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JUNE 2012

THE INTERNATIONAL REVIEW OF AIRCRAFT INTERIOR DESIGN AND COMPLETION



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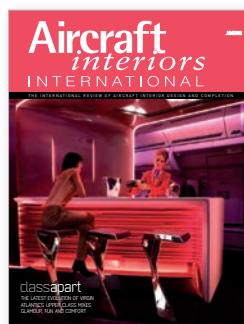
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“ AT EITHER END OF THE AIRCRAFT EVERYONE IS
TAKING PART IN SOMETHING REMARKABLE: FLIGHT ”



highsociety

“Turn left, sir” must be the sweetest words in air travel. The precursor to a few hours of opulence with the stresses of the world looking insignificant far below, they mean a luxury seat, attentive service, endless food, an extensive drinks menu and the latest blockbusters in widescreen – bliss.

However, turn right and you can be in for a quite different journey. Wedged shoulder-to-shoulder and knee-to-spine with your fellow inmates, there is only the occasional trolley service and small-screen movie to keep you from thinking how much longer it will be until you reach the comfort of terra firma again.

Two very different experiences – and indeed two very different price points – but regardless of which end of the aircraft you’re sitting in, everyone is taking part in something remarkable: flight. As Luke Pearson of design studio PearsonLloyd says, “We grew up with aircraft travel being very special and expensive and an investment you made. Aircraft are phenomenal things – tens of tonnes hurled into the air by huge engines – yet people just get on and read a newspaper or fall asleep. It’s extraordinary and there should be more excitement.”

Perhaps there will be more excitement following the launch of Lufthansa’s all-new Business Class, which Pearson played a role in creating. Its shape may look similar to other V-shaped business-class offerings, but beneath its lower-backed, more sociable shell design lies an all-new anatomy that manages to maximise comfort and LOPA. The airline considered off-the-shelf seats but the scale of the investment and passion for the project required nothing less than tailor-made.

A little tailoring has also been taking place at Virgin Atlantic. Now every passenger can have a glimpse of Upper Class when they step on board and are greeted by a dramatic bar. Those turning left will experience a new seat design that, like Lufthansa’s, offers more comfort to more passengers without losing the feeling of exclusivity.

However, let’s not forget those people turning right – I am usually one of them, after all. Every inch counts and it’s remarkable how seats are being shaved to squeeze in an extra row while ensuring journeys remain bearable. You’ll see the latest designs in our seating review, and it’s good to see solutions that might put an end to the dreaded ‘recline wars’. Economy class will never be the lap of luxury, and indeed the cabins are becoming denser with every new design, but passengers should take comfort from the fact that they are doing something so amazing for so little money.

Incidentally, I don’t believe we’ve met. I’ll be taking you on the next leg of the *Aircraft Interiors International* journey, which I promise will offer great entertainment, first class service, a glamorous crew, hopefully not too much turbulence, and great rewards for frequent readers.

Adam Gavine, editor

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Luke Pearson has designed everything from cosmetics containers to Virgin's first Upper Class suite, and now Lufthansa's Business Class. This romantic visionary is looking to bring glamour back to air travel

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virgin upper class 042

Following 10 years of service, Virgin Atlantic has launched its latest generation Upper Class. The ethos was evolution not revolution, but there are a few surprises

ADAM GAVINE,
AIRCRAFT INTERIORS INTERNATIONAL





features



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This is not just any new business class, it's an all-new, clean-sheet reinterpretation of Lufthansa's business cabin

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Twin-aisle designs dominate the design headlines, but there are exciting opportunities on the horizon for short-haul aircraft, too

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Airline alliances moving towards joint procurement is great for the bottom line, but it may not be so good for passengers and branding

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066 triple celebration

The number of the best? The recent delivery of the 1,000th Boeing 777 makes it the bestselling twin-aisle, long-range aircraft. The cabin plays a large part in its success

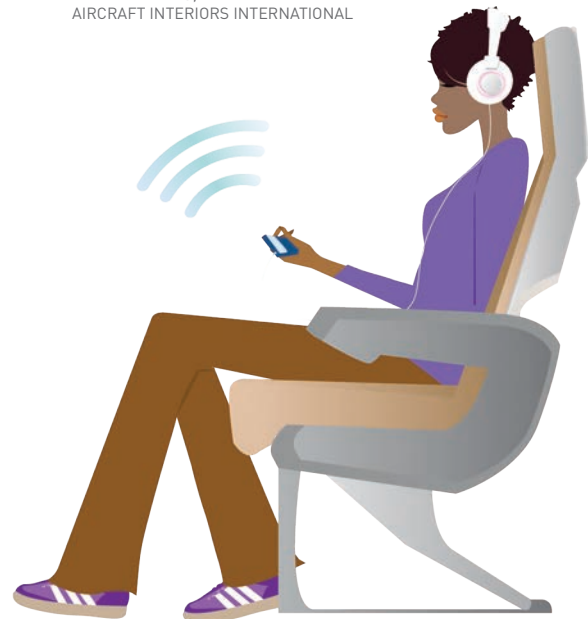
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IFE is currently straddling airline-supplied systems and PEDs. A clever approach to IFE, including streaming technology, can keep everyone entertained

ADAM WILLIAMS,
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088 seating review

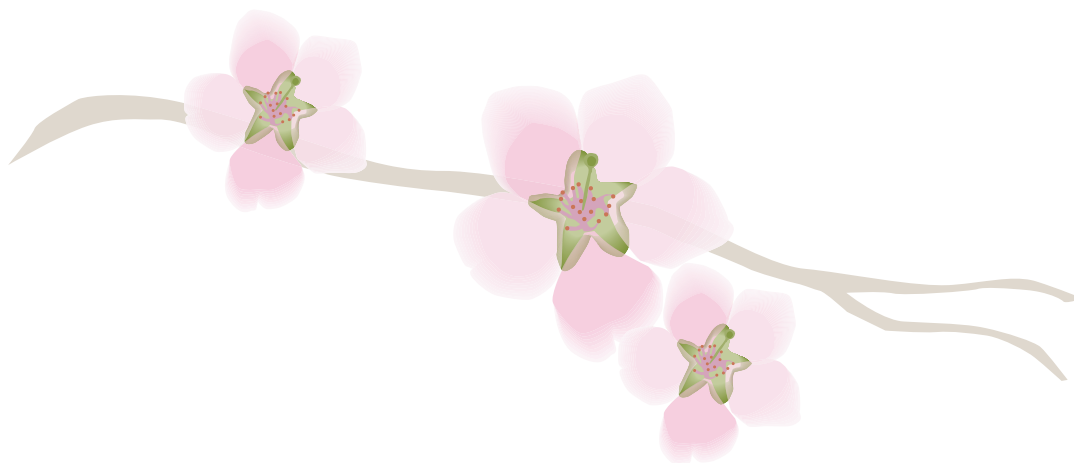
2012 is shaping up to be a great year in seating, with many recent product launches. They may all be different, but they are all driven by weight reduction

ADAM GAVINE,
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crystal cabin awards 104

58 applicants, 12 runners-up and six winners. The Crystal Cabin Awards 2012 have been announced

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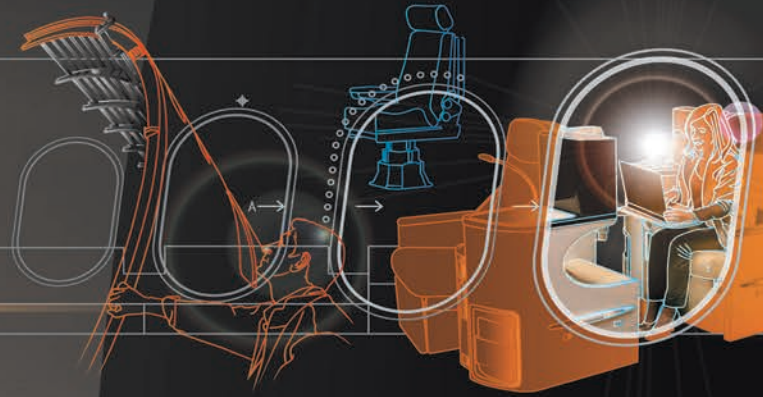
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American upgrades entire wide-body fleet

American Airlines is redesigning and refreshing its wide-body fleet as part of an investment of several hundred million dollars per year in enhancements.

American's entire fleet of 777-200ERs will be redesigned to a two-class cabin configuration featuring unique mood lighting, plus a dramatic archway and ceiling treatment, to create a feeling of spaciousness similar to the 777-300ERs, the first of which American will receive later this year as part of a 10-strong order. The 777-200ERs will feature up to 45 fully

lie-flat Business Class seats, offering up to twice the living space of American's current 777-200ER business class seat.

New seats in the main cabin will improve knee room and customer comfort. There will be up to 45 Main Cabin Extra seats and 170 Main Cabin seats. The Main Cabin Extra seats, located in the forward portion of the main cabin, will offer 4-6in more legroom than the standard Main Cabin seat. American also intends to retrofit up to half of its existing 767-300ER aircraft and retire the others over time.

El Al launches premium economy

Israeli airline El Al has launched Economy Class Plus, which offers passengers more legroom, a wider seat cushion, more seat recline and preferred seating in the economy cabin, together with amenities such as a footrest and a curtain for privacy. Installation of laptop and mobile phone electrical outlets at every seat will be completed by year end.

Economy Class Plus seating will be installed on all of El Al's 747-400 aircraft flying between New York and Israel, with the 777 fleet to follow.

"In an effort to cater to our best customers and accommodate all our passengers, we are thrilled to offer this affordable new product that provides more seating options," said Danny Saadon, El Al's VP for North and Central America.

Virgin Australia refreshes 777s

Virgin Australia has begun a design and interior refresh of its international Boeing 777 fleet, which brings it in line with its refreshed domestic network.

The cabins will undergo a complete redesign of seat fabrics, carpets and curtain dividers. Seats across Business, Premium Economy and Economy have been updated for extra comfort with extra padding, new fabrics from Rohi, and new headrests.

Led by Virgin Australia's creative director, Hans Hulsbosch, the designs are inspired by the ceiling and flooring 'leaf' designs in the Virgin Australia lounges, and have been created exclusively for the 777 fleet. The design and colour palette is intended to create a strong brand connection throughout Virgin Australia.

Thales and Qatar Airways open technical laboratory

IFEC specialist Thales and Qatar Airways have joined forces to open a new technology research, development and training centre at the Qatar Science & Technology Park (QSTP) in Doha.

The laboratory, named Thales QSTP-LLC, is part of Thales' commitment to develop a strong local presence in Qatar and houses state-of-the-art IFEC equipment that supports software and application prototyping, content integration, system level testing and training.

Over the past several years, Qatar Airways selected the Thales TopSeries System for its fleet of Airbus aircraft and will also install the system on its B787, including SwiftBroadband cabin connectivity for access to current news, sports, social networks and other mobile applications.

Qatar Airways CEO Akbar Al Baker stated, "The new centre will ensure the development and implementation needs of Qatar Airways will be met quicker, with improved timelines for content updates on our aircraft. IFE today plays a crucial role in a passenger's decision-making process when choosing which airline to fly with."

The Touch Passenger Media Unit (TouchPMU), a handheld media device, was the first innovation conceived and developed by Thales and Qatar Airways, and will take flight later this year.



Air Transat celebrates a quarter-century with new cabins

As part of its 25-year celebrations, Canadian airline Air Transat has unveiled the first of its Airbus A330s to feature a new, fully redesigned cabin interior.

Club and economy passengers will enjoy improved comfort through roomier, ergonomically designed leather seats with touchscreen-operated IFE systems. The aircraft will seat 333 in Economy and 12 in Club class (the first use of Zim Flugsitz BC-01 seats – see page 101), for a total of 345. The lavatories have also been entirely redesigned, as has the overall cabin, to better fulfil travellers' needs.

A new mood lighting system employs sophisticated technology to vary cabin lighting levels and colours, smoothing the transitions between the phases of a flight.

"We care more than ever about our passengers' inflight experience, and the changes introduced today address our

ultimate objective: to deliver value-added tourism services and exceptional standards of quality," explained Allen B. Graham, president and CEO of Air Transat. "As we introduce these cabin improvements, we also reiterate our commitment to providing best-in-class, professional inflight services."

Cabin interior refurbishments for the remainder of the Airbus A330 fleet will be completed gradually over a two-year period at a cost of US\$4 million per aircraft. Three A330s with the new interiors will be in service by summer, flying Air Transat's Europe routes.

An added green bonus is that all of the A330s in the fleet will also be lighter once the cabin redesigns are complete, which will mean substantial fuel and cost savings. In the case of the first aircraft, the weight difference is two tonnes.

Honeywell and Inmarsat ink US\$2.8bn connectivity deal

Honeywell and Inmarsat have signed an exclusive agreement to provide global inflight connectivity services to business, commercial and government aviation customers. Honeywell will develop, produce and distribute the onboard hardware that will enable users to connect to Inmarsat's Global Xpress network.

The agreement is estimated to represent US\$2.8 billion for Honeywell in sales of hardware, customer service and maintenance to airlines, government entities and OEMs over the next two decades. Global Xpress is scheduled for launch in 2013, with global service for commercial, business aviation and government customers available in 2014.

By combining Honeywell's satellite communication capabilities with Inmarsat's Global Xpress connectivity, travellers will be able to do everything from real-time social media to video conferencing while in flight virtually anywhere in the world, with an experience designed to be similar to being at home or in the office. The deal is intended to give passengers fast, reliable connectivity for their devices while crossing oceans.

Tim Mahoney, president and CEO of Honeywell Aerospace, said, "Honeywell identified global aircraft connectivity as a future growth trend, and through the combination of the recently acquired EMS Technologies' broad technology offerings and Honeywell's global aerospace franchise, the company is the perfect partner to launch the Inmarsat Global Xpress aerospace network. We believe this new network will significantly expand the connectivity options of consumer, business and government customers around the world."

KLM recruits furniture designer to revitalise World Business Class

KLM Royal Dutch Airlines has asked leading Dutch designer Hella Jongerius to revitalise the World Business Class cabin interior across its fleet to create an entirely new business class look and feel, and also to help design the new full-flat seats.

Jongerius stated, "The challenge is one of safeguarding individual comfort in amiable settings using innovation. In so doing, I can optimally combine traditional details, and my industrial textile and colour skills with high-tech functionality."

KLM will begin revitalising the first aircraft in June 2013, beginning with its 22 747-400s. Further details of the design and the new seat will be published later this year.

Thompson takes on production

Thompson Aero Seating, which moved into a brand-new factory in Northern Ireland in February 2011, says the first shipset of its new Vantage seats will roll off the production line by November. Thompson's high-density 'staggered' Vantage business-class product is already in service with Swiss, Delta Air Lines and Finnair. Until now, Thompson only licensed the seat design, with manufacturing handled by Contour.

However, Thompson says that together with its own in-house production line it has introduced a number of improvements to the seat. "These will result in a considerably lighter and more easily maintained seat, offering a lower cost of ownership to the operator," said founder, James Thompson.

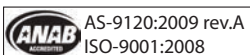
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737 Sky Interior reaches triple century

Boeing is celebrating a milestone as it has just delivered its 300th 737 Boeing Sky Interior. The landmark delivery was for a next-generation 737-800 for Indonesian customer, Garuda Indonesia.

"The superior passenger experience of this spectacular new interior has been well received by our customers and the travelling public," said Beverly Wyse, Boeing's 737 vice president and general manager. "Airlines like Garuda tell us that they draw great value from the many

practical improvements we have made in the new design, and their passengers are wowed by the enhancements."

Since the first 737 Boeing Sky Interior was delivered in October 2010, 65 airlines and leasing companies have placed orders for the interior.

Approximately 85% of Boeing's backlog of more than 2,600 next-generation 737s will be delivered with the Boeing Sky Interior. Customers of the 737 MAX also will benefit from the Boeing Sky Interior.

Recaro BL3520 launches with Alaska Airlines

Alaska Airlines and Recaro Aircraft Seating have announced that the carrier is the North America launch customer for the Recaro Basic Line 3520 seat. The seat will be installed on all 22 of Alaska Airlines' new Boeing 737-900ERs scheduled for delivery beginning in autumn 2012 through 2014.

The seat design includes a slimmer seatback and bottom, and a literature pocket located above the tray table, creating more than an inch of extra legroom within the existing spacing between each row of seats.

According to the airline, the seat will save an estimated 8,000 gallons of fuel annually per aircraft as it is about 30% lighter than the previous model, helping lower costs by reducing fuel consumption and CO₂ emissions.

Lufthansa has inflight RAVE

Following a successful trial period, solutions provider The IMS Company's seat-centric RAVE IFE system has been selected by Lufthansa to be deployed across at least 80 of the airline's wide-body production aircraft, including A330s, A340s and B747s.

RAVE is based on a system architecture that stores content and playback functionality independently in each seatback display unit (SDU), thus eliminating the single-point-of-failure scenario that potentially compromises head end-centric systems, as well as eliminating distribution boxes and seat electronics boxes.

In this architecture, the head end contains the System Control Unit (SCU), which loads future content to the SDUs in the background while passengers watch current content that is played back from an SD card in each seat.

Panasonic, Weber and SIAEC work on major Air Pacific rebranding

Air Pacific, Fiji's national airline, is preparing for a relaunch in 2013 through the creation of three key strategic partnerships to enhance the inflight experience.

The airline will rebrand to its original name, Fiji Airways, when the airline's new fleet of three Airbus A330-200s begin service in June 2013. These aircraft will be fitted out by companies including the three key partners: Panasonic Avionics Corporation (Panasonic), Weber Aircraft, and Singapore Airlines Engineering Company (SIAEC), who will all contribute their services or premium products to assist Air Pacific with the new aircraft.

Panasonic will install its eX2 IFE system on the airline's A330-200s, which will include on-demand audio/video, games, communications and applications that will be available in economy and business class.

Weber Aircraft has been selected to provide the seats for both economy and business class on board the new Airbus fleet. Incorporating the Panasonic IFE system, each seat will also have a USB and power outlet for devices.

With a focus on refreshing the look of the airline, SIAEC has been selected for the new A330-200s' cabin design and functionality. SIAEC will design the A330 interiors, and complete the specifications and quality inspections of the aircraft.



Virgin Atlantic strengthens airside offerings

Virgin Atlantic has opened a US\$7 million Clubhouse for its Upper Class passengers at New York's JFK Airport. The 930m² airside space, designed by Slade Architecture in collaboration with Virgin Atlantic's in-house design team, provides different spaces that offer the passenger zones in which to work, relax or socialise.

Areas include the Central Park Lounge, designed to recreate the aura of a private members' club; the Entertainment Zone,

which features a billiards table and a striking flame-red ball sofa; the Clubhouse Spa complete with Bumble and Bumble hair salon; an open lounge area; a brasserie for formal dining; a quiet lounge; and a work area.

Meanwhile, at the London Heathrow Clubhouse, guests with a musical bent can use the Avid Suite, a newly installed professional-grade recording studio within the lounge.

Multi-voice added to Aviator SwiftBroadband

Thrane & Thrane plans to introduce the new Inmarsat Multi-voice service across its entire Aviator SwiftBroadband range. As part of the service upgrade, Aviator systems will support several simultaneous voice calls via SwiftBroadband, enabling more users to make calls during flight.

The new Multi-voice service is compatible with the Aviator Wireless Handset, and passengers and crew can also use their own WiFi-enabled smartphones to access SwiftBroadband voice calling on Aviator.

Each handset can have its own number, making it easy to dial into a specific handset from the outside. It is also possible to dial out from any handset in the aircraft.

The service is made possible by an update of the current Aviator firmware, so no new internal hardware is required to activate the service. The Multi-voice capability will be available on all new system installations from the third quarter of 2012, and existing Aviator users can upgrade.

EVA Air invests US\$100 million in Royal Laurel class

Taiwanese airline EVA Air has formalised its plans to add seven brand-new Boeing 777-300ER aircraft to its existing fleet of 15, to be configured with 333 seats in three cabins, 56 in Elite premium economy and 238 in Economy, and 39 in the new Royal Laurel Class business cabin.

The Royal Laurel Class cabins will benefit from a US\$100 million investment to upgrade the top cabins on all of its Boeing 777-300ERs with new, fully lie-flat seats.

EVA is configuring its Royal Laurel Class cabins with 38 lie-flat seats in a reverse herringbone layout. The seats are approximately 26in wide, recline 180°, and stretch out almost 79in. Each passenger environment includes features such as a coat hook, space for shoe stowage, nooks for water, glasses and reading material, and a seat-side table for beverages, snacks or writing materials, all within easy reach.

Comfort centre to influence future Embraer cabins

Embraer and the University of São Paulo (USP) have opened a Comfort Engineering Center in USP's Polytechnic School in Brazil's capital.

The main purpose of the centre, which is the only one of its kind outside of Europe and will be a reference point for comfort studies, is to improve aircraft cabin comfort by establishing 'harmonious aesthetic and functionality standards'.

The centre has two full-size mock-ups of cabin sections from an E-Jet, part of the Embraer 170/190 family, for performing tests. One of the models is for reproducing thermal conditions. The other is set up in an area similar to a boarding area, with a 30-seat structure installed inside a pressure chamber, which is able to reproduce conditions very close to those of a real flight. In this setting, it will be possible to determine how various parameters, such as air pressure and humidity in the cabin, impact the perception of comfort for passengers.

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Car and yacht personalisation specialist Brabus is turning its talents to the private jet market. Brabus Private Aviation now offers cabin design and manufacturing services for new executive jets, as well as redesign and customisation services for aircraft already in operation. It is focusing on aircraft such as the Bombardier Global Express and Challenger families, the Dassault Falcon series, and larger business liners.

