

BusinessJet *interiors* INTERNATIONAL

NOVEMBER 2009

THE INTERNATIONAL REVIEW OF BUSINESS JET INTERIOR DESIGN AND COMPLETION

preciouspearl

WELCOME ABOARD THE 'ASIAN BUSINESS JET' – A NEW
AIRLINER CONVERSION FROM COMTRAN AND RITZ PACIFIC

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Bombardier reveals
Learjet 60 XR Signature
Series Red and Black interiors

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The recent NBAA show in Orlando provided the perfect opportunity to take the bizjet industry's pulse – the defibrillator remains charged and ready, but experts are at least cautiously optimistic for the longer term, with Honeywell forecasting delivery of approximately 11,000 new business jets from 2009 through 2019, generating estimated industry sales of US\$200 billion. Honeywell notes long-term buyer interest is actually increasing, but adds new purchase plans are currently timed later in the five-year planning window – a situation that by 2011-2012 could see “significant pent-up demand” for new jet deliveries.

A number of companies are hoping to syphon off some of that “pent-up demand” long before then by offering an attractive alternative – converting airliners into sparkling wide-body private jets complete with luxurious and spacious interiors and radically reduced price tags. One of the most recent examples of such a venture is the ‘Asian Business Jet’ (ABJ), featured on page 12. Based on the McDonnell Douglas MD-87 platform, the project is the brainchild of Hong Kong-based investment firm Ritz Pacific, cabin outfitter Comtran International and charter company Jet Asia Limited. A Chinese customer has already snapped up the first conversion for a fee that sources place at less than US\$30 million.

The project reflects the changing global fortunes of the world's economies – Asian respondents to Honeywell's annual survey said they expected to purchase aircraft equal to about 58% of their existing fleets for replacement or expansion during the next five years – more than half the 25% figure of their American counterparts. “There is still a great deal of wealth in Asia; although some people have lost money, they are still earning,” says Ritz Pacific's Les Merszei. “There is also a new generation of entrepreneurs who are embracing private aviation as an efficient means of business transport. They are looking to develop their businesses, so require aircraft with longer ranges and lots of space.”

The roomy, stand-up cabins of converted airliners provide plenty of space for passengers to stretch out and relax, but as our feature on onboard comfort on page 20 underlines, there's a lot more going on behind the scenes to ensure a restful journey, regardless of fluctuations in the world's stock markets!



Anthony James, editor



Cover Image:
Asian Business Jet

preciouspearl

A NEW AIRLINER VARIANT IS
MAKING WAVES IN ASIA

Liz Moscrop, Business Jet Interiors International

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These guys want to fly long range in ultimate comfort with lots of cabin space, a stateroom and shower with large private bathroom and cooking facilities – for this you need a large-size aircraft

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BOMBARDIER REVEALS LEARJET 60 XR 'RED'
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NEW INTERIOR AND AVIONICS PACKAGES SHOULD HELP KEEP THE EXTREMELY ROBUST AND EVER POPULAR MU-2 FLYING FOR DECADES TO COME

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STYLISH CASES TO PROTECT YOUR LAPTOP

Redesigned cabin seats feature berthing capability, removable armrest caps and panels, as well as larger storage drawers

New window shade management system

InspecTech Aero Service has unveiled the Smart Cabin Automated Dimming System (SCADS) for its I-Shades light-control window-shading system. Now, in addition to the light, heat and glare control that I-Shades brings to cabin windows, the product can integrate into airframe systems – automating cabin light management. The SCADS network architecture has also been designed for interconnectivity, and can interface with other cabin systems such as in-flight entertainment (IFE) and cabin management systems (CMS).

With the push of a button, I-Shades regulates light, glare and heat entering the cabin – from fully clear to completely private, and to any level of view-preserving tint in between. The company says that I-Shades block over 99.9% of harmful UV radiation, whether in the fully clear or private state. These dynamic switchable window shades are now available for any aircraft or helicopter as an aftermarket install at service centres worldwide, or for production aircraft.

SCADS's window-dimming system maintains a specified fixed level of light entering the cabin at any given altitude or attitude. It is designed to ensure that passengers never suffer from glaring sun entering from the opposite side of the cabin, as each I-Shade continuously adjusts to the amount of light striking it.

Other features include temperature control; an inflight movie feature that dims all the I-Shades to a 15% light transmission level; and programmes for the pre-flight safety presentation, take-off and landing, and emergencies.

The SCADS architecture can also be used with other aircraft cabin systems. For example, mood lighting equipment and programmes can now interface with I-Shades to include and control the use of natural daylight in the system.



New interiors for Learjet 60 XR

Bombardier Aerospace is offering two new cabin configurations for its mid-size Learjet 60 XR aircraft – Signature Series Red (pictured) and Signature Series Black. Both feature six seats, soft colour schemes, dark wood veneers and a larger galley. Signature Series Red features a self-service galley with multiple storage units, optional built-in espresso machine and work surface for complete meal preparation on board. Signature Series Black includes a galley geared more towards cabin steward service; and a media credenza featuring a 24in (61cm) flat-screen monitor opposite a two-seat divan. Both versions feature SwiftBroadband and satcom phone as standard.

Flying Colours chooses DeCrane seats for 850s

Flying Colours has chosen DeCrane Aerospace Aircraft Seating's 16g Nexus linear bearing seats and 16g divans for three green Challenger 850 completions it is completing at its main facility in Peterborough, Ontario, Canada, and its US affiliate Jetcorp Technical Services, based in St Louis, Missouri.

"We have had great success in the past integrating the DeCrane Aerospace Aircraft Seating products into the aircraft," said Eric Gillespie, sales and marketing manager for Flying Colours. "We want to continue this successful partnership on the upcoming green Challenger 850 completions programme."



Aircell selected for mid-size Hawker business jets

Hawker Beechcraft Corporation has selected two new Aircell connectivity systems for its line of mid-size Hawker business jets.

Customers taking delivery of new Hawker 750 and 900XP aircraft in 2010 can equip them with their choice of Aircell High Speed Internet or Aircell's SwiftBroadband solution at the factory. Both systems will be available to Hawker customers as modular add-ons to the Aircell Axxess cabin communications system.

Aircell says its High Speed Internet product provides an internet service to equal what passengers are accustomed to on the ground, while being small and light enough to fit on virtually any business aircraft. The air-to-ground system is powered by the Aircell Network and operates in continental USA.

Aircell's SwiftBroadband solution, powered by Thrane & Thrane, operates over satellites for global coverage. Using a standard intermediate-gain antenna, the system provides connection speeds of up to 332kbps.



The dining area of Greenpoint's 16th BBJ completion

Greenpoint delivers 16th BBJ

Greenpoint Technologies has completed its 16th Boeing Business Jet (BBJ), months ahead of the contractual delivery date. The interior was designed by Greenpoint's in-house designers, working closely with the client's representative – Dina Tkacheva, development director for Petroff Air. "Greenpoint provides a versatile design team and its installation team is highly knowledgeable and meticulous with details. The team is very passionate about its programmes; they enjoy what they are doing and make it an enjoyable experience for their customer," said Tkacheva. Greenpoint reports it has a deep backlog into 2013 for completion programmes.

Comlux Completion takes Cair for VIP A320

Comlux Completion, based in Indianapolis, USA, has ordered a CTT Cair System for installation during spring 2010 on a VIP A320. Cair is designed to give a pleasant relative humidity of 25%, thereby reducing problems related with dry air, such as fatigue and dry skin, and also incorporates the Zonal Drying System to counter condensation problems.

Meanwhile, Fly Comlux, the VIP charter division of Comlux, has ordered a Challenger 605 and an Airbus Corporate Jet (ACJ). The ACJ, Comlux's 10th (one of which is pictured below), will be outfitted at Comlux Completion with a cabin designed by Comlux Creatives.



IWG announces inflight drain STC kit for the BBJ

International Water-Guard (IWG) has developed an In-Flight Drain System (IFDS) as a retrofit package with STC for the Boeing Business Jet (BBJ).

"An operational concern with 737-derived VIP aircraft has been the inability to drain the aircraft water system in flight," said David C. Fox, president and CEO of IWG. "To avoid a potentially damaging system freeze in cold weather, crews must stay with the aircraft to make sure it completely drains on the ground. Our solution is the installation of a new drain mast with associated water lines and controls that allow draining during the aircraft's descent."

IWG says the STC kit will be available from the third quarter of 2010, and suitable for installation by any qualified completion or service centre.

"The IFDS represents a continuation of IWG's initiatives in the enhancement of aircraft water systems, and in particular builds on experience gained through the design and installation of our Circulating Potable Water System on BBJs," said Fox.

Honda selects Emteq's SkyPro for HondaJet

The HondaJet, Honda Aircraft Company's advanced light jet, will feature Emteq's SkyPro cabin management (CMS) and in-flight entertainment (IFE) system.

SkyPro is an all-digital high-definition (HD) system that Emteq says is scalable for any aircraft. SkyPro features specific to the HondaJet will include HD touch-screen monitors, audio/video on demand (AVOD), interactive 3D HD moving map, exterior camera with real-time viewing capability, and cabin control.

The HD, ultra low-profile touch-screen monitors will be mounted and deployable at each seat. The system will feature touch-screen controls including capacitive touch switches and an intuitive menu for enhanced usability.

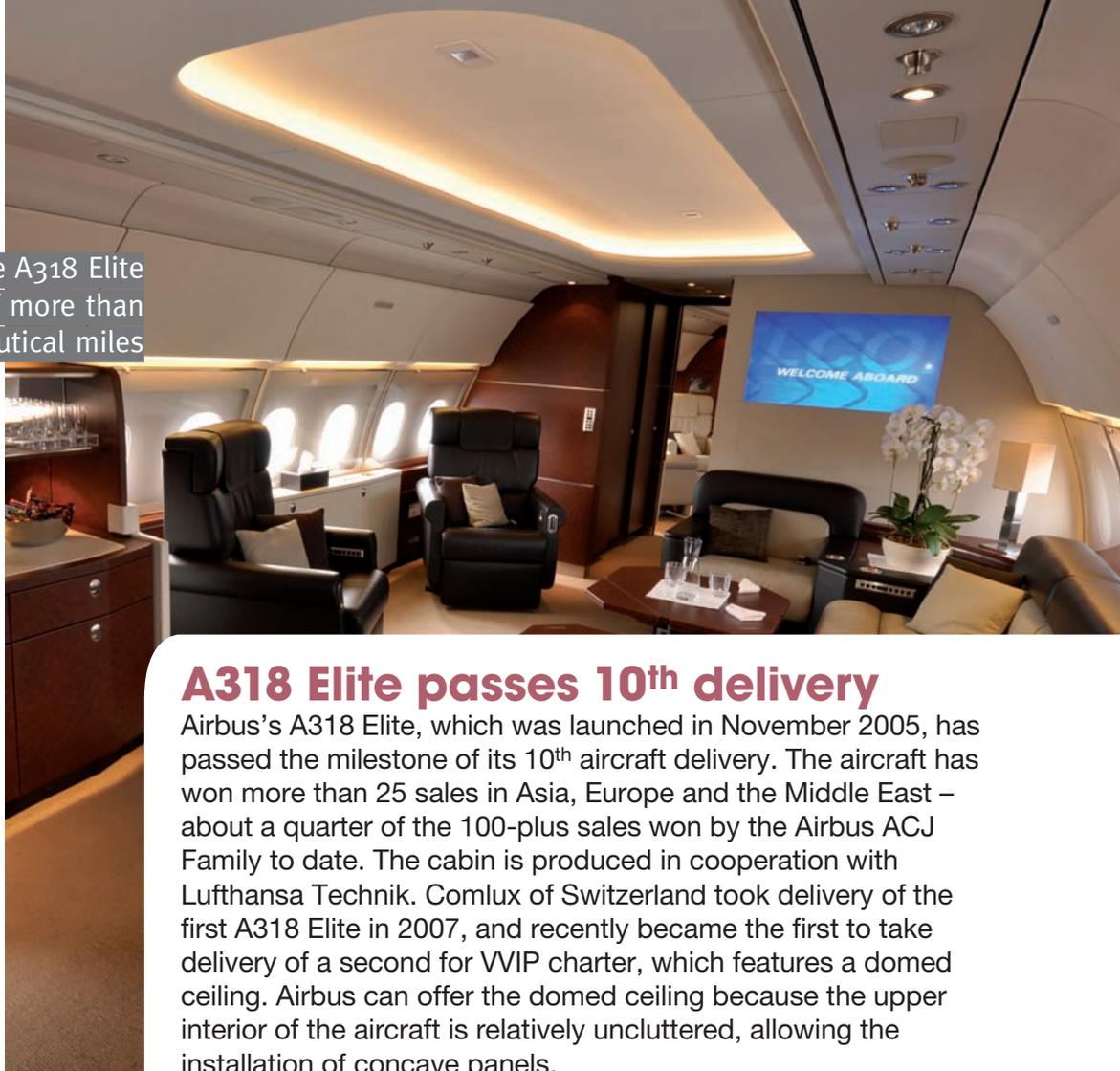
Passengers will be able to access any audio, video and information independently, with the option to synchronise with another passenger to simultaneously view content through SkyPro's passenger synchronisation system. AVOD will be available through the removable media storage unit.

With multiple media inputs available, passengers will be able to interface with audio, video or gaming systems brought onto the aircraft to play through the speakers and HD monitors. HondaJet will also be offering an XM Satellite Radio option, where SkyPro will interface with XM, allowing passengers to select their desired station presets at their own seat.

SkyShow, the fully interactive 3D HD moving map system, will allow passengers to view and navigate the world through their monitor. Passengers will also be able to view flight path and status information, overlaid on the HD moving map.

The system will also give passengers control over their cabin environment through the touch-screen at their seat, including full control of lights.

The single-aisle A318 Elite has a range of more than 4,200 nautical miles



Greenpoint creates boarding lift for the 747-8

Greenpoint Technologies' design team has released its concept for a patent-pending, ground-to-main deck lift for the Boeing 747-8 VIP aircraft – Aerolift. The lift will transport up to four passengers at a time from the ground to the main deck, providing an elegant and secure method to board the aircraft.

“Tackling the complex task of modifications to the aircraft’s primary structure, Greenpoint’s Aerolift is a complete installation. It consists of an automatic door on the fuselage, a power unit and lift structure from the keel up through the main deck, a lift carriage with internal doors and a cabin enclosure. The carriage was specifically sized to permit the transport of a wheelchair and attendant, creating a dignified, secure boarding experience,” said Mike Weisner, chief customer engineer at Greenpoint Technologies. “From a security standpoint, the enclosed carriage descends directly to the tarmac, reducing the occupant’s exposure from public view and permits close-quarters boarding of awaiting ground transportation.”

Greenpoint has also renamed its 747-8 Overhead Space Utilization (OSU) as the Aeroloft. The Aeroloft includes a custom interior (designed in house) with a finished staircase, and is installed after delivery from Boeing, but before the aircraft goes to a completion centre.



A318 Elite passes 10th delivery

Airbus’s A318 Elite, which was launched in November 2005, has passed the milestone of its 10th aircraft delivery. The aircraft has won more than 25 sales in Asia, Europe and the Middle East – about a quarter of the 100-plus sales won by the Airbus ACJ Family to date. The cabin is produced in cooperation with Lufthansa Technik. Comlux of Switzerland took delivery of the first A318 Elite in 2007, and recently became the first to take delivery of a second for VVIP charter, which features a domed ceiling. Airbus can offer the domed ceiling because the upper interior of the aircraft is relatively uncluttered, allowing the installation of concave panels.

Lufthansa Technik’s ‘nice’ CMS chosen for Learjet 85

Lufthansa Technik’s networked integrated cabin equipment (nice) has been selected by Bombardier Aerospace as the platform for the Learjet 85 aircraft’s customised cabin management system (CMS). The two companies will collaborate in integrating and adapting nice into the Learjet 85 aircraft.

