESS TO VISIONARY



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# timeflies

Interior designs and completion processes have progressed massively over the 50-year lifetime of the Dassault Falcon family

1. The first Mystère 20, restored in 2013
2. A 1963 mock-up of the Mystère 20
3. An abandoned twin-jet project from the early 1960s
4. Company founder Marcel Dassault investigates computer-aided design in 1980
5. The original Mystère 20 mock-up exterior

It's hard to believe that the Falcon Jet has been around for nearly half the history of aviation, but on 4 May 1963, the first Dassault-Breguet Mystère 20 lifted off from Bordeaux-Mérignac airport in France. The same year, Pan American World Airways (Pan Am) became the first customer for the 8-10-passenger mid-size jet, renaming it the Fan Jet Falcon in 1966. The Fan Jet Falcon became the Falcon 20, later the Falcon 200 and for the military, the HU-25 (in the USA) or CC-117 (in Canada).

Early examples were fitted out at Pacific Airmotive Company (PAC) in Burbank, California, USA, then at US completions centres such as Air Research in California and Atlantic Aviation in Delaware. "The aircraft were customised to the customer's requirements and each completion facility had its own style and construction methods," says Roy Elsasser, director of specification and design at Dassault Falcon.

The Dassault and Pan Am relationship became a partnership in 1972, when they established Falcon Jet

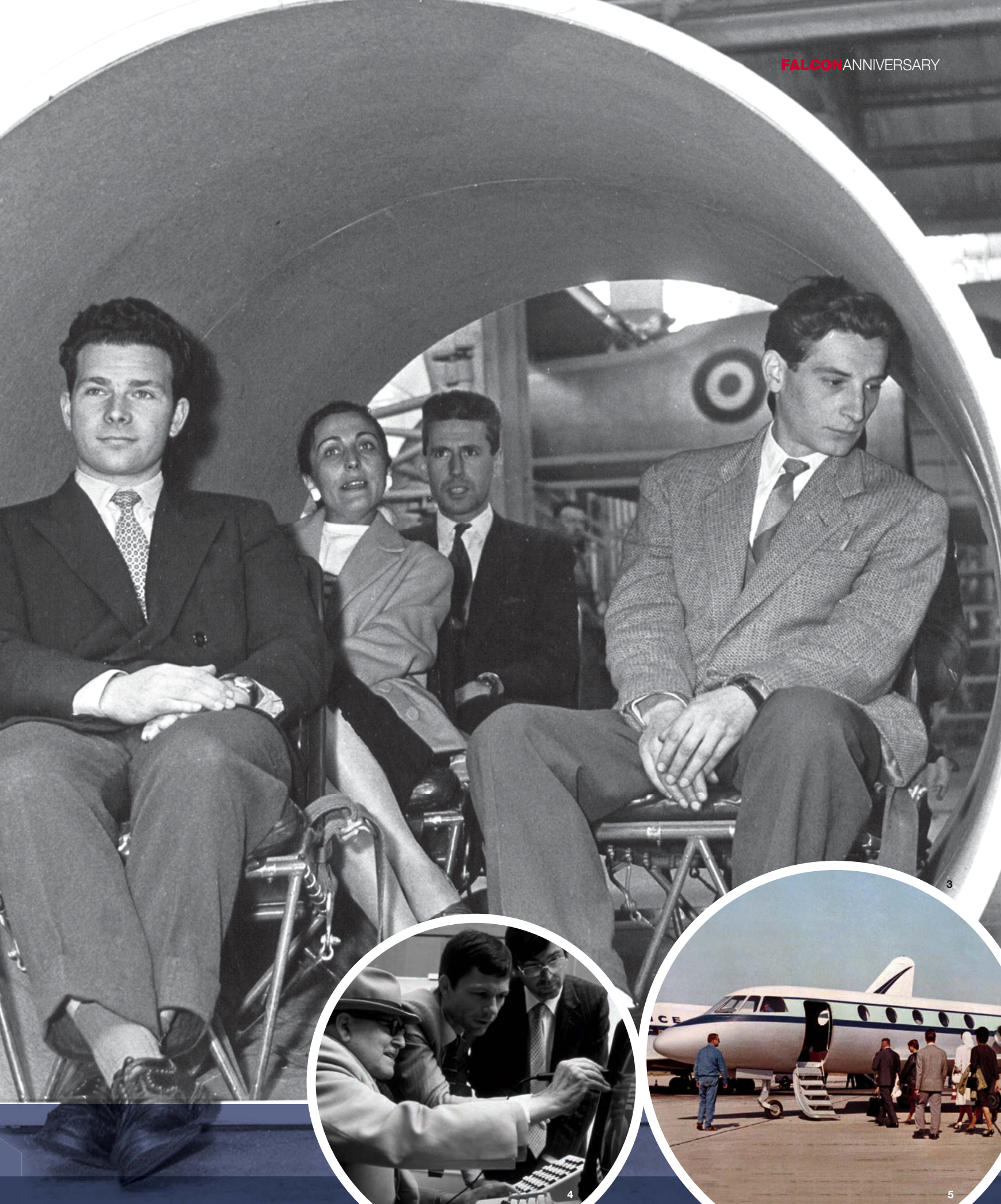


1



2







- 6. Chairman and CEO  
Serge Dassault
- 7. The Falcon 50
- 8. The Falcon 900



## CABIN PRESSURISATION, HUMIDITY AND NOISE HAVE BECOME MORE IMPORTANT

Corp. In 1975 this venture purchased Ark Aviation Sales, a modification and maintenance facility in Arkansas, USA, which was renamed Little Rock Airmotive. FedEx was already using this facility to fit out its Falcon 20s, which included installing a huge cargo door (for which they bought the company that owned the STC).

With this acquisition came cabin standardisation. "We developed a standard aircraft configuration and a list of defined avionics and interior options – the master option list," says Elsasser. "The aircraft were ferried from France to Little Rock using a ferry kit. The aircraft came in green and we completed them."

Originally 61,500ft<sup>2</sup>, the Little Rock compound now covers 897,000ft<sup>2</sup> and includes carpentry, cabinetry, avionics, leather and upholstery shops, plus a sales consulting office. A US\$60m (£38m) expansion to its production and completion facilities was made public in May 2013 – this will boost the facility to 1,250,000ft<sup>2</sup>.

**Early birds** After the 1975 consolidation at Little Rock, things moved fast. "Soon, we began work with Henry Dreyfuss Associates to refresh the Falcon 10," says Elsasser. Henry Dreyfuss Associates' involvement in the Falcon 10 included ergonomic and human factors development, its

### Three key changes

#### 1 OFFICE EQUIPMENT

Elsasser notes that the office in the sky has evolved beyond recognition since the early Falcons. "The office in the sky was the CEO's desk, where he could work and keep his humidor for his cigar and bottle of cognac," he says. "Later, we saw a monitor to connect his computer for business presentations and to watch movies. Today, we have full worldwide connectivity, just like the office on the ground."

#### 2 CABINTRY

Technology has made an impact on completions processes as well, notably cabinetry. "In the earlier times cabinetry was designed on a drafting table and built with plywood by craftsmen, who trimmed and fitted it," says Elsasser. "Today we use 3D CATIA to design; we build the cabinetry before the aircraft arrives at the completion centre."

#### 3 CABIN ATMOSPHERE

As aircraft range has increased, all the factors that affect cabin comfort have come under closer scrutiny. "Cabin pressurisation, humidity and noise have become more important," comments Elsasser. "Dassault Falcon is continuing to research and develop quieter, more comfortable interiors."



### 50 YEARS OF FALCONS

Mystère 20 prototype makes first flight	Mystère 20 certified and enters service	Mystère 20 renamed Fan Jet Falcon, later Falcon 20	Dassault and Pan Am form Falcon Jet Corporation	Falcon 10 certified	Falcon 50 certified	Dassault purchases Pan Am's interest in Falcon Jet	Falcon 100 announced, as replacement for 10	Falcon 200 certified	Falcon 900 certified	
1963	1965	1966	1972	1973	1979	1980	1981	1982	1986	





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9

specialism. Dreyfuss studies resulted in modifications to table height, galley access and lighting. “Practically every aspect of the interior was redone according to human factors, including the element of attractiveness,” comments Jim Ryan, former account manager at Dreyfuss.

It was the first in a series of aircraft developments involving Dreyfuss – the next being the 1981 Falcon 100, a follow-on to the Falcon 10. “The Falcon 100 was born by adding a fourth window on the starboard side, an enclosed lavatory, a small refreshment centre and an external baggage compartment,” says Elsasser.

Then there was the Falcon 50 in 1982, developed by Dassault, Dreyfuss and customer Sony Corporation. “The Falcon 50 included a complete redesign that touched on areas like



10

## PRACTICALLY EVERY ASPECT OF THE INTERIOR WAS REDONE ACCORDING TO HUMAN FACTORS



11

- 9. Aviator Jacqueline Auriol in 1965
- 10. A shower option developed for the Falcon 7X
- 11. The Falcon 2000S

lighting and cabin window reveals,” says Ryan. “The new aircraft was so distinct from previous Falcons that some called it the Dreyfuss Falcon.”

**Built-in comfort** When Dassault initiated the Falcon 900 in 1983, it again looked to Dreyfuss, which built a full-size interior mock-up in its studio to simulate and verify all size, reach and comfort factors. Dreyfuss worked with Dassault to build a mobile fibreglass fuselage, which was used to demonstrate the interior design at airshows and the NBAA convention in

### 50 YEARS OF FALCONS

1,000 <sup>th</sup> Falcon (a 900) delivered	CATIA replaces physical mock-ups, on the Falcon 2000 programme	2000 certified by JAA	2000 certified by FAA; Dassault Falcon Jet Corp formed; most completion work moved to Little Rock	Falcon 50EX and Falcon 900EX certified	Expansion of Little Rock facility	Falcon 900C certified	1,500 <sup>th</sup> Falcon (a 2000) delivered	‘Visual plateau’ software established for collaborative development of Falcon 7X
1988	1991	1994	1995	1996	1998	1999	2001	2002

1984. The mock-up was flown to the Paris Air Show in 1985 and presented to company founder Marcel Dassault.

Patents granted during the Falcon 900 development included an articulating forward lavatory door that allowed more room in the lavatory and which is still in use today; a folding table; and a berthing seat.

Many of the ideas that Dreyfuss developed during the Falcon 900 programme were carried over to the Falcon 2000, which was certified in 1995. Dreyfuss was also involved early on during the Falcon 7X programme, where it helped to study elements such as window location and size, use of LED lighting and a shower option. One of the Dreyfuss studies resulted in a 20% increase in window size.

“We at Henry Dreyfuss had a great relationship with Dassault Falcon, and our work together brought many experimental designs to Falcon interiors,” says Ryan. “The work was

one of the first applications of human factors in a business jet interior. It truly was revolutionary.”

**Packaged options** The Falcon 7X also marked Dassault’s first attempt at a packaged interior, created with the help of BMW Group DesignworksUSA. This is offered as an option on the Falcon 7X; customers can still specify a completely customised interior. For the ‘entry-level’ Falcon 2000S, the companies worked again to create a choice of three standardised cabins, based on layouts and features that have proved optimal for most clients.

“We typically begin the interior design process with a customer 18-20 months before delivery,” says Elsasser. “While we still have the ability to create a wide variety of custom interiors, finished to the customer’s unique specification, we’ve also seen many benefits in offering pre-determined packages with customisation options.