To implement this concept, Brabus has forged an alliance with three partners from the aviation industry. Sourcing, purchasing and aircraft management services are offered in cooperation with PrivatAir, and aircraft completion and redesign will take place at RUAG Aviation's facilities in Munich, Germany. Finally, Happy Design Studio will create detailed and unique livery designs for customers.

For the launch, Brabus designers have developed two exclusive cabin design lines for the Bombardier Global Express: a bright 'Elegance' model (pictured above right) and a 'Sportive' model featuring darker leathers and carbon fibre finishes.



Automotive tuner Brabus enters business jet sector

Increased seating options for Embraer's Phenom 100

Embraer is offering two new interior options on the Phenom 100, designed to increase the flexibility of the aircraft and the number of passengers it can accommodate. The interior options include a fifth seat, replacing the wardrobe in the forward cabin. In addition, Embraer has certified a belted lavatory. Both options are now available and flying in customer aircraft. The new seating options have the potential to bring the Phenom 100's total occupancy to eight. In addition, Embraer is in the process of certifying an increase in maximum zero fuel weight (MZFW) for those requiring higher payload capacity. The company expects to offer this as an option later in 2012.

VIP interiors joint venture established in Middle East

GAL Aviation of Quebec City and MENA Aerospace Enterprises of Bahrain have established GALMENA, a joint venture based in Bahrain providing comprehensive services for corporate aircraft and VIP airliner interior design, refurbishment and installation. GALMENA has fabrication and design capabilities in Bahrain and carries out training in the trades associated with this activity.

The services will be provided from GALMENA's manufacturing and operational support facilities in Bahrain, and at its hangar at Bahrain International Airport, supported by GAL Aviation's production centre in Canada.

Airbus and Lufthansa Technik renew VIP agreement

Airbus and Lufthansa Technik have renewed their general agreement about cooperation in the VIP and executive jet market and will continue to further develop their partnership in this area. The companies have worked closely in the completion of ACJs since 1998.

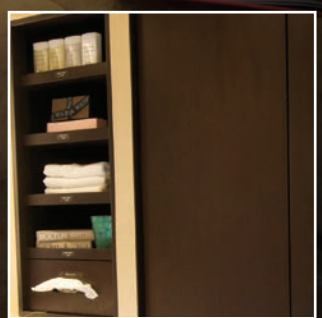
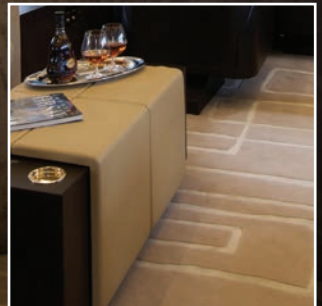
Within the ACJ318 programme, Lufthansa Technik is Airbus' cabin interior partner. So far, 15 ACJ318 cabin completions have been delivered out of Lufthansa Technik's completion centre in Hamburg, Germany, and at its US subsidiary BizJet International, in Tulsa, Oklahoma. Two ACJ318s are currently under completion, and a further three aircraft are scheduled for completion in Tulsa.

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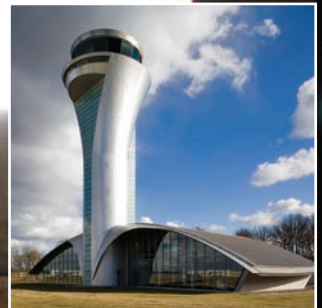
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coolkat

BRIEF: Lightweight materials are a given in modern seats, so the challenge is to find creative ways to further reduce weight without sacrificing durability or passenger comfort. This is an even greater challenge when the seat is to be suitable for long-haul travel in ever-denser economy cabins. Through intelligent consideration of every aspect of the economy seat, the Meerkat seat concept from Hong-Kong-based Paperclip Design is claimed to have answered all these demands, while also offering clever storage solutions.

DESCRIPTION: To gain a deep recline without encroaching on the space behind, the lower portion of the backrest cushion can be flipped open, allowing carry-on items such as bags or jackets to be sandwiched in between as lumbar support. This effectively creates a deeply reclined backrest and a shortened seat pan, which supports passengers' buttocks so their legs can stretch out below the seat in front, with an angled IFE box as a footrest.

To prevent 'armrest wars', a unique dual-user armrest adds an additional level of forearm support above the forward half of the armrest. If the lower level is taken, a passenger can rest their forearms on the upper level instead.

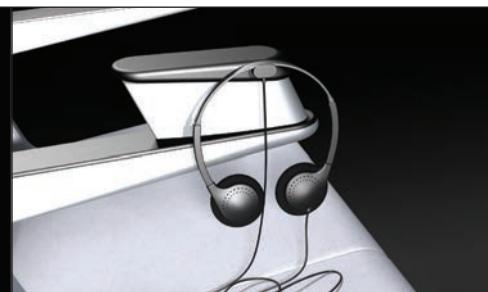
To enhance knee room, the seat pocket is relocated to the space between the seatback and the tray table, creating a personal cabinet with the tray acting as the door. In place of the original seat pocket is a simple strap that can be used to hold occasional bulky items such as pillows, blankets, or a water bottle.

A literature rack is still required, and it is located high up between adjacent seat pairs, presenting an opportunity to cut inflight magazines and hence their weight by up to 50% (or 33% for triple seats), while also raising their visibility.

No modern design is complete without incorporating PEDs, and Meerkat is no exception, as a simple spring mechanism keeps the table at a half-opened position, while two lips on the edge of the tray form a trough for tablet computers or books to stand on at an elevated viewing position. The spring also doubles as the locking mechanism for stowing the tray.



VERDICT: We would have to try a prototype to be sure, but putting small hard items in the backrest could prove uncomfortable. Also, the short seat pan puts the passenger in a near-standing position, which may not be ideal for long-haul travel, although it is good for seat density. However, there is true elegance to some of the solutions that make this a concept worthy of further investigation.



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homecooking

BRIEF: With state-of-the-art aircraft entering fleets featuring painstakingly designed cabins with soft shapes and palettes, why spoil the experience with an unattractive galley? B/E Aerospace has teamed up with Teague to develop a range of galley inserts that can offer the same functionality and durability as more utilitarian designs, but with refined aesthetics and operation more akin to domestic appliances. In addition, the simple surfaces can be adorned with different colours or logos to reinforce brand identity.

DESCRIPTION: Aircraft galley areas, with their sharp metal edges and tough latches, are great for utility and durability, but do little for cabin aesthetics or brand differentiation.

In 2010, B/E Aerospace teamed up with Teague to redefine the galley space and create a common, clean and simple design, and a consistent user experience across all touch-points. The collection features 10 items including ovens, refrigerators, trash compactors and coffee makers.

The range is designed for ease of use, with menu functions displayed on high-resolution screens accessed via flush-mounted backlit buttons. To further simplify operation, only available functions are shown. The inserts are opened and closed using ergonomically-friendly rotary latches that couple the first and secondary latching.

B/E Aerospace says that the collection offers the lowest cost of ownership available on the market. Weight reduction varies from 3%-40% depending on the product, while the full range of inserts benefits from improved power efficiencies, as well as claimed superior product performance and increased reliability.

The Essence Inserts Collection will receive certification in 2012 and is expected to be in service in early 2013. It may also enter the A350 catalogue as part of the SPICE (SPace Innovative Catering Equipment) standard.



VERDICT: As well as often being the first part of the aircraft passengers see when boarding, galleys are becoming a popular area to visit for snacks during flights. Now passengers can feel more at home, especially with the buttons that are reminiscent of modern consumer electronics. Also, cabin crew will find the menu-driven cooking process simple to use. However, could the greater differentiation between more traditional inserts be a feature that busy cabin crew will miss?



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take**shape**

The clean-sheet design of Lufthansa's new business class is one of the largest and most challenging projects taking place in the industry. The key players reveal the story behind this sophisticated V-shaped seat

ADAM GAVINE, AIRCRAFT INTERIORS INTERNATIONAL



“Lufthansa passengers don’t fly backwards.” That was one of the main stipulations given by the airline to the designers of its new business-class seat. This was a daunting project, forming a major part of Lufthansa’s €3 billion investment in inflight product over the next two years, which will see the seats installed in new 747-8 Intercontinentals and retrofitted across the entire long-haul fleet of more than 100 aircraft.

“It’s so complicated to construct a new aircraft seat,” explains Uta Kötting, intercontinental product manager at Lufthansa. “It’s incredibly expensive and that’s why we had to really think about whether to go for a next generation or not, and whether to refit the whole fleet. But you have to refit the whole fleet so you always get the same product whenever you fly Lufthansa Business Class. I don’t know that any other airline goes so deeply into the development of a new seat, not only design-wise, but also in the construction.”



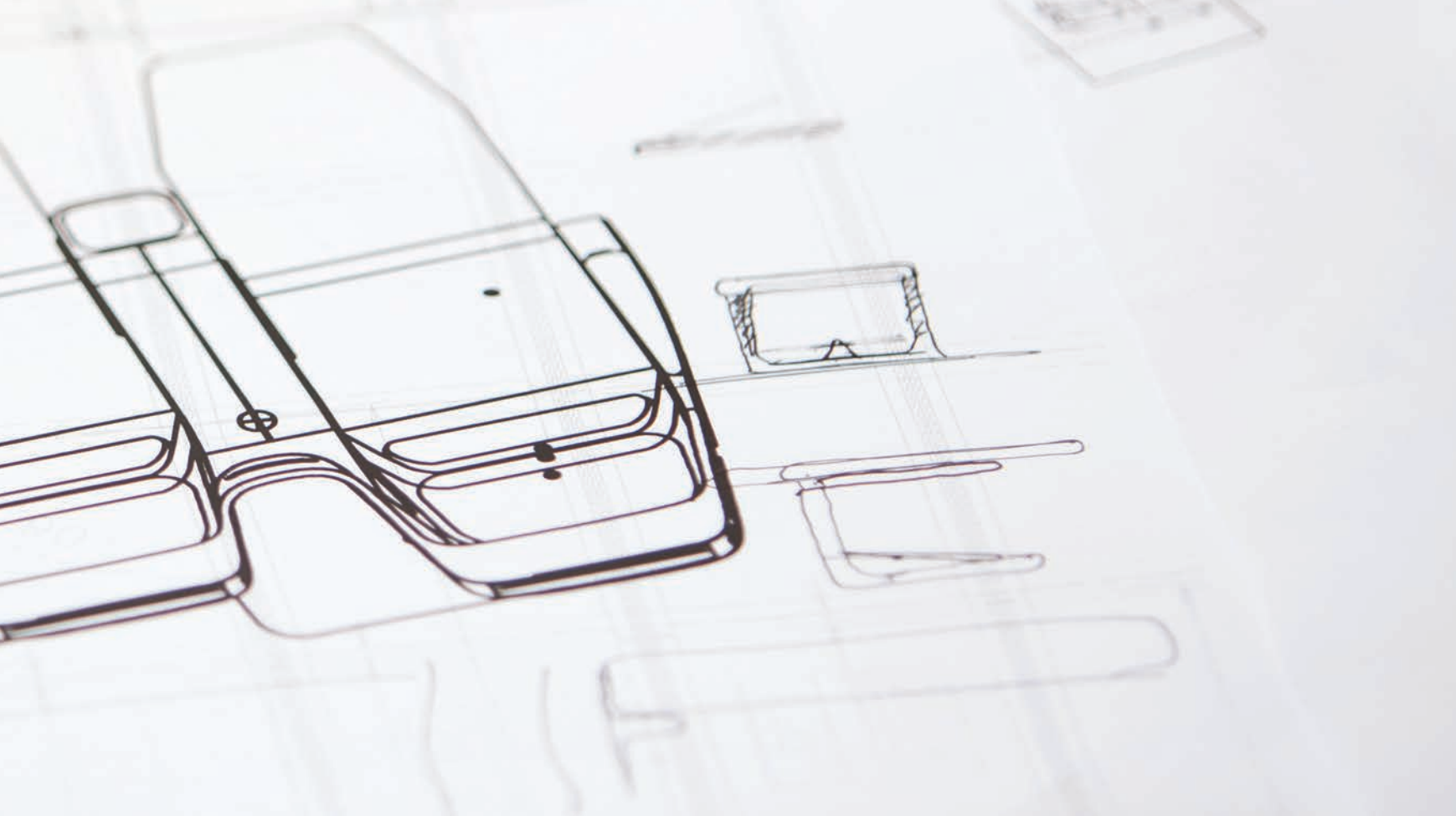
I DON'T KNOW THAT ANY OTHER AIRLINE GOES SO DEEPLY INTO THE DEVELOPMENT OF A NEW SEAT, NOT ONLY DESIGN-WISE, BUT ALSO IN THE CONSTRUCTION



Someone in full agreement is Luke Pearson, co-founder and director at London-based design agency PearsonLloyd, which was one of the agencies invited to tender for the design of the seat in 2007. “So many airlines just buy stock product and make little changes, but to partner with a manufacturer and do a ground-up design is fantastic because it’s hugely demanding and so high risk and costly, and at all times Lufthansa’s agenda was the passenger – would the passenger accept this?” he says.

Following a five-month selection process that took in everything from design language to financial stability, Lufthansa asked PearsonLloyd to investigate using various seat layouts and to come up with an independent vision of a new business class. They began with a trim and finish brand vision in terms of colour and material palette, and then came up with a vision of the seat.

“The current seat [Recaro’s ICI] was good for its day, but now people have moved forwards,” states Pearson.





01



02

- 01. It may look like a simple solution, but that V shape is the result of years of hard work and refinements to the design
- 02. Valued Lufthansa customers were given the chance to give their opinion of the seat at the airline's mock-up centre

“Lufthansa asked us to look at other configurations and we looked at their processes in terms of load and layout. There are a lot of business-class offerings and pretty universally they’re not great in terms of head count. The ICI seat was pretty dense, but the physics of a lie-flat seat mean you need someone to lie next to someone else in a given floorspace unless you stack them on top of each other, but that reality is some way off.”

Lufthansa had conducted research into other business-class products on the market and how its current seat performed from a customer satisfaction point of view, and found the only real problem with it was the lack of full-flat functionality. The airline brainstormed with universities, with airframe manufacturers, with the development departments of many seat manufacturers, and also with some creative designers and creative engineers on how its

specific problem could be solved: how to provide full-flat but not to lose more than 8-10% earning capacity, when many existing designs on the market would consume up to 25% more capacity. Their research had also showed that to be suitable for customers the world over, the bed needed to be at least 1.95m-long and that leaving the seat to put it into the sleeping position was unacceptable.

This is where the most striking feature of the new business class was born: the ‘V’ arrangement with two seats angled towards each other along a central axis, an idea both Lufthansa and PearsonLloyd had been working on. “Research showed that this shape was the best to maintain the highest density for forward sitting and forward sleeping, but maintaining what we felt to be an adequate or appropriate width for a business-class user in terms of sleeping,” states Pearson.



hook of love

Even the smallest of elements became a project within the project, such as the coat hook and glasses holder, which Pearson describes as an “iconic jewel”.

Lufthansa could easily have chosen a high-quality stock item, but this would have spoiled the bespoke nature of the design. As Pearson states, “There are so many suppliers supplying stock items, but you recognise them on other seats. Lufthansa didn’t want stock items; they wanted everything bespoke and for the passenger to feel they get a valued experience. That was demanding but very enjoyable because we’ve ended up with a seat that is pretty unique in every aspect. Even the handle took three weeks – it looks simple but how do you attach it, how do you machine the parts, how far does the handle open, can you get your fingers in it easily? This is the level of detail we went into in every single part of the seat.”

A major design issue was that the LOPA of around 7,000 seats had to be right for the fleet as a whole, which includes A340s, 748s and A380s, with A350s and 787s to follow. However, Lufthansa’s studies show that the seat shell is adaptable to other aircraft to resolve issues such as sidewall clashes, while the angle of the seats can be altered to ensure the user does not lose space.

“Quite a few seats on the market only really work well on one aircraft. For Lufthansa it was key for it to work as a retrofit across the whole fleet, which brought another whole level of development,” states Pearson.

As Kötting explains, “We always think of both the customer and the efficiency of the seat concept on board so that we don’t lose too many seats. We don’t want to lose customers – we want to attract customers with a good seat, while also having an efficient seating arrangement in the cabin. This seat arrangement is a lot more efficient than the old one. People like to look straight ahead – they don’t like too much of an angle and they don’t like to sit facing backwards. They want to look out of the window so they want to be turned more that way than the aisle.

“The seat arrangement is most important for the look of the cabin. The new one is open and not so crowded, so you come in and feel free. That’s what our passengers have said,” adds Kötting. “If you’re on board for 11 hours, you don’t want to feel enclosed. These seats are quite different to those on other airlines because they always put high shelves around the seats for privacy, but it doesn’t give a good feeling in the cabin. We think it’s better to have less privacy, but to have privacy where you need it, which is around the head when in the lying position, with open space around your shoulders.”

The new seat offers double the distance between seats at shoulder level compared with its predecessor. Of course, with the angle of the seat, this means the passengers’ feet are very close together, though a divider separates them. Responding to some initial criticism concerning this proximity, Kötting states, “Yes they are quite close together at the feet, but they are turned away in the upper body.

And that is where humans have a sense of privacy, not so much in the feet.”

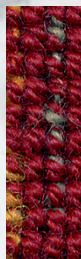
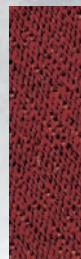
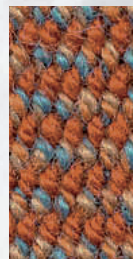
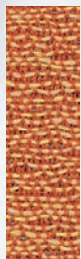
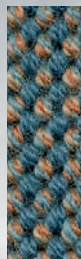
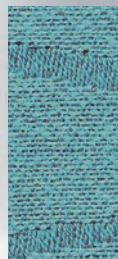
An ‘H’ arrangement is also available, with the seats positioned parallel to one another, but angled slightly towards the outer cabin wall.

THE SEAT IN DETAIL Boeing had very long time schedules in place for the seat’s initial use in the 747-8I and applied pressure for the seat to be ready two years before the aircraft’s launch. To ensure the right seat manufacturer took on the project, when the main specification and design was complete, Lufthansa put the project out to tender. B/E Aerospace, which also makes the airline’s first-class seat, won the business-class tender. Recaro is still heavily involved with Lufthansa, though, with 5,000 of its Comfort Line 3520 economy-class seats being installed in the airline’s 20 747-8Is and a further 5,000 being retrofitted to the 19-strong 747-400 fleet.

Lufthansa did not take switching their business-class seat supplier lightly, as Kötting explains: “From a purchasing perspective, we need quite a long time to make sure everyone understands our needs and expectations and that we understand what they are capable of offering. So we work very closely together and this takes time. I don’t think it is good to change suppliers all the time – not for a product that is so complicated – or to have different suppliers for the same product.”

Something in B/E’s favour was that it too was working on a V concept. Tom Plant, vice president and general manager of seating at the company, was heavily involved in the project. “We did have some developments that were already ongoing within B/E for configuring seats in a V arrangement,” he says. “That was of benefit when we started our dialogue with Lufthansa because they said they had an idea and asked if we could show them some work we’d already done, which gave us a leg-up in the tendering process. That said, once we began design and development as a team, make no mistake, this is very much a ground-up development from a blank sheet of paper.”

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B/E's work with the Diamond platform could have been used as a base kinematic, but in this instance even that was developed from scratch for Lufthansa, such was the all-new nature of the programme.

An ergonomics institute in Munich produced the initial specification for the ergonomics of the seat (see page 33), with a brief for the electronic continuous seat adjustment mechanism to go through comfortable low-sine paths from upright through lounge into the bed position. The institute approved the design and B/E created the engineering for the elaborate seat path.

The engineering is slightly simpler than the Recaro predecessor as it has four actuators rather than six, which saves weight and aids reliability. The redundant actuators were for the leg rest extension, which was no longer required due to the ottoman, and the seat height adjustment, which research showed customers didn't use.

Whenever a decision was made, it was checked with the airline's frequent flyers, either online or at its test lab near Frankfurt, where it keeps mock-ups. One online discussion related to seat features, when it was revealed that the massage system was not needed, which allowed the team to delete a pump from the specification.

Instead a lumbar support was specified, which pumps air into airbags for lumbar support when in the upright position, and releases the air when a flat sleeping position is needed.

The lumbar system is Lantal's Pneumatic Comfort System, as used by Swiss International Airlines and Brussels Airlines. Its implementation stands out though, as Plant points out: "It has been done on some other seats so it's not unique; however, what is unique is that Lufthansa is the first airline I've seen that wants to use it on such a large scale – they have a lot of aircraft with a lot of business class seats. You don't see these things on other top 20 carriers. You will see them on some third-tier carriers that have experimented with them, but I'm not sure what their degree of success has been."

Losing two actuators and a pump also gave PearsonLloyd a little more design freedom, though B/E's engineers were always keen to gain more space for the workings of the seat. "In many respects the PearsonLloyd

in it for the long haul



Uta Kötting, Lufthansa's intercontinental product manager, took an unconventional path to her design role. Born in Bangkok in July 1967, she then grew up in Egypt and Spain, before studying business administration in Munich.

In 1996, Kötting began her career at Lufthansa, where she joined the product management team straight away, initially developing concepts for ground products, such as the worldwide lounge offering. For nearly five years she developed and introduced the current Lufthansa uniforms (for cockpit, cabin and ground crews), before moving on to develop a new concept for onboard services, leading some projects with an aim of improving the long-haul regional onboard services (especially for India, Japan, Korea and China), and then taking on the development of comfort articles on long-haul flights and developing a brand new line for the new first class.

