

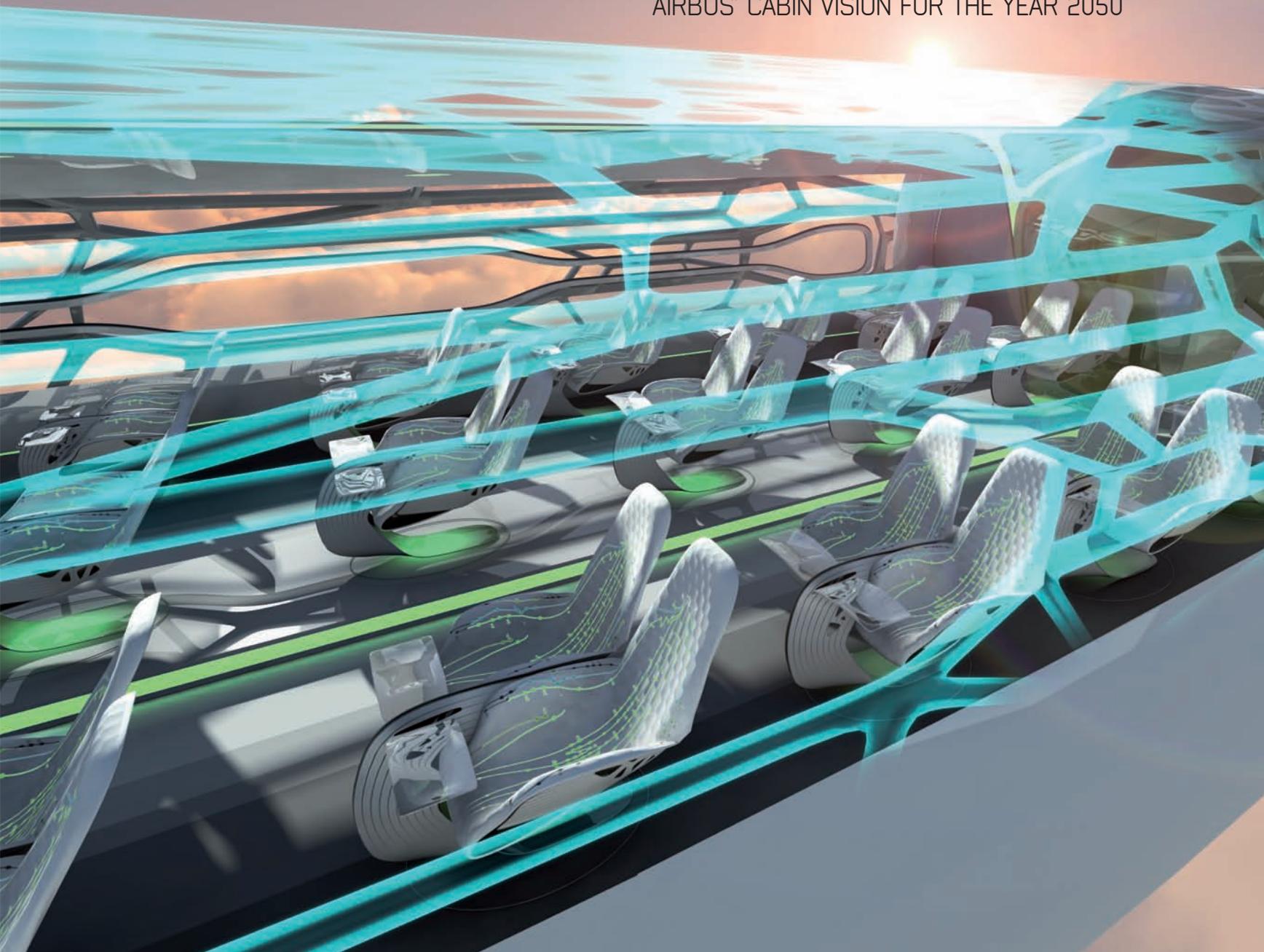
Aircraft *interiors* INTERNATIONAL

SEPTEMBER 2011

THE INTERNATIONAL REVIEW OF AIRCRAFT INTERIOR DESIGN AND COMPLETION

whatif?

TRANSPARENT MEMBRANES, MORPHING SEATS
AND HOLOGRAPHIC INTERFACES – STEP INSIDE
AIRBUS' CABIN VISION FOR THE YEAR 2050



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dreammachines

Having kicked off the year by taking a look at the future of cabin design and technology in our March edition, we're 'back to the future' again in this issue, where we examine the merits of Airbus' Future Cabin Concept, unveiled just before this year's Paris Air Show. I'm not sure if we'll still have air shows in their current format in the year 2050 – but if we do, I hope they offer a better experience than the one I endured at Le Bourget. Traffic chaos, long queues, miserable weather and a sprawling and confusing mass of exhibits and displays left me questioning the value of my attendance.

Perhaps it didn't help that one of the reasons behind my visit to Paris was to attend a press conference where ANA had promised to finally reveal the interior details of its new 787s. But something must have been lost in translation – despite attempts to ascertain the most basic of details, little information was forthcoming. ANA executives could not even confirm which seat suppliers they had decided on, let alone LOPAs. Fortunately, we finally secured the answers – take a look at our feature on page 34.

Despite its well-documented delay into service, the Dreamliner is a fantastic aircraft designed to reconnect passengers with the magic of flight – the 787's large windows have a very important role to play in this respect. However, this idea is taken to a whole new dimension on board the Airbus Future Cabin Concept (see page 66), which proposes an "intelligent cabin wall membrane that controls air temperature and can become transparent to give passengers open panoramic views". The concept relies on a cabin fuselage with similar structural qualities to bird bone – some may denounce this vision as more 'bird brain' – but it gets my vote!

One trend for the future that both Airbus and Boeing are keenly aware of is that the world's population is getting older – and inevitably a little less firm on its feet – see our feature on designing for passengers with reduced mobility (PRM) on page 42. Older people are also more pre-occupied with their health and well-being. Hence the Airbus Concept Cabin features a vitalising zone complete with vitamin and antioxidant enriched cabin air, as well as aromatherapy and acupressure treatments delivered via sensors impregnated in the seating. The 787 recognises this same trend with its vastly improved cabin altitude that is designed to reduce jet lag.

Both manufacturers are locked in battle over the moral high ground – who is doing the most to save the planet (see our recycling feature on page 58) and who is doing the most to improve the onboard experience. I'd just like to congratulate them for their continuing efforts. I can't wait to fly the Dreamliner and I would love to one day fly something as bold as Airbus portrays for the year 2050 – even if ultimately upon arrival my reason for travel disappointed, at least I could say I thoroughly enjoyed the journey.

Anthony James, editor

THE CONCEPT RELIES ON A FUSELAGE WITH SIMILAR STRUCTURAL QUALITIES TO BIRD BONE – SOME MAY DENOUNCE THIS VISION AS MORE 'BIRD BRAIN' – BUT IT GETS MY VOTE!

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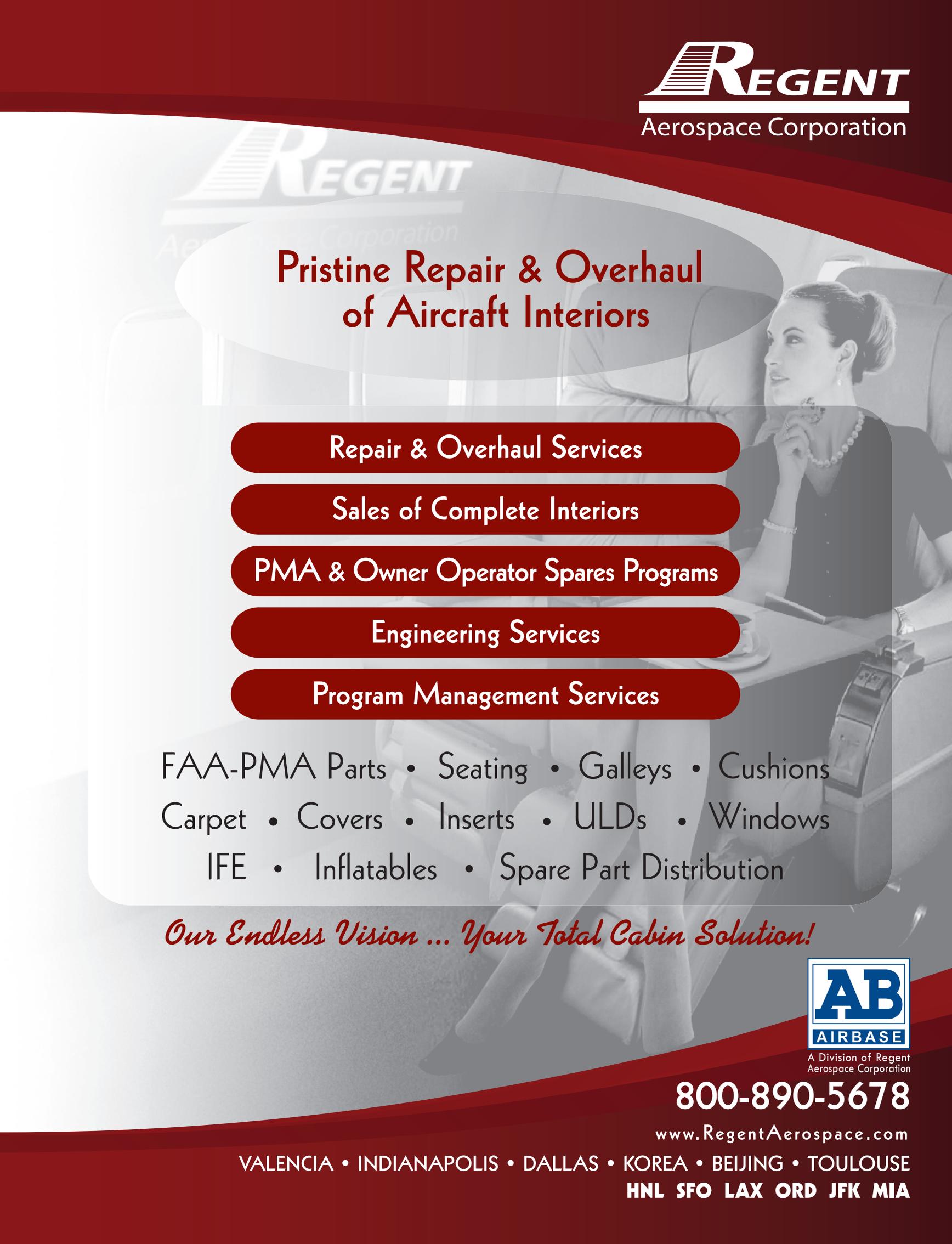
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regulars

015 news

The latest interiors news from around the globe

028 design briefs

A rail car concept to improve airport-city connections; and a futuristic bizjet cabin concept that has already been translated into a mock-up

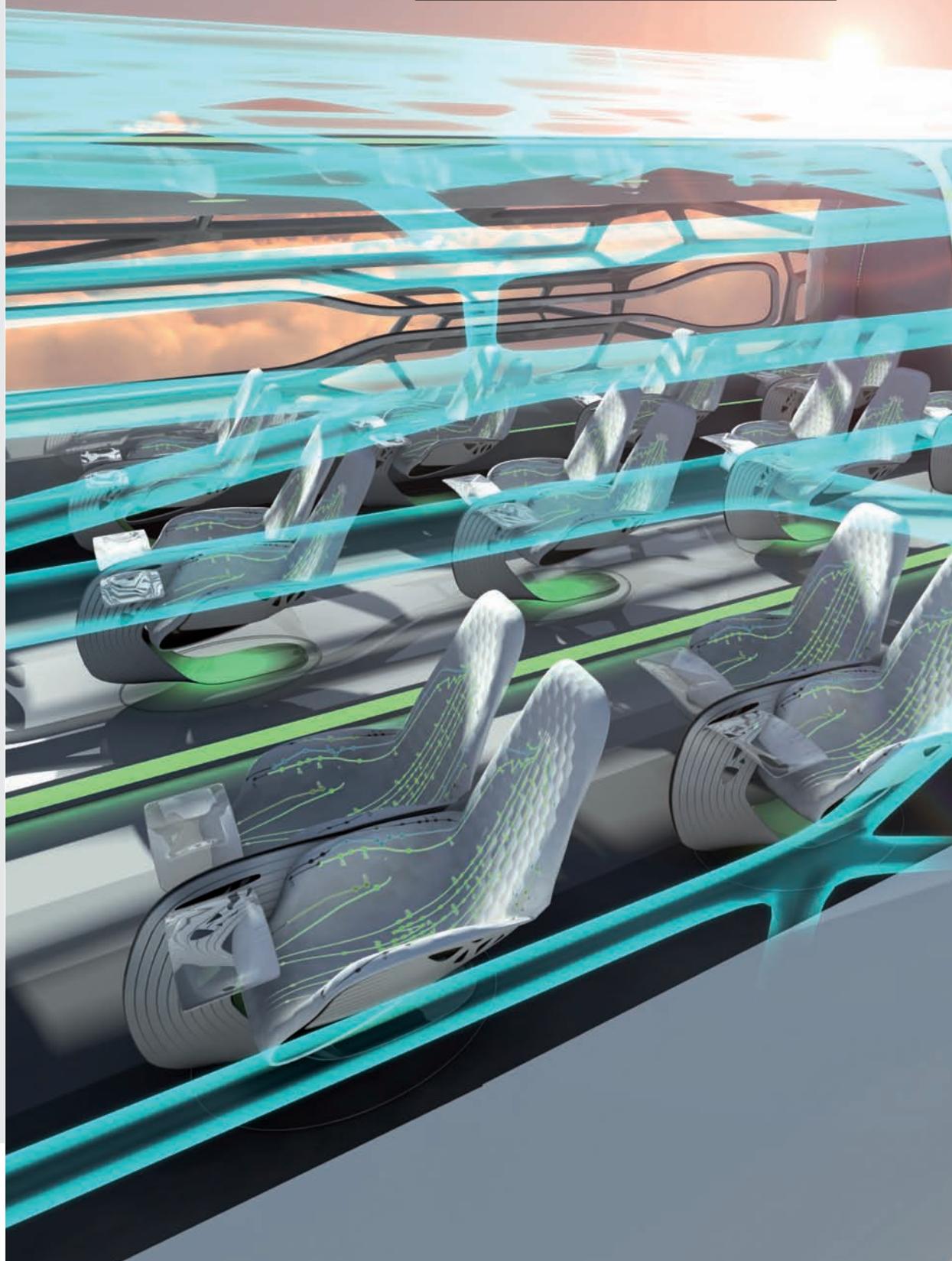
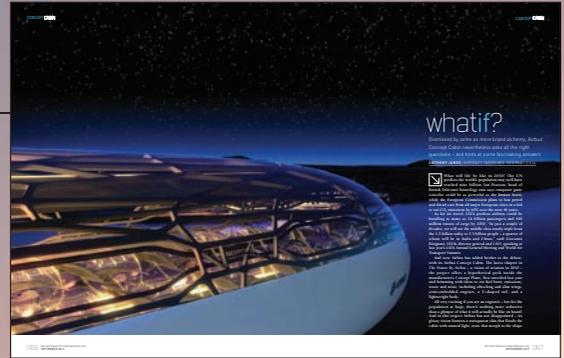
032 fact file

airberlin's fleet in numbers

what if? 066

Dismissed by some as mere brand alchemy, Airbus's Concept Cabin nevertheless asks all the right questions – and hints at some fascinating answers

ANTHONY JAMES,
AIRCRAFT INTERIORS INTERNATIONAL



123 show preview

The top innovations to look out for at the Aircraft Interiors Expo Americas, APEX and IFSA shows in Seattle, USA, this September

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Chase Craig of Alaska Airlines on the airline's IFEC choices, and what expo visitors can do in his home town, Seattle

features



gamechanger

ANA finally looks set to begin 787 commercial service this September – so what can we expect to see on board?

By Anthony James, Aircraft Interiors International

ANA's new Boeing 787-9 Dreamliner is set to begin commercial service this September. The aircraft is expected to be the most advanced and comfortable aircraft ever built, with a range of new features and amenities that will make it a game-changer for the airline industry.

The aircraft's new cabin layout, featuring larger seats and more legroom, will provide a more comfortable and spacious environment for passengers. Additionally, the aircraft's new lighting system, which can be dimmed to match the time of day, will help reduce jet lag and improve passenger comfort.

ANA is also introducing a new menu of food and beverage options, including a new selection of Japanese cuisine and a new selection of drinks. The aircraft's new entertainment system, which includes larger screens and a new selection of movies and TV shows, will also provide a more enjoyable and relaxing flight experience.

034 game changer

ANA finally looks set to begin 787 commercial service this September – so what can we expect to see on board?

ANTHONY JAMES,
AIRCRAFT INTERIORS INTERNATIONAL



accesscode

An aging population and growing numbers of travellers with disabilities mean new considerations for cabin designers

By Bernard Fitzsimons, Aircraft Interiors International

The aviation industry is facing a significant challenge as the number of travellers with disabilities and the aging population grows. This has led to a demand for more accessible and comfortable aircraft interiors. Cabin designers are now being asked to consider a wider range of needs, from wheelchair accessibility to larger seats and more legroom.

Designers are also being asked to consider the needs of passengers with visual and hearing impairments. This has led to the development of new technologies, such as tactile floor indicators and audio announcements, to help passengers with disabilities navigate the aircraft cabin more easily.

As the industry continues to evolve, it is clear that accessibility will become an increasingly important consideration for cabin designers. By creating more inclusive and comfortable aircraft interiors, designers can help ensure that all passengers have a safe and enjoyable flight experience.

042 access code

An aging population and growing numbers of travellers with disabilities mean new considerations for aircraft cabin designers

BERNARD FITZSIMONS,
AIRCRAFT INTERIORS INTERNATIONAL



spaceflight

Korean Air has unveiled the roomiest A380 yet – with its spacious layout complemented by headline-grabbing lounges and even a duty-free shop

By Izzy Kington, Aircraft Interiors International

Korean Air has unveiled the most spacious A380 yet, featuring a new cabin layout that provides more legroom and larger seats. The aircraft also features a new selection of food and beverage options, including a new selection of Korean cuisine and a new selection of drinks. The aircraft's new entertainment system, which includes larger screens and a new selection of movies and TV shows, will also provide a more enjoyable and relaxing flight experience.

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050 space flight

Korean Air has unveiled the roomiest A380 yet – with its spacious layout complemented by headline-grabbing lounges and even a duty-free shop

IZZY KINGTON,
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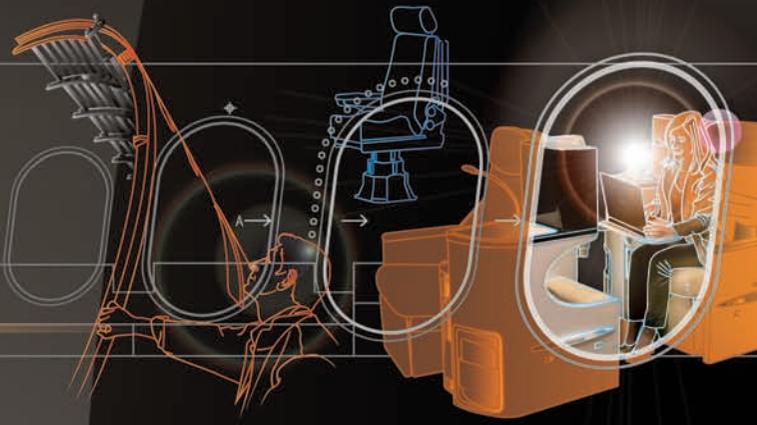


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second life 058

Most cabin furnishings currently cannot be recycled, but airframers and airlines alike are working to make it possible
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weight loss 074

Lighter seats and other cabin elements are helping airlines achieve substantial reductions in fuel consumption, costs and emissions
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082 global player

Germany's second largest airline is investing in both its short- and long-haul fleet as it prepares to join the oneworld alliance in 2012

IZZY KINGTON,
 AIRCRAFT INTERIORS INTERNATIONAL



090 market share

Airlines continue to complain of a lack of innovation and choice among seating firms, but can a new generation of suppliers provide a solution?

GUY BIRD,
 AIRCRAFT INTERIORS INTERNATIONAL



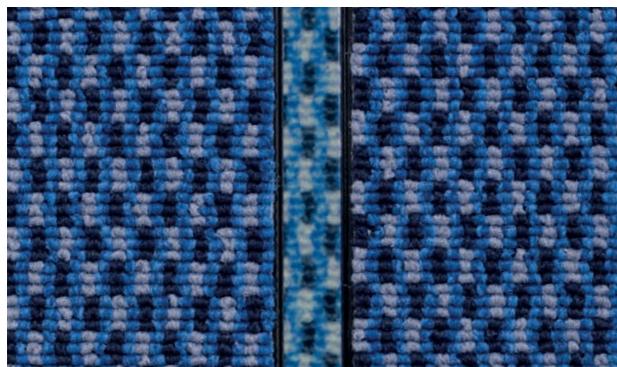


STG Aerospace unveils the latest innovation in photoluminescent (PL) floorpath marking; a unique pattern-matching service.

SafTGlo is the world's leading photoluminescent emergency floorpath marking system and has been at the forefront of all the major innovations in PL for the aerospace sector.

STG has now extended its market-leading SafTGlo range with a unique pattern-matching offer.

SafTGlo PatternMatch is tailor-made to match the actual pattern of even the most intricate carpet design. A translucent overlay, specially printed to match the surrounding carpet's color and design, sits over the PL strip making the system completely discreet when cabin lighting is on but just as effective as other SafTGlo variants if the lights go out.



A unique ultra slim profile and an easy clip-to-fit installation makes SafTGlo the leading choice in premium cabin design schemes

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PatternMatch has been developed in response to demands from customers for whom interior design is a key feature.

Like all SafTGlo ColorMatch systems the new design is a completely sealed system that is both hard-wearing and low maintenance; making it the perfect, easy-to-fit low cost alternative to electrical floorpath marking systems.

With its inherent ability to drive down the cost of operating aircraft SafTGlo is the preferred choice for Boeing, Embraer and is flying high in over 6000 aircraft worldwide.

For more information on how your airline could benefit from new SafTGlo PatternMatch, visit us online at: stgaerospace.com or come and visit us at Aircraft Interiors Expo Americas – booth 146.



Visit us at booth 146

fourth estate 098

Airbus reveals its next-generation IFE requirements for the A350XWB
 MICHAEL CHILDERS,
 AIRCRAFT INTERIORS INTERNATIONAL



life support 106

Reports of the death of airline-provided IFE have been greatly exaggerated – neither PEDs, nor live TV, nor inflight connectivity have got the better of it yet – but will they in the future?
 MICHAEL CHILDERS
 AIRCRAFT INTERIORS INTERNATIONAL



114 miles ahead

Virgin Atlantic's new head of design, Luke Miles, takes time out to talk about his ambitions for the airline
 ANTHONY JAMES,
 AIRCRAFT INTERIORS INTERNATIONAL

miles ahead

Virgin Atlantic's new head of design, Luke Miles, takes time out to talk about his ambitions for the airline



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Innovation and Integration



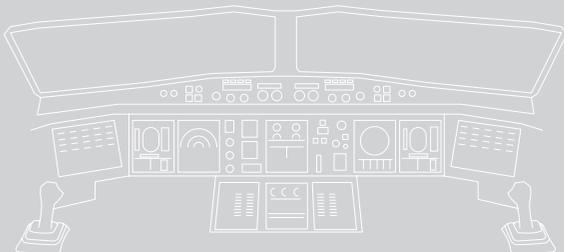
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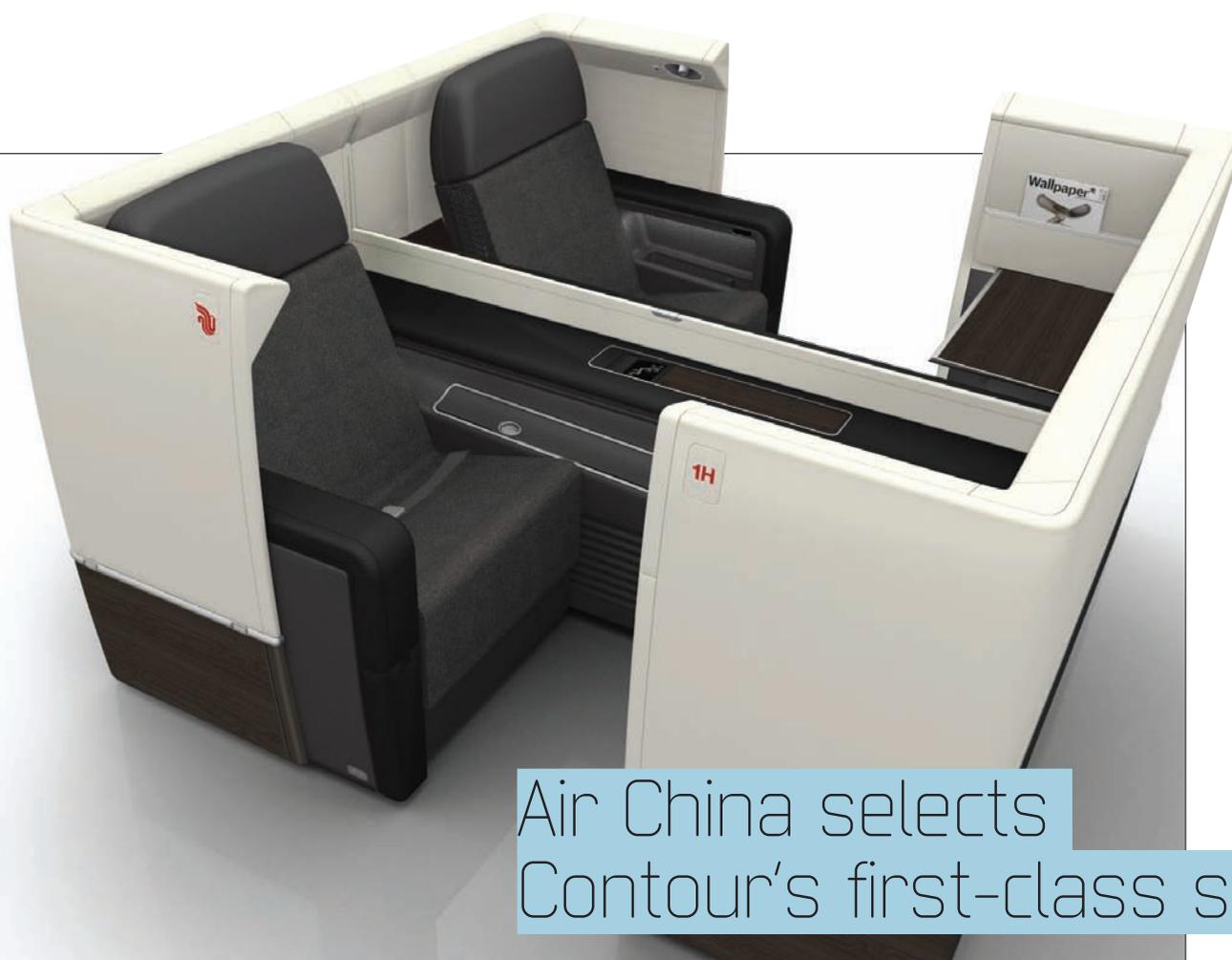
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Air China selects Contour's first-class suite

Air China's Boeing 777-300ERs are entering service with a new first-class suite customised and installed by Contour.

The Mercury suite is installed at 83in pitch and features three positions – TTL, dining and lie-flat. The bed is 78in long and 26.5in wide. Amenities include two control units for each seat; a wardrobe with hanging rod; two literature stowages; two stowage areas in the console; a cocktail tray; an ottoman baggage stowage

area; a three-level reading light; an LED strip light in the sidearm/stowage area; a sliding table with 32in travel; and a 23in touchscreen. Inboard/centre seats boast a powered privacy screen.

"We have worked closely with Boeing and Air China over the last 18 months to ensure the Mercury suites were certified and delivered on time," said Graham McNamara, senior programme manager at Contour Aerospace.

Talking TV app opens up IFE for blind passengers

A software application that enables entertainment systems to talk to blind or partially-sighted users – allowing them to navigate the programme guide and menu items – is now available for IFE. The Talking TV product resulted from cooperation between the Royal National Institute for the Blind (RNIB) and Ocean Blue.

Léonie Watson, chairman of the British Computer Association of the Blind, backs the call for greater adoption by airlines. "I recently flew long-haul to the USA, and being blind, was dismayed to discover the 'advanced' IFE system was all but useless to me," said Watson. "The addition of spoken menus would have made all the difference."

B/E super-first seats chosen by three Middle Eastern airlines

B/E Aerospace has been selected by three Middle Eastern airlines to outfit their new wide-body aircraft with next-generation 'super-first-class' suites. The awards are initially valued in excess of US\$125 million. B/E Aerospace will work with each of the airlines to develop customised private suites for their first-class international cabins.

"International passenger travel to and from the Middle East has been, and is expected to remain, among the fastest-growing routes in the world," said Amin J. Houry, chairman and CEO of B/E Aerospace. The seats are currently under development, and further details are being kept confidential for the time being.

American Airlines launches inflight streaming video

Inflight video streaming is now available on American Airlines flights operated by a Boeing 767-200 aircraft (primarily transcontinental flights). The new IFE option enables customers to stream content such as movies and TV shows wirelessly from an inflight library to WiFi-enabled laptops.

It is being offered for the introductory price of 99 cents per TV show and US\$3.99 per movie. The airline plans to roll it out on all its WiFi-enabled aircraft from later in 2011, pending FAA certifications.

"We've been deeply involved in developing the concept of streaming video with Gogo," said Rob Friedman, American's VP for marketing. "During this initial phase of launch, Entertainment On Demand allows customers to access content through select personal WiFi-enabled laptops, and in the coming months Gogo intends to make tablets and other devices available for use with the product."

The inflight library features more than 100 movies and TV shows. Rented content remains accessible for passengers to view after landing – movies for 24 hours and TV shows for 72 hours.

American began testing the system on two Boeing 767-200 aircraft in May 2011 and received FAA certification in August 2011.



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Austrian Airlines has converted all its A320-family aircraft (21 in total), adding new interior furnishings. By September 2011, Austrian also plans to refurbish its 11 Boeing 737 aircraft – bringing 32 medium-haul aircraft up to date in total. In addition, in the first half of 2012 it will refurbish the A320 aircraft that it incorporated into its fleet in 2011.

The core element of the new cabin is a completely redeveloped seat from Recaro with a light construction and leather cover. Its magazine pocket has been moved upwards on the seatback, while the coat hook is on the outer side.

The seat's construction gives passengers up to 10cm (3.9in) more legroom, depending on the aircraft. The

Austrian finishes conversion of A320 family

airline says the seat is also between 3-5kg lighter than its predecessor, enabling it to save a total of 14,304kg of weight every year. In addition, the new seat takes up less space, meaning an average of almost five additional seats can be installed in each aircraft.

The colour of the new design differs from Austrian's previous image. The seats and carpeting are grey, with accents in a typically Austrian red.

Thai Airways takes over Boeing 747-400 retrofit project

Thai Airways has received its first retrofitted Boeing 747-400 aircraft, which it will operate on flights from Bangkok to London from the end of October 2011, with further European destinations to follow. The airline is upgrading 12 Boeing 747-400s in two phases – the first six should be completed by December 2011; with the remaining six to be completed in 2012. Although the first aircraft was completed by an external company, the rest are being done in-house by the Thai Technical Department.

The revamped economy class features 325 Zim Flugsitz seats, installed at 34in pitch. Each is 18in wide and has a 9in IFE screen. In first class there are 10 seats set at 76in pitch. Each converts into a full-flat bed, is 22in wide and features a 10.4in screen. Business class consists of 40 seats at 60in pitch. The new 20in-wide seats convert into lie-flat-at-an-angle (170°) beds, and also feature 10.4in IFE screens.

Beside the upgraded seats and IFE, a personal telephone system is being installed to enable customers to call ground networks through credit card payment. Passengers can also make seat-to-seat calls.

Intelligent Avionics selects design partners for Aura IFE

The company behind the Aura IFE system, Intelligent Avionics, is to partner with London-based design firms Factorydesign and Reactive to turn the prototype into a flying product. Factorydesign will design in-seat hardware including industrialised screen units (initially 10.1in and 15.6in touchscreen devices), 'fail-safe' mount mechanisms, and hardware for business, first and VIP applications. Meanwhile, Reactive will develop the touchscreen user interface, which must engage a wide spectrum of passengers.

TAM to extend GSM and WiFi to entire long-range fleet

TAM Airlines is extending OnAir connectivity to enable passengers to use their mobile devices on its entire long-haul fleet, including 12 Boeing 777-300ERs (eight of which are currently on order, and should be received by 2014), 10 A330s and 27 A350s (to be delivered between 2014 and 2018). The decision follows nine successful months of service on selected short-haul flights. Connectivity will be deployed on a total of 80 aircraft. The long-haul service will be rolled out from the second half of 2012. Installation on 31 short-haul aircraft has already begun.

TECHNOLOGY

mgs



P/N: MR4AA1-01
Model: microwave



P/N: HFES0028-20
Model: Nespresso maker



P/N: HFA2000-10
Model: beverage maker



P/N: HFWF2003-01
Model: trash compactor



P/N: FT048
Model: folding trolley



P/N: HFE2007-01
Model: espresso maker

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BOOTH 437

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P/N: R4AD2-01
Model: induction oven

INNOVATION

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P/N: IHP4
Model: induction hot plate



P/N: HFA2007-01
Model: beverage maker

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P/N: HFE95-20D10
Model: Nespresso maker



P/N: HFAWB2005-01
Model: water heater



P/N: MB0000750
Model: trash compactor box



P/N: HFWH2003-02
Model: trash compactor



P/N: 9501D
Model: espresso maker

mgs



P/N: AAD4-07
Model: induction oven



P/N: HFN2007
Model: beverage maker



P/N: HFA28V
Model: beverage maker

CARE



P/N: HFE95-20D
Model: espresso maker



P/N: SHF2010-002
Model: vip seat



P/N: HFWH0028-02
Model: trash compactor



P/N: MK279-00
Model: half-size trolley



P/N: HFEJ2008-10
Model: Nespresso maker

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P/N: HFAWB2007-01
Model: water heater

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Food service update for Emirates' premium cabins

Emirates has unveiled new products in its first- and business-class cabins – including a range of white Royal Doulton fine bone china and Robert Welch cutlery. The new service also includes charger plates, new salad and soup bowls, coffee mugs and teacups in first class; and the introduction of soup dishes to the business-class menu.

Approximately 5,000 cabin crew – including pursers, senior flight stewards and crew who operate in business class –

have been through an intensive training programme aimed at familiarising them with both the new product range and the new service philosophy.

“Redefining not just our onboard product, but also the complete customer service experience is the result of painstaking attention to detail and extensive planning,” said Terry Daly, divisional senior vice president of service delivery at Emirates.