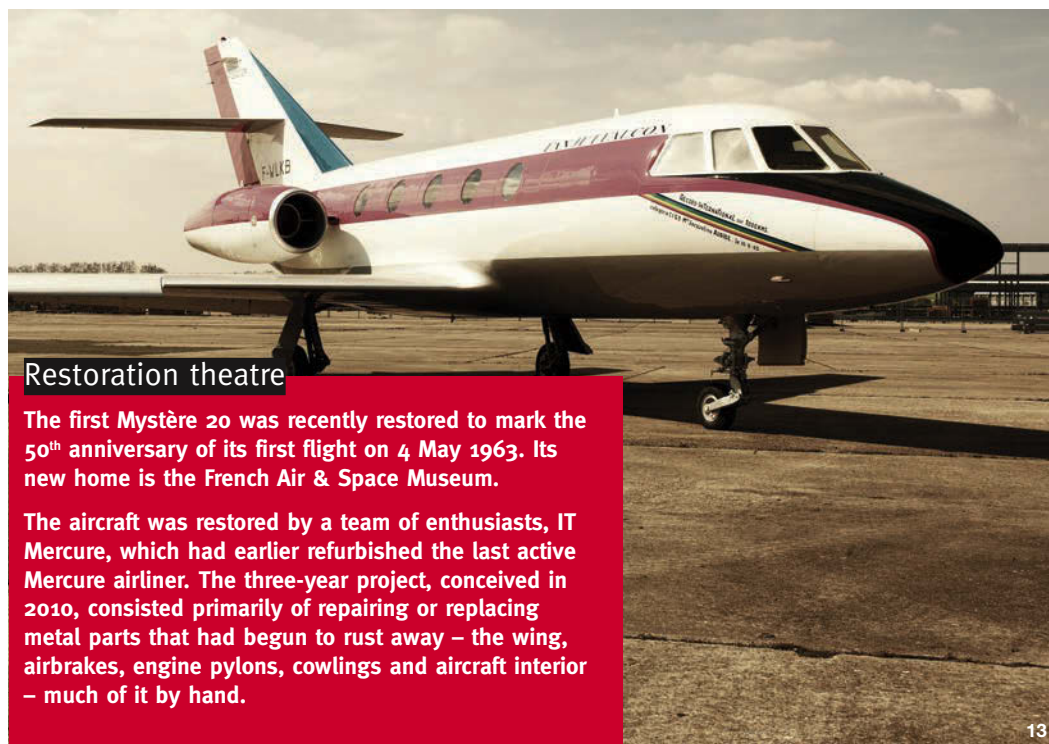
12. A 1998 Falcon 900B interior designed by Marc Newson

13. The restored Mystère 20

We’ve found that these packages appeal to a wide variety of operators and offer reduced engineering costs and completion times. These packages include the most popular options and offer a choice of colour and ambiance harmonies. This also allows us to integrate the newest technologies across a wide variety of interior options. Working with well-known design firms allows us to offer the most advanced, productive and pleasing interior options to our customers.”

Offering a range of material options to choose from also enables Dassault to minimise completion times, because it knows the materials are suitable for the aircraft environment, and available. “For example, to shorten the cycle and simplify the supply chain, we offer wood veneer from what we call a log promotion programme. We have pre-selected wood veneer that is on reserve with our supplier,” explains Elsasser. “The biggest challenge we face is giving customers what they want at a reasonable price, while still maintaining the highest quality and on-time delivery.” **END**

**Web** [www.designworksusa.com](http://www.designworksusa.com);  
[www.falconjet.com](http://www.falconjet.com);  
[www.hda.net/hda.swf](http://www.hda.net/hda.swf);  
[www.marc-newson.com](http://www.marc-newson.com)



## Restoration theatre

The first Mystère 20 was recently restored to mark the 50<sup>th</sup> anniversary of its first flight on 4 May 1963. Its new home is the French Air & Space Museum.

The aircraft was restored by a team of enthusiasts, IT Mercure, which had earlier refurbished the last active Mercure airliner. The three-year project, conceived in 2010, consisted primarily of repairing or replacing metal parts that had begun to rust away – the wing, airbrakes, engine pylons, cowlings and aircraft interior – much of it by hand.

## 50 YEARS OF FALCONS

Falcon 2000EX certified	Falcon 900DX certified	First new Falcon delivered to China	7X and Falcon 2000DX certified	Second expansion of Little Rock facility	Falcon 2000LX certified; packaged option announced for 7X; 2,000 <sup>th</sup> Falcon (a 2000LX) delivered	Falcon 900LX certified; delivery of 100 <sup>th</sup> 7X; FAA approves use of 3D data for type design and completions	First 7X delivered with VIP shower option; launch of FalconCabin HD+	Falcon 2000S and Falcon 2000LXS certified	
2003	2005	2006	2007	2008	2009	2010	2012	2013	



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



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Is there a place for wet film laminate in luxury jets?

**A**lthough perhaps at the VIP end of the market the overwhelming demand will always be for real wood veneer, in some charter and governmental aircraft, entry-level jets and turboprops, alternatives such as wet film laminate are being implemented. The main reasons for this are the technology's ability to save weight and make grain matching easier.

The process of applying film goes under a variety of names – including cubic printing, hydro graphics, wet dip, water transfer printing, wet film transfer and wet film printing.

Selecting an aviation-specific supplier is important because the applications must pass aviation burn tests. Bostik is one such supplier. Its

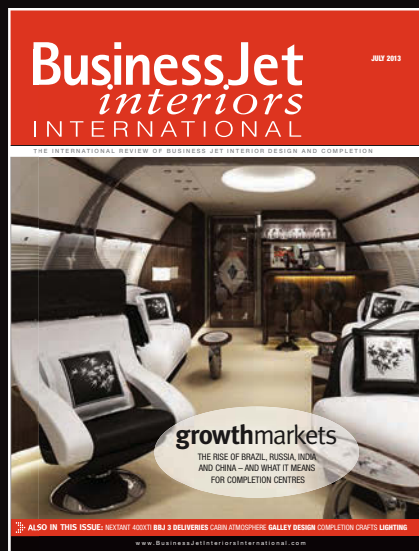






1. A Lufthansa Technik technician checking cabinetry made using wet film transfer





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## Composite veneer

Another alternative to natural wood veneer is man-made composite wood veneer. Supplier Brookside Veneers believes there is a place for both.

“Man-made veneer is a good alternative to natural veneer because it is consistent in colour and grain, with no limitations as to availability,” says David Thomsson, president at the company. “Subsequent add-ons or repairs are easier as well. Another advantage is that we can also make lumber. With the rare species, it is as difficult to get lumber as it is to get veneer, and most projects require both. Also the veneer and lumber will match, which usually does not happen with the actual species.”

Brookside Veneers stocks nearly 50 varieties of composite veneer. “For the aircraft interior market, our bestsellers replicate exotic veneers like rosewood, ebony, wenge, zebrawood and some burls,” says Thomsson. “In their natural form, these species are expensive and can be difficult to get hold of. Some woods, like true Brazilian rosewood, are so rare that international trade is restricted.”

The composite wood veneer supplied by Brookside Veneers is made from obeche, poplar or basswood, which is dyed to the required colour. The leaves are glued together in a mould that produces the grain pattern and this block is then sliced into leaves.

From then on the application process is exactly the same as for a natural veneer. “The process has three steps,” says Thomsson. “You splice the veneer leaves to the required size; press them to the core material with the proper glue, in either a hot or cold press; then apply a finish.”

**IN THEIR NATURAL FORM, THESE SPECIES ARE EXPENSIVE AND CAN BE DIFFICULT TO GET HOLD OF**



film comes in widths from 1-60in. When dry, the thickness of the film ranges from 40-250µm.

The first stage in applying the film is to paint a base coat onto the surface to be treated and leave it to dry. The graphic film is then laid onto the surface of a special, temperature-controlled tank of purified water. Then a solvent is sprayed on the film, which dissolves the polyvinyl carrier, but not the graphic. It's left floating on the surface. The cabinet, drawer or side piece is then dipped into the tank. As it does so it displaces the water and the graphic adheres to the surface. It is then removed from the tank, dried and sprayed or brushed with a clear coat and sometimes buffed or wet-sanded.

**Perfect match** Although David Edinger, president of Comlux America, is “not eager” to use wet film laminate, because VIP clients “want real wood veneer and that deep, luxurious feeling

2. Some of Brookside Veneers' range of composite veneers
3. Lufthansa Technik uses wet film transfer on the packaged ACJ318 programme, on which it is Airbus's completion partner

you get with lots of clear coat built up on it”, he does concede that applying film can be easier than applying veneer.

“One advantage is that the film repeats itself, so if you need to match doors or panels it is easy,” Edinger explains. “With veneer you have to apply a whole sheet and then make incisions for cut-outs and drawers, factoring in a cap around the edges.”

Edinger, who began his career as a cabinetmaker and has experience with the process, says applying film is simpler: “You cut out your film, then you take another piece that matches it for your drawers. There are advantages to it – for example, it is easy to make touch-ups. All you have to do is dip your brush into the tank to pick up some of the film, then you can apply it like paint. You use the film as the touch-up product.”

**Fleet commonality** Cord Sandmann, an interior backshop engineer at Lufthansa Technik VIP and Executive Jet Solutions, also has experience with the technology. “You have the ability to get the same look even after years of repairs,” he says. “Pattern matching and fleet commonality can be very difficult with traditional veneer. Popular grains are becoming increasingly rare, some woods are very difficult to process, and prices on rare veneers are still high.





**IT'S A SOLUTION FOR SOME THINGS, BUT NOT ALL. YOU'RE LIMITED BY THE SIZE OF THE TANK**

With film, the design is controllable within a range of base colours. Natural wood often has problems you only see after the finish is applied. With film, you do not need to apply as many protective layers as you do for wood."

**Chop and change** However, Edinger points out that the technique necessitates a change in the way you



build the cabinet in the first place. "If you are going to put film on there is a different build philosophy," he says. "You can't stick a whole closet inside the tank. You have to take the closet, disassemble it, build it with angles underneath shelves and along the back so that you can dip it in the solution, get the film on it, and then assemble it. You need to make sure your engineers are educated on how to do this. It's a solution for some things, but not all. You're limited by the size of the tank and the size of the piece. The tanks are usually 10-12ft long and 5ft wide. The film comes in sheets 4ft wide."

Because of this, Edinger doesn't believe film offers a time saving compared with traditional veneer. "I don't think you are saving any time," he says. "When I was a cabinetmaker it was easier for me not having to factor in angles for assembly. When you are using veneer, you just build the piece

4-6. The wet film transfer process at Lufthansa Technik

and apply the veneer, route the edge and put your caps on." He also believes the solvents used in the film process give a flatter result than traditional veneer with a high-gloss finish. "It is thinner looking," Edinger says. "You don't get the same deep, rich look."

"Film laminates don't give a VVIP appearance," agrees Sandmann. "We use it mostly on government and charter aircraft, not VVIP jets."

Still, Edinger acknowledges that film technology is improving: "In the old days film was mainly used only when veneer couldn't pass the burn test requirements. However, now that it has more coats over it, it looks more like veneer. If you do it well, it is difficult to tell the difference." **END**

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A potential Greenpoint BBJ787 project, with an interior design by Pierrejean Design Studio



# NBAA 2013

The organisers of **NBAA 2013** are expecting around 25,000 industry professionals to convene in fabulous **Las Vegas** on **22-24 October 2013**. With more than 1,000 exhibits and two static displays to get round, we hope you find the following pages a helpful starting point for your essential pre-show planning!

## 2 STATIC DISPLAYS

As well as the customary outdoor static display of aircraft, this year NBAA's organisers are adding an indoor static display, on the main exhibit floor, for 10-15 light business aircraft and helicopters

## BBJ 787 EXPERTISE

Greenpoint Technologies will highlight its capability to take on a VVIP BBJ 787 completion. The completion centre is in discussions with multiple customers and hopes to announce a contract before the end of 2013. This effort reflects the company's 2013 corporate goal to obtain the knowledge and resource documentation to efficiently price and contract a BBJ 787 completion.

Meanwhile, the company's BBJ 747-8 completion is in full swing, and should be delivered in the first half of 2014. Greenpoint will show its 1/20<sup>th</sup>-scale VIP BBJ 747-8 model, which it debuted at EBACE 2013. The model incorporates the patented products Aerolift and Aeroloft, for which the company anticipates sales in 2014.

Odyssey Aerospace Components, Greenpoint's VIP cabinetry manufacturer, will co-exhibit.



## Jet mock-up

Pilatus Aircraft will exhibit a full-scale mock-up of the new PC-24 jet. Highlights of the cabin include 13 large windows and a continuous flat floor.



## Soft launch

Moore & Giles will launch its new leather collection, Maui. Tanned on Spanish hides that average 45ft<sup>2</sup>, Maui is a semi-aniline leather with a two-tone tipping effect that emulates the skin of the stingray. It is available in an extensive range of colours.

All Moore & Giles aviation leathers are treated to meet technical aviation specifications. Additionally, many of the company's more fashion-forward leathers can be treated to meet these standards.

## Shared entertainment

Flight Display Systems will display JetJukebox, an IFE device that uses cabin wi-fi to share files and stream movies and music without an internet connection. It creates a local area network for up to eight passengers. In addition to audio and video, passengers can view the included worldwide moving map. The JetJukebox works with any wi-fi-enabled laptop, tablet or smartphone with a browser.

Passengers connect to the wi-fi network, open a browser window and type in a URL. Users can add content instantly via multiple USB flash drives. Content can be added to the internal solid-state drive by connecting a laptop and following instructions.