Kötting is currently responsible for the customer comfort and design concept of the 748 cabin interior and for introducing the new business class on the 748 and A330.

approach is focused from the outside in and we're focused from the inside out, and then hopefully as a team we meet in the middle and have a solid product," says Plant. "Obviously when you tear apart a lot of the things that are aesthetically important to a design agency like PearsonLloyd and you get down to the guts of what is underneath the seat, there is a tremendously complicated kinematic underneath that moves the seat from an upright position, to a dining position, to a reclined position, to a [1.98m-long] lie-flat bed position. Lufthansa had a key specification they were looking towards in terms of comfort, which was a project within a project. Working with PearsonLloyd on design, style, aesthetic and external function, and the internal functionality of the workings of the product, we were having hot and heavy review sessions, design reviews, and building mock-ups of the guts of the engine of the seat."

- 03. While the new colour palette is more subdued, it offers a broader scope for creativity
- 04. Luke Pearson (left) worked closely with the other partners on every element of the project

03



04



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As Pearson adds, “At every stage, B/E, us and Lufthansa would have to agree the design ambition was being met, as well as the engineering and service issues. I can’t tell you how elaborate the process was.”

Weight was minimised through the extensive use of materials such as aluminium, carbon fibre, honeycomb composites, and using airframe-grade 7000-series alloys as opposed to seat frame grade alloys. “I would say the use of weight reducing and exotic materials is more prevalent on this seat than most,” states Plant.

“Lufthansa is very operationally focused – they want a great lie-flat horizontal product, but they are very attuned to things like density and weight,” he adds. “Some airlines will push the boundaries and suffer from not meeting some of those operational requirements, but I would say Lufthansa does a better job than most airlines in being sensitive to these issues.”

To ensure the seat keeps looking fresh throughout its projected eight- to ten-year lifetime, it can be split into various parts and taken off the aircraft, which also means the cabin can be quickly reconfigured if required. In addition, rather than a Tedlar covering for the carbon fibre shell, which can be difficult to replace if damaged, a vacuum-formed cover wrapped in artificial leather is used, which can be swapped while the aircraft is on the runway.

aisle access The buzzword of direct aisle access was considered and dropped for the design.

Pearson explains, “There really wasn’t any way round that; the only way would be to have a slippage to create space, but then you lose a huge amount of head count. With the current seat you have to step over anyway, and from Lufthansa’s perspective this wasn’t a major problem. And it is offset by the gain in head count and the flat bed. We felt very strongly we should maintain head count and not compromise the design for a relatively rare occurrence in the flight. Maintaining comfort in the seat and bed and a good head count leaves no other option.”

Accessing the aisle is a fairly simple process, facilitated by the 64in pitch; you just put your seat upright and step across the knees of your neighbour.

sitting comfortably

Dr Florian Heidinger, head of the Ergonomie Institut München, was called upon for two important aspects of the project. The first was to optimise the dimensions, contour, hardness and thickness of the seat, backrest and headrest cushions.

“The quality of the cushion has a big impact on the comfort of sitting and lying body posture,” he says. “The challenge was to find the best compromise between sitting and lying body posture, since there are different requirements of the cushion behaviour.”

To support this varying cushion behaviour, the air bladders are inflated in different ways in order to change the elastic cushion behaviour according to body posture. Optimising the cushion behaviour directs, on one hand, the quality of the body posture (e.g. vertebral column) while sitting/lying; and on the other hand, the pressure distribution between body and seat.

The second aspect was to optimise the movement of the backrest, seat pan and leg rest seat elements. “The target was to find a regulation of these seat elements to ensure that every position between upright and fully flat is as comfortable as possible,” says Heidinger. “In our work on these two key aspects, we had to take into account the fact that seats have to accommodate different sizes of people, so tests always included people with different anthropometric conditions.”

B/E’s plant is unfazed by any criticism of non-direct access. “I personally think direct aisle access is overrated and I fly business class all the time,” he states. “Direct access gets a strong buzz in the industry. There are different types of seats in the market, and some make it hard to step over the passenger next to you, but with this one it’s clearly not hard. The difference is that, as a passenger, I don’t mind being slightly inconvenienced to step over someone else as long as I can fairly easily get out to go to the restroom. I’m going to be realistic – even on a 12-hour flight I might get up six times. If I’m travelling with someone, I’d rather be sitting next to them than in a seat where I have aisle access but can’t converse with them.

“Unfortunately what the industry does over and over is migrate to certain solutions – it is almost drawn to them like a magnet. Previous solutions have been bad because airlines haven’t tried to solve the problem more incrementally and make it better. That’s my view, but saying that, we do make aisle-access seats as well, so we know different people in the market want different things.”

centre console One of the most difficult elements to design was the leather-covered centre console, which had to accommodate several passenger comfort items such as a generous surface area, a folding table, USB and power sockets, as well as engineering items, while also serving as a maintenance access point.

“The centre console required its own project because we had to package the tray table, cocktail table, IFE systems and headphones in such a compact space. And we couldn’t move it into the aisle because we wanted to preserve space,” states Pearson. “Huge energy went into packaging content into the seat so it didn’t take away seat



05

- 05. When in the sleeping position, the seat shell cocoons the head for privacy
- 06. The wide centre console offers room to stretch out but also a sociable layout

or aisle space. There was an entire six-week development programme just for the centre console.”

The final design incorporates a bi-fold table that slides down in a cassette, which through weeks of PearsonLloyd sending concepts to B/E in CAD files and B/E checking for spatial issues, was finally refined to an achievable package in the available space. The bi-fold design can also swivel to allow egress without clearing the table.

In addition, hollows have been formed in the console to allow more shoulder space when lying down.

FITTING MONUMENT The front row monuments, despite featuring IFE monitors, a footwell and an ottoman, should be one of the simpler elements to design. However, this was not true in practice for Pearson.

“That project had to be streamlined with the seat development, so every time the LOPA changed, the monument had to change. The front row monuments aren’t cabin architecture – they work more like furniture. They are difficult because there are so few – there are only three in each compartment, whereas there might be 35 seats. You can’t get the same economies of scale, so the production and design methods are different,” he explains.

The solution was to create a synergy of design with the seats, while remaining distinct and looking like part of the cabin architecture. The monuments also serve as the interface between first and business class.

A CABIN THAT MEANS BUSINESS The previous cabin was overwhelmingly blue with its seat and carpeting fabrics, lightened by heavy silver accents. However, this is rather at odds with the relaxing neutral hues chosen by most for home and car interiors – and indeed within Lufthansa’s own lounges and First Class cabin.



06

Hence a more soothing palette has been introduced in the Business Class cabin, with natural grey and brown tones derived from the colours already found in First Class and the airline’s lounges, and soft virgin wool seat covers. The passengers themselves bring extra colour into the cabin.

Lufthansa worked with PearsonLloyd on the colour palette and textiles, a process that took several weeks and iterations. “We wanted to reduce the blue and produce a much warmer textural feel, as well as textiles that respond to different times of day. With flights taking off in the morning and landing at night or vice versa, the lighting changes in the cabin and the blue was too dominant at either end of the spectrum. We also wanted to carry the gold/tan colour into the textile so we had multiple weaves in multiple filaments, which was fun because it was an antidote to the very hard engineering of the seat. At the end of the day that’s what the customer interfaces with – it’s the sensorial spatial touch aspects of the seat.”

THE RESULT The project was exhausting for all concerned. As Pearson says, “There have been a huge number of compromises, some forced by engineering, some by Lufthansa in terms of passenger requirements, but ultimately the seat is testament to a very thorough design process because it looks so close to the initial model. It’s extraordinary to go through 24 months of development and essentially have the same seat design, same concept, and same delivery of most of the componentry, when at multiple stages we could have trashed certain ideas as being just too difficult or re-evaluated certain things from scratch, but everyone kept hammering away at the original design ambition which is fantastic.”

Whether the cabin and the seat are a success is for the passengers to decide. However, in 2010, Lufthansa conducted an eight-week trial of the seat on its Frankfurt to New York route and received positive feedback from the 1,349 passengers in terms of comfort and ease of use, together with a score of some 98% for technical reliability. A thoroughly good result for a thorough design. ☒

MORE DETAILS

For the full story about the development process of the seat, and to see a video of it in action, visit the web exclusives section of our website: www.AircraftInteriorsInternational.com



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bigissue

There could be a big problem in the skies, as many passengers are now heavier than the dummies used to assess safety standards. Do larger passengers and those around them have a comparatively slim chance of survival in the event of a crash?

CHRISTINE NEGRONI, AIRCRAFT INTERIORS INTERNATIONAL

Twenty years after aviation authorities bumped up the requirements for aircraft seat certification, nearly doubling the force of gravity that seats must be able to withstand and remain protective, questions are being raised about just how well those strengthened seats perform. The average weight of air travellers in several western countries has surpassed the weight of the dummies used to test aircraft seats. The 77.1kg weight of the dummies was selected by the FAA in 1946, which means there hasn't been a reassessment of passenger weight and seat certification since practically the beginning of commercial aviation. Despite the lack of tests to demonstrate how increased weight will affect seats and seatbelts, some experts say the safety of overweight travellers – and those seated around them – is at risk.

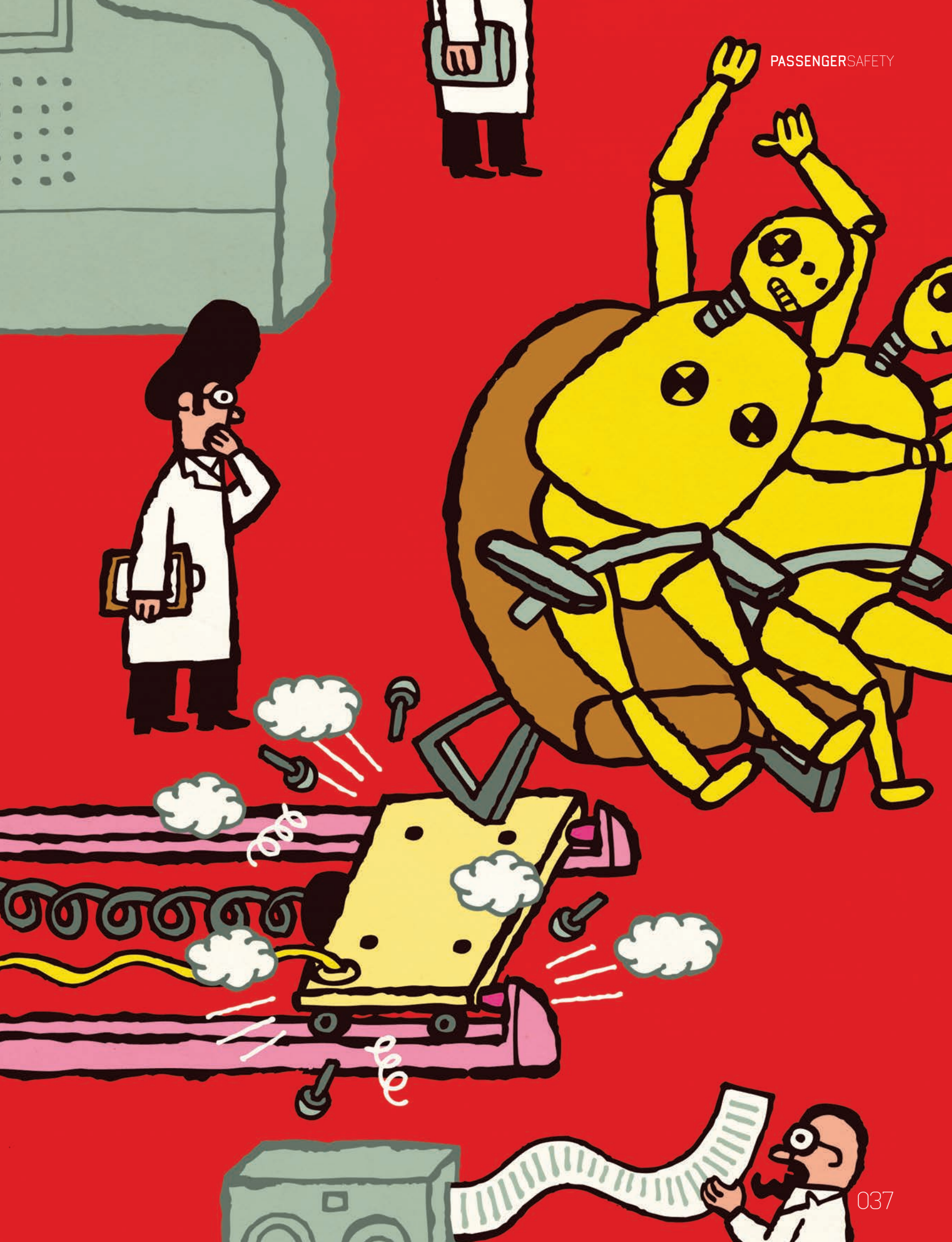
“We are beginning to move in the direction of acknowledging our inherent obesity but it is happening faster than the industry can keep up,” says Dr Robert Salzar, chief scientist at the University of Virginia's Center for Applied Biomechanics.

Yoshihiro Ozawa, an engineer whose company, Jasti Ltd in Japan, has been manufacturing crash dummies for transportation safety certification tests for 20 years, says he is concerned that there is no data proving that seating is safe for larger passengers.

“If we don't test with heavier dummies we won't know if seats and seatbelts are safe enough,” says Ozawa. “The regulation says the manufacturer is responsible to test for the 50th percentile male and they all do that. There is no regulation that says they have to test for heavier.”

The 50th percentile male weighs 77.1kg and seat manufacturers test their products using dummies of that weight, which regulators have said represents the median weight for men. But the latest numbers from the US National Center for Health Statistics shows the average man in the USA weighs 88.5kg – some 11kg more than the regulatory median. It is widely reported that in North America 33% of people over 20 years of age are obese, but larger girth isn't confined to one region of the world. Back in 2000, the World Health Organization called obesity







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a 'global epidemic'. Seat certification, however, has failed to keep up with the size of the person occupying that seat, says Dr Salzar, and as a result the airline industry is facing a 'huge' problem.

"If a heavier person completely fills an aircraft seat, the seat is not likely to behave as intended during a crash," explains Dr Salzar. "The energy absorption that is built into the seat is likely to be overwhelmed and the occupants will not be protected optimally."

There is most potential for incident in economy seats, Ozawa says, as the close proximity to other passengers increases the likelihood that the heavier passenger will become a hazard by colliding with those sitting nearby.

Airline seats have been under increased scrutiny since 1988, when regulators determined that safety could be enhanced if obstacles to escape were eliminated. Accidents involving aircraft take longer to play out than with other modes of transport and, even after the aircraft comes to a stop, surviving passengers need to be able to evacuate quickly. It is for this reason that the 1988 regulations gave the prevention of passenger incapacitation and seat collapse greater emphasis.

Seat design takes into consideration how best to protect heads, spines and limbs while the seat remains connected to the aircraft floor. The 1988 rules dictated that new seats should be made even more resilient by requiring them to withstand 16-times the force of gravity applied with energy; previously, seats needed to hold up under 9g of static force. So contemporary seat certification is intended to improve survivability on two fronts: protecting the occupants during the crash and giving them more time to get out afterwards.

"From a survivability point of view, the first thing you want to do is protect the occupants during the crash by ensuring that people and seats stay connected to the aero," states Nora Marshall, a senior advisor for human performance and survival factors at the US National Transportation Safety Board (NTSB). "The new 16g seats are tested dynamically to improve everyone's chances for crash protection."

In her job, Marshall takes passenger lists from aircraft crashes and studies medical reports and injury patterns with the aim of determining which factors turn an accident lethal. In 20 years she says she has never encountered a crash in which the weight of the passenger appeared to be a factor in survival.

Still, Dr Salzar says regulators need to catch up with changing physiques of air travellers and that present testing does not provide information about a growing class of passenger. "They know they've got a problem," Dr Salzar says of the Federal Aviation Administration certification criteria, "and like all large government entities, they don't know what to do about it any more."

Although passenger size and how it affects seat restraints is being discussed regarding aircraft for the first time, it is an acknowledged safety issue in cars, according to Andrew Walton, senior project engineer at Cranfield University's Impact Centre in the UK. "We've actually tried to raise this in the automotive sector. We thought we'd get a better response. People are getting heavier



ILLUSTRATION BY KENNETH ANDERSSON/EYE CANDY ILLUSTRATION

pain in the neck?

An idea for aircraft passenger safety could come from the automotive world, with a seat that designers at Chard Safety claim eradicates whiplash as well as generally enhancing occupant safety in motor vehicles.

"Integrated seats and seatbelts have been investigated in the past," says Chard Safety's Michel Coenen, the creator of the DRS-Albatross seat concept. "But for one reason or another they have never really taken off. Crash forces – particularly at the back of the seat – are extremely high so such designs had to be structurally strong, and consequently were heavy and more expensive to manufacture. With OEMs looking at reducing vehicle weight, particularly for reasons of fuel economy, their take-up has been virtually non-existent.

"But what we have with our Deceleration Responsive Seat (DRS) is an entirely new seat frame concept. It is assembled to the vehicle floor, and has three legs instead of four – two at the front and one at the rear. Essentially we're integrating the seat within a seatbelt, rather than the other way around. We have relocated the seatbelt anchor points from the sides of the occupant to points in the floor, in front of and behind the seat. The seat itself is made up of three sections, kept rigid and in place partly by the seatbelt webbing, which is threaded through the seatback and seat section, across the occupant's shoulder and around the lap area."

As Coenen reveals in further detail, the webbing is an integral part of the design. "In the event of a crash, an inertia release function transforms the seat from a solid structure into fully supporting sections, with the exerted crash forces being transferred directly to the belt. All of these design changes mean that the seat itself doesn't need to be that strong, hence why we can offer reduced weight and lower production costs for Tier 1 suppliers and OEMs."

The upshot of this unique construction is that the vehicle occupant is maintained in the optimal position in the event of a crash – the normal sitting posture – and decelerates with the vehicle, rather than at a different velocity away from the seated position.



HEAVIER PASSENGERS COULD INJURE OTHER TRAVELLERS, ESPECIALLY IN AREAS OF THE AIRCRAFT WHERE SEATS ARE SMALLER AND MORE CLOSELY SPACED



but all the certification requirements are based around a standard 50th percentile male.”

Dr Salzar is also concerned that without testing on larger dummies, there is no way of knowing if seat restraints will adequately confine heavier passengers. “You’d be amazed at how a large person can blast through that restraint,” he says.

Technology is being developed for automobiles that can sense the weight of the seat occupant and calculate the correct seatbelt feed rate and airbag inflation for that person’s size and weight. This technology is not presently in use in aviation.

But seat strength and restraint effectiveness aren’t the only factors affecting safety when the passenger is overweight; many overweight air travellers do not wear their seatbelts except when required at take-off and landing, and when specifically asked to do so during turbulence.

Deitrich Jehle, professor of emergency medicine at University at Buffalo in New York, conducted a national study of more than 300,000 serious automobile accidents to see how passenger size affected crash mortality. He found that obese people were 21% more likely than people of average weight to die in automobile accidents. It was a consequence of many factors, Dr Jehle said, but he believed his study was the first to look at the effect of body mass on crash outcome.

Dr Jehle said that in the accidents he studied, obese people were 67% less likely to be wearing seatbelts, a situation that he said was probably applicable to air travel. There appear to be no studies of how common it is for people to keep seatbelts buckled when usage is optional. Dr Jehle suspects that obese air travellers are probably taking their belts off, taking on greater risk to themselves and becoming a hazard to others.

“Force = mass x acceleration, and when someone is heavier and unbelted, much more force is applied,” he stated.

Based on tests that Ozawa has seen, he said he believed heavier passengers could injure other travellers, especially in areas of the aircraft where seats are smaller and more closely spaced. “In economy, the backs of the seats may not be strong enough and the spaces between seats not sufficient to protect against the impact of heavier passengers behind or beside,” he says.

Marshall at the NTSB said she had not yet investigated any accidents in which seatbelt failure was a factor in survivability. “I think theoretically it could have an impact but we haven’t seen that in our accident investigations,” she says, adding that if such evidence showed up in an investigation, the NTSB would take a closer look.

The sensitive subject of passenger size is something that airlines avoid discussing, although a few have policies about when large travellers are required to purchase two seats. In a newly published booklet, the USA’s National Association to Advance Fat Acceptance provides an airline-by-airline listing of these policies. But Peggy Howell, the group’s public relations director, says she is unaware of safety issues regarding heavy passengers.

In a paper published in 2006, Christian Olschinka and Axel Schumacher, scientists at the Hamburg University of Applied Sciences, Germany, wrote, “Seats are the most influential mechanical components on the safety of flight passengers.”

A study of airline accidents by the NTSB published in 2001 showed that in 568 accidents over a 17-year period, 95% of passengers lived. “Most accidents we investigate are survivable,” Marshall says. “There is the misconception among the public that the things you do to protect yourself are meaningless because there’s nothing you can do if an aircraft crashes. That’s not true.” The evolution of safety equipment including seats and restraints has had a role to play in this success, asserts Marshall. With further developments in safety tests and equipment in line with growing passenger sizes, perhaps these survival statistics can get even better. ☒



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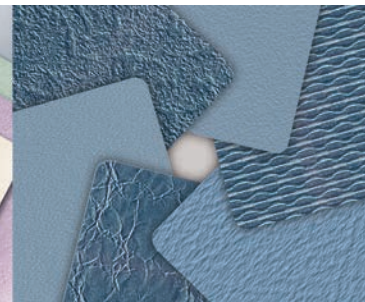
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flipout

Virgin Atlantic's latest Upper Class cabin may be evolution rather than revolution, but its all-new design is the product of a 4.5-year mission to increase revenue potential while enhancing the passenger experience

ADAM GAVINE, AIRCRAFT INTERIORS INTERNATIONAL





As transatlantic business travellers find themselves being seduced by an increasingly attractive range of new products, Virgin Atlantic's Upper Class offering is showing a few signs of age following a decade of service. Something new, something more glamorous, something more fun was needed to turn the heads of business-class flyers. Following a facelift and thorough workout, the Upper Class cabin has emerged reinvigorated, more refined and lighter.