A new user interface with custom third-generation graphical user interface (GUI), high-definition (HD) distribution to each seat, Blu-ray players, smartphone integration and system control (including native iPhone application development), as well as other unique in-seat applications, are being developed for the Learjet 85 aircraft programme.



Interior update and 8C check for Global Express

Lufthansa Bombardier Aviation Services (LBAS) has completed a major overhaul of a Bombardier Global Express – an 8C check for a Spanish customer. LBAS delivered the Global Express in September.

The 8C check is a regular maintenance event for Bombardier’s flagship, due after 10 years of flight operations. The scope of work includes dismantling the entire VIP cabin, completing a major overhaul of the landing gears, and extensive structure and system inspections, as well as modifications. The cabin interior equipment was also revised and modernised. All wood surfaces and carpets were renewed by OHS Aircraft Services, while the seats got new upholstery and leather.

“We are thankful for the trust our customer has had in us. I am at the same time very proud of my team. Under time pressure they have delivered a complex overhaul in an excellent quality on this maiden project and did a perfect job integrating the services of the various external suppliers,” said Andreas Kaden, CEO of LBAS.



The exterior of the helicopter is inspired by the contours of ocean waves, as well as the teak decking often found on yachts

Andrew Winch tackles EC155

Edmiston (a luxury superyacht brand), Eurocopter and Andrew Winch Designs have unveiled a new design for the Eurocopter EC155 B1 Dauphin, a medium twin-engine helicopter. Andrew Winch Designs, a specialist in yacht design and aviation interiors, took up the challenge to come up with a 'vertical take-off tender' concept especially for yachts. The resulting interior features teak flooring, leather wrap-around adjustable seats fitted with carbon fibre back shells, fold-down central armrests, 'floating' LCD screens and headphones. "We are confident in the commercial potential of this 'dream' helicopter design," said Dominique Orbec from Eurocopter.

ACJC creates VIP kit for multimission A320

Airbus Corporate Jet Centre (ACJC), a specialist in Airbus Corporate Jet (ACJ) VIP cabin completions, is developing a VIP kit that will be installed on an A320 for a customer based in the Middle East, giving the aircraft dual capability to transport either VIPs or other passengers. "This kit allows conversion of the forward A320 passenger area into a VIP section, giving the customer the flexibility to make even wider use of its aircraft," said Benoit Defforge, CEO of ACJC.

The kit includes two double VIP seats and two club-four VIP seats, with hi/lo tables. To complement this VIP configuration and bring a warmer ambiance and greater privacy, the forward area also features leather upholstery, woollen carpets and elegant curtains. ACJC will deliver the VIP kit in the second quarter of 2010, and will also install provisions for subsequent installation of the kit later that year in a second A320.

ACJC has also launched VIP Pass, a package of customised services specifically developed for executive, private and government operators of ACJ aircraft. The VIP Pass can include cabin upgrades and refurbishment, airframe maintenance, cabin and airframe spares, as well as full engine support. It can also offer ACJC's customers an airworthiness and maintenance engineering service. The VIP Pass is available for all Airbus corporate jets, including the ACJ Family, A330 and A340. The dedicated ACJC customer support and services team, headed by Fabio Beretta, is currently fine-tuning this package with ACJ operators for entry into service in 2010.

ACJC has now booked 10 contracts for cabin outfitting, from customers in Asia, Europe and the Middle East, the latest of which is scheduled for delivery in 2011.

G650 completes first flight

Despite cutting its first flight short because of 'a slight vibration in a landing-gear door', Gulfstream says the ultra-large-cabin G650 remains on schedule for type certification by 2011 and entry-into-service in 2012.

The jet will seat 11 to 18 passengers, and features 16 oval windows, which measure 28in x 20.5in. Emteq has been awarded the long-term contract for interior and exterior LED lighting packages (including dome and reading lights for the flight deck, aft compartment lights, exit signs, air stair lights and outlets), while IWG is providing IWG-A6 water treatment units.

The aircraft also comes with the new Gulfstream Cabin Essential package, designed to ensure a single-point failure does not lead to loss of functionality.



AMAC goes Global

AMAC Aerospace Switzerland (AMAC) has been awarded EASA approval to perform line and base maintenance as well as interior refurbishments and modifications on Global Express, Global Express XRS and Global 5000 aircraft.

In operation since November 2008, AMAC is already certified for base and line maintenance on the Gulfstream large cabin series, Airbus A318/A319/A320/A321 series, Boeing BBJ series and line maintenance for the McDonnell Douglas MD-80 series. AMAC expects full EASA Part 21 Design and Production Organization Approval (DOA/POA) to be granted with the completion of its first outfitting project (November 2009).

The company is also adding a new wide-body hangar to its facility, adding 8,400m² floor space (90,416ft²) and additional workshops and offices. This is due to be completed in May 2010, enabling the company to accommodate multiple wide-body aircraft such as Boeing B747s and B787s, Airbus A350s and A340s, and small business jets of every type. One hangar is extendable to house the A380.

In late 2008 Bulgaria Air took delivery of this Inflight-converted ABJ, which features an interior conceived by Design O



Dornier Seaplane Company to select Seastar suppliers

The Dornier Seaplane Company is building momentum in production, sales and product configuration definition. As well as narrowing down its options for its final assembly site (either St-Jean-sur-Richelieu in Quebec, or North Bay in Ontario, both in Canada), the company will select suppliers for Seastar, its all-composite seaplane, over the next year.

“The company is in detailed discussions with our major suppliers. The supplier selection process will be completed over the next 12 months and deliveries will begin in 24 months,” said Joe Walker, chief executive officer of the Dornier Seaplane Company, in October. “We are gratified by the depth and breadth of market interest in the Dornier Seastar. Inquiries have been received from over 132 countries and our website is averaging over 125 hits per day. This worldwide market demand has generated a backlog in excess of 25 letters of intent that we are currently maturing into firm contracts.”

The Seastar cabin, which is 13ft 1in long and 5ft 4in wide, has flexible seating for six to 12 passengers. The executive interior will feature ergonomically designed seating and an optional fully enclosed lavatory, while passengers will have inflight access to storage and closet space. Purchasers will be able to choose from a selection of leathers, fabrics, wood veneers and metal plating to fit out their interior.



Inflite purchases ABJ for resale

Inflite Engineering Services, which has fitted most of the Avro Business Jets (ABJs) sold by BAE systems over the past two years with executive interiors, has elected to purchase its own ABJ (a BAe 146-100), to convert it for onward sale. “If this concept works then we would not rule out further speculative acquisitions,” said Steve Buckingham, managing director of Inflite. The company also recently announced a new partnership with design company LINLEY to customise further ABJs.

Gore Design Completions awarded FAA ODA

Gore Design Completions (GDC) has been awarded Organization Designation Authorization (ODA) by the FAA. This permits GDC, with FAA oversight, to issue FAA certification approvals at its facility in San Antonio, Texas, USA.

An approved completion and maintenance facility for Boeing and Airbus, the company performs interior design, engineering, avionics and project management service for customers worldwide. GDC has extensive experience in head-of-state and VVIP aircraft, including the latest generation wide bodies.



328 Support Services secures FAA Repair Station status for conversions

328 Support Services has been awarded FAA Repair Station status for the Dornier 328 Jet and Turboprop in recognition of its VIP conversion work, hitherto focused in Europe. The company’s headquarters are at Oberpfaffenhofen Airport near Munich, Germany. “This extension to our approval will enable 328 Support Services to expand into the US market and offer VIP conversions on the type. It is a significant development for our three-year-old company,” said Dave Jackson, chief executive of 328 Support Services.

The company reports it is also progressing well with its first ‘N’ registered 12-seat VIP conversion, serial number 3209, for customer Aviando Services of Miami, Florida. The aircraft, which is scheduled for delivery in the first quarter of 2010, will feature a high-definition in-flight entertainment (IFE) system, noise reduction kit, satellite communication system including internet access, increased cabin space and electric window blinds.

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Brief:

M&R associates design, a new design firm formed by experienced aircraft interior veterans Vincent Rey and Florent Magnin, has created a concept interior for a VVIP A350. "One of our main concerns for the VVIP interior concept of the A350, is to avoid the feeling of oppression, the sense of restricted space in the airplane," explains Magnin. "On the contrary, our aim is to provide the client and the passengers with the feeling of spaciousness and openness. We want to steer away from traditional criteria, to open up spaces utilising materials, light and other sophisticated and refined details."

Description:

A master bedroom, bathroom and office, as well as a small galley and crew area, are housed between the cockpit and entrance area. An open-plan lounge and dining zone features a U-shaped sofa and 'low profile' chairs around the dining table: "We have eliminated the armrests to provide complete freedom of movement to the passenger while seated during a meal," explains Rey. "We have also imagined a large table with a thin marble surface from which the light of an 'e foil' can pass through – an enchanting effect is generated by the interplay between the light diffused by the table and the crystal plates and glasses while eating." Special accommodation has been set aside for two children and a nanny, and there's a dedicated guest room. A 'theatre room' for relaxation and entertainment is housed beyond. Interesting details include: ultra-thin OLED screens integrated into transparent walls in the lobby and the lounge; luminescent film technology in the seat backrests and cabin floor; and a "wall of water" between the dining and lounge areas that "can be turned on or off according to the passenger's wishes".





Verdict:

This design certainly has the 'wow' factor – fluid forms, seamless joins and open spaces provide a futuristic finish, reinforced by a heavy sprinkling of new technology. “We wanted to create another vision of what the A350 cabin could be,” says Magnin. “We set out to break the tube effect and recreate a new architectural rhythm of the space.” Judged by that criteria alone, the concept is a success, combining some interesting spatial solutions with an exciting palette of new materials.



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Florent Magnin & Vincent Rey
M&R Associates Design
www.mr-associates-design.com



preciouspearl

A new airliner variant is making waves in Asia

The 'Asian Business Jet' (ABJ) came into being when three entrepreneurs were relaxing at Comtran International's Horseshoe Bay resort during an aviation summit.

Les Merszei, owner of Hong Kong-based investment firm Ritz Pacific, Chuck Woods, chief executive of charter operator Jet Asia Limited and Jordan Jaffe, CEO of outfitters Comtran International were discussing the success of airliner conversion projects. Ritz Pacific was the launch customer for Project Phoenix's CRJ 200 conversion and Comtran has created several VIP Dornier 328 aircraft.

The three sketched out an ideal for the Asian market – almost literally on the back of an envelope – and ran with the scheme. Today, the first version of a converted McDonnell Douglas MD-87 is in process at Comtran and already sold to an unnamed Chinese customer. There will be a programme of 15 of the limited edition aircraft produced and sold over the next five years. The first one will take 15 months to outfit, but from then on each should take around a year to do.

Comtran offers a full service programme, both for the heavy engineering conversion work and installing the VIP interior. Its San Antonio facility has large hangars next door to each other and engineers can simply transfer the aircraft from one to the other for each aspect of the job.

Merszei says: "From all our potential clients in Asia for the Project Phoenix aircraft we discovered there was a more interesting market for larger cabins presenting itself. We had done a great deal of research talking to high net worth individuals based in the region. These guys want to fly long range in ultimate comfort with lots of cabin space, a stateroom and shower with large private bathroom and cooking facilities – for this you need a large-size aircraft."

The result is an extraordinary fusion of simple design, clever use of space and creative lighting. It is the next edition of Comtran's 'Revolution' series, first realised in the Dornier 328. Merszei says that the aircraft has "a real competitive position vis a vis BBJ and Airbus Elites, which are two to three times more expensive."

Second life

The McDonnell Douglas MD-80 series are twin-engine, medium-range, single-aisle commercial jet airliners. Comtran has developed hush kits for the series, so knows the type well. At 85.5ft long, the cabin is 3 to 4ft longer than the BBJ, but a foot narrower at 10.1ft, and because the engines are mounted on the tail, the aircraft are quieter on board than other airliners. Comtran has also added its custom blended winglets and auxiliary fuel tanks taking the range to 4,000 nautical miles.

Merszei points out that since several airlines are in trouble, there is a slew of airliners on the market, which means that Ritz Pacific is able to acquire them at an attractive price that he can pass on to his customers. He says: "The MD series includes more than 1,000 aircraft, so the availability of MD spares is global. The aircraft comes with P&W engines and since MD was acquired by Boeing, it is easy to get service and maintenance." Ritz Pacific is offering the aircraft only in alliance with charter company Jet Asia Limited, which is developing a network of MRO providers for the ABJ all over the region.

There are very few VIP versions of the MD-87 on the market and the ABJ is the most luxurious. Ritz Pacific launched the aircraft in Singapore this autumn, followed by Kuala Lumpur. It is already a hit. Merszei says: "We ran a targeted road show and now have four aircraft reserved with deposits and are proceeding towards number five."



THESE GUYS WANT TO FLY LONG RANGE IN ULTIMATE COMFORT WITH LOTS OF CABIN SPACE – FOR THIS YOU NEED A LARGE-SIZE AIRCRAFT



1

Two choices Jaffe is the creative force behind the interior, which comes in two standard configurations (customisations cost extra). Each interior has touch-screen controls at each passenger location, cockpit and external video cameras, WiFi and satellite phone headsets, a fax machine on board, mood lighting and electric window shades. The jets are also equipped with a thermal acoustic cabin noise reduction system. Because the aircraft are aimed at the Asian market, the galleys also feature a rice cooker and wok, as well as a hot tea maker.

Configuration 1 includes a forward lounge for 11 passengers with two flat-panel displays in the bulkheads. There are two fully berthing club arrangements, comprising sofas and two seats, with a high low table at the sofas and a personal 10in monitor at each seat. At the middle of a cabin is a large changing room and galley, which services dining for six passengers. There are two further monitors in this zone. It is possible to isolate the forward lounge from the dining room and stateroom if required. The aft bedroom features a fully articulating double bed, two seater sofa and large flat-panel display. There is also surround sound and a wardrobe with master lavatory and full stand-up shower toilet, bidet and sink.

The aft service area includes a large galley with double sinks, custom nylon cutting board inserts, microwave oven, steamer, fridge, dishwasher, trash compactor and coffee maker. There is seating for up to three flight attendants, with a seat for the primary flight attendant at the rear of the aircraft.

Configuration 2 seats nineteen and is more suitable for conferences, meetings and entertainment. The forward lounge has seating for nine. There is a mid-cabin dining area, and an aft bar and lounge. The back of the aircraft features a full walk-up bar with three barstools and a large flat-panel



1. A large galley complete with double sink, rice cooker, wok and hot tea maker
2. Seating is finished in cream and white leathers



2

cinema display. The bar area comes with lighted baccarat crystal stemware and storage for full-size bottles of spirits and wine. There is also an ice-maker and clean and dirty ice drawers.

Interior motifs Drawing from his experience of converting the Dornier cabins to comfortable spaces, Jaffe has designed the aircraft so that there are no right angles on board. He says: "We used simple curves and compound curvatures to create the feeling of space and flow in the cabin." Comtran uses high-quality veneers and C&C machinery to ensure that the curves are accurate and durable. Jordan adds: "We only use natural hardwoods and veneer, no hydrographics. Everything is built to a higher spec, giving a luxury finish to our large-cabin aircraft."

Jaffe is a stickler for simplicity and detests "over designed ergonomics," and consequently has used much of the same thinking that he brought to the Dornier, but on a larger scale. The aircraft are kitted out in cream and white leathers for the seating, carpet and overheads with dark wood veneers, with a metal film complementing the colours of the wood. This edging also



3

WE WILL STRIP THE AIRCRAFT TO THE BARE METAL AND OVERHAUL IT, INCLUDING NEW ENGINES

highlights the smoked nickel cup holders, which are lined with stingray skin. The side ledge overheads and ceilings all feature recessed lighting.