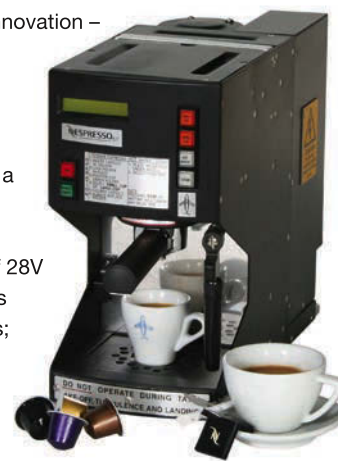
The JetJukebox provides two Ethernet ports, one for a laptop and one for the router. There are two USB ports on the front and four on the back of the unit. Also included on the back are moving map, HDMI and VGA outputs. Streamable file formats include MP4 for video, MP3 for audio, and jpeg for photos.



## Capsule coffee machine

Aerolux will demonstrate its newest innovation – a 28V version of its popular Espresso Coffee Maker (ECM), which is compatible with Nespresso capsules. The main advantage is that the unit requires much less power to produce a constant supply of the same high-quality beverage.

Aerolux can supply a wide array of 28V and 115V equipment, including: ovens ranging in function from 1-48 servings; refrigerators and freezers ranging in capacity from 1-3ft<sup>3</sup>; and various beverage makers.





Mahjong, a popular game that originated in China, is commonly played by four participants

## GAME TABLE

Jeff Bonner Research & Development (JBRND) will showcase its latest project – adapting a fully automated Mahjong table for a narrow-body business jet.

“During the last three years we have had numerous requests to manufacture a Mahjong table for Asian VVIP aircraft,” says Ed Harris, vice president of sales at the company. “We have our work cut out for us in this adaptation of a commercial off-the-shelf product into the aircraft. But the FAA guidance is in place and we have adapted similar electromechanical products in the past. We like to set the benchmark in the industry.”

JBRND provides VVIP aircraft component and subassembly fabrication services and is based in San Antonio, Texas, USA.



**Q&A:** Gareth Davies,  
head of design at Technicon

6

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### What are your plans for the show?

Our focus is to demonstrate our design experience and capabilities and to segway into the business aviation market. We offer a complete design service from ideas to visualisation and prototyping. Our main selling point is our international presence and experience. We are looking forward to meeting potential clients and partners, as well as immersing ourselves in the wealth of resources available at NBAA.

### What technologies are driving progress in your field?

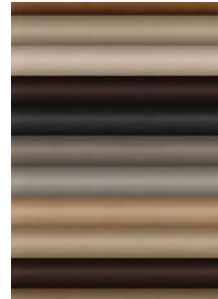
Our interior work is increasingly influenced by technology such as augmented reality and holographics. Human machine interface is an area we are developing – we recently integrated a workflow more typically used in film and video games, which we believe will improve efficiency and offer our clients more options in a shorter timeframe.

### What projects are you working on?

We are currently working on a contract with a commercial aviation client – a project that is in its fifth year. In parallel to this we are working with clients in the automotive and mass transport domains, and preparing two VIP aviation projects to showcase at NBAA 2013.

### What can aviation learn from other markets you work in?

Our experience in other markets, particularly the automotive sector, is a benefit for business aviation clients. There is more crossover than ever before – automotive standards are influencing aviation interiors, particularly in colour, trim and perceived quality. Clients are more discerning than ever and expect the same level of design, comfort and refinement in their aircraft that they are used to in their homes and vehicles. At the same time, the drama and romance of aircraft can be seen influencing automotive products as well.



## Leather launch

Edelman will show Royal Aviation, a new leather developed for aviation and marine clients. The leather is made from bull hides embossed with a light grain, and comes with the company's Edge finish at no extra charge. It will be available from November 2013 – with 12 colours in stock ready to ship, and custom colours available “with minimum requirements”.

## New rotorcraft

Bell Helicopter will focus on the Bell 429 product line, including the new Bell 429WLG. The company also recently revealed a new short light single offering advancements including a fully flat cabin floor and the new Turbomeca Arrius 2R engine. In addition it has another product in the testing stage, the Bell 525 Relentless.



## Holistic exhibit

B/E Aerospace's demonstrations will include its seating products, which range from private VIP suites to light jet seats.

The company says its collaborative approach to design yields solutions such as hydraulic actuation and wireless controls. Other booth highlights will include the vacuum waste system, which is designed to reduce weight by 50% while simplifying maintenance; and ProVision, a new crew oxygen mask designed to eliminate lens fogging and provide a more secure fit. Meanwhile, a specially designed lighting simulator will allow participants to experience B/E Aerospace's architectural and system lighting. The company will also show a multifunctional Gourmet Beverage Maker, and its full suite of Essence inserts.





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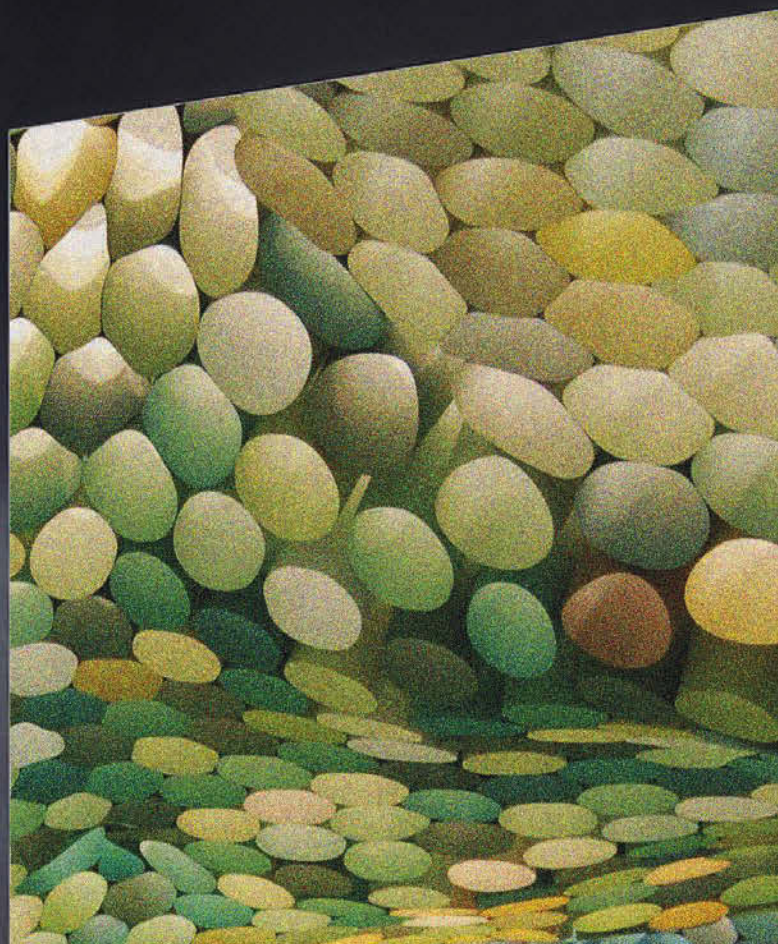
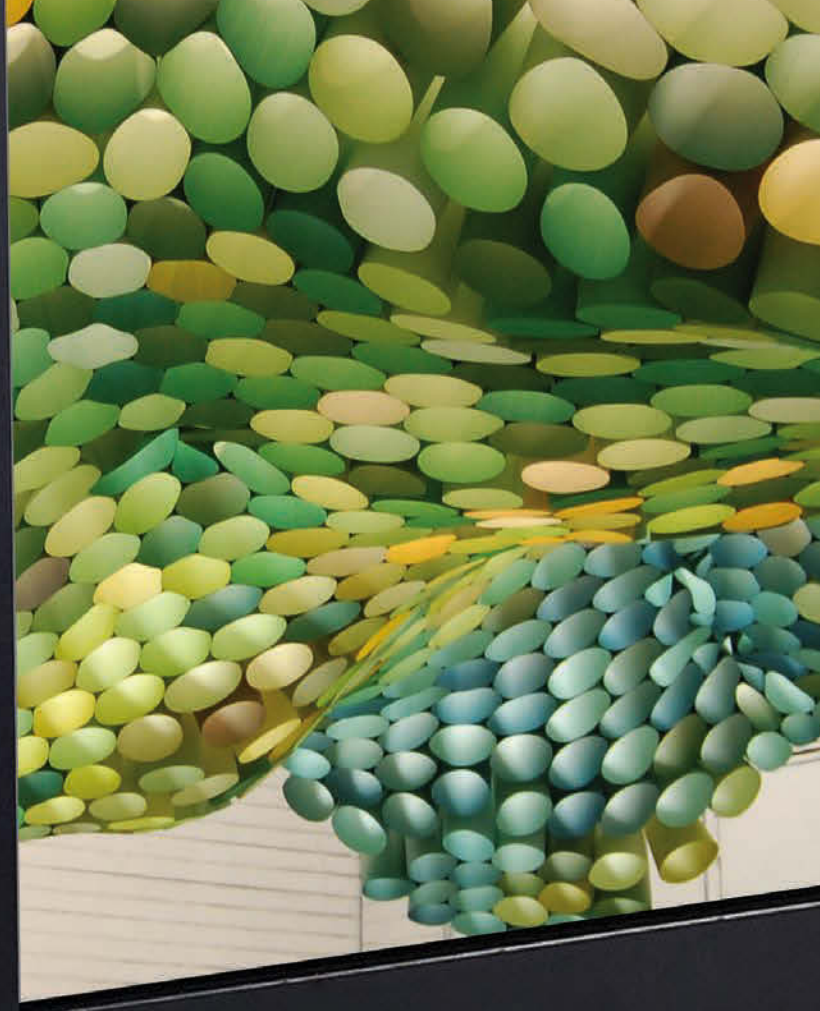
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A Bombardier Global refurbishment by Flying Colours Corp

## UNITED FRONT

NBAA 2013 will be the first outing for Flying Colours Corporation's refreshed branding, and the first time its facility in St Louis, Missouri, formerly known as JetCorp Technical Services, will exhibit under the single Flying Colours Corporation brand name. "We've worked under two brands since we purchased JetCorp in 2009 but decided to unify the facilities under one name as it reflects the similar capabilities that both locations offer," said Sean Gillespie, vice president at Flying Colours. "It also serves to reinforce our overall North Americas coverage."

The new look and feel will be displayed on a larger, redesigned exhibition booth from which the Flying Colours team will promote its maintenance capabilities. The company will also promote its infrastructure expansion plans. With an investment of more than US\$2.5m dollars, the initial phase will see the addition of 20,000ft<sup>2</sup> to the third hangar at Flying Colours' facility in Peterborough, Canada, increasing its large-cabin maintenance, completion and refurbishment capacity.



## Leather care

The Leather Institute will distribute samples of its Finished Leather Cleaning Wipes at sister company Townsend Leather's booth. The wipes have been off the market for

several months while improvements were made. The company says the wipes are safe for use on all finished leather products. They are supplied in pouches of 10 wipes, 7in x 9in in size, and are pre-moistened with the company's Finished Leather Cleaner.

## Audio advances

Bose will highlight QuietComfort 20, its first in-ear noise-cancelling headphones, and its new SoundLink Mini Bluetooth speaker. The QC 20 headphones have two tiny microphones in each earbud; one senses the sound approaching, the other measures the sound inside. The measurements are sent to a digital electronic chip that calculates an equal and opposite noise cancellation signal within a fraction of a millisecond. Bose says its TriPort technology increases the effective acoustic space of the earbud to reproduce deep lows, and lifelike vocals and instruments, while its active equalisation tunes the frequency response for improved, natural sound. The headphones also incorporate new StayHear+ ear tips, which are designed to ensure an effective seal to passively block noise. The QC20 headphones can be used in two ways. Owners can choose to block out the world or switch to the new Aware mode, which keeps music playing, but allows surrounding activity to be heard clearly. The headphones also have an inline microphone for taking calls. Meanwhile the SoundLink Mini Bluetooth speaker connects wirelessly to a smart device or tablet and weighs 1.5 lb.



**100**  
business aircraft are expected on the outdoor static display, at Henderson Executive Airport

Attendees from **87**  
countries and all 50 US states came to NBAA 2012



**Q&A:** Frederic Relea, sales manager at SELA

## What will you display?

Our Clematis lighting system, which has been flying since June 2012. The principal network controls a dimmer sequencer box (storing colour settings and scenarios) for several lights. We can extend the system simply by adding dimmer sequencer boxes, with no modifications to the principal network control system. In terms of colour rendering, the white light reproduces 90% of sunlight or a halogen lamp. In addition, it offers full homogeneity and stabilised colours for the complete visible spectrum.

## How is the system operated?

The dimmer sequencer can work in standalone mode, linked to push buttons so passengers can trigger scenarios or adjust the colour and brightness of individual lights. It can also be synchronised with other dimmer boxes, receiving scenario instructions from the network master box, the Master Light. The Master Light also enables interface with other cabin equipment, as it is equipped with a wi-fi hub, Bluetooth, internet network, audio and video inputs. Our concept is to simplify the interface with the CMS. The CMS sends basic instructions to the Master Light, which manages the lights. This allows easy adaptation for any type of CMS.