AN APERITIF Many good stories begin with a trip to a bar, and hopefully this will be no exception. The success of Virgin Atlantic has a lot to do with its brand image as a stylish and glamorous flying experience. It's fitting, then, that upon stepping aboard the airline's fresh fleet of A330s all passengers are greeted by a striking new bar, which plunges you into the brand's ethos, with its Virgin red frontage etched in a 'Jetstream' pattern. It's a great introduction, whether you're turning left into the Upper Class cabin, or right into the economy sections (having seen what you could have had, had you upgraded your ticket).

The 2.7m-long bar is marketed as the longest in the sky, but that superlative is the product of function, not marketing. To seat three passengers, with the bartenders able to reach the ends of the bar without risk of spillage, this length was required. The bar structure also houses storage areas for a range of equipment and supplies for the 'mixologists', and spirits and magazine storage are left exposed in diamond-shaped cutouts, while the new champagne coupe glasses are shown off to their best effect in illuminated racks.

This area came under the purview of senior designer Gareth Southall, who came up with an initial design, which he then refined together with design experts from London-based architecture practice Voon Wong + Benson Saw (VW+BS).

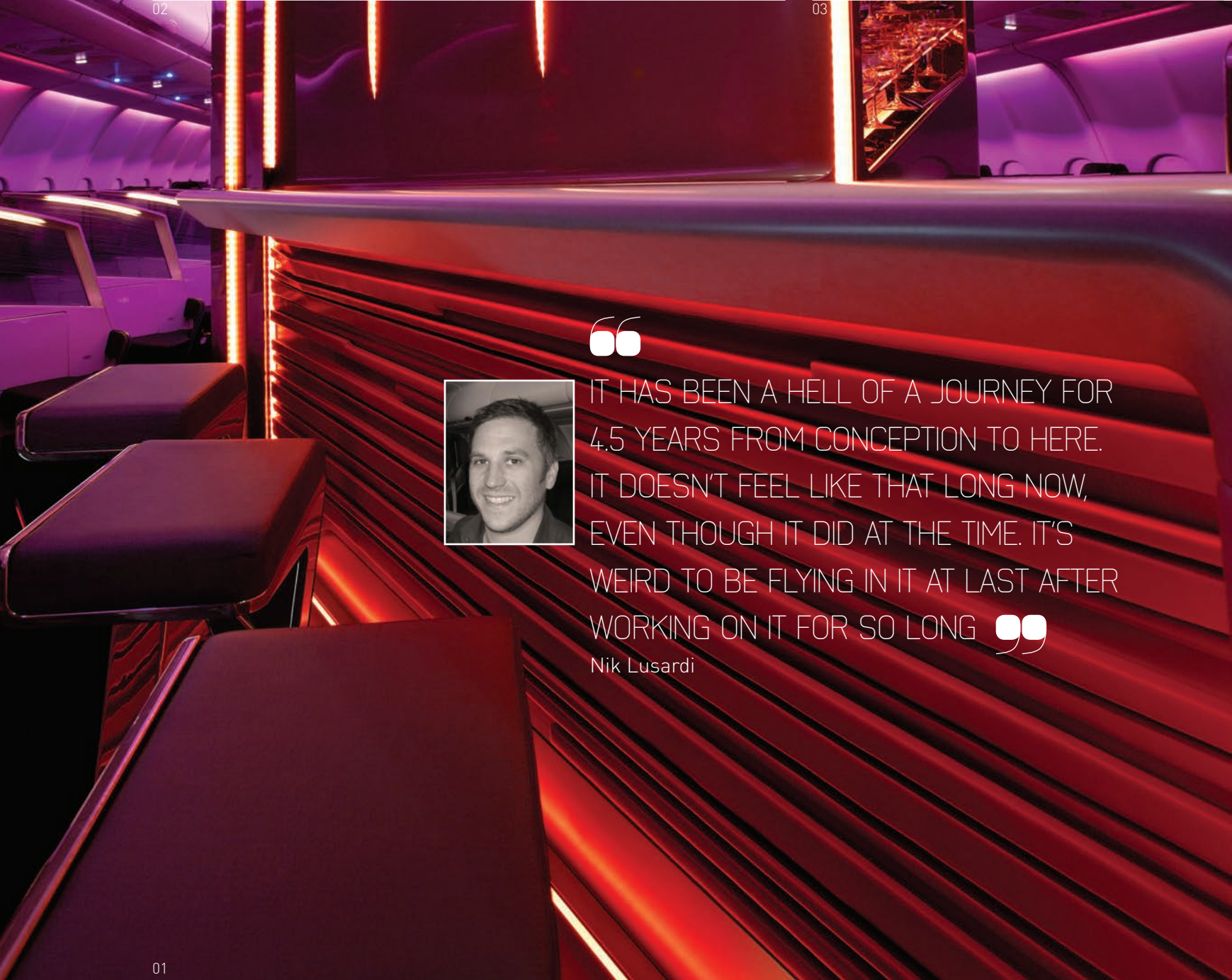
"The bar is one of the areas we really invest in and will continue to invest in; it's the first impression. I think even people going to the back to economy appreciate the fact it's on the aircraft and they will talk about it, whether or not they use it," states Southall. "It's all about the brand experience and interaction. For people who do come into



02



03



IT HAS BEEN A HELL OF A JOURNEY FOR 4.5 YEARS FROM CONCEPTION TO HERE. IT DOESN'T FEEL LIKE THAT LONG NOW, EVEN THOUGH IT DID AT THE TIME. IT'S WEIRD TO BE FLYING IN IT AT LAST AFTER WORKING ON IT FOR SO LONG

Nik Lusardi

01



04

Upper Class, it's very much a welcome encounter similar to being greeted in a hotel."

The bar area is much brighter and more inviting than the previous design, especially as it is now set at a more sociable orientation. The bar is wrapped in a champagne-coloured canopy, in which several slashes house lighting systems developed with DHA Design that pour light into the bar area and bathe it in a range of colours. These slashes are orientated so the light is focused on the bar, not on the seating areas. This is especially important as seats 8A and particularly 9A are virtually in the bar area but the occupants need to feel part of the Upper Class cabin.

"The lighting can be changed depending on the time of day or the route – for example on a New Year's Eve flight to Las Vegas we can give it the full works. Or we can have a more domestic feel so it's relaxing. Mood lighting makes a big difference to the passenger," says Southall.

The light reflects off a glossy bar surface made from a bespoke glass-reinforced aggregate. When manufacturing the surface material, the glass fibres were allowed to float to the surface, adding sparkle and helping to hide any scratches. The bar feels remarkably solid and stone-like (it is even cold to the touch), even though the surface is a mere 4mm-thick.

The three bar stools look fantastic, a twisted chrome cantilever design topped with aubergine leather. The cantilever design was a real challenge for certification, says Southall, but the result is worth it (and indeed worth the US\$40,000 they each cost). Other guests can lean on the bar or stand in the area behind. On Beauty Queen's inaugural flight from LHR to JFK we managed to fit 13 people into the area, although the official limit is eight.

A V-shaped bar with the bartender in the centre may have seated more guests, as with the previous design's five-seater arrangement, but the welcoming factor demanded the current shape, as did a clever new seat configuration. Which brings us to...

DREAM SUITE Enter the Upper Class cabin and everything will look familiar to regular users, just a little refined, with calmer colours and lighting, and Swarovski crystals adding a little bling. The feeling of space is certainly helped by the omission of overhead lockers in the centre, as before.

JAM session

All passengers on board Virgin Atlantic's A330 fleet will be able to enjoy JAM, a new IFE system, as part of a US\$70 million-plus partnership with Panasonic. The touchscreen system, fitted with a 12.1in screen in Upper Class, has been developed in conjunction with Panasonic. In Premium Economy and Upper Class, the system is coupled with a Karma touchscreen handset, again developed with Panasonic. The 'finger swipe' operation of both interfaces will be familiar to users of modern mobile phones. Passengers with the screen and handset can multitask, for example by watching a movie on the screen and the moving map on the handset.

When the Upper Class IFE screen is pulled out it reveals a useful space, which can be used as an armrest or cocktail table, especially with its soft-touch elastomer surface. The space was made possible because all the drivers are in the screen unit rather than under the seat, and all the cabling is ducted through the arm.

Over 300 hours of content is available, with key features including: content rating, whereby passengers rate their choices with a 'thumb up' or 'thumb down', with the results updated throughout the flight; critic reviews and cast/director interviews; a 'save for later' application that enables passengers to create playlists; and a 'Virgin Loves' section with the airline's recommendations. Kids have their own menu system with specially selected entertainment and games. To simplify selection, cover art represents each movie, CD or TV show, although a more traditional list format can be used, by genre, A-Z or passenger ratings.

Economy passengers can plug in a USB and view their own content on the seatback screens, and Premium Economy and Upper Class passengers can also plug in mobile devices to play music, videos, pictures or documents. This capability will also be available to economy passengers later in the year.

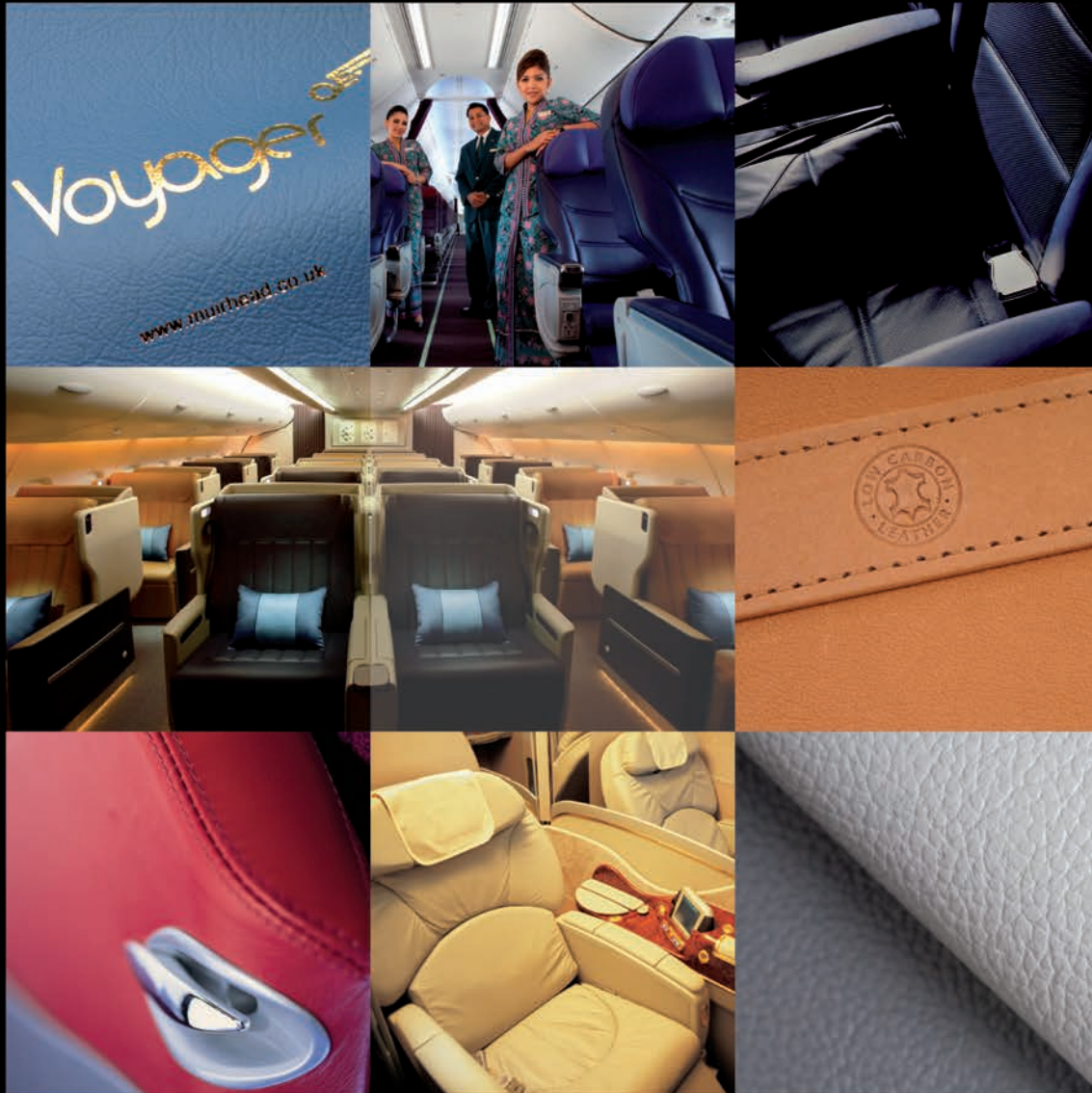
However, a major change is the configuration: the 1-1-1 layout used on Virgin Atlantic's A340s has given way to a 1-2-1 layout in the same cabin width of 5.28m.

The new layout was the brainchild of senior designer Nik Lusardi. "It was one of those 'Eureka!' moments. We were working on the seat as a team and had six or seven ideas. We were working on different configurations and knew the herringbone was the holy grail of space efficiency as everyone gets aisle access and their own suite and we can get a good length and width in the seat. But we weren't sure how to improve the existing product so we did a lot of renderings and finally worked out a way to get four abreast on a small wide-bodied aircraft. The fundamental of the design is the offset, combined with a different pitch and angle, so we can have four abreast next to each other."

The design, codenamed Uri – "It's great for space," explains Lusardi – enables not only an additional three seats to be fitted in an A330 (33 versus 30 in the previous design), but also a longer bed and wider seat, and the larger bar area. "No one believed me when I first showed them the new design," reveals Lusardi.

01. The bar area's bright lights are shielded from the seating area
02. The opaque shield is injection-moulded by Tex Plastics and laser etched with the Jetstream pattern
03. The only surface that isn't bespoke is the wall lining, which is a standard Airbus item
04. A snake light and flip-down cocktail table turn the table into a work area. Laptops can be charged via a socket located under the seat

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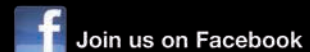


Andrew Muirhead

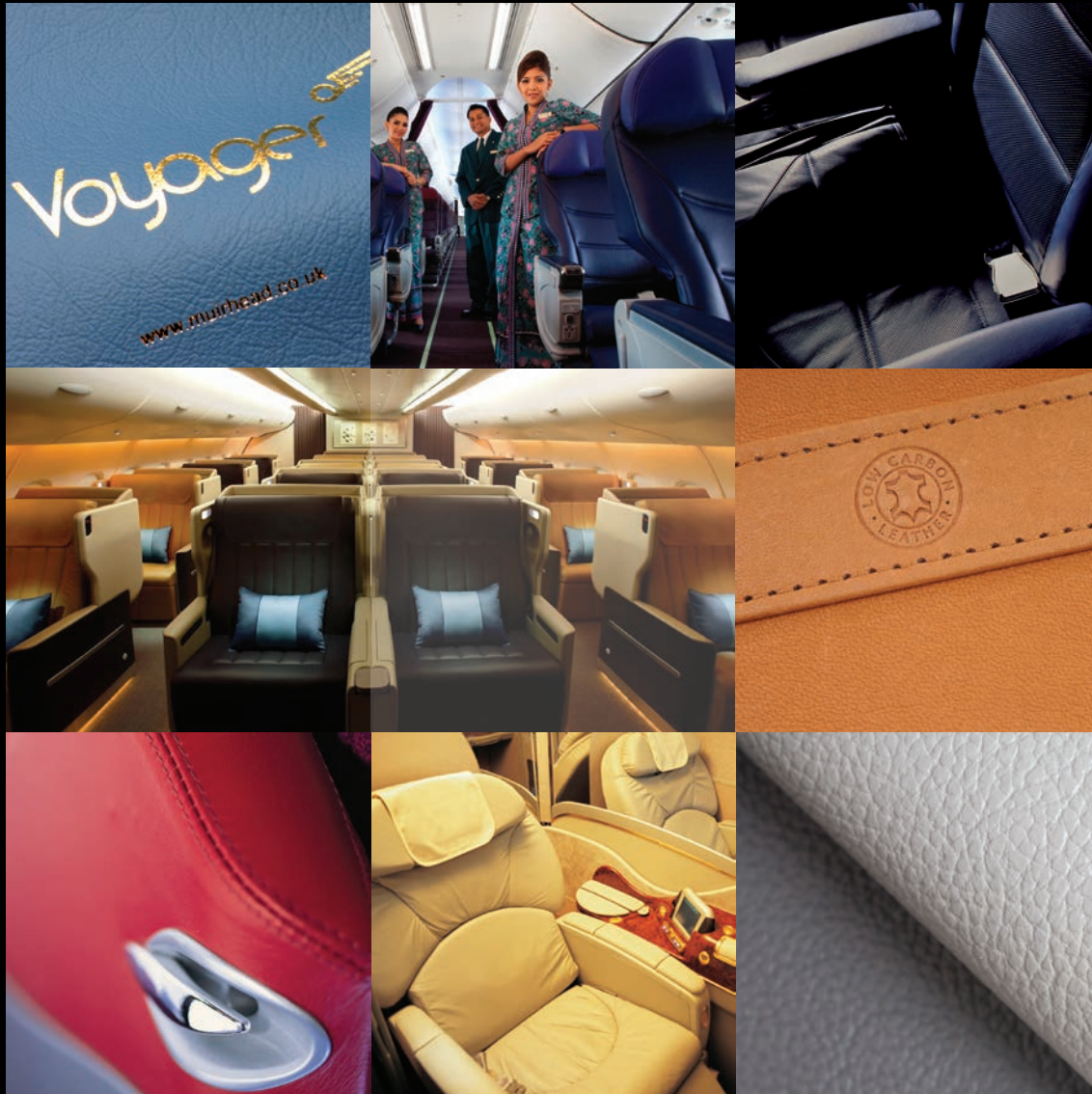
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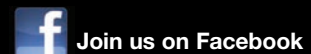
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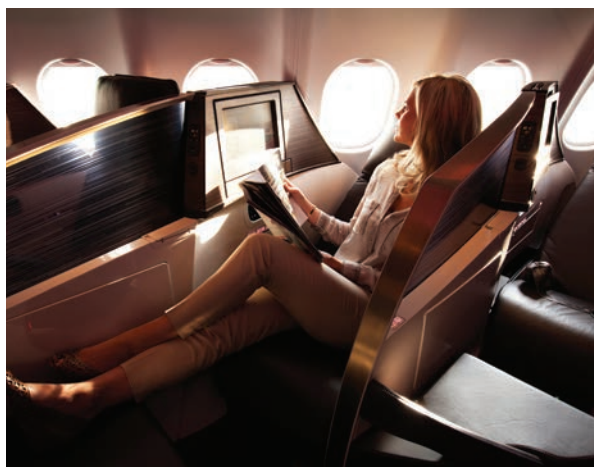


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05

no sky-high charges

Like it or loathe it, passengers in Upper Class can now keep up with business on the ground using their mobile phones. After takeoff, phones enabled for international roaming can be used for calling or texting at similar charges to using international roaming on the ground. For email, however, data roaming charges are still high (except for Blackberry users).

The Aeromobile technology, which has been integrated into Panasonic's eXPhone communications product, connects to the aircraft's network using the lowest settings to ensure passengers' phones do not interfere with any onboard electronics. The system will be available on 13 of Virgin Atlantic's aircraft by the end of 2012 and will initially operate over Inmarsat SwiftBroadband.



WE'VE INCREASED DENSITY WITHOUT TAKING ANYTHING AWAY FROM THE PASSENGER, AND THE CABIN HAS AN AIRIER FEEL

Martin Barnes

The suite, nicknamed the Dream Suite and assembled by Threesixty Aerospace (see *All-round Innovation*, page 49) is noticeably curvier than its predecessor, with the curves sweeping away rather than being parallel, which adds to the feeling of space in the cabin, as well as physically adding shoulder and midriff space within the composite walls, without losing any cabin space. A new opaque shield also helps break up the suite walls.

"The curves not only look great and give you a greater sense of space, but the aesthetics were created by the need to create space. The wall moves away from you in a twisted helix, which gives you a feeling of space – you don't get the MRI scanner effect," says Lusardi.

Four design agencies were invited to develop the design, and Pengelly Design won with its vision of the shapes and curves and shield design. Nine months into the project an unexpected hurdle was encountered when Boeing announced delays in the delivery of the 787 – the aircraft the design was originally intended for. "We had to flip the project on its head and work out how to take it off the 787 and put it on an A330," explains Lusardi. "The 787 is wider and the sidewalls are straighter, which makes a huge difference. It was a major tweak to make it fit because of the cause and effect: whatever you changed affected something else. All the unique features we had developed had to be altered and remain commercially viable – it was really challenging. Some things got lost – for example, a dual armpad on the original concept wouldn't work with the packaging [only a single would

fit], but on the 787 they'll be brought back. Also the ottoman was made a little smaller."

Gone is the bright purple leather ('aubergine' in Virgin Atlantic's colour palette), replaced by 'espresso' brown leather for a calmer feel, with the ottoman base wrapped in 'black cherry'. The curves in the seat also enable an additional 1.5in seat width, bringing it to 23.5in, which gives more room to the waist area when sleeping, and a longer bed at 87in, although the centre seats come in at 80.3in. The seat also reclines by around an extra 50% over the previous design to bring it closer to the ideal 'lazy Z' in what the airline calls the 'super lounge position'.