EVA Airways boosts connectivity with Arinc satcom

Taiwan-based EVA Airways has chosen Arinc's GLOBALink satcom to enhance its passenger and flight deck communications.

Besides delivering an air/ground data link solution, Arinc has collaborated with Panasonic to enhance EVA Airways' IFE offering with seatback messaging, which lets passengers send emails and SMS communications in flight. It utilises the airline's existing IFE infrastructure to provide full email and SMS capabilities.

Meanwhile, the airline has selected Rockwell Collins' Airshow 4200D 3D moving map system for 36 of its aircraft. It will be installed on three new A330s (scheduled for first delivery later in 2011), and EVA Airways' fleet of 33 A330-200, Boeing 777-300ER and Boeing 747-400 aircraft.

New guide from Thomson aims at improving passengers' well-being

Thomson Airways has launched a guide to help long-haul travellers to arrive feeling fresh and fighting fit, instead of fatigued. The Good Flight Guide includes fitness, health and beauty tips.

Research into flying habits commissioned by the airline was published at the same time. According to the results, over 70% of long-haul passengers do little or no exercise during their flight, with only 30% following the recommended advice to walk around and stretch their muscles frequently. 41% admitted to drinking only a little water on board, with 7% confessing to drinking none at all, despite it being freely available. The study also found that calorie intake increases two-fold in flight, while water intake is halved compared with habits on the ground.

Heath Tecna reveals contracts with Austrian and Korean Air

Austrian Airlines has selected Heath Tecna to reconfigure six Boeing 767-300s and four Boeing 777-200s. The first deliveries are scheduled for the third quarter of 2012.

Heath Tecna has been tasked with overseeing the programme, producing reconfiguration kits, managing the delivery and installation of buyer-furnished equipment from third-party suppliers, and pursuing an STC from the FAA (with subsequent validation by EASA).

The company will also engineer, manufacture and install new cabin furnishings, including new footwell stowages, closets, partitions and floor-mounted stowages. Many of the new furnishings include provisions for LCD monitors, fold-down baby bassinets, and emergency equipment.

For five of the Boeing 767s, the company will supply its NuLook Pivot Bin Interior to replace the existing OEM interior architecture. For Austrian Airlines this will include new outboard pivot bins, centreline stowbins, gullwing-style ceiling panels, PSU faceplates and filler panels, sidewalls and hatchway surround liner panels.

Heath Tecna has also revealed an ongoing multi-year supply relationship with Korean Air, to manufacture A380 upper deck bars, sofas and other equipment (see p50 for more details).

Air New Zealand is once again harnessing the power of celebrity to promote its inflight product. On a recent trip to LA, its furry mascot Rico 'interviewed' celebrities including David Hasselhoff and Lindsay Lohan for a new online series.

Each was interviewed on the new economy-class Skycouch, and the airline estimates that gossip about the interviews has already reached more than 60 million people via twitter and mainstream media. Previous Rico hits include a collaboration with rapper Snoop Dogg, which has attracted around 566,000 views on YouTube since March 2011. Rico also has 39,000 friends on Facebook.

"Given the Kiwi dollar doesn't go far in many of the overseas markets we operate in, innovation is critical for us," said Mike Tod, general manager of marketing and communications at the airline. "We are really proud that as a small company at the bottom of the world we are punching well above our weight when it comes to gaining awareness of our brand and products."



Air New Zealand taps power of celebrities and social media

Thales TopSeries AVOD IFE chosen for Boeing 777s

Thales' TopSeries IFE has been selected by Aeroflot for its fleet of 16 Boeing 777-300s. The system will be configured for 402 passengers and will be line-fit into the new aircraft. The first delivery is scheduled for January 2013.

The aircraft will have AVOD at every seat. In business class, in-seat screen sizes will be 15.4in. Features include in-seat power, USB and iPort, to enable passengers to interface their portable devices to the system. The offering also includes the new Thales Touch Passenger Media Unit, a handheld media device that gives the passenger access to Android applications. In premium economy and economy, in-seat screens will be 10.6in and 8.6in respectively. All seats will feature a passenger controller and personal electronic modules.

Meanwhile, TAAG Angola Airlines has taken delivery of the first of its two new Boeing 777-300ERs, with the TopSeries system installed at every seat.

KLM to sell à la carte alongside free fare in economy

KLM is set to give economy-class passengers the option of ordering à la carte meals on intercontinental flights from Amsterdam. Passengers can choose the standard catering or, for a fee, one of four gourmet meals on an à la carte menu.

The à la carte meals will be available from 14 September 2011. They include a light Japanese meal, a selection of popular Italian dishes, an Indonesian rice table and a vegetarian meal. They are available at prices ranging from €12-15.

"KLM ran a successful trial with à la carte catering over the past year on flights to eight destinations departing from Amsterdam," said Erik Varwijk, KLM's managing director. "The greater range of menu options follows the introduction of a broader range of seat comfort options and a wider variety of IFE."

The airline will also be launching a trial in World Business Class from October 2011, with a menu of five specially created meals.

Gulf Air selects Panasonic's Global Communications Suite

Gulf Air has selected Panasonic's Global Communications Suite (GCS) for worldwide inflight broadband connectivity, mobile phone service and live TV programming. Panasonic will install its broadband Ku solution eXConnect, eXPhone and the eXTV live TV network across the entire Gulf Air fleet. Retrofitting work will be implemented across the airline's fleet from September 2011 and should take two years to complete.

All passengers will be able to enjoy fully integrated broadband that offers high-speed internet, 3G-4G mobile data speed connectivity, voice over internet, streaming videos and live inflight satellite TV streaming across continents. The latter will enable sports fans to watch their favourite matches in real time. Meanwhile, business passengers will have unlimited access to virtual private networks, as well as live news and stock market updates. The service will offer several global channels as well as regional channels.

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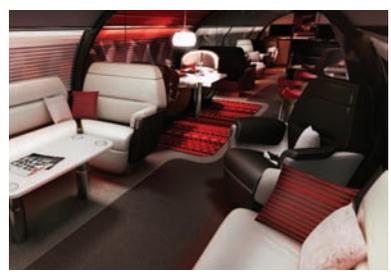
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Virgin Atlantic researches language of lighting for A330

New mood lighting has been introduced into the cabins of Virgin Atlantic's latest A330 aircraft. The lighting, which has been designed alongside architectural lighting experts DHA, changes colour throughout the flight to help passengers relax and unwind, fall asleep and even adjust time zones. A new soft apricot filter incorporated in the reading lights is designed to make people look more attractive during their long-haul flight.

Research conducted by Virgin Atlantic and DHA found that apricot is the most flattering for skin tones, while yellow causes people to lose their tempers more often and makes babies cry. It also concluded that pink is seen as a relaxing, tranquilising colour and red is the most emotionally intense, stimulating a faster heartbeat and breathing.

"After extensive research, we chose a palette of colours to create a relaxing

ambience on board our new aircraft," said Luke Miles, head of design at Virgin Atlantic. "We aim to help our passengers unwind, sleep and arrive at their destination rejuvenated. We are getting some great feedback so far and we look forward to introducing the lighting in all cabins on future aircraft."

On boarding the aircraft, a soft 'rose champagne' colour has been chosen to de-stress passengers. This then changes into 'purple haze', which is designed to be cosy and comfortable, before transforming into 'amber warmth', which recreates a candlelight environment for passengers while dining. To help passengers drift into a deep sleep, 'silver moonlight' is introduced to reflect a starry night sky.

Virgin Atlantic is initially offering mood lighting in the premium-economy cabin on the new A330; over time it is intending to extend the lighting to all its aircraft.

Man U star in Turkish safety video

Turkish Airlines has enlisted Manchester United FC for its latest inflight safety video, in a bid to engage passengers. The video features Wayne Rooney, Darren Fletcher, Chris Smalling, Nani, Rafael and Fabio da Silva in comedic sketches that play on the official voiceover of the correct safety procedures. It follows Man U's involvement in the airline's current TV commercial and forms part of an ongoing sponsorship deal.

Skymark chooses LIFT for A380

Tokyo-based LIFT Strategic Design has been selected by Skymark Airlines as cabin design and product development partner for the carrier's recently ordered A380. The Japanese carrier will take delivery from 2014, and plans to use the aircraft for long-haul services. LIFT will be joined by Grain, a London-based studio, for assistance in programme management.

Asia Jet, one of the largest charter operators in Asia, has added a Cessna Citation XLS+ to its fleet. The jet is believed to be the first of its kind in Hong Kong and China. Asia Jet's XLS+ boasts six fully reclining, extra-wide seats; a refreshment centre; individual IFE monitors; and an aft bathroom with sliding privacy doors. It is also equipped with Ultrasone Edition 8 Palladium headphones, which are handmade in Germany.

The XLS+ is the latest version of the Citation Excel and XLS models already in service in China. It will support shorter trips within Asia – for example, linking Hong Kong to Shanghai, Guangzhou to Beijing and Ho Chi Minh to Macau.

Asia Jet's offers consultancy on the technical and financial aspects of purchasing aircraft, as well as managing the operation and maintenance of the aircraft for its owners.



Citation XLS+ joins Asia Jet's charter fleet

Bombardier improves internet for Global 5000 and 6000s

Bombardier has selected EMS Aviation to provide high-speed internet connectivity as an option for Global 5000 and Global 6000 business jets.

The system features ViaSat Ku-band communication system and EMS router equipment, and complements the aircraft's standard L-band SwiftBroadband system. It is designed to operate with the ViaSat Yonder high-speed internet service and through service partners, offering increased connectivity and multiregional service coverage.

With Yonder, the Global 5000 and Global 6000 business jets will give passengers access to full internet connectivity (WiFi), virtual private networks, email with attachments via laptops, voice-over IP and the use of other WiFi devices.

The high-speed data suite includes typical download speeds to the aircraft of above 1 Mbps and upload speeds from the aircraft of more than 128 kbps.

Sukhoi to launch business jet version of SSJ100 regional aircraft

Sukhoi Civil Aircraft and Alenia Aeronautica have announced that a new business jet version of the Sukhoi Superjet 100 regional jet (SSJ100) will be launched at October 2011's NBAA convention in Las Vegas, USA.

The Sukhoi Business Jet (SBJ) will be developed by SuperJet International, a joint venture between Alenia Aeronautica and Sukhoi Holding. Based on the SSJ100/95, the SBJ will come in three configurations – VIP, corporate and governmental.

The companies highlighted the VIP version at the Le Bourget International Airshow in France (June 2011); it features several comfort zones – including office, bedroom and bathroom areas – that can be tailored in line with customers' needs. Additional fuel tanks in the cargo hold will enable a range of almost 4,300 nautical miles – more than double the SSJ100's standard range of 1,645 nautical miles.

Certification of the SBJ is scheduled for the beginning of 2014.

Associated develops airframe mock-up facility for BBJs

Associated Air Center (AAC), StandardAero's large transport category, VIP aircraft completions centre in Dallas, Texas, USA, has developed a full-scale airframe mock-up centre for creating and testing new designs, fabrications and systems on Boeing Business Jets (BBJs). The re-engineered facility now offers full-scale fit capabilities on the BBJ while continuing to support designs on the Airbus Corporate Jet (ACJ).

AAC says that airframe mock-ups allows it to reduce aircraft downtime by starting key elements of the completion process before the aircraft arrives at the facility. The tool supports the 737NG family of aircraft (BBJ/700IGW, BBJ2/800ER and BBJ3/900ER). There is also a project under way to develop the same capability for ACJ aircraft (A318CJ, A319CJ, A320CJ and A321CJ).

Earlier this year, AAC achieved its 21st BBJ aircraft cabin completion since 1998, when it became a BBJ approved completion and service centre.

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hotlink

BRIEF: "LoungeLink is an idea to improve transit (train) services and make the journey between airport and city centres more comfortable, practical and useful, as well as make for a speedier journey through the airport," explains Luke Hawes, a director at London-based design firm Priestmangoode.

DESCRIPTION: Similar to many airline business-class cabins, LoungeLink features a staggered layout: "A staggered layout is an efficient way to utilise a small space, maximise seat numbers, provide privacy and improve passenger comfort," says Hawes. There are also single workstations with sliding partitions for optional privacy: "These would provide an ergonomic working environment in which to prepare for meetings or access files before boarding a flight." The workstations feature individual work/task lamps, document and bag/briefcase storage, a drink holder, and power and data ports. "Presently, business travellers may be out of contact with their office or clients for the entire duration of their travel, from leaving the city centre until they reach their final destination," continues Hawes. "LoungeLink would allow them to effectively use the transit train as a moving office, downloading files and emails ahead of boarding flights and upon arriving at their destination." Interior details include generous-sized leather armchairs that sit on swivel bases, to create a more sociable space, and soft ambient light spills to create a luxurious but domestic feel. Aisle-facing sofas, a refreshments zone, a flight information display and a dedicated monitor for check in are also included.



VERDICT: With increased competitiveness from other modes of transport, particularly over short-haul journeys, it's imperative that the airline industry focuses its attention on the entire passenger journey, beyond just the aircraft interior. Better connectivity with city centres and a more comfortable transit journey with significant passenger benefits will be crucial to airlines' success in the future. Business travellers will also welcome the opportunity LoungeLink affords to download emails and files before boarding the flight. ☒



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livesigns

BRIEF: 'LIFE' (Lighter, Integrated, eco-Friendly and Efficient) is a bizjet cabin concept and mock-up created by a consortium of Portuguese companies, including Amorim Cork Composites, CAIDO, Couro Azul (Carvalhos Group), INEGI, SERNIS and SET (Iberomoldes Group). Industrial design expertise was provided by Almadesign, while Embraer was on hand to provide guidance with regard to user requirements. The end result – a 6m-long full-scale mock up – was presented in the Portuguese Pavilion at this year's Paris Air Show.

DESCRIPTION: The cabin is divided according to use: an executive area and a lounge/meeting space are for business use; while a bathroom, bedroom and an interactive sphere with an immersive infotainment system are for personal/private use. José Rui Marcelino, Almadesign's design manager, says a "motion-sensing interactive lighting system" featuring fibre optics, LEDs and motion sensors embedded in composite and cork sandwich panels provides each passenger with "personalised light intensities and colour" and allows either "mood lighting or more traditional spot lights for reading". The cabin's lightweight carbon fibre seats "are ergonomically adaptable to every passenger through a biometric identifier," continues Marcelino. Floating on a suspended carbon fibre structure, the seats enhance passenger comfort by reducing vibration, while integrated biometric sensors monitor the passenger's body temperature and heart rate. Retractable touchscreens in each seat provide a permanent "connection to the cloud". The lounge features two large sofas and a multi-touchscreen table. An "immersive infotainment interface" consists of a "geodesic modular sphere" that allows the projection of images, creating "a virtual environment for business or entertainment".



VERDICT: The LIFE project required an investment of €1.85 million – was it worth it? "Visitors were very surprised to see a full-scale model of such a different concept and were very curious about some of the technical details behind it," says Marcelino. "LIFE has strengthened and promoted a more multidisciplinary and cooperative approach of working for future aerospace projects. Some of the solutions will be further developed for production in the medium-term." ☒



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Web: <http://life.inegi.up.pt>

factfile:airberlin

AIRCRAFT TYPE	A330-300	A330-200	A321	A320	A319
No. of aircraft	3	12	14	46	13
Entered service/last refurbishment	1996/2008	2007/Oct 2011 to April 2012	2007	2005	2006
Total seats	387	303	210	174	150
Number of seats	0	Not yet decided	0	0	0
Configuration	N/A	2-2-2	N/A	N/A	N/A
Seat pitch	N/A	59-60in (149.9-152.4cm)	N/A	N/A	N/A
Seat width	N/A	19.7in (50cm)	N/A	N/A	N/A
Seat recline	N/A	170°	N/A	N/A	N/A
Seat supplier	N/A	Contour	N/A	N/A	N/A
IFE system	N/A	RAVE	N/A	N/A	N/A
Business class	IFE supplier	N/A	IMS	N/A	N/A
Number of seats	387	279	210	174	150
Configuration	2-4-2	2-4-2	3-3	3-3	3-3
Seat pitch	30in (76.2cm)	30in (76.2cm)	29-30in (73.7-16.2cm)	29-30in (73.7-16.2cm)	29-30in (73.7-16.2cm)
Seat width	18in (45.7cm)	18in (45.7cm)	17-18in (43.2-45.7cm)	17-18in (43.2-45.7cm)	17-18in (43.2-45.7cm)
Seat recline	5in (12.7cm)	5in (12.7cm)	3in (7.6cm)	3in (7.6cm)	3in (7.6cm)
Seat supplier	Recaro	Zim Flugsitz	Recaro	Recaro	Recaro
IFE system	Panasonic	RAVE	MPES / PAVES	MPES	MPES
Economy class	IFE supplier	MAS 2000	IMS	Panasonic / Rockwell	Panasonic

AIRCRAFT TYPE	B737-800	B737-700	Q400	E190 *
No. of aircraft	39	26	10	7
Entered service/last refurbishment	1998/Feb 2011	2003/Mar 2011	2008	2009
Total seats	186	144	76	112
Number of seats	186	144	76	112
Configuration	3-3	3-3	2-2	2-2
Seat pitch	30in (76.2cm)	30in (76.2cm)	30in (76.2cm)	29in (73.7cm)
Seat width	16.7in (42.4cm)	16.7in (42.4cm)	16.8in (42.7cm)	16.7in (42.4cm)
Seat recline	3in (7.6cm)	3in (7.6cm)	3in (7.6cm)	3in (7.6cm)
Seat supplier	Recaro	Recaro	B/E Aerospace (Spectrum)	C&D
IFE system	dMPES	dMPES	N/A	N/A
Economy class	IFE supplier	Panasonic	Panasonic	N/A

* Operated by NIKI, part of the airberlin group

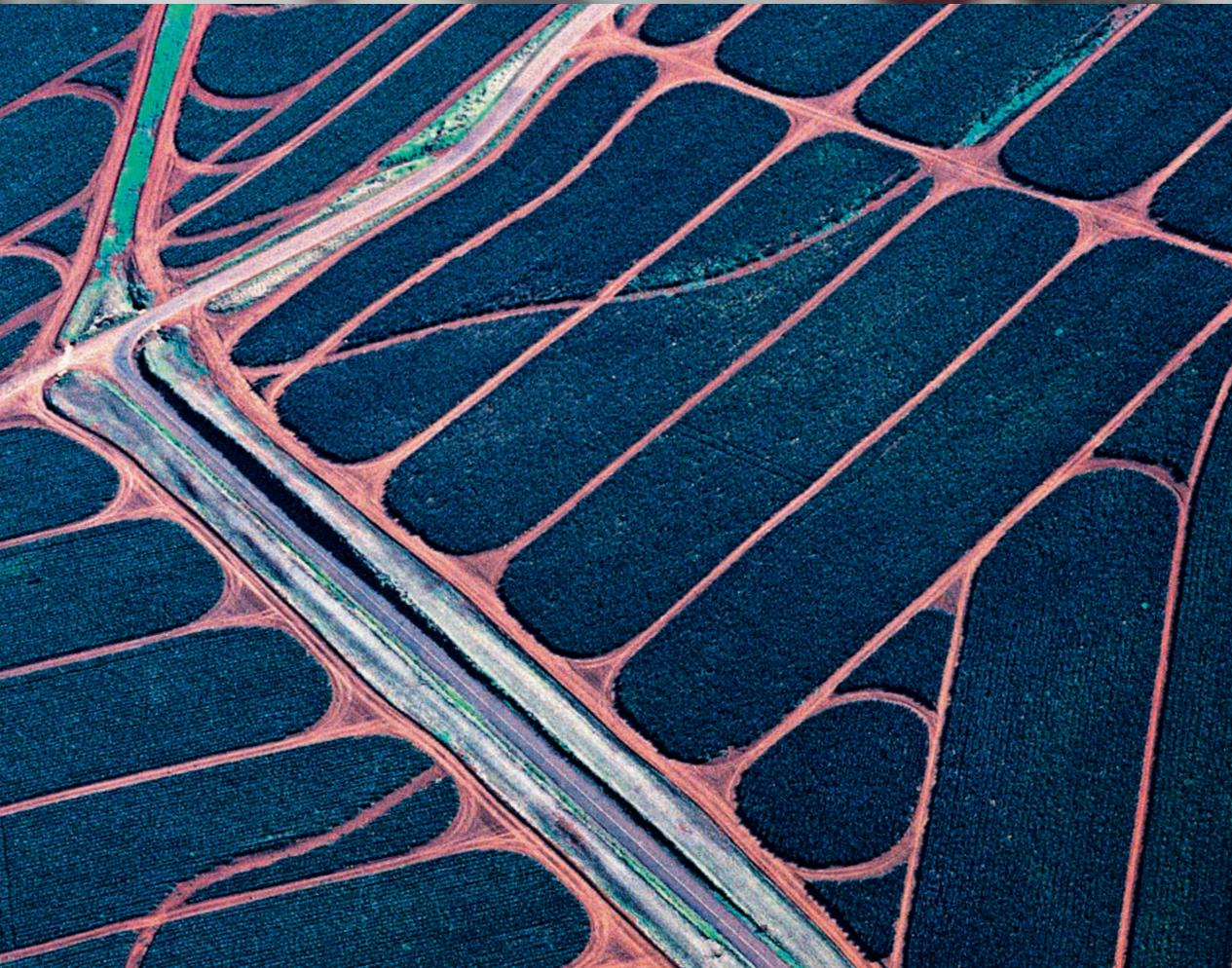


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PASSENGERS CARRIED IN 2010: 33.6 million

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ANA finally looks set to begin 787 commercial service this September – so what can we expect to see on board?

ANTHONY JAMES, AIRCRAFT INTERIORS INTERNATIONAL



“Everything comes to those who wait,” – the words of ANA president Shinichiro Ito during the 787’s unveiling to the Japanese public at Tokyo’s Haneda Airport back in July. ANA’s president is clearly a very patient man – as the 787’s launch customer, the carrier was supposed to receive the first of 55 Dreamliners it has on order back in 2008. However, it looks set to finally begin 787 commercial service this September: “At first we plan to introduce the 787 for domestic flights to train our pilots,” explains Norihiro Kawate, senior manager products and services strategy. “And we are certainly planning to introduce the 787 on routes between Haneda Airport in Tokyo and Europe before the end of the current fiscal year.”

In preparation, Boeing and the airline began service readiness validation for the aircraft in July. ANA pilots, together with Boeing, flew the Dreamliner on routes from Seattle to Tokyo and Tokyo to four airports across Japan, including Osaka (Itami and Kansai), Okayama and Hiroshima. Teams from ANA and Boeing validated more than a hundred procedures, including towing the aircraft, conducting fit checks of ground support equipment, staging electronic flight bag data and completing maintenance actions, among other activities. “Our teams worked well together and the aircraft performed as we expected,” says Mike Fleming, 787 services and support vice president.

ANA is now looking forward to receiving its first Dreamliner in September. To further facilitate staff training, this first aircraft will initially be deployed on domestic routes with a high-density short-haul interior capable of carrying 264 passengers (12 business-class seats and 252 economy



01. ANA’s long-haul 787s will feature Sicma’s Skylounge seating in a staggered (1-2-1/1-1-1) layout in business class

01





THE AIM IS TO INCREASE SPACE AND
PRIVACY, AS WELL AS PROVIDING
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seats). It will also perform a commemorative first commercial charter flight from Tokyo-Narita to Hong Kong. The aircraft will then be used for scheduled flights on the Haneda-Okayama and Haneda-Hiroshima routes.

INSPIRED CHOICE But what can passengers expect to find on board subsequent 787s? Well that will depend on whether they are flying the short- or long-haul version of the aircraft. Both feature just two classes – business and economy – but ANA's long-haul 787s boast full-flat business beds while its short-haul 787s offer only cradle-style seating up front. There's also a big difference in capacity: short-haul aircraft offer 222 seats in total with 42 seats in business and 180 in economy. However ANA's long-haul 787s are equipped with 46 seats in business and 112 in economy, providing total accommodation for just 158 passengers – far lower than the 787-8's maximum capacity of 250 seats, as listed by Boeing. "The long-haul cabin is based on ANA's new Inspiration of Japan brand concept, first introduced on its 777-300ERs," explains Kawate. "The aim is to increase space and privacy for passengers, as well as providing improved storage options for personal belongings."

Similar to its 777-300ERs, long-haul business class features Sicma's Skylounge III product in a staggered 1-2-1/1-1-1 seating arrangement at 44in pitch, with direct aisle access for every passenger and a minimum seat width between armrests of 22in. "Each seat is aisle-side so everyone needn't worry or be bothered by other passengers when resting or sleeping," notes Kawate. "And you can enjoy a fully flat seat and plenty of personal room."

The track-mounted seat converts into 74.5 x 25.3in bed with fully retractable armrests to provide the best possible width when sleeping, while a privacy shell is designed to counteract any disturbance from noise. Two actuators per seat provide tracking and recline functions (seat pan and legrest). A 17in touchscreen IFE monitor is integrated into the seat shell and a universal PC power source, USB port and an iPod jack are included.

paint job

ANA is celebrating the arrival of what it describes as "the world's most innovative aircraft" with a specially designed livery. The design sees the numbers 787 painted big in bold and blue at the front of the aircraft to signify that ANA will be the first airline in the world to fly the Dreamliner. The blue lines at the rear of the fuselage are designed to highlight how the three core elements of the airline's service brand – innovation, uniqueness and the inspiration of modern Japan – operate across the ANA network.

Only ANA's first two 787s will be painted in the special livery. The remainder of the fleet will feature the standard ANA livery.

A generous side table on top of each side monument, in combination with individual lighting, help create an ideal work environment. There's certainly plenty of room for laptops and papers – in fact central single seats feature two such side tables – perfect for travelling bureaucrats and bankers overloaded with files and reports. If that's not enough, there's also a one-piece meal table that pulls out from underneath the side monument surface.

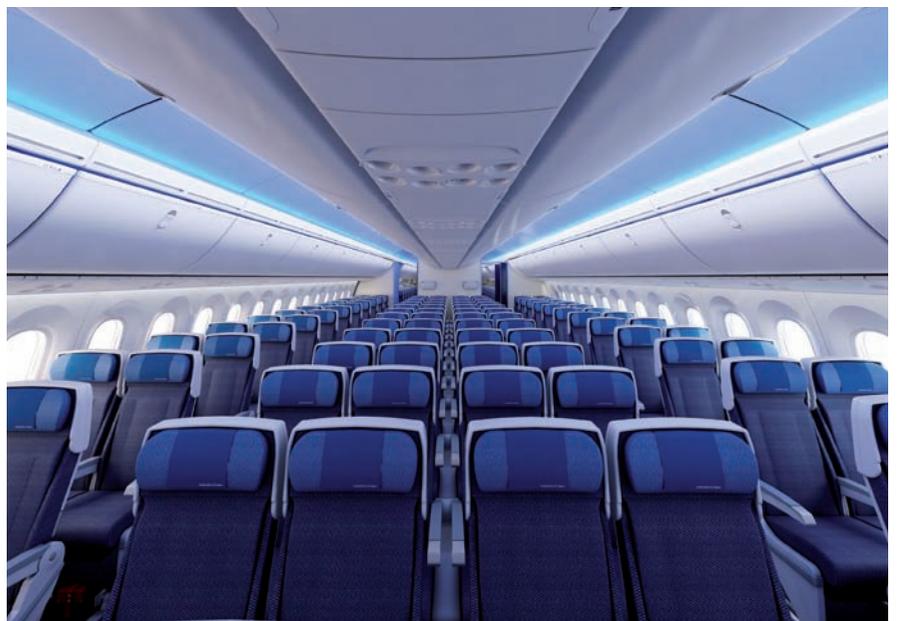
There's even a dedicated shoe drawer under the seat – a feature first introduced on the 777-300ER. The idea was to make passengers feel more at home – removing one's shoes before entering a house is customary in Japan – while it also ensures a more neat and tidy cabin appearance.

The trick was to persuade seat manufacturer Sicma that such a feature was necessary in the first place: "A seat maker naturally thinks of the seat as just a seat," explains Koichi Tsuzuki, a senior director for product strategy at ANA who led the Inspiration for Japan rebranding project introduced on the 777-300ER. "But we were thinking of it the way interior designers would – as furniture. It's part of a whole. It took a long time to get them to understand why we wanted to do it. We were

02. An economy-class bar, supplied by Jamco, is installed in the 787's signature entrance area
03. ANA's short-haul 787s feature Sicma's cradle-style Majesty seating units in business class
04. Economy on both short- and long-haul 787s features Sicma's AIRgonomic units in a 2-4-2 configuration



03



04

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asking them to rearrange the already limited space under the seat where the electric cables and other connection chords and gadgetry is housed.”

Business class features a full-height chilled bar unit, while economy sees a self-service bar installed in the entrance area.

Meanwhile ANA's short-haul 787s serving Asian destinations such as Hong Kong, China, Singapore and Bangkok will feature 42 Sicma Majesty cradle-style seats in business class in a 2-2-2 configuration. Each seat is equipped with a 12.1in touchscreen IFE monitor (10.6in for first row units), power and USB dock.

The economy section of both its long- and short-haul 787s sees Sicma's AIRgonomic FX seating units installed. The seats feature a fixed backshell to ensure no intrusion into passengers' living space: "We didn't want passengers to be bothered by people sitting back," explains Kawate. ANA has opted for a 2-4-2 configuration, despite the majority of 787 customers choosing nine-abreast seating. "We wanted to enhance the comfort for passengers in economy class," explains Kawate. Long-haul seat pitch is a generous 34in, and passengers get a seat-mounted 10.6in IFE monitor, in-seat power and USB port. Short-haul economy seat pitch is 31-32in with 9in seatback screens installed.

Both classes on both versions of the 787 will feature Panasonic's eX2 IFE platform – this reflects the three-year



06

delay that the airline has suffered – Panasonic's latest product is its Android-based eX3 system, which is considerably more advanced. "Panasonic only unveiled its eX3 system in April," remarks Kawate. "Hence it was not available at the time of system implementation for our 787s."

Overall, Kawate remains philosophical about the long wait to receive the aircraft: "It was regrettable to have it delayed seven times," he says. "However, we trust this time will be used to deliver the best possible aircraft in the shortest possible timeframe."

WINDOW OF OPPORTUNITY Despite the delay, there's no doubt that ANA is getting an aircraft with some exciting new cabin features – all fitted as standard by Boeing. First of all there's the Dreamliner's 47cm tall and 28cm wide windows – 30% larger than those installed on the 767. "Their size and

- 05. ANA's first two 787s will feature this special livery
- 06. Long-haul business class will feature 46 Sicma Sky lounge seats in total



07



08



PASSENGERS WILL KNOW THEY ARE ON
A 787 THE MINUTE THEY WALK ON BOARD
– ITS INTERIOR IS UNMISTAKABLE “”

07. 'Washlet' toilets feature seats equipped with hot water washers for better hygiene
08. Jamco is the sole galley and lavatory supplier for the 787

location give a really remarkable view of the flight,” says Tom Galantowitz, Boeing’s 787 interiors director. “One of the really key aspects is that any passenger can see out of the windows.” An electronic dimming function integrated into each window adds to the excitement: “There’s no comparison to a shade, because you can have it at a setting where you can still see through the window yet not disturb the other passengers around you,” adds Galantowitz.

Passengers will also welcome the more expansive overhead compartments, which are 30% bigger than those on the 777, with enough room for four standard carry-on bags.

They’ll also notice the much improved cabin atmosphere – air pressure will be maintained at an equivalent altitude of 6,000ft, in comparison to 8,000ft on its previous aircraft, while humidity will also be increased.

The 787’s much celebrated entrance area, with its iconic vaulted ceiling and integrated mood lighting, provides a warm welcome when boarding, emphasizing a sense of space and drama. “Passengers will know they are on a 787

the minute they walk on board,” says Boeing spokesperson, Lori Gunter. “Its interior is unmistakable. From its high ceilings to its larger windows and versatile LED lighting, we have designed the Dreamliner to delight our customers’ customers. And, as important as the visible touches are, the lower cabin altitude, higher humidity and cleaner air will mean that passengers arrive at their destinations feeling more refreshed. They may not know why but they will feel a difference.”

Individual touches added by ANA to the overall passenger experience include lavatories jointly developed by Toto Ltd, Jamco and Boeing that feature ‘washlet’ technology – a toilet seat equipped with a hot water washer. Such toilets are common in Japanese homes, hence the airline was keen to introduce them in flight. “Washlets have quite a reputation in our market,” explains Kawate.

With service entry imminent, Kawate is genuinely excited by the improved passenger experience the 787 will offer ANA’s customers, particularly those travelling in business: “You can enjoy a fully flat seat and lots of personal space,” he says. “Passengers will sleep well, be able to eat a delicious meal, and enjoy the entertainment programming or work with ease. Introducing staggered seats in business ensures greater privacy, while the fixed seat backs in economy also help in this regard.” ☒

CONTACTS

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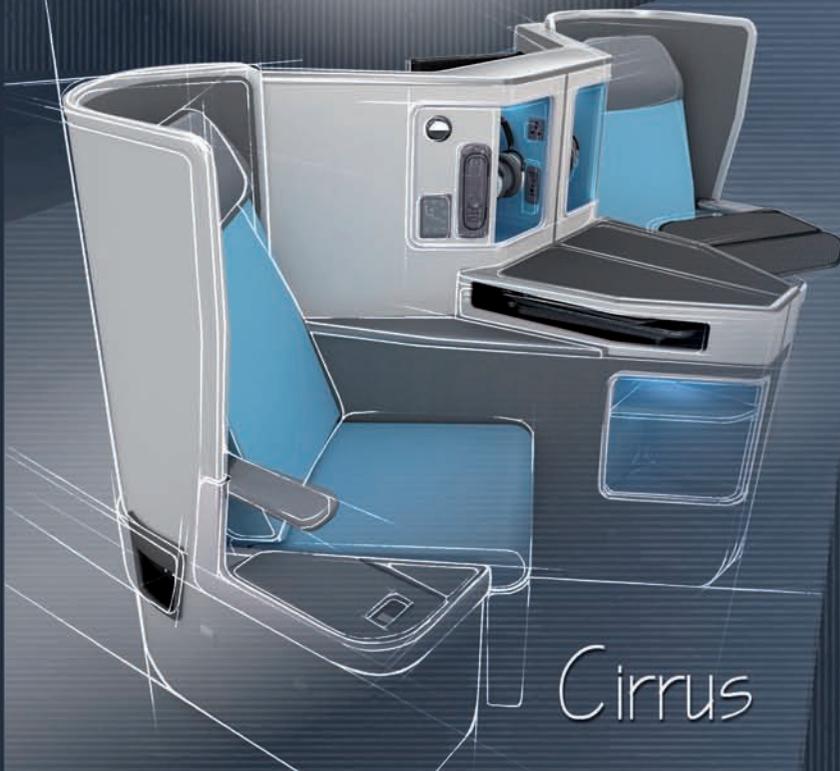
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accesscode

An aging population and growing numbers of travellers with disabilities mean new considerations for cabin designers

BERNARD FITZSIMONS, AIRCRAFT INTERIORS INTERNATIONAL



Airlines are legally obliged to carry disabled passengers and persons of reduced mobility (PRMs) in US, European and other jurisdictions, and are likely to find themselves carrying substantially more of them in the future. The number of people over 60 has doubled in the last 30 years to reach nearly 760 million in 2010, and the United Nations expects the total to reach two billion by 2050. By 2030, according to the US Department of State, the number over 65 will reach one billion, or one in eight of the world's people, and in many countries the over-85s are the fastest growing segment of the population.