## How do you support installation?

Our lighting designer customise the lighting according to the client's requirements, managing the fine tuning, Ethernet and wi-fi connection to the Master Light box and the programming. He can also participate in the development and modification of lamps to ensure compatibility with the system.



Seats from AST's  
Next Generation range

## HIGH-TECH SEATS

Aero Seating Technologies (AST) will display three seats from its Next Generation family. These will include a fully electric seat with wireless iPad controls for seat movement, and optional features like a massage system; and an electric-assisted seat with touchpanel controls for seat movement and optional comfort features. The company will also showcase its audio-response massage system, and passive cooling technology combined with heating elements.

The company offers a wide range of certified 16g products featuring vertical lift and full flat berthing seats. AST is now supplying Embraer with a complete set of cabin seats and divans for the Lineage 1000.



**Q&A:** Rhonda Lanier,  
creative director at Aircraft Interior Products

**25,150**  
attendees registered  
by close of NBAA 2012

### What soft goods will you exhibit?

Our carpet designs pay homage to classic motifs used in many cultures, patterns that have lasted through the ages. Our design team has delivered both traditional and interpretive expressions of these motifs. There will also be a focus on luxury fibres. Our American mohair exhibits a lustre not unlike silk, with great durability; merino wool's bulbous fibre adds texture, volume and softness without adding weight; and our fine-denier New Zealand wool gives a layer of complexity and refinement.

### What is popular now?

Colour saturation is popular, although using slightly more subtle hues or amounts than seen in the fashion world. Additionally, complementary design motifs are being used in tandem. It's no longer enough for a custom piece to be a single yarn colour in cut and loop with carvings – customers want more layers. Responding to this, we are creating designs with unique variations in texture, sheen and pile heights.

### How is technology evolving your service offering?

From design to fabrication we utilise technology to deliver efficient design solutions and consistent quality. In addition, we are developing a virtual tool that will put the power of design into the hands of the client.

### What are you looking forward to at the show?

Our clients have made it clear that today's market is more time-sensitive than ever, so we are launching the Legacy stocking programme. Products in this programme are kept in stock at our headquarters in Wichita, Kansas, USA, so they are ready to ship the same day. However, we have refused to compromise quality for fast turnaround, so they are all manufactured in the USA at our own carpet mill. We have used our soft backing and offer five styles and eight colours – 40 options in all.



## Power solutions

Emteq will showcase eEquation, its line of cabin power products, which feature intelliOutlets with plug presence detection and ground fault interruption. intelliOutlets

can combine five LRUs and excess wiring in one outlet. Another power solution that will be demonstrated is the intelliUSB SR. With a small footprint and remote power supply, Emteq says it can be installed virtually anywhere in the cabin, and can charge 90% of phones, tablets and other personal electronic devices at the same speed as on the ground. The company will also highlight its QuasarII full-spectrum mood lighting solution. Emteq says QuasarII is simple to install because it has no need for external power supplies. It is designed with Emteq's Cabin Lighting Network Protocol to eliminate the need for external control boxes and simplify CMS integration.



## Applications for foam

Zotefoams will exhibit with its partner customer Technifab. It will show its new Zotek F concept for modular lightweight ECS ducting, which it says combines flexibility in system design with off-the-

shelf components. These ECS products will be displayed along with examples of Zotek F carpet underlay, trim, pipe and general insulation products. The Zotek F range of closed-cell foams is based on PVDF fluoropolymer. The company says it exhibits outstanding flame, smoke and toxicity performance characteristics; exceptionally low heat release, meeting FAR 25.853(d); high thermal and acoustic insulation performance; and excellent resistance to impact and crush. Aircraft applications include carpet underlay and soft touch trims when combined with leathers, textiles and decorative laminates. Zotek F is also used for ECS ducting, window seals, gaskets and cores for aircraft composite wall panels.





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# contents



86

MSB DESIGN



89

HILLER



90

LIGHTBOX



93

AMAC AEROSPACE



94

STEECON



97

ASTRONICS



98

IMAGIK



101

3D VISUALIZATION  
SERVICE



102

AEROSPACE  
DESIGNWORKS



105

ALTO AVIATION



106

TAPIS



109

TAYLOR-DEAL AVIATION



111

ASCENDING DESIGNS



112

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# levelup

With expansions to its product range, manufacturing abilities and client list, it has been a busy year for MSB Design

Now in its eighth year of operation, MSB Design has embarked on its biggest course of expansion yet. The company's product range includes china, crystal and flatware inserts (CCFs); galleys and other cabinets; hi-lo conference tables; and cockpit tables.

The company says its latest launch, a hi-lo conference table debuted in 2012, has garnered a lot of positive feedback. Designed to offer exceptional stability, strength and comfort, the table is supported by a single pedestal and can be locked at any height. "It's not a question of whether I want an MSB table for an aircraft contract," said one of the company's customers. "We have been quiet, and I need an aircraft contract before I can install one of its tables!" However, MSB has signed contracts for the table with OEMs.

The company already has CCFs flying with two major OEMs; one of these has been using MSB exclusively for its flagship platforms since the company's inception. The second OEM made its first aircraft delivery with an MSB CCF on board recently.



2

In July 2013, MSB reconfigured its operations by adding a night shift. This was to honour a contract for the manufacture of a large number of galleys, left-hand enclosures and wardrobes. The first of these were delivered at the end of August 2013.

MSB's outsourcing company, MSB Ressources Globales, has also enjoyed success in 2013. The division specialises in aerospace human resource management, and has more than 165 engineers, method specialists and project managers on its books. These candidates have been screened and trained to ensure smooth integration and continuity, and can be found working on-site at various aerospace companies.

No matter what products or services it is delivering, MSB is committed to putting its customers first and ensuring exceptional quality. "It is the attention to detail that makes MSB exceptional," says Shannon Gill, director of business development at the company. "Our manufacturing team makes my job easy. Customers can see the quality for themselves, and in this business quality sells."

The MSB team will be at booth N5423 at NBAA 2013 (to be held in Las Vegas, USA, on 22-24 October) to demonstrate products including the CCFs and hi-lo conference table.

**MSB Design**

Reader Enquiry No. 501



1. Cutlery inserts are part of MSB's range
2. Co-presidents Mario Sévigny and Sony Boudreau demonstrate the strength of the new hi-lo table
3. The Montreal-based company also makes cabinets



3





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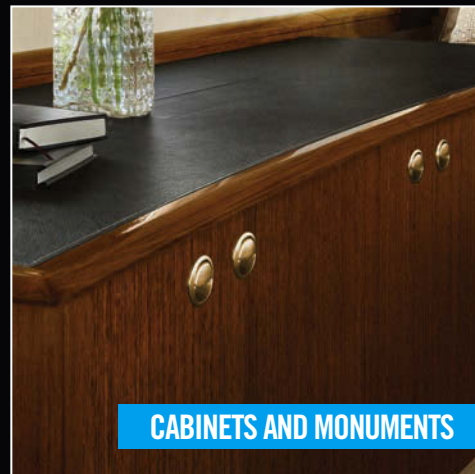
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# historylesson

As Hiller embarks on a new Learjet programme, it looks back at its first project with the company

Later in 2013, Bombardier Learjet will deliver the last production unit of its hugely successful Model 60XR aircraft type. Hiller became involved in the programme in 1990, when it formed a strategic partnership with Learjet to design, certify and ultimately manufacture production interiors for the Model 60 series.

Hiller worked closely with Kip Harkness and Danny Ensminger of Learjet's design group, as well as certification and design engineers and line installers to develop the interior. It created mock-ups of concepts and suggested material types to ensure a strong, lightweight and lasting product. New cabinet pulls, buttons and other hardware were designed specially for the interior.

"Engineering, certifying, manufacturing and ultimately delivering an interior for a new model requires a great deal of cooperation," comments Marc Hiller, vice president at Hiller. "All aspects of the programme must flow together to meet the due dates."

The company's success on the Model 60 series led to it being selected as a supplier for the Model 45 in 1996 and later the Model 45XR and Model 40XR. The Model 60 itself went through many versions over the years, including the SE. Later it was upgraded to the current Model 60XR, and the new interior had to be certified. This required testing some monuments in a specially designed static test rig, witnessed by the FAA.

"The monuments passed with flying colours, because of our superior construction methods," says Hiller. "There is nothing worse than getting to the late stages in a programme and having a structural failure during testing. That's why it's critical to have experienced design and certification engineers and proven manufacturing methods, because at that stage there is little or no room for delays. As my father Horst has always said, 'This is no industry for rookies.'"

Hiller celebrates its 41<sup>st</sup> and Learjet its 50<sup>th</sup> year in business in 2013. "Striving to be the best rather than the largest in the industry has allowed us to be nimble and efficient," says Hiller. "It has allowed us to incorporate ideas and changes rapidly and turn them around faster. This is an advantage customers greatly appreciate."

Hiller looks back with pride at the Model 60's success. "We congratulate all the people who have worked on all aspects of the programme to make it one of the most successful business jets ever produced," says Hiller. "We also look forward to the next generation of programmes, with excitement and a serious attitude."

The company is now embarking on a new programme for Learjet that will entail the design, certification and manufacture of an interior for a new aircraft, building on the joint successes of the past.

Hiller

Reader Enquiry No. 502



1-2. Monuments built for a Learjet 60XR  
3. The Learjet 60XR's sidewall

# visualarts

## A real-time 3D application developed by Lightbox to revolutionise aircraft design



1

Three years ago the team of programmers, graphic designers and digital artists at Lightbox set out to create a software product that would deliver a truly realistic cabin navigation experience. It was also vital to provide users with a simple, friendly interface. The challenge was not small and the product development took thousands of hours of hard work – for example coming up with complex algorithms to control how lighting would work with different layouts and objects, and optimising camera angles.

The result of this development, CBox, enables designers and their potential clients to visualise cabin interiors from every angle before modifications are actually done on the aircraft. They can add comments, take a screen capture and save their preferred options.

The potential of the tool beyond the skies is also becoming clear – architecture firms and manufacturers of boats and automobiles are also looking at the technology.

Lightbox continues to grow and expand CBox in line with the needs of its customers and the ever-changing digital world. But the company believes there is more to a great product than the product itself – the process of working alongside the client is just as important. Therefore, the company has participated in the development of an online platform that enables the client's team to access their project anywhere in the world, at any time. They can document, communicate, interact, access updates on the project's progress and provide feedback, around the clock.

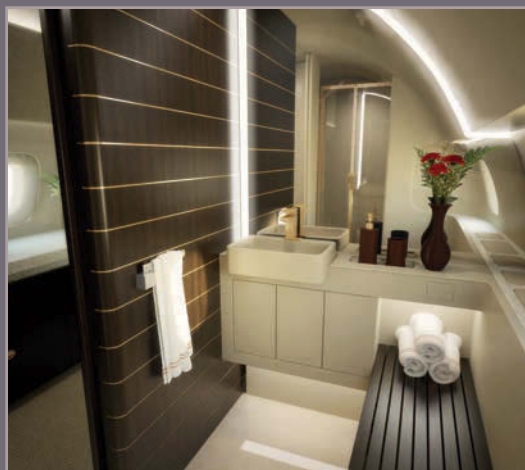
The company also says the online platform streamlines the process of making renderings so well that it has been able to cut turnaround time by 15-20%, while delivering the same quality.

"We want to make it easy for clients to work with us and mesh our process with theirs so that it's seamless," comments Martin Amengual, co-founder of Lightbox and the driving force behind the online platform. "This development enables us to deliver outstanding results consistently over time."

Lightbox is the visualisation arm of the Corbis Global Group, an architectural, visualisation and engineering support company with offices in Los Angeles, USA; Cordoba, Argentina; Dubai, UAE; Perth, Australia; and São Paulo, Brazil.



2



3



4

Lightbox

Reader Enquiry No. 503

1-4. Renderings of the Embraer Lineage 1000, created by Lightbox





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# swiftsuccess

In only a few years, AMAC Aerospace has established itself as a major player in completions and maintenance

1. AMAC's first completion, an ACJ320 designed by Francis Munch of Studio E/motions
2. An ACJ319 designed by M&R Associates Design and delivered in October 2010
3. One of AMAC's three wide-body hangars

Launched in 2008, AMAC Aerospace has quickly established itself as a leading provider of corporate aviation maintenance and completion services. The company is headquartered at EuroAirport Basel-Mulhouse, and has the capacity to accommodate four wide-body and four single-aisle large jets, plus lighter business jet types. Its business is split 60:40 between VIP completions and maintenance work.