STORYTIME The bed function remains familiar, requiring the passenger to stand up and press a button for the seat to return to upright, waiting for the 'click' when the mechanism is unlocked, pulling the headrest down so the seat is flipped to its sleeping surface, and giving it a final push to lock it in position. A push on the bed is required to unlock it and reverse the process. A full-electric mechanism was discounted for reasons of weight and consistency of product across the entire fleet. "This design is just as intuitive to use [as a full-electric system] but reduces weight. The passenger intuitively knows what to do with the bed and it's simple to use – and nine times out of 10 the crew will prepare the bed as part of the service anyway. It's a balancing act between aesthetics, engineering and the customer experience," says Lusardi.

05. A suite with a view. Though not every seat has direct access to a window

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Threesixty Aerospace may not be a name familiar to you, but many will know it under its previous name: Reynard Aviation. Reynard was set up in 1998 to support the development of Virgin Atlantic's J2000 seat and went on to engineer and manufacture the first Upper Class suite as well as premium economy products.

The past four years have seen the company grow from 22 staff to 125, split 50:50 between production and engineering. This growth, together with a desire to break away from the association with Reynard Motorsport and fit more closely with the Virgin brand, saw a rebranding as Threesixty Aerospace, to coincide with the launch of the new Upper Class suite, though it will continue to make premium economy seats on a new proprietary base rather than the previous bases from Contour.

The ownership structure has also changed; in March 2011 it became a wholly owned subsidiary of Virgin Atlantic Airways, rather than a part of Virgin Group with Virgin Atlantic as a sister company. As managing director of Threesixty Aerospace Martin Barnes, who joined in 2008 and reports directly to Virgin Atlantic COO Steve Griffiths, says, "Our prime rationale is to support the products of Virgin Atlantic."

Using Threesixty also safeguards Virgin Atlantic's designs. "One of the advantages of having an in-house seating company is that it protects the confidentiality of the product and the registered design rights are protected," explains Barnes. "This is a key advantage – not only can you collaborate better through the design process but you protect the design and get a product at the end that closely meets the aspiration of the start of the process. There are no commercial issues to overcome, no confidentiality issues – we can have free-flowing discussions and have the same common goals and objectives."



THE WHOLE METHODOLOGY BEHIND THE SEAT IS ONE OF EXPLORATION. THE WHOLE CUSTOMER JOURNEY FROM CHECK-IN TO THE LOUNGE – THE SEAT IS AN EXTENSION OF THAT, AN EXPLORATION EXERCISE

Nik Lusardi

As the supplier of the seat, Martin Barnes, managing director of Threesixty Aerospace, was heavily involved in the engineering. "It's more of an evolution than a radical change. We tried to keep the same ethos so it's still a lie-flat seat, still uses flip technology, but visually it looks very different," he says. "What we tried to address with this seat was to improve sleeping comfort and some of the maintainability issues of the old seat."

SUSPEND BELIEF As well as now offering the longest bed in business class, Virgin Atlantic also wanted the most comfortable. Key to achieving this is a new hoop-supported webbing system which means the seatback doesn't have a hard surface – both the sitting and sleeping surface are on a webbing that gives a flexible sleeping surface.

"This innovation has never been done on an aircraft before. There are other suspension systems out there, but

nothing like this," asserts Lusardi. "This is brand new and actually comes from the furniture industry. We're really proud of this and can put our hands on our hearts and say this is a really comfy bed – probably the comfiest bed in the sky."

A bespoke elastomeric system, manufactured by Dahti using similar principles to the Herman Miller office chair, is strung between the load points of the seat and tunes itself to each passenger's weight and stature. The seat had to be engineered for greatly increased strength over the previous version, as around 40 lb of pressure is exerted on each point of the frame when empty – far more when it is occupied.

"This was quite an engineering feat and it was all developed from the ground up," says Barnes. "We tuned the tension on the webbing membranes to make sure we got the best comfort quality. Dahti works in a task chair

- 06. The rose gold PVD coated aluminium strips actually contain gold. The strips – US\$3,000 each – are made from 2mm-thick sheet aluminium, specified with a little springiness, and are supplied by an automotive trimmer
- 07. Flip over the seat for the longest bed in business

flying spanners

Should any problems arise with the new cabin within the first month of operation, help is at hand. Every time Virgin Atlantic puts a new product on its fleet, for a month it is accompanied by an engineer – or ‘flying spanner’, as they’re known internally.

We found spannerman Russ Walton on board, enjoying his job immensely. “It’s belt and braces. We fly to help the crew and give them a briefing and a helping hand, although they are trained on the new cabin already. We can also sort out teething troubles and do quick fixes, and get feedback from passengers.”

Don’t be harsh on Walton or his team if you see them lounging with a cocktail, though, as that is the sign of a job well done. “If we do nothing that’s good for the airline, and if we’re busy that’s bad.”

The only job we saw on board for the spanners to address was an inconsistent fit on the tray tables, which didn’t sit quite flush when stowed.



08

08. The herringbone configuration created an extra three seats, but also load share challenges

environment and the process they use is that the webbing membrane is injection moulded and they can adjust the tension for the best passenger comfort. There is no pure science in ensuring comfort – by adjusting it and trialling it we get the best comfort we can.”

To be sure, Lusardi consulted with a number of ergonomists to measure comfort levels, and conducted line trials with some top-rated Flying Club members. Some of these regular flyers even slept overnight on the beds at Virgin Atlantic’s mock-up centre near London Gatwick for a full-service ‘flight’, and gave their feedback. “When you’re working very closely with something it’s difficult to take a step back and be objective about the different options so it was good to get that feedback. We got some really interesting comments and we took those on board,” says Lusardi.

A bespoke ‘3D Nomex hexmaterial’ fabric on the sleeping surface aids sleep, as does the cabin crew’s recent coaching to speak to passengers at 20-30dB during night flights.

CERTIFICATION The Uri layout is good for comfort and should be good for revenue. However, it has not been without practical problems. To make it all fit, the aisles have narrowed, making it difficult to wheel a cabin bag without hitting an ottoman, and bed length in the centre suites has been sacrificed. However, the team faced bigger problems.

Certifying those centre seats was probably the biggest challenge as there was a potential load share condition between the seats whereby the load from one seat could be imparted on the shield perpendicular to it. To solve this, a ‘frangible fuse’ was built into the rear screen so that in the event of a loading the shield would bend so no load was imparted on the seat in front. This design passed all tests and has been approved by Airbus and Boeing.

“It’s a novel approach and we’re the only people to have done this with an interlocking concept down the centre section,” explains Barnes.

A further design change was that the composite suite walls, while looking like one piece, have been split into two sections with a thin split line. The rear shield is seat-mounted underneath through integrated metal structures, and the forward shield is a separate structure, enabling them to be certified separately – the rear to 16g, the front to 9g. This also means that in the event of damage to the forward shield, it can be replaced in around an hour while the aircraft is on the tarmac.

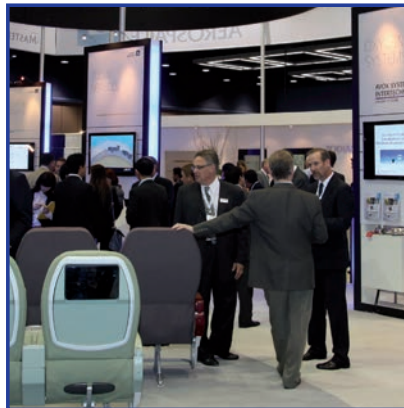
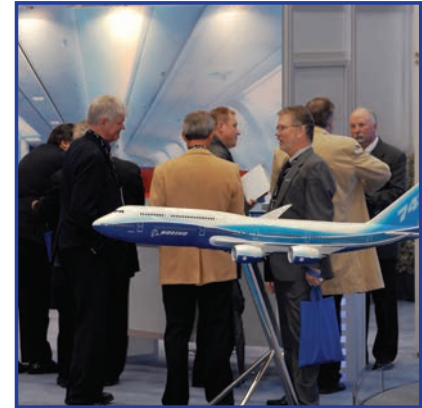
OVERALL Getting more passengers on board while adding to living and social space is a great achievement, especially as the new seat is actually around 18% lighter than the previous version, at 100kg. The certification process added a little to the seat’s target weight, but Threesixty Aerospace hopes that by the time comes to fit out the 787s they may be able to remove a little more weight, especially in the tray table assembly.

Three of Virgin Atlantic’s fleet of A330s have been fitted with the new Upper Class product, with the remainder due for completion in September 2012 and the A330 retrofit program due to be completed by the second quarter of 2013. The remaining fleet of 747s and A340s will not be upgraded; instead the airline will focussing its efforts on making the Dream Suite for its 15 Dreamliners, due for delivery beginning in 2014. ☒

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There are plenty of fancy new ideas for wide-body aircraft, given the extra space to play with, but single-aisle interiors could have an exciting future, too. We take a look at the short- and near-term view

GUY BIRD, AIRCRAFT INTERIORS INTERNATIONAL



Space and budget constraints make short-haul, single-aisle aircraft more difficult to package than their wide-body cousins, based on the need to fit more people into a smaller space for less money. Of course, this doesn't mean short-haul interiors have to be dull or lack innovation. On the contrary, just like the best city cars, smaller aircraft don't necessarily have to feel that way inside. Indeed, innovation can sometimes be greater in these compact spaces, with the old adage 'necessity, the mother of invention' apposite.

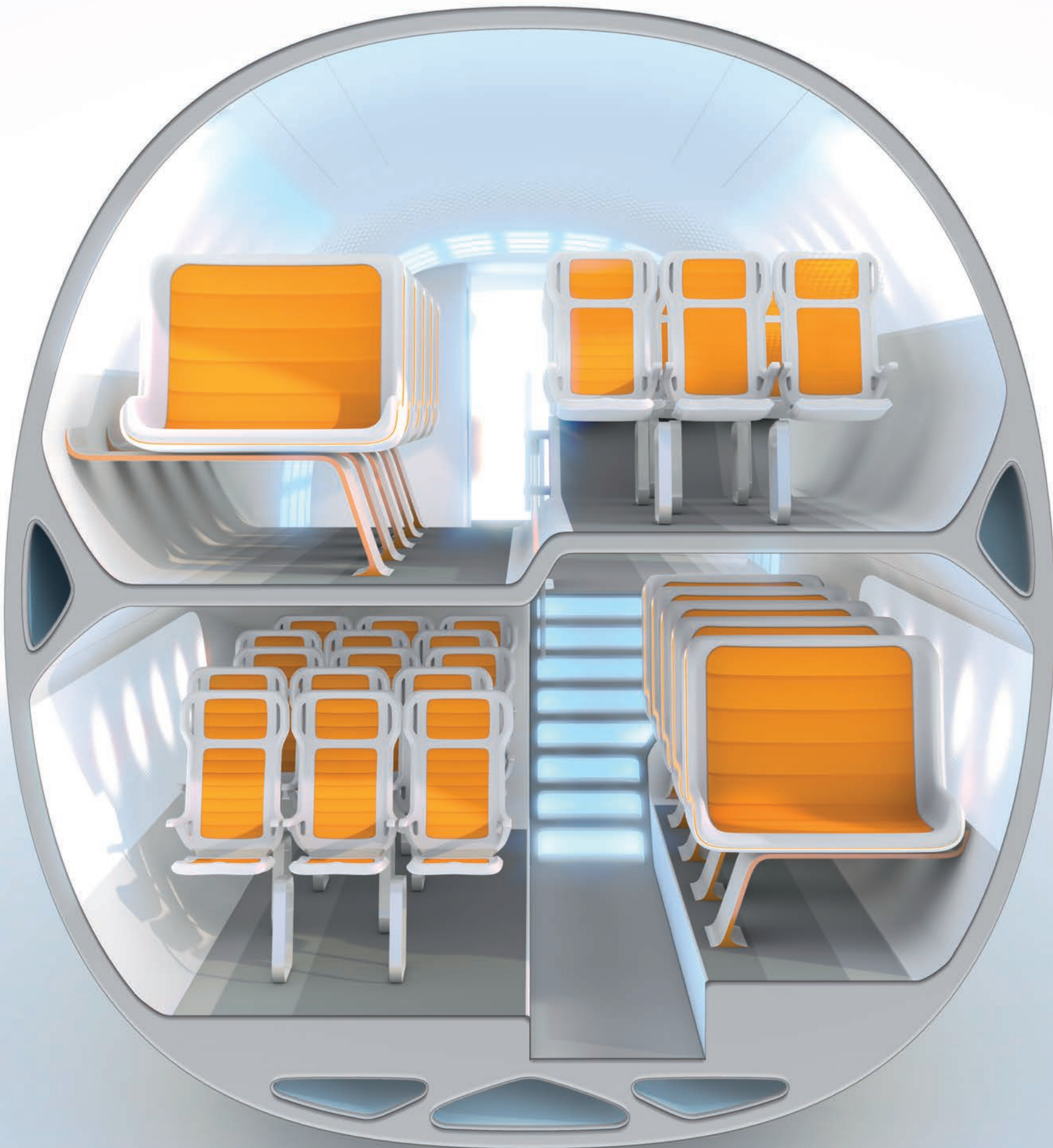
Dan Rice, director of air transport for lighting specialist Emteq, is practical in his assessment of the differences: "Short-haul aircraft will never require the breadth of personal accoutrements demanded in long-haul aircraft. But because of the weight and space considerations (and the sheer number of these aircraft), the demand for innovation will be greater."

Less money to spend per passenger doesn't have to mean fewer interesting cabins, either, reckons José Rui Marcelino of Portuguese multidisciplinary design business Almadesign. "Innovation does not always require big budgets," he states. "Usually it is the other way around, as limited – but reasonable – budgets can spur creativity and lead to ingenious solutions, as long as they are properly targeted and managed. Space should be seen as a boundary condition, not a hindrance to innovation."

ISIS A320 One of the most important short-haul cabin concepts to be revealed recently is C&D Zodiac's ISIS, which is the company's near-term vision for smaller single-aisle production cabins. The concept has been in development since July 2011 and was revealed at Aircraft Interiors Expo 2012.

C&D Zodiac's Scott Savian takes up the story: "The ISIS interior provides a wide-body experience in a single aisle," enthuses the VP of marketing, "with innovations yet to be realised in wide-body aircraft, including new bin and lighting innovations."

01. ISIS creates extra cabin space, while boosting baggage capacity and reducing weight and cost





03



04

One of the key features, currently being demonstrated for an Airbus A320, is the much larger, pivoting overhead stowage areas, each of which is able to take up to five bags, wheels-first. This is made possible by better design integration of bin, lighting and air-conditioning systems that C&D's Savian says his firm is uniquely placed to handle, given its expertise in design, engineering and production. Overall, a 60% increase in cabin baggage capacity is claimed.

It's a very practical approach that has also been applied to the passenger service unit (PSU) to create more space – and the feeling of space – as Savian recounts: “The PaxPod coupled with LEDs afforded us the opportunity to change the basic architecture of the cabin. We removed the linear sidewall lighting and went with a passenger-centric arrangement where, for the first time ever, we placed a significant piece of the interior lining architecture (the pod and lighting) in sync (at the same pitch, and adjustable) with the passengers and seats. Traditionally the liners and lighting design are based on the aircraft structure, not at the same pitch as the passengers. The resultant effect is an elegant light solution, increased passenger space, cleaner lines, and more even light distribution for passengers. We save nearly two inches overhead and almost an inch at the top of the sidewall.”

Overall, the ISIS interior for the A320 has five unique installation modules (a 55% reduction over the A320's 11) and 55 mechanical fixation points (a 56% reduction over the A320's 124).

Although the ISIS features are being showcased in an A320 mock-up, Bombardier has already adopted many of the innovations from the concept for its forthcoming CSeries cabins due for first deliveries in 2013, and Savian says the PSU will also likely see service in 18 months or less.

MAX SPACE Meanwhile BDLI, the German Aerospace Industries Association, has been focusing on integrated concepts for the future, in conjunction with Airbus. Its latest venture is a multidisciplinary approach to a single-aisle aircraft, again using an A320 as a base. The aircraft

project amber

Pivot bins can be installed without investing in new aircraft or expensive retrofit programmes, claim Project Amber's creators.

This concept, created by Heath Tecna, is a pivot bin interior with a unique bin configuration that fits in standard 80in modules, suitable for B737NGs and B757NGs. For every 80in module, two pivot bins are configured in a 33 x 47in arrangement. This allows passengers to stow roller bags transversely on their sides with three bags in one bin, and four bags in the other. This is great news for airlines who want to increase baggage capacity in the cabin, and especially so for those flying the latest B737NG with the Boeing Sky Interior, who want to offer a similar overhead stowage system across their narrow-body Boeing fleet.

Heath Tecna is currently optimising the bin design by making it deeper, which will allow passengers to stow 110 roller bags wheels-down per 737-800NG aircraft, while a side stowage style will afford 156 roller bags per cabin.

While the interior is presently called 'Project Amber', later this year when it is launched with a customer, its name will officially become 'Amber Interior'.




- 02. The wide single seats in BDLI's vision can be easily converted to accommodate two people
- 03. Not just a pretty light: cabin baggage is rotated around the fuselage as it is stored
- 04. BDLI's smooth, self-cleaning lavatory

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05

05. The Bombardier C Series cabin features several design cues from the ISIS concept
06. A mock-up A320 with an ISIS interior is being evaluated at C&D Zodiac's California HQ

features double-decker 'Max Space' architecture, with passengers welcomed on board and their movements monitored via RFID. A revolving 'collar' between the forward and rear cabins functions as an automated luggage drop with smart storage for carry-on bags, thus dispensing with overhead stowage bins.

The seating, designed by Recaro, is flexible, featuring adjustable width and pitch as a revenue generator. The unusual 3-1 configuration offers the greatest luxury, especially for larger passengers, but that single wide seat can be quickly converted to a two-seat shape or adult and child seat.

A video showing a walkthrough of the concept aircraft is available on www.AircraftInteriorsInternational.com.

FUTURE LIFE Moving further into the future, Almadesign's LIFE (lighter, friendly, eco-efficient) aircraft cabin concept envisions a new way of looking at single-aisle interiors, focusing on sustainable materials within a comfortable space mixing natural and artificial elements. With only four seats, a lounge, and its own sit-in geodesic dome for immersive entertainment, it is clearly not fully focused on maximising passenger numbers (its original pitch was as a business jet). But some of its features have been developed with an eye on smaller budgets that could be applied to cabins carrying far more passengers.

Advanced composite materials and new manufacturing techniques have been used to attach the seat structures to the cabin side walls – so the seats appear to 'float' – which is both pleasing to the eye and, says Almadesign, has weight-saving benefits.

The two-year project is clearly highly conceptual and not tested to FAA and EASA regulations, but Embraer was



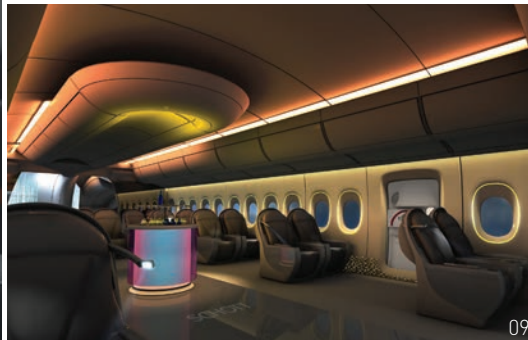
06

“
THE CONSTRUCTION OF
SLIM SEATS HAS REACHED
ITS LIMITS”

responsible for defining the parameters for possible certification so that the prototype could stay rooted in a future potential reality. As Marcelino says, “These solutions can be more easily tested and integrated in high-end business aircraft, but the team's long-term expectation is to bring these ideas into commercial aircraft.”

IN THE DETAIL While Almadesign, BDLI and C&D Zodiac's proposals show visions of complete aircraft interiors, many specialist suppliers are also pushing the boundaries of how the individual components in those cabins may look and function in the future. A crucial area for single-aisle cabins is clearly seating, but specialist Recaro Aircraft Seating isn't convinced that a major shift will occur within the next 10 years. As Recaro CEO, Dr Mark Hiller, reasons, “Seats are installed in the aircraft by attaching them to seat floor tracks, and as long as this construction principle doesn't change, seat construction won't change fundamentally either. Only if seats become an integral part of the aircraft cabin construction might there be changes in the design of passenger seats. But even if we expect the big picture to remain the same, some details will certainly change.”

In terms of that detail, Hiller sees further improvements in weight reduction by using new analysis techniques in the design stage and different materials, such as the new aluminium alloy, titanium and carbon fibre reinforced plastic seen on Recaro's Stingray concept, which, in turn informed the Smart Line 3510 seat. However, he doesn't see much more change in seat size, as he boldly states: “The construction of slim seats has reached its limits. Seats that get slimmer and slimmer do not enhance a passenger's sense of safety.”



07. Dual-zone PSU 'PaxPods' in the ISIS integrate lighting
 08-09. Schott predicts the possibilities of LEDs lighting up the future



SINGLE-COLOUR RGB ACCENT LIGHTING
 COULD BECOME COMMONPLACE IN
 THE NEXT FIVE TO 10 YEARS



Lighting is another big area where technology is leading the charge. LEDs are now becoming mature, being used for mood and function purposes, with OLEDs (organic light emitting diodes) to follow, and then flat-panel designs. According to lighting expert Matt Davis, product manager for Emteq's LED programmes, single-colour RGB accent lighting could become commonplace in the next five to 10 years, even on regional carriers, to help brand cabins in a more dynamic way using the walls and ceilings. Lighting signage could become more dynamic, too, pulsing, flashing or flowing along a virtual line to become an enhanced communication tool beyond existing static 'on' or 'off' styles.

Another light specialist, Klaus Portmanns, business manager for aviation at Schott, also sees LEDs taking centre stage by 2022. Currently estimating that fluorescent tubes are still used in around 20,000 aircraft, he sees big retrofitting business opportunities available. Schott is pushing its HeliJet product, which features only a few LEDs combined with light guides in order to reduce the maintenance and control issues associated with the greater number of LEDs used in LED stripes. Working with Lufthansa Technik, a full-colour version is due to be introduced from 2013.