Discrimination on the grounds of disability was outlawed by the United States Air Carrier Access Act of 1986, and in 2009, after multiple amendments to its 1990 ACAA rule, the US Department of Transportation introduced an extensively revised rule, Part 328.

Under Part 328, which also applies to non-US carriers operating to or from the country, there is no limit on the number of PRMs that an airline must carry on a single flight. And the regulation goes further, defining aspects of the accommodation on board. So, on new aircraft with 30 or more seats or when new seats are fitted to existing aircraft, aisle seats in at least half the rows in which disabled people are permitted to sit must have movable armrests. New aircraft with more than one aisle must have at least one wheelchair-accessible lavatory, and replacement lavatories must be accessible.

Aircraft with more than 60 seats and an accessible lavatory must carry a wheelchair, and those with more than 100 seats must have space for at least one passenger's own wheelchair as well. Safety and information videos must be high-contrast captioned, a requirement that is likely to be extended to visual entertainment in the future.

Current European Union legislation (EU 1107/2006) requires airlines to accept as many disabled or PRM passengers as are permitted by JAR-OPS 1 operator certification requirements. The associated advisory circular

says their number should not exceed the number of able-bodied persons capable of assisting with an emergency evacuation, but the Association of European Airlines says the US DOT will not accept that as grounds to waive its unlimited requirement, because it is a recommendation rather than a legal requirement.

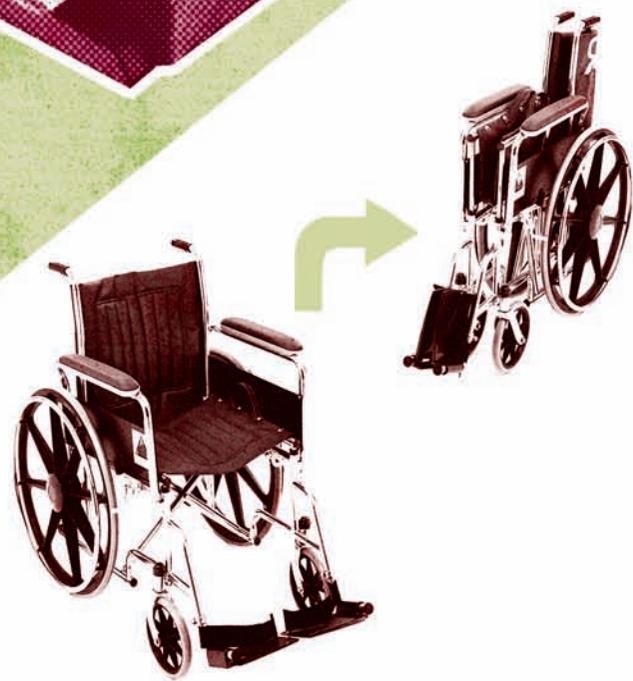
Like Part 328, 1107/2006 also covers off-aircraft disabled services, though in Europe these are the responsibility of airports rather than airlines, a difference which has caused difficulties for airlines required to comply with Part 328. Another difficulty is the variation in pre-notification requirements. The European rule requires notification 48 hours ahead of the flight for assistance to be guaranteed, while Part 382 specifically prohibits airlines from requiring advance notice of the intention to travel except where special services such as medical oxygen are concerned.

The EU rule in turn refers to the European Civil Aviation Conference's policy on facilitation, DOC No 30, which echoes the US recommendation of 50% movable armrests on aisle seats and the provision of accessible lavatories.

CABIN IMPLICATIONS The UK Department for Transport's code of practice on access to air travel for disabled persons and PRMs builds on the ECAC recommendations and, like Part 328, covers the entire air travel process, from the provision of pre-booking information to the handling of post-flight feedback and complaints. Its recommendations for cabin design range from detailed advice on the design of integrated boarding steps to the location and presentation of signs (they should be positioned to avoid shadows and glare, should contrast with their surroundings and where appropriate should be embossed and incorporate pictograms).

The code goes further than the ECAC recommendations in some areas, suggesting that a wheelchair should be carried on any aircraft with 20 or more seats and that designers of new aircraft should consider facilitating the

REDUCED MOBILITY



use of lifting aids such as hoists. The design, maintenance, stowage and use of onboard wheelchairs, including staff training requirements, are detailed in a separate 20-page design specification. Accessible lavatories are the subject of their own 48-page specification.

But the disabled and PRM classification covers more than wheelchair users. The definition in EU 1107/2006, an elaboration of that in ICAO Annex 9, is “any person whose mobility when using transport is reduced due to any physical disability (sensory or locomotor, permanent or temporary), intellectual disability or impairment, or any other cause of disability, or age, and whose situation needs appropriate attention and the adaptation to his or her particular needs of the service made available to all passengers.”

So the UK code of practice also addresses the needs of passengers with impaired sight or hearing. Apart from reading or other lights under the passenger’s control, lighting should be directed and controlled to prevent glare or shadows, the DfT recommends. Lighting in the passenger cabin should be strong enough to allow lip reading but should not cause any sharp contrasts in

intensity. And coloured lighting should be avoided because it reduces contrast, while blue lighting can cause glare.

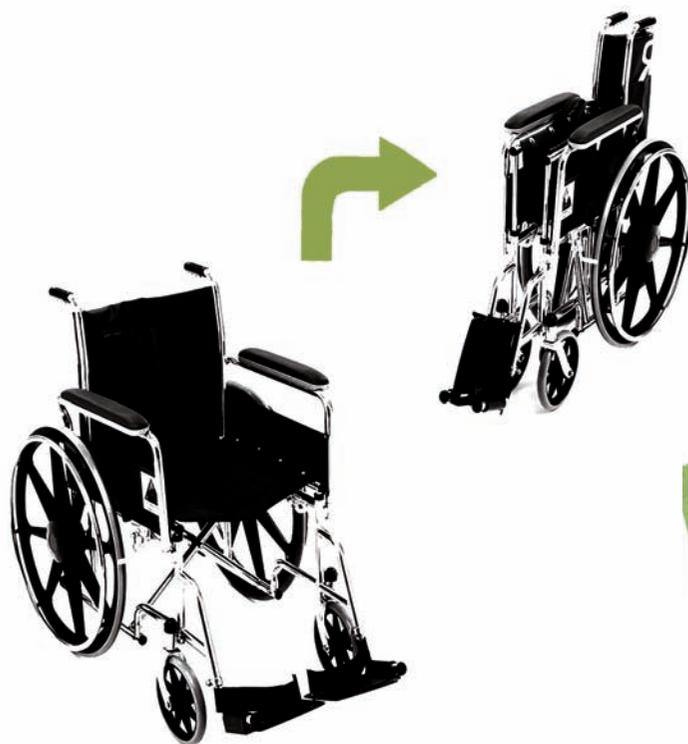
EXPERT VIEW Dipl-Ing Regine Fischer, interior designer with Germany’s AIDA Development, says EU 1107/2006 created only the legal framework to allow disabled and mobility-impaired passengers equal access to air transport. In terms of onboard facilities the regulation is limited to indicating that the airlines should take the needs of disabled persons and PRMs into account as far as possible in the design of new and newly refurbished aircraft. Only the ECAC and DOT regulations define more far-reaching recommendations regarding, for example, barrier-free communication, staff training, accessibility and usability and accessibility features on board.

“The regulations are completely inadequate regarding accessibility in the cabin,” says Fischer. “They define a minimum configuration, with seats with movable armrests, disabled toilets and wheelchair provision and stowage, and make general statements about the requirements for lighting, the use of colours and contrasts and so on. But they do not meet the real needs and requirements arising from the functional and mobility limitations of the various forms of disability. To ensure disabled and PRM safety and comfort in the cabin requires legislation based on binding international standards and specifications.”

Through various customer projects and extensive fundamental research projects, Fischer says AIDA Development has identified requirements for barrier-free layouts and the accessible design and equipment of interior components and fittings. The company has



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BECAUSE IT REDUCES CONTRAST, WHILE
BLUE LIGHTING CAN CAUSE GLARE



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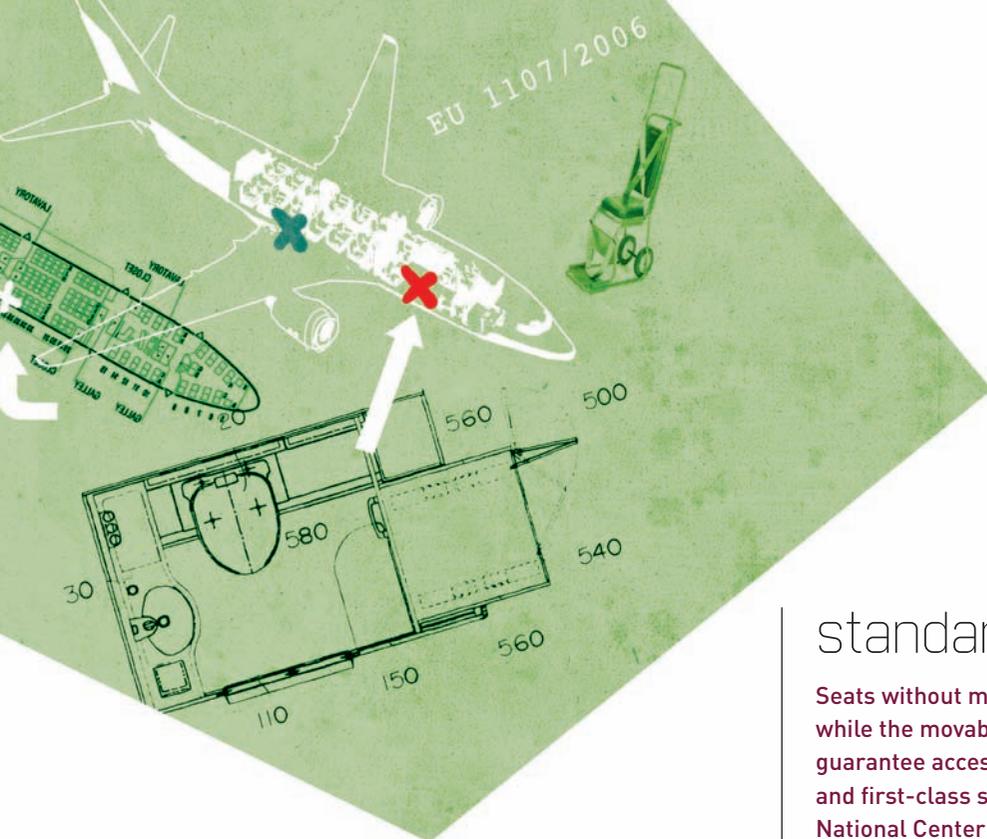
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developed process-oriented requirement specifications, particularly for wheelchair users, the elderly and the visually impaired or blind.

In July AIDA completed a 30-month research project on the specification and conceptual development of a disabled aircraft toilet, with particular focus on usability by a wheelchair with or without an assistant in the aircraft toilet and its use by older people, the visually impaired and blind people. An intelligent product development, it considered the interests of manufacturers and airlines in terms of space economy and integration into existing cabin layout while taking account of universal design criteria.

A further targeted research project addresses the issue of barrier-free seating areas, where not only the seat and the seat layout, but also the surrounding passenger-related functions of overhead bin and PSUs are designed for disabled people. Making aircraft accessible, Fischer concludes, means understanding in great depth the specific user needs and mobility limitations that confront the characteristic actions and movements of disabled people. Especially where the space for the standing transferors is limited, it is essential to use basic biomechanical data.

VISUAL ENVIRONMENT The Teague-designed Boeing 787 cabin incorporates the required features such as movable armrests and accessible lavatories. In terms of lighting scene development, though, Teague vice president Ken Dowd says the regulations impose minimal constraints. “The regulations would seem to suggest a utilitarian approach to design,” he says. “Glare is rarely an issue to the seated passenger and most often experienced during movement about the cabin.”

While the UK DfT code cautions against blue light glare, he says, colourful lighting scenes can be used to communicate various expectations and “moods” of the flight: “Judicious use of the colour palette afforded by the lighting system can accommodate the mood objectives without appreciably increasing glare for the passenger and crew.” For example, colour scenes can be designed to

standard bearer

Seats without movable armrests are generally not accessible, while the movable armrest mandated by US legislation does not guarantee accessibility and is not even feasible on many business- and first-class seats. Those are among the findings from trials by the US National Center for Accessible Transportation (NCAT), which is working with the SAE Seating Committee to define new standards for accessible seating. During assisted or dependent transfers, in which two people lift the passenger from aisle chair to seat, seat backs can obstruct the transferors, and even a small difference in height between seat and aisle chair makes the job harder.

In many premium seats, the easiest way for passengers to carry out independent transfers is to slide onto the seat while opened flat then return it to the upright position for takeoff. But those requiring an assisted transfer typically have no upper body control, so that method does not work.

At the same time, the privacy screens, large seat backs and fixed armrests typical of premium seats pose a great risk of lower back injury to the rear transferor. Sometimes the only possible assisted transfer is a one-person lift and turn transfer, which is dangerous for both the assistant and the passenger. Future standards, NCAT believes, must be informed by biometric studies.

mimic natural lighting conditions, or colourful accents. “The accents would by their nature be less prominent and therefore less likely to produce glare.”

Lighting design that takes account of passenger comfort and appearance will allow the use of any available hue while maximising the utility of the lighting system for that particular scene or mode, Dowd says. “The use of a multi-source lighting system, which in this case means lighting subsystems dedicated to particular functions – general cabin, accent or task – give the designer the flexibility and power to produce a wide range of lighting scenarios that meet both design and regulatory requirements.” Regulations stemming from the legislation seem to be part and parcel of good lighting design, he says, though the recommendation against any particular hue of light may not be supported.

Dowd says all passengers, including those with impaired vision or hearing, are considered when designing a lighting system: “With such an extraordinary range of visual capabilities and needs, the general cabin lighting must strive to meet the needs of all and the preferences of as many as possible, including the colour blind and those with severe visual impairment. The use of PSU lights plays



01



02



THERE IS MORE AIR TRAVEL BY PASSENGERS WITH DISABILITIES AND THEREFORE MORE REVENUE FOR AIRLINES



- 01. Priestmangoode is helping UK charity MERU with its AirChair
- 02. German design firm AIDA Development GmbH is working on a new disabled toilet

a major role in the customisation of the individual passenger environment, and the general lighting system accommodates all safety requirements.”

The use of colours in the lighting system to denote various events or moods enables the hearing impaired to accept cues for changes in the cabin, he adds, while information lighting such as lighted seat row markers, exit signs and photo luminescent strips, provide safety data for all.

FLEXIBLE THINKING Priestmangoode holds that air transport is a service-driven industry. “Those companies that succeed are the ones that keep their passengers happy, and providing good services to passengers with reduced mobility is a key consideration for all our clients,” says co-founding director Nigel Goode. “Our job as designers is to create environments that are flexible and give the passenger the freedom and ability to customise their space to their requirements.”

Lighting allows for a high level of customisation, he says. The cabin should provide overall ambient light without glare, something that not only will be of particular importance for the visually impaired but will provide a more pleasant cabin experience for all passengers. When it comes to seat lighting, such as reading lights, Goode says, “we try to design them so that each passenger is able to move the light as they need, to eliminate shadows or better illuminate an area in front of them. Space constraints mean that some things work better in some classes, but we aim to put flexible designs in place across all classes.”

Space constraints, of course, are a particular consideration for PRMs, who need to get in and out of seats. “We recently re-designed the entire cabin interiors for Lufthansa’s European fleet,” he says. “We worked with seat manufacturer Recaro on the new cabin, and each seat now provides an additional 4.2cm in the knee area. That makes it easier for passengers with reduced mobility to get in and out of seats as well as making the journey more comfortable for all passengers.”

In terms of other PRM provisions, Goode adds: “We try to ensure that our designs in premium areas are flexible so that they can be adapted in case of emergencies and to suit any specific needs – for instance, a sofa could be used by a passenger who is unable to sit upright. By keeping the passenger at the heart of everything we do and creating flexible designs, we can at least ensure that the onboard passenger journey is as comfortable for passengers with disabilities as for those without.”

Priestmangoode also consulted recently with UK charity MERU, which specialises in designing products for children with disabilities. “They have come up with a concept called the AirChair for which they are currently raising funds,” Goode says. “The idea behind it is that current airline seats are not particularly well suited to the needs of severely physically disabled passengers. The AirChair aims to rectify that and provide a safe environment for them to fly in.”

Making cabins fully accessible for disabled and PRM passengers is evidently still a work in progress. Even so, airlines should welcome the obligations. As the US DOT’s Samuel Podberesky told an ECAC workshop on assistance to PRMs last October, although his department does not collect data in this area, “based on anecdotal evidence there is more air travel by passengers with disabilities and therefore more revenue for the airlines.” ☒

CONTACTS

www.aida-development.de; www.meru.org.uk; <http://ncat.oregon-state.edu>; www.priestmangoode.com; www.teague.com

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spaceflight

Korean Air has unveiled the roomiest A380 yet – with its spacious layout complemented by headline-grabbing lounges and even a duty-free area

IZZY KINGTON, AIRCRAFT INTERIORS INTERNATIONAL



The sheer size of the A380 offers airlines the opportunity to do something special with the cabin. Singapore Airlines (471 seats) got the ball rolling in October 2007 when it gave passengers private suites with seats and beds in first class, 34in-wide seats in business and led the way with office productivity functions on Panasonic's eX2 IFE system.

Next up was Emirates (489 seats) in July 2008. The biggest customer for the A380 (with 90 orders), Emirates' buying power enabled it to really go to town on a highly customised upper deck, designed by Jacques Pierrejean. Given over to the premium classes, it boasts suites, bars, a waterfall feature and, of course, those famous showers.

The third A380 (450 seats) followed soon after, delivered to Qantas in September 2008. Benefiting from the star power of Marc Newson at the helm, the interior is perhaps less showy than previous A380s, but oozes style and attention to detail. It is also the only A380 so far to include four classes – with the addition of premium economy.

The next A380 was the first for a European airline, Air France (538 seats). Delivered in October 2009, highlights include an art gallery on the upper deck.

The fifth design (526 seats) was delivered to Lufthansa in May 2010. It boasts several firsts – including the first use of cabin humidification in a commercial airliner, and the first onboard urinals. It also has spacious bathrooms with changing zones by muller romca in first class, and extensive sound-dampening technology.

01. The Celestial bar, which graces the top deck of Korean Air's A380

01



“ KOREAN AIR WANTED AN OPEN, SPACIOUS FEEL TO THE CABIN AND DIDN'T WANT TO GO DOWN THE 'FULL SUITE WITH SLIDING DOORS' APPROACH ”



- 02. Korean Air's A380 features first-class suites supplied by Contour and modified by Acumen
- 03. The top deck is given over to one class, business



03

All this means that Korean Air, the sixth customer for the superjumbo, had a tough act to follow. It hasn't disappointed. Unveiled in May 2011, Korean Air's A380 is not only the most spacious of its class, with only 407 seats, it also boasts the world's first onboard duty-free area, and stylish bars sponsored by mammoth vodka brand Absolut.

"With its spacious layout, the A380 is expected to further strengthen Korean Air's competitiveness as a leading global carrier in the aviation industry," says Lee Young Kuk, assistant manager of the airline's inflight sales team.

Young Kuk says the airline hasn't sacrificed seats to fit in the duty-free area and bars, but instead "just maximised the space resources in the rear side of the A380".

The carrier is also the first to dedicate the top deck entirely to one class – decked out as it is with 94 business-class seats, plus two bars. The business-class model is the Prestige Sleeper from B/E Aerospace, a full-flat product configured at 74in pitch and 21.6in width.

The main deck has 12 first-class and 301 economy-class seats. The new economy seating from Weber offers 118° recline, 34in pitch and 18in width. All classes feature Panasonic's eX2 IFE, with 23in screens in first, 15.4in for business and 10.6in in economy. Meanwhile, in first class, the Kosmo Suite boasts 83in pitch and 27in width and transforms into a fully flat bed. It also features on the airline's refurbished Boeing 777s.

suite success

The Kosmo Suite that adorns Korean Air's first-class cabin is based on Contour's Venus product, but it has been customised by London-based design firm Acumen for the airline. "We worked closely with Korean Air to define a brief for the new first-class product," says Acumen's John McKeever. "The chairman of Korean Air, Yang Ho Cho, was actively involved in these early meetings and had a clear vision of what the airline wanted – a first-class cabin that would appeal to both Korean and global passengers."

Striking a balance between privacy and openness was a key issue. "Korean Air wanted an open, spacious feel to the cabin and didn't want to go down the 'full suite with sliding doors' approach that a lot of other airlines have implemented in first class," says McKeever. "Korean Air's preference was for a conventional forward-facing layout in a 1-2-1 configuration across the aircraft. Other key drivers for the brief were seat and bed comfort, reducing weight as much as possible and minimising the number of electrical actuators."

To solve the privacy issue, the suite's structure hides an L-shaped screen that can be deployed at the touch of a button. The idea is to offer 'flexible privacy' whereby passengers can choose the level to suit their individual requirements. "This gives a feeling of openness within the cabin, but offers excellent levels of privacy without the need for high walls around the suite," says McKeever.

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ITEMS AND THE COLOURS OF COSMETICS



04



04. Economy class is fitted out with seats from Weber
05. The onboard duty-free showcase



05

RETAIL THERAPY The duty-free area is located at the back of the main cabin. Its main function is to showcase the airline's duty-free offering, enabling passengers to get hands on with items including high-end cosmetics, fragrances, alcohol and accessories.

"We believe that the Korean Air Duty Free Showcase will make our passengers' flying experience even more enjoyable," says Young Kuk. "Passengers can now appreciate the duty-free offering – they can check the size of items and the colour of cosmetics, and handle accessories."

Up to 64 items can be displayed at one time. Designed by AIM Aviation, the area includes magnetic shelves to prevent the luxury products sliding around during takeoff and turbulence. Magnets are glued to the bottom of display items to adhere them to the shelves.

The airline estimates that each display monument adds around 130kg in weight, plus 30kg for the display items. Korean Air conducts all its duty-free transactions in full in flight, so it has to carry all the items it intends to sell on the aircraft, rather than storing them at each destination. As such, storage is included as part of the area.

Of course, all this bumps up the weight of the aircraft, but perhaps this cost will be outweighed by ancillary revenue – only time will tell. The airline certainly has an extremely successful track record in inflight sales, and is

making the best of the rest

Aside from its A380, Korean Air has also been busy working on the rest of its mid- and long-haul fleet. In May 2011 it completed a six-year project to install next-generation premium seats and the latest AVOD IFE on 68 passenger aircraft, at a cost of KRW360 billion (US\$0.33 billion). As well as acquiring 19 new aircraft with the latest cabin, the airline refurbished 49 passenger aircraft (Boeing 777s, Boeing 747s and A330s) – which entailed the replacement of 14,441 seats.

Korean Air's refurbishment plan began with 17 Boeing 747-400s. The second phase, from 2009 to 2011, encompassed 32 Boeing 777 and A330 aircraft. A total of 85 engineers from around the world worked together from March 2007 to September 2009 to study more than 12,000 pages of interior design prints and reports to successfully upgrade each cabin. In all, 40,000 staff were involved in the project.

The next-generation premium seats include Kosmo Suites, Kosmo Sleepers and Sleeper seats in first class, Prestige Sleepers and Prestige Plus seats in business class, and two types of economy seat. The Boeing 777s, which often operate long-haul routes, have been fitted with Kosmo Suites, at a cost of KRW250 million (US\$230,000) per seat – the same product as on the A380.



KOREAN AIR IS THE WORLD'S MOST SUCCESSFUL AIRLINE IN TERMS OF INFLIGHT RETAIL



06



07

- 06. The forward bar/lounge
- 07. Both bar/lounges feature Absolut branding

believed to have made in excess of US\$200 million from it in 2010. “Korean Air is the world’s most successful airline in terms of inflight retail,” says Young Kuk.

BAR WORK Meanwhile, Heath Tecna has created two bar/lounges for the top deck, both sponsored by Absolut Vodka. “The partnership between Absolut and Korean Air is backed by a long tradition so this new collaboration was a logical next step,” says Young Kuk. “Absolut is famous for its innovative and groundbreaking initiatives in the duty-free/travel retail market. It’s a brand that represents all the cutting-edge values of quality, exclusivity, creativity and innovation that are also core to Korean Air.”

The forward lounge includes a four-person sofa with built-in side tables and reading lamps; a magazine display, which also doubles as an amenity/snack serving area; and a self-service Absolut-themed bar featuring a display tower, martini glasses and chilled liquor bottles stored in a conjoined side table.

The aft lounge, appropriately called the Celestial Bar, is even more elaborate. Staffed full time with a bartender, and at the cost of around three seating rows, it incorporates a two-person sofa with reading lamps, a trio of lean-to cushions, a flat-panel LCD on top of a magazine display, and a stand-up bar. Both the lounges are finished in blue fabrics, high-gloss white paint, powder-coated aluminium surfaces,

accent lighting and a special squirrel and grape leaf decorative motif.

Heath Tecna’s contract calls for the company to coordinate the design – incorporating input from Absolut and Airbus as well as the airline. It also had to build mock-ups, engineer the designs to pass certification and manufacture the equipment. The programme kicked off in 2006; shipsets will support Korean Air’s A380 deliveries through 2014. Heath Tecna is also supplying centreline stowage closets for the top of the forward stairway. For every Korean Air A380 built, Heath Tecna supplies nine cabin furnishing assemblies, which will total 90 units over the course of the programme.

All in all, it’s clear Korean Air means to make a splash with its flagship. “Korean Air was the first airline to purchase an Airbus aircraft outside Europe and they have now become an essential part of our fleet,” said Yang Ho Cho, chairman and CEO of Korean Air, on receiving the first of its A380s. “The exceptional, fuel efficient and environmentally friendly A380 that is being delivered today is perfect to assist Korean Air in advancing our goal of becoming a respected leading global carrier.” ☒

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secondlife

Most cabin furnishings currently cannot be recycled, but airframers and airlines alike are working to make it possible

BERNARD FITZSIMONS, AIRCRAFT INTERIORS INTERNATIONAL



A lot of aircraft will be heading for the scrapyard over the next two decades. Boeing forecasts that more than 13,000 of the 19,400 airliners in service at the end of 2010 will be replaced by 2030. Given that the typical weight of cabin furnishings ranges from five tons for a 737 to 10 tons for a 747, there is going to be a lot of material to dispose of.

Apart from the aluminium in seat frames, though, most of it is currently destined for landfill. The Airbus-led, European Commission-supported Process for Advanced Management of End-of-Life-Aircraft (PAMELA) project that ended in 2007 demonstrated that up to 85% of an aircraft's weight could be recycled and more than 70% of components and materials could be reused or recovered through regulated recovery channels. But cabin linings and insulation were among the major exceptions.

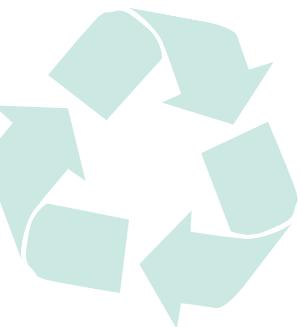
Aluminium can be recycled readily and repeatedly. After being cleaned and shredded it is melted at 700°C and once impurities have been removed it is formed into ingots that can be used in the same way as virgin metal. The energy

used is only 5% of that required for smelting bauxite to make new ingots, although the alloys commonly used in aircraft require more sorting and are harder to process than the unalloyed metal.

The carbon fibres from structural composite materials can also be recovered for reuse, though not necessarily in such demanding applications. Again, recycled fibres are more economical to produce than new ones, using just 5% of the electricity and costing around 30% less, and the recycled fibres preserve many of their original qualities.

But cabin furnishings tend to be made of a range of materials, most of them plastic or polymer-based composites. The various materials are often used in close combination, making it difficult to identify and separate organic, metallic and composite elements. And as yet there are no commercially viable reprocessing technologies or applications for the recovered materials. But there is a lot of work going on to overcome those obstacles.

In the wake of the PAMELA project Airbus, Safran and waste specialist SITA France established Tarmac Aerosave at







IT'S NOT ONLY ABOUT THE TECHNOLOGY,
BUT ALSO ABOUT THE SUPPLY CHAIN

Tarbes, France; and Airbus set out to develop an international network of recycling centres. Boeing, meanwhile, helped form the Aircraft Fleet Recycling Association.

RE-USE OR RECYCLE? AFRA member Aircraft End-of-Life Solutions (AELS) of Delft in the Netherlands has dismantled aircraft ranging in size from Fokker F27s to a Boeing 747-200 freighter. AELS general manager Derk-Jan van Heerden says his company considers recycling to be turning material into new virgin material. “Turning aluminium parts into new aluminium products via a melting process is recycling,” he says. “Using a part from an aircraft on another aircraft is what we would call re-use, not recycling.”

When it comes to the interior, the seat frames are stripped and recycled along with the aircraft via a shredder process. Then, van Heerden says, depending on the country where the project is being executed, the non-recyclable material from cabin linings is either consigned to landfill or used for energy recovery. “It is interesting that in car

recycling legislation a good incineration process is actually considered to be recycling,” he comments.

Although there is currently no alternative to landfill or incineration for the remaining materials, he is confident that processes for recycling them will emerge in the future, and AELS itself is working on solutions as part of a group of seven AFRA members. “We are studying several options,” he says. “Recycling only works if you use an integrated approach. So it’s not only about the technology but also about the supply chain around it, the logistics, and the financials of course.”

Reducing the weight of cabin furnishings, with its direct impact on carbon dioxide emissions, may be a more important consideration than whether it can be recycled in 10 or 20 years’ time. And while van Heerden agrees, he says that should not be the end of the story: “That doesn’t mean we should not look for a material or solution that scores 10 out of 10 on all fields.”

The combinations of materials currently used tend to be unique to aerospace applications, because the requirements in areas such as fire retardation are more stringent than those applying to products such as household plastics, for example. “This doesn’t mean that the materials could not be added to existing recycling supply chains or that we could



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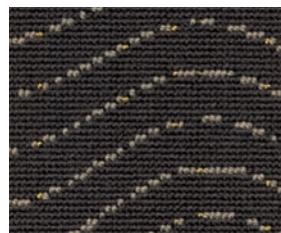
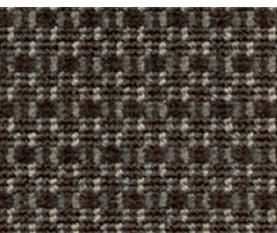


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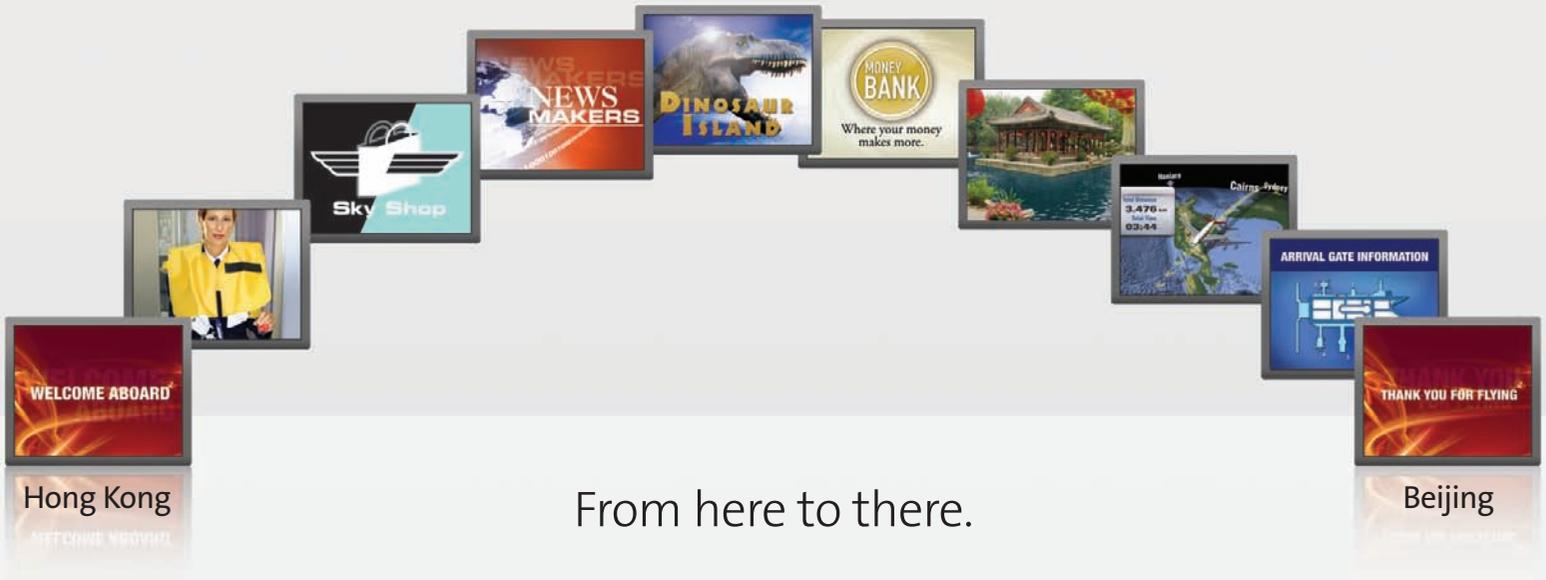
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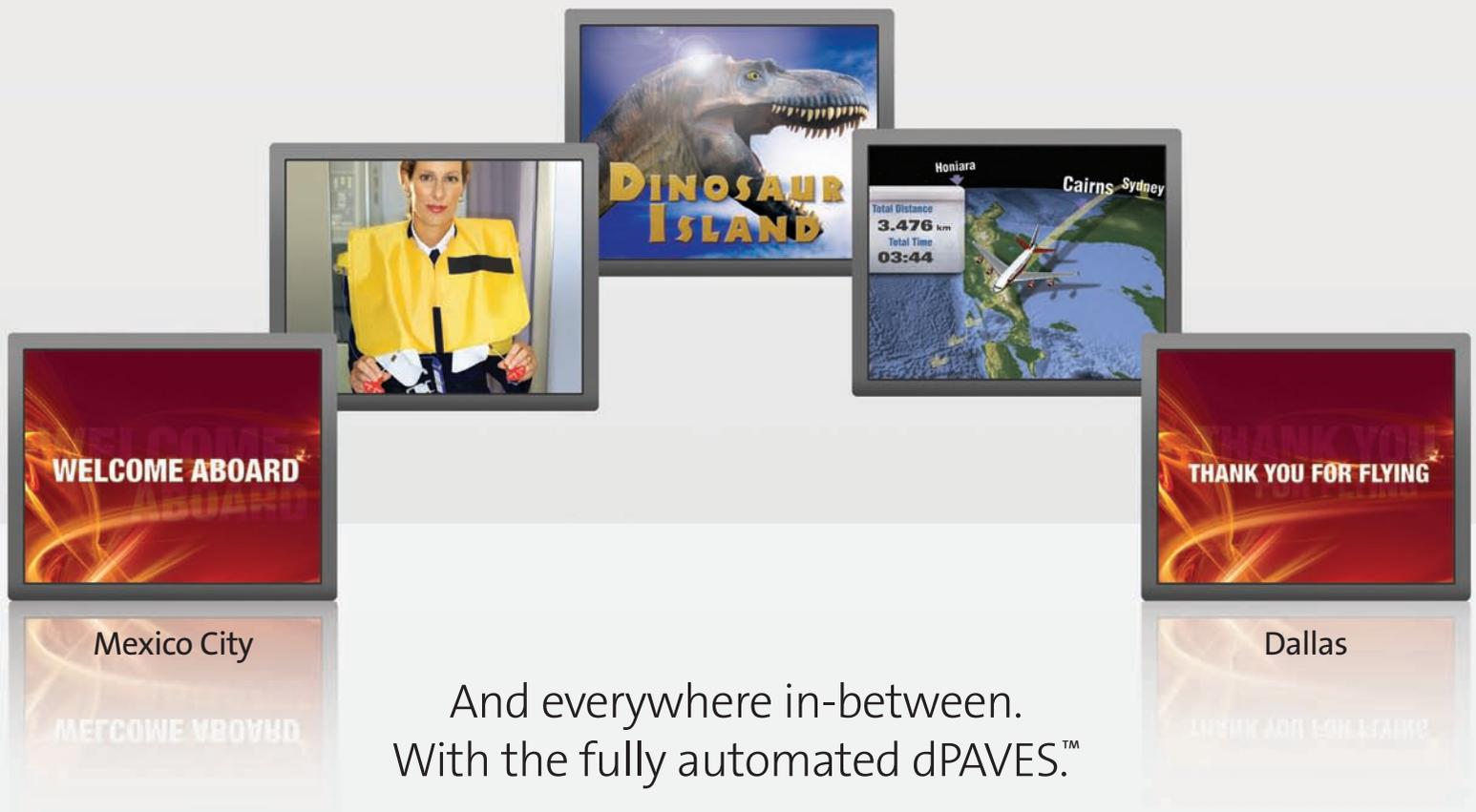
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textile restyle

Seat covers and other cabin fabrics from several airlines have been adapted to make bags and other fashion items, a process sometimes called 'upcycling' since it turns something disposable into a product of greater use and value.