The company secured its first completion in early 2008, seven months before its first hangar was even built. That project, an ACJ320, was delivered in a VVIP configuration on time and on budget. Since then, AMAC Aerospace has become one of the largest privately owned aviation companies in the world, specialising in private, corporate and VIP completions, maintenance, charter and management services. The company boasts a 580-strong workforce across four locations and 23,000m<sup>2</sup> of hangar space – a figure that includes its third wide-body hangar at EuroAirport Basel-Mulhouse and a new hangar at Ataturk Airport, Istanbul, both inaugurated in 2012.

AMAC continues to defy the global economic situation by attracting new business. It has contracts secured for the next two years and an order book worth more than US\$1bn (£0.6bn). The company also continues to add to its maintenance capabilities. It currently has approvals to work on aircraft including the BBJ, BBJ 747 and BBJ 777; ACJ, ACJ330 and ACJ340; Pilatus PC-12; and Gulfstream and Bombardier models.

"We are hugely proud of our growth and achievements in just over six years of business," comments Kadri Muhiddin, group executive chairman and CEO. "The opening of our third wide-body hangar at EuroAirport followed by the opening of our Turkish facility at

Ataturk Airport is testament to our success. We are excited by the further opportunities that are currently being presented in the business aviation sector and we intend to maximise them to their full potential."

Maintenance and completions are by far the bulk of AMAC's work and thus it employs 40 licensed certifying staff for Airbus and Boeing types. The workforce includes mechanics, completion specialists and craftspeople.

The company's proudest achievements include an MD-87 in December 2010, on which the company performed heavy maintenance, returning the aircraft on time and with 'no additional findings' to cause delay; and a solution launched in August 2011 to support clients requiring immediate spare parts assistance for AOG with their PC-12s, bypassing the normal courier channels.

Standout completions include the company's second such project, an ACJ319 delivered in October 2010 that featured VVIP areas forward of the wingbox and medical repatriation and emergency equipment in the aft cabin; and its two wide-body completions – a BBJ 777-200(LR) in November 2012 and a BBJ 777-300(ER) in August 2013. A BBJ 747-8i is currently undergoing engineering analysis and workshop build-ups to accommodate a two-year programme of design, production, installation, certification and re-delivery to the client.

Another source of pride is the official recognition AMAC has received from OEMs such as Airbus and Boeing – both of which list the company as a recommended completion centre. For AMAC, the secret to all this success is the support of its skilled workforce and dedicated management.

AMAC Aerospace

Reader Enquiry No. 504



1



2



Images by Roth+Schmid, Zurich



3

# monumental success

How a garage start-up became a global player delivering customised monuments for the VIP interiors market

In 1982, an aerospace engineer in Huntington Beach, California, had an idea – to manufacture a better frangible pocket door for the burgeoning VIP aircraft industry. That engineer was Charles Steel, and the product that he subsequently developed in his garage became the first offering of Steecon.

Nowadays, the company works with completion centres, aircraft owners, designers and OEMs from around the world. “Our focus on customisation, quality and reliability has allowed us to expand from a small business to the organisation we are today,” comments the company’s recently appointed president, Chris Steel. “But even more instrumental to our growth has been the input of people – both customers and employees.”

Building on the success of its patented frangible pocket door, Steecon has expanded its product line to include a variety of customised monuments. Hi-lo tables, sideedge tables, monitor lifts and curved pocket doors are now available in both manual and electrically operated versions, for all VIP aircraft. Every Steecon product is custom built to order and arrives pre-assembled for ease of installation.

“We don’t just sell products, we also support them after installation,” says Steel. “Being responsive to our customers is vitally important. You know that issues are going to come up from time to time and it’s

how you handle them that separates you from the competition. Our customers know that they can truly count on us for the support they need.”

Although a small organisation by some standards, over the course of its 31 years in business, Steecon has worked closely with major manufacturers and completion centres to design, engineer and manufacture thousands of monuments.

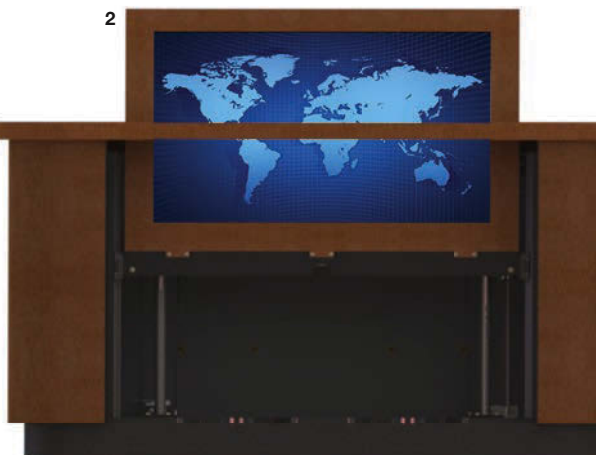
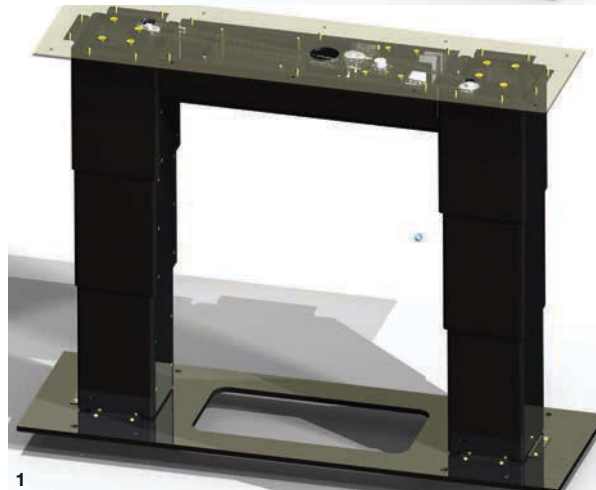
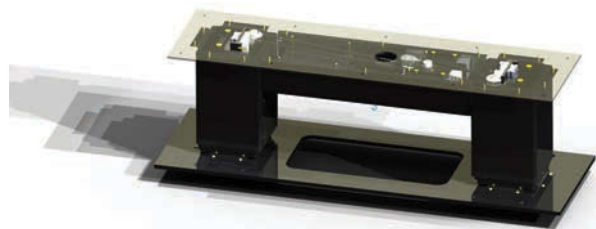
“Having a dedicated team of employees, and manufacturing 98% of the components used in our products in-house, has enabled us to react more quickly to changes during projects,” says Steel. “We continue to bring more and more manufacturing in-house so that we can ensure we meet our customers’ demands for quality and reliability, but also allow for last-minute design changes.”

Steel attributes the company’s success to solid engineering skills, innovative ideas, and an openness to taking manufacturing risks. “We build our products to last,” he adds. “In fact, some of our first pocket doors are still in service today. We know this because they are returned to us periodically for a technology upgrade or service check-up.”

Steecon will be on booth C11418 at NBAA 2013, to be held in Las Vegas, USA, on 22-24 October.

Steecon

Reader Enquiry No. 505



1. Steecon's hi-lo table in stowed and deployed positions
2. A monitor lift
3. The company's pocket doors, fitted on an Embraer Legacy 600



Image courtesy of Embraer



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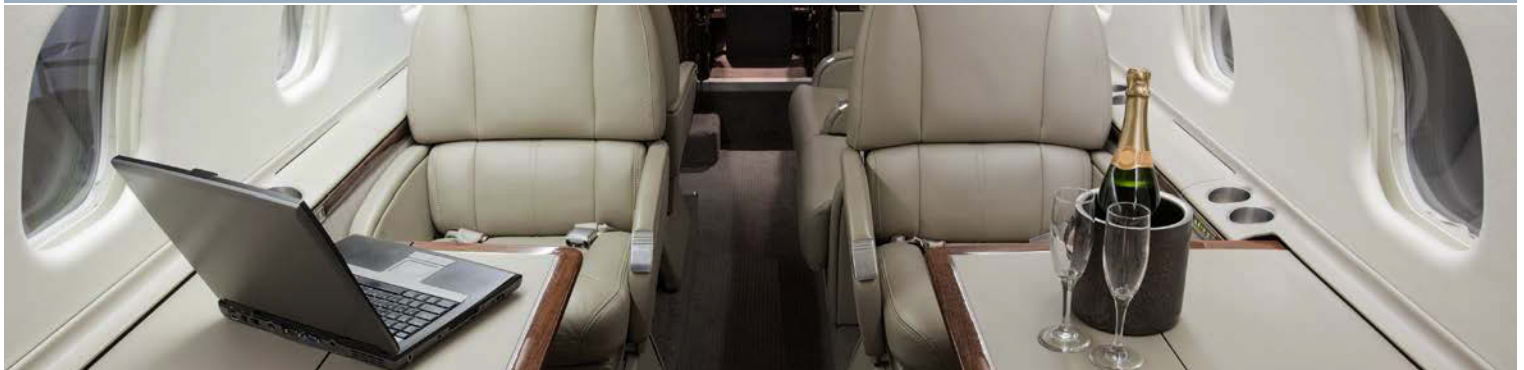


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# fullflow

## Power outlets enable passengers to enjoy uninterrupted connectivity, reasons Astronics



1



2



3

Today's business and leisure travellers expect to stay connected through a myriad of battery-powered personal electronic devices – from laptop and notepad computers to tablets and smartphones. "But the small size and high usage often depletes the battery quickly, leaving the user looking for power to recharge or use the device," says John Behrens, director of new business development at Astronics. "Electrical power is available in passengers' homes, offices and automobiles – setting the expectation that it will be in the aircraft. Passengers want to stay connected to business applications and social media. A charged laptop or phone battery can make the difference between a productive trip and frustration over lost work time. It can make the difference between long mundane flights and being entertained or connected to family and friends."

Moreover, inflight charging enables passengers to have their devices charged and ready for use when they arrive at their destination. "Managing a busy schedule can be difficult enough," says Behrens. "There is no need to add to this stress by being at the mercy of the device's battery life. Regardless of age, occupation or purpose of travel, the message is clear – passengers require outlet power."

Astronics offers EmPower, an off-the-shelf power supply system, to meet this requirement on aircraft. The system provides up to three outlets per unit. Each unit is available in various AC and DC configurations, with up to 175VA

per outlet, which Astronics says is enough to power even the most modern laptops.

The latest addition to the product line is a system that also incorporates USB outlets, so passengers can charge USB devices at the same time as using the 110V AC outlet for their laptop or other personal electronic device.

"The dual use AC/USB outlet provides enough power to operate and charge tablet devices, which require more power than is supplied by traditional USB ports," says Behrens. "All this is provided in a convenient and easy-to-install package. The innovation of dual-use AC/USB charging is great for passengers who travel with more than one device, and often use them simultaneously."

Each in-seat power supply incorporates redundant circuitry, making each box independent from the rest. Astronics also designed the system with internal GFI and other safety features to protect passengers. "EmPower products are TSO certified and meet or exceed FAA requirements," says Behrens.

EmPower outlets have been chosen by more than 180 airline and OEM clients for installation in more than 500,000 seats. "Outlet units are an easy and essential upgrade to any aircraft," comments Behrens. "By adding outlets, a flight transitions from a potentially stressful and unproductive environment to an extension of the passenger's home or office. A business professional can make use of their travel time by working on their laptop or tablet worry-free for hours – as well as charging their phone and listening to their MP3 player – while vacationers can relax and use all of their favourite electronic devices to keep themselves entertained."

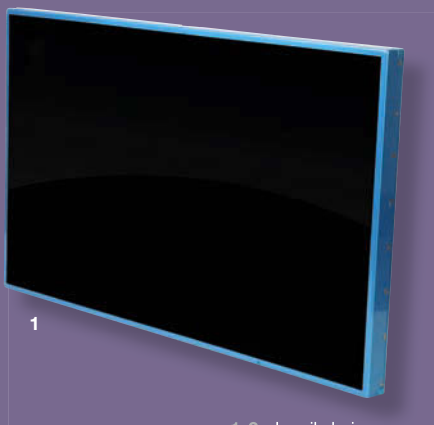
Astronics

Reader Enquiry No. 506

1. A USB outlet
2. The new dual-use AC and USB outlet
3. An AC outlet with a gold cover

# cabinupgrade

With a new range of wi-fi-enabled HD monitors, Imagik plans to translate know-how honed from considerable airline experience into success in the business jet market



1-2. Imagik designs, manufactures and supports all its monitors in-house

With more than 16 years of experience, Imagik is one of the leading suppliers of flat-panel IFE monitors. Its products fly with prestigious airlines such as Air China, British Airways, El Al, Finnair, Hawaiian Airlines and US Airways.