Comtran is remaining tight lipped about who most of its suppliers are, but Jaffe tells a story that explains his design and work ethic. While working on the 328, he teamed with DeCrane to create the perfect seat. To build it the design engineers sculpted a prototype and draped it in leather. Jaffe sat on the chair in his office for a week. He said: "Sometimes a seat feels great at first, but after a couple of minutes fatigue sets in because there is not enough lumbar support, or it is over stuffed or under stuffed." The prototype had too much height at shoulder level, so the team modified the headrest and installed the seat once it had been thoroughly tested. He adds: "You sit for four hours on a seat, so it is important that it is comfortable." The resulting design is elegantly contoured with hand stitched leather and supple suede contrast with full swivel and recline. It kick started the Revolution series.

Cost of ownership According to Merszei, the converted airliners have only used 20-25% of their airframe life.

He says that most airliners from the MD-87 series were designed to fly 100,000 hours. He adds: "The jet in the new configuration will never fly as often as it did as a highly-used airliner. It will fly a maximum of 1,000 hours per annum. That's another 75 years of life."

Ritz Pacific says the MD series will not be retired for many years and the process of educating buyers on the fact that the ABJs used to be airliners is an important part of penetrating the market. Merszei continues: "We will strip the aircraft to the bare metal and overhaul it, including new engines and critical parts such as the landing gear. They will have zero hours on them, so effectively owners will get a new aircraft."

The team believes that the selling price (sources say it will come in at under US\$30 million) will also be a winner with a market still unused to the concept of flying privately. New wide-body aircraft have not come down a great deal in price during the recession and are still not available for at least two or three years. Merszei says that many new aircraft purchased today could actually lose value during their delivery periods because of the global economic environment.

Merszei explains the rationale behind choosing the Asian market for

3. Touch-screen controls will be available at every passenger position

the type. He says: "We are here and know it best – we concentrate on what we know best and how our potential customers told us they would like it. There is still a great deal of wealth in Asia, although some people have lost money, they are still earning. There is also a new generation of entrepreneurs who are embracing private aviation as an efficient means of business transport. They are looking to develop their businesses, so require aircraft with longer ranges and lots of space."

Merszei also owns OrientSKYs, which offers charter services and is another potential source of income. The first owner "definitely wants to charter it out" according to Merszei. Charter revenue could come in between US\$8-11,000 per hour with direct operating costs less than US\$4,000. Jet Asia has a local Air Operators Certificate and would oversee both charter and management. **END**

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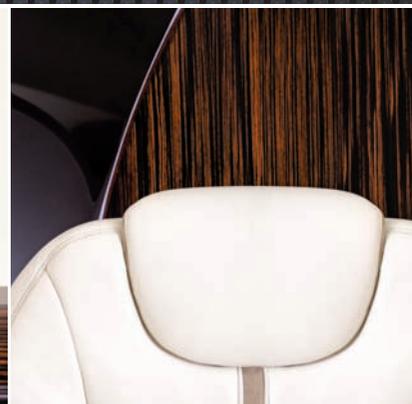
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creature comforts

Getting rest at 40,000ft can be tough – but manufacturers are soothing passengers with innovative technologies to ensure a relaxing flight

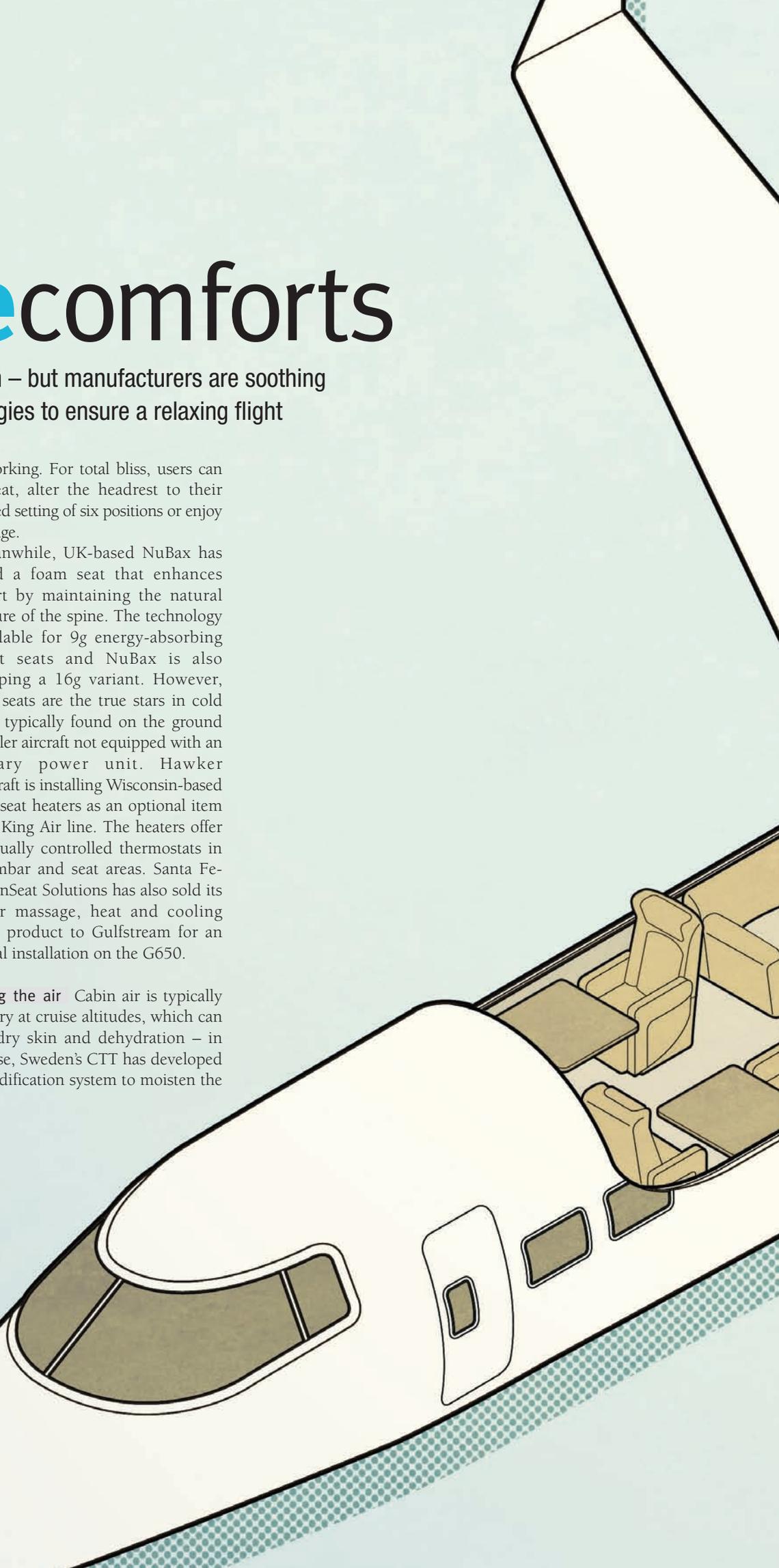
There are few worse starts to a tough meeting than feeling groggy after a long flight. Proper rest makes all the difference between arriving jet-lagged or refreshed and ready to take on the world. Spacious stand-up cabins and comfortable seats play their part in business aviation, but invisible factors such as cabin air pressure, ambient noise, vibration and natural light are critical elements for a restful journey.

OEMs recognise this and are rising to the challenge of creating comfortable environments. Debby Franz works on Bombardier's product research team and knows more than most what works in a cabin, having flown as corporate cabin crew for many years. "There are many more long-haul flights now, so combining seat design and comfort with flat berthing is essential," she says. Addressing the fact that most of the flight is spent sitting down, B/E Aerospace has created the 'Ultimate Comfort' seat, with adjustments ranging from 'comfortable' to 'bliss'. B/E claims the seat is the first full-flat berth built for business aircraft. Designed for mid-size up to large aircraft, the seat adjusts to several positions for eating

and working. For total bliss, users can add heat, alter the headrest to their preferred setting of six positions or enjoy a massage.

Meanwhile, UK-based NuBax has created a foam seat that enhances comfort by maintaining the natural curvature of the spine. The technology is available for 9g energy-absorbing aircraft seats and NuBax is also developing a 16g variant. However, heated seats are the true stars in cold cabins, typically found on the ground in smaller aircraft not equipped with an auxiliary power unit. Hawker Beechcraft is installing Wisconsin-based Emteq seat heaters as an optional item on the King Air line. The heaters offer individually controlled thermostats in the lumbar and seat areas. Santa Fe-based InSeat Solutions has also sold its Relaxor massage, heat and cooling seating product to Gulfstream for an optional installation on the G650.

Clearing the air Cabin air is typically quite dry at cruise altitudes, which can cause dry skin and dehydration – in response, Sweden's CTT has developed a humidification system to moisten the



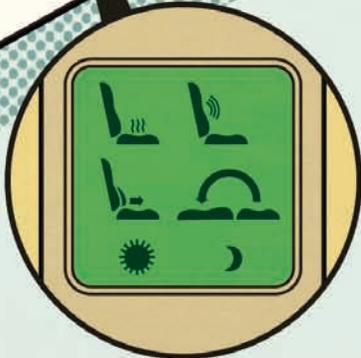
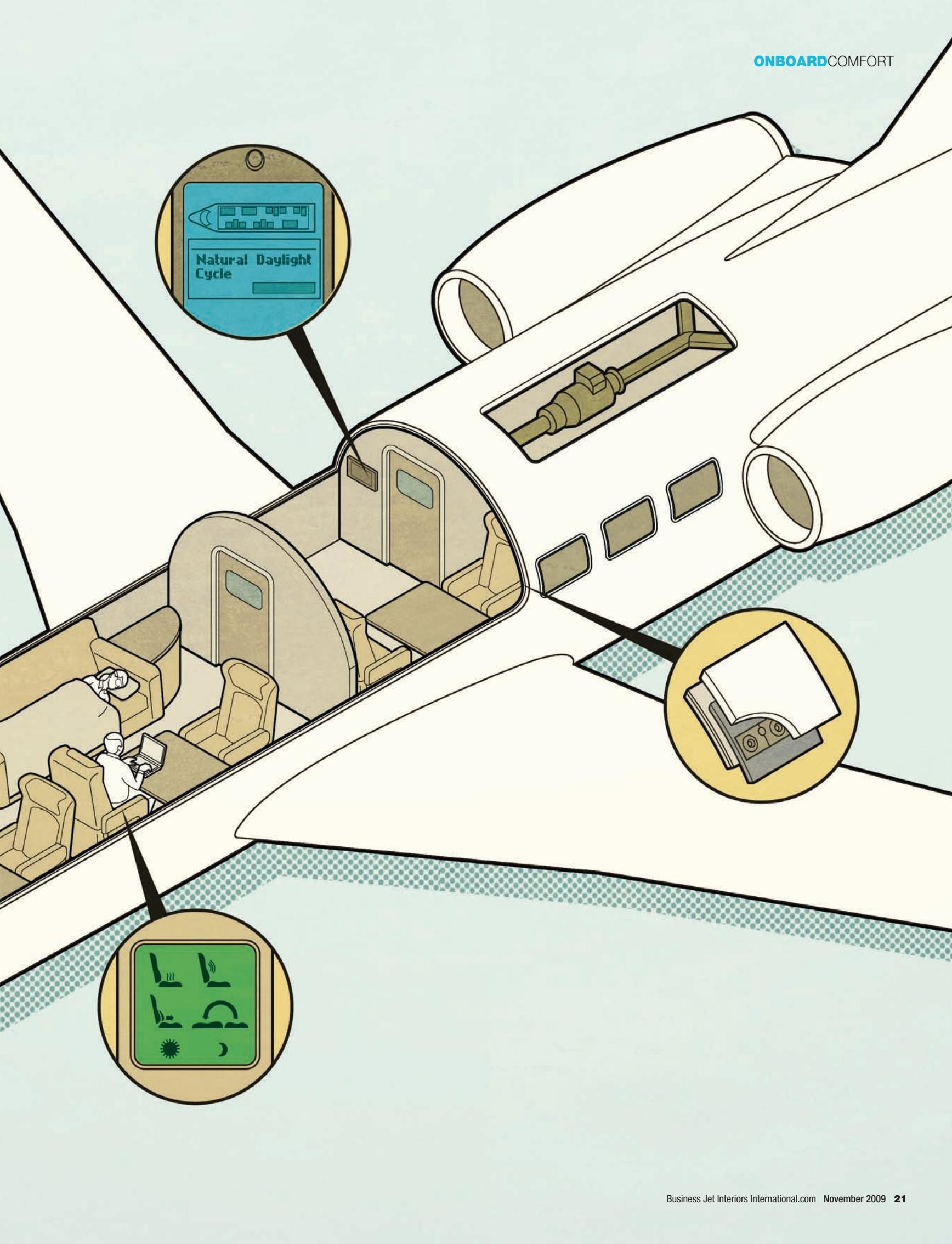




Illustration by Toby Leigh

1. B/E Aerospace's Ultimate Comfort seat offers full-flat berthing

cabin air. Meanwhile, recycled air may also make passengers more susceptible to airborne illnesses. Manufacturers of large cabin jets are eager to address this problem: Gulfstream's new G650 cabin will pump through 100% fresh air every 90 seconds, while the Dassault Falcon 7X comes with an optional humidifier and High Efficiency Particulate Arrest (HEPA) bacteria filter. Bombardier is offering an air purification system made by Air Data of Canada as an option on the Bombardier Global Express XRS and Global 5000.

In the UK, BAE Systems recently joined forces with Cheshire's Quest International to create the AirManager, a new active air management system, certificated for the BAe 146 and Avro airliners and Boeing 757, with further aircraft under consideration.

"At a time when there is increasing concern about the transmission of infections on aircraft, together with the continued debate about the quality of air on board aircraft, we are making available benchmark technology," says Sean McGovern, BAE's operations

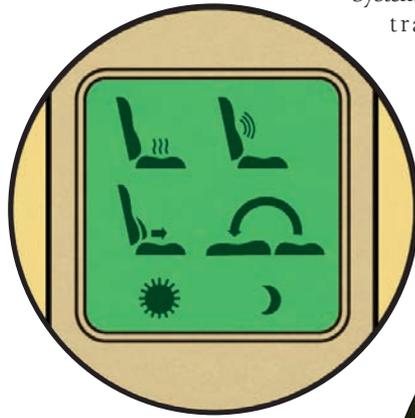
director, regional aircraft business. The technology uses a contained and safe electrical field that eliminates smells, and breaks down and destroys airborne pathogens, contaminants and toxins.

"Our active air treatment systems provide reduction of airborne contaminants to levels far in excess of those achieved by conventional passive HEPA filters," explains David Hallam, inventor of the software. "In addition, we have identified potential fuel burn savings, as the AirManager system cleans the air, allowing the air-conditioning system to operate more fully in 're-circ' mode," adds McGovern.

So far the system is installed on eight airlines on a trial basis and BAE Systems' own corporate air travel executive shuttle operation has also ordered the system.

Canadian company Air Data's JetAir Bio Protection System (BPS) is based on cold plasma ionic interaction technology pioneered in space and currently used on the International Space Station and in numerous international hospitals. BPS uses "catch and kill" technology to destroy even the smallest viruses and toxins, which are electrically charged and attracted to the surfaces of porous materials where they are annihilated.