Finnair curtains and seat belts, for example, have been transformed into bags used as business gifts and IFE video monitor support brackets from its MD-11 business-class seats have become energy-saving LED lamps. Seat covers retired by Virgin Atlantic and Delta Air Lines have also become bags.

More ambitiously, KLM combined with a group of nine companies to upcycle 90,000kg of old flight attendant uniforms into new raw materials to be used in manufacturing new, high-quality products.

The conventional collection and processing techniques used in recycling usually reduce the quality of raw materials, the airline says, making recycling little more than a detour on the way to the rubbish dump. But by upcycling it instead, the savings compared with the production of new textiles include 500 million litres of water, 4,600 tons of carbon dioxide and a million cubic metres of natural gas, according to the airline.

not use existing technologies developed for other materials," says van Heeren. "What we do know is that we need to investigate it all and work towards a solution. And that is currently being done."

AFRA's deputy director, Bill Carberry of Boeing, reinforces van Heeren's view. "AFRA members are applying increased industry resources to the area of cabin recyclability," he says. "There is no pressing deadline for making this applicable, but we fully recognise that it makes good business sense and it is also the responsible thing to push forward and drive sustainable best practices into our industry."

Of the AFRA member companies working on the problem, he says, all seven are collecting materials, two are carrying out contaminant analysis and four are assessing solutions ranging from thermal recovery through remanufacturing applications: "The majority are for re-use applications outside of aviation, but using recovered materials." AFRA is not looking at seats, fabric, foam and carpet, because others are doing that work. "What we are looking at is the plastics – sidewalls, stow bins, ceiling panels, possibly floor panels. We are still in the very early stages, but are seeing promise and believe it is feasible going forward."

SEAT SALE There is a market for used seats, which are sold both to private individuals and to other airlines for reuse. Lufthansa, currently in the middle of replacing seats on more than 180 single-aisle aircraft, uses both channels to dispose of end-of-life seats.

But the supply is far in excess of demand. France's Air Support, which started selling second-hand seats as a sideline to its cabin component repair business five years ago, is not the biggest company in the field and does not maintain its own stock, but sales manager Ismaël Falidi says it has the biggest database of used seats.

Last year, he says, the company sold the equivalent of around 1,200 passenger seats. Depending on the customer's requirement, the seats can be sold as they are or fully overhauled with plastic parts replaced and new cushions and covers. The average age of seats the company buys is 10 years, though occasionally a customer will want older seats for a specific purpose. When it comes to disposing of surplus seats, Falidi says, the metal structure can be recycled. "But for the cushions, the covers and all the textile parts we have no solution at the moment, so we have to put them in the bin and we have to pay for that."

The market is growing, says Falidi: "There are new small companies arriving on the market, they are leasing an aircraft but they want to have their own interior so they are removing the existing seats to get new ones. So there is a

“

THE AVERAGE AGE OF SEATS THE COMPANY BUYS IS 10 YEARS ”





growing market for used seats.” At the same time, major airlines are changing their seats more frequently. The result, he says, is “a lot of seats all round the world still waiting for someone.”

CRADLE TO CRADLE Recycling carpet seems to be a more practical proposition. Delta and Mohawk Aviation Carpet embarked on a carpet recycling effort in late 2007: under its ReCover programme, Mohawk collects the discarded carpet in containers at several of the airline’s hubs and handles transportation to local reclamation centres for recycling.

Meanwhile, under a project called carpet care, KLM is working with the manufacturer and a waste treatment company to reuse carpets as a raw material for the cement industry. It aims to recycle 80% of its 35,000m² of carpet every year.

The ideal recycling process, though, is one that forms part of a cradle-to-cradle lifecycle. Carpet manufacturer Desso is implementing the concept, which involves designing products that are either biodegradable or recyclable in their entirety, manufactured using processes that rely on renewable energy and ease of disassembly for recycling.

The Green Carpet from France’s Green Sky Europe also adheres to those principles. The manufacturer says it is produced without using water, is less than half the weight of conventional carpet and can be reprocessed into new carpet at the end of its life. For low-cost carriers it can even be used as a tool to generate ancillary revenue by incorporating advertising. Erie Aviation has established GreenSky Textiles to produce the carpet in the United States.

Another new product designed for recyclability is the Sky-Tile from InterfaceFLOR. Said to be easier to ship, store, install and maintain as well as recycle than conventional aviation carpet, the Sky-Tiles are claimed to last longer and, being dimensionally stable, need no edge serging. Developed in collaboration with Boeing and Teague Industrial Design, the InterfaceFLOR tiles were trialled on Southwest Airlines’ Green Plane.

The same Southwest testbed aircraft also features seat covers from E-Leather. The material for the covers is made from wet blue – raw tanned leather – discarded by tanneries, which is then ground to produce leather fibres. The fibres are combined with a high-performance core by a process called ‘hydroentanglement’ without the use of adhesives. The resulting composition leather is up to 50% lighter than conventional leather – helping to save on fuel burn. ☒

CONTACTS

www.aels.nl; www.afraassociation.org; www.tarmacaerosave.aero



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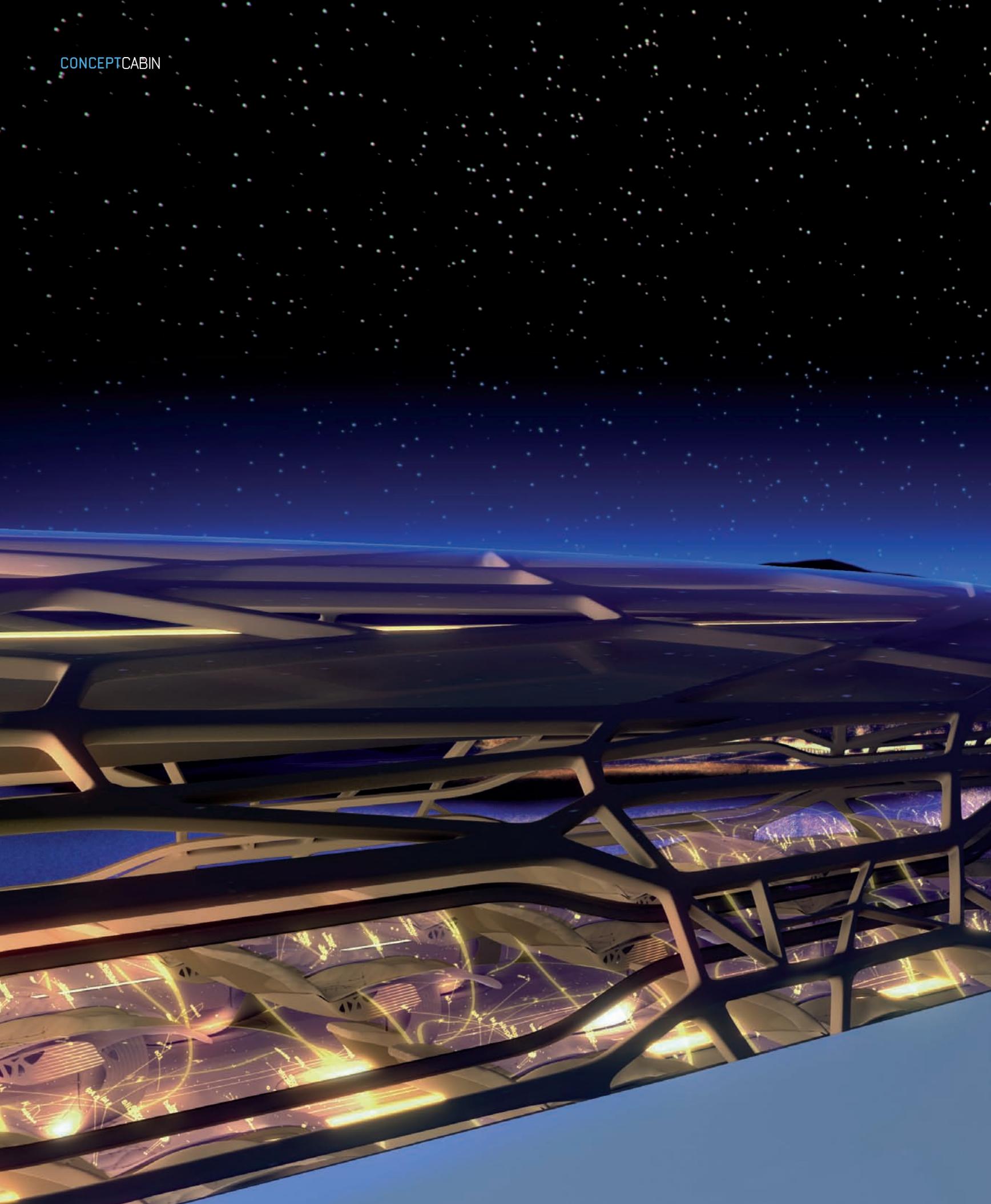
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whatif?

Dismissed by some as mere brand alchemy, Airbus' Concept Cabin nevertheless asks all the right questions – and hints at some fascinating answers

ANTHONY JAMES, AIRCRAFT INTERIORS INTERNATIONAL

What will life be like in 2050? The UN predicts the world's population may well have reached nine billion; Ian Pearson, head of British Telecom's futurology unit says computer game consoles could be as powerful as the human brain; while the European Commission plans to ban petrol and diesel cars from all major European cities in a bid to cut CO₂ emissions by 60% over the next 40 years.

As for air travel, IATA predicts airlines could be handling as many as 16 billion passengers and 400 million tonnes of cargo by 2050. "In just a couple of decades, we will see the middle class nearly triple from the 1.3 billion today to 3.5 billion people – a quarter of whom will be in India and China," said Giovanni Bisignani, IATA's director general and CEO, speaking at last year's IATA Annual General Meeting and World Air Transport Summit.

And now Airbus has added further to the debate, with its Airbus Concept Cabin. The latest chapter in *The Future By Airbus* – a vision of aviation in 2050 – the project offers a hypothetical peek inside the manufacturer's Concept Plane, first unveiled last year and brimming with ideas to cut fuel burn, emissions, waste and noise, including ultra-long and slim wings, semi-embedded engines, a U-shaped tail, and a lightweight body.

All very exciting if you are an engineer – but for the population at large, there's nothing more seductive than a glimpse of what it will actually be like on board! And in this respect Airbus has not disappointed – its glossy vision features a transparent skin that floods the cabin with natural light, seats that morph to the shape



01

01. The vitalising zone takes full advantage of the transparent cabin membrane, flooding the cabin with rejuvenating natural light

of individual passengers to provide optimum comfort, and an interactive zone where passengers can play virtual golf or take part in a language lecture.

But just how likely is all of this? For example, the concept cabin is built upon a bionic structure that mimics the efficiency of bird bone, which is optimised to provide strength where needed, and also allows for an intelligent cabin wall membrane that controls air temperature and can become transparent to give passengers open, panoramic views. Such a vision sounds light years away, never mind a few decades or so.

Not so, says Ingo Wuggetzer, Airbus vice president of cabin innovation and design: “We’re already applying the idea of a bionic structure today on smaller parts,” he says. For example, the manufacturer has already developed a bracket with similar properties to the proposed fuselage: “It’s twisted and has variable dimensions depending on the strength and load angles – it’s very clever.”

The bracket was made using a new 3D printing technology: “It involves a paradigm shift in manufacturing, where we use a printed process to put the structure where it needs to be without consideration of assembly or of traditional manufacturing processes,” explains Ian Scoley, Airbus’ head of industrial design. “3D printing has the potential to do what stereo lithography did for mock-up manufacture – you can build things that are impossible by conventional techniques. It will allow us to re-address how a structure links together – we will no longer be tied by the conventional limitations of hoops and stringers and skin.”

Both men are clearly excited by the possibilities – not least the chance to escape a cylindrical fuselage: “Let’s face it, what we would like to do to change a cabin interior is to get away from that cylinder and this could be the way of doing it,” says Scoley. “It’s releasing us from conventional boundaries, allowing for a much larger entrance and windows than what you have today.”



And both insist that the vision is entirely deliverable: “It would take some time, but the technology is in principle available, albeit on a smaller scale,” says Wuggetzer. “A lot of the technologies, enablers and touchpoints that we refer to in the concept cabin are already available in some format today – it’s just extrapolating that to how it might be for the cabin of the future and filling in the details of how we get there, if of course, that is eventually where we want to go.”

However, they both also stress that the project is focused firmly on the passenger, rather than hi-tech wizardry: “We do not use something just because it’s a new technology,” says Wuggetzer. “The needs of the passenger are the first priority, then we devise the technologies that enable these.”

FUTURE NEEDS The project began by asking a simple question: what are the needs of future passengers? Airbus’ research identified four core requirements: health and well-

future tech

A host of fascinating and exciting new technologies underpin the Airbus Concept Cabin:

■ Bionic structures

Future aircraft could be built using a bionic structure that mimics the bone structure of birds. Bone is both light and strong because its porous interior carries tension only where necessary, leaving space elsewhere. This not only reduces the aircraft’s weight and fuel burn, but also makes it possible to add features like oversized doors for easier boarding and panoramic windows.

■ Biopolymer membrane

The cabin’s bionic structure will be coated with a biopolymer membrane, which controls the amount of natural light, humidity and temperature, providing opacity or transparency on command and eliminating the need for windows.

■ Integrated neural network

The cabin electrical system can be compared to the human brain, with a network of intelligence pulsating through the cabin. This network will be absorbed into the structural materials, making cables and wires a thing of the past. Known as ‘smart’ materials they can perform numerous functions, recognising each passenger, and ‘connecting’ them to the aircraft.

■ Morphing materials

Materials that change shape and return to their initial form, growing like the leaves of a plant, are a very real possibility. Morphing materials might be metals or polymers that have a ‘memory’; or are covered with a ‘skin’ that will instigate a shape change. A memory is created using sensor and activator systems that give materials a certain level of artificial intelligence, allowing them to adapt to passenger needs.

■ Self-reliant materials

Materials will be self-cleaning: Think of the leaves of a lotus plant, which water rolls off in beads, taking contaminants with it. Today, coatings inspired by this are used on the surfaces of cabin bathrooms. In the future they will be found in seat fabrics of and carpets. Materials will also be self-repairing – today, certain paints can already seal a scratch by themselves, just as the human skin does.

■ Ecological materials

The future passenger cabin will be fully ecological. Fully recyclable plant fibres that can be grown to a custom shape will be sourced from responsible and sustainable practices.

■ 3D printing

Some cabin elements could be created using additive layer manufacturing, which is a bit like printing in 3D. The process repeatedly prints very thin layers of material on top of each other until the layers form a solid object in materials ranging from high-grade titanium alloys to glass and concrete. This makes it simpler to produce complex shapes and wastes a lot less material than cutting shapes out of bigger blocks.

■ Holographic technology

Scenes showing the destination, a city skyline or a tropical forest, will be projected onto the cabin walls.

■ Energy harvesting

The body heat you give out will be collected by your seat or pod as you relax or sleep, and combined with energy collected from other sources, like solar panels, to fuel cabin appliances.

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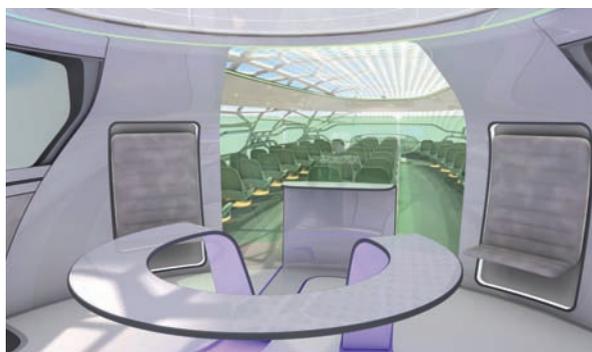
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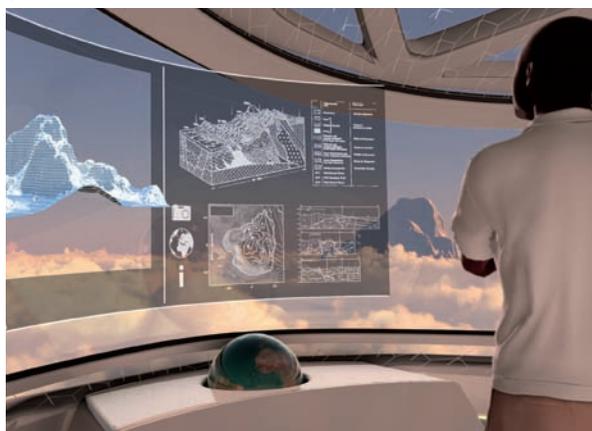
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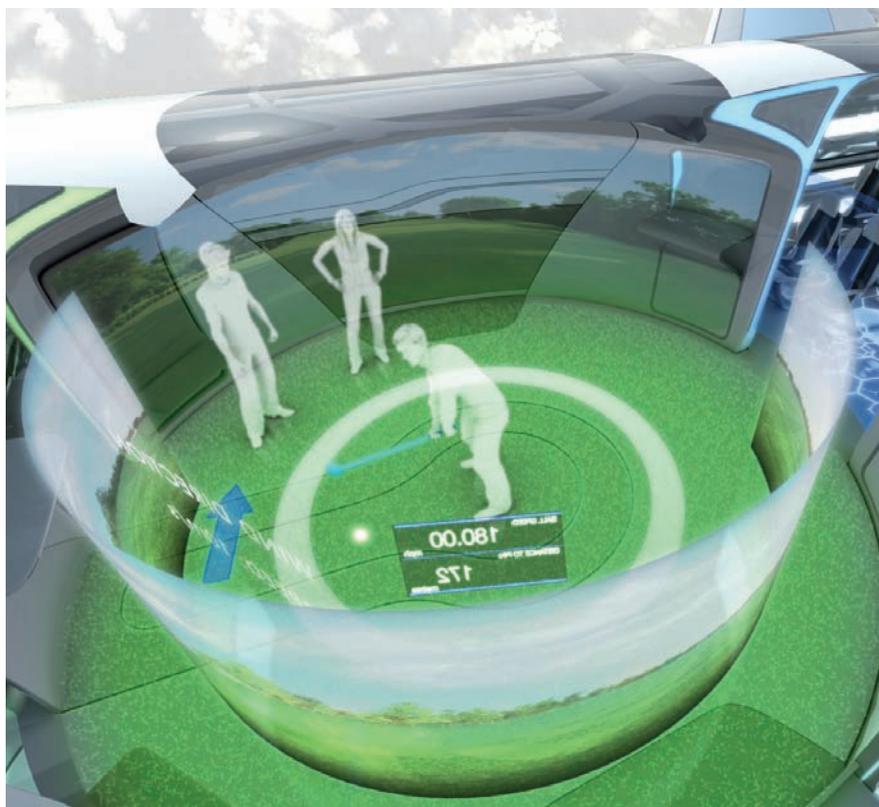
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02



03



04

being; multidimensional passenger environments; product and service personalisation; and seamless mobility.

“What we already see today is that older people want to stay healthy and they invest money in their well-being – this is going to be a very important trend in the future,” says Wuggetzer. Hence the concept cabin includes a vitalising zone at the front of the aircraft complete with vitamin and antioxidant enriched cabin air, mood lighting, aromatherapy, as well as seating fitted with sensors and actuators to promote circulation, rest and relaxation.

A multidimensional environment is most evident in the concept’s interactive zone, where pop-up projections provide holographic gaming, virtual shopping and interactive learning experiences. Located in the centre of the cabin, this zone also forms the main entrance area, with passengers boarding via a large door made possible by the bionic fuselage.

The personalisation and seamless mobility trends are manifest in the concept’s smart tech zone, located aft. According to Airbus, this zone enables passengers “to choose from a simple to a full luxury service, but all allowing you to continue life as if on the ground”.

Full details on how all this will be delivered in terms of onboard technology and materials remain thin on the



THE MORPHING SEATS... RECOGNISE LOAD FACTOR AND ADJUST TO THE BEST USE OF SPACE



ground, but a presentation refers to a next generation human-machine interface, quantum computing and a holographic interface, as well as intelligent seats featuring “biomorphing polymers” capable of adapting to each passenger’s space and support needs. “The morphing seats work on two levels,” explains Scoley. “On a global cabin level, they recognise load factor and adjust to the best use of space; and on an individual level, they adjust to individual requirements and anthropometrics.”

Wuggetzer says the interior membrane will feature “smart materials” that can change from opaque to transparent, as well as breathe to regulate cabin temperature and humidity. “And when we talk about a bionic structure, we don’t just mean that it’s lightweight and strong – it’s also intelligent,” he adds. “There’s a nerve system – it can heal itself or let you know that there’s a problem, using artificial intelligence.”

- 02. The Interaction Zone can also feature a bar
- 03. Holographic interfaces and pop-up screens connected to ‘the Cloud’ replace traditional IFE systems
- 04. The central interactive zone provides space for social scenarios, such as a virtual game of golf

bags of room

One conundrum that the concept cabin seems to gloss over is what to do with passengers' hand luggage – all the cabin visuals are bereft of overhead storage bins, with passengers instead dropping their bags onto a conveyor-fed storage system when boarding via the interactive zone.

"We've done a lot of work in the past on handling hand luggage – including looking at automated onboard storage solutions," says Scoley. However, he admits passengers prefer to have their luggage with them for convenience, comfort and security. Fortunately Wuggetzer has the perfect solution: "We see that the pure luxury in the future is to travel without luggage – because it is hanging already in your wardrobe when you arrive in your hotel room!"



05

05. Morphing seats can harvest passenger's body heat to power aircraft systems such as holographic pop-up pods as shown here in the Smart Tech Zone

Similar to BMW's futuristic GINA concept car, which features a lightweight fabric skin that can be quickly and easily manipulated to radically alter the vehicle's appearance, the concept proposes far more flexible cabin linings: "Textile linings could provide a huge number of solutions for assembly and integration topics," says Scoley. "With textile linings you can cover manufacturing tolerances and build issues, illumination topics, trim and finish aspects – and if you combined it with OLED technology you'd be able to offer branding opportunities too."

OLED technology, although in its infancy, could eventually allow panels with integrated features/functions

such as signage and lighting: "An OLED panel could show you if the lavatory is in use or not, without having to build an extra box for the light or sign behind," explains Wuggetzer. "The next thing is to make these OLED panels flexible – and transparent!"

Despite admitting there's a long way to go until we are likely to see such materials and technologies in full-scale industrial use, Airbus believes certain aspects from the project will be familiar to us all well before 2050: "We already have many projects running in our R&T portfolio that you will find in our products far sooner," says Wuggetzer. "For instance we are already working on integrating intelligent sensors, wireless technology and antibacterial surfaces into our aircraft."

RISKY BUSINESS Predicting the future is always a risky business – but Airbus insists it's worth the effort. "First of all, we want to show our appetite for innovation," says Wuggetzer. "Projects like this demonstrate clearly our capability to think out of the box and into the future and that we are a reliable partner in the long, long run. It also provides internal motivation – to inspire our staff to keep working in the creative way that we need to continue producing the market's leading products."

Scoley alludes to an even greater goal – to inspire a whole generation of aviation professionals: "The aviation industry went through a very creative phase in its infancy, developing new vehicles and trying new formats," he says. "We're now in a very heavily regulated industry that is very cost- and performance-driven – we need to get the excitement and energy back and make it engaging for the future – people have to be allowed to dream."

As such, the concept cabin is a powerful recruiting poster: "We want to get the best people on board – the leading experts and university degree students – resources are limited and we want to get the best of those," concludes Wuggetzer. ☒

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weightloss

Lighter seats and other cabin elements are helping airlines achieve substantial reductions in fuel consumption, costs and emissions

BERNARD FITZSIMONS, AIRCRAFT INTERIORS INTERNATIONAL



Weight and drag are the enemies of flight, overcome only by the brute force of thrust and the subtle wizardry of aerodynamics. Weight is also the enemy of economy and, in the longer term, human survival: higher weight demands greater thrust, which means burning more fuel and pumping yet more carbon dioxide into an atmosphere already overburdened with the gas.

As fuel prices have risen, and the approach of emissions trading raises the prospect of airlines having to pay not only for the fuel itself but also for the right to burn it, weight reduction has become a constant preoccupation. Inflight magazines, economy-class footrests, metal cutlery and glass bottles are just a few of the conventional amenities to have come under scrutiny or been jettisoned altogether.

Seats, at least in economy class, are an obvious target for weight reduction: manufacturers have responded with some dramatic gains, and won some impressive orders as a result. Last year B/E Aerospace launched Pinnacle, billed as the industry's lightest full-featured seat, with orders from nine airlines worth more than US\$250 million for installation in new-buy Boeing 737s and 787s and Airbus A320s.

By January the Pinnacle order book was worth more than US\$400 million for seats to equip more than 1,000 new and existing aircraft. A claimed 15% weight saving over the lightest seat then on the market was achieved by increased use of composites, an integrated lightweight suspension system and a 25% reduction in parts:

additional benefits are simplified maintenance and increased passenger living space.

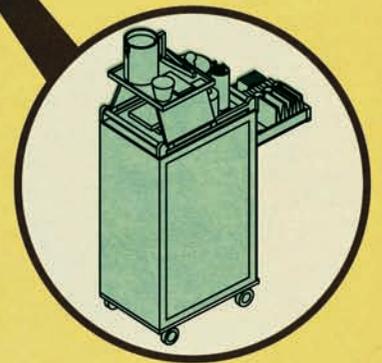
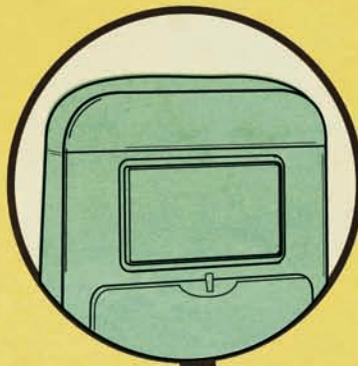
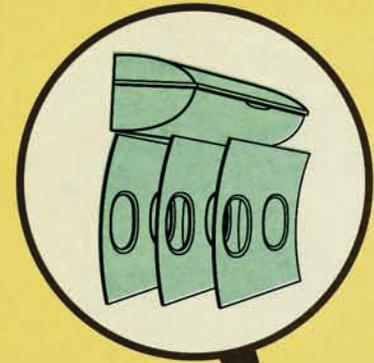
Recaro's lightweight seats have also done good business. Air France has installed the company's 9.1kg fixed-recline Smart Line 3510 on its domestic fleet of 38 A320 family aircraft, saving an annual 1,700 tons of fuel as a result, and Lufthansa has adopted the sub-11kg Basic Line 3520 for the 180-plus aircraft in its European fleet. As well as lowering aircraft empty operating weight, both seats allow more legroom at a reduced seat pitch, increasing the capacity of the aircraft.

Still lighter is Sicma Aero Seat's new Dragonfly. Designed for narrowbody aircraft but selected in July for the two A380s Corsairfly plans to operate between Paris and Reunion Island in the Indian Ocean, the Dragonfly weighs in at just 7.5kg per passenger. Using 30% fewer components than its economy-class predecessor, the seat features short armrests and a very slim backrest. An impressive 85% of components are also recyclable, says the manufacturer.

COMPETITIVE ADVANTAGE Airlines need to sell seats as well as save fuel, and those that choose to compete on quality rather than price have to offer additional comfort and services without inflating costs dramatically. In that context weight savings can provide the scope for a compelling commercial advantage. So Lufthansa has accompanied the ongoing installation of its new BL 3520s with snacks even on domestic flights and hot meals on cross-border sectors of two hours or more.

Cabin lining: Parts reduction, new materials and new production methods are slashing the weight of sidewalls, baggage bins and lighting systems.

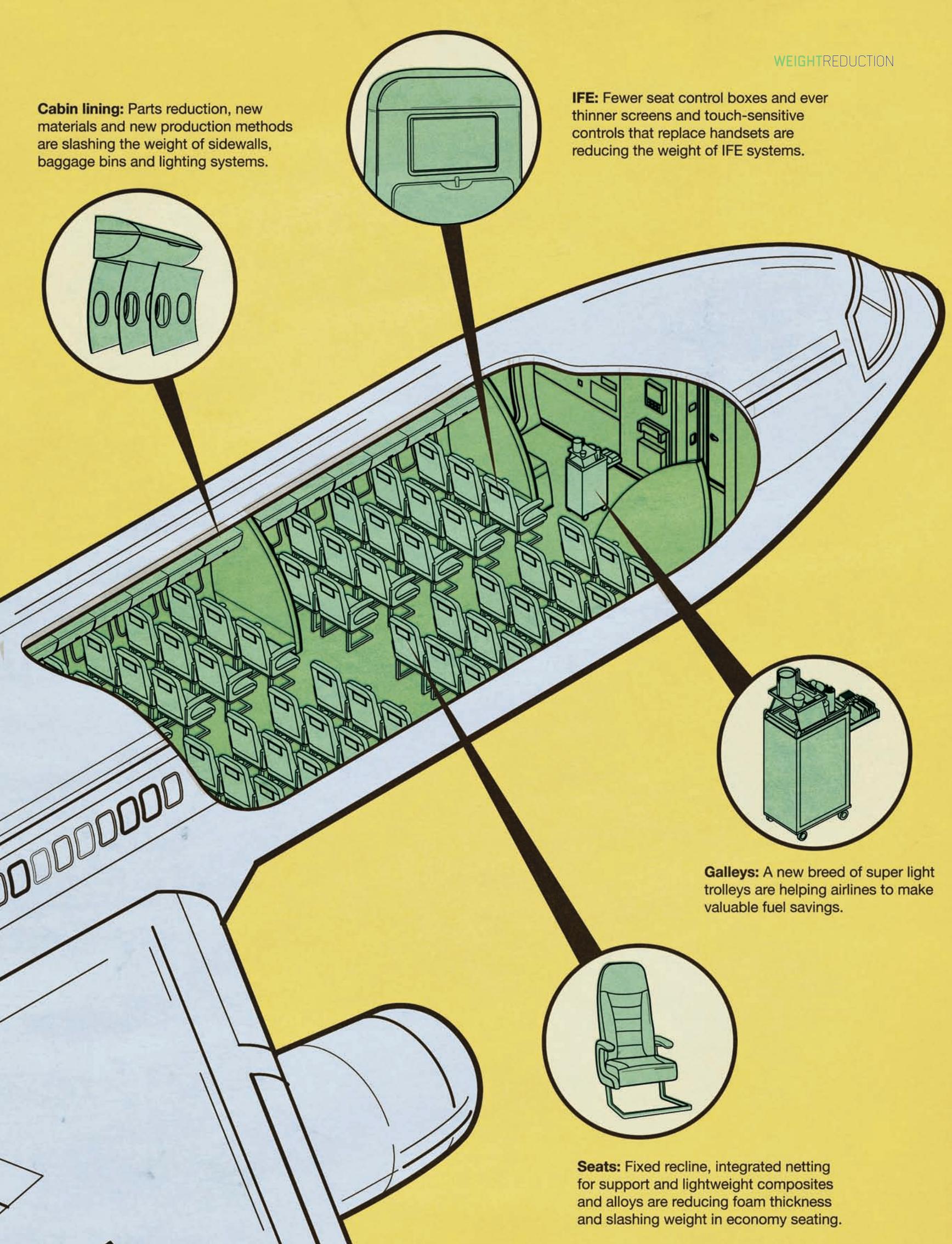
IFE: Fewer seat control boxes and ever thinner screens and touch-sensitive controls that replace handsets are reducing the weight of IFE systems.



Galleys: A new breed of super light trolleys are helping airlines to make valuable fuel savings.



Seats: Fixed recline, integrated netting for support and lightweight composites and alloys are reducing foam thickness and slashing weight in economy seating.