"Our technologically advanced monitors, proven track record and ability to work with our customers have allowed the company to win big retrofit orders," says Claudio Ovide, general manager at Imagik. "We have an enviable reputation for producing the best monitors at reasonable prices with no compromise in quality and reliability."

The company designs both the electronic components (hardware, software and firmware) and the external hardware and shrouds for its monitors in-house, the aim being to ensure the most efficient power usage and weight. This approach also enables the company to maintain a comprehensive stock of components, to support its products in the long term.

Currently Imagik is working to achieve an STC for the installation of 32in monitors on monuments in a B747 cabin. This will extend its list of ready-to-install monitors, brackets and shrouds, also designed in-house.

The company's most recent success was the completion of a six-year project with El Al: Imagik's monitors were installed on all the airline's B767 and B747 aircraft. The company also completed its third project with British Airways in 2013 – monitors for the airline's short-haul B767 fleet. Now Imagik is working on its second project with Hawaiian Airlines. The

airline is expanding its use of Imagik monitors to its B767 aircraft. Imagik has also completed the retrofit of Air China's B777 fleet and was recently awarded the retrofit of its B747 fleet. Many other installations have been performed by integrators and MROs throughout the world; the latest took place in India, Dubai and the USA. Other projects have been secured but not yet made public.

Imagik also supports and repairs all its products, through its FAA 145 and EASA Repair Station authorisations.

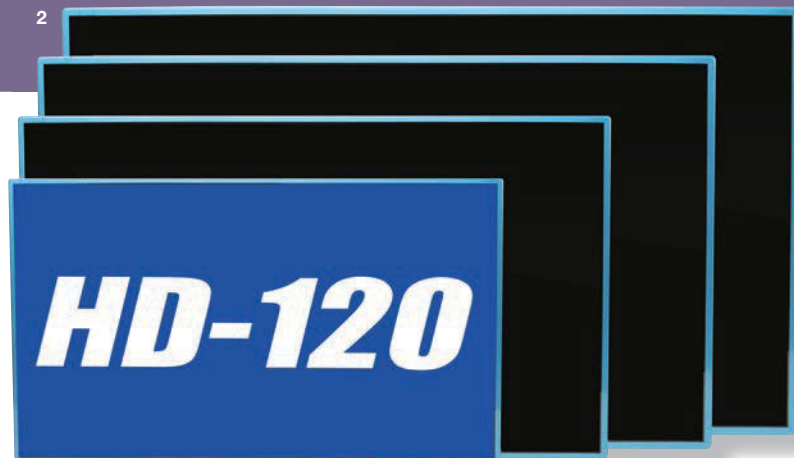
In terms of product development, the company is now working on a new line of large LED monitors. The 17in, 32in and 40in versions are in the DO160 testing stage.

"These will be state-of-the-art products and will introduce the most advanced technology available today into the IFE business," says Ovide. "They will be in HD and wi-fi enabled, giving the same experience that passengers expect from consumer products at home. Further lowering weight, power consumption and size (at just over 1in thick), these monitors will bring the latest viewing experience into the aircraft."

With these new products, Imagik hopes to continue servicing commercial aircraft and extend into the business jet market. It has also recently signed commercial and strategic agreements with prestigious companies, adding visibility and reach to its product line.

**Imagik**

Reader Enquiry No. 507





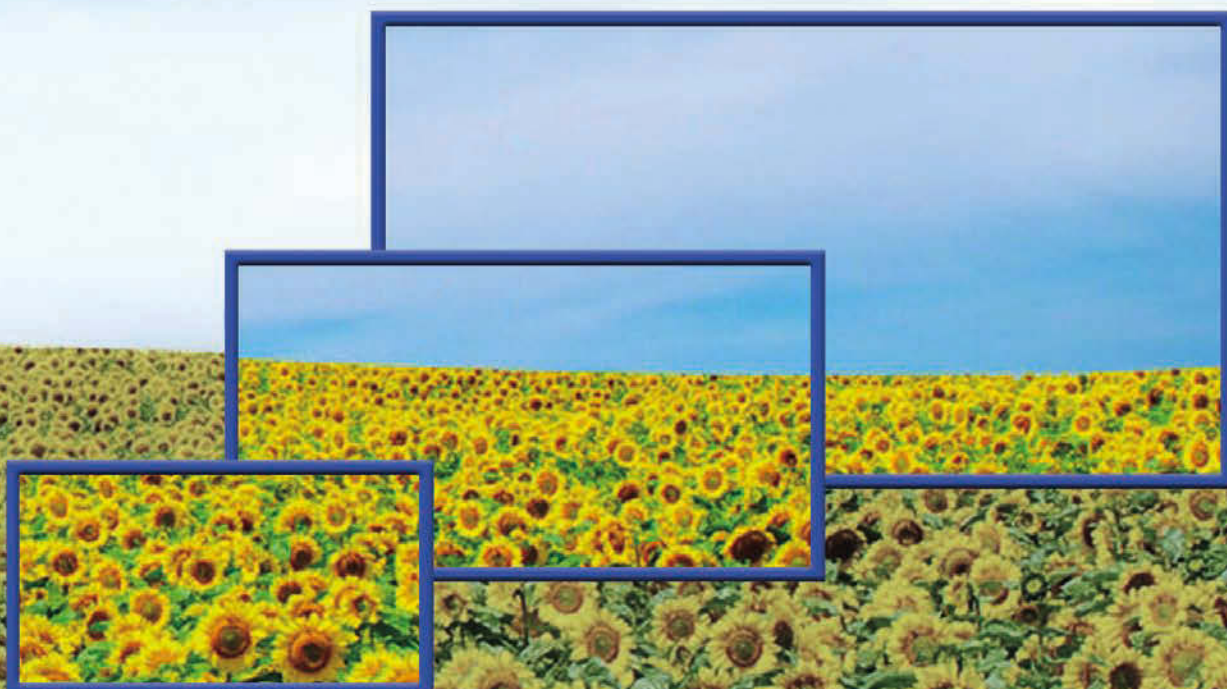
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# pictureperfect

Accurate renderings can be a powerful tool for persuasion, argues 3D Visualization Service

Not everybody has a designer's mind, so anything that can help a customer visualise what they are signing up for is valuable, especially given how big an investment an aircraft is. "One of the advantages of 3D images is that they can help convince both the rational and the emotional type of customer," says J P Magnano, president and CEO of 3D Visualization Service, a specialist in 3D imaging. "For those customers who know they need to refurbish their jet or buy a new one, but want to make sure that their investment pays off, good images created with close attention to technical details can confirm to them that the interior meets all their needs. And for those customers who still need a little nudge, beautiful, crisp images will sway them in the right direction."

Magnano says that in the past 10 years, computer-generated images have become a huge selling and marketing tool in the industry. "The 3D industry itself has grown exponentially, with many new companies trying to enter the market," he adds. "However, not all 3D is created equal. You want your 3D renderings provider to be experienced in the aviation industry so that they are conversant in the technicalities of the trade. That's why somebody who specialises in aircraft is your best bet to create good, accurate images."

Other things that Magnano says may be desirable in a 3D provider are geographical and cultural proximity to the customer, to

avoid having to work around different time zones and ways of doing business.

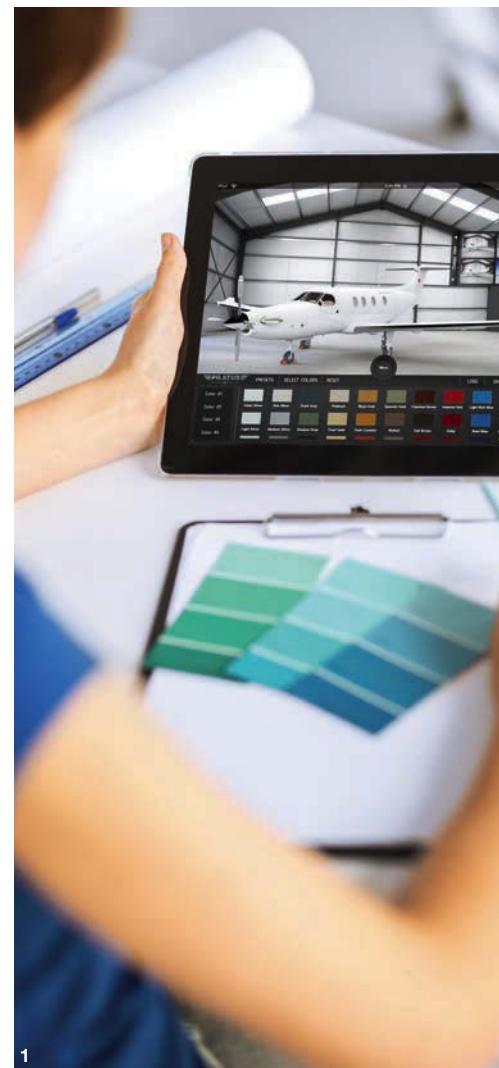
"Having providers who can hop in a car or an aircraft and be in your office in a few hours to solve any last-minute problems is always a plus," he adds.

3D Visualization Service has been in the aviation business for more than 10 years and counts many OEMs among its clients. The company boasts talented, reliable artists who have been working in the field for many years. The company and most of its artistic team is based in Miami, a fact that Magnano believes makes a huge difference to quality and turnaround time.

"You can send your blueprints to disparate parts of the world and order renderings for what you may think is a more competitive price, but the end result is never good," he says. "We have many clients who have tried that and then come to us when the results are not what they expected."

The company's biggest hit in the past five years has been its configurator, a software program that can be installed on any computer or run as an app on the iPad. It allows manufacturers to show clients the interiors that can be achieved with different combinations of materials and layouts, as well as exterior paint schemes. "It's very simple to operate, it looks gorgeous and it's been a huge hit," says Magnano. "It's a product no OEM can live without."

3D Visualization Service Reader Enquiry No. 508



1



2

1. A designer using the Pilatus iPad app, which is based on 3D Viz's software
2. 3D Viz artists visiting Pilatus' facility in Broomfield, Colorado, USA

# personal space

Customised seat pods can envelop the passenger in their own world of luxury

1-2. Europa One, a new seat pod for wide-body aircraft

Wide-body VIP aircraft are proving a strong market for Aerospace Designworks' custom pod/cocoon seats. At this level, passengers' expectations of comfort and convenience are sky high, so the company says everything has to be designed around the passenger's experience. Special attention is paid to ensuring ergonomic functionality, aesthetics and compatibility with popular communication equipment such as tablets and phones.

Aerospace Designworks' first seat pod development project was for an ACJ340 in 2010. It is now working on a product for the new BBJ 747-8i.

"Over the years, it has become clear that the seat pod is not just another fixture, but its own ecosystem within a luxury cabin," says Javier Quintana, CEO of Aerospace Designworks. "This idea started evolving several years ago when we supported the redesign of the latest Learjet production interiors and realised that VIP seat pods are like mini cabins within the larger cabin. Everything has to revolve around the elite passenger."

The company determined to bring this concept to wide-body aircraft. "We decided not

to take the traditional route of creating the design first, then engineering around it, but to define an engineering concept first, which would serve as a solid foundation upon which the design concept can flourish," says Quintana. "This ensures structural, airworthiness, ergonomic and functional issues are assessed properly from the start and we can then concentrate on creating the perfect emotional experience for the passenger."

To create this luxurious ideal, Aerospace Designworks put together an unconventional design team comprising filmmakers, web developers and designers. These people worked in collaboration with industry experts in such areas as seating, lighting, entertainment equipment, dynamic/static testing, materials, upholstery and finished goods.

The result is Europa One, which Quintana calls "a true expression of functionality, safety and beauty". Features include a 26in HD monitor with camera; a vanity compartment; an electrical pull-out table; a touchscreen CMS; multifunction seats with hot and cold air-conditioning, massage feature and firmness adjustment; a reading light; an easy-access life jacket; a push-away table function to allow egress when deployed; a night path light; stowage and charging compartments for laptops, tablets and phones; an electrical privacy window; a nightstand that provides stowage when the seat is berthed; a shoe rack; and a magazine rack.

"Creating Europa One has proven to us that today's seat pod design involves more than just developing long-haul quarters; it is a personal ecosystem that combines comfort, technology and luxury," says Quintana.

The company will be at NBAA 2013 (to be held in Las Vegas, USA, on 22-24 October), meeting prospective clients, completion centres and manufacturers to discuss how it can help with turnkey seat pod solutions for their current and future projects.