The less glamorous areas of aircraft interiors will also see changes. Gerhard Mörtenhuber, the executive vice

president of interiors at composite specialist FACC, sees a trend for hi-tech, touchless control equipment in lavatories for obvious reasons of improved hygiene and a general customer demand for more customisable new interiors that, in turn, could result in shorter cabin lifecycles.

Looking further ahead, Almadesign sees lavatory areas with new surface materials that can be self-cleaning and automatically recycle air. A similar idea has been incorporated into BDLI's concept, with lavatories developed with Diehl that have a smooth shape for easy cleaning, touchless operation, and active antibacterial surfaces for self cleaning.


Short-haul travel certainly sounds interesting in the long haul... ☒

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one seat fits all

Joint procurement by airline alliances could lead to more standardised cabin interiors. This is good for the bottom line, but is it good for the passenger experience, branding and innovation?

SASHA BROWN, AIRCRAFT INTERIORS INTERNATIONAL





For more than a decade, the major airline alliances have explored various joint procurement initiatives across a number of different levels, and now their purchasing patterns could lead to greater standardisation inside the aircraft, with the seat being the first target.

Last year, Star Alliance announced the development of a common economy-class long-haul seat as part of a continued effort to standardise services and derive greater economies of scale across the alliance.

“The primary objective was to provide participating Star Alliance carriers with the best economy seating product that optimised passenger comfort features and lowered TCO [total cost of ownership] for the operators,” explains Steve Collard, director of strategic sourcing at Star Alliance. “The approach was to establish a design that incorporated both a standard platform shared by all, and a catalogue of options that allow carriers to address their brand differentiating requirements.”

The joint sourcing efforts follow the Star Alliance’s objective, when established in 1997, to offer procurement and cost-saving opportunities for airlines – but this is the first such initiative by an alliance at this scale. The alliance

is made up presently of 25 members; however, the product originated after 10 of its members worked together to research the possibility of deriving synergies through the project.

“The biggest challenge is to get all the airlines on the same page,” observes Tom Plant, the vice president and general manager of seating products at B/E Aerospace, which was selected as the manufacturer and designer of the Star seat. “So far, three airlines have come to the table, Lufthansa, Austrian Airlines and Air China – those are the carriers who have given a firm commitment – but the launch programme is for Lufthansa.”

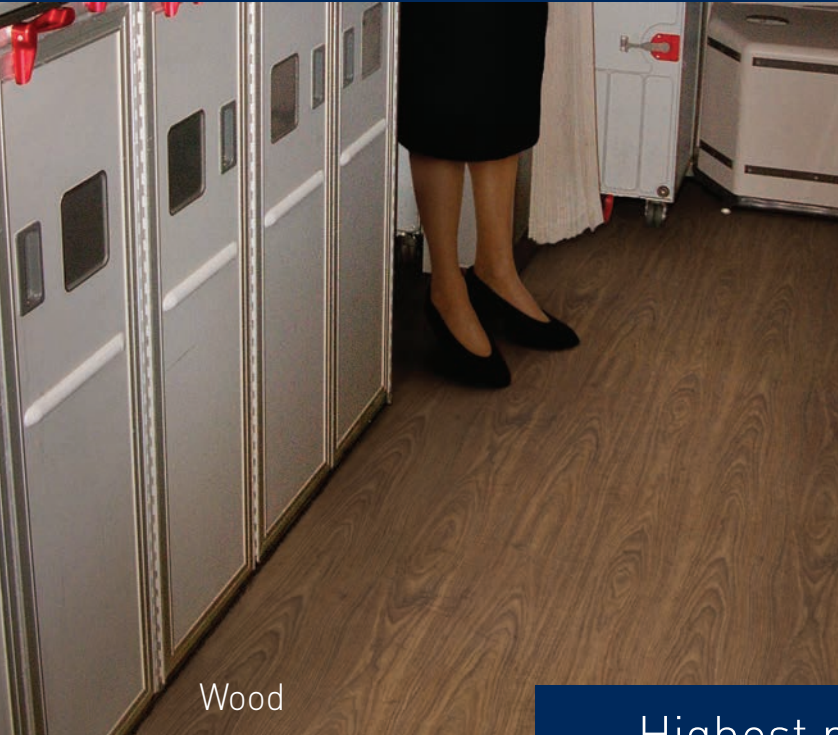
The Star Alliance has previously said the intention was not to have the same product and brand across all its members, but to develop a single platform, and that other Star carriers could join the three launch customers. The airlines will remain independent when it comes to choosing colours and fabrics, which all contribute to the uniqueness of the seat.

B/E Aerospace conducted multiple reviews with the airlines and the programme is now rapidly reaching the testing phase, according to Plant: “We have passed the



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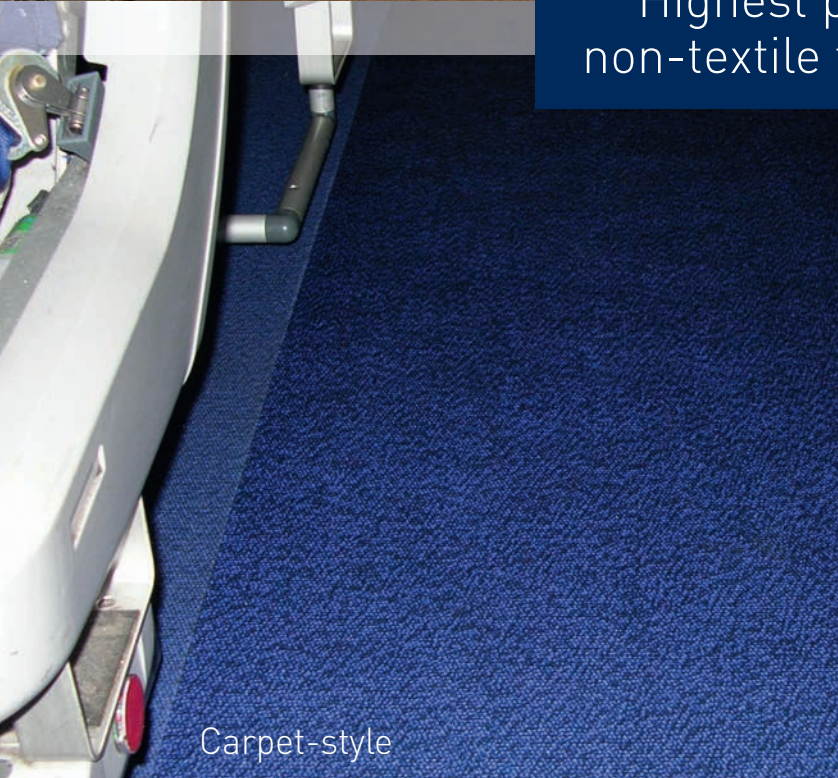


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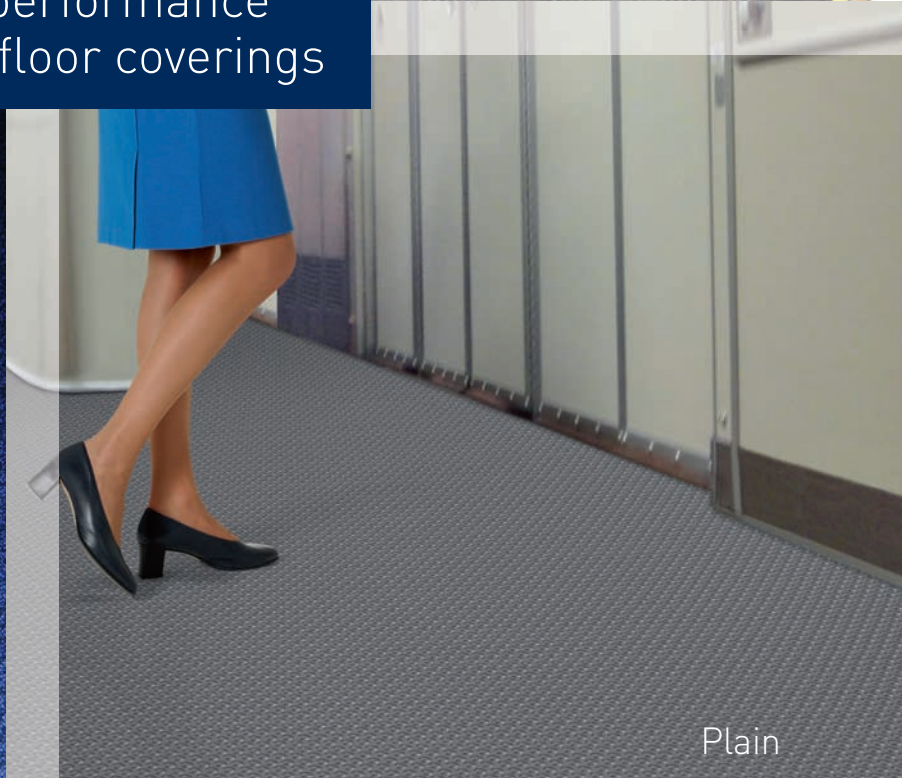


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01



02

critical design and development stage and are moving into the testing phase.” He says initial deliveries are expected in the third or fourth quarter of this year. “The Air China commitment, however, is not until the beginning of 2014, so they are on a slightly longer schedule,” he adds.

PINNACLE OF DESIGN The long-haul economy seat platform is based on the B/E Aerospace Pinnacle economy design. “Before entering into discussions with the Star Alliance we already had quite a portfolio of varieties of solutions, but beyond that we created a more advanced version for the Star Alliance application,” explains Plant.

Known as Star Plus, the seat comes as a baseline or advanced version. Plant says the baseline variant is more akin to the standard Pinnacle offering, but the higher-end advanced seat would be unique to Star Alliance carriers. “It looks totally different from anything else that we have produced. The reaction to the seat has been great and it’s the product that we have the most interest in,” adds Plant.

During the market research stage, Air China set up a special aircraft seating simulation zone at Beijing Capital International Airport. Selected from the airline’s Phoenix Miles members, the 200 qualified participants had all taken four recent international Air China flights and flown at least once for six hours or more on another Star Alliance member’s flight.

Passengers tested seats that were already on the market and three new seat concepts from various manufacturers. Each passenger spent 1.5 hours in the simulated cabin environment testing the seats. Their feedback would gauge various aspects of the seats, including comfort, design, and possible improvements as an important reference for Star Alliance in deciding on the most suitable seat.

Industry observers believe it was no coincidence that Star Alliance chose a blue-chip company to develop the seat; perhaps this gave airframe manufacturers more confidence

in including the seat into their catalogues. An observer at Aircraft Interiors Expo in Hamburg earlier this year said it would be more of an issue if Star Alliance had chosen a standard seat from a start-up supplier – “but for reliability reasons, I guess they didn’t chose that,” he reckoned.

For example, Airbus includes the B/E Aerospace Pinnacle seat in its A330 buyer furnished catalogue and supplier furnishing for its A350; it is most likely that the new Star seat will meet the same certification criteria and can piggyback on the Pinnacle catalogue inclusion.

However, Steve Collard stresses that Star Alliance engaged with both legacy and emerging suppliers in their evaluation: “The selection process was objective and was based on carrier-agreed evaluation and selection criteria.”

AIRFRAMERS In terms of airframe manufacturers, Tom Plant says “they are obviously supportive” when it comes to mass standardisation of aircraft seating. His remark was echoed by an Airbus spokesperson, who recently said that if an aircraft manufacturer received enough customers who wanted something fairly similar with its own derivatives, so you can customise around it, then it would actually go in the exact same direction they would hope for. “We see no lack of capability there at all,” said Airbus.

“ THE OVERALL BENEFIT TO MEMBER AIRLINES IS THE OPPORTUNITY TO BUY A FULLY CUSTOMISED SEAT THAT INCORPORATES THE KNOW-HOW OF SEVERAL MEMBER AIRLINES ”

01. B/E Aerospace’s Tom Plant predicts no difficulty in the Star seats entering the A330 and A350 catalogues

02. The Pinnacle-based Star Plus comes in two versions, which have been well-received by airlines



03

“ THE STAR PLUS SEAT IS
ACTUALLY AN EXCELLENT EXAMPLE
OF HOW ALLIANCE-BASED PURCHASING
CAN INFLUENCE THAT MARKETPLACE TO
PROVIDE GREATER INNOVATION ”

03. Smaller airlines will appreciate the lower IFE costs that alliance buying power could bring

Boeing agrees, saying that if the concept is adopted on a wide scale (and in addition to reduced acquisition costs), increased standardisation could result in decreased engineering, certification and programme management workloads, benefitting the industry as a whole. “Boeing is positioned to support customers who choose this path, as well those who want more variability in their seating products,” said a Boeing spokesman in response to this article. He added that it’s important to remember that airlines have wide ranging and varied markets, leading to diverse seating and interior requirements. “Accordingly, some airlines have always taken the lead on innovation and will continue to do so. Airlines will take advantage of the purchasing power of an alliance when it makes sense to them, and will continue to drive for their own unique brand identity in other areas,” he stated.

CHEAPER IFE? Perhaps that last point is also true when it comes to IFE systems; Star Alliance has reportedly expressed interest in future joint procurement of IFE and connectivity. It’s considered likely that the alliance will not look at creating a new IFE or connectivity system, but rather leverage its purchasing power to drive down costs.

The question of what level of sophistication different members require, and what they are willing to spend for it, has already sprung up, as has consideration of the various requirements that might sometimes be contradictory. IFE systems and seat architecture are two areas that normally have the most diverse requirements by airlines.

INNOVATION Despite the obvious advantage of reducing cost through volume, some believe mass standardisation may scale-back cabin innovation because several airlines will use the same or a similar product.

Steve Collard disagrees, believing the situation is quite the opposite. “The Star Plus Seat is actually an excellent example of how alliance-based purchasing can influence that marketplace to provide greater innovation. In addition to the economy seat initiative, which is the most advanced at this time, we are evaluating other initiatives,” he says.

Boeing predicts that there will be continued activity throughout the industry to standardise commodities to gain cost benefits, while maintaining appropriate levels of individual brand identity. However, other airline alliances are cautiously treading around the issue.

“Greater standardisation in aircraft seating or interiors could be an area of interest,” say the Skyteam Alliance in a statement. “Where cost-cutting initiatives such as joint procurement are possible, we will consider this, but the scale is sometimes so large that we believe it will be a challenge to find a supplier who can deliver.

“Ultimately, however, we look into anything that has a positive impact on our customers and our members. Currently, lounges, check-in facilities and platform handling are areas we focus on when finding synergies to get costs down,” Skyteam says.

Oneworld has a healthy record of joint procurement activity across the alliance, but Michael Blunt, its vice-president for corporate communications, says there has never been a sufficient level of interest among the member carriers for the development and purchase of standard seating to warrant pursuing this as a multilateral alliance activity. He points to a number of reasons for this: differing re-equipment time schedules; competitive issues; complexity of working with different partner airlines; differences in preferred suppliers; differing requirements; and differing fleet types.

The members of the Star Alliance are riding high on the prospect that they can achieve a differentiated product while working together to drive synergies, lower costs and enhance the overall passenger experience. The overall benefit to member airlines is the opportunity to buy a fully customised seat that incorporates the know-how of several member airlines. The aircraft interiors industry will no doubt watch closely as the Star Alliance standardised approach unfolds; only time will tell if it takes off across the airline industry. ☒

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EXIT

The Emirates logo, featuring a stylized falcon emblem above the word "Emirates" in a serif font.

magnificentseven

When Emirates recently took delivery of the 1,000th Boeing 777, it was just part of the success story of the world's best-selling twin-aisle, long-range aircraft. What role does the cabin play in this achievement?

AUBREY COHEN, AIRCRAFT INTERIORS INTERNATIONAL



From the publishers of Aircraft Interiors International magazine

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02

going the distance

On November 10, 2005, a Boeing 777-200LR Worldliner set a Guinness World Record for the distance travelled nonstop by a commercial aircraft, demonstrating that the 777 can connect nonstop almost any two cities in the world. A 777-200LR flew 11,664 nautical miles (21,601km) during its 22-hour 42-minute flight that left Hong Kong flying eastbound the evening of November 9 and landed at London Heathrow Airport on November 10.

That distance is farther than any previous commercial jetliner has flown and equates to a flight of more than halfway around the world.

More distance and speed records were won in April 1997, when a Malaysia Airlines 777-200ER set a new Great Circle Distance Without Landing record, flying 12,455.34 miles (20,044.20km) from Seattle to Kuala Lumpur. The aircraft then returned to Seattle at an average speed of 553mph, setting a new speed world record at the time for its size and class of aircraft.

 The Boeing 777 got to 1,000 deliveries faster than any wide-body aircraft in history, largely due to its economics, range, size and reliability. “It’s very much the workhorse of the fleet,” says James Boyd, vice president of communications for Singapore Airlines in the Americas. Singapore Airlines has ordered 73 of the 777s and received 65.

But don’t discount the 777’s interior: “The interior was certainly an important consideration,” states Mahmood Ameen, vice president of engineering projects for Emirates, the 777’s top customer, with 136 ordered and 52 received. “Currently, we believe the Boeing 777 interior architecture to be one of the very best in terms of space, ergonomics and comfort. Overall, the 777’s interior creates a feeling of spaciousness that contributes to passenger comfort and well-being in the air.”

The 777 is a great aircraft to work with, believes Luke Hawes, a director and head of the aviation team at design firm Priestmangoode. “When one of our designers outlines a cabin vision for an airline and looks at ways of pushing the brand forward, the 777 is top of our list,” he states. “That’s the aircraft we want as the flagship.”

Why? “It’s just a very, very flexible platform,” Hawes explains. “We’re able to create a much more ‘wow’ entrance area, because the 777 cabin lining allows us to customise the sidewalls, galleys, lavatories and stowages. Likewise we’re able to get many more branded items as attachment parts. Other aircraft are much more restrictive.”

Airlines have given new attention to the boarding area over the past four or five years, according to Gary Weissel, vice president at consulting firm ICF SH&E. “They’re installing social areas including bars in the entry area, trying to provide a feeling of spaciousness. They don’t want the passengers to feel like they’re walking into a claustrophobic tube, but rather into an airport lounge.”

The 777, like many aircraft, normally has a galley right by the entrance. But the 777 allows for a variety of options that help make this area more open and give galleys a less industrial look.

The 777’s flexibility covers where bins start and stop (allowing for different zone sizes) and whether there are bins at all in first class, explains Hawes. “With no bins at eye level, it gives you a much bigger impression of the space, so the first-class space seems a little bit more indulgent.”

01. Previous page: Emirates’ custom door entry and first class cabin were designed collaboratively by Teague, Boeing and Pierrejean Design Studio
02. The 777 is still flying high after 17 years
03. Singapore Airlines has fitted the widest seat in business class to its 777s, at 32-34in wide
04. Emirates First Class Private Suites, made by B/E Aerospace



03



04

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CEILING FAN The 777's high ceilings add to that effect, says Weissel: "You have a massive amount of headroom, which you don't have on other aircraft."

Emirates features first-class suites on its 777s, with a starry-sky motif throughout the cabin. "One of the features of our 777 first-class cabin is the ceiling design, which required Boeing to make structural changes to the fuselage in order to raise the ceiling height," says Ameen. Emirates eliminated bins in first class, but Ameen describes the 777's bin design and capacity as "unique in the industry".

Singapore Airlines' Boyd calls the 777 "a blank canvas". This airline also went with no bins in its 777-300ER first-class section, installing mood lighting and 35in-wide mahogany-trimmed leather seats that fold flat to become what the airline calls "the largest full-flat bed in the sky".

In designing the 777, Boeing set out to make the cabin feel more open, says Doug Ackerman, 777 interiors chief engineer at Boeing Commercial Aeroplanes. This included moving the side stow bins as far to the side of the cabin as possible and putting the centre bins higher than on other aircraft, he said. "When you're sitting down, you can see across the aircraft. You can see the ceiling lights on the other side of the aircraft."

PERSONAL TOUCHES Boeing also has certified high-end lavatory features such as a bowl basin with a freestanding mixer-tap off to the side and a recessed mirror, Hawes notes. Emirates outfitted its 777 lavatories with a larger basin and wood-finish interior, Ameen adds.

There are further opportunities for logo placement throughout the aircraft, as well as installation of customised versions of finishes such as monitor shrouds, magazine racks, literature pockets and signs.

In updating the Turkish Airlines brand image to a more "contemporary European look and feel" a few years ago, Hawes explains that, "the 777 was just easier and quicker to implement" than other aircraft.

digital dream

When it was launched in 1995, the 777 was the first jetliner to be completely designed and pre-assembled using 3D CAD. Massive investments into its laboratory facilities enabled Boeing to test the various aircraft systems as a single integrated entity in simulated flight conditions before the first 777 took to the air, significantly reducing development costs.

American Airlines announced last November that the 777-300ERs it has on order, set for delivery this year and next, will feature a walk-up bar stocked with snacks and refreshments in the premium cabin, to go with its new Flagship Suite first-class seats.

POPULAR OPINION The 777's adaptability is reflected in the fact that readers of *Executive Travel* magazine have voted the 777 the best interior every year since the survey started in 2008, says Boeing's Ackerman. And that translates to sales and pricing, he says. "We do believe we get a premium on the 777 because of the interior."

But Cathay Pacific Airways, which has ordered 54 777s and received 22, doesn't see a passenger preference for the aircraft, says Alex McGowan, the carrier's general manager of product. "Our research shows that passengers are far more interested in network, schedule and product than they are about the aircraft. There is nothing remarkable about the 777 interior that makes it more or less conducive to the standards of product and service excellence to which we strive." Cathay Pacific designs its interiors "to provide the same customer experience across all aircraft", McGowan adds.