WHEN YOU HAVE THE FIRST PARTS IN HAND,
IT'S NOT A SURPRISE TO SEE YOU ARE
OVERWEIGHT



01



02

01. B/E Aerospace's popular Pinnacle seat uses advanced materials and fewer parts to deliver weight savings

02. Air France has installed Recaro's 9.1kg fixed-recline Smart Line 3510 seats on its A320 domestic fleet

Air France, having previously used its SL 3510s to add seats, increase legroom and help reduce fares while retaining traditional frills such as snacks, free newspapers and no-charge checked bags, has used the reconfigured fleet to launch what it terms a commercial offensive on departures from the four major regional centres of Marseille, Toulouse, Nice and Bordeaux. The airline is targeting an additional 4.5 million passengers every year through new routes, increased frequencies and a service offer that also includes advance seat selection.

On long-haul flights IFE has become a standard feature, and IFE systems are also addressing the issue of weight. Zodiac claims the elimination of head-end servers and a more simplified architecture ensure its seat-centric SiT (Seat integrated Technology) IFE system is 40% lighter than traditional systems. Lumexis's Fiber To The Screen (FTTS) system uses fibre optic distribution to eliminate components such as seat electronic boxes to reduce weight while improving reliability and lowering cost of operation.

Established vendors Panasonic and Thales, meanwhile, have worked with seat manufacturers to reduce the weight of IFE screen installations. Panasonic's Eco 9i integrated smart monitor is half the weight of traditional designs according to the vendor, as a result of the elimination of peripheral controls, brackets, tilt mechanisms, harnesses and wiring.

The Thales TopSeries AVANT next-generation IFE system also integrates functionality into the seatback screens, helping reduce weight by 30%. The associated Touch PMU, a combined controller and display, could even serve as a standalone IFE system.

DRY CURE While weight-saving initiatives typically involve either sacrificing non-essential items or replacing essential equipment with lighter versions, the Zonal Drying system from Sweden's CTT eliminates the positively undesirable condensation that accumulates in the insulation behind cabin walls, reducing aircraft weight by as much as 200kg while improving the efficiency of the insulation and reducing airframe corrosion.

Many VIP aircraft have Zonal Drying and its associated Cair humidification system. Airlines have been slower to adopt the technology, but Air New Zealand has installed Zonal Drying on its Boeing 767s, and in May the vendor revealed that Lumexis FTTS launch customer flydubai had ordered the system for 31 new-build Boeing 737-800s. The system will reduce each aircraft's emissions by 69 tons of carbon dioxide, 200kg of nitrogen oxides, 35kg of hydrocarbons and 480kg of carbon monoxide, according to CEO Ghaith Al Ghaith. Zonal Drying is basic equipment on the Boeing 787 and an option for the A350.

FUTURE FIT Diehl Aircabin, the former Airbus subsidiary now owned jointly by Diehl of Germany and Thales of France, is designing the interior for the Airbus A350. Board member Hans-Peter Traber says the contract with the OEM, like all programmes where the supplier is responsible for the design, includes a weight target. And meeting that target involves an iterative process of engineering optimisation.

"When you have the first parts in hand it's not a surprise to see that you are overweight," Traber says, and weight reduction initiatives are normal in aircraft development: "It's the same for the OEMs. They are



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running around now to chase reductions in weight in all the systems, so every supplier is addressed to do potentially more than what is agreed in the contract.”

Doing more is difficult: “We logically apply well-introduced technologies with regard to the production, so it’s hard to come below the target,” says Traber. “In some situations it’s mentioned in the contract that you get a bonus if you come below the target weight. But under normal circumstances you have to fight hard to achieve your target weight.”

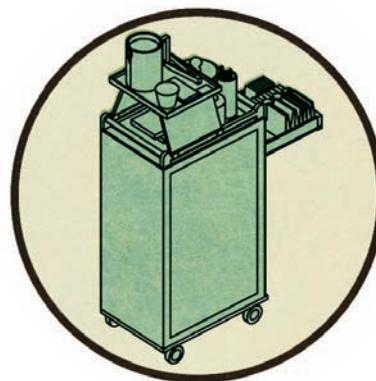
Each project is more complex than the last, he says. “Project to project the complexity is growing, with new ideas, requirements, certifications. Look at what has happened since the A380 was introduced on the market. The cabin has become more and more equipped with all kinds of electronic media, the complexity in lighting systems is growing, with mood lights and electronically dimmable lights and window shades, you have computer applications, you have a variety of movie applications and music. You have more systems, you have more weight, so the target is to bring weight down in the classical components.”

That means reducing the weight of elements such as sidewalls: “The intention is somehow to compensate for the additional weight of the media equipment in traditional parts. That is the challenge.”

TASK FORCE The process is the same for everybody, says Traber. The project starts with some sort of pre-design giving a rough idea of the final weight, then the contract is signed and subsequently the component or structure turns out to be 10 to 15% overweight. Diehl’s approach is to form a weight task force consisting of external as well as internal expert engineers who then work to optimise even classical parts.

“You review engineering principles,” he says. “Can we reduce the complexity of detail parts, can we reduce the number of parts, can we introduce new materials or new processes?” Materials are a more likely solution than processes: “New processes are always a critical issue because you need the consent of the OEMs and due to safety issues the aerospace industry is very conservative, you always have a long qualification period if you really come up with a totally new production process.”

A metal frame, for example, might be replaced by glass fibre with a decorative coating to reduce the weight without compromising aesthetic appeal. That may not work in premium cabins, where airlines compete increasingly on interiors. “You have airlines that insist on a



03. The plastic salad bowl designed by Marcel Wanders and used in KLM’s long-haul business class meal service has one-sixth of the environmental impact of a heavier porcelain equivalent

fuel service

Weight, which has a direct correlation with the amount of fuel burnt and the resulting carbon dioxide emissions, seems to trump other considerations when it comes to the environment, so that even ostensibly counter-intuitive measures can be environmentally beneficial.

The Netherlands Organisation for Applied Scientific Research (TNO) cites the example of KLM’s long-haul business-class meal service, introduced last year, which includes a transparent polystyrene salad bowl rather than the porcelain bowl used previously.

Both the fuel used to produce the energy to wash the porcelain and the oil required to make the plastic cause emissions, while the plastic dish increases waste. Even so, TNO’s lifecycle analysis calculated that the porcelain dish had six times the environmental impact of the plastic equivalent.

The explanation is in the weight – the plastic bowl is just one eighth the weight of the porcelain equivalent, and the reduction in fuel burnt to carry it on long-haul flights eclipses the environmental impact of its production and disposal. According to KLM, the new tableware saves an annual total of more than 700 tonnes of CO₂.



03



A LOT OF ITERATION IS NECESSARY AND
THERE IS A LOT OF LAB WORK



04. Sicma's Dragonfly unit weighs in at just 7.5kg per passenger

05. Diehl has to consider both weight and noise reduction when designing cabin linings

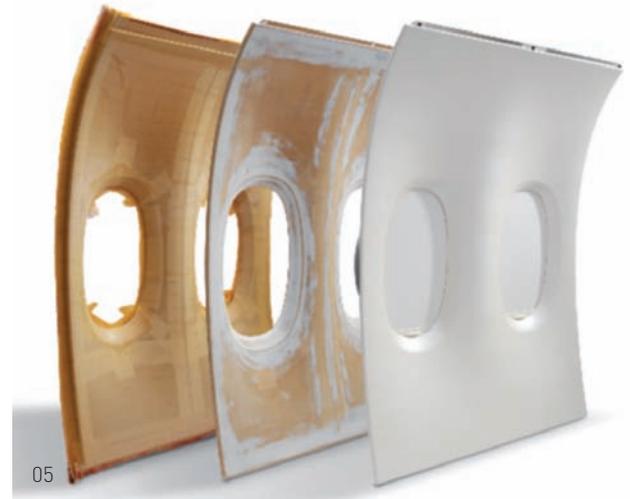
wooden décor or leather applications or whatever, but in economy class it's a different story, and there you look for alternative solutions."

The process is inevitably an iterative one: "If you are looking for one kilogram in weight reduction you have to have ideas for two," Traber says. An engineering solution for one part may affect other systems, and if two engineers work on two separate parts the solutions may not work in combination. "It's often the case that you cannot optimise both parts individually, you have to see how they interact when assembled, so in general you need the double volume in ideas to achieve your target."

NOISE REDUCTION Another challenge on the A350 is the requirement for reduced cabin noise, something that works directly against weight reduction. "Noise reduction normally needs mass, and weight reduction needs reduction of mass," explains Traber. "The challenge for the engineer is to do both in parallel by avoiding additional mass and it's not easy. So a lot of iteration is necessary and there is a lot of lab work, you have to do tests with test parts in an acoustic lab to find out what is the optimum way to reduce noise without increasing weight."

Much of that work is trial and error, he says. "In the sidewall the noise reduction requirement is 3dB. This is a tremendous number. If I install a lot of bricks there then it's easy, but to do this without additional thickness of the part and without additional material is a challenge." Typically, not all targets are met with the first example built, by either Airbus itself or the supply chain.

There are no dramatic changes compared with earlier programmes, Traber says. "The product as such is similar to what we produced in other programmes and it's already optimised. So it's most likely to consider the detailed



design of the parts and review material applications. The relevant space you can occupy with your part is limited anyway, so it's really a case of thinking hard in the engineering department to come up with new engineering solutions."

MATERIAL GAIN The A350 cabin will introduce some new materials, says Traber. "Whatever you do needs to be separately and specifically certified, so most of the stuff is already certified materials, and then it's normal for a project, whether it's the 787 or the A350, that a lot of additional certified material is decided in advance. But I would say that the majority is similar to what we have already applied."

Having responsibility for the floor-to-floor design of the A350 cabin, including sidewalls, ceiling and other liners, wardrobes and luggage bins, means Diehl has additional scope with regard to the engineering. But Traber says that does not necessarily help: "We do the integration of the modules in the airplane as well," he explains. "In theory you have more chances to install weight ideas, but practically the weight targets are really high and hard to achieve so this additional engineering scope doesn't make my life any easier."

Diehl Aircabin is also aiming for the retrofit market where, perhaps surprisingly, weight reduction is not a primary consideration: "Most interiors applications are the result of a service bulletin, or a customer wants a new décor or a new monument," says Traber. "In most cases to my personal experience, weight reduction as such is not the prime driver in the retrofit business." ☒

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Germany's second largest airline is investing in both its short- and long-haul fleet as it prepares to join the oneworld alliance

IZZY KINGTON, AIRCRAFT INTERIORS INTERNATIONAL



In early 2012, Germany's second (and Europe's sixth) largest carrier, airberlin, will join the oneworld airline alliance. Having started life in 1979 as a low-cost carrier serving domestic and European routes with a simple all-economy service, airberlin first made the leap into long-haul operations in August 2007 after the take-over of LTU. It now serves 163 destinations in 39 countries with a 'hybrid' mix of low-cost and full-service cabin offerings, depending on flight length.

Long-haul flights will soon feature business and economy cabins, seatback IFE, and free food and drinks. Premium passengers have access to lounges and priority check-in, and the airline also operates a frequent flyer programme.

Meanwhile the carrier's popular Euro Shuttle service, launched in 2005, continues to provide high-frequency business connections between the continent's key cities, offering passengers a more stripped down all-economy product for affordable business travel.

"We will continue to hone our hybrid model, which is being copied by an increasing number of our competitors," says Joachim Hunold, CEO of the airline. For Hunold, joining oneworld is one of the most important decisions in airberlin's history: "International networking offers a huge opportunity for growth," he told shareholders at an annual general meeting in June 2011. "Although the cost of becoming a member of the oneworld alliance will run in the lower two-digit millions, in the long term, under normal circumstances, we are expecting clear annual additional returns that exceed this one-time cost."

NEW INVESTMENT Some of this investment is already evident – airberlin's first Boeing 737-800 featuring the new Boeing Sky Interior (BSI) arrived on 15 February 2011, followed by its first 737-700 with the BSI on 8 March 2011. All subsequent new Boeing next-generation aircraft supplied to the carrier will be fitted with the interior, which features new sidewalls redesigned to be less curved, and larger window recesses to make the cabin look more open and modern. The luggage compartments have also been redesigned, and with the help of an integrated pivoting mechanism, now take up less space in the cabin area. The

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01. The airline's new Boeing 737-800 interior with BSI

01

design of the storage compartments provides passengers with more headroom in the aisle area and greater capacity to stow more hand luggage.

The BSI includes integrated LED lighting within the ceiling, controlled by the cabin crew via a touchscreen monitor. The crew can choose between eight different lighting scenarios. The PSU above each seat row has also been optimised. Particular care has been taken to distinguish the flight attendant button from the reading light button – both aesthetically and by placing them far apart. This is expected to save cabin crew many wasted trips responding to passengers who actually meant to turn on their reading light.

Meanwhile, noise levels are reduced by 2-3dB using noise-dampening materials inside the aircraft and redesigned ventilation grills at the bottom of the cabin sidewalls.

The 737-800s and 737-700s will operate on short- and medium-haul routes, with an all-economy cabin fitted with Recaro's BL3510 seats. Its 737-800s will offer 186 seats and its 737-700s will provide 144 seats in total. Seating on both aircraft types is installed at 30in pitch and all seats are 16.7in wide. The aircraft also feature Panasonic's dMPES IFE system and galleys from Mühlenberg.

"The BSI is a taste of things to come for airberlin passengers, as the design is based on the interior of the

berlin calling

Airberlin's oneworld membership coincides with the planned opening in June 2012 of Berlin Brandenburg Willy Brandt Airport, which should eventually have capacity for 45 million passengers a year, and will become the airline's new home. airberlin will have its first business-class lounge there, inspired by Sansibar.

The new airport is being created by effectively merging three airports. Being built on the site of the old Schoenefeld Airport (which will be extended by 970 hectares), it will also gain traffic from Tempelhof, which closed in 2008, and Tegel, which is currently Berlin's inner-city airport and will be closed when Berlin Brandenburg opens.

The new airport will cover 1,470 hectares 20km southeast of Berlin city centre, a 20-minute train journey. The six-floor terminal will be flanked by two parallel runways (3,600m and 4,000m), which can be run separately. Other key features include a rail station, more than 65 aircraft parking stands, 80 check-in desks, around 200 airline check-in machines, catering and retail outlets, and hotels and conference centres in the Airport City. Environmental features include heat recovery systems, geothermal energy harvesting and rainwater cooling. Interestingly, Berlin Airports has been testing biometric security at Schoenefeld and Tegel.

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02

02. Zim Flugsitz's economy-class ECO-01 NG seat, customised for airberlin's A330-200s
03. The RAVE IFE system by IMS, also chosen for the airline's A330-200s

Boeing Dreamliner," says Hunold. The first Boeing 787 destined for airberlin is due to be delivered to the airline in April 2014. A further 17 deliveries are planned between then and August 2019 – the airline downgraded its 787 order book in March 2010 by 10 aircraft. Thomas Ney, CPO at airberlin, says the process of cabin configuration has just started, and vendors have yet to be finalised.

NEW SEATS AND IFE The airline is also investing heavily in its fleet of 12 long-haul A330-200s, which are being retrofitted from October 2011 until the end of April 2012. Passengers will begin seeing new seats and IFE in both economy and business class from November 2011.

The new business-class seat from Contour (its Eclipse model) reclines to an 170°, 71.3in-long bed surface. The seat boasts 59-60in pitch and 19.7in width, an improvement compared with the previous 57in pitch and 18.5in width. Every seat has a power supply for passengers' laptops or other electronic devices. Configuration is as yet undecided.

In the economy-class cabin, 279 new lightweight seats featuring carbon fibre are being installed in a 2-4-2 layout. The ECO-01 seats from Zim Flugsitz have 30in pitch (the seat's thinner backrest helps to maximise legroom), 18in width and should reduce weight by 575kg per ship set and therefore 160kg fuel per flight. The seats being taken off these aircraft also featured 30in pitch and 18in width, and numbered 279 per cabin.

The German seat manufacturer customised its ECO-01 NG model especially for airberlin – the seat has a modular design to enable this to be done relatively quickly. The whole process took approximately eight months. Adaptable to all narrow-body and wide-body aircraft, features such as the dress cover styling and colours were tailored for airberlin. The seat cushion was also customised for low

rave reviews

airberlin has chosen RAVE – IMS's seat-centric, Crystal Cabin Award-winning IFE system – for its A330-200s. It's not the only airline to make this choice. German rival Lufthansa announced it was opting for the system just three weeks after airberlin. Details are not yet forthcoming; Lufthansa is currently trialling the system. RAVE has also won orders from Brussels Airlines, which will install it on five A330 aircraft from the fourth quarter of 2011, like airberlin utilising a 9in Seat Display Unit (SDU) in economy; but Brussels Airlines will have a 15in model in business. However, the first airline to operate RAVE is SriLankan. With installation beginning this summer, RAVE will be installed initially on two A340s and four A330s, with options for more.



03



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04. Contour's Eclipse seat will be installed in business class on the A330-200s
05. airberlin operates 12 A330s on long-haul routes

high pressure to increase comfort for passengers. In addition, Zim Flugsitz developed its table mechanics to make operating the table even smoother for airberlin.

The airline placed the order with Zim Flugsitz in January 2011, and is due to receive its shipsets in two-week intervals from mid October 2011. For airberlin, working with the relative newcomer has proved a very positive experience. "Zim Flugsitz has a highly experienced team and an innovative culture," says a spokesperson for the airline. "Zim Flugsitz's product, the ECO-01 NG, convinced airberlin right from the start and Zim Flugsitz was able to deliver all this in the short timeframe airberlin was looking for."

Other suppliers for the interiors include Mühlenberg and Sell for galleys, B/E Aerospace for coffeemakers, Sell for ovens and Dasell for lavatories.

RAVE ON Meanwhile, for IFE on the A330-200s, airberlin opted for RAVE, IMS's new seat-centric AVOD IFE system. RAVE is a 'plug-and-play monitor' built into the backrest of each seat. airberlin will utilise a 9in Seat Display Unit (SDU) at every seat from nose to tail, and will use a 12in crew panel display. In business class, the SDU will be attached to a swing arm, while in economy the screens are integrated into the backrest. Headphone and USB ports (for connecting carry-on devices such as iPhones and iPads) will be located directly on the monitor. The complete IFE system is being integrated straight into the seats at Zim Flugsitz's facility.



05

RAVE is a departure from traditional 'server-centric' IFE systems in that each SDU contains all of the content, applications and playback functionality, just like portable solutions. The system control unit (SCU) provides the interface to the aircraft Passenger Service System. It performs bulk content loads in the background while the current content is played back to the passenger. The SCU also distributes video in real-time such as safety videos and boarding music via the gigabit Ethernet cabin network.

"We evaluated the systems on the market and decided that RAVE is the most reliable solution to own and operate," says the airline.

NET GAINS Joining the oneworld alliance will open up a huge global network for airberlin's passengers, as well as point-gathering and lounge-access benefits for frequent fliers. airberlin has been offering flights under codeshare agreements with American Airlines and Finnair since November 2010. While the American arrangement opens up multiple new routes within the USA, the Finnair deal makes it possible to connect through Helsinki to New Delhi, and also facilitate connections to Singapore.

Meanwhile airberlin and Russian airline S7 have extended their codeshare arrangements, which have been in place since the start of 2009. In July 2011, the airline also started codeshare flights with both its alliance sponsor British Airways, and Spanish airline Iberia, for selected flights within Europe. ☒

CONTACTS

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Airlines continue to complain of a lack of innovation and choice among seating firms, but can a new generation of suppliers provide a solution?

GUY BIRD, AIRCRAFT INTERIORS INTERNATIONAL

 The revelations of falsified certifications at seat maker Koito and its associated fall from grace has only exacerbated what many see as a gaping hole in the supply of one of the key products of the aircraft interior. "It's a huge problem across the industry," says John Tighe, recently head of product at Gulf Air but now design director at James Park Associates (JPA) – the London-based design firm behind Singapore Airlines A380 business-class seat among others.

He blames a combination of the super stringent supplier approval criteria of airframe manufacturers only "interested in building aircraft"; the small amount of suppliers available – some industry experts put the number as low as seven or eight depending on how you define them; and the global recession, which has discouraged investment.

Tighe cites considerable tribulations trying to find a seat supplier while still at Gulf Air, despite the carrier being well known. He says a typical scenario for a business of his former employer's size might involve a starting point of four or five airframe-approved suppliers – half of which would

drop out immediately based on the (small) size of the potential order – leaving perhaps two to three suppliers to tender. These would likely offer good value but would be low on customisation options.

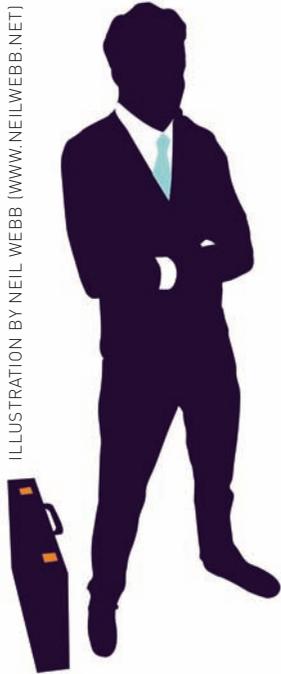
Paul Estoppey, head of cabin interior development and infotainment at Swiss International Air Lines is in agreement. He feels the lack of supply options has been affected by seat suppliers cutting back staff in a declining industry after 9/11, too conservative in hiring since and thus not growing fast enough to be dynamic when the economy picked up again.

Existing suppliers like B/E Aerospace and Zodiac seem to be attempting to rectify this situation if the big recruitment drives evident on *Aircraft Interiors International's* own website are any guide. However other experts, like designer Daniel Baron, managing director of LIFT Strategic Design, a Tokyo-based airline design consultancy with a client list including Skymark, China and Philippine Airlines, believes there is a more fundamental problem: "Like other industries, the aircraft seat manufacturing world is suffering from an





01



01. ZIM Flugsitz's ECO 01 economy seat in leather

extreme shortage of engineering skills," he says. "This can severely limit a seat supplier's ability to expand capacity or develop new products. The fundamental issue is a lack of strategic planning at a government level. The industry should come together and lobby the highest levels of national governments so they understand the absolutely huge economic benefits of aviation, and why investing in engineering education now is needed to keep air travel affordable for future generations."

NEW ENTRANTS Despite these issues, there have been some newer entrants to the market who are keen to gain a slice of the action. German company ZIM Flugsitz is one, and although less established than others in the industry, boasts 20 years' experience in understanding aircraft manufacture, with most of its engineers having worked with aircraft manufacturers and seat suppliers in previous roles.

According to Helga Gerber, ZIM's assistant CEO, what makes the firm stand out compared with bigger players is its small-company agility: "Our key factor to get new customers is our flexibility and speed in managing projects," she explains. "We have shown on existing projects that we deliver on time and the product has an attractive price according to advantages like less weight and low maintenance cost, which saves money for the airline."



OUR KEY FACTOR TO GET NEW CUSTOMERS IS OUR FLEXIBILITY AND SPEED IN MANAGING PROJECTS



But when maintenance is required, how can small firms like ZIM be expected to cope? Gerber says airlines in Europe are served by ZIM's own certified staff while those outside of Europe are assisted by contracted third parties with spare part stocks at global hubs.

APPROVAL RATINGS Mainstream airlines are interested in the prospect such suppliers could bring too. While Swiss Air's Estoppey says the airline is not involved in a new seat programme right now, he is "watching what these firms are doing and is very interested."

Ex-Gulf Air man Tighe says the firm looked at smaller vendors – if not brand new start-ups – "very seriously", while adding the caveat that given the resource-heavy nature of running a seat programme, he suggests that carriers might

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02

- 02. New supplier Jiahang United Seating Technologies' hopes to attract customers with its X Light economy seat
- 03. Table design detail from ZIM's ECO 01 seat



need to “pump more money into the relationship to mitigate the potential risks and inexperience of the supplier.”

Ultimately though, something has to give, as Air New Zealand aircraft programme manager Kerry Reeves bluntly puts it: “Many of the new companies appearing in the market are not approved as suppliers to Boeing or Airbus and therefore not able to be selected for new aircraft programmes,” he says. “It is clear that with the increased delivery rate of new aircraft over the next three to five years from both airframe manufacturers, they must reduce the timeframe and cost hurdle for these new suppliers to gain approval or the risk is high that aircraft will be produced without seats to install.”

CATALOGUE OFFER So how do the airframe manufacturers respond to such perceived issues and criticisms of their increasing product standardization ‘catalogue approach’ to interiors – that one senior airline carrier manager who preferred not to be named called “complete rubbish and a cure for innovation”?

Unsurprisingly, Daniel Percy, marketing manager for Airbus’ aircraft interiors sees it quite differently, saying his firm’s stance is “actually a catalyst for innovation”. He adds: “By taking a catalogue approach to seat supply, we are able to include criteria in the contracts which directly drive the suppliers to come up with innovations to reach the targets that the customer community tells us are necessary.



MANY OF THE NEW COMPANIES APPEARING IN THE MARKET ARE NOT APPROVED AS SUPPLIERS TO BOEING OR AIRBUS



03



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04

04. Thai Airways seating supplied by ZIM Flugsitz



Additionally, the higher volume of business secured by the supplier through the catalogue approach enables suppliers to invest more in product development than they would have done when the orders were for individual customers.”

Percy also says Airbus is constantly meeting with seat suppliers of all sizes, listens to business plans and provides support in understanding the technical and industrial requirements it has in place. It is also championing the creation and use of agreed IFE integration standards to simplify development work, however the bottom line appears to be that the suppliers’ ability to deliver on time and with quality is paramount.

RISK REDUCTION As Vern Alg, an aircraft interiors project management consultant points out: “The airframe manufacturers’ agenda is to reduce risk. No one wants a delay like Airbus had with the A380 and Boeing had with the 787 for ‘little’ items like seats. The main criteria for

materials research

Air New Zealand’s Reeves believes that until new materials are available to use, current designs are unlikely to change much in the near future. A collaborative approach could be the key, as he posits: “Perhaps the industry needs to find a way to invest in new material development, as this seems too risky and costly for each supplier to do on their own.” If they could share the costs and R&D for a collective market advantage – as a group of carmakers is currently doing to reduce the price of prohibitively expensive fuel cell technology – maybe true innovation could follow. Whatever path is followed, ‘lightweight’ will be the mantra for all future seating for eco and economic reasons, with JPA’s Tighe believing that a true ‘full’ carbon fibre monocoque seat is the ultimate goal, as he enthuses: “It will need a very willing and brave airline to help make such change happen, but once done, the floodgates should open, so great will the weight and fuel savings be.”

customers of seating suppliers is to be able to deliver on time and have suitable aftermarket support. Design comes third, as if the supplier can’t do the first two it doesn’t matter what the design is like.”

Despite the aircraft manufacturers seeming to have the current whip hand in these business transactions, JPA’s Tighe believes the other players in the mix have more power than they sometimes perceive. “Without a shadow of a doubt Boeing and Airbus have a monopoly over wide-bodied aircraft but with a lot of the cancellations over the last few years [caused by the recession], there have been gaps in capacity they’ve had to fill. Thus they need to keep airlines onside as a whole and wide-body craft is only a small percentage of the total market. They’re also feeling less secure in the smaller aircraft market where, for instance, Bombardier is taking many orders for its new CSeries range.”

With new seat supplier blood looking for business, existing supplier recruitment drives and possibilities to get round what Air New Zealand’s Reeves terms the “vanilla-risation” of aircraft seating by doing what Swiss Air’s Estoppey optionally suggests and buying just a shell and using a respected and certified retrofitter to fill it “off-catalogue” – maybe there is light at the end of the tunnel for seating design innovation yet. ☒

CONTACTS

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Airbus reveals its next-generation IFE requirements for the A350XWB

MICHAEL CHILDERS, AIRCRAFT INTERIORS INTERNATIONAL

01. Thales' TopSeries AVANT IFE system, seen here installed in a Recaro seating unit, is line-fit approved for the A350XWB



“The A350XWB (eXtra Wide Body) will be the first aircraft with a genuine fourth-generation (4G) IFE platform,” says Patrick Candelier, Airbus cabin services marketing. Changes in technology, business models, IFE systems integration and changes impacting the overall passenger experience on board the A350XWB aircraft family characterise Airbus’s vision of 4G IFE, defined for the European aircraft manufacturer by ARINC.

The 4G IFE description emphasises reductions in weight and power consumption, easier integration of the IFE system into the aircraft and seat, and higher in-seat availability of the IFE system, realised in part by redundancies in the system architecture. Other objectives of 4G IFE are to lower lifecycle costs of the system, and make it future-proof.

The new specifications will be reflected in Panasonic’s eX3 and Thales’ AVANT products, which offer many of the same features as 3G IFE, but are characterised by the use of an Android operating system, solid state hard drives, faster processors and seamless integration into the seat and cabin environment. Retractable overhead systems are becoming a thing of the past for long-haul aircraft, says Candelier, with audio/video on-demand (AVOD) now the standard for A350XWB line-fit aircraft, and with the objective of offering IFE to every passenger seat.

Candelier says when Airbus asked airlines what they would like to see IFE systems do better, they replied that current systems are too heavy, too complex and too costly

– all concerns which are directly addressed by the new 4G systems. In addition, according to Candelier, airlines are looking for the ability to offer more content, as well as to accommodate the increasing number of passengers who carry their own personal entertainment devices (PEDs) on board – often in search of connectivity and sometimes containing their own content. These PEDs need to interface with the aircraft’s IFE and connectivity offerings, says Candelier, and Airbus foresees a connectivity offering as becoming more and more common on long-haul aircraft.

VITAL STATISTICS In addition, one of the aims of 4G IFE is to restore passenger legroom that has been surrendered to bulky seatboxes in earlier generations, an objective that is realised both by smaller components and better integration of IFE into the seat. “There should be no more restrictions on passenger comfort attributable to IFE,” says Candelier. “It is also of utmost importance for IFE systems to provide the best viewing comfort possible to the passenger.” The A350XWB, as well as the A380, provide wider seats and offer monitors up to 12.1in wide in economy – a 30% increase in viewing surface compared to other aircraft.

The A350XWB IFE platform specification, which Candelier says is intended to be “future-proof”, includes five times more content delivery bandwidth per passenger than 3G, and looks to support HD content delivery – currently being crafted into a specification by APEX’s High Definition



01

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Working Group (HDWG) – and even 3D. The objective is “to provision the system so that it can handle any future development in terms of bandwidth,” says Candelier. Therefore, while 3G IFE systems deliver up to 5MBps of throughput to the seat monitor, the A350XWB 4G IFE platform delivers up to 25MBps. Solid state storage is increasing, and the new systems will offer terabytes of storage to accommodate both an increase in content volume and increased file size with HD and 3D.

TAKE CONTROL While it is not necessarily a 4G-specific requirement, the A350XWB will see IFE – as well as cabin lighting, temperature, connectivity systems and environmental settings – fall within the extended range of cabin services controlled from the flight attendant panel, allowing the purser to handle all of the systems impacting the passenger experience. The objective calls for the seamless integration of IFE into cabin management controls. However, A350XWB operators, who are increasingly considering having two IFE control centres, can also select IFE suppliers’ proprietary equipment either inserted in galleys/stowage or wall-mounted as a result. Overall, the A350XWB will offer a choice of any combination of three different types of cabin management systems.

Even though the A350XWB 4G IFE platform is based on a centralised architecture, system architecture redundancies are provided by replacing the former ‘star’ architecture with a ‘ring’ architecture. Two backbones form a loop for each seat column, with a total of nine seat columns on each aircraft.

These architectural redundancies built into the system increase IFE seat availability. Each seat group is served by two cables, one going from front to back, and the other from back to front. If the content delivery stream coming to a passenger’s seat group from the direction of the seat group in front of him experiences a failure, the seat group can receive an identical stream from the cable running from the direction of the seat group behind. “Hence, a single systemic failure will not impact more than a single group of three seats,” says Candelier.

multiple choice

Thales and Panasonic currently benefit from being the only two IFE vendors approved by Airbus and Boeing for line-fit installation of their systems. However challengers to this ‘duopoly’ include The IMS Company’s seat-centric RAVE, Sicma’s seat-centric SiT, Lumexis’s fibre-optic FTTS and Lufthansa Systems’ wireless BoardConnect – along with a couple of proposed systems still on the drawing board. All have raised the bar for reduced weight, reduced cost and increased reliability.

If these suppliers are contributing to and perhaps even driving the impetus for change, isn’t it only fair that they too should be line-fit offerable at some point in the future? “The A350XWB catalogue of options will constantly be enriched,” says Patrick Candelier, Airbus cabin services marketing. “Any cabin feature breakthrough, such as new IFE systems built on ‘seat-centric’ architecture – with content stored at every seat – are potential candidates when they attract both a lot of attention and a lot of airline orders.”

Interviewed prior to this year’s Aircraft Interiors Expo in Hamburg, Sicma’s Eric Cornilleau remarked that his company’s seat-centric SiT had engaged the offerability process for Airbus’s A330/340 platform. “It is signed, it is in progress,” he said.

Meanwhile the IMS Company’s founder and CEO Joseph Renton reports that his company “is making progress with Airbus” and will continue the pursuit of line-fit offerability “vigorously”.

Lumexis’s CEO, Doug Cline, who has been emphasising less weight and increased reliability perhaps longer than anyone, confirms that Lumexis is “actively engaged with all the major OEMs, who have been tracking the nearly one dozen flydubai B737-800s flying in daily revenue service with over 99% documented seat availability. Since we will begin installation of the first four B777-400s for Transaero in September, twin-aisle offerability committees will soon have similar data,” continues Cline. “I can honestly report that we have found Airbus – and Boeing – to be very receptive to customer requests for fit of FTTS because of such flight experience.”

Meanwhile, the ‘loop’ system redundancy in 4G IFE also reduces both the number and size of seatboxes. Under 3G, there were two boxes per seat group – under 4G there can be only one. And the remaining seatbox is too small to even be seen or felt by the passenger who gets back all of the legroom taken away by older systems.

Moreover, seat-to-seat cables themselves have been reduced by half – a single 8mm-wide cable, contains both IFE streams and in-seat power. Not a 4G characteristic, but nonetheless a characteristic of the A350XWB, the seat-to-seat cover is flush to the floor. “No other aircraft delivers this,” says Candelier.

02. Panasonic’s eX3 IFE system is also line-fit offerable on the A350XWB



02



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Candelier sees the 4G IFE offer for the A350XWB as a “living offer” that will be permanently engaging to Airbus’s suppliers, and whose characteristics such suppliers will want to see rolled out across long-haul fleets and transferred to other aircraft types to duplicate the look and feel for passengers. The A350XWB catalogue of options will increase over time, and any cabin breakthrough or new systems – such as seat-centric architecture with content storage at every seat – are potential candidates, says Candelier.

CONTRACTED SUPPLIERS The integration of IFE systems into the aircraft and seats will be facilitated by the adoption of new business models, according to Candelier. Traditionally, airlines source equipment from a list of Airbus-approved suppliers, and Airbus then installs the equipment on its aircraft. Some of this equipment, such as lavatories and galleys, is referred to as supplier furnished equipment (SFE) and seats and IFE are designated buyer furnished equipment (BFE).