Aerospace Designworks

Reader Enquiry No. 509







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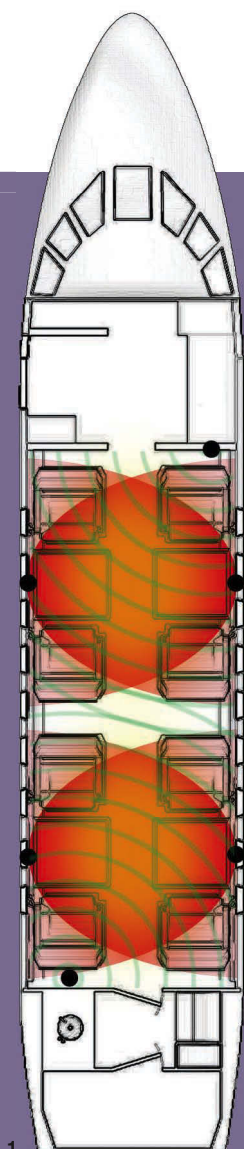
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# digitalfingerprint

Digital technologies can be used to deliver premium sound system performance customised to each aircraft



1. Proprietary software maps the acoustics of an aircraft to generate a digitised computer model
2. Alto Aviation's new PA-100 chimes/paging amplifier

While some die-hard audio enthusiasts may insist that analogue technology can never be surpassed by digital audio, Alto Aviation believes it can leverage digital technologies to create better sound systems. Thus the company has enhanced its product offering to include digital amplifiers with FAA TSO-C139 approval.

The digital amplifiers feature Class D drivers with an internal digital signal processor (DSP) engine. Alto says eight channels at 40W RMS provides sufficient power to drive its speaker enclosures, providing high sound pressure levels with no distortion. The equipment is suitable for linefit or retrofit projects.

"Every interior has its own acoustic signature, and without equalisation, often depreciates the audio because leather, carpet and interior furnishings tend to attenuate audio signals," says Kevin Hayes, vice president of sales and marketing at Alto. "The DSP engine allows us to tune the infinite band equalisation to compensate for any aircraft interior. By using proprietary sound mapping technologies, Alto can custom-tune each interior to ensure optimum system performance."

Alto has a large acoustic database and says it can preset the system for great sound. For the customer that wishes to customise their system, the company can fine-tune it to compensate for interior materials, to create the optimum sound for that aircraft. For these projects, Alto goes on board the aircraft with a precision microphone and measures the system's response at each seat. These measurements are then used to define an equalisation setting that is specific to that

interior. So, while the hardware is common to all installations, the equalisation settings are fully customised for each aircraft.

Alto recently added a digital chimes/paging amplifier, the PA-100, to its product range. "This accommodates microphone and ordinance inputs, provides high audio output and configuration flexibility," says Hayes. "It implements Class D technology for greater efficiency and low thermal output. It also features the same DSP for improved reliability and intelligible audio control through its customisable equalisation parameters."

This new unit was recently linefitted on an offshore utility helicopter to overcome the ambient noise. "The result was a functional public address system with high acoustic output and intelligibility," says Hayes.

System performance is also dependent on speaker positioning. Alto recommends that mid/high speakers are placed in front of passengers, rather than behind or to the side. "This location provides the spatial imaging needed to create great sound," says Hayes. "The left and right speakers are better balanced as the sound is emanating from the front, often in correlation to a monitor. To produce this frontal imaging, any point forward of the passenger, whether it be near the floor, just forward and aft of a table assembly or up in the PSU assembly, can be used. Subwoofers are typically placed in opposite corners of the aircraft for maximum bass response. Sometimes, the best sound is created with fewer speakers, not more!"

Alto Aviation

Reader Enquiry No. 510



# fullyfurnished

A wide array of customisable fabrics are available from Tapis

A supplier to the aviation industry since 1977, Tapis Corporation offers a wide range of fabrics and associated services to help clients fulfil their design visions.

For example, Tapis' custom-matching capabilities have enabled it to develop custom grains, colours and finishes for Ultraleather customers including Singapore Airlines, Etihad Airways, Swiss Air, Kingfisher Airlines and JAL. On each occasion, Tapis created a customised programme to meet the airline's precise needs for texture and colour. These capabilities are not limited to Ultraleather – for example, the grain of Tapis' Promessa fabric can be customised.

Ultraleather is one of Tapis' most popular products. Designed to weigh less than half the weight of traditional leather, the company says Ultraleather is often chosen by those looking to reduce fuel consumption and therefore costs. "Another advantage is that there is less shrinkage than with traditional leathers, so it offers 100% yield," comments Jason Estes, director of sales at Tapis. "In addition, independent testing by the University of Cincinnati has shown that Ultraleather meets or exceeds all industry standard testing criteria used for the most durable leathers on the market today."

Many fabrics in Tapis' product line complement each other. For example, Ultrasuede has been used in combination with Ultraleather for seat inserts. Ultrasuede is made of 100% recycled ultra-microfibres using a manufacturing method that the company says minimises energy consumption. British Airways, El Al, Emirates, LOT Polish Airlines and Virgin

Atlantic are just some of the airlines currently using Ultrasuede for seating and other applications. The fabric also comes in a variety of embossed patterns – the latest of which is called Sonic.

Another fabric designed for durability, luxury and environmental responsibility is TapiSuede. This is composed of high-purity recycled polyester (88%) and polyurethane (12%). The polyester fibres are made from a mixture of post-industrial and post-consumer recycled polyester.

A variant of this range, TapiSuede BHC-SS, maintains exactly the same characteristics as standard TapiSuede, but is also designed to be extremely lightweight and meet the stringent flame-retardant requirements for commercial aircraft. "This product's durability, flexibility and suitability for use on many panels with various adhesives make it an excellent choice for aircraft interiors," says Estes.

Tapis also offers several types of 100% wool fabrics – the Grospoint, Geneve and Brussels ranges. These fabrics are designed for bulkheads, sidewall panels, stowage areas, chair bases and drawer liners, among other applications.

"For 35 years, Tapis has offered environmentally conscious products that bear in mind the long-term impact on our present and future lifestyle," says Estes. "The products' performance attributes ensure a sustainable presence within the aircraft environment. We provide a solution that is a reliable investment, guaranteeing product longevity, decreased waste and low replacement costs. Our quality ensures a lifespan that will exceed expectations for most applications."

An example of this commitment to the longevity of the company's products is its partnership with The Leather Institute, and cleaning kits for Ultraleather, Ultrasuede and TapiSuede that are now offered as a value-added service for customers.

Headquartered in Armonk, New York, Tapis also has a facility in Dallas, Texas, and its distribution network spans the globe. The company is a qualified vendor for OEMs Beechcraft, Boeing, Bombardier, Cessna, Dassault, Embraer and Gulfstream, as well as for many completion centres and commercial airlines around the world. The company also boasts certification to the AS9100 and ISO 9001 international quality system standards.

Tapis Corporation

Reader Enquiry No. 511



1. Sonic, the latest embossed pattern for Ultrasuede
2. A Bombardier Challenger 850 featuring Tapis fabrics







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Tapis products are currently flying on most OEM's worldwide including Gulfstream, Bombardier, Dassault, Embraer, Cessna and Hawker Beechcraft, as well as the world's top commercial airlines including Qatar, Emirates, Singapore Airlines, Lufthansa, Etihad, British Airways, JAL, Qantas, Air New Zealand, Virgin Atlantic, TAM and many more.

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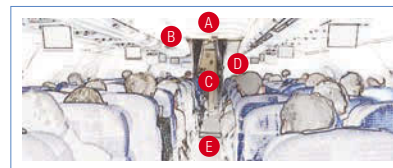
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# fullhouse

With recently expanded in-house capabilities, Taylor-Deal Aviation offers a partnership from concept to completion

1. TDA's recently expanded facility
2. The company offers turnkey engineering, manufacturing and certification services



From its corporate headquarters in Irving, Texas, USA, Taylor-Deal Aviation (TDA) offers turnkey VIP engineering design services, including structural, interior, mechanical system and electrical engineering designs. The independent firm also offers turnkey product support, stress analysis, test plan/report preparation, weight and balance analysis, flammability test plans/reports and coordination of modification certification efforts for a wide range of VIP aircraft customers worldwide. In addition, TDA has established itself as a specialist in additive manufacturing (FDM and SLS) in the aircraft modification industry.

TDA was formed in 2004 and in a short amount of time has expanded to employ around 60 full-time engineers. Prompted by its customers, TDA has boosted its in-house

capabilities. The company announced a brand-new 68,500ft<sup>2</sup> VIP engineering and manufacturing facility in September 2013. TDA's in-house capabilities now include VIP cabinetry, paint and finish, upholstery, thermoforming, full sheet metal and CNC capabilities. The company anticipates gaining its Part 145 repair station certification in the first quarter of 2014 and is also pursuing ODA certification, which it expects to gain by the third quarter of 2014.

"Utilising TDA for engineering, fabrication and certification ensures a quality product that will meet the custom design, engineering and certification requirements of your VIP aircraft," comments Brian Taylor, founder and president of the company.

TDA coordinates engineering, manufacturing and certification, the aim being to provide a true turnkey solution to customers. "We believe our business model of having engineering, manufacturing and certification under the same roof – with an exceptional team of engineers and in-house DERs – gives us an advantage in the current VIP aviation marketplace," says Taylor. "It allows the customer to have one point of contact for both engineering and manufacturing, allowing superior communication and expedited completion times, intelligent design improvements for lighter and stronger products, and perpetual continuous improvements reducing errors and downtime."

At TDA, total customer satisfaction is the ultimate goal. "We will do anything we can to ensure we deliver a quality product to our customer that meets their schedule," says Taylor. "We hire only the best engineers and craftspeople, who are technically exceptional and have a can-do attitude, to ensure we meet our customers' needs."

Taylor-Deal Aviation

Reader Enquiry No. 512



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# humanfactors

Working well with completion centres is as important as understanding the customer, says Ascending Designs

A small studio tucked away in the bustling aviation corridor of the Dallas Metroplex in Texas, USA, serves as the base of Ascending Designs. It is here that husband and wife team Scott and Jeannine Ohrmundt create sumptuous designs that serve as offices, homes and retreats in the sky.

Jeannine's talent is for colour and material selections, while Scott's is for consolidating these with his own imagination and customer input to create a presentation of sketches, renderings and technical drawings.

The company's latest project was a head-of-state BBJ 2 completed at PATS Aircraft in Georgetown, Delaware, USA. "Completion centres are finding ways to deliver unique platforms that exceed expectations," comments Scott. "The industry has remade itself after a significant decrease in altitude just five years ago. The industry is reaching new highs and it is not simply business as usual. Companies such as PATS are finding ways to operate more efficiently while increasing their ability to meet and exceed customer demands."

Ascending Designs believes one way of doing this is to incorporate the outside designer

and the completion centre as a team. "It is a win-win for the customer and in turn the completion centre is able to capitalise on our vast experience," Jeannine says. "This concept increases communication between the customer, the designer and the completion centre – a benefit often never realised when the designer assumes the role of the customer."

Altitude Aerospace is the latest completion centre to embrace this type of joint venture – recently teaming with Ascending Designs to develop a custom interior for a first-time BBJ owner based in central Europe. "As competition in the completion business grows, the prime benefactor is the customer," says Jeannine.

"Both PATS and Altitude have embraced the idea of outsourcing to the very best vendors in the industry for key areas of design – allowing the independent designer to join in the selection of these vendors, to ensure the very best interiors," adds Scott. "This means specialised quality is passed on to the customer, allowing overheads to be managed and minimising additional charges for the customer."

The pair are confident in the stability of the present aviation economy, and excited by the potential of new platforms such as the BBJ 787, BBJ 747-8 and ACJ380 to expand the completions business. They say independent design firms with a background in wide-body projects are in high demand. To build up its experience designing for these types, Ascending Designs has teamed up with Aeria to develop a conceptual design for a BBJ 787. "We have BBJ 777, BBJ 767 and ACJ designs out there flying – and are eager to bring the hands-on approach needed to assist completion centres in avoiding the pitfalls that new platforms can present," says Jeannine.

"It is about understanding the customer and helping them express what they imagine to be their best work of art," says Scott. "It's also about working with the completion centre to bring the design off the canvas and into the cabin. Sometimes out of respect to customer privacy our name and interior must remain anonymous – but our reputation is in every stitch, monument and radius."

Ascending Designs

Reader Enquiry No. 513

1. A stateroom concept for a BBJ 787



## personaleffects



"As the business aviation industry continues to seek increasingly high levels of comfort, we've noticed an increasing inclination towards customisation," says Taisha Bezzo, sales and marketing manager at Bucher Aerospace. Creating innovative new designs while maintaining product reliability is something the company prides itself on.

Bucher regularly receives requests for unique deployable table or video arm designs to fit into custom applications. Although this would seem to drive ground-up design efforts, there is another approach that can be taken. The company is often able to integrate customer requests into existing premium-class designs, which Bezzo says delivers the required customisation quicker while maintaining high standards of quality, functionality and reliability.