COMPETITION While it remains popular, the 777 is no longer the new kid on the block. The biggest splash to follow 777 into service was the A380, which boasts luxuries such as suites, showers, lounges and duty-free shops.

05. Cathay Pacific's Business Class suite on the 777 features a unique bed extension that automatically increases the width when deployed

06. Cathay's JPA-designed Business Class seat won a runner-up position in the Crystal Cabin Awards 2012



05



06



07



08

07. The 777-200ER and 777-200LR also offer crew comfort, with six-bunk rest stations located above the economy cabin

08. The 737 has been kept fresh with the Sky Interior, as shown by Norwegian Airlines. A similar programme may be applied to the 777

“There are a lot of carriers that still have the 777 as their flagship aircraft,” states Weissel. “However, as the A380 joins an airline’s fleet, I expect the 777 may lose its title.”

This is mainly because the A380 is much more spacious, not just because of the upper deck, but also because the main-deck sidewalls are near-vertical, creating a much more usable space, he explains. “More space translates into more flexibility, a better passenger experience, and the ability to maintain economies of scale to keep an aircraft profitable.”

Singapore Airlines, for instance, offers suites on its A380s but has no plans to do so on the 777, according to Boyd.

Asked about the A380, Ackerman acknowledges, “There is something you get with sheer size. We’ve seen some pretty innovative stuff on the A380 in terms of what they do in the – I guess I’ll call it – wasted space, in the front end of the upper deck. Really, the rest of the aircraft, in spite of its size, actually has less opportunity for customisation than the 777.”

Ackerman notes that the front of the 777 has more space above the stow bins, for instance, because there isn’t another deck above it.

Boeing itself has since rolled out the 787 Dreamliner, with a huge focus on a high welcoming entrance with an arch stretching across the entire width of the aircraft.

When the 777 came out, we didn’t do anything unique at the entry doors to welcome passengers,” Ackerman says. “That was a philosophy that we really developed on 787.”

The 787 also boasts new, larger stow bins and full-spectrum LED lighting that can simulate different times of day (along with scenes that are far from natural). Boeing incorporated much of the 787 interior design into the new 748-8I and the new Sky Interior option on the 737.

FRESH APPROACH “I think Boeing is going to have to take a look at keeping the 777 interior fresh, similar to what they’ve done with the 737 Sky Interior,” says Weissel. “I wouldn’t say that the 777 is getting old, but from what I’ve seen the 787 really does take the aircraft interior to the next level. I wouldn’t be surprised to see some of the 787 interior architecture rolled back in to a refreshed 777.”

Boeing has started offering 777 customers a new 787-style door-to-door entry archway, and American Airlines has said it will be the first airline to get the feature. The 777 already has a partial-LED lighting option, and Boeing plans to offer a full-LED option for delivery starting in late 2013 or early 2014, reveals Ackerman.

Meanwhile, Boeing is working on plans for overhauling the 777, and the interior is part of that, he says. “We have a group working on the longer-term vision for the 777.”

It’s fair to say the 777 will evolve in the direction of the 787, 747-8 Intercontinental and Sky Interior 737, he explains. “All that research is absolutely going to find its way onto the 777 interior.”

There is one area where the 777 still has an edge over newer airliners. With the 787 and competing A350 XWB, Boeing and Airbus have moved to a catalogue approach, offering customers a menu of pre-approved options, Hawes notes. “These new aircraft, although much greener, lightweight and fuel-efficient, offer less customisation.”

The popularity of the 777 is showing no sign of abating – here’s to another 1,000 orders. ☒



BOEING IS GOING TO HAVE TO TAKE A LOOK AT KEEPING THE 777 INTERIOR FRESH, SIMILAR TO WHAT THEY’VE DONE WITH THE 737





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When Steve Jobs created the iPhone, he knew he was introducing a transformative device, but he may not have realised the extent to which the transformation would reach. With the success of the iPhone, Apple introduced the iPad. Sceptics shouted, “It won’t succeed! Others have tried tablet devices and all have failed.” Maybe it was the timing, maybe it was the sleek case, but either way, Apple opened a door that is still changing many markets – including IFE.

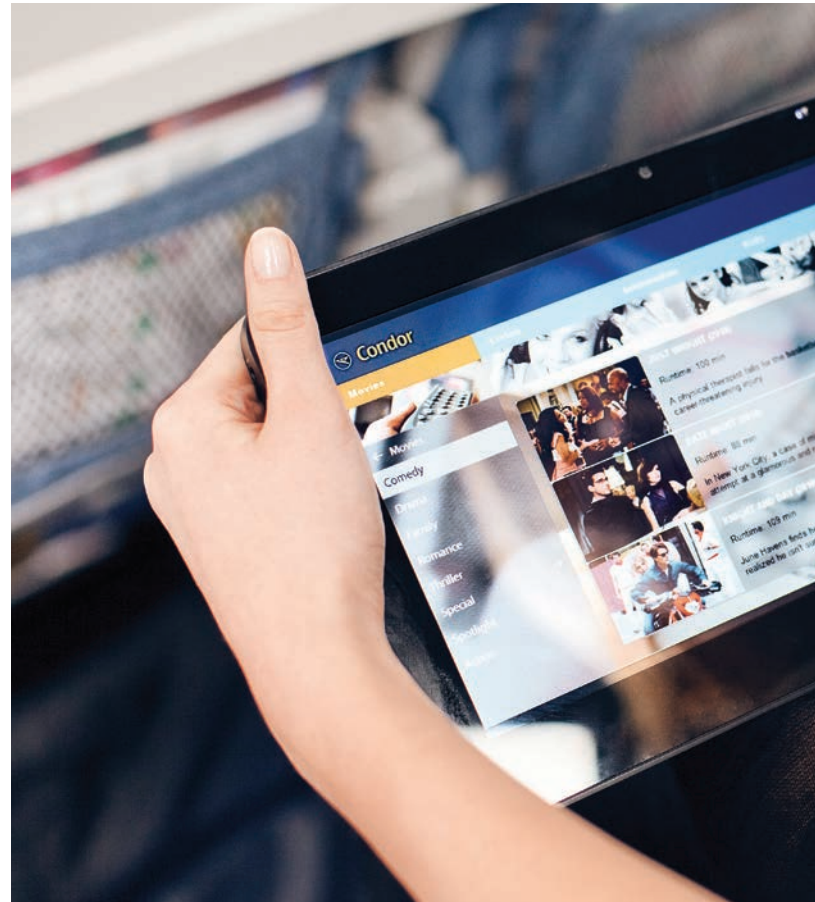
The IFE industry has historically followed the consumer market – usually at a slow pace. With the tablet wars have come huge communities that support both Android and iOS development and mobile carriers making content available over their networks at increasingly higher

speeds, resulting in passengers expecting more from their inflight experience.

Each time in the past when there has been an evolution in media devices on the ground, some analysts have predicted the end of IFE systems. However, the variables at play on the media stage today actually combine to provide a unique opportunity for airlines. IFE is becoming more of a collaborative effort between airline and passenger.

With the slew of smart devices being brought on board every day by flyers – and not just those in first class – airlines have the opportunity to push some of the IFE responsibility onto travellers. In fact, airport WiFi provider Boingo reported that 58.9% of Internet users in airports used a mobile device rather than a laptop during 2011.





01

- 01. With passenger devices, BoardConnect is only available for late window content, accessible via MS Silverlight
- 02. The first customer for BoardConnect is German leisure airline Condor

Contrast that with the only 34.1% in 2010 and the trend is evident.

However, many passengers still expect the airline to provide entertainment. In a study conducted last summer, handheld-IFE provider digEcor surveyed more than 540 passengers in various countries, and the findings showed that 70% of passengers still preferred an airline-supplied system in lieu of their own device.

It's the combination of the need to satisfy technophiles who prefer their own devices, and also those passengers who want to immerse themselves in a fixed system, that creates a perfect window of opportunity for streaming solutions.

ADVANTAGES OF STREAMING IFE When airlines or IFE providers talk about streaming, they are referring to one of several solutions. For example, an airline may choose to install an in-seat system but stream the content to each seat in order to avoid the extra wiring that would be

necessary to deliver content to traditional wired systems. Additionally, the airline can make content available to passengers through their own devices. Or an airline may choose to stream only to passenger devices to save the weight and cost of fixed systems.

Furthermore, airlines can continue to differentiate between cabins by charging for access in economy, while providing free access in premium cabins.

Some of the other immediate advantages of streaming include lighter-weight systems that can be used by many devices, reduced installation times, and savings on operating costs.

Brett Snyder, author of the popular CrankyFlier.com blog, says, "As a traveller, I'm excited about being able to combine my air and ground experiences. It's always frustrating to have to shut off a movie before you finish because the flight is over. I also like being able to take control of how I view the video. I can use my own device, which might provide a better viewing experience than what the airline gives me."

SECURITY AND COVERAGE ISSUES The biggest and most apparent challenge of streaming to an aircraft full of personal electronic devices (PEDs) is security. The studios do not allow streaming of early window content to PEDs, although such content can be streamed to airline owned and supplied devices that have received studio approval.



THE BIGGEST AND MOST APPARENT CHALLENGE OF STREAMING TO AN AIRCRAFT FULL OF PEDS IS SECURITY





02

At a Technical Committee meeting for the Airline Passenger Experience (APEX) association last autumn, several studios commented that, for the foreseeable future, early window content would not be made available. However, if someone were to present a viable solution to ensure the security of the content, then they would be willing to review it and change the current policy.

Furthermore, a representative from Paramount Studios comments, “We have several White Papers that are in the approval process – an indication that all the hardware companies are planning for the future of IFE.”

Also, airlines and suppliers have much debated the ability to provide sufficient coverage to all passengers on an aircraft. Research firm IMDC stated in its *Inflight Technologies Market Outlook 2012* report, “The technology employed for such systems is currently not capable of delivering streaming video to a full aircraft, according to most suppliers. This limitation is more sensibly just one more consideration for airlines rather than a reason to extinguish all interest. The technology is likely scalable and will improve, demand may well not reach system limits, and not all usage has to be live video streaming.”

IMDC cites other considerations such as battery life and screen size of mobile devices and whether to use a browser-based solution or platform-specific downloadable application. Additionally, Apple does not support Adobe Flash, used for many interfaces. IMDC wrote, “Such issues



ILLUSTRATION BY GABRIELLA BIANCA



EFFECTIVE WIFI COVERAGE AND SERVER LOAD IS AN ISSUE THAT HAS TO BE CONSIDERED



are not at all insurmountable, but they add a layer of complexity that must be addressed when deploying wireless IFE and will likely be a differentiator between suppliers in this new sector.”

Chris Wood, vice president of digEcor, says, “Effective WiFi coverage and server load is an issue that has to be considered. Setting a goal to simultaneously stream to 100% of the seats is going to be much harder and more expensive than a goal to simultaneously stream to 50% of the seats. The goal will largely depend on an airline’s demographic and customer behaviour.”

Despite the challenges, many hardware providers are racing to offer streaming solutions.

WHO’S DOING WHAT? BoardConnect boasts the first wireless IFE system to receive security approval from Hollywood studios for early window content. The approval is specific to in-seat systems and tablets provided by the airline itself. Passenger devices are approved only



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The latest concept in the world of IFE is Concierge from design studio 'ustwo', a concept that is intended to work across multiple platforms and provide equal benefit to passengers and airlines.

Concierge is a personalised travel and IFE service available to passengers from the moment they book, right through to when they reach their destinations. The system is delivered as a cross-platform service available on the web, downloadable onto passengers' own mobile and tablet devices, and is integrated with the airline's reservation system, loyalty programme and cabin services. It also means PEDs can be used instead of embedded seatback devices, and each user can receive a personalised greeting when they connect to the aircraft's LAN.

The interface is adaptive to the current stage of the passenger's journey, enabling an airline and its affiliate partners to guide the user through a comprehensive range of pre-, during, and post-flight service options such as arranging transport to and from the airport, check-in, meal selection, baggage status, flight tracking, on-board retail, hotel reservations, destination activities, and enabling the cabin crew to give extra care to special needs passengers or frequent fliers.

for late window content. Users can access the content via Microsoft Silverlight, although apps for both iOS and Android are being developed.

Sandra Hammer, vice president of corporate communications at Lufthansa Systems, remarks, "In February 2012, Qantas officially launched its Q Streaming in-flight entertainment system based on BoardConnect. During a trial phase involving a Boeing 767-300 registered VH-OGH flying on Australian domestic routes, all 254 passengers were able to enjoy more than 200 hours of on-demand movies, television and radio programmes, streamed direct to a WiFi-enabled device." Virgin America is also currently planning its first installations and Condor will soon roll out BoardConnect, pending regulatory approval.

GOGO VISION Last August, Gogo announced that in addition to internet access, passengers on American Airlines would be able to stream movies starting at US\$0.99 per TV show and US\$3.99 per movie title. Although uptake rates for the service are unavailable, Dan Frommer of SplatF.com reported that Gogo experiences an approximate internet uptake rate of 4% across all of its carriers (based on Gogo's SEC filings for an initial public offering).

Making some headway overseas, Gogo also announced last November that Air China would trial wireless IFE during the first quarter of 2012. This trial marks the first

Chinese and international carrier to equip aircraft with Gogo's products.

ROW 44 Row 44 currently has a streaming solution on trial with one airline and "will soon make its debut to those passengers", according to Frederick St-Amour, vice president of sales at the company, possibly referring to a recent deal with Russian airline Transaero. On the topic of early window content, St-Amour adds, "The race to 'early window' is actually closing as new technology enables greater control and payment assurance for the content owner, and as content owners extend and evolve their business models to optimise the new opportunities presented by technologies such as Row 44's."

To access content, passengers are required to download an application that acts as the client-side decryption mechanism.



THE RACE TO EARLY WINDOW IS CLOSING
AS NEW TECHNOLOGY ENABLES GREATER
CONTROL AND PAYMENT ASSURANCE



A LOT OF SHORTER-HAUL CARRIERS WILL GO TO A WIFI-BASED SYSTEM WITH CONSUMER-PROVIDED DEVICES IN ORDER TO SAVE ON COSTS



03

03. American Airlines' entertainment devices could become redundant in the near future

In contrast to other vendors, St-Amour says, "Row 44 allows the airline to brand the service as it sees fit. Row 44 does not impose itself between the airline and its passenger, nor do we seek to be a brand in the mind of the passenger. A crucial component of Row 44's solution is that we enable the airline to take back control of the passenger relationship many airlines have unwittingly ceded to IFE systems and manufacturers."

WiPAX Recently announced, Lumexis's WiPAX solution is in the hands of sales representatives, but has yet to board an aircraft, and CTO Rich Salter says there is "great interest from the airlines". Available as either a standalone service or add-on to the FTTS seatback system, WiPAX can support any size of aircraft – from regional jet to wide-body.

In describing the passenger experience, Salter explains, "It is very similar to logging on to a wireless network in your hotel room: the user first connects to the WiPAX network, sees the airline's portal web page, and then selects the GUI page that they want to view – movies, TV series, eReader content, food and beverage menu, duty-free shopping, moving map, etc."

THE NEXT STEPS Not many dare prophesise as to the future of IFE (far too many have been proved wrong),



although Snyder offers his thoughts: "It seems to me that a lot of shorter-haul carriers will go to a WiFi-based system with consumer-provided devices in order to save on costs. But for long haul, I expect to see airline-provided systems for years to come. Some will stick with embedded systems because that's what they know. An increasing number will look towards standalone devices despite the issues surrounding battery life and storage space. More systems will look to integrate WiFi into the systems on board, regardless of whether they're embedded or not."

Citing its new report *The Future of Wireless IFE - World - 2012 Edition*, IMS Research stated, "Largely only a trial offering today, wireless in-flight entertainment is forecasted to reach a global install-base of nearly 9,000 aircraft by 2021, revolutionising how passengers are entertained, able to communicate outside of the aircraft, and manage their on-going travel."

Ultimately, the brand image, financial objectives and passenger demographic all play a role in selecting the right solution for each airline. ☒

CONTACTS

- www.digecor.com; www.lhsystems.com; www.gogoair.com;
- www.row44.com; www.lumexis.com; www.ustwo.co.uk;
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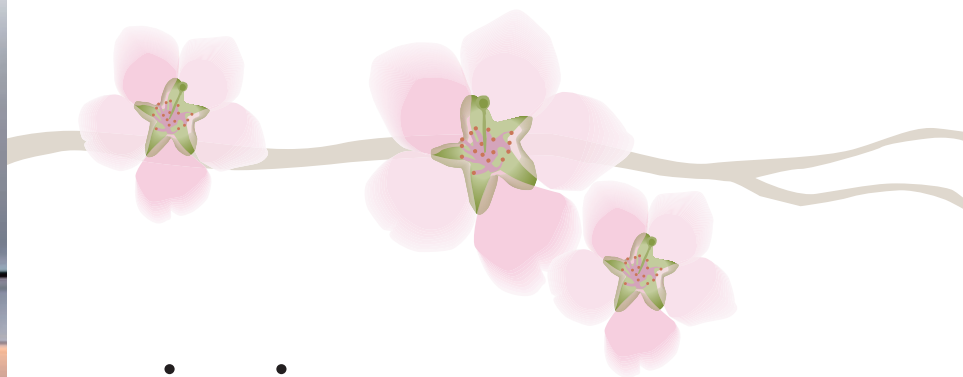
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rising sun

Japan Airlines' 787 Dreamliner interior is designed to give a taste of Japanese hospitality, and the chance to experience its changing seasons

AUBREY COHEN, AIRCRAFT INTERIORS INTERNATIONAL



“As an airline symbolising Japan, the interior as a whole depicts ‘hospitality, Japanese-style.’” These are the words of Yuichi Akutsu, a design director at GK Industrial Design, which worked for Japan Airlines (JAL) and with Boeing on the interior design early in the development of the 787. JAL took delivery of its first 787 in March 2012, second only to launch customer All Nippon Airways, and is the first to run 787s with General Electric GENx engines (ANA’s have Trent 1000 engines).

JAL’s 787 Japanese experience starts with the new seasonal lighting scheme, which shows the 787’s full-spectrum LED lighting at its best and is perhaps the most obvious way the carrier is taking advantage of the composite aircraft’s unique cabin features.

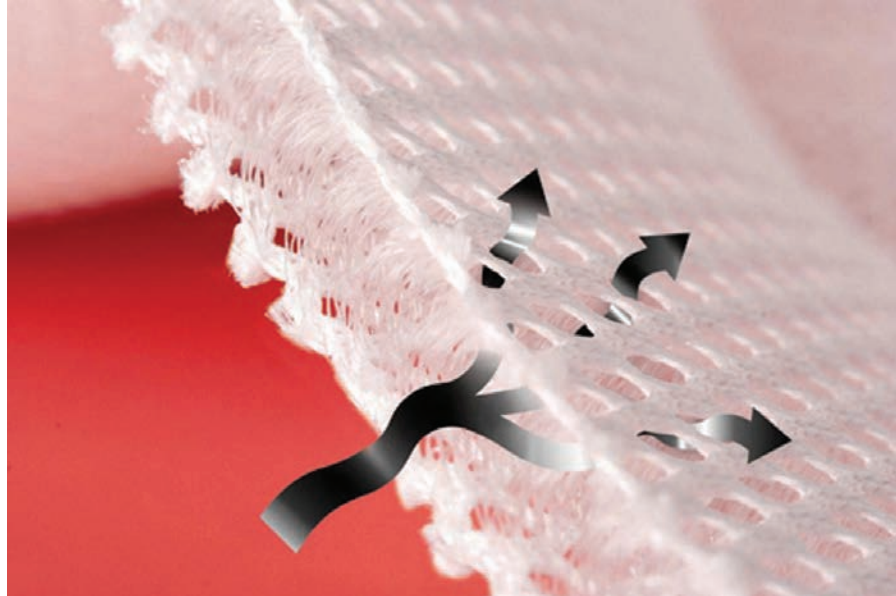
“For the overall lighting of the cabin during boarding and disembarking, there are six colours to reflect the seasons in Japan, or to reflect those of the country at which the aircraft is departing or arriving,” explains Koichiro Fujishima, JAL’s director of marketing and branding, product and service strategy development.

Board in February or early March and you’ll see *momo* (peach), for early spring. Late March and April bring *sakura* (cherry blossom), followed by *wakaba* (young leaf) in May and June, *natsuzora* (summer sky) in July and August, *minori* (harvest orange) in September, October and November, and ‘JAL red’, inspired by the airline’s corporate colour, in December and January.

“JAL often reflects the seasons in our service offering, such as the use of seasonal ingredients in our inflight menu,” continues Fujishima, “and we are able to enhance this with the LED lighting.”

“An original colour temperature and lighting intensity were set for Japanese cuisine,” explains GK’s Akutsu, “which values not only real taste but must also look pleasant.”

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THE IDEA IS TO MAKE THINGS EASILY
USABLE BY AS BROAD A RANGE OF
THE POPULATION AS POSSIBLE



Or, as Fujishima puts it: “The mealtime lighting serves to make food look even more appetising than it already is.” This is enhanced further by new surface materials and finishes that better reflect the LED lighting.

At bedtime, lights change from ‘Relax’ mode, with a warm hue, to ‘Night’ mode, aimed at inducing sleep. Wake-up lighting moves from ‘Awakening’ mode up to a cool hue and higher intensity. Fujishima explains that these changes help passengers transition from one mood to another “gradually and comfortably”.

The lighting is one way that JAL “aims to demonstrate hospitality from the heart in all customer-contact points in the cabin” and is in line with the universal design concept the carrier has been integrating into its products and services for several years. The idea is to make things easily usable by as broad a range of the population as possible.

“It may be a challenge for elderly people to use something that younger people find easy to use,” a JAL official notes. “What is comfortable for a right-handed person to manipulate may be very awkward for a left-hander. There are many things around us that are convenient for some to use but pose barriers to others. Making things even a little simpler and easier for everyone to use is the goal of universal design.”