Lighten up Natural light also plays a key role in reducing fatigue on board and manufacturers are constantly working on solutions to allow more light into the cabin. Bombardier's Challenger 605 features enlarged and relocated windows that boost the amount of natural light in the cabin by approximately 30% more than its predecessor. Dassault's Falcon 7X, has 28 windows – letting in 40% more light



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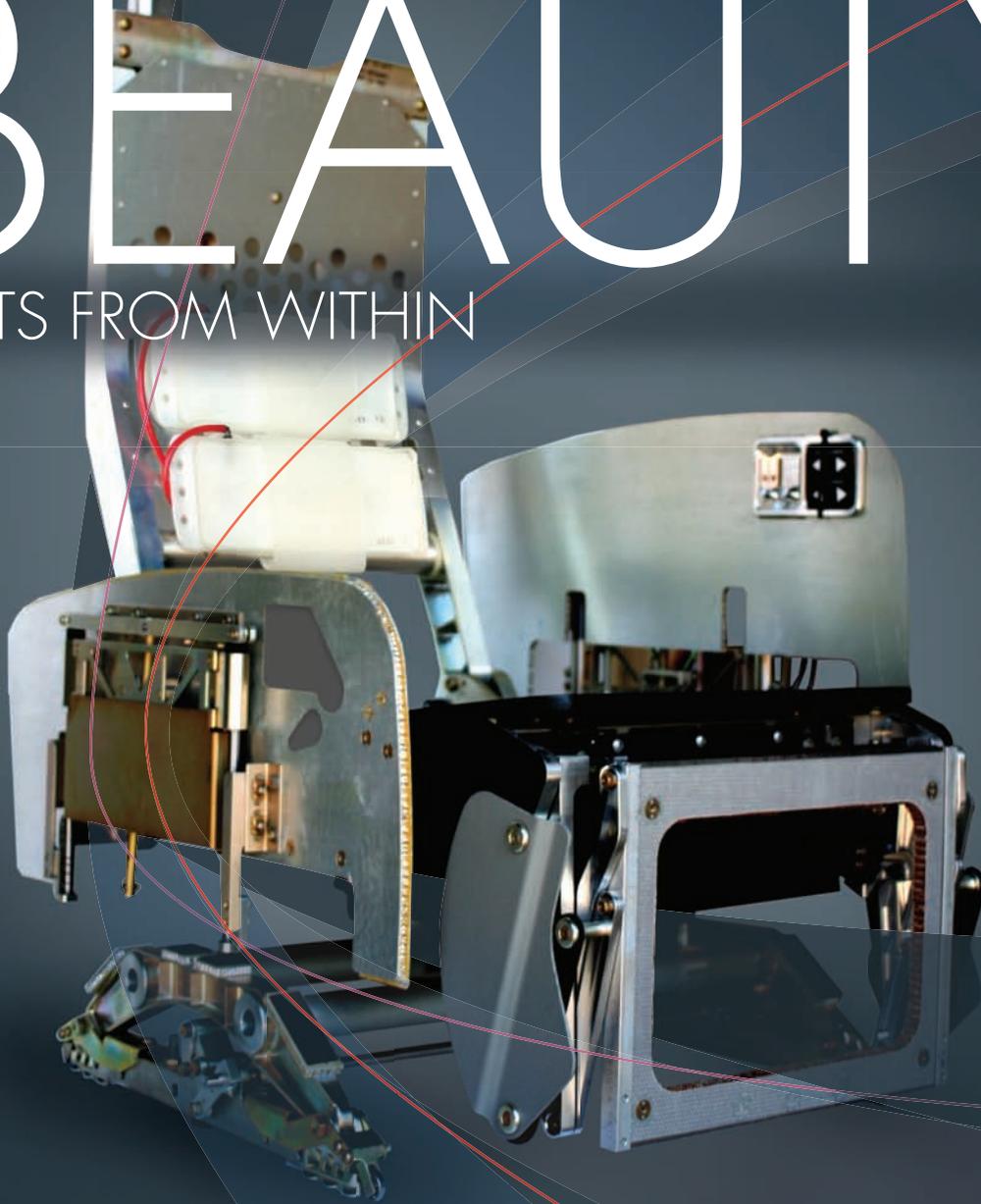


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SOME STUDIES INDICATE THAT BLUE LIGHT IS CALMING FOR PEOPLE

than earlier Falcons. The windows are positioned higher in the fuselage, making it easier for passengers to see outside. Meanwhile, Gulfstream's new flagship G650 also features 28in-high x 20.5in-wide windows, which are the industry's largest.

Smart windows This year's NBAA also threw up a couple of 'smart window' announcements. The concept is akin to the self-dimming rearview mirrors found in high-end cars. The technology is set to supersede the heavy, electrically operated, pleated shades found on most aircraft. Hawker Beechcraft is the latest OEM to favour the new technology, selecting InspecTech's smart windows as a retrofit item on its King Air line.

Alabama's PPG Aerospace and New York's Research Frontiers have also both introduced smart windows. The systems include gel and a conductive coating between polycarbonate or glass layers. Small shots of electrical current through the coating cause the window to darken or become clearer, although the

2. Long-range jets are vulnerable to noise and vibration in the cabin – France's SMAC installs 'Smacsonic' noise-reduction layers in Dassault's Falcon 7X to combat the problem



technology does not eliminate 100% of light or allow for totally clear views.

Today's artificial lighting is deeply sophisticated. Many aircraft feature mood lighting that incorporates bright, white LED light, along with a broad variety of potential colours that are completely dimmable. B/E and Emteq both have LED systems on offer. Emteq's Quasar features colour-mixing optics to cast even, blended light without revealing individual colours. The system features 32 preset lighting modes, including sunset/sunrise mode, and 100% dimming. It accentuates interior fabrics and skin tones using white colour programming, and is more usually found on VVIP aircraft such as the BBJ. "Some studies indicate that blue light is calming for people," says Matt Trotter, Emteq's director of product development. "This principle is used to

set the scene when people get into an aircraft or on take-off and landing." He adds that trends are moving increasingly to as natural a light as possible.

Noise abatement Quieting down is a constant battle – especially for long-range jets, so robust acoustical insulation is a must. "There are two modes of noise typically found on aircraft: structure-borne from the interior; and airborne from the sound of the engines or aerodynamic flow over the fuselage," explains Marshall Downing, staff engineer at Lord Corporation, which creates sound reduction technologies. "Good acoustic design mitigates both noise modes." Using sophisticated fasteners on the airframe also helps, such as vibration-dampening 360° adjustable brackets to connect aircraft components.

AT 8,000FT, A PASSENGER'S OXYGEN INTAKE IS REDUCED BY 4%

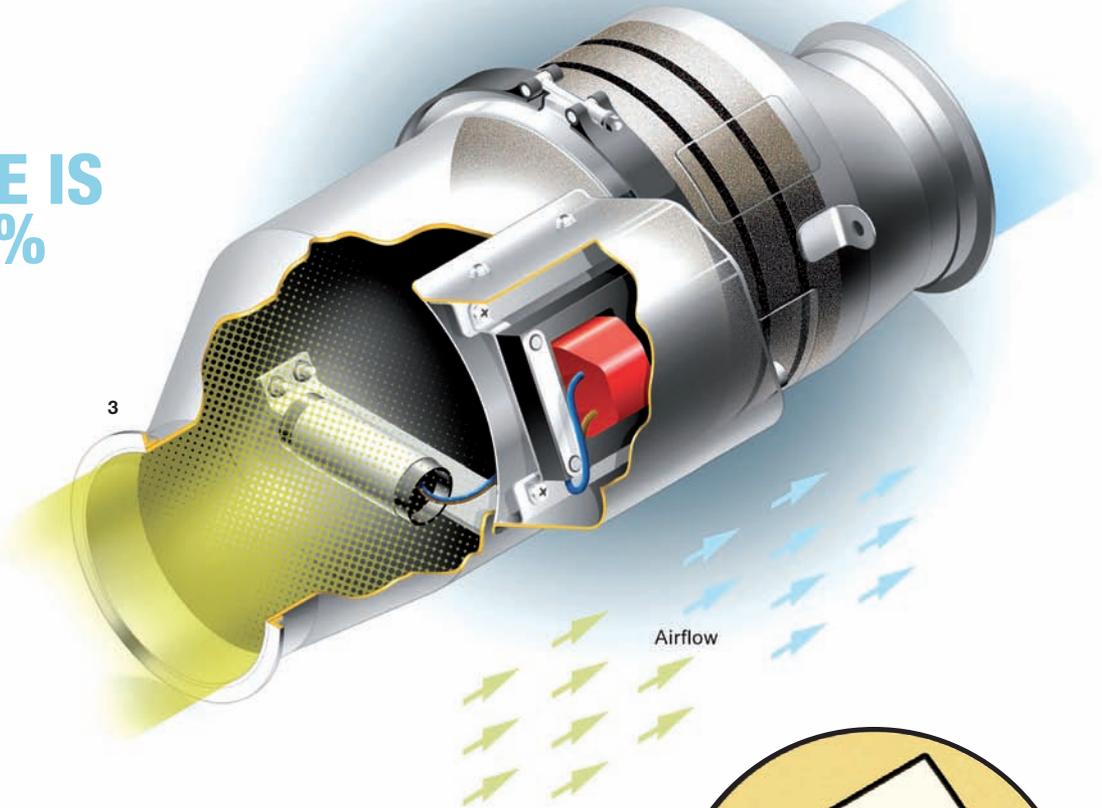
Unfortunately, flat aircraft floor panels are perfect sound radiators – stiff attachments transmit structural vibration that heightens interior noise. Lord has developed a soft isolation system to combat this problem, which Embraer has successfully tested on the Legacy and Lineage business jets.

Creating a passive sound barrier involves blocking a sound wave at source. The heavier the barrier material, the better the muffle. However, since weight is never welcome on an aircraft, companies are constantly looking to lighten the load. Rogers Corporation in Connecticut, for example, is due to launch a lighter acoustic sound barrier engineered silicone rubber, called Bisco L3, later this year.

Meanwhile, active noise cancellation technology is developing apace, which works well to combat low-frequency nuisance sound. Illinois-based Elliott Aviation built upon British manufacturer Ultra Electronics' electronic noise-cancelling system to create a sound management system for the Beech King Air 200, 300 and 350 executive turboprops, which have noisy cabins as a result of their propeller blades projecting a shockwave against the side of the fuselage. Elliott uses the Ultra system to quieten the cabin with speakers, microphones and a computer processor that generates a sound wave 180° out of phase from the offending noise, which consequently eliminates it. The system distributes 12 speakers and 24 microphones throughout the cabin from the cockpit to the rear.

However, once low-frequency noise is cancelled, the high-frequency sound becomes louder, so Elliott installed an improved lightweight thermal and acoustic insulation package in the King Air's cabin, as well as applying foam to the backs of some of the longer interior trim panels to reduce vibration.

Dallas-based carpet specialist Kalogridis International has another solution: it has hired designer LiChing Liu



Tsai to create new coverings for cabin surfaces. The result, Deconel, is a 3D decorative process applicable to bulkheads, headliners, window panels and dado panels. It comes in 300 designs, with a smooth, hard finish and can reduce cabin noise by as much as four decibels.

Under pressure Noise and vibration are not the only tiring factors on board. Atmospheric pressure is continually fluctuating, and researchers in the Ukraine have found that slight low-frequency atmospheric oscillations can influence human mental activity, causing significant changes in attention and short-term memory functions.

In most airline cabins the air pressure is equivalent to about 6,000-8,000ft above sea level. At 8,000ft, a passenger's oxygen intake is reduced by about 4% – not enough to be harmful, but enough to cause fatigue. On longer trips, passengers feel more tired. Larger and more expensive jets, such as the Gulfstream G650 or Global Express provide sea-level cabin pressure up to a much higher altitude, which greatly reduces fatigue on both passengers and crew.

The US\$59.5 million G650 can hold cabin pressure equivalent to 2,800ft while cruising at up to 41,000ft. At the aircraft's maximum altitude of 51,000ft, the cabin pressure climbs only to



3. Quest's AirManager uses an electrical field to eliminate smells and destroy airborne pathogens, contaminants and toxins

4,850ft. "The G650 comes with an almost sea level cabin, greatly reducing fatigue on a long flight," says Robert Bagniet, former director of communications for Gulfstream. At the lighter end of the scale, Emivest Aerospace's SJ30 is the only small jet to maintain sea-level pressure up to 41,000ft.

Critical comfort Today's aircraft offer a range of comfortable options and operators know that onboard ambience means the difference between a sale and an enquiry. "As somebody who owns aircraft and uses them for charter, I know how important it is to get the interior right," says Ocean Sky's non-executive chairman, Kurosh Tehranian. "It is critical." **END**

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The image shows the interior of a Bombardier CRJ aircraft. The focus is on a row of leather seats in a light tan color with darker tan accents on the headrests and armrests. A dark wood table is positioned in front of the seats. The lighting is soft, highlighting the texture of the leather and the grain of the wood.

flyinghigh

Peterborough, Ontario-based Flying Colours Corp is poised to significantly increase its number of executive conversions of Bombardier CRJs

In March, Flying Colours acquired JetCorp of St. Louis and renamed the company JetCorp Technical Services. The two companies had developed competing programmes for the CRJ. Flying Colours' programme is called ExecLiner, while JetCorp's was branded Renaissance. Flying Colours was also performing green completions on the new Challenger 850, an updated version of the CRJ designed for executive use. To date, Flying Colours has completed four CRJ conversions. JetCorp has completed two. Flying Colours is also utilising the acquisition to increase its capacity for completing green 850s and sent the first one to JetCorp for completion there in September.

Combining these programmes to drive greater efficiencies and the natural synergies of the organisations drove the acquisition, explained Flying Colours' director of sales and marketing, Sean Gillespie. "We've been talking about this for a long time," he says. In 2010, Gillespie says Flying Colours and JetCorp plan to complete 10 to 12 CRJ conversions and Challenger 850 completions, as well as substantial work on 30 to 40 other corporate aircraft, including Challengers, Falcons, Globals, and Gulfstreams. "The refurb market has picked up quite a bit over the last few months and we've built a lot of new business over the last two years," says Gillespie.



YOU COULD PLUCK A LIGHTLY USED CRJ OUT OF THE DESERT, INSTALL A PLUSH EXECUTIVE INTERIOR AND HAVE IT IN EIGHT MONTHS

Flying Colours completes first Phoenix

The availability and suitability of CRJs for executive conversion has drawn a number of players into the market, including Dubai-based Project Phoenix, which delivered its first Phoenix CRJ No 1 (Serial No 7211) to a Macau-based businessman in August. The aircraft is managed and operated by Jet Asia Limited.

The aircraft's elegant, new 15-seat luxury interior includes a state-of-the-art cabin management and IFE system, with Airshow 4000, iPod stations and satcom communications. Phoenix CRJ No 1 has also been fitted with long-range fuel tanks, providing a maximum range in excess of 3,000 nautical miles and giving US coast-to-coast capability. The delivery took place at Flying Colours' completion facility in Peterborough, Ontario, Canada. Flying Colours is Project Phoenix's official completions partner.

"The aircraft is everything we expected it to be and initial feedback from both the operator and owner is very positive. They are delighted with the quality and the handling of the aircraft," said Project Phoenix president, Mike Cappuccitti. "The Phoenix is no longer a myth – it's out there and performing."

Military background The seeds of the current CRJ programme began in the late 1960s with two US military aircraft programmes, the USAF's A-10 ground support attack aircraft and the US Navy's SA-3 carrier-based anti-submarine and patrol jet. Both aircraft would come to utilise a new, higher-bypass turbofan engine, the General Electric TF-34 series. The engine came to the attention of business jet legend Bill Lear, who used it for a proposed new design business jet in 1971, the Learstar 600, with a wide cabin, efficient and thin laminar-flow wings, and transcontinental range. Canadair bought the design from Lear in 1976 and the 'Challenger 600' made its first flight in 1978. Customer deliveries began in 1980. Bombardier subsequently bought Canadair from the Canadian Government in 1986. More than 700 Challenger 600-605

series aircraft have been delivered to date and Bombardier used it as the basis to launch Canada's most successful civil aircraft programme of all time, the Canadair Regional Jet or CRJ. More than 1,300 CRJs have been delivered to date.