But under a new designation – Airbus Contracted Supplier (ACS) – seats and IFE systems are no longer either SFE or BFE. Airline customers will be able to choose from a catalogue of seat and IFE suppliers contracted with Airbus, and pre-qualified to meet certain technical and performance specifications and criteria. The airline and supplier have the ability to negotiate directly the commercial and support terms and conditions of purchase.

“The ACS concept results in a more thorough supplier qualification process, closer supplier participation in the joint definition phase, and a cooperative approach with seat suppliers, improving in-seat integration,” asserts Candelier. He also believes that it helps to make suppliers’ programme partners – albeit contractually obligated partners responsible for the quality, supply chain and product support – more committed to better systems integration and reliability.



03



UNDER A NEW DESIGNATION – AIRBUS CONTRACTED SUPPLIER (ACS) – SEATS AND IFE ARE NO LONGER EITHER SFE OR BFE



CATALOGUE OPTIONS Panasonic’s 4G IFE offering is called eX3, the systems provider’s tenth-generation IFEC solution. Industrial design features include the Integrated Smart Monitor, which is designed to integrate seamlessly into the aircraft seat. It also includes capacitive touch, proximity sensors, increased viewing angles, touchscreen handsets and next-generation processors. The system utilises an open platform architecture built on the Android operating system (OS), solid state disc drives, fewer components, improved BITE accuracy and real-time system monitoring through connectivity.

- 03. Panasonic’s eX3 offers users a rich and varied experience via multiple screens and windows
- 04. Panasonic eX3 features the Integrated Smart Monitor

Along with promising reduced weight and increased reliability, Panasonic accompanies its eX3 system solution with a plan to reduce content management costs and decrease the traditional media cycle from 45 to 15 days. Thales’ media cycle is currently just 21 days and in many cases will be greatly reduced with its new Making Media Mobile to just 10 days.

Thales’ version of 4G IFE is called TopSeries AVANT, which first embraced the Android OS, offering it with their award-winning Touch PMU and now their 4G displays. Thales has also announced it is opening a Thales App Portal to offer a growing number of Android-based applications,



04



05



THE NEW SPECIFICATION ADDS CONNECTIVITY TO THE ENVIRONMENTAL CONTROLS AT THE FLIGHT ATTENDANT PANEL



- 05. Thales AVANT IFE system and PMU controller
- 06. Airbus's Patrick Candelier

which Thales says will make it easier for airlines to review and select capabilities already tested and integrated to the new system.

Thales will also be delivering HD content, as well as solid state drives and faster processors, and has been heavily focused on the seat electronics box (power supply only) and the reclamation of legroom. Thales will also feature onboard content delivery through its Cabin Media Loader with a load-and-go content hands-free approach, as well as offering more 'connected' applications to the airline's ground-based operations for upload and download of information or content through the Top Connect or GateSync options.

CONNECTED CABIN Seeing connectivity as more and more common on long-haul aircraft, Candelier observes that it will be necessary to "provision the system so that it can handle any future development in terms of bandwidth," foreseeing bandwidth demand originating in both IFE and connectivity. The new specification also adds connectivity to the environmental controls at the flight attendant control panel.

"Airbus believes connectivity will be as important to the long-haul market as IFE has proven to be," notes Candelier. "OnAir, a joint venture established by Airbus and SITA, is the preferred Airbus Service provider, offering a one-stop shop for the airline to establish service agreements with ground operators, obtain the necessary authorisations from telecommunications regulatory bodies and provide all possible services."

Candelier is adamant that Airbus's vision for 4G IFE will result in a better experience for the passenger, as well as the airline, with an IFE specification that considers not only advances in technology, but the onboard environmental impact of IFE, and opportunities to improve the process as well, engaging suppliers in this responsibility to a far greater extent than previous specifications. ☒

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Reports of the death of airline-provided IFE have been greatly exaggerated – neither PEDs, nor live TV, nor inflight connectivity have got the better of it yet – but will they in the future?

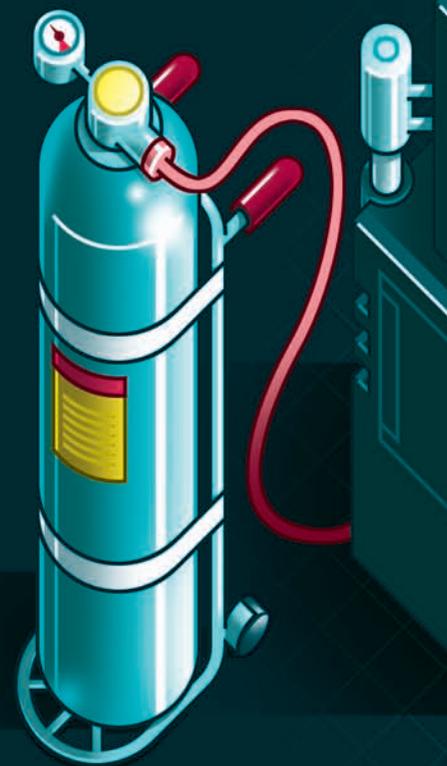
MICHAEL CHILDERS, AIRCRAFT INTERIORS INTERNATIONAL

IFE has undergone a great many changes since its 'birth' some 50 years ago. It was on 19 July 1961 that Trans World Airlines (TWA) used a 16mm film projector that took three years and US\$1 million to develop to screen the movie *By Love Possessed* – starring Lana Turner – in a first-class cabin on a flight from New York to Los Angeles.

However Michael Small, the president and CEO of connectivity provider Gogo (formerly Aircell), which now offers a wireless IFE onboard multimedia platform – recently told journalists that embedded IFE is “not long for this world”. Others have made similar grim prognostications. But despite some long product lifecycles, IFE platforms have done a rather good job of evolving.

Leaving aside the early frontier of 8mm and 16mm film delivery platforms, and looking only at video, IFE systems have migrated from overhead communal screens to linear broadcast systems to personal seatback linear broadcast systems to personal seatback on-demand (AVOD) systems – which Patrick Candelier of Airbus' aircraft interiors marketing believes is today's standard for long-haul aircraft.

Airbus has just announced the details of its 4G IFE specifications (see page 98) and we're seeing solid state drives, faster processors, and a host of sophisticated characteristics, as IFE evolves and expands, serving screens








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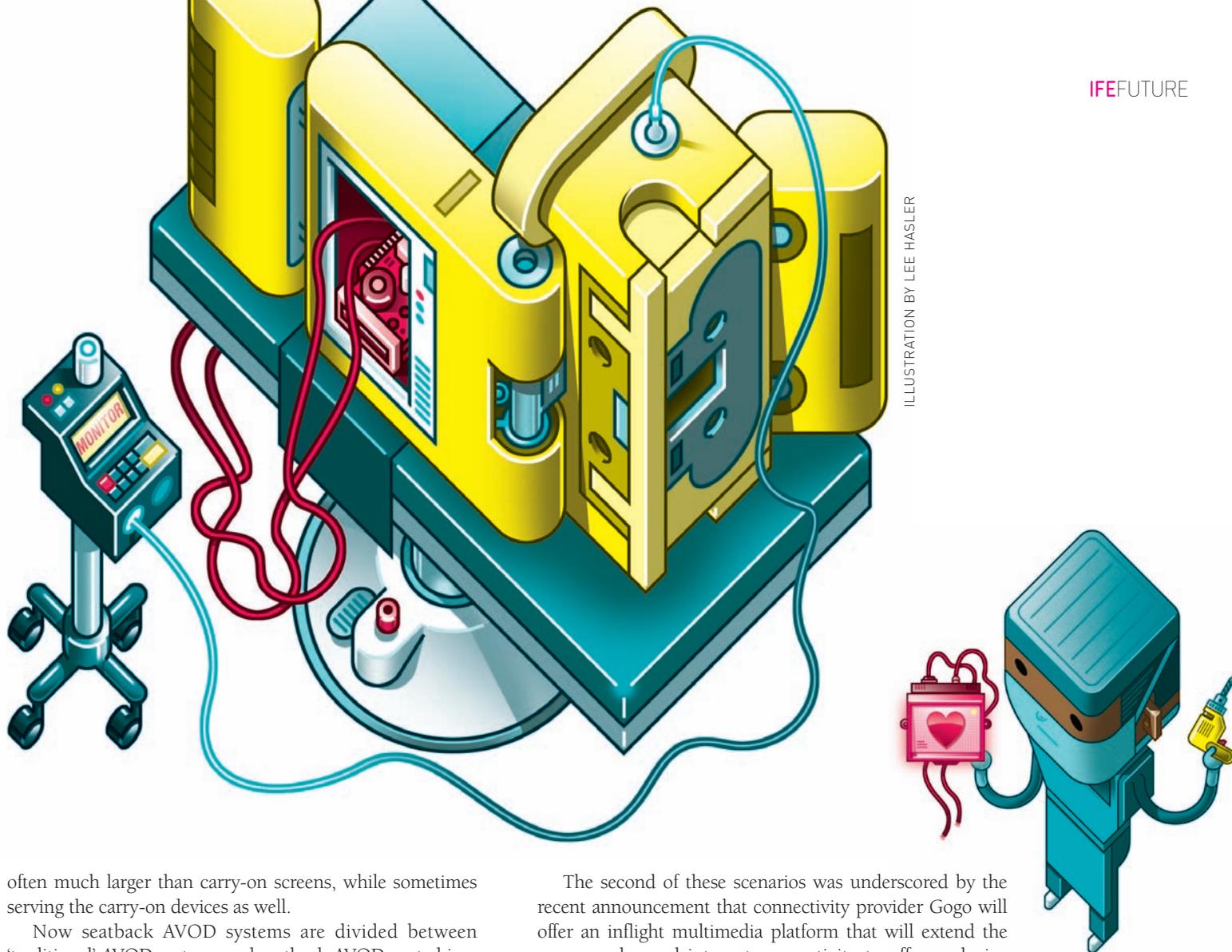


ILLUSTRATION BY LEE HASLER

often much larger than carry-on screens, while sometimes serving the carry-on devices as well.

Now seatback AVOD systems are divided between 'traditional' AVOD systems and seatback AVOD rooted in a 'seat-centric' architecture. What's more, some of the components of seatback AVOD systems are undergoing change: Lumexis' replacement of copper wiring with fibre optics is an example. But the changes don't stop there – Lufthansa Systems is eliminating wires entirely.

But there is yet another bifurcation of personal on-demand IFE and that is between embedded IFE and handheld IFE (not to mention semi-embedded IFE). And even these can be split in two – between purpose-built and consumer-off-the-shelf (COTS).

And handheld can be further separated between passenger-provided and airline-provided – and it's the introduction of the passenger-provided handheld players that have caused some pundits to say that airline-provided IFE is destined for ephemera.

FUTURE FORECAST Is this really the case? As airlines have attempted to reduce costs and increase revenues, many services and amenities have either been eliminated or migrated into a passenger-pay model – or a model where passengers bring their own. But IFE continues to thrive and is largely provided free by the airline.

However, the following four opinions on its future are often expressed: IFE will be replaced by passengers' own carry-on devices and carry-on content; IFE will be replaced by broadband connectivity and IPTV; IFE will remain but move to a passenger-pay model in economy class; and IFE will remain but will scale down significantly and away from traditional systems.

The second of these scenarios was underscored by the recent announcement that connectivity provider Gogo will offer an inflight multimedia platform that will extend the company beyond internet connectivity to offer exclusive access to online services that include real-time travel information, destination content, news, shopping and social network integration.

These services will be offered alongside Gogo's previously announced video offering involving the streaming of movie and TV content – which still relies on traditional cached content – and is a passenger-pay model. "Our video option represents an easy add-on without seat modifications or significant capital outlay," explains Fran Phillips, senior vice president for airline solutions at Gogo. That said, each airline has their own perspective on installing seatback screens versus delivering content wirelessly to passengers' own devices. Some may want both or something in between like a wireless system coupled with airline-provided devices. "The result is that the airlines now have both choice and flexibility even on a per fleet basis," adds Phillips.

Gogo's streaming service involves a passenger-pay model for late window content delivered to passengers' devices while embedded screens generally qualify for newer, early window movies. Gogo seems more an option than a replacement – and with Lufthansa Systems entering the market, not the only streaming-to-PEDs option.



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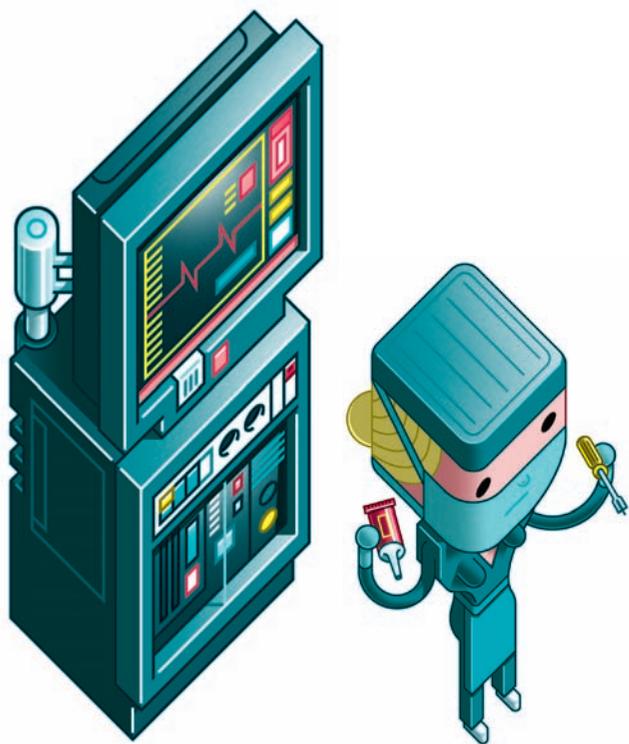
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“We believe that IFEC and PEDs complement one another,” says Neil James, Panasonic’s executive director of corporate sales and product management. “Mobile devices such as tablets, when used in the wrong scenario, can actually detach the passenger from the airline’s brand. Having passengers onboard an aircraft without immersing them into your world and your brand is a missed opportunity to increase passenger loyalty.”

But James sees some instances where PEDs “make absolute sense – these include short flights or with older aircraft where retrofitting any type of system is not feasible because of the age of the aircraft, etc,” he says. “There are also instances where a combination of embedded systems and mobile devices makes the most sense, such as the ability to offer passengers content on the seatback, and email, text, and other services on a tablet or other device. Finally, there are those times, such as longer flights, when a fully embedded home theatre experience is an absolute must.”

CLOUD CUCKOO? What about the consumer content consumption trend away from owning movies and toward rentals – as well as a trend toward cloud storage versus local storage? “Consumers are not walking around with an Android phone with a terabyte of storage, and when they use voice recognition for text on Android phones, it’s not happening at the phone. It’s going through the network and it’s happening at the server,” says James. “So the world is going towards a thinner and thinner client, faster connections, and more capacity at the server.”

James also does not believe that IFE will be replaced with broadband connectivity offerings based on IPTV any time in the near future. “Over the near term,” he says, “we believe that airlines will want to balance the value of live content versus that stored onboard and early window. For live sporting events such as the FIFA World Cup or Wimbledon, it makes perfect sense – especially if that content is backed up by exciting content that is locally stored on the server,” he says. “Today, we see passengers accessing only the edge of the cloud while in flight,” continues

central premise

Seat-centric was the buzzword among IFE visitors at this year’s Aircraft Interiors Expo, but what does the phrase really mean and what are the key advantages of such an approach to IFE? When applied to IFE system architecture, ‘seat-centric’ refers to the storage of content at the seat in the seat display unit (SDU) for passenger consumption rather than the seat client playing the content from the head-end server. In this architecture, the head-end server might be used for content loading in the back ground while passengers are watching content inflight from a second storage source in the SDU, and for cabin announcements; or it might be eliminated entirely.

The principal advantage is that every SDU is fully independent – no failure in the IFE system would impact more than the single seat at which it occurs. The SDU in this architecture is generally removable by a flight attendant, so any SDU failure can be remedied in a matter of seconds by swapping the SDU in question for a new one.

Additional advantages are the elimination of seat boxes, reduction in weight compared with many central-architecture systems, lower costs, and less complexity.

But how are the major suppliers of ‘traditional’ IFE systems reacting to the clamour for all things seat-centric? “As we move to an Android-based solution,” says Panasonic’s Neil James, “we will go to a second generation of displays that have local content storage so the airline has the choice to use it for redundancy or to augment the experience.”

Thales’ Ken Brady believes a mix of solutions remains most sensible: “There is no single, best place to put content and services. Something that a high percentage of users are likely to do or watch might best be placed as close to the user as possible,” he says. “Something that very few users would want to watch might best be placed ‘in the cloud’ and obtained in the rare situation when it is needed.”

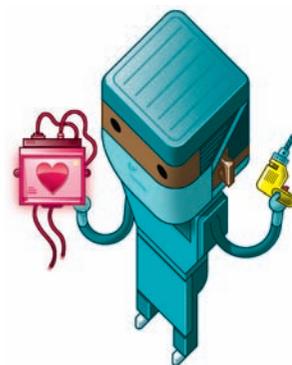
Ultimately Brady is sceptical of the hype currently surrounding seat-centric IFE: “The location of content players and processing has moved back and forth between the seat and the head-end for 30 years,” he notes.

James. “It’s difficult to predict the future, but moving forwards if global satellite coverage and costs of delivery of connectivity improve, then it’s safe to say that we will see passengers accessing more and more of the cloud while on board aircraft.”

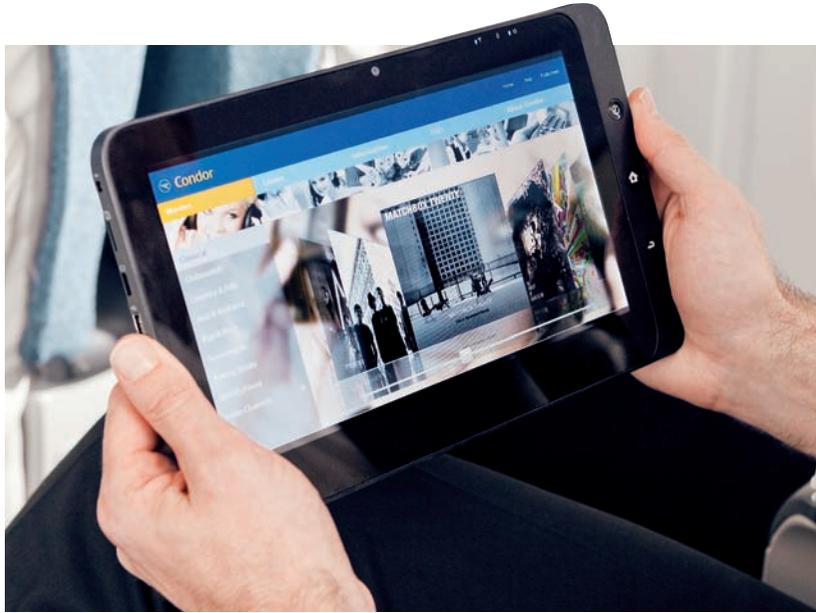
And what about wireless? “We see wireless as complementary to traditional systems, or as a partial delivery system where no IFE has previously existed,” responds James. “We do not see it as a replacement for the IFE systems that are currently being deployed.”

Traditional IFE suppliers are quick to point out that there may be bandwidth constraints on streaming video over WiFi. Even Gogo’s Small acknowledged that “serving the whole aeroplane will take additional work”.

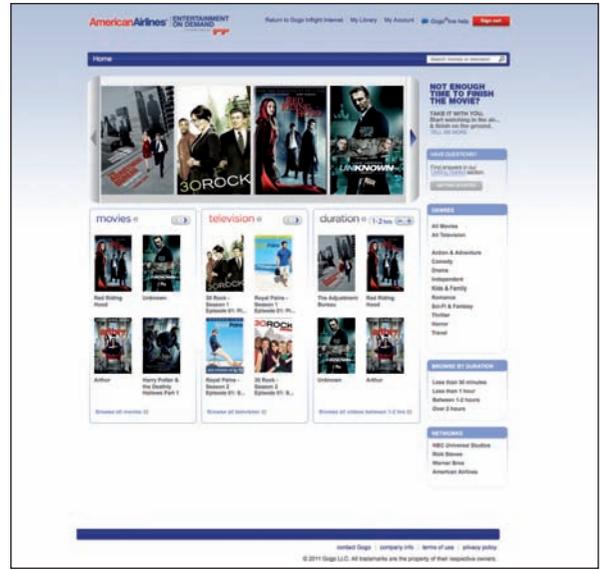
But Lufthansa Systems tested its BoardConnect onboard an aircraft with a wireless access point (WAP) for every 100



“ AIRLINES NOW HAVE BOTH CHOICE AND FLEXIBILITY EVEN ON A PER-FLEET BASIS ”



01



02

- 01. Lufthansa Systems' new wireless IFE system, BoardConnect, will enter service later this year on Condor's 767 fleet
- 02. American Airlines is the first carrier to opt for Gogo's wireless movie streaming service

seats – three WAPs for 300 seats. Not only were there no service or quality issues, they told us, but they took one WAP out of service and found that the other two served all 300 seats with no reduction in streaming quality. And ViaSat's Bill Sullivan believes that the company's Ka-band solution will give plenty of bandwidth to every passenger.

SECOND OPINION Ken Brady, principal engineer at Thales, believes that pax-provided entertainment will be an ever-increasing option for passengers: "If and when it is a replacement for IFE is a complex question," he says. "Several factors continue to make good-quality [airline-provided] IFE desirable. For one, it doesn't require the passenger to bring his own device."

Brady refers to the difficulty of using a personal device on a tray table in economy, before asking: "Will we ever see the day when 70 or 80% of passengers are carrying with them a device with an 8in or larger screen? Until that is the case, it's difficult to think of pax-provided IFE truly replacing airline-provided IFE."

On the subject of the cloud, Brady says: "I believe there is a substantial opportunity to expand the role of IFE to become a 'Cloud in the Clouds' for passenger devices. It is an important part of expanding the options available to the flying passenger. Our world is rapidly embracing personalisation in all aspects of our lives. This is a new role for airline IFE but not a replacement for personal content."

Brady observes that: "Wireless service to passengers' devices is a highly desirable service option for an airline to provide to its passengers. This service can have value

whether it is associated with connectivity or simply the onboard wireless distribution of content to passengers' devices. Wireless handouts are just another dimension of the general hand-out market. I see this as one of the options to be made available, but not a replacement for IFE," he continues.

"Connectivity presents an additional source of entertainment for passengers but in all cases (ground-based or satellite) it utilises a special purpose and limited resource. IPTV can in principle provide AVOD using IP networks, however in doing so it requires a substantial amount of bandwidth to accomplish any reasonable level of quality."

Brady says that the discussion about surrendering IFE to passengers' own carry-on devices or to an open internet pipe with IPTV overlooks an important consideration: "If an airline is providing content to a passenger, they can exploit today's IFE systems to provide useful information including targeted advertising," he says. "If done properly, this is a service and benefit to the passenger provided by the airline."

Airline-provided IFE, connectivity, and pax-provided IFE have the ability to co-exist, it seems, and the range of IFE systems today fills a range of needs. Reports of the death of airline-provided IFE would therefore appear greatly exaggerated, but Fran Phillips' statement that "airlines now have both choice and flexibility even on a per-fleet basis" seems a good summary. ☒

CONTACTS

www.gogoair.com; www.lhsystems.com; www.panasonic.aero; www.thales-ifs.com





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milesahead

Virgin Atlantic's new head of design, Luke Miles, takes time out to talk about his ambitions for the airline

ANTHONY JAMES, AIRCRAFT INTERIORS INTERNATIONAL



For a designer, the opportunity of working at an airline is extremely attractive – it's hard to think of a bigger canvas on which to make your mark – helping to build a brand identity across multiple countries and regions, and touching on everything from check-in desks, lounges and liveries through to the cabin and staff uniforms. And when it comes to airlines with a reputation for innovation, Virgin Atlantic tops the list.

“This place has always had a special place in my heart – it's something to do with the scale of the project work and also the culture of the company,” remarks Luke Miles, who was appointed Virgin Atlantic's new head of design back in April. Miles is responsible for initiatives on the ground and in the air, including brand design, events, clubhouses, IFE, seating and service design. “In terms of pure design, you're actually dealing with environments – you don't really get that anywhere else,” he continues. “You're dealing with seating, entertainment, lighting all the way down to food – it's a special blend that's naturally attractive to a designer because you're shaping the overall experience.”

And experience counts for a lot in the airline industry – particularly when designing aircraft interiors, where an awareness of certification issues and a mountain of engineering considerations relating to weight and materials is priceless. Fortunately Miles has earned his stripes – he previously worked for the airline between 2000 and 2004 as a senior designer, where he helped shape the carrier's premium-economy seating and IFE system, as well as playing an integral role in the development of its award-winning Upper Class Suite, working on its onboard bar, interior lighting and cabin architecture.

“There's no doubt about it – I think the experience of working here before and having worked on the Upper Class Suite and the bar and the overall interior was a real coup,” says Miles. “It's an amazing piece of work and I think that level of knowledge doesn't really leave you. When designing an aircraft interior, you have to be aware of the maths of the space – it's challenging to be innovative within a very defined envelope such as the cabin, which is governed by certification and engineering issues. So knowing stuff about



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01



02



YOU HAVE TO HOLD ON TO YOUR VISION FOR EACH PIECE OF WORK FOR AS LONG AS POSSIBLE



aisles and access and all the other rules can be useful. You also have to have a certain sensitivity to passenger flows and how people move around the cabin, and service delivery.”

However, Miles clearly relishes the challenge, insisting there is still plenty of scope for creativity: “The cabin is clearly a difficult place to design, but it never ceases to surprise me the jumps that can be made. You have to hold on to your vision for each piece of work for as long as possible. It requires relationship building and an intelligent approach and process to take that vision and make it a reality. Ultimately it relies on engineering and design coming together to execute the vision.”

VOTE OF CONFIDENCE It also requires the backing of a strong board – fortunately Virgin Atlantic’s key decision makers have always recognised the value the design team adds to the overall business: “The airline has always had this pioneering gene running through it from when it first began,” says Miles. “I think that sense of a ‘can do’ attitude is fantastic and really refreshing. The design group is an important part of the structure of the company, and the dialogue is seamless and you’re supported. Fundamentally,

design is seen as a business tool. A lot of the stuff that we’ve done is testament to that. There is a directness of communication and dialogue between the design group and very senior people in the company, which allows a certain cleanliness in decision making.”

As to what new ideas might be in front of Virgin’s executives right now for review, Miles is unable to divulge too much: “I can’t really talk about that – needless to say it’s exciting, and I’m excited about the future, but I can’t really go into detail at this stage,” he says.

However, he is at least able to give an indication of what he sees as important going forward: “Speaking generally I think it’s about the sum of all the parts giving way to a sort of golden experience. As much as it comes down to product, it also comes down to people, who are the face of the brand. And you’ve also obviously seen the new IFE we have on our A330s – the touchscreen controls and handsets are a direct reference to what’s happening on the ground with smartphones and all that sort of stuff. We want to continue that synergy moving forward – it’s all about touchpoints and consistency and knowing who’s dealing with you at each moment.”

- 01. Virgin Atlantic’s A330s feature Panasonic’s eX2 IFE system with touchscreen controls that allow its passengers to scroll and swipe through over 300 hours of content
- 02. Its A330s also feature mood lighting in every class, designed with help from expert lighting firm DHA

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03

This sense of carefully crafting every step of the passenger's journey is particularly important to Miles, who uses the recent introduction of mood lighting to the economy cabin of its A330s as a further example of such attention to detail. "For me, being able to come back and look at all the touchpoints that we're involved with is a lovely opportunity in itself. It's all about the customer experience and how you keep that experience buoyant at each and every point."

NEW AGE Looking ahead, a key trend for all airlines and designers to consider is the needs of an increasingly ageing population. Could that perhaps be a problem for Virgin Atlantic, which is typically viewed as a brand that appeals to younger consumers? "I don't think so," says Miles. "As a brand, we're all about joy actually and I like to think that's multi-generational. And I think it would be wrong to say that people of a certain age don't have an energy about them. Again, as a designer for an airline, it's more about providing those personal touches along the way, which has always been a phenomenally valuable asset for us, and one that I think a lot of other companies would give their right arm for."

So what traits is Miles looking for in any new recruits to his design team to help shape the airline's future? "We need people who are design literate in a mechanical and mathematical sense, but who are also able to talk through

career calling

Before taking up his new role at Virgin Atlantic Airways, Miles worked for LG Electronics Europe, where he was head of design for its European design studio, overseeing a multidisciplinary team of designers and responsible for a diverse portfolio of global products, from mobile phones through audio visual products to domestic appliances.

Prior to his time at LG, he worked at Nokia as a senior design manager, where he helped develop a global 'design DNA' strategy, as well as product families for the N-Series multimedia portfolio. He was also responsible for establishing three generations of the innovative 'Xpress Music' range. This included Nokia's first bio product, first touch-sensitive device and Nokia's thinnest music phone.

"Designing mobile phones or TVs requires the same mathematical understanding and attention to detail as designing an aircraft cabin," he says. "You have to consider battery size and how best to protect the screen, and so there are always compromises to manage and challenges to deal with."

Miles, who has a BSc in product design from the University of North Lancashire, currently lives in West London, and dreams of one day owning a 1973 Porsche 356 speedster in black: "A thing of beauty in my eyes." His grandfather was an architect, his parents are actors and his brother is a moving image designer: "There's a creative gene there for sure," he says.

their ideas elegantly – story telling is really valuable because it helps stakeholders and the people you are working with understand and get an impression of what you are trying to achieve," says Miles. "Being able to articulate through sketch work or model making is paramount, but a problem-solving capacity is probably the most critical."

In the past, the airline has been particularly effective at identifying and working with fresh talent from external agencies – is this likely to continue under Miles? "I think it's a good way of working – bringing in talent and experts in their field, whether it be architects or furniture designers," he says. "It's always nice to have that fresh perspective, particularly from firms that have never done airline work before and have a very different, almost cold view of how things should be – that's invaluable for us."



AS A BRAND, WE'RE ALL ABOUT JOY
ACTUALLY AND I LIKE TO THINK THAT'S
MULTI-GENERATIONAL



03. This 'purple haze' phase of the mood lighting on Virgin Atlantic's new A330s is designed to be "cosy and comfortable" for passengers



04



05



- 04. Virgin's Upper Class Suite combines style with passenger density
- 05. Virgin's onboard bar in Upper Class is a key expression of the airline brand

When it comes to executing its vision, it's fair to say that the airline has had its differences with the aircraft interiors supply base over the years – manufacturers are wary of the airline's exacting standards and question their likely return on investment when dealing with the carrier's relatively small fleet. The airline went as far as setting up its own seating manufacturer, Reynard Aviation, back in 1998 to design, develop and manufacture its J2000 business-class product, the predecessor of its current Upper Class Suite.

Asked for his opinion on the current supply base, Miles is diplomatic: "Obviously we want to work with people who have a real sense of attention to detail and to whom craftsmanship is key, but that's always been the case," he says. "You go on journeys with the people that you work

with, and there's always a learning process when you enter that trajectory together."

CHAMPION ELECT Summing up, Miles is looking forward to championing design within a company recognised for pushing the boundaries: "I think the critical thing about this airline is there is always a desire for improvement that never goes away. The design team is in a lovely situation where we can question the status quo and push as we see fit and make recommendations that are maybe out of the norm but I think generally we're relied upon to do that."

And from a purely selfish perspective, Miles admits to gleaning a huge satisfaction from his new job – especially when he gets up close and personal with the hardware: "I still get excited when I see an aircraft in all its glory – it's just such an incredible manifestation of what human kind can do – it's phenomenal and it still switches me on." Readers will just have to wait and see what his plans are for the carrier's cabins, but with its first A380 due in 2013, there's every chance we're likely to see something special. ☒

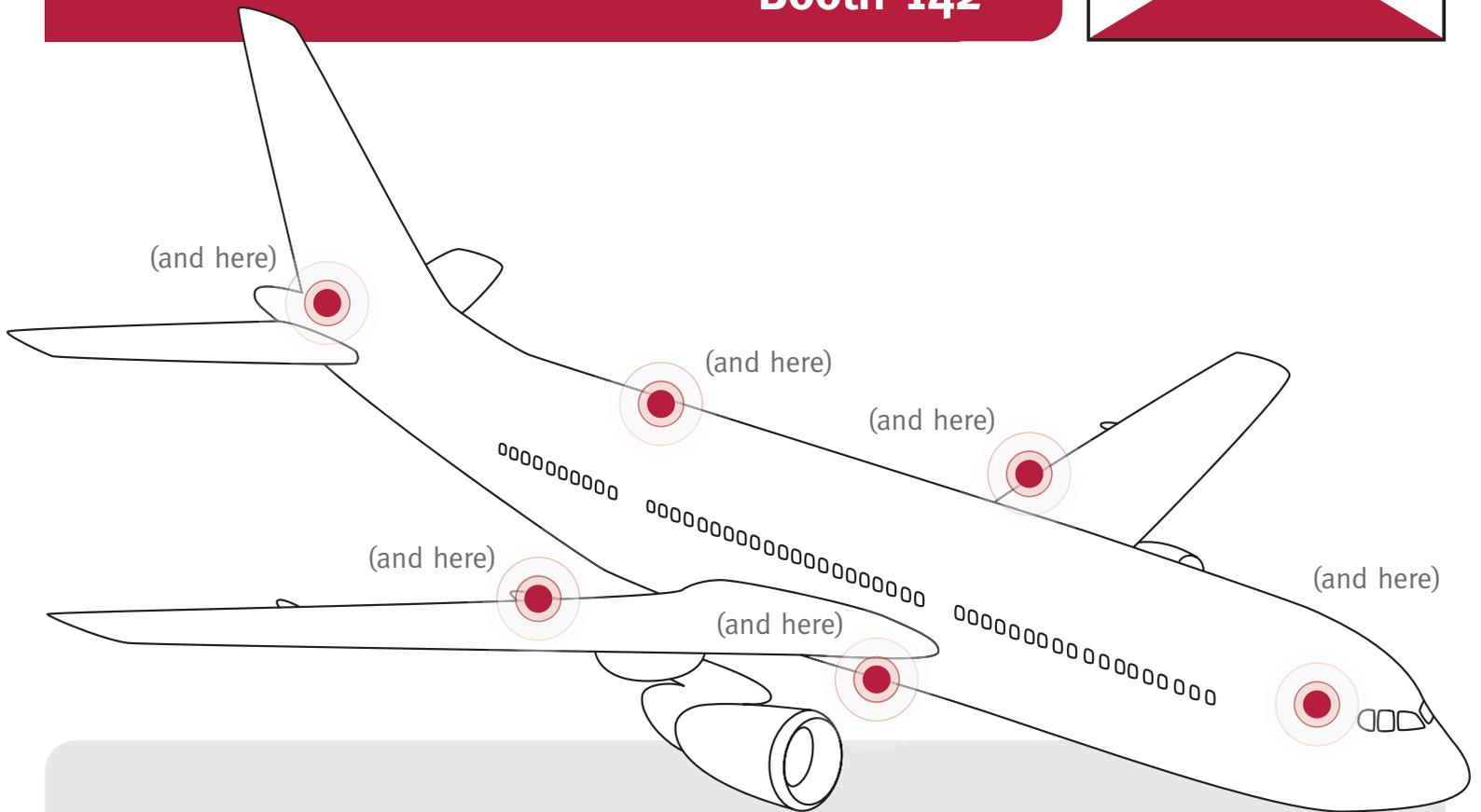
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SHOWPREVIEW

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Aircraft Interiors Expo Americas 2011



More than 100 industry suppliers are expected at this year's Aircraft Interiors Expo Americas, which will be held on 12-14 September in Seattle, Washington, USA. Airlines registered to attend include

American, Delta Air Lines, United, Air France, Air New Zealand, Austrian, British Midland International, Cathay Pacific, Condor, El Al, Emirates, Japan Airlines, Jetblue, Saudi Arabian Airlines, Skywest, Tam and US Airways.