An example of this approach is the new line of IFE products for Panasonic's Elite 11in monitor. Bucher now offers several deployment solutions including an articulating front row and a pop-up deployment unit to meet the growing demand for this monitor.

The front row deployment video arm features a double-jointed articulation designed to control the position of the monitor through its deployment by minimising the swing arc radius, allowing large-format monitors to be stowed under the seat.

The pop-up deployment arm fits into restrictive spaces such as seat arms or sideledges, while still accommodating a large monitor. The pop-up system utilises Bucher deployment mechanisms that have been tested to more than 35,000 cycles. The mechanism deploys the monitor automatically to full height without assistance, swivels 180° for egress without stowing and tilts 70° for optimal viewing. Bucher includes motion control mechanisms to preclude contact with the surrounding furniture.

"As the industry strives for customisation, our approach of harmonising customer needs with proven designs allows us to succeed in an environment filled with challenges, changes and growth," says Bezzo.

**Bucher Aerospace**

Reader Enquiry No. 514

## lightswitch

Aircraft Lighting International (ALI) says its replacement LED lamps make the decision to convert fluorescent lamps to LED lamps an obvious one. According to Nick Michelinakis, president of ALI, these replacement LED Lamps are 100% interchangeable with existing 12mm series fluorescent lamps. Requiring no rewiring, lamp holders, connectors, dimmers nor controllers, these fully dimmable LED replacement lamps are designed to make the conversion easy and economical. "Downtime, cost and FAA paperwork are major issues when considering a conversion; but these replacement LED lamps eliminate those concerns," says Michelinakis.

Ease of installation was a major consideration during the development of the LED replacement lamps. "You can't imagine how easy it is to change out the lights," remarked one of ALI's customers. "You take out the old fluorescent lamps and put the new LED lamps on the existing lamp holders and you are done."

ALI has been manufacturing lighting systems for aircraft interiors since 1998. In addition to

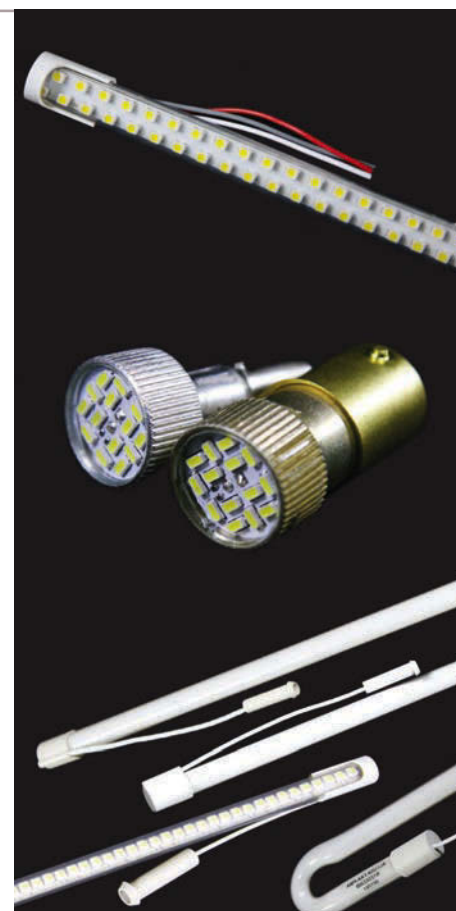
offering the replacement LED lamps, it will continue to supply replacement fluorescent lamps. These replacement fluorescent lamps are manufactured in carefully calibrated and controlled processes to ensure uniformity.

ALI's recently FAA-PMA-approved 28V DC LED lamp kit incorporates the LED lamp and ballast as one unit. Again, ease of installation, full dimming and customisable lengths were the design aims. "The installation can be performed with only three wires," says Michelinakis. "Without using any tools, you can rotate the light 360°. This product allows for programmable dimming capability as per customers' specifications. In addition, customisable lengths afford maximum design freedom."

Requiring absolutely no modification to reading light fixtures, another popular product from ALI is its replacement LED reading light bulb. This replaces 28V DC/AC halogen/incandescent miniature lamps.

**Aircraft Lighting International**

Reader Enquiry No. 515





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## best of both

Dave Garing, vice president of business development at Innovative Advantage, says there are advantages and disadvantages to both classic and IP-based AV distribution systems used on aircraft.

Classic systems route uncompressed video signals around the cabin. "The primary advantage of this kind of system is video quality; the picture is perfect," says Garing. "Audio and video are inherently synchronised, there are no latencies and most systems are reliable and simple. However, these systems entail excessive cabling – most use large crosspoint switches that require big wiring trunks and are potentially critical single point failure points. Also these systems are not easily scalable – if you need to add a source or output the hardware has to change."

An alternative is an IP-based system using an Ethernet network to distribute compressed AV content. "A key advantage of IP-based systems is their scalability – sources and monitors can be added by plugging in another cable or adding another network switch," says Garing. "One of the two main disadvantages is

compression. All the live sources have to be encoded and compressed in real time, which often results in a loss in quality and/or latencies. The other main disadvantage is that synchronising audio and video around the cabin is complicated. As each screen decodes the playback signal independently, the network is much more complex than the simple switches in an uncompressed system."

Innovative Advantage offers a hybrid solution designed to leverage the best of both approaches – providing the highest video quality and allowing integration with streaming sources and services. "A good hybrid solution minimises real-time encoding and routes the highest-quality video signals to the displays," says Garing. "The experience of high-end home theatre is combined with the capability to stream content from the internet and airborne video servers. The icing on the cake is that hybrid systems are much more future-proof. They are inherently more flexible in accepting different video formats, such as: CVBS, component, VGA, HDMI, HD-SDI and newer 4K content."

**Innovative Advantage**

Reader Enquiry No.516



## made to measure

The seat is a huge factor in passenger comfort, and yet it can be difficult to get just right – not least because different people have different definitions of comfort. For example, the optimum level of firmness and adjustability may change from person to person; and each may have their own list of desired integrated features.

RCO Engineering is endeavouring to turn the complex art of seat comfort into a science, using its Robostand equipment to measure comfort quantitatively. If a customer has a seat that they say is comfortable, the company says it can replicate its exact contour and firmness. It does this by using Robostand to measure the original seat and convert the information into 3D data that can be repeated for the aircraft seat.

"Seat comfort is about more than the foam padding," says Norm Starr, general manager at RCO. "It's affected by the seat frame, the seat pan and the foam. We produce seats with a combination of foam and suspension, resulting in a lighter seat and greater comfort."

RCO Engineering has been providing seat development services to the automotive and aerospace industries for more than 40 years. It says it has been involved in nearly every North American automotive seat programme on the road today. The company's expertise is in tailoring a product to match specifications and the product's target market. It performs design, engineering, tooling, fabrication, testing and assembly tasks in-house.

The company offers a range of single and double seats and divans

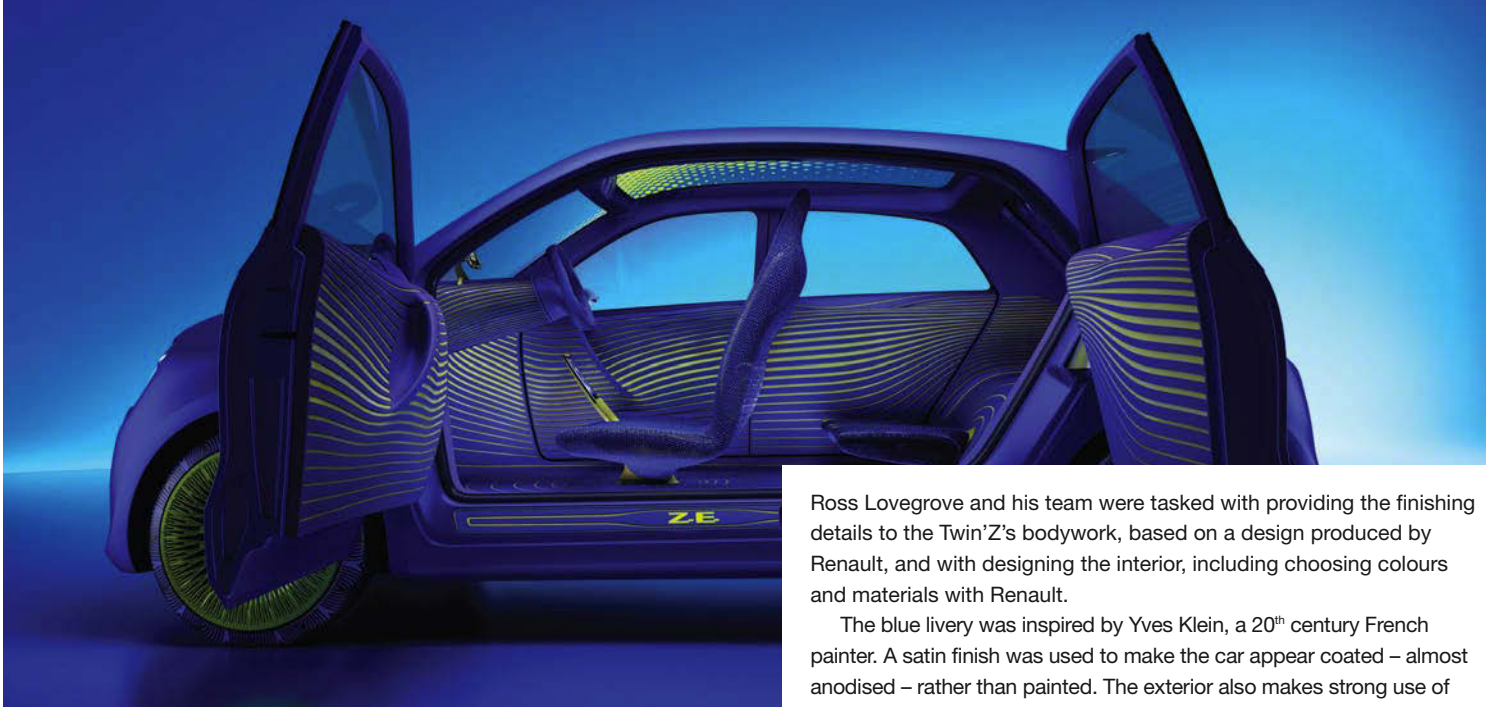
for business jets, all of which are available in manual versions and some can be powered. "All of our seats have been certified and are currently in use on business jets around the world," says Starr.

**RCO Engineering** Reader Enquiry No. 517



# ELECTRICBLUE

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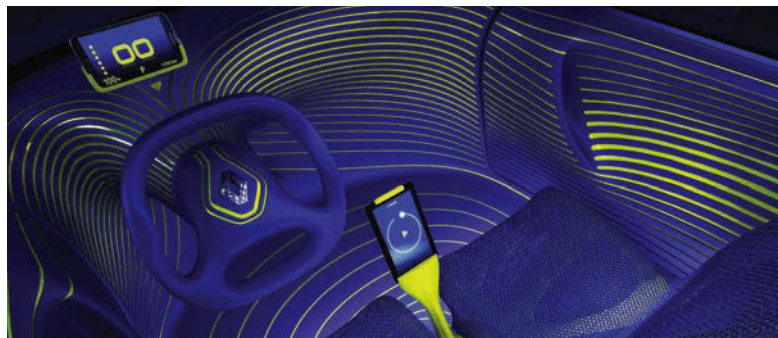


Ross Lovegrove and his team were tasked with providing the finishing details to the Twin'Z's bodywork, based on a design produced by Renault, and with designing the interior, including choosing colours and materials with Renault.

The blue livery was inspired by Yves Klein, a 20<sup>th</sup> century French painter. A satin finish was used to make the car appear coated – almost anodised – rather than painted. The exterior also makes strong use of LEDs, especially the glass roof, where an array forms animated patterns.

Inside, the cabin has no central pillar and no dashboard – instead a single tablet with a touchscreen display is mounted on a central post. The tablet can be used to control heat, seat settings, lights and the roof as well as for GPS guidance and in-car connectivity. A smartphone located in the driver's line of sight displays the vehicle's speed, range-related information and the principal warning lights.

Seats have been made as small as possible. Their green organic-looking frames have been upholstered in a 3D woven, self-cushioning blue textile. LEDs have been embedded into the frame's branches to pick out their forms and illuminate the interior.



## OTHER EYE-CATCHING DESIGNS FROM VARIOUS INDUSTRIES...



A luxury residence in Monaco, designed by Cabinet Alberto Pinto



BMW Group DesignworksUSA's design for Singapore Airlines' new first-class seats and suites, which will debut on the new Boeing 777-300ER on selected flights between Singapore and London



The Mercedes-Benz Vision Golf Cart concept, which includes Bluetooth connectivity, heated and ventilated seats, a neck-level heating system and lots of stowage



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