Bombardier began to study the 44- to 50-seat CRJ100 in 1987 and launched the programme in 1989. The aircraft made its first flight in 1991 and customer deliveries began the following year to Lufthansa CityLine. The aircraft utilises the same fuselage cross-section as the Challenger 600 series. The CRJ100 and CRJ200 share the same fuselage, but the latter has uprated engines. Lengthier and faster variants, the models 700, 705, 900, and 1000, have subsequently been introduced with seating for 70 to 100.

Regional jets were a real game changer for the airline industry,



1



3



2



allowing them to bypass traditional hubs, provide economical point-to-point routes to smaller markets, and bring more passengers from outlying airports into their hubs. But it was hard, if not impossible, to make money with 50-seat jets. It also made unions representing airline pilots flying larger aircraft very nervous. They viewed the RJ as a threat, being able to replace larger jets on less frequently travelled routes with the smaller aircraft and pilots who made far less money.

As part of their labour contracts, mainline pilots fought for, and in several cases won, 'scope clauses' with major airlines limiting them to flying RJs with 50 or fewer seats. While the 50-seat RJ was a way to expand market share, it was not necessarily a way to make money.

Nothing demonstrated this more forcefully than Independence Air.

Independence lost As the major airlines entered a fresh round of bankruptcies in the years following the terrorist attacks on the US in 2001, they began to issue financial beat-downs to, or sever ties altogether with, long-standing regional airline partners, many of which had enjoyed no-lose 'cost plus' contracts for years.

One of these marriages gone bad was between mainline carrier Delta and its feeder, Atlantic Coast Airlines (ACA). Rather than trying to find another mainline carrier to ally with, ACA decided to go it alone, rebranding itself Independence Air, and challenging the majors head-to-head in the extremely competitive East Coast market with a fleet of 87 CRJ-200s and money-losing discount fares.

The experiment lasted 19 months and it was a financial disaster. By the time Independence shut down in 2006,

1. CRJ ExecLiner interior, delivered by Flying Colours
2. Phoenix CRJ No 1 (Serial No 7211), completed by Flying Colours earlier this year
3. CRJ ExecLiner exterior

it had shed 49 of its 87 RJs. Others were stashed at remote airports out of creditors' reach. There was no talk of reorganising the airline: it was headed straight to liquidation. Overnight there was a glut of CRJs on the market, with many of them headed to long-term storage. For about the time Independence went under, the airlines came to the inescapable conclusion that there was no way to make money with aircraft that had fewer than 70 seats – and bankruptcy provided a ready tonic for scope clauses with the unions. RJs with 50 or fewer seats were headed to the desert caliche in Marana and Mojave in droves, with prices falling to as little as US\$4 million.

As luck would have it... Curiously, this was also about the time that the waiting list for a new corporate jet reached its apex. It was inevitable that people began to connect the dots. You could pluck a lightly used CRJ, an aircraft with a cabin virtually the same size as a Global Express or a Gulfstream G550, out of the desert, install a plush executive interior with all the bells and whistles, and have it in eight months. Or you could get on a waiting list for three or four years.

When the wheels began coming off the global economy in 2007, the wait at the OEMs shortened, but the business case for CRJ conversions became even more compelling. Most of the aircraft on the market were less than 10 years old and were selling for US\$4 million to US\$10 million. The price of the conversion, including an auxiliary fuel system that boosted range to 3,000 nautical miles, tacked on another US\$4.5 million to US\$6 million. Contrast that with the price of a new Gulfstream or Global at more than US\$50 million. Granted the converted CRJs don't have the range and speed of



EVEN IN THIS MARKET, YOU CAN'T COMPETE WITH THE PRICE – WE'RE STILL SEEING A LOT OF INTEREST

those new jets, but you can overlook a lot to save US\$34 million to US\$40 million. And people have.

“Even in this market, you can’t compete with the price,” says Flying Colours’ Sean Gillespie. “We’re still seeing a lot of interest.”

The layout for a typical executive conversion is 16 to 18 passengers. Customers can choose between an oversize forward galley and closet or a forward second lavatory with a regular galley and a galley annex across the aisle. Customers can get almost whatever they want in the galley. A TIA Wavejet microwave/convection oven is standard equipment but it can be supplemented with warming ovens, espresso maker, refrigerator, wine chiller, and even a freezer.

Flying Colours offers three basic cabin layouts that can be tweaked and customised. Aft of the galley there is an

executive ‘club four’ of large single seats, followed by a conference grouping with narrower seats (seating four to six passengers) with a hi-lo table, a mid-cabin credenza, and an aft stateroom with privacy pocket doors. The stateroom can be outfitted with either a single, four-place berthing side-facing divan opposite a half-club or two opposed divans.

Aft of the stateroom is the rear lavatory, which opens to a passageway for inflight access to the baggage compartment. Two, 300-gallon auxiliary fuel tanks are located in this area.

Stay in touch Flying Colours uses Audio International’s Spectra, touch-screen cabin management system, Aircell satcom with three position headsets, and EMTEQ LED lighting and optional electric seat warmers. Gillespie says Spectra is “a very solid

4. CRJ ExecLiner interior showing table deployed for dining

system”. The EMTEQ Elements passenger seat heaters have separate heating elements within the seat cushion and back, three temperature settings, a ‘lumbar heat only’ feature and automatic shut-off. The seat heater only adds 1 lb per seat and has a very low power draw. The system comes with LED lighted switches. The seats and tables are also new. Full electric function seats are an available option.

Gillespie acknowledges that an unmodified CRJ’s cabin can be a noisy place, but points out Flying Colours adds a standard, three-stage, lightweight noise dampening system to quieten the cabin. It uses dampening panels against the interior skin, followed by insulation bags, and an insulation blanket on the back of the sidewalls.

Gillespie said most conversions have been sold to foreign markets including China, Europe, the Middle East, and South Africa. The company’s first conversion is based in Macau. However, Gillespie says the US market is still fertile ground for conversions. “There’s still a big chunk of interest [there],” he says. **END**

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Bombardier reveals Learjet 60 XR 'Red' or 'Black' special editions

Bombardier is preparing to remake the Learjet 60 – again. The new Learjet 60 XR Signature Series Red and Black interiors emphasise connectivity, galley space, and personal comfort to create the look and feel of a super-mid-size cabin but in a mid-size aircraft.

Bombardier acquired Learjet in 1990. The Model 60 first flew in 1991 and first customer deliveries began in 1993. The 60 has an unrefuelled range (two crew, four passengers, NBAA IFR reserves) of 2,134 nautical miles. This aircraft doesn't just take off, it blasts off. That power comes courtesy of a pair of Pratt & Whitney Canada 305As bolted to the back that each crank 4,600 lbs of thrust, giving this 23,500 lb aircraft (maximum take-off weight) one of the highest thrust-to-weight ratios in its class. This jet initially will climb at 4,500ft per minute and reach 41,000ft from sea level in less than 20 minutes. Cracking open a beverage before reaching cruise altitude is just not a good idea – unless you want to wear it.

While the 60 has undergone various interior and avionics changes over the years, notably the SE and current XR models, the fuselage remains largely unchanged. Between 1993 and 2005, when the successor Model 60SE was introduced, 274 Model 60s were manufactured. Compared to its forerunner, the Model 55, the 60's fuselage was stretched 43in, yielding an 18in longer cabin (17.67ft) and more legroom. Cabin width is a fraction under 6ft. Headroom, while standing in the trenched centre aisle, is 5.7ft.

The standard cabin layout features five single executive slide/swivel seats, a two-place side-facing divan opposite the cabin entry door, a small forward galley with space for a microwave and an ice drawer, a forward closet, and a rear lavatory.

Inside the cabin, the closet provides 24ft³ of storage; an equal amount is also available in the baggage

compartment aft of the lavatory. Cabin noise close to the entry door can be pronounced and that was a major driver when Learjet gutted the Model 60 cabin for the US\$13.65 million Model 60XR in 2007.

Cabinet reshuffle The redesigned XR cabin included more curvaceous cabinetry, redesigned single seat structure and upholstery, a cleaner looking headliner with recessed gaspers, LED cabin lighting, new and more illuminating window surrounds, and a redesigned lavatory with larger vanity cabinet. That new look was distributed across five basic seven- to eight-seat floorplans. Owners can also specify a larger galley and a three-place divan in addition to four slide/swivel single executive seats. Other layouts include six single seats or a high-density, eight-seat layout including six single seats and a two-place divan.

The XR also featured improved natural and artificial lighting. A new Nordam cabin shell, combined with the LED lighting, combined to create a taller and cleaner look. The lavatory received an extra window and new window surrounds – a trick picked up from the larger Global 5000 – allowing a significant amount of additional natural light inside the cabin.

The XR's improved Cabin Management System had fewer and more user-friendly menus and inputs for iPods and other equipment such as laptops and DVD players, and allows content from these devices to be transmitted throughout the cabin via headphone jacks and displays. A plethora of available IFE options includes Iridium satphones, the Airshow 410 or 4000 with network package, 15.1in forward monitor, 10.4in aft monitor, single or dual DVD video system, passenger AV inputs, and XM radio. However high-speed internet was not available on the XR. But that, and many other things about the aircraft's interior, is about to change with the XR Signature Series.



Signature Series Red

This floorplan offers spacious seating for six passengers. The stand-up cabin's unique cross-section and 15in-wide (38 cm) aisle provides exceptional shoulder room and additional space between seats. The redesigned seats feature berthing capability, removable armrest caps and panels, as well as larger storage drawers. Streamlined side ledges allow for better ergonomics and a more harmonious cabin design. This configuration also includes a larger galley with multiple storage units, an optional built-in espresso machine and a work surface for complete meal preparation on board. The cabin entertainment system features SwiftBroadband, supporting simultaneous WiFi connectivity for laptops and personal electronic devices and satcom cabin phone. The private aft lavatory includes an unveiled window for increased natural light, as well as a larger and more functional vanity cabinet.

Talk of the show Bombardier Learjet unveiled two new six-seater cabin configurations at NBAA 2009 that should be finding their way into customer aircraft later this year (2010). The new Signature Series Red and Signature Series Black interiors weigh less, have larger seats, more legroom, and the latest in connectivity, including SwiftBroadband high-speed internet for web surfing or video conferencing, HD monitors, and interfaces for PlayStations, BluRay and DVDs.

Both borrow heavily from the high-contrast styling influence of the Learjet 85 cabin mock-up – light-coloured fabrics against dark stained veneers with complementary-coloured custom Scott Group carpets featured throughout. The similarities to the 85 are really not all that surprising as Bombardier utilised similar customer focus groups for design input. It also plans to incorporate customer feedback received at NBAA before freezing the final design.

1. Signature Series Red interior
2. An impressive media credenza takes pride of place in the Black interior
3. Black touch-screen detail

The Signature Series are all about comfort, even if that means losing the occasional style point. Case-in-point: the seats. Gone is the hip, tapered, rounded look in earlier Lear 60 designs. While visually appealing, these seats had comfort issues, especially for larger passengers. The stylishness of the sloping, narrow armrests faded with

actual use. The new single executive seat style is decidedly squared-off looking with big drop-down armrests, deeper and longer seat cushions, and taller backs reminiscent of a Challenger 605. But they are much more comfortable than even the redesigned XR seats. The squared-off arms can be dropped flush with the seat bottom



Signature Series Black

This six-passenger configuration combines the cabin design and features of the Signature Series Red with an enhanced entertainment centre. A media credenza with a 24in (61cm) flat-screen monitor opposite a two-seat divan creates a defined multimedia space at the entrance of the cabin. Entertainment options include SwiftBroadband capability and powered portable electronic devices featuring interface units compatible with audio and video outputs.

cushion to create extra area for plus-sized passengers. The softer foam creates more room within the seat. The new B/E Aerospace seat frames each weigh 10 lbs less than the model they replaced, but they are more functional, with a seat pan lifter that activates through 70° as the seat is reclined to full berthing. This eliminates the gap between the seat bottom and back cushions when the seat is reclined. The seats rotate a full 180°. Increased seat pitch and more space between the seats yields an additional 3.5in of legroom between the facing club seats – but it actually feels like more. The facing clubs can be moved together and reclined to create a very comfortable bed.

There is also more space in the single seat latched pedestal drawers. While not big enough for a laptop, these drawers can hold a web book, smaller beverage bottles or enough candy to give children tummy trouble for days.

A pair of Astronics universal power plugs are located between the club seats in the lower sidewall. The perforated Tapis leather adds visually appealing texture to this area that contrasts nicely with the patterned carpet. The lighter-coloured Edelman leather seat upholstery, Tapis sidewalls and headliners also contrast well with the dark-coloured stains on the visually interesting Birdseye maple and lace wood veneers and the clear-coat black epoxy painted surfaces in the lav and the galley. The LED cabin lighting also accentuates this look, with softened downwash accomplished by pushing back the lens, creating more of an accent, and less of an area, effect. The redesigned PSUs are also more appealing and user-friendly. Their touch-screens are in the side ledge with adjacent audio and visual jacks. There is also room there for a variety of personal electronics stowage.

The cockpit and the lav have been improved as well. Uniform shades of grey give the cockpit a more thoughtful and unified look while the enhanced fit and finish of the lav give it more of a larger aircraft feel. The belted seat there is also certified for a seventh passenger – last one on the aircraft gets the short straw.

Tasty treats However, the really big changes on the Signature Series are to be found in the galley and a brand-new forward entertainment credenza. The elegant, curved, space-sucking, left-hand galley on the XR has been replaced by a choice of two different and compact, but intelligently designed, right-hand galleys with a plethora of innovative features. One is more open and geared toward self-service (Black), while the other has everything neatly stowed behind doors and in drawers for cabin steward service (Red). A



4. Signature Series self-service Black galley
5. The Red galley is geared more towards cabin steward service

THE REALLY BIG CHANGES ON THE SIGNATURE SERIES ARE TO BE FOUND IN THE GALLEY

forward galley annex immediately aft of the cockpit also has room for catering storage and is configured with rails to hold standard ATLAS trays that are popular in Europe. A doored compartment below this can hold water bottles on their side and is within easy reach of the pilots. The galley can be equipped with a warming oven, hot liquid container, and an Iacobucci espresso machine. There are ample drawers, liquor stowage, and overboard drains. One particularly clever feature is the double-deck ice drawer. The bottom holds champagne bottles while a perforated retractable top drawer immediately above it has room for clean ice. As the clean ice melts, the water drips into the dirty ice beverage drawer below and then out an overboard drain.