The show is once again being held alongside events hosted by the Airline Passenger Experience Association (APEX) and the International Flight Services Association (IFSA). On page 126, we speak to Vicky

Stennes, president of IFSA, on some of the highlights in store.

We've also cherry-picked just some of the many aircraft interior innovations that will be on display – from seats to IFEC solutions, galley equipment to materials and components.

FORM AND FUNCTION

Sell - Zodiac Aerospace will display its newly developed series of galley inserts, including ovens, coffee makers, beverage makers, bun warmers and water boilers. These are designed to embody new technologies while offering an advanced design that harmonises with the cabin. The challenge was to deliver an attractive outer appearance while also building in the increased functionality required by airlines. The new oven is about 6.5kg lighter than Sell's current model.

GOLDEN TICKETS

Lumexis will showcase its Fiber-To-The-Screen (FTTS) in-seat IFEC system. In November 2010 the company installed and delivered three 189-seat systems within only 23 days for launch airline flydubai. Lumexis is now completing each aircraft in less than three days of down time.

The thirteenth Boeing 737 FTTS installation for flydubai is due to take place during the show. If this tentative schedule holds, the airline, Lumexis and ATS (the system installer) are planning private appointments at the latter's facility at Paine Field in Everett, Washington, to include a tour of the installation in progress. Doug Cline, CEO of Lumexis, promises that if the OEM delivery schedule proves out, "Guests for this unique event will be quite limited as the system comes together very quickly, offering only a short viewing window. So, invitations will be much sought-after!"



culinary heights

Altitude Aerospace Interiors (Altitude) will highlight its customised product offering, which is expanding to include monuments that have traditionally operated as galleys. With much experience in manufacturing complex bar units, Altitude is developing modular and highly customised monuments designed to operate as galleys in function but evoke a stylish bar-like unit in form.

The modular nature of these monuments will allow airlines to mix and match a range of inserts – including steam and conventional ovens, beverage makers, microwaves, meal boxes and standard carts. Customisation can be achieved through the anodise finish of the metal components, laminate inserts, bench tops and a ceiling feature.

Often galleys are placed in direct passenger view – a Door 2 centre-aisle galley for example, is a showpiece for every passenger boarding an aircraft. This

"We feel it is time that galleys start offering something more to the interior of an aircraft"

provides a real opportunity for airlines to create a wow factor. "We feel it is time that galleys start offering something more to the interior of an aircraft and demonstrate the uniqueness of an airline," says Baden Smith, head of commercial, airlines at Altitude. "These hard working areas of the cabin can work as designed to, if not better than in their current form, and look incredible."





VICKY STENNES

PRESIDENT OF THE INTERNATIONAL
FLIGHT SERVICES ASSOCIATION (IFSA)

Why is IFSA co-locating with APEX and Aircraft Interiors Expo Americas?

In 2010, IFSA co-located with the Airline Passenger Experience Association (APEX) show and Aircraft Interiors Expo for the first time. This resulted in 65% more airline attendees. Now that the word has spread, we anticipate an even greater increase. This year we are co-locating again in Seattle. IFSA and APEX are co-presenting combined education sessions and social networking events. Collaboration allows IFSA, APEX and Aircraft Interiors Expo to offer a one-stop-shop industry 'super show', which enables exhibitors to meet with more customers and attract valuable prospects for future business opportunities.

Are you planning any further cooperation?

IFSA will continue to seek out and work with related industry organisations to identify those opportunities that provide additional value to our members.

What can we expect from IFSA and APEX's joint education sessions?

With the combined buying power of IFSA and APEX, we are able to attract an array of high-calibre speakers. As such, the committees of both groups have been working very closely together to develop sessions that would appeal to a cross-section of attendees. The shared sessions will be geared towards both IFSA and APEX members. The speakers have been provided background information on both associations so they may tailor their presentation to the respective memberships.

What's new with this year's IFSA Annual Conference and Exhibition?

This year's Chef's Competition will offer a new and exciting format. In previous years, all judging took place in the catering kitchen, where the chefs prepared their dishes. With the popularity of shows such as Iron Chef and Chopped, this year will involve a new twist. Judging for the 2011 competition will take place right on the tradeshow floor, and allow conference attendees to see the chefs in action, while also hearing the judges' feedback during their evaluations. The excitement of a live competition will ensure that the chefs receive heightened exposure and provide a memorable experience for attendees.

What does IFSA have planned for the year ahead?

As IFSA moves into its 43rd year of association status, we remain committed to our mission as a global professional association created to serve the needs and wants of airline and railway personnel, caterers and suppliers responsible for providing services on regularly scheduled routes. IFSA's board of directors is continuing to build momentum on a strategic course to identify opportunities that provide our members with increased return on their investment dollars, while also maintaining ongoing association initiatives. We've had a number of successes. We've awarded nearly US\$300,000 (£183,719) worth of scholarships through the IFSA Foundation to date. In addition, we provide industry information through our member communications, website, World Food Safety Guidelines, and the IFSA Annual Conference and Exhibition. We also offer ongoing food safety and quality assurance programmes through our Government and Education Committee. Lastly, our strategic alliances with associations such as APEX and the International Travel Catering Association (ITCA) allow IFSA additional opportunities to enhance membership benefits.

SITTING PRETTY

Jiahang United Seating Technologies (JUST) will reveal a long-range economy seat and a long-range premium-economy seat. JUST is a joint venture company recently established by Aerospace Life-Support Industries (a wholly owned subsidiary of Aviation Industry Corporation of China (AVIC)) and United Seating Technologies of Switzerland.

The company plans to deliver a full range of high-tech, lightweight seats that make extensive use of advanced carbon-fibre technology, to be styled by Bertone and engineered by Optimares. Its initial product line will include nine seat types covering all cabin classes, based on five seat platform structures.

The company has already revealed some details about its range. The X-Light FB and X-Light R will be short- to medium-range economy-class seats weighing 6kg per passenger place for the FB version and 9kg for the medium-range R version with IFE provision. Meanwhile the X-Light BCSR will be a short-range business-class seat.

SECRET SEVEN

digEcor will highlight the digEplayer L7, a handheld IFE player. The product has already been chosen by airlines such as United for premium-service transcontinental flights; Azerbaijan Airlines for business class on certain international flights; Danish charter airline Jet Time for rental on its Boeing 737s; Thomas Cook Airlines Belgium for rental on some medium-haul A320 flights; and Sun Country on select flights for free in first class and US\$6 in economy.

Earlier in 2011, digEcor announced that GuestLogix's OnTouch retail technology and merchandising platform would be integrated with the digEplayer family. The idea is to help airlines make ancillary revenue through merchandising, advertising, gaming, movies, TV shows, music and device rental.

The company will also use the show to conduct private demonstrations of some new capabilities that it says will streamline some of its processes and add value for airlines.



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feathers fly

Geven will showcase the lightweight Piuma (which means feather in Italian). This latest addition to Geven's family of economy-class seats has already garnered orders for over 200 shipsets worldwide. It was delivered to Airbus for line-fit for the first time in May 2011, earning the exceptional '0' defect report card. The seat was designed to incorporate the latest material innovations as well as clever design solutions to reduce part count.

Piuma Alta Quota is the long-haul variant, conceived for long-range comfort at the same weight as the single-aisle version. Piuma Alta Quota is the result of a design adaptation exercise, designed especially for applications such as a high-density A380.

Geven says the Piuma family yields weight savings of over 3kg per pax compared to traditional economy-class seating solutions, and at least 1.5kg less per pax compared to other lightweight seats on the market. The seats are available in lightweight Italian leather in all hues of the rainbow.



DIGITAL DREAMS

Rockwell Collins will highlight its Digital Programmable Audio Video Entertainment System (dPAVES) HD IFE system as well as its latest Airshow 3D moving-map product.

A single-aisle offering, dPAVES delivers digital entertainment, pre-recorded announcements and the Airshow 3D moving map in a 4 MCU package.

Meanwhile, with a new graphical design, the latest version of Airshow 4200 and 4200D provides dramatic product enhancements. Based on actual satellite imagery, utilising NASA's Blue Marble Map data, passengers can now enjoy new features, more map detail and 3D realism.

While offering identical features as the Airshow 4200 product, Airshow 4200D offers native 16:9 wide screen display and unconverted digital image generation optimised for the latest IFE systems.



SIT UP

Zodiac Aerospace's SiT division, created in May 2011, will focus on its seat-centric IFE solution. The system is designed to offer airlines the benefits of weight savings, reliability and simplicity, and is offered as an integrated solution (IFE and seat).

SiT has already been selected by Airbus for line-fit installation on the wide-body A330 and A340 aircraft; by both Airbus and Boeing for retrofit installation; and by airlines in the Middle East, Africa and Europe for retrofit.

GOING GREEN

Andrew Muirhead and Son will show its 'Low Carbon Leather' for the first time in the USA. The company reports that the marquee has already created a buzz in Europe and Asia and orders from the recent Hamburg show are exceeding expectations.

Peter Jones, recently appointed as vice president of sales for the Americas, will be on hand to explain the benefits of the new leather, which is the result of a £6 million investment by parent company Scottish Leather Group in a plant designed to reduce the company's carbon footprint.

The company will also share information on its recent research into colour forecasting. The aim of forecasting is to help customers anticipate trends in colour, mood and style that can be reflected in aircraft interiors. In addition to its extensive standard colour range, the company offers a bespoke colour creation service.

COAT OF MANY COLOURS

AkzoNobel Aerospace Coatings will present three new additions to its Aerofine range of water-based cabin interior coatings. The company says these are low-solvent and FAR-compliant products that can be used for the maintenance and refurbishment of cabin surfaces.

The Aerofine range consists of a waterborne topcoat, a waterborne primer/surface, and a virtually solvent-free pinhole filler; supplemented by a touch-up repair kit which can be used between flights. Aerofine is designed to be easy to apply and leave surfaces with a stain-resistant finish offering excellent cleanability.

Aerofine is available in a wide range of colours and in a choice of matt and semi-gloss sheen levels. AkzoNobel Aerospace Coatings says the products offer quick drying for shorter processing times.



MEET YOUR MATCH

STG Aerospace will exhibit the latest addition to its SaftGlo photoluminescent (PL) floorpath marking system range, SaftGlo PatternMatch. STG has extended the SaftGlo range by building on the technology of SaftGlo and SaftGlo ColorMatch, which offers over 300 solid colour options.

SaftGlo PatternMatch can be made to match the pattern of even the most intricate carpet design. A translucent overlay, printed to match the surrounding carpet's colour and design, sits over the PL strip meaning the system is completely discreet when cabin lighting is on but just as effective as other SaftGlo variants if the lights go out.

"We're constantly striving to innovate effective and cost-saving solutions for safety-critical systems," says Peter Stokes, chief executive at STG Aerospace. "PatternMatch is a logical extension to our range."



DRINK UP

IWG Technologies will showcase its potable water treatment, water systems and components for aircraft. The company recently received its first order for the new IWG-ES7 On-Demand Aircraft Water Heater, following the acquisition of the product line from Keltech.

"Our integration process is progressing well, and products are already available within normal eight to 12-week lead times," says David Fox, president and CEO of IWG Technologies. "Within the next few months we should have authorisation to ship units as aeronautical products with a Transport Canada Form One. This should enable customers to integrate the units onto aircraft with a simplified documentation process. Following this, we will put the products through an expanded series of aviation environmental tests (DO-160), to allow installation at an increasing number of facilities worldwide."

plastic fantastic

Sabic Innovative Plastics will spotlight its thermoplastic resin, sheet, foam and composite solutions for the aviation interiors industry by displaying some noteworthy applications.

These include a passenger service unit engineered and supplied by PECO Manufacturing for the Boeing 737 BSI; new-generation recyclable, thermoformable Ultem composite aerospace board; 40% carbon-filled Ultem resin to replace die-cast aluminium in structural components; a new seating design using Lexan XHR sheet; and an inflight magazine rack made using transparent Lexan F2000A sheet (pictured right).

The magazine rack was created by renowned designer Patrick Lindon for Bucher Leichtbau. Sabic says that Lexan F2000A complies with flame, smoke and toxicity requirements (FAR 25853 and ABD 0031 at 2mm and 3mm), while offering a light weight.



"Lexan F2000A complies with flame, smoke and toxicity requirements while offering a light weight"

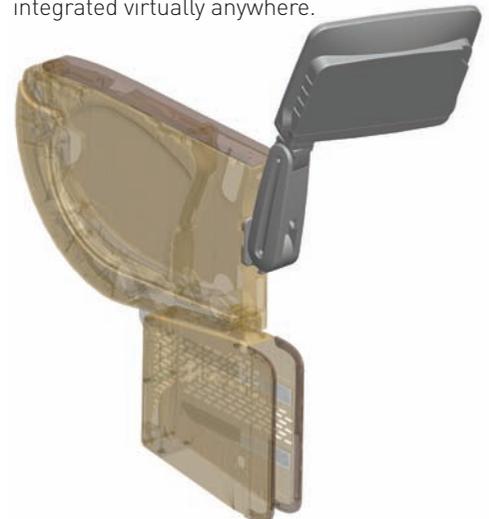
ARM CANDY

Bucher Aerospace will display its new IFE deployment arm concept, which was developed in collaboration with Thales.

The new arm features a unique articulation mechanism allowing the accommodation of large-format IFE displays such as Thales' 12.1in SVDU Gen IV display under a standard or premium-economy seat, with a reduced swing radius. Bucher Aerospace says the reduced swing radius also works with smaller format displays and allows seats utilising the arm to be positioned as close as allowable to class dividers, monuments and seatbacks so airlines can maximise seat capacity.

In the case of the Thales's 12.1in SVDU Gen IV display, the collaborative design seamlessly integrates the arm and display creating a highly homogenous look. Bucher Aerospace says the arm is easily adaptable to accommodate other sizes, styles and brands

of display and can accept large, fully terminated harnesses, thereby simplifying installation and maintenance. Since Bucher Aerospace works with nearly all seating manufacturers, it says the design can be integrated virtually anywhere.



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team players

Avianor will highlight its alliance with Irish IFE specialist **Airvod**, which it says will change the way IFE is procured and delivered and allow for the fast roll-out of a patented, seat-centric IFE system.

Airvod has been developing the seat-centric system over the past couple of years. The companies believe it will save airlines millions of dollars in fuel, reduce maintenance costs, enable flexibility in cabin reconfigurations, and offer passengers the very latest technology.

They already have a launch customer and are on schedule for roll-out on a fleet of Boeing 777-200 wide-body aircraft. With a new approach called Pit Stop, customers can count on one team to supply the system, the integration, installation, seat and airframe modifications and STC.



SLICK FIX

Velcro will introduce three new hook-and-loop fasteners for aircraft interiors, which it says meet the industry's performance and flame propagation resistance standards, i.e. FAR 25.856(a).

The HTH724 hook is ultra-thin and made of PVDF resin. Velcro says it is 25% lighter than the hook fasteners typically used in aircraft seating and carpet hold-downs. The Hook 82, woven from polyphenylene sulfide (PPS), is designed to be light in weight and rugged to withstand the repeated fastening and unfastening of insulation blankets and textile applications. The Loop 3502, made of polyether imide (PEI), is a circular knit that can be used with either Hook 82 or HTH724.

Like other Velcro brand products, these fasteners are designed to provide excellent peel and shear strength while simplifying assembly and realignment. They are available in different widths to suit a variety of aircraft cabin applications.



HEALTH IS WEALTH

Humbay Health and **Stoddard International** will exhibit, having just signed an agreement to design and manufacture a proprietary humidity control product. Humbay says its design has direct retrofit possibilities for the flight deck of Boeing wide-body aircraft, and can be expanded to a multitude of aircraft applications. Stoddard manufactures composite interiors and structures. "We are enthused about the health benefits that this product will offer cabin environments," says Bruce Hamilton, president of Stoddard.

GET CONNECTED

Cobham will showcase its satcom antenna and server systems. Its technology enables satcom connectivity for passenger use in the cabin and data services for the cockpit and flight deck. Its hardware is certified and selectable on many new-production aircraft as well as available for retrofit. The JetLAN family of servers offers a variety of configurations – whether the need is point-solution processing, a server-router platform or audio and video management/processing.



REDUCE, REUSE, RECYCLE

Mohawk Aviation Carpet will spotlight its sustainability efforts. Delta Air Lines is just one carrier to partner with the aircraft carpet supplier. The airline recycles its cabin carpet through Mohawk's ReCover programme. In fact 191 tons of its carpet has been recycled (and diverted from landfill) since 2008, enough to carpet 1,200 Boeing 737s.

Boeing Facilities also uses Mohawk's ReCover programme, and has diverted 116,755 square yards (over 1,050,793 lb) of carpet from landfill since 2007.

Mohawk manufactures sustainable woven nylon carpet that it says enables customers to enjoy lower cost and lighter, more durable carpets that can outwear wool by as much as 6:1, meaning fewer replacements per year.

Mohawk's carpet weaving facility in South Carolina, USA, is ISO 14000 certified. The company's future sustainability plans include the introduction of post-consumer PET in to the backing yarns of aircraft carpet.



COMMAND AND CONTROL

ITT Control Technologies will display a selection of its huge range of aviation products. The full range includes UltraLOC seat locks, rotary dampers, stow bin actuators, rate controls, panel isolators, interior noise and vibration isolators, pumps, actuators, switches and seat control products and software.

ITT Control Technologies' product lines are continually expanding to provide customers with solutions for applications in commercial, business and civil aviation as well as military and cargo aircraft. The company provides analysis, products, service and support for customers including airframe manufacturers, seat recline suppliers, stowage bin OEMs and aircraft maintenance providers.



CLEAN BILL OF HEALTH

Celeste Industries will focus on holistic aircraft interior hygiene, with programmes to clean, disinfect and deodorise, as well as potable water programmes designed to help airlines meet the new EPA Aircraft Drinking Water Rule easily, safely and effectively. Celeste Industries says it can help airlines go beyond potable water tank disinfection to target limescale and biofilm.

Today, Celeste's portfolio of non-hazardous chemical, includes system 38 cleaners and descalers, interior cleaners, disinfectants, speciality cleaners, exterior washes and potable water system solutions.



enter the dragon

Sicma Aero Seat will show its Dragonfly economy-class seat. Designed for short- and medium-haul aircraft, Dragonfly weighs 7.5kg per pax (8.2kg per pax for a medium-haul version with 4in of recline). It is certified and available for deliveries from early 2012.

Features include an aluminium backrest, 2in extra knee space, short armrests for disabled access and a tray table. Audio IFE and PC power are available as options. Dragonfly uses 30% fewer components than its predecessor and 85% of it can be recycled.

The company will also feature the 5751, a long-haul economy-class seat already in service, and the business-class Cirrus. Cirrus consists of a seat with a surrounding shell. It has a reverse herringbone layout designed to enable fully flat recline at minimum cost to passenger count.



CLEAN CONSCIENCE

PSA Paris will exhibit a new hand soap for aircraft washrooms that is 100% recyclable and biodegradable. The company says the soap is made of a natural formula, is paraben free, PH neutral, fits all supports and is hypoallergenic.

PSA Paris's product range includes disinfectants, cleaners, soaps, detergents and insecticides that can be used during flight, operations or maintenance. It has products for pilots, crew, passengers and cleaning and maintenance teams.



STRETCH YOUR WINGS

Skandia will introduce a new upholstery foam – Dax with jersey scrim. When sewn in to the dress cover, Skandia says seats appear smooth and wrinkle-free. Its ability to stretch is designed to make decorative quilting and other techniques ease to apply, as well as making putting the dress cover on easier.

Skandia says the product passes important flammability requirements including 14 CFR 25.853(a) and (c) when constructed using approved covering materials; and also passes Airbus smoke and toxicity tests.



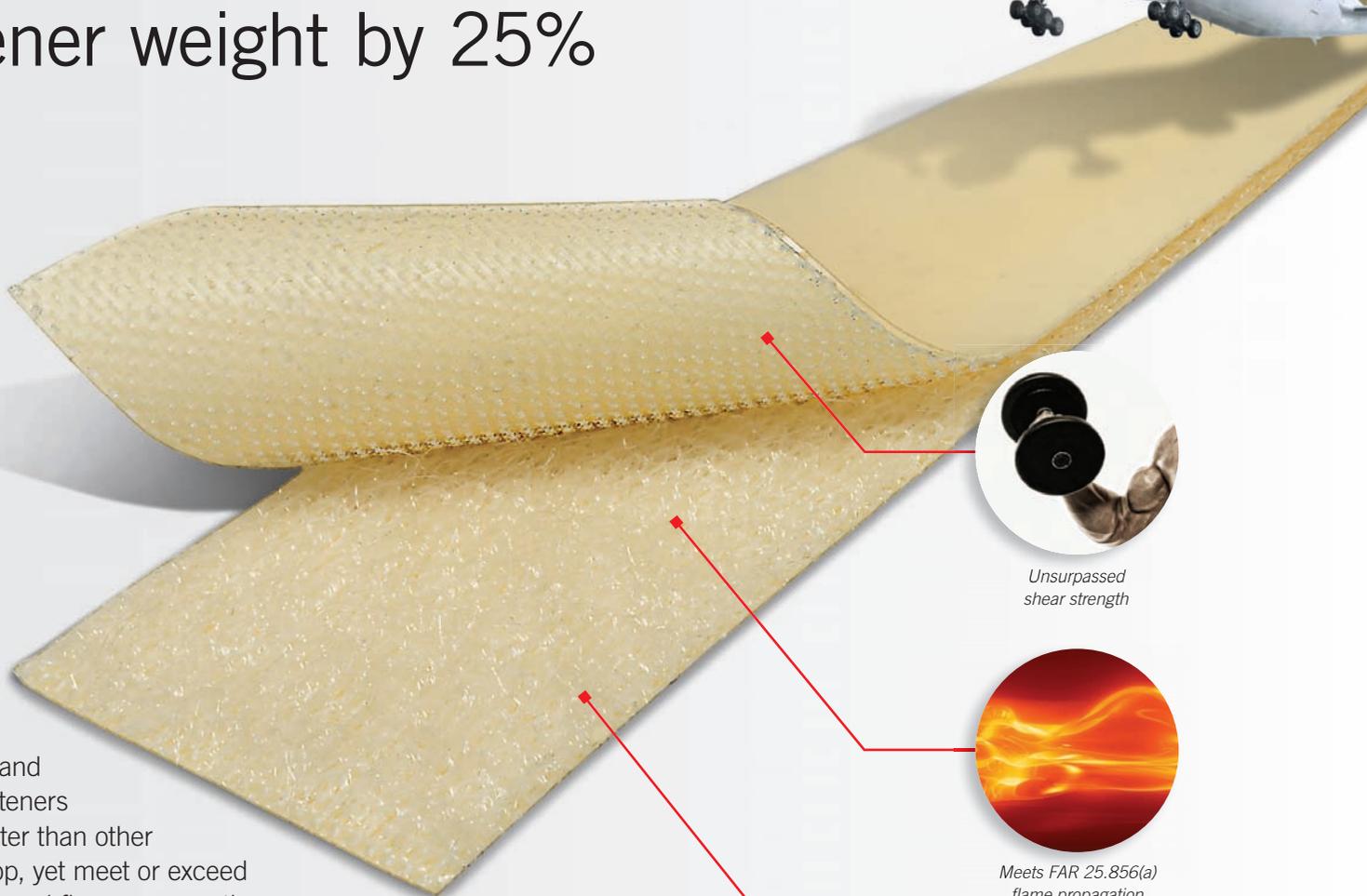


Aerospace touch fasteners

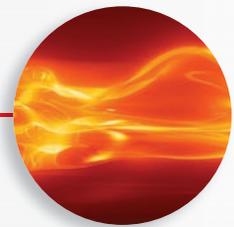
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mohawk
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AVIATION CARPET

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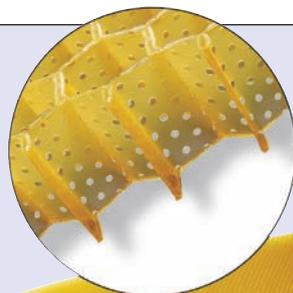
The only flooring company listed in NewsWeek's 2010 Green Rankings	The Highest ranked flooring company in Southeastern Corporate Sustainability Rankings	Awarded the 2011 Virginia Governor's Environmental Excellence Award
--	---	---

To learn more about our approach to products, processes and people, visit us at MOHAWKSUSTAINABILITY.COM.

bee's knees

Supracor will feature its Stimulite honeycomb material, an alternative to traditional foam cushioning designed to provide load distribution and weight reduction, with comfort coming from its elastomeric matrix. Supracor says perforations in the honeycomb cell walls circulate air to eliminate the heat build-up associated with foam cushioning while the 'footprint' of the cells and their flexing action stimulates blood flow to enhance circulation.

The material can be applied in profiles just 1-1.5in thick, yielding more living space for passengers. Another advantage is that it is made from thermoplastics, so it is 100% recyclable. Supracor says it meets all flammability requirements with standard dress cover materials.



Debuted this year at Aircraft Interiors Expo in Hamburg, Germany (April 2011), Stimulite will be featured in mattresses in the crew rest areas of the new Boeing 787 Dreamliner and 747-800.

COMPLETE CONTROL

Crane Aerospace & Electronics will demonstrate its new mcX Premium Modular Control System. The system features a patent-pending modular architecture designed to reduce overall system hardware and system wiring complexity, while ensuring that the system is easily scalable and customisable. The company says that mcX gives passengers smooth and simultaneous seat motion and less system noise. In

addition, mcX provides integration capabilities with a wide range of cabin systems, including Astronics' In-Seat Power and GGI Passenger Control.

Crane Aerospace & Electronics will also introduce the newest member of its family of Hydroloks – the Compact Hydrolok seat recline system. It says the product combines the compactness of a gas lock design with the reliability of a Hydrolok design.



MAGIC CARPET

InterfaceFLOR will display Sky-Tiles, a system of aviation carpet tiles that incorporated recycled raw materials. From working with companies like Boeing and Southwest Airlines, the company has fine-tuned Sky-Tiles to meet stringent FAA testing regulations and global standards required for use on commercial aircraft.

"Our Sky-Tiles product is a tool to help airlines achieve their goals of using more recycled materials and less fuel to reduce their carbon footprints," says Scott Landa, vice president of business development for InterfaceFLOR.

"Sky-Tiles are a perfect fit for the aviation industry," says Kippen Westphal, director of transportation products for InterfaceFLOR. "The tiles are easier to ship, store, install, maintain, replace and recycle."

The company says the tiles are light in weight, enable easier non-directional installation, are longer lasting than traditional aviation carpet and can be recycled. Moreover, it says the product needs no serging around the edges.

HOT STUFF

The Iacobucci HF Group will present the latest creation from its German subsidiary Modular Galley System (MGS) – a new microwave. The product boasts an empty weight of 14kg, and has an optimised internal volume with over 12 litres of cavity capacity.

The product has no rotating plate, to save energy and minimise maintenance costs. What it does have is a digit pad that can be customised to include programmes including popcorn heating, defrosting and baby bottle heating; it can also be programmed manually. MGS says the microwave meets all the requirements of ARINC's 810 and 812 standards, which means it will successfully communicate with future galley inserts as required for the new A350 platform.

The group will also display three- and four-layer models of MGS's MFU series, and its Cooking Station.



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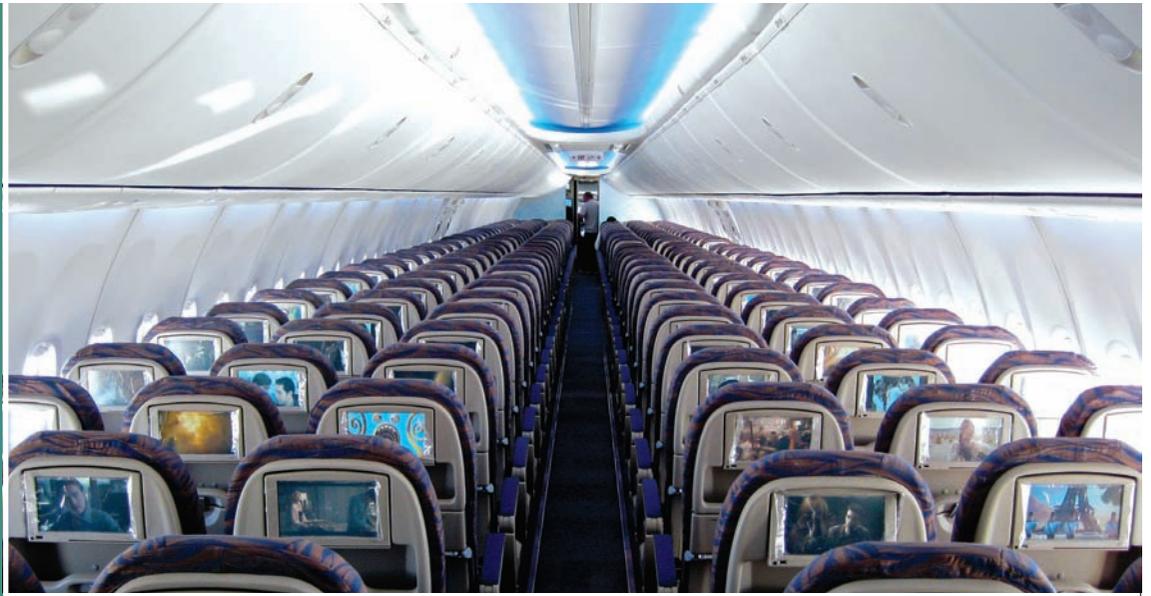
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BUCHER



Lumexis's FTTS is bringing cloud computing to the clouds

cloudcontrol

Lumexis and its Fiber-To-The-Screen (FTTS) in-seat IFEC captured a lot of attention in November 2010 with the installation and delivery of three 189-seat systems within only 23 days. flydubai was the launch customer, and required the rate to meet its committed delivery from Boeing of its Boeing Sky Interior (BSI) 737-800s. That blistering pace was only the beginning, however, as Lumexis is now completing each aircraft in less than three days of downtime. By the opening of APEX 2011 (12-15 September), flydubai will be operating 12 aircraft in daily revenue service.

As Lumexis' CEO Doug Cline points out, the system is completely aligned with the direction of terrestrial IT toward full cloud computing. "We have optimised our system architecture around the huge connectivity bandwidth of a fully fibre optic, onboard network," he says. "If you examine the history of terrestrial commercial and consumer computing, you will see a continuous pursuit of higher and higher data rate connectivity to access massively increasing and dispersed databases. Airline passengers want the same connectivity, but airlines are limited by the very high cost and limited bandwidth of satellite channels."

Overcoming this obstacle for long-haul, international routes has been a major driver for Lumexis. "On the ground we can cheaply access very large amounts of data in near real-time," says Cline. "We can't do the same on board, because even as satellite bandwidth increases over the next several years, the cost-per-bit will remain extremely high for the long term."

Cline points to FTTS's massive, redundant content storage (already 1.4 Terabytes and designed for essentially unlimited growth at low

cost) as demonstrating the trend towards more and more head-end server storage capacity. He says this minimises the airline's need to utilise high-cost, off-aircraft data communication.

"We can now economically pre-load huge, multi-terabyte libraries of data on board at the head end, which leads directly to increased ancillary revenue without having to go to terrestrial servers for such massive content," says Cline. "For example, if the passenger needs to book a hotel room in flight, we can tap the FTTS servers to instantly pull up full-colour, high-definition virtual tours of hotel facilities and sponsoring tourist attractions."

Only after the passenger has made their choice does the Lumexis system draw upon the aircraft's satellite connection to transmit a tiny packet of data to ground servers requesting the booking, payment and confirmation. "By easily hosting the airline's hotel, rental car and entertainment partners at its many destinations, we can drive up ancillary revenue; and by minimising transaction data exchange, we can drive down costs," Cline says proudly.

In addition to its advancing capabilities, the company has moved aggressively into wide-body installations. It has four Boeing 777-300 full-cabin FTTS installations planned for Transaero Airlines in October 2011. Lumexis will then begin installation of FTTS on four Boeing 747-400s for Transaero in the first quarter of 2012.

The 13th BSI 737 FTTS installation for flydubai is due to take place during the APEX show. If this tentative schedule holds, the airline, Lumexis and ATS (the system installer) are planning private appointments at the latter's facility, including a tour of the aircraft installation in progress.

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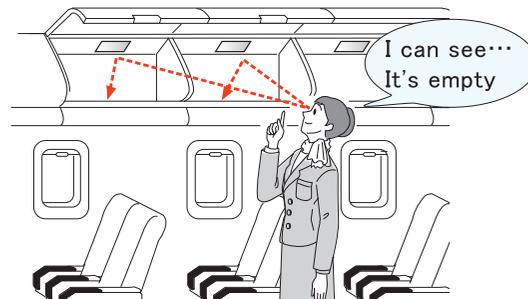
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Development continues apace on the aeras knit and Bio³SPHERE technologies

sitting comfortably

In the five years since the aeras team debuted the aeras knit material at the 2006 Aircraft Interiors Expo in Hamburg, Germany, it has continued to fine-tune the technology. The key challenge was to channel the concept's comfort features into quantifiable and feasible technology.

Both aeras knit and Bio³SPHERE are knitting processes. The aeras principle uses carefully engineered zones of varying elastic 2D knit to conform to the body, providing individual support where necessary. Bio³SPHERE is a 3D knit, which gives the material a padded look and feel. It combines some of the knit's adaptive properties with the more traditional look of conventional cushions. Both materials are designed to offer an optimal microclimate and large weight savings.

The aeras knit presented the biggest challenge to established perceptions of what comfort looks and feels like. As well as passing all airworthiness flammability tests, the concept has been evaluated in various comfort tests – a seat cushioning comparison with an OEM; frequent-flyer feedback from a European airline; and ergonomics testing with Darmstadt University of Technology. In total, 242 people of all walks of life, size, age and weight tested the aeras seat in a triple configuration at 31in pitch for up to four and a half hours. The concept's creators – Greiner Aerospace, ludekedesign and Kobleder Knittec – report that comfort was shown to increase over time. This is interesting for two reasons.