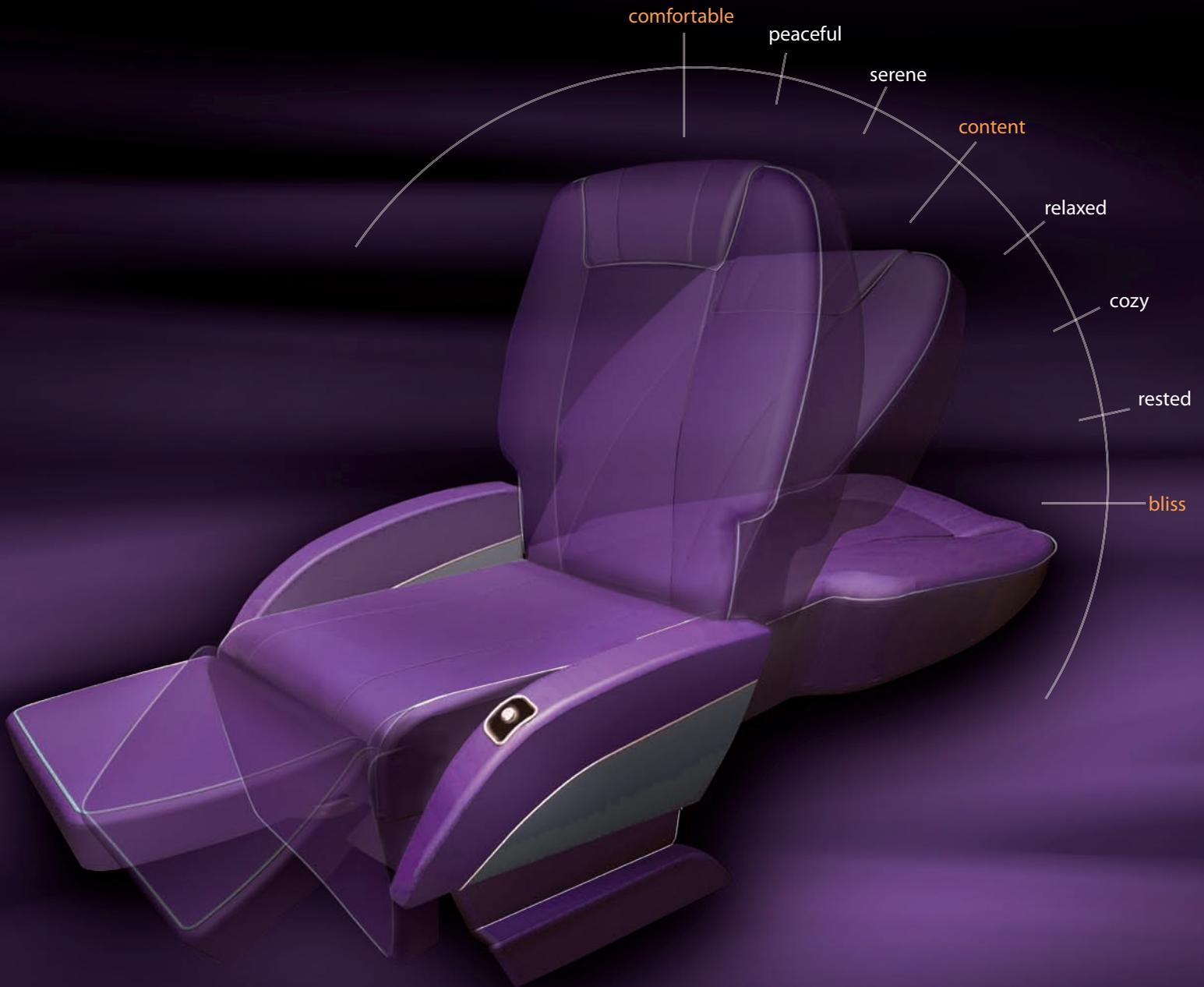
Impressive as these new galleys are, the forward entertainment credenza in the Signature Series Black interior is the real show stopper. It houses a pop-up 24in Audio International HD flat-screen monitor that can be rotated for easy viewing throughout the cabin once it is deployed. The credenza also provides an additional 2ft³ of onboard storage and can be used as a work station when the screen is stowed. The credenza takes the place of a left-hand single seat and Bombardier is developing several modular 'plug-and-play' quick change layouts that would facilitate easy cabin reconfiguration for customers with shifting passenger loads.

The basic Signature Series package is expected to add US\$60,000 to the price of a new XR, or about US\$200,000 with everything including broadband. It promises to make the Learjet 60 XR the most capable cabin in its class. **END**

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on the move

Powerful air-to-ground connectivity and sophisticated onboard local networks ensure bizjet passengers can work, rest and play as they speed through the sky

We do a lot of round-the-world trips – our executives need to get out and do their business,” says Bob Driscoll of Honeywell Flight Operations. “The minute they get on the aircraft, it’s boom, turn on the BlackBerry. On a 12-hour leg from our New Jersey base to, say, the Middle East, the traveller can be up to speed the whole time as the world goes about its business on the ground – then he’s ready for action the moment he steps off the aircraft.”

Driscoll is responsible for the technical support of the six business jets that avionics manufacturer Honeywell uses for senior executive travel and product development. Currently engaged in implementing Inmarsat SwiftBroadband 432kbit/sec L-band satcoms in the fleet, he has no

doubts about the value of air-to-ground connectivity to his top managers.

“Blackberry email and internet access via Inmarsat is our preferred approach,” he says. “It was introduced in 2007 and since then our executives have come to depend on it. If a user loses connection he may put up with it for half an hour. But then he’ll ask the pilot to reset the system because he really wants his email back. Our leaders live by email – hundreds and hundreds of them a day.”

Connectivity is now fundamental to the business jet value proposition. Long gone are the days when chief executives were content with saving a few hours of travelling time compared with an airline flight, and maybe reviewing a few documents en route. Today they want real-time interaction with staff and customers on the ground, and equipment and service providers are queuing up to make it possible.



Growth market Last month's National Business Aviation Association (NBAA) show in Orlando, Florida, was the setting for dozens of product announcements. Nothing unusual there, except that so many of them were to do with air-to-ground communications for passengers. What's more, they revealed an explosion in the range of choice of suppliers and capabilities on offer to aircraft operators.

London-headquartered Inmarsat was the first company to offer satellite communications for aircraft, starting in the early 1990s. SwiftBroadband, its latest service for aviation, supports voice and a range of data communications to the cabin, including internet and private network access through both wired and wireless laptops and handheld devices. Round-the-world coverage was completed this spring and since then SwiftBroadband has made significant headway in the business jet market. But it faces competition from several other satellite providers, while Aircell with its US ground-based network is having an increasing influence on the whole connectivity scene.

At NBAA the good news for Inmarsat and its supplier community came from Embraer, which announced that Danish company Thrane & Thrane's Aero-SB Lite SwiftBroadband terminal would be available on the new Legacy 450 and Legacy 500 mid-size jets, under



1. Inmarsat's SwiftBroadband service supports voice and a range of data communications to the cabin
2. Honeywell Ovation Select cabin management system
3. Rockwell Collins Venue Quad station for iPod docking



Sociable networking

Beyond working, bizjet passengers are also using the latest technology to kick back and relax. Leading the charge to bring up-to-the-minute in-flight entertainment (IFE) to the VIP/business cabin are avionics giants Honeywell and Rockwell Collins.

Honeywell's Ovation Select cabin management system (CMS) was shown in full mock-up form at NBAA 2009. Successor to the first-generation digital Ovation E-series and analogue C-series, Ovation is fully HD-capable, with the necessary video encoding and decoding resident in both the central server and the passenger control units. The latter, available at each seat, are touch-screen devices featuring slide-and-select icons similar to those of the iPod Touch and iPhone.

Rockwell Collins' comparable Venue system was introduced two years ago with the promise that it would bring the best of networking

to even the smallest cabins. The claim has since been borne out by selections for the Cessna CJ4 light jet and a number of Hawker Beechcraft types, including the twin-turboprop King Air 350i. Due for first deliveries to customers from next year, Venue is also now on offer as an upgrade to users of earlier Rockwell Collins systems in large-cabin business jets.

Venue is designed as a home theatre for the cabin. Its hub is the Media Centre, a compact device bringing together a Blu-Ray DVD player, CD and MP3 players, an audio and video juke-box, Airshow 3D moving-map, games, and a USB port allowing passengers to load their own content on to the system. iPod and iPhone integration means that Apple's iconic devices can also act as content sources. And everything is delivered to the seat via crystal-clear 1080p-standard HD screens.

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Announcing the arrival of SwiftBroadband from Cobham



Nice touch

An iPhone capability has just been added to NICE, the stylish, Ethernet-based CMS developed by Lufthansa Technik to meet the needs of its wide-body-operating VVIP customers and since adopted as standard on Bombardier's Challenger 300 mid-size business jet and the new Learjet 85. Other current developments include integration of Blu-Ray content source equipment with the company's existing range of HD screens, and creation of an HD upgrade for existing NICE users.

Meanwhile, Flight Display Systems – originally set up to provide compact, moderately priced screens, DVD players and other systems suitable for retrofit – is now offering HD LCD screens as big as 52in, along with iPod docking stations, Blu-Ray players and a newly announced cabin network. Designed for HD compatibility, the FDS product could stand out from the crowd by virtue of its price. Total system cost is put at US\$55,000 and US\$160,000 for a Challenger 601 and a VIP Boeing 757 respectively – 35 to 65% less than the competition, according to FDS.

development for first flights in 2011-12. The Brazilian manufacturer also said that the Inmarsat provision in the long-range Legacy 650, currently in flight test in preparation for first deliveries next year, would be upgraded to SwiftBroadband.

The satellite operator is also benefiting from the growing success of Aircell, which has seen its air-to-ground cellular-based, megabit-rated Gogo service adopted by most of the leading US airlines and is now marketing it to business aviation under the High Speed Internet (HSI) label. Like SwiftBroadband, HSI supports the full range of modern mobile communications, while offering more bandwidth through lighter and simpler onboard equipment.

Colorado-headquartered Aircell recognises that many US business aircraft operators also need service outside the USA, where its network does not reach, and has teamed with Thrane & Thrane to offer an optional integrated SwiftBroadband capability. At NBAA the company announced that customers taking delivery of new Hawker 750 and 900XP mid-size jets next year can opt to have HSI and SwiftBroadband fitted on the line. A Hawker 750 demonstrator is now flying with HSI and the first with SwiftBroadband is due to take to the air this month.

HSI has also been selected by US fractional-ownership operator Flight Options for most of its 110-aircraft fleet – brand-new Embraer Phenom 300 light jets, Legacy 600s, Hawker 400XPs

and 800XPs, and Cessna Citation Xs – and is to be offered as an option on the whole Dassault Falcon range of large-cabin aircraft.

Ocean warfare Aircell represents an unmatched combination of capability and costs over the continental USA. But satellite is the only solution over the oceans and, at present, the other continents. Several providers are now contesting this market with Inmarsat, offering various combinations of bandwidth, coverage and cost.

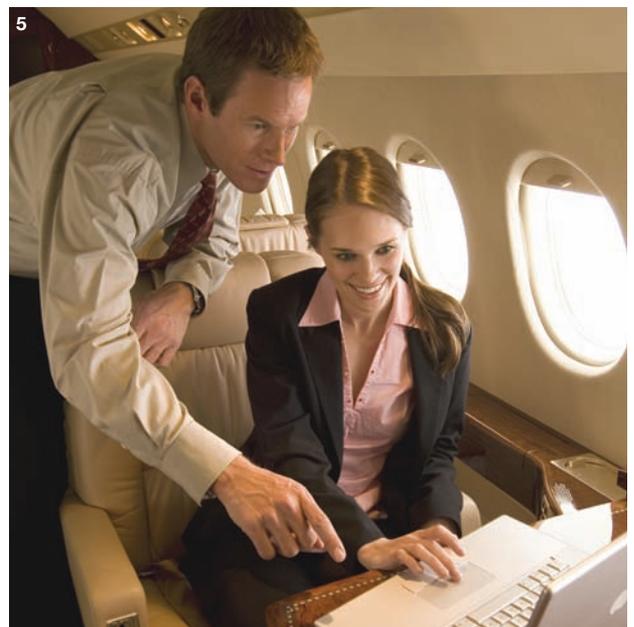
At one end of the range are companies using leased Ku-band satellite capacity to provide megabits of data throughput via comparatively complex aircraft equipment and over certain regions of the world. In the middle is Inmarsat, with its L-band technology, maximum of 432kbit/sec per channel, intermediate-price equipment and coverage of the whole globe apart from the poles. Completing the picture is Iridium, with its L-band low-Earth-orbit satellites providing true global coverage, modest equipment costs and low data rates – no more than 2kbit/sec for the time being.

Ku-band players with an interest in the business jet market include Panasonic and ViaSat. At NBAA the former, fresh from unveiling Lufthansa as its first airline customer, announced that its Global Communications Suite would also be made available to business and VIP aircraft operators. Comprising data connectivity at a

- 4. NICE iPod docking station from Lufthansa Technik
- 5. Aircell has teamed with Thrane & Thrane to offer SwiftBroadband capability

claimed maximum of 50Mbit/sec, onboard mobile phone and live inflight TV, the service is reported to be the subject of discussions with the operators of a number of air transport-category business/VIP aircraft – Airbus ACJs and Boeing BBJs, 747s and 777s.

Having entered the market as a Ku-band equipment supplier, California-based company ViaSat has developed service ambitions. Its Yonder service is now available from Moscow westwards across the Atlantic Ocean, North America, the Pacific Ocean and into Japan and southeast Asia. Development continues, with the goal of providing round-the-world coverage





THE MESSAGE IS LOUD AND CLEAR – CONNECTIVITY IS HERE TO STAY

by mid-2011. In Orlando the company announced that its VMT-1500 airborne terminal had just been installed for the first time in a Bombardier Global Express XRS large-cabin, ultra-long-range aircraft.

Iridium is growing in popularity with business operators who are content with a moderately priced phone and basic email service. At NBAA two exhibitors unveiled offerings designed to make the most of the satellite operator's currently limited bandwidth.

Montreal-based Innotech Aviation introduced its Sky Berry System, which allows passengers to send and receive messages via their smartphones, a WiFi cabin network, an International Communications Group (ICG) router, and Iridium. Usage costs are claimed to be significantly lower than those of other solutions, and installation time is just two days.

Iridium service provider EMS Sky Connect took the wraps off Forté Airmail – air-to-ground email via WiFi-enabled iPhones and other smartphones. The service complements the Maryland-based company's existing

Forté products for voice and text, and is priced at US\$25,995, including the WiFi interface and Iridium transceiver and antenna. That compares with reported Ku-band installation costs running into the hundreds of thousands of dollars.

Live and direct Another supplier to trumpet a combination of keen pricing and smartphone-centricity at NBAA was LiveTV. Owned by low-cost airline JetBlue, LiveTV made its name with satellite-delivered inflight television but has since added a connectivity string to its bow. The company is using ground infrastructure acquired from the now defunct Verizon Airfone to provide Continental Airlines passengers with email and instant messaging in US airspace.

Last month it announced BlackBerry on Board (BOB), a service aimed at the 2,000 business and general-aviation users of the Magnastar phone service inherited from Verizon. BOB combines the existing onboard Magnastar radio and ground network with a carry-on wireless laptop that acts as an access point to the air-to-ground system for



- 6. ViaSat's Yonder mobile broadband service
- 7. Wireless system controller for Lufthansa Technik's NICE entertainment system

WiFi-enabled BlackBerries. The laptop and accompanying licence cost US\$10,000 per aircraft, and the user pays US\$299 a month for unlimited connection time.

There's even more to corporate connectivity than met the eye at NBAA. Ku-band satellite provider ARINC claims more than a hundred installations of equipment giving access to its SKYLink service, mainly in Gulfstreams. And Geneva-based OnAir says it has two operators of VIP narrowbodies signed up for its Inmarsat-supported onboard mobile phone and internet access services.

Air-to-ground communications for the business jet cabin used to look like an expensive luxury. Now a host of providers are locked in competition, prices are coming down and the services exactly match the executive travellers' needs. The message is loud and clear – connectivity is here to stay. **END**

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same difference

Vistajet has called on luxury yacht designer Ivana Porfiri to design the interiors of its all-Bombardier fleet



VistaJet continues to expand at a rapid rate – taking delivery of seven aircraft in 2009, as planned, which will operate across the three regions it caters

to via its ‘single service area’ of Europe, the Middle East and Asia Pacific. And despite one of the industry’s toughest years, VistaJet reported a 25% increase in revenue in the first quarter of 2009 compared to the same period in 2008.

The Swiss company says it plans to take delivery of a further seven jets next year, taking its all-Bombardier fleet to 32 aircraft in 2010, based on the Learjet 40 XR, Learjet 60 XR, Challenger 605, Challenger 850 and Global Express XRS. VistaJet has enlisted the help of luxury-yacht interior designer Ivana Porfiri to design the fleet’s interiors, which feature Hermès-style leather and stitching amongst other high-level features.

“We’re bucking the trend and we’re taking significant market share from others, which is due in no small part to an incredible amount of hard work, but also our unique business model and the luxurious cabin experience we offer,” says VistaJet’s founder and chairman, Thomas Flohr.