Firstly, to maximise the aeras knit's adjustable characteristics, the fixed-back seat has a more open angle than a traditional seat, creating an unusual aesthetic. In spite of this, comfort benefits prevailed over initial scepticism.

Secondly, the seat was actually perceived as more comfortable over time – going against what ergonomics evaluators might expect from a seat.

While aeras knit and Bio³SPHERE can be implemented separately, when used in combination the result is a seat benefiting from aeras knit's comfort properties and Bio³SPHERE's visual impression. This has apparently generated interest from airlines and seat manufacturers.

"With today's increased complexities, there is a general trend – not just in the aircraft industry – to simplify, to re-visit traditional techniques in a high-tech manner," says Christine Ludeke of ludekedesign. "The beauty of aeras knit and Bio³SPHERE is their simplicity – self-contained production, minimal secondary fabrication, inherent functional characteristics, extreme light weight (up to 2.5 times lighter than the traditional foam and seat cover), straightforward attachment options, and improved active seating comfort."

The first product based on aeras knit is the FIT, a lounge seat being produced by office seat manufacturer Interstuhl. An office chair based on the same principle is in development. In the aircraft sector, aeras' creators are working on three separate projects with airlines and seat manufacturers, ranging from fixed-shell short-distance to long-distance with integrated recline applications. "These projects also illustrate that aeras knit and Bio³SPHERE can be integrated onto standard economy seating, thus opening up new possibilities for existing geometries," says Manfred Girking of Greiner Aerospace. "We look forward to collaborating with like-minded companies, interested in advancing aircraft seat comfort while reducing weight."

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Aviointeriors is partnering with Lamborghini to bring carbon fibre technology to its seats

carbontrading

Italian aircraft seat producer Aviointeriors is adding to its production capabilities. The company already boasts extensive in-house operations, including metal machining, PUR production, upholstery and composite shops, and is now expanding into the field of carbon fibre reinforced components.

"It has been a conscious decision over the last two years to develop sufficient in-house knowledge on all processes involved with aircraft seat production," says Marc Uleman, CEO of Aviointeriors. "In this way we have much better control over our supply chain, which is an advantage in projects with short lead times. Add in the fact that we have our own 16g and fire-testing facilities, and it is clear that we are well placed to satisfy airlines' need for lead time reduction and reliable delivery, big plusses in current market conditions."

The investment in carbon fibre technology is being made in direct response to airlines' calls for weight reduction. "After a careful evaluation of all players with expertise in carbon fibre composite technology, we have opted for a technical collaboration with Lamborghini," reveals Uleman. "With its newly developed Aventador, a 700hp extreme sports car, it uses the technology to its full extent. This is why we feel that Lamborghini is the right partner – in terms of product development, design capabilities and the industrialisation of the product. With its Aventador product range

Lamborghini has used various forms of carbon fibre composite technology, optimising cost and weight, while guaranteeing the repeatability of industrial processes. This industrial experience was especially important to us in making our decision, as we need to be confident that our manufacturing processes are fully controllable and repeatable."

Tanya Saracino, vice president of sales and marketing at Aviointeriors, is delighted with the new developments. "It is exciting to see the positive response of leading airlines to our new product offerings," she says. "We are currently discussing various large projects – both with major airlines and OEMs – for our Ultralight seat ranges."

In the long-range economy-class segment, Aviointeriors' Centaurus New Generation, already installed in more than 50 Boeing 777s, is now being installed in a twin-aisle configuration on Iberia's A340 fleet. It has also been certified by EASA for installation on the A380, opening further possibilities for growth.

With references that vary from the recent acquisition of Boeing 777 economy-, business- and first-class contracts from SIAECO/JAMCO, and a follow up order for four Boeing 747s (three classes), Aviointeriors says it is well placed to satisfy even the most specific demands. Add in its new Ultralight range and it is clear that the company is looking forward to celebrating its 40th birthday next year in style.

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Acumen and Boltaron often collaborate on aircraft-grade thermoplastic sheet

teamsheet

Acumen is a UK-based design consultancy with an impressive background in cabin design, having partnered with more than 20 airlines and seating manufacturers. When designing premium seating, Acumen typically turns to high-performance thermoplastic sheet for components such as side furniture panelling, back-shelves and privacy screens in first class, trays (in economy), literature pockets and IFE screens.

Its search for a durable, aircraft-compliant, gloss-black finish for an aircraft seat was what initially led Acumen to USA-based Boltaron. Over the last three years, Acumen has developed several cabin interior concepts for which Boltaron's aircraft-rated thermoplastic sheet is recommended.

"The reason I work with Boltaron is that they are open to new ideas and innovations in decorative finishes," says Catherine Barber of Acumen. "They understand the technical challenges, but are not closed-minded to experimenting with new treatments and materials and providing customised solutions."

Boltaron offers a wide choice of colours, levels of gloss, patterns and textures including metallics and woodgrains. For another seating programme, Acumen wanted a pearlescent thermoplastic. "Boltaron sourced the special materials needed to produce exact colour matches to paint finishes," says Barber.

Acumen and Boltaron are also developing new types of thermoplastic sheet for an A380 programme. "For the first time, we can develop aircraft-compatible products that look like contemporary finishes currently used in high-end restaurants and hotel interiors," says Barber.

She adds that Boltaron offers a broad standard range of textured sheet suitable for vacuum forming, allowing her "to add a subtle design element to what otherwise would typically be large expanses of plain plastic".

Textures can add an extra dimension. "Plastic sheet need not mimic natural materials, but textures can be used to add interest," says Barber. "While such finishes have long been used in automotive interiors, they have been relatively slow to reach aviation suppliers."

Boltaron's thermoplastic sheet manufacturing capabilities include extrusion, calendaring and press laminating. Each of these processes produces sheets with distinct qualities.

The two companies have also been exploring possibilities for Boltaron's new 9915FSTH aircraft-grade decorative sheet, a proprietary composite of Boltaron's thermoplastic sheet and Lexan XHR6000 from Sabic Innovative Plastics. The material is offered in numerous colours, textures and effects such as woodgrain, pearlescent and carbon fibre-look surfaces. Currently, this composite is specified for relatively small- to medium-sized parts, but Barber foresees demand for larger components such as bulkheads, as well as for other transport applications. Barber says this new sheet meets the increasingly stringent aviation regulation standards (ABD0031, BSS7239 and D65137) for flammability, smoke toxicity and heat release.

Acumen and Boltaron have also been collaborating to develop transparent and frosted translucent designs with Boltaron's 9816 sheet, for use in aircraft applications such as first-class transparent/refractive privacy screens.

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Environmentally friendly leather and trend forecasting were hits at April's Aircraft Interiors Expo in Hamburg for Andrew Muirhead & Son

showbusiness

'Low Carbon Leather' from Andrew Muirhead & Son proved to be the star of the show on the company's stand at this year's Aircraft Interiors Expo (held in Hamburg, Germany, in April 2011). The brand has been developed by parent company Scottish Leather Group to address concerns about carbon issues.

Launched in 2010 around the opening of the group's £6 million thermal energy plant (TEP), the marque reflects commitment to sustainability and the group's zero waste strategy. The opening of the TEP represents the completion of phase one of the scheme, and planning on phase two (converting oil to electricity) has already started.

"Increased aviation tax means that our airline customers are looking to demonstrate that they are trying to address the carbon issue in other ways and we are dedicated to helping them achieve this objective," says Archie Browning, sales director at the company. "We supplied leather for both Singapore Airlines' and Emirates' A380, and the trend in mega-aircraft is set to continue."

The company is currently supplying leather in three colours to Malaysia Airlines for headrests throughout its A380, in addition to an ongoing Boeing fleet refurbishment programme for all leather seating. Andrew Muirhead & Son is also supplying leather to Air China and China Eastern for first-class cabins.

"We are in discussion with designers on lots of exciting new projects resulting from our presence in Hamburg, and hope to be in a position to make announcements soon," says Browning. "Our track record in innovation has made us leaders in the field of upholstery leathers in the aviation industry. Low Carbon Leather is the next step in high-performance yet environmentally friendly interior upholstery. Although people are complaining of

tough market conditions, and we are not denying that this is the case, the quality and standard of our product range, green credentials and many accreditations ensure that we are still the supplier of choice for the world's leading airlines."

The company also reports major interest has arisen from its Trends presentation at the show, based on colour forecasting. Normally associated with the fashion industry, the idea behind forecasting is to help customers anticipate trends in colour, mood and style which can be reflected in aircraft interiors. "The three main trends for this year are naturals, pastels and skin tone shades and bright post-it note colours," says Susan Ross, who works with the company on its forecasting. "We present the trends information as a guide for customers, allowing them to anticipate the latest fashion innovations. Taupe, smoke and pearl shades are proving popular, and we anticipate an interest in finishes such as embossing and metallics in the future."

Andrew Muirhead & Son also offers a bespoke service to customers, creating leather to each specific requirement in addition to its Library of Leather colour swatch service.

In other news, the company is looking to expand its business in the Americas with the appointment of a new vice president of sales, Peter Jones. Jones has extensive experience in handling large airline accounts and has been based in Seattle, Washington, USA, since 2005.

"The appointment of Peter Jones gives us further exposure to the US market and Peter is well placed to help us expand our customer base," says Browning. "Although the market is tough we are confident that the quality of our products and continuing commitment to customer service and innovation will keep us ahead of the competition."

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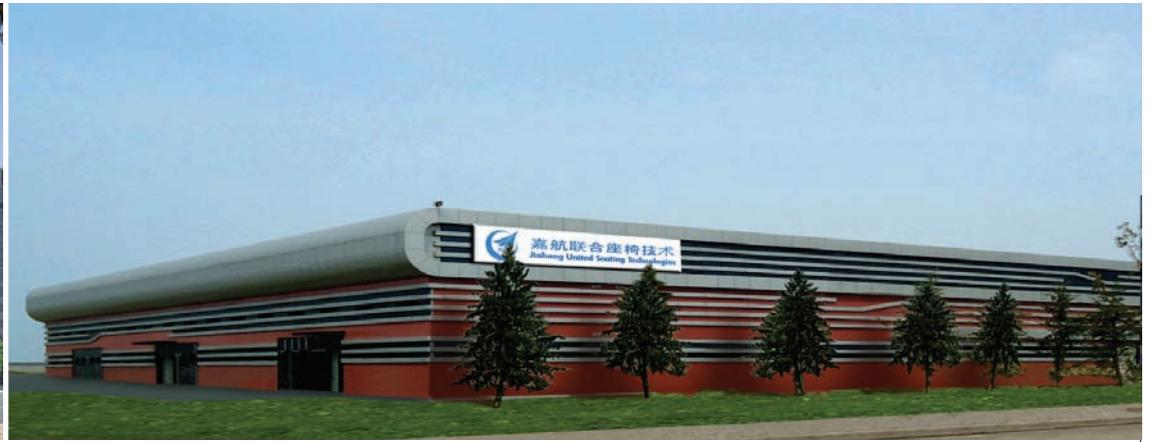
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JUST is opening modern facilities in China, Italy and the UAE

justforstarters

Unveiled to the world market in the June 2011 issue of *Aircraft Interiors International* (p115), Jiahang United Seating Technologies (JUST) is a joint venture company set up by Aerospace Life-Support Industries (a wholly owned subsidiary of Aviation Industry Corporation of China (AVIC)) and United Seating Technologies of Switzerland. On 21 June 2011, JUST held a press conference at the Paris Air Show to provide details about the new company, its forthcoming new product line, and its planned timeline for the product launches.

Once EASA has issued the appropriate design and production certification and the European Technical Standard Order (ETSO) certification, JUST, in collaboration with Italian subsidiary United Seating Technologies Engineering, plans to deliver seats using the latest lightweight engineering technology.

JUST's state-of-the-art headquarters are located in Xiangyang, China, which is also home to Aerospace Life-Support Industries. Xiangyang is the second largest city in the Hubei province and combines the beautiful historic cities of Xiangcheng and Fancheng, which stand on the southern and northern sides of the Han river respectively. It is the only large city in the adjoining region of Hubei, Henan, Sichuan and Shaanxi, and is honoured nationally as a Garden City. It is a cultural and historic city that dates back over 2,800 years, yet it is very well preserved.

The commercial and technical divisions are headquartered in Latina, Italy. The company also has regional sales offices located in Dubai, UAE, to cover the Middle East and North Africa; in Hong Kong, China, for the Asia-Pacific region; in Washington DC, USA, for the Americas; and in Beijing, China, for the Chinese domestic market.

JUST's products are styled by the century-old Italian transport industry design house Bertone, and engineered by Optimares to the highest technological level for certification to international standards. With its solid financial, technological and commercial structure, JUST is aiming to capture a 15-20% share of the world's commercial airline seating market.

The company plans to deliver a full range of high-tech, lightweight seats that make extensive use of advanced carbon-fibre technology, and plans to ultimately produce 110,000 passenger seats per year. The initial product line will include nine seat types covering all cabin classes, based on five seat platform structures.

The X-Light FB and X-Light R will be short-to medium-range economy-class seats weighing 6kg per passenger place for the FB version and 9kg for the medium-range R version with IFE provision. The X-Light BCSR will be a short-range business-class seat; and JUST also plans seats for medium- to long-range economy, premium economy and business class, plus two first-class seats.

More seat types are set to be unveiled at major seating and interiors events over the next year. At Aircraft Interiors Expo Americas in Seattle, Washington, USA (12-14 September 2011), JUST will reveal a long-range economy seat and a long-range premium-economy seat. At the Dubai Airshow, UAE (13-17 November 2011), visitors will be introduced to a long-range lie-flat business-class seat and a long-range fully flat business-class seat. At Aircraft Interiors Expo in Hamburg, Germany (27-29 March 2012), JUST will conclude the third phase of its product launch with an extended-range new-generation economy-class seat and an extra-long-range first-class seat.

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Modular Galley System (MGS), a wholly owned subsidiary of the Iacobucci HF Group, has created a new microwave for commercial aircraft, the MWO (P/N 00294). This compact product was conceived to complement MGS's successful induction oven series, Multifunctional Units (MFU) and its Cooking Station, which have enabled new ways of cooking food on both commercial and business-aviation aircraft.

The Iacobucci HF Group will present MGS's new creation at Aircraft Interiors Expo Americas 2011 (to be held in Seattle, Washington, USA, on 12-14 September). The product weighs 14kg when empty, and is designed to rapidly reheat any kind of food. The microwave has an optimised internal volume with over 12 litres of capacity.

To save energy and reduce maintenance costs, the new microwave has no rotating plate. It has a programmable digit pad with software to enable customisation of the programmes according to each airline's needs. Programmes include popcorn heating, defrosting and baby bottle heating. The microwave can also be programmed manually to adjust power level and time. The microwave is designed to be extremely reliable and very simple to use.

MGS says that the MWO product meets all the requirements of ARINC's 810 and 812 standards, meaning that it will also communicate with future galley inserts as required for the new A350 aircraft platform.

Alongside the new microwave, the group will use the show to display three- and four-layer models of MGS's MFU series, as well as the Cooking Station. With the support of the Iacobucci HF group, MGS is also developing a new ARINC

size 4 version of the MFU. This unit will provide the same features as its predecessors, but in a compact version with two heating layers, meeting ARINC's 810 and 812 standards.

The MFU has been honoured with three Mercury Awards. It uses induction technology for steam cooking, to speed up the cooking process and conserve vitamins, colours and moisture. A variety of inserts are available to enable functions such as broiling fish and meat, frying eggs, toasting bread, steaming vegetables and cooking pasta and rice. The MFU also boasts a smart programming system with automatic processing, and special attention has been paid to materials to ensure simple, convenient and safe handling for the operator.

The Iacobucci HF Group, headquartered in Ferentino, Italy, is a worldwide leader in manufacturing galley inserts, with over 30 years of experience, a strong focus on research and development and a customer-oriented approach. Subsidiaries include Iacobucci HF Electronics; Iacobucci Aircraft Trolley System (ATS); Iacobucci MK (based in Lecce, Italy); and MGS (based in Germany). The group is supported by 17 international certified repair stations.

The group's products include espresso and coffeemakers, water heaters, trash compactors, ovens, trolleys and seats for commercial and business aviation. The group recently created two new business units, one dedicated to the production of VIP seats for business jets and the other to create innovative solutions for non-aeronautical markets. The group boasts experienced Catia industrial designers, highly skilled engineers and qualified craftspeople.

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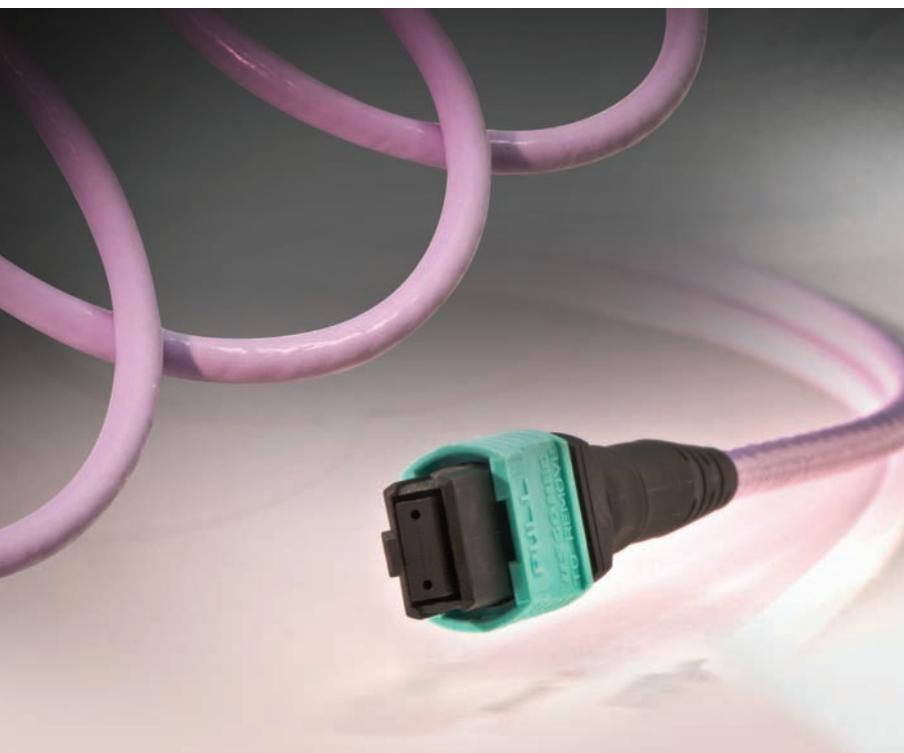
Desso Aviation celebrates its 20th anniversary in aviation carpets this year. Its achievements, as a partner to a multitude of aircraft builders and airlines, are numerous. In May 2011 for instance, Desso was certified to the AS 9100 Revision C by Lloyd's Register Nederland. The company is believed to be the only carpet manufacturer in the aviation industry to have achieved the certification at this time.

Looking forwards, adopting the Cradle to Cradle closed-loop theory should bring more innovation in the future. Cradle to Cradle manufacturers create only products that can either be entirely and endlessly recycled to provide the raw materials for new identical products, or that are 100% biodegradable.

For Desso, going green goes hand-in-hand with producing quality products; carpet with pure and safe components that are designed to be re-used without any loss of quality. And it believes it is not only the products that should be harmless, but the production process as well.

The company is progressing toward implementing a 100% Cradle to Cradle strategy by 2020. It has started a Take Back programme to process used aviation carpets, has eliminated bromide flame retardants from nylon carpet and is using renewable energy rather than using less traditional energy.

"It's all about doing the right thing, rather than doing less bad," says Stef Kranendijk, CEO of Desso. "With Cradle to Cradle, Desso is in it for the long haul. It is a challenging task which will involve the creation of entirely new products and technologies. But it is a task we are proud to undertake, for the betterment of our products, our brand, the people and our planet."



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fibreprovider

Interconnecting data-hungry systems and building in scalability is a constant challenge. Carlisle Interconnect Technologies (CarlisleIT)'s response is its patent-pending LITEflight HD fibre optic assemblies. "Our assemblies support a wide range of avionics applications while combating the hostile aircraft environment and the ever-increasing need to save weight," says Corrie Hartline, marketing communications manager at CarlisleIT. "With its round and mechanically robust structure, LITEflight HD overcomes the poor flexibility and high losses of flat ribbon cables."

LITEflight HD fibreoptic assemblies are designed to last. "They achieve this by providing improved bending performance, flexible routing, clamping and bundling options as well as excellent abrasion, cut and impact resistance," says Hartline. "Delivering a 50% reduction in bundle size and weight reduction compared with current optical cables, LITEflight HD provides big advantages in weight, size, bandwidth and routing, along with non-flammable properties, low smoke, low toxicity and superior resistance to caustic fluids."

LITEflight HD is compatible with multifibre interface connectors and contacts including the standard multifibre push on connectors and rugged multifibre connector types. It is available with all standard fibre types, including OM1-, OM2-, OM3- and OM4-grade fibre, bend-insensitive fibres, polarisation-maintaining fibre and high-performance coated fibres with temperature ratings from -65 to +125, +150 and +260.



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Making its US debut at the 2011 Aircraft Interiors Expo Americas (to be held in Seattle, Washington, USA, on 12 - 14 September), the latest innovation in IFE deployment from Bucher Aerospace will be on display. Based on a collaborative development with Thales, the new arm boasts a number of unique features.

Perhaps the first thing to strike visitors will be how the deployment arm blends aesthetically with the 12.1in Thales SVDU Gen IV display that it accommodates within a production economy-class seat. The arm and screen were co-developed with this specific aim, for a highly homogenous look and dramatic departure from 'bolted-on' designs.

Beyond those clean lines, a user will soon also notice the unique articulation of the arm's mechanism. The initial incarnation of the system had to accommodate 12.1in display in a front-row economy seat. Bucher says that typically, a 10.4in screen is the largest size that can be deployed in a front-row seat, because of the under-seat space available and the swing radius of the arm; plus the space forward of the seat can also be an inhibitor to screen size. However, the new arm meets this challenge by

incorporating a set of connected joints that controls the swing of the SVDU to avoid the seat geometry, the floor and also restrictions within close proximity of the front of the seat.

Bucher has also endeavoured to simplify cable replacement. It says the design provides the ability to replace the industry's largest IFE cables in their fully built, fully terminated state, saving time and money.

Looking forwards, the modular design of the arm coupled with Bucher's experience in tailoring its products to multiple platforms, presents many other possibilities. The company says the incorporation of other IFE systems or even a standard-row economy seating application could be just around the corner.



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creativevision

The process of transforming CAD geometry into breathtaking 3D visuals is not as straightforward as you may think – going far beyond simply pressing a button. “Certainly, over recent years technology has made things easier, but clients’ expectations have accelerated, surpassing this advantage,” says Dano Battista, director of 3D visualisation specialist db3d. “Photo-realism is the minimum requirement, with Hollywood movie effects and editing a close second.”

Long before the render button is pressed, a strenuous workflow has to be established to transfer engineering data into a format that can be understood by the rendering engine. “Care is taken not to compromise the integrity of the data, as this is key to generating clean, crisp images,” says Battista. Only once the data is assembled on the LOPA does the cabin begin to emerge. “This is the most exciting stage, seeing the first glimpses of the cabin as colour and trim are applied and the overall scheme reveals itself,” says Battista.

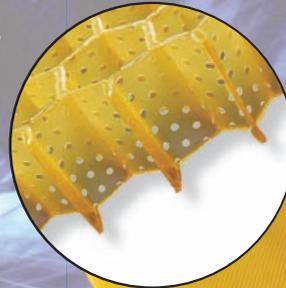
Creating beautiful still images is one thing but attaining the same quality in an animation is another. “Processing times can take weeks so the power consumption or carbon footprint of each project must be considered,” says Battista.

For the future, Battista hopes that the advent of cloud computing and more energy-efficient GPU processing will help bridge the gap between expectation and feasibility against an ever-depleting timeframe. Will instant rendering take the fun out of visualisation? “Certainly not, but it will enhance the creativity of the visualiser and give designers what they really want - beautiful images in less time,” he says.

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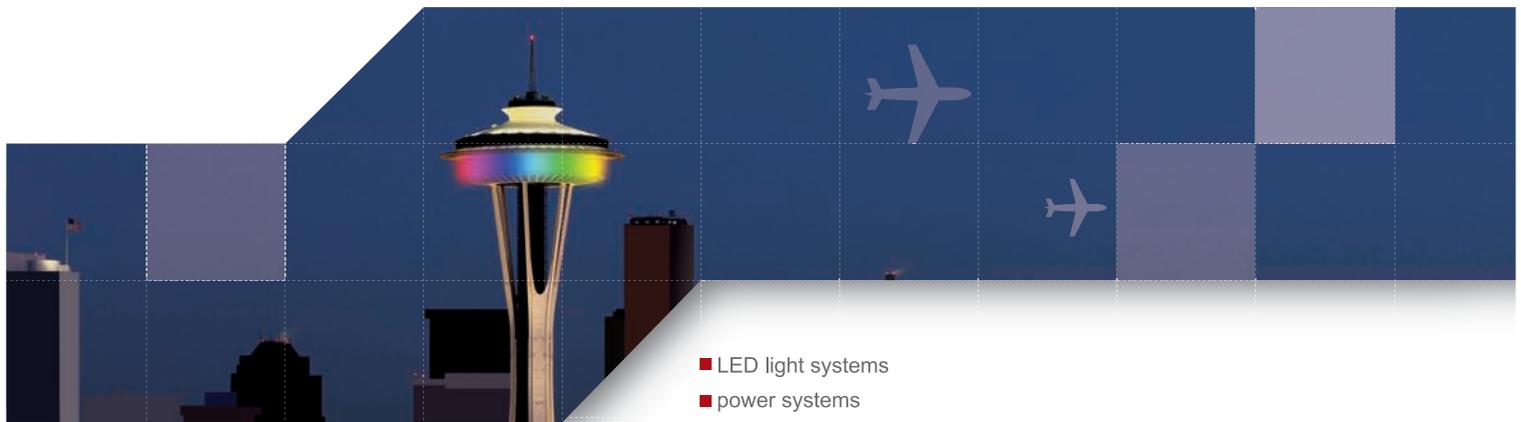
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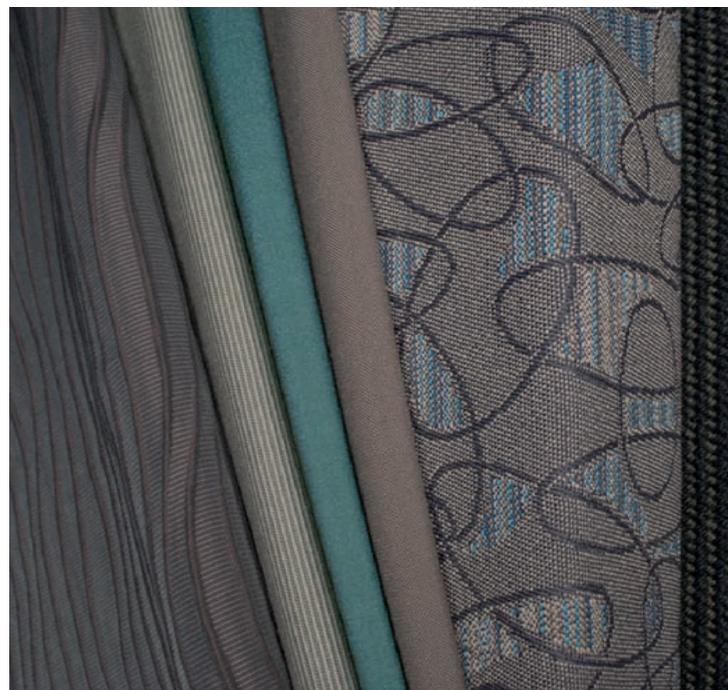
sweet harmony

The latest collection from Tisca Tiara Mobility Textiles is called Alto Basso Avio. It consists of carefully harmonised carpets, seat cover and curtain fabrics, providing a single source of ready-to-implement soft furnishing design concepts for the entire cabin. The new collection reflects the latest trends in terms of designs, textures and colour combinations, and has won an enthusiastic reception from the design community. "Alto Basso Avio allows airlines to fulfil the increased demand to differentiate themselves from the competition through better design," says Matthias Tischhauser, managing director of the company's Mobility Textiles division.

At the same time, Tisca Tiara's main objective with the new collection was to provide 'smarter' and premium carpets, seat cover fabrics and curtains that will result in lower lifecycle costs for airlines. "Using Tisca Tiara's pioneering textiles, airlines can successfully reduce operating costs by minimising replacement and refurbishment costs, reducing maintenance costs, minimising offcuts and waste during installation, lowering kerosene consumption and reducing aircraft-on-the-ground times," says Tischhauser. "Moreover, our products will further support our customers' efforts to become greener, more environmentally friendly airlines."

Founded in 1940, Tisca Tiara designs, develops and manufactures all sorts of premium textiles for the complete cabin interior under one roof – including carpets, fabrics, steam-pleated curtains and other ready-to-install products. Customised products and services are offered for the commercial airline and the business jet market.

"By operating many different fabric and carpet production technologies under one roof, we are a true all-inclusive manufacturer and thus able to satisfy any textile need of the aviation industry, without having to subcontract or source from other companies," says Tischhauser.



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chasecraig

Want to know more about key industry individuals, but haven't got the time to search for their Facebook profile or LinkedIn page? This issue's 'FaceSpacer' is Chase Craig, brand and product marketing manager at Alaska Airlines. Based in Seattle, host to this year's Aircraft Interiors Expo USA and APEX shows, Chase offers his insights on where to head this September.



01 HOW AND WHEN DID YOU FIRST START WORKING FOR ALASKA AIRLINES? I started with Alaska Airlines as a concierge in our LAX airport lounge. It was a great entry into the airline world in that I worked with our top customers on a daily basis. This really gave me a sense of the importance of customer service at Alaska. From there I entered our management development programme as a business analyst in marketing. Ironically, portable IFE was basically dumped on my lap as my first project to manage (now, many moons later, I still manage portable IFE). I grew in that analyst role and progressively took on more responsibility with our brand team for connectivity, interiors, IFE and customer experience.

02 WHAT'S DIFFERENT ABOUT THE AIRLINE? Our employees – for four straight years we've been ranked the highest in customer satisfaction among traditional network carriers in J. D. Power and Associates' North America Airline Satisfaction Studies. Within the cabin, we offer all-leather seats with a two-toned cover design meant to evoke the crisp glacial colours you might see in Alaska. Next year we take delivery of our first 737 with the Boeing Sky Interior, which will help us make the next step forward in terms of cabin comfort and spaciousness. Our signature interior piece is our bulkhead tapestry, located in front of first class and the first row of the main cabin. The pattern represents a compilation of different shapes from cultures up and down the US West Coast and into Alaska. It's an amalgamation of cultures and to this day is representative of us as an airline –genuine, unique and deeply rooted.

03 WHY DON'T YOU OFFER SEAT-BACK IFE? Our route network is changing as we spread our wings to Hawaii, but we remain an airline with roughly 75% of our flights operating under 3.5 hours long. Customers indicate schedule frequency, frequent flier programme and price as the most important considerations on flights of that length. Toss in the weight, fuel and operational penalties of flying seatback systems and it doesn't make for a very compelling business case. Make no mistake, there's no arguing the cool factor and the sheer penetration you can get with a seatback system, but with our network and sensitivity to cost, it just doesn't make sense for us. Conversely, portable IFE, namely the digEplayer, has suited us well for many years because it allows us to make IFE available where customers say they want it the most – on those flights we operate over 3.5 hours long. The tides may be changing though, and the seat-

centric systems have the potential to make the business case for IFE at every seat a lot more attractive.

04 WHAT FEEDBACK DO YOU GET FROM PASSENGERS REGARDING YOUR ONBOARD WIFI? Customers who use the inflight WiFi love it. We have it on nearly all of our aircraft and it is clearly an expectation that when you board an Alaska 737, you'll be able to get online. Our partner Gogo is continually looking for ways to improve the experience. Customers tell us they love being able to get in touch with friends or family, they love getting work done and being able to keep abreast of news and sports. They also love it when it's free! Overall, we're pleased with it.

05 WHAT HAS HAD THE GREATEST IMPACT ON THE CABIN IN RECENT YEARS? New technologies and a focus on ancillary revenue. The new technologies of the last decade – complex seatback systems, portables, connectivity and now a plethora of smart electronic devices brought on board – all make for a lot of opportunity and a lot of mostly positive customer-facing changes. Meanwhile the focus on ancillary revenue means airlines are spending more and more energy on providing items of value on board. Seems a long time ago but Alaska first tested fresh buy-on-board meals in 2005. Since then we have built our Northern Bites programme with care and with the customer in mind – healthy, fresh food at a reasonable price. The industry has seen many examples just like this of an airline being innovative to meet customer demands in challenging economic times.

06 WHAT ARE THE ADVANTAGES OF BEING BASED IN SEATTLE? The rain keeps our cars clean, that's for sure! We do realize Seattle is one of the world's hotbeds of aviation support. We are a very proud Boeing customer and do enjoy access to some of their research and support centres. Take the Boeing Sky Interior as an example – we spent countless hours in different Boeing labs reviewing and testing different design elements. Also, the number of key suppliers in Seattle means we can keep our eyes on different markets, learn about new products or services and conduct concept testing and validation with a highly qualified audience. The Seattle area boasts a lot of creativity and entrepreneurial spirit and we are proud to be the hometown carrier.

07 ANY ADVICE FOR THOSE VISITING THE CITY FOR THIS YEAR'S APEX AND INTERIORS SHOWS? September should see nice weather, so I recommend some outdoor activities. The Woodland Park Zoo is fun. Of course the waterfront in downtown Seattle is great for people-watching, dining and just being on the water. For a more typical and eclectic Seattle experience, the areas of Capitol Hill, Wallingford, Fremont and the University District offer plenty of options. Night-time eating is diverse and tasty in the Belltown area of downtown Seattle. And Alki Beach is a quick drive across Elliot Bay, for the more 'sand-in-your-toes' lot.

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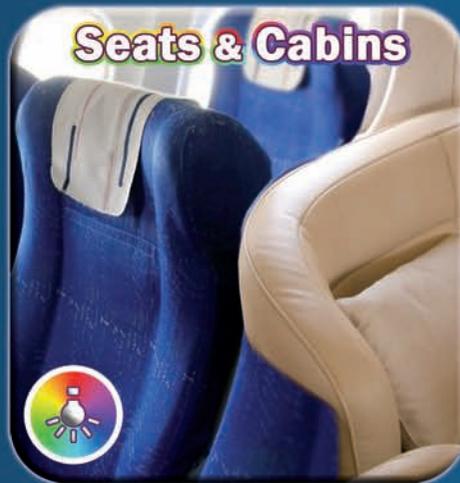


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