The interior is a critical component of VistaJet’s success, asserts Flohr: “It is very important because, first of all, we want the customer to have a consistent experience throughout the fleet,” he says. “So if you hop around in Europe on a Learjet, or need to go to New York on a Challenger, or maybe you have a trip to Tokyo on a Global Express, the

interior should be of the same high quality and visual appearance. Just like when you go to a Four Seasons Hotel, whether you check into a double room, junior suite or the Presidential suite, there is the same touch, look and feel – the same bed sheets, service and carpets. You have the same experience and that's what we are replicating for the first time in this industry.”

Having aircraft supplied by just one manufacturer obviously helps in this respect, but just how much ‘wiggle room’ was Vistajet able to secure from Bombardier when defining the interiors for each type? “We had very clear ideas of what we wanted to achieve in the cabin, and Bombardier was able to accommodate that,” replies Flohr.

Porfiri paints a slightly different picture: “Any change has a huge cost, so you have to be clever working inside of the established costs,” she says. “So long as you don't change the budget, they are flexible. But if you make changes that impact the cost, then it becomes a big deal – either you pay or the change is not possible.”

Learning the ropes The Vistajet project is a significant departure for Porfiri, who as a luxury yacht designer (she first became involved after designing Flohr's personal 43m motor yacht) normally has the freedom to craft far more individual and expressive interiors: “I have to say that I am not doing this kind of project normally,”

1



WE WANTED SOMETHING VERY NEUTRAL – BUT WHEN YOU LOOK A LITTLE CLOSER YOU CAN SEE A REAL ATTENTION TO DETAIL



2

she says. “It was totally different from making something very personal. The goal instead was to make something that every customer would be able to appreciate, whether they were Russian, Indian or European.”

It didn't take Porfiri long to realise another distinction: “There is a big difference between a yacht and aircraft, because of the rules governing materials, fire proofing and certification – there are so many tests you have to do before you can apply certain solutions – many more than in yacht design. Let's say you want to change the type of oven in the galley, because it doesn't suit the design or you have a better type. It costs a fortune to change it because of all the certification testing involved, so much so you have to pay ten times the real cost of the oven. It's the same if you want to apply a wood finish that is not in the range already tested – it can become very difficult.”

Design directions Flohr says he was after something “luxurious and comfortable” for each cabin scheme, and to guard against the use of strong colours, to ensure the widest customer appeal: “We wanted something very neutral – it's not crazy in one direction or the other – but when you look a little closer you can see a real attention to detail that we feel customers will really appreciate,” he says. “We have

1. Bombardier Challenger 850 interior
2. Vistajet's prize jewel – a Bombardier Global Express XRS

THEN WE CHOSE THE DETAILS – ADDING LITTLE TOUCHES FOR THE OBJECTS THAT YOU TOUCH OR ARE CLOSE TO YOU



two-tone leather seats in earth colours, with Hermes-style stitching. Overall, we are trying to bring a calmness into the cabin.”

Warmth was another important factor – dark browns are teamed with gentle creams rather than colder whites, and Porfiri avoided stainless steel: “All the metal parts have a platinum-like appearance, rather than stainless steel or chrome, to give a greater sense of warmth,” she says. “The wood is similar to ebony, while all the carpets and the leather sideliners and fabric finishes are a light cream. It’s a very, very simple combination, which avoids making a mess of the smaller cabins.”

Despite sharing strong characteristics, Porfiri notes that there are subtle differences between aircraft models, in recognition of the very different environments they present: “There are differences, due to the size of each aircraft and their various configurations,” she says. “We were therefore obliged to choose different materials and colours. For example, the impact of using a dark wood in a partition on a Learjet is very different from the impact it would have in a Challenger. This is a very simple, but significant difference, so the combination of carpet pattern, overall colour and materials cannot be the same for every model, which vary in their interior layout and quantity of surfaces. You have to develop each one slightly differently.”

Although limited to choosing furniture already approved by the manufacturer, Vistajet was at least able to exert some influence: “When you buy an aircraft from Bombardier, you have a range of options you can choose from,” explains Porfiri. “You have four seats, two possible solutions for the galley, and so on, depending on the model. You cannot invent as such – and this project was for a commercial fleet, so you cannot invent completely, but you can pick from a range of already prepared solutions.”

However, Vistajet opted to ditch the standard seat model for a version featuring higher backrests: “There were four models, but we chose the one that was closer to our aim,” continues

- 3. Vistajet works with local catering suppliers to provide onboard meals
- 4. Cream leather seating features stitching inspired by luxury luggage

Porfiri. “Then we chose the details – adding little touches for the objects that you normally touch or are close to you. We paid special attention to the leather stitching of the seats and the sofas.”

Porfiri says the stitching is reminiscent of luxury leather-bound luggage: “If you look at that kind of object, especially older examples, you see their construction features really rich stitching, and this in turn has become associated in our minds with travel and luxury.”

Vistajet opted for manual seats, rather than electric: “We decided to stay with manual because if one electrical motor gets broken, which can happen if the kids play around with the controls, once that seat is broken, it’s an ‘AOG’ [aircraft on ground],” explains Flohr. “The aircraft cannot take off until the seat is repaired. So you have to find the right balance between functionality and electronic gimmicks.”

However, Vistajet’s fleet does boast the latest IFE and communications technology: “We equipped it with the best entertainment features so the client can watch movies and have his iPod plugged in, while the bigger jets feature onboard internet,” he says.

Overall, Flohr is more than happy with the end result: “A unique cabin is one of Vistajet’s most attractive features, helping our customers feel comfortable, which is how you want to feel when you are in a very small space for a very long time.” **END**



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ruggedruler

New interior and avionics packages should help keep the extremely robust and ever popular MU-2 flying for decades to come



Between 1966 and 1986, 703 MU-2s were built at Mitsubishi's San Angelo, Texas plant from kits shipped over from Japan. Some 400 remain in service today. Depending on the model, MU-2s hold six to nine passengers; they also cruise at 315 knots, land on very short and rough fields and have a range of 1,100 nautical miles. Used MU-2s also cost less than half as much as comparable used turboprops, are built like a tank and enjoy some of the best product support of any used business aircraft. In many ways, they recall the Lockheed C-130, the rugged, go-anywhere cargo aircraft that has been the backbone of the US Military Airlift Command for 50 years. Prices vary from US\$150,000 to US\$850,000, depending on model and condition. For the cost of a new four-seat, single-engine piston aircraft, you can get a turboprop that performs almost as well as a very light jet and has a larger cabin.

The MU-2 harkens back to the days when pilots actually flew aircraft, as opposed to pushing buttons and looking at pretty display screens. Consequently, the airplane has scant patience for pilots whose hubris outruns their abilities. While the MU-2 is a turboprop, it flies more like a jet. The MU-2 demands a pilot's attention and respect, but the rewards it provides are great, including a smooth ride through turbulent air, fast cruise speeds, responsive controls and rugged construction. It features a variety of advance design elements including full-span wing flaps and over-wing spoilers instead of ailerons. What this does is give you a short wing that performs well between the low-speed landing characteristics of a docile turboprop, such as a King Air, and the slick wing of a Learjet in cruise flight. Because of its jet-like performance, US MU-2 pilots must now obtain the equivalent of a jet-type rating, and recurrent training to fly one.

MITSUBUSHI MU-2

Owners of these aircraft are fanatically loyal to them. Part of this stems from Mitsubishi's decision to continue to provide top-notch product support for the aircraft, even decades after halting production. However, more of it emanates from the aircraft's performance. Pennsylvania businessman Bob Watkins has owned and flown MU-2s since 1983. He also has a Learjet. "Given a choice for the coldest, darkest, ice-covered, snowstorm-kicking crosswind night landing, I'll take the MU-2 long after I've left the Lear in the barn," says Watkins.

Short or long? The MU-2 was in a state of constant evolution over its 20-year production run, but it basically comes in two flavours: short-body, which seats six or seven; and long-body, which seats seven to nine. The long-body models have a 6ft-longer fuselage and give up 10 knots of airspeed (down to 305 from 315). The most recent versions of the short and long bodies are referred to as the Solitaire and Marquise, respectively, and these are the most desirable MU-2s on the market. Power comes from a pair of Honeywell/Garrett engines that are compact and incredibly durable, with long intervals (5,400 hours) between recommended overhauls, which cost about US\$175,000 per engine. Most used MU-2s have accumulated 5,000 to 10,000 hours.

Today, most MU-2s are used for executive transport, but some are enlisted for more rigorous missions. In the United States, The Navy uses 13 MU-2s to simulate targets for teething F-18 pilots and the Federal Reserve relies on MU-2s to transport checks and currency. Of the 309 MU-2s registered in the US, 20% are flying some sort of public-sector mission. The Japanese Defense Agency still flies 40 MU-2s for coastal-patrol and search-and-rescue missions.

Comfortable cabin For an aircraft of this size it has a comfortable cabin: 4.3ft high, 4.8ft wide, and 16.1ft long yielding a total cabin volume of 265ft³. The baggage compartment is in the aft cabin and has 44ft³ of capacity.

The MU-2's massive, submarine-style main cabin door is aft of the wing and propellers. An optional toilet can





1. Recently refurbished MU-2 interior from Ranger Aviation Enterprises



GIVEN A CHOICE FOR THE COLDEST, DARKEST, ICE-COVERED, SNOWSTORM-KICKING CROSSWIND NIGHT LANDING, I'LL TAKE THE MU-2 LONG AFTER I'VE LEFT THE LEAR IN THE BARN



be located back there and there is also a cargo net for baggage that can be accessed in flight. While far from a stand-up cabin, the MU-2's passenger area boasts a flat floor that makes transiting between seats easier than in trenched-aisle aircraft.

Fold-out sidewall tables can be deployed between the facing 'club four' seats and also from the front-cabin bulkhead in the long-body models. Typically there is also a pair of pyramid cabinets behind the pilot and co-pilot positions. The long body also has a left aft oxygen cabinet and storage area/first aid kit. There is room for a small coat closet, beverage drawers and built-in CD/DVD players.

Noise control Taking into account the engine's distinct high-pitch and the proximity of the propellers to the fuselage, interior cabin noise, while certainly noticeable, is less than you might expect. It is even less so with Skandia's STC'd soundproofing kit for the aircraft. This popular after-market option adds approximately 70 lb, but makes an appreciable difference in cabin noise levels. The package is applied behind the sidewalls and headliner and under the floor in layers depending on its location in the aircraft.

"There are three layers at the prop arcs," says John Fields, president of Ranger Aviation, a leading MU-2 refurbisher. "It cuts down vibration and noise transfer and does a significant job of quieting down the airplane."

Most of these aircraft will need a refreshed interior and the average price runs between US\$40,000 and UK\$60,000. Add top-notch exterior paint and an MU-2 can be cosmetically made over for around US\$100,000.

After Mitsubishi folded its San Angelo operation, Fields, a former

executive there, founded Ranger Aviation Enterprises to service MU-2s and provide paint and interior services for various different corporate class aircraft. Over the years Ranger has refurbished nearly 75 MU-2s. A typical job takes four to five weeks and includes refoaming and resculpting the seats, to add built-in lumbar and more modern contour, and providing new seat, sidewall, and headliner coverings, as well as new cabinetry veneer and laminates. Ranger typically uses Aeristo Aeronappa leather on the seats and side panels, Skandia seat foam, Izit Leather headliner covering, Douglas's Tochi

A TYPICAL JOB TAKES FOUR TO FIVE WEEKS AND INCLUDES REFOAMING AND RESCULPTING THE SEATS

2. Front divan and cabinetry



Linen on the sidewalls, laminates and veneer from Laminart, and carpet from Aircraft Interior Products. Ranger also uses Hemisphere sheepskin inserts that are sewn into the leather of the crew seats.

Ray Garcia is an MU-2 veteran who started at Mitsubishi in 1979 and then moved to Ranger in 1990. He currently runs the company's interior shop and says that the most challenging part of an MU-2 interior refurb is removing and replacing the one-piece headliner without damaging it: "It's big and bulky."

Limited edition Up until now, owners who wanted to refurbish their MU-2 cabins were limited to re-rags and other options that fell within the aircraft's original certification confines, but that is about to change. Early next year, Tulsa-based Intercontinental Jet Services, a Mitsubishi subsidiary, will begin offering remanufactured MU-2s. The MU-2 Limited Edition (LE) package includes pilot training; warranted and updated engines; overhauled propellers; new paint and interior; new cabin windows; and new cockpit avionics, including new radios and Sagem glass-panel displays.

Intercontinental is teaming with Lou Martin & Associates to develop new STC'd interior panels, window treatments, cabinetry, and tables for the Limited Edition package. These components, including one-piece headliners and sidewalls, will be largely fashioned from composites and will be substantially lighter than the ones they replace. The new-design table will fold into the sideledge, as opposed to being stored within it on the old design. The new sideledges will also incorporate integrated armrest panels. The new-look LE interior uses Nickel Medium Aged Antique finish plating from High Tech on the reading lights, switches, O2 rings, and entry door trim. Initially, the LE package will be available for the short-body, or Dash 40 series MU-2s.

The new interior and avionics packages promise to increase the MU-2's aesthetic and operational appeal and keep this veteran turboprop relevant and popular for decades to come. **END**

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3100 series

Goodrich has launched a new seat model for mid-to-light size business jets – the 3100 series. The seat features 180° recline (or ‘full berthing’), fore/aft movement, a swivel capability, and adjustable armrests and headrest.

Goodrich says advantages include fast installation and low maintenance. No cable adjustments are required and the seat stows outboard for take-off and landing.

www.goodrich.com



Nexus

Building on previous successes in the large-cabin VIP market, DeCrane Aerospace Aircraft Seating (DeCrane) has developed the Nexus programme of 9g and 16g seats and divans. Energy-absorbing capabilities incorporated within the seat structure are designed to minimise loads against the seated passenger, therefore improving installation and occupant protection criteria.

DeCrane says the Nexus programme is focused on flexibility, lead-time, weight and overall cost considerations, with no non-recurring expenditure presented to the customer. Standard and optional features include electric and manual capabilities, a multitude of upholstery styles and options, full-flat recline, in-arm single-leaf tables, 9in x 5in tracking, 360° rotation, manual and electric lumbar and massage systems, and flexibility in how monitors and in-flight entertainment (IFE) is installed. For specialised and non-standard applications, the company also provides development and engineering services to customise and retest to the client's specific needs and requirements.

The 16g Nexus divan offers all these features and has a single module design, configurable in as many seating positions as required. Available in forward-, aft- and side-facing configurations, standard and optional features include drawer and door storage, fold-down arms, and flexibility in the cushion design for various upholstery solutions. The divan has a low back during flight so as not to obscure the windows, and a raised back for the taxi, take-off and landing position. Soon to be added to this offering will be a three-place single unit side-facing divan incorporating DeCrane's patented telescoping leg technology to accommodate the pitch and roll and energy absorption requirements of a unit approximately 81in long.

Recently, DeCrane's 16g Nexus linear bearing seats and 16g divans were chosen by Flying Colours for three green Challenger 850 completions. DeCrane Seating will supply single seats, double seats and divans for the aircraft.

www.decraneaerospace.com



Master Class

Aero Seating Technologies (AST)'s next-generation 16g-certified Master Class seat (pictured right) is loaded with features designed to ensure ultimate seating comfort, including vertical adjustment for 3in of vertical travel. Fore, aft and lateral translation – including 360° swivel and full-flat berthing – is standard on all AST's 9g and 16g Master Class VIP seats. The pivot point placement of the integrated seatpan lifter and articulating seat bottom allows the seat to move from the fully upright position to lie-flat sleep mode with the touch of a single lever. The bottom cushion tilt feature allows additional adjustment for personalised comfort. Powered massage and electric lumbar support systems and leg rest are also available as options.

AST is also offering a new 16g VIP seat for light jets, which when upholstered, weighs less than 93 lb (43kg). Standard features include fore, aft and lateral translation – including 360° swivel and full-flat berthing. Additional features include electric lumbar support and leg rest. Optional power-assist mechanical controls are augmented by a 28V DC solenoid motor.

AST seats can be used for a wide range of aircraft installations including executive jets, wide- and narrow-body business jets and VVIP aircraft, and can also be customised to accommodate owner/operator requirements for comfort, style and ergonomics.

"AST is focused on providing every customer with the highest level of luxury through the integration of innovative designs, meticulous craftsmanship, comfort and style," says Pete Perera vice president of business development at AST. The company provides VIP seating solutions for a wide range of customers worldwide, and has expertise gained from many years of developing crew and passenger seats for the aerospace industry.

www.aeroseating.com



Learjet 55 divan

Aviation Fabricators (AvFab) has received FAA STC approval for its Learjet 55 divan (pictured left). The two-place side-facing divan kit includes seatbelts and shoulder harnesses. It is delivered in green condition, without upholstery and has the capacity for an ample under-seat storage compartment. It also comes with the option for close-out panels and armrests. The divan can be installed on either side of the aircraft, and AvFab says installation is made simple by using the existing seat track. Divans are custom built for each customer and are engineered for durability and utility.

AvFab has also received FAA approval to install its Clear View Headrest on Beechcraft King Air seats. The headrest replaces the existing plug-in headrest on existing seats and effectively opens sightlines in the cabin above the seats. The new headrest can be extended above the seat top if desired. This product is FAA approved by STC and PMA for all Beechcraft-built King Air aircraft (from the 90 series to the 200 series) cabin seats fitted with shoulder harnesses.

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balancingact

ctm design's recent VIP projects demonstrate its emphasis on bridging the gap between design and engineering

With design pushing the boundaries like never before, ctm design says one core challenge remains – to maintain the design intent from concept right through to completion. In the world of aircraft interior design, where luxury finishes and creative innovation are in high demand by VIP clients, design consultancy ctm design works hard to achieve this balance.

Engineering challenges “Our recently completed interiors, both commercial and VIP, have succeeded in taking aircraft design to a new level, while making the final creation acceptable from an engineering perspective,” says Robin Dunlop, director at ctm design. “From pushing new materials to refreshing mechanical or structural designs, we work closely with engineers and completion centres to challenge design guidelines, and provide realistic solutions so that our innovative interior designs are achieved.”

Recent aircraft designs completed by ctm design include an A318 for a Saudi-based gentleman – a ‘triple A’ VIP interior, for which the company worked closely with the completion centre. The result is classic, luxurious and elegant, comprising a private suite with bathroom, entrance, galley and lounge areas.

ctm design has also completed designs for three separate Dornier 328 ACJ

projects. One of these was for a former motor racing driver – a jet conversion where the aim was to raise build quality as well as design finish. The sophisticated interior also had to meet the tech-savvy client’s high-tech entertainment needs with lightweight high-definition and digital infrastructure to secure the highest quality picture and sound in a luxury environment.

Another project is a Fokker 70 for a European head of state – a refurbishment design for which ctm design worked with government officials and the head of state’s aides to bring the interior and in-flight entertainment (IFE) into the modern era.

Custom design “Each of these interior designs, whilst completely tailored to the client’s specification and meeting their desires for the ultimate in luxury interior design, has also achieved excellence in manufacture,” says Dunlop. “We are taking the headache out of the design, making it clearer for the engineering teams, without losing the innovative design.”

In addition to designing complete aircraft interiors for VIPs, ctm design has also created designs for first-class products on commercial airlines such as Emirates and Virgin – from seats to bar areas, sleeping quarters and crew rests. “Our technical expertise and creative design vision have allowed us to ensure ctm design’s creations



are not just stunning – they are technically achievable, meet the high standards and specification required, yet all the while, maintain innovative, luxury design finishes,” says Dunlop.

ctm design’s vision is to continue to exceed expectations in VIP aircraft interior and exterior design, whilst also applying its expertise and skills in other areas – such as yacht and property design.

ctm design

Reader Enquiry No. 501

2



1. The design for a washroom on a Dornier 328 ACJ
2. The lounge area of an A320
3. Robin Dunlop, director of ctm design

3

flybywire

It may not be noticed by passengers, but the composite aerospace wire driving everything from lighting to in-flight entertainment is the result of constant research and development

When passengers board an aircraft for a flight, it is safe to say that very few, if any, ever think about the miles of wire and cable used in a modern aircraft. Wire and cable is used for a wide variety of applications from power and lighting, to sensors and communication – functions absolutely essential to the operation of the aircraft. There are many types of wire used, but by far the bulk of it is classified as hook-up wire.

Thermax, which manufactures wire and cable, says the ideal aerospace hook-up wire will boast exceptional electrical insulation for electrical performance and mechanical durability (abrasion resistance), the lightest weight and smallest diameter possible to save weight and minimise the size of wire bundles, a smooth surface for ease of installation, and the ability to endure temperature extremes ranging from -55°C to over 260°C.

Composite wire Although several insulation types are used in the wire of a modern aircraft, Thermax says the insulation chosen most often is composite wire, because it meets the key attributes described above – exceptional electrical insulation, light weight, small diameter, smooth surface, and extreme temperature durability. Composite wire is manufactured to several key specifications – EN2267 (Airbus), BMS 13-60 (Boeing), and AS2259/80-92.

Composite wire is named such because it is actually the lamination of two dissimilar insulating materials – polytetrafluoroethylene (PTFE, or more commonly Teflon, a registered trademark

of E. I. du Pont de Nemours and Company) and a polyimide film – over the base copper wire. Both films are applied in a taping process and the resulting assembly is heated to initiate a thermal reaction that results in a homogenous outer surface.

“This combination provides a very thin yet durable insulation that can survive the rigours of the aerospace environment over the many years of service for a typical aircraft,” says Don Slutz, senior product manager at Thermax.

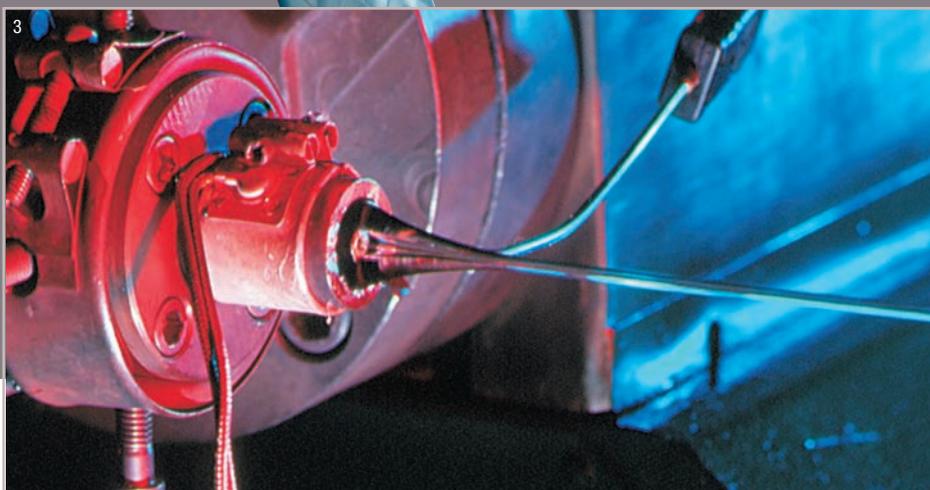
Composite wire has its roots in the USA’s space programme of the 1960s. “The need for higher performance wire was highlighted based on durability issues that were observed not only in space flight but commercial aircraft as well,” says Slutz. “This drove the need for a durable high-performance wire with the key attributes previously noted. It was observed that by combining dissimilar materials – each with its own unique performance characteristics – ultimate performance could be gained.”

Research and development So what does the future hold for composite aerospace wire? Thermax and other manufacturers are working to develop next-generation versions of composite wire. Of course the goal will be to continually improve durability and electrical performance while at the same time providing a wire that meets the design requirements of space and weight savings, and is easy to install. But in addition, improvements are being evaluated to meet future system requirements. Thermax’s research and development is being conducted in two key areas – fault detection and self repair. In the first case, during routine maintenance, the wire will have the ability to report if it has been damaged, thus simplifying repair. In the second case, the wire will actually be designed to ‘heal itself’ if damaged.

“Regardless of future aerospace requirements, passengers can rest assured that the wire and cable manufacturer’s goal is to make sure that they never have to think about the miles of wire in an aircraft,” says Slutz.



1. A composite wire
2. Thermax's Gigabit-Plus 1,000 Base-T Ethernet cable
3. A wire extruder on Thermax's wire manufacturing line



Thermax

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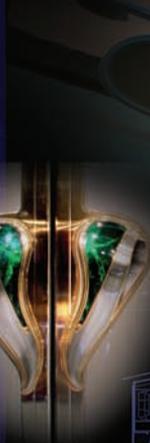
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softcell

TrueNorth Avionics has taken a software-based approach to airborne telecommunications – focusing on connecting the aircraft to the office on the ground, rather than creating a second office on the aircraft

While many airborne telecommunications products aim for the holy grail of the office in the sky, TrueNorth Avionics has achieved that result through a different philosophy – instead of turning the aircraft into a second office, the company's new Simphone (pronounced 'symphony') OpenCabin system links the aircraft to the passenger's office on the ground.

An all-digital, fully secure, end-to-end solution for business aviation, Simphone OpenCabin takes its cue from such smartphones as the BlackBerry and iPhone, using a suite of software applications, or apps to enable the passenger to do such things as use their own WiFi-enabled smartphone, laptop or other device as soon as they walk onto the aircraft, and add as many voice lines as they want through voice over internet protocol (VoIP), for on-demand teleconferencing of up to 20 voice channels at once. Passengers can also interface with every available off-aircraft communications network – including Iridium, Inmarsat, various other Satcom options, and even the Aircell

air-to-ground (ATG) high-speed passenger entertainment service – to provide seamless connectivity with their office on the ground, at what TrueNorth Avionics says is the lowest possible service cost.

Future-proofing Making the aircraft – whether one aircraft or a fleet – a node on the client's telephone and IT networks, Simphone OpenCabin brings the concept of convergence to the sky. "For the first time, airborne voice in the cabin is converted to data packets, which is how ground-based telephony is increasingly handled," says Mark van Berkel, president and CEO of TrueNorth Avionics. "The Simphone OpenCabin system, with its app functionality and future-proof approach, is the harbinger of the future for airborne telecom."

Introduced with a suite of 18 apps covering voice, WiFi, enterprise broadband and information functions, TrueNorth Avionics has already added two interesting new apps to Simphone OpenCabin to enhance connectivity. The previously mentioned ATG Connectivity App was

created with the aim of offering more choice and saving operators money by allowing them to use an Aircell ATG-4000 as a possible network connection without adding any other additional hardware. "Everything is seamlessly integrated into the OpenCabin network with the security and robustness that is expected from an enterprise solution," says van Berkel.

The second new app will provide access to the forthcoming TerreStar S-band satellite network, a North American service designed for use with lighter and less expensive hardware, with lower service costs.

Cutting development time "These apps illustrate other key benefits of the software-centric approach, in that no new hardware is needed to add capability, and development time for new features can be slashed dramatically," says van Berkel. "Since software is eminently less expensive than hardware, cost-saving touches abound, such as OpenCabin's built-in, enterprise-level data router app – sold by third parties for as much as US\$30,000."

The data router app software, along with the rugged Simphone OpenCabin hardware, forms a system developed for enterprise level. This system is designed to offer executive-class voice quality, hardware reliability, integration, features, and corporate-class security. "Knowing that aircraft can be a target for eavesdropping and other forms of unsavoury interest, the Simphone OpenCabin system breaks new ground for airborne systems with both WEP and WPA security to ensure your communications are as safe in the air as they are in your office," says van Berkel. "The system not only connects your aircraft to your office on the ground, it connects you to the future."

TrueNorth Avionics

Reader Enquiry No. 503

1-2



1-2. The OpenCabin telephone handset



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justaddwater

Addressing a growing concern over potable water quality in aviation, Monogram Systems – TIA Division (TIA) is launching a new product, the 1604 Top-Fill coffee brewer. The new coffee brewer does not rely on aircraft potable water supplies, using its own internal water tank to brew coffee in flight.

The water tank is easily filled during flight with the customer's choice of bottled water. The coffee brewer's fill port is conveniently mounted on the front of the unit, and is stowed in a hidden position when not in use. The design completely separates the coffee brewer from the aircraft water system.

"Pour-over technology is not new to TIA and has proven its reliability over thousands of hours in business aviation and cargo aircraft," says George Stachowski, manager, airline sales and customer support at TIA. "In addition to its better tasting cup of coffee, the 1604 coffee brewer is up to 5 lb lighter than existing units and is available in ATLAS and ARINC standards. With the 1604 coffee brewer, business jet owners and operators now have a cost-effective alternative to the overly complex, commercial airline coffee makers that have been used in the past."

Monogram Systems – TIA Division

Reader Enquiry No. 504

businessclass

In response to the industry's growing demand for high-tech accessories and VIP interiors, and the implications this creates for design certification, Aerospace Design and Certification (aeroDAC) has launched a new cabin safety certification course.

With a reputation for excellence in global aerospace design and certification, aeroDAC has utilised its vast experience and training expertise to create a course based on what it says are the three main principles of cabin safety certification – occupant protection, extending time for egress and increasing the speed of egress.

The new airworthiness requirements have grown in response to the rapid development of technology including in-seat power, in-flight entertainment, portable electronic devices and airbag seatbelts. New designs must also adhere to Electrical Wiring Interconnection System (EWIS) specifications.

Difficulties that design organisations may face when working on aircraft interiors include design modifications aimed at renewing and

re-designing soft furnishings that must meet flammability regulations, while also ensuring compliance with dynamic seat requirements. "VIP interiors present further concerns regarding compliance, as many suppliers of furnishing and equipment are not approved, and therefore the design organisation must take responsibility for certification," says Terry Gibson, managing director of aeroDAC. "EASA does not approve burn test laboratories and one of the more controversial areas that our clients encounter is that multiple audits of test facilities can be time wasting."

aeroDAC would like to see better understanding of the certification implications surrounding new designs before they reach the final stages of completion. "aeroDAC's new cabin safety certification and EWIS courses assist organisations by providing comprehensive training in, and understanding of, all of these areas," says Gibson.

aeroDAC

Reader Enquiry No. 505





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starquality

TranStar Aircraft Interiors designs and manufactures custom-specified luxurious components for the executive and private sectors of the aviation industry.

In 2005, TranStar Aircraft Interiors worked exclusively for an aircraft cabinet manufacturer, opening its own facility in 2006 to increase capacity and expand its customer base. Over the past few years, the company has striven to build its competitiveness through increasing production output levels and customer service, using modern equipment and software to manufacture at a higher efficiency level. Ultimately this means it can cut labour costs and pass these savings along to its customers.

As well as cabinet design and manufacture (fabrication, cover and finish), the company makes soft goods, sheet metal and machine parts. Other services include on-site support, engineering, structural analysis, flammability testing and certification (8110s and 8130s).

A comprehensive aircraft interior business that is committed to guaranteeing its customers premium service and craftsmanship, Transtar Aircraft Interiors has built a motivated management team that benefits from over 30 years of experience.

Transtar Aircraft Interiors

Reader Enquiry No. 506



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casestudy

With the growing availability of inflight connectivity, you're going to need a stylish case to protect your laptop

1. Voltaic Generator solar laptop charger bag; €499 (US\$742); eu.voltaicsystems.com
2. Aspinal Chairman's Laptop Briefcase in black croc with cobalt blue suede; £495 (US\$809); www.aspinaloflondon.com
3. Knomo Bungo men's laptop messenger; £185 (US\$302); www.knomo.com
4. Paul Smith Envelope Case for the Apple MacBook Air; £65 (US\$106); www.paulsmith.co.uk
5. AnOther MacBook sleeve by Gareth Pugh for InCase; £76 (US\$124); www.liberty.co.uk



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