JAL’s universal design includes: airport terminal floors with black and white tiles to help the visually impaired,

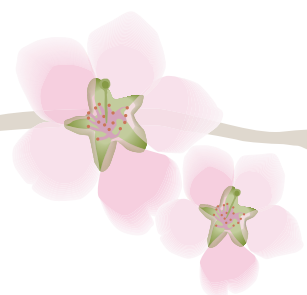
and with no raised bumps to reduce risk of tripping; the option to check in online, at kiosks and at counters; and aircraft toilet locks that turn lights on and off.

The 787 also employs universal design features, including overhead bin latches that open by pushing or pulling the top or the bottom part of the latch; lavatory occupancy indicator lights that passengers can easily see from their seats; and a toilet supporting handle bar placed in a natural position for people of various heights.

The 787’s composite fuselage enhances the passenger experience by allowing larger windows, pressurisation to a lower altitude and higher humidity than is feasible on aluminium aircraft. In addition to the full-spectrum LED lighting, all 787s also have a dramatic main entry with a door-to-door archway across the width of the aircraft, a multisetting electronic dimming system in place of window shades, and high ceilings and larger stow bins.

It’s just as well that Boeing worked with airlines to develop the 787 interior, given that it uses a catalogue approach that limits customisation more than on other aircraft.

“A strategy was required to ensure that the characteristics of the airline are embodied despite limited alternatives of design resources [that are the result] of the advanced standardisation compared with conventional models,” explains Akutsu.



01. Passengers can say ‘ohayou’ to their destination when landing in Awakening mode

02. The Executive Class cabin has been configured for 42 Shell Flat NEO seats



AS WELL AS THE LIGHTING SCHEMES,
JAL ADDED SOME OTHER FEATURES NOT
YET AVAILABLE IN ITS OTHER AIRCRAFT



03



04

- 03. The minimal livery conceals a kaleidoscope of possible colours
- 04. JAL specified 144 Recaro CL350 seats for economy class

As well as the lighting schemes, JAL added some other custom features not yet available in its other aircraft. For example, Executive Class lavatories feature a warm-water Toto Washlet, which is an electronic toilet seat with a water jet that's adjustable for gender and intensity; all seats have PC power outlets and USB and RCA sockets; and Sky Manga is billed as 'the world's first onboard electronic comic book'. These comics are available only in Japanese at the moment, although English versions are planned.

JAL has opted to outfit the 787 with two classes to match the demand on the routes the aircraft serves, putting 42 seats in Executive Class and 144 seats in Economy. There is no news yet as to whether it plans to put First Class sections on any future 787s.

Executive Class seats are in a 2-2-2 configuration, putting each passenger by a window or aisle. The seats are JAL's Shell Flat NEO seats, a new generation Shell Flat based on B/E Aerospace's MiniPods, which are 21.3in wide between the armrests (2in wider than the seats on the airline's 777s), have a pitch of 60.2in and recline to 171°, just short of a true lie-flat position. The seats have controls for 'Upright' and 'Relax' as well as the bed position. There's also variable lumbar support and the seats are clad in slip-proof covers.

The seats also feature a 15.4in touchscreen (up from 10.4in) that runs the Thales i8000 IFE system (JAL is the

launch customer of the TopSeries-based system); and places to keep books and documents, magazines, plastic bottles and small items such as spectacles.

The Executive Class cabins feature Japan Airlines' new "Sky Gallery," which is an area with a wall of photos directly opposite a bar counter where customers can serve themselves snacks and beverages.

In addition to the 787, Japan Airlines has installed Shell Flat NEO seats on some 777-300ERs, serving routes from Tokyo Narita to New York, Chicago, Los Angeles, Jakarta, Boston, Moscow and Delhi. The Shell Flat seats are on some 777-300ERs and 777-200ERs, flying from Narita to London, Paris, Frankfurt, Sydney, Bangkok, Jakarta and Delhi; and from Tokyo Haneda to San Francisco and Paris.

Economy Class has seats in a 2-4-2 configuration. The Recaro CL3510 seats have a pitch of 31in and are 18.5in wide, with a 10.6in touchscreen.

JAL has ordered 25 of the initial 787-8 model and 20 of the stretched 787-9 version. The 787 is designed to enable secondary routes that larger and less efficient aircraft couldn't profitably serve. JAL has shown this by launching the aircraft on the first ever non-stop service between Boston and Asia, flying to Tokyo Narita Airport. ☒

CONTACTS

www.jal.com; www.gk-design.co.jp; www.beaerospace.com

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Long Prosper Enterprise has been the largest airline headphone and snap-fit aircraft model manufacturer for the past 34 years. Our factory's direct service not only saves you time and money but also deals with any of your needs and changes immediately. With our experience and understanding in IFE requirements, you won't have to worry about anything. Please visit us at booth 1006 at APEX from Sept. 11 to Sept. 15, 2011 and booth 6A3 in Hamburg from Mar. 27 to Mar. 29, 2012.

NCH headphone Patent Number
China: 2004200828790
UK: GB2417385

LPE-P3NC



LPE-P3NC
Noise Cancellation
Headphone

LPE-P2NC



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In-Ear 601



W-02



W-01

All Scale type Aircraft Model



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DC-3



JU-52

hotseats

The latest generation of seats have all been driven by one major aim: weight reduction. However, several exciting approaches have been taken to ensure that passenger comfort is maintained

ADAM GAVINE, AIRCRAFT INTERIORS INTERNATIONAL

Pitch Aircraft Seating

PF2000

Previously an automotive seat supplier, it is fitting that Pitch Aircraft Seating Systems has developed a lightweight economy seat in conjunction with Intier Automotive, a global Tier 1 automotive manufacturer owned by Magna.

The seat is aimed at the single-aisle short-haul retrofit market and weighs less than 25kg for a standard triple. The weight is possible thanks to an aluminium primary structure, with a customisable fixed semi-recline backrest moulded from composite materials, which can feature a fully integrated IFE package, an iPad carrier, or simply a high or low literature pocket. The seat-back modules are interchangeable, so customers can add IFE later on.

The seat, designed with input from Design Q, moulds to the human form and optimises knee and leg room, for a claimed 2.5in extra legroom over a standard economy seat. The family of seats includes variants for front, exit and rear rows, and the fuselage taper section. To aid access, the front of the seat cushions are angled and the armrests can be deployed between the backrest cushions.

In January 2012, Pitch successfully passed an indicative 16g dynamic test and is on target to complete the certification plan by the third quarter of 2012. Pitch is advancing with plans to support retrofits for A320s and 737s, and has received serious interest from a number of airlines. The seats will be manufactured in the UK using automotive manufacturing processes that are expected to create lead times in the region of 12 weeks, with seats being available for delivery in late 2012.

www.pitchaircraftseating.com





Zeus HFF

The Zeus HFF, due for launch by Aviointeriors in October 2012, is a horizontal, fully flat seat composed of a double seat module and front double support module, designed to offer first-class comfort, even in narrow width installations.

A classical in-line configuration enables Zeus HFF to be installed in all aircraft and to be a customisable platform for whatever the customer needs. The seat can be installed starting from a 76in pitch, and seat width is variable depending on cabin width and desired density. The bed width is just a little less than the whole seat width, providing excellent sleeping comfort, and the ottoman is a full-size cushion, allowing any sleeping position. In addition, any IFE system and massage system can be installed.

Aluminium alloy, plastics and composites are used for the shells and secondary structures, and special ultimate technology foams and upholstery are used for the cushions, bringing the fully dressed weight for the seat plus the front module to around 75kg per pax.

The bed width takes full advantage of the descending armrests, which form a single surface with the seat and backrest when in the horizontal position. All the transitions are driven by just two actuators, increasing lightness and reliability.

The lead time for orders is six months for 'follow on', and nine months for 'first of model'. Aviointeriors has already secured an order from an undisclosed customer for installation on a narrow-body aircraft.

www.aviointeriors.it

Aviointeriors



Arcus

The Arcus is a lightweight business class seat, weighing only 56.7kg, complete with electrical integration for low power consumption.

The living space has increased, with a minimum pitch of 75in, and also a full-flat bed though it has an angled seat pan. The seat has a modular kinematic with one actuator, and a one-piece tray table with an innovative kinematic and lateral back sliding armrest for an optimised living space.

The main features of Arcus – being considered for the A350 XWB catalogue – include track mounting; a full-flat

bed; easy maintenance with a single actuator located underneath the seat pan; an extra-wide seat and bed; synchronised legrest and footrest extension; a four-way adjustable headrest with a six-way option; a unique meal table deployment mechanism; a new armrest concept offering disabled passenger access and increased seat width; easy access to IFE equipment; a backshell video screen of up to 17in; exclusive privacy and stowage; a shoe box under the ottoman; laptop stowage; a literature pocket; and reading light and mood lighting options.

www.sicma.zodiacaerospace.com



A350
CATALOGUE?



Superlight Ultra

UK-based economy seat maker Acro Aircraft Seating launched the Superlight Ultra in March 2012, designed in response to the demand of full-service operators to combine simplicity and robustness with added features to give passengers a greater sense of comfort, including IFE features, for longer sector flying.

The Ultra is designed for comfort and space, with 3in more legroom than some rival seats at the same pitch. Bucking the weight-saving trend of dispensing with base foams, Acro has fitted the Ultra with a full seat cushion for support and comfort over longer flights.

The seat can be used in both single and twin-aisle economy and premium economy applications, and is available in any combination of doubles, triples and quads, covering all potential configurations.

The Ultra features design principles common to the rest of the Superlight series, with a composite back and

the monospar modular construction that gained a runner-up position in the 2011 Crystal Cabin Awards. By applying strict design principles and minimising the part count, a fully dressed Ultra weighs in at around 11kg per pax, slightly heavier than the base 10kg Superlight seat.

The contoured seat shell, base cushion foam and the main spar location at the front of the seat offer legroom and comfort. Operators win on initial investment – the low weight saves fuel, and the low parts count and simplicity deliver low service costs.

Launch customer Primera Air is already flying the seat, having ordered five shipsets to refurbish its 737NG fleet. With an order for a further 1,200 seats, the first fully equipped IFE seats will be supplied later this year for an operator flying B767 and B747 aircraft. Standard seats can normally be supplied within 12 weeks.

www.acro.aero

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Basic Line 3520

The Basic Line 3520 is Recaro Aircraft Seating's newest economy-class seat for short-haul. The seat provides more comfort and living space than its predecessor, and is about 30% lighter at around 11kg (including a leather cover), depending on the options selected. Furthermore, the BL3520 offers passengers extra living space due to a leaner, space-saving backrest combined with a high literature pocket. Airlines can install additional rows of seats and still offer more legroom, which has a positive effect on profit.

The seat is being modified this year for extra comfort on long-haul flights, with thicker foam in the backrest and seat cushion, and the padding contour and seat cover materials (fabric or leather) designed for added comfort. The six-way adjustable headrest can be integrated into the contour of the backrest or attached to the surface, and features height and angle adjustment, together with V-shaped side wings. In addition, the seat can be ordered with a touchscreen video monitor integrated into the backrest. An audio/video control unit with PC and headphone access, along with channel selector and volume control, is located in the new armrest.

Alaska Airlines has become the launch customer of the seat, and total orders now top 100,000.

www.recaro-as.com

Recaro



"The seat is being modified this year for extra comfort on long-haul flights"

Catalogue models

Airbus has been deciding on its business-class seating for the A350 XWB catalogue, which will be revised and updated by the end of 2012.

Following an agreement signed at Aircraft Interiors Expo 2012, Jamco America is now an A350 XWB Airbus contracted supplier for premium seating products and will offer its all-new Journey premium business-class seat through the catalogue. This seat is aimed at the long-haul business segment and offers a six- or seven-abreast forward-facing seat. The all-important fully flat bed capability is met, and a new kinematic system provides smooth transitions between seat and bed positions.



Meanwhile, EADS Sogerma, an existing Airbus contracted supplier, will enter the A350 XWB catalogue with its Equinox model (pictured left). Available in a six-abreast configuration, the seat is being optimised for the A350 XWB's wide fuselage. Equinox uses the vertical space to create a full-flat bed in a pitch range equivalent to current lie-flat products.

In addition, Airbus will shortly enter into an agreement with Sicma to become an A350 XWB Airbus Contracted Supplier. Sicma is already undertaking a technical study on its Cirrus and Arcus business class seats for inclusion in the catalogue, both of which transform into fully flat beds.



Zodiac Seats

Sicma - Weber - Contour - ZS California

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Dragonfly

At 7.5kg per pax, the Dragonfly High Efficiency is claimed to be the lightest economy seat on the market. The Dragonfly is suitable for all aircraft types, on short and medium haul, with different configurations such as 3-3 for A320/B737/A330 and 3-4-3 (2-4-2 in the upper deck) for A380s.

The Dragonfly is light and 'green' as it sits on an aluminium base frame and contains 85% recyclable components, conforms to REACH environmental legislation, and uses 30% fewer parts than the previous generation.

This seat, a finalist in the Crystal Cabin Awards 2012, has been in development since 2010, and features an ergonomic stamped backrest and seat pan. The living space has increased by 2in, with a minimum pitch of 28in and optimum knee clearance aft of the armrest. The backrest is very slim and the seat cushion height is down to 16.2in, which helps reduce the risk of DVT.

Standard features include the option of a recline function, a backrest lower kick panel, an upper meal table, a plug-and-play modular armrest (with disabled access capability), a backrest upper plastic fairing, a glass holder, a coat hook, four-way headrests, audio IFE, and PC power compatibility.

The seat can be customised with a life-vest box or pouch, instruction labels or markings, a range of seatbelt colours, tool-less track fitting, and various trims and finishes for endbays, dress covers, armcaps, IAT shrouds, armrests, and foodtrays.

A short delivery time of five to six months is available, and two orders have been placed: one for Air Austral's A380, where it will be used for 12-hour flights; and for Czech Airlines on its A320 fleet retrofit, due for May delivery.



Sicma Aero Seat

Two further versions are available: the 8.2kg Dragonfly High Comfort with a long armrest and reclining backrest for medium-haul flights of less than 2,500 miles, or three to four hours of flight; and also the 12.5kg Dragonfly Comfort+ with a long armrest and reclining backrest for long-haul aircraft, which can also be specified with a 10.6in IFE screen, full-size tray table and headrest.

www.sicma.zodiac aerospace.com



B/E Aerospace Minipod XM

The All-Aisle Access Minipod XM, as the name implies, provides access to the aisle for each passenger in 2-2-2 or 2-3-2 configurations. The design was influenced by BMW's i8 electric car concept, and boasts multiple storage options, two actuator movements and a fully flat bed, with lots of individual storage in a private suite.

www.beaerospace.com



Geven Comoda

This stylish business class seat, reminiscent of sports car seats, is designed for single-aisle applications. The Comoda ('comfortable' in Italian) is designed to offer all the comfort and appeal of business class, while being compact and light (21kg). This model will be available on the market by late 2012.

www.geven.com



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3200 FeatherWeight

The primary goals of this modern design were to deliver significant weight savings over standard economy seats, while maximising passenger comfort in high-density configurations at a seat pitch as narrow as 28in.

Research showed that customers wanted a reclining seat that did not encroach on the passenger space in the seat behind, particularly around the legs and knees. Thus, even with the forward seat at full recline, passengers in 3200s are claimed to actually perceive more space than at wider pitches with standard, reclining economy seats.

The 3200 offers a number of features, including a full, standardised recline. This is delivered with minimal encroachment on the passenger seated behind through the seatback shell design, relocation of the literature pocket from the lower knee area to above the food tray latch, and the incorporation of a cushion-less back.



The comfort issue of removing the standard back foam cushion has been addressed through an innovative fabric material that is claimed to be more comfortable than foam, combined with passive lumbar support.

The standard seat place is 11.8kg, including the bottom cushion, dress covers, pivoting tray table, seatbelt and life jacket container. The standard seatback height is 44in, the recline is up to 6.5in, and the tray table is 10in with a 'belly-room' curvature to support passenger movement. Timco has already secured customer orders for the seat, with deliveries expected to commence later in 2012.

www.timco.aero

Timco

Comfort Line 5510

Recaro's new business-class concept, the Comfort Line 5510, is designed for short- and medium-range flights with its seat pitch of 43-45in and generous legroom in the backshell. It can be integrated into cabin layouts in wide-body or single-aisle aircraft and is fitted with ergonomic cushions and wide armrests, as well as a headrest with six-way adjustment and folding side wings.

A lightweight shell, weight-optimised kinematics and modern materials bring in the CL5510 at less than 95kg per double (without airbag belt). Recaro Aircraft Seating has made use of the expertise of its South African subsidiary AAT, a supplier of composite parts, for the shell construction. Even the surface finish – which also plays a role in the total weight of a seat – is made from a new kind of lightweight, thin-layer adhesive foil applied to the shell, which is available in a variety of textures and colours.

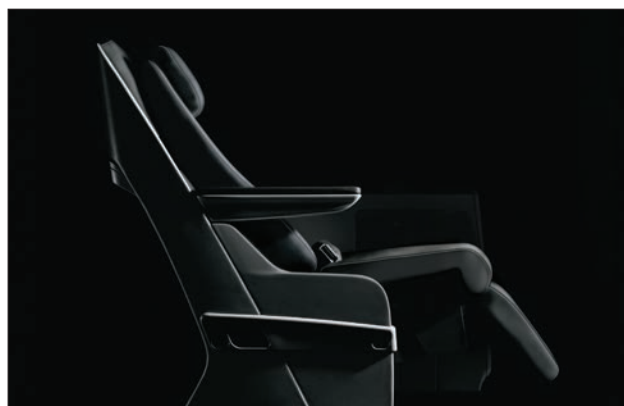
The legroom space in the shell can be used as a compartment and optionally secured with a baggage bar. Space for magazines, notebooks, or books can be found in the deep literature pocket in the centre console, and a separate compartment in the shell is designed to store mobile phones and other small electrical items, which can be connected to the adjacent multiport. Coats and jackets can be hung on the coat hook on the aisle side of the seat.

Flat surface space is offered by a large cocktail table integrated into the centre console, with a pullout element

on the front. A large two-piece dining table for inflight meals or for use as a workspace is integrated into the backshell. Completely extended and folded out, the table offers a surface space measuring 11in deep by 16in wide.

IFE is well organised, with a multiport unit adjacent to the iPhone holder with connections for PC, iPod or iPhone cables, while the audio connect unit includes a headphone jack with channel selector and volume control. The seat control panel in the centre console features a variety of adjustment options. Although the take-off/landing position is preset, passengers can individually adjust the backrest and leg rest angle.

www.recaro-as.com



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Sabre

Optimares' answer to the need for passenger-centric solutions in economy class is Sabre, a semi-fixed backshell seat. The design combines the best of a traditional reclining system with the space advantage of a fixed back-shell, and creates an interesting result.

Proposed at 32in, Sabre enables passengers to completely stretch their legs underneath the ultra-efficient carbon-fibre structure of the seat in front. While reclining, the seat bottom slides forwards and gently down, providing support with a unique cushion system, and the backrest pushes the passenger forwards and down, providing lumbar support in all positions.

The backshell does not move and therefore the space for passengers behind remains unchanged, enabling them to continue eating, working or relaxing, while enjoying a constant space without intrusions. The only movement noticeable by the passenger behind is the gentle sliding of the monitor, which does not affect the visibility of the IFE.

The seat design also avoids the claustrophobic effect that previous generations of fixed backshell economy seats could impose on passengers. Luxury finishes, non-plastic materials all around, and solutions previously seen only on luxury cars complete this seat, which will soon be flying with its launch customer.

www.optimares.com



Optimares



C2C Biz Lite

The C2C may not be all-new, but European Aviation's refurbishment of these B/E Aerospace seats originally in service with British Airways seats has involved reducing weight and increasing comfort, including a modification which allows the legrest to be adjusted from a 40° to a 50° or 60° position for additional comfort. This feature was requested by one customer who had experienced a problem with some of its smaller and elderly passengers.

The seat features a Famotex lightweight cushion system that distributes pressure evenly. This eliminates foam and is claimed to be one-third lighter than conventional foam, helping reduce the weight of the seat from 77kg to 65kg.

The cushion system can be cleaned in a washing machine and also features reversible covers. European Aviation claims that the dual reversible seat covers make it possible for airlines to offer both leather and cloth, and the covers can be switched to all-leather or all-cloth in about five minutes per pax place, while allowing airlines to effectively procure two sets of covers for the price of one.

The seat is 16g certified for B737NG and Airbus narrow-body aircraft at a 40in to 55in pitch, and nine orders have been placed for delivery in May.

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"Air Transat worked with Zim Flugsitz in an eight-month development programme"

BC-01

The focus on low weight and a modular seat structure was a baseline requirement for the development of the new BC-01 business-class seat, claimed to set a new standard for mechanical business-class seats. The design weighs 68.5kg per double in standard configuration.

The BC-01's standard configuration can be customised according to customer specifications. The minimum pitch is 36in, with variable seat widths available (20.1-21.1in standard). The long list of BC-01 options includes an ergonomically contoured seatback and bottom, seat articulation, a one-piece in-arm table with ball bearings in the centre console, a leg rest including footbar and leg rest extension, a six-way movable headrest, and a large cocktail table. Additionally, the seat can be customised with all common IFE systems of up to 12.1in and for enhanced compatibility with electronic devices.

Magazines or notebooks can be stored in the deep literature pocket in the backrest shell, and PEDs can be stowed in various compartments and connected to the multiport installed in the centre console. The PCU, integrated in the centre console, enables the passenger to control the IFE functions as well as the other functions such as attendant call and reading light, and the integration of in-arm video in the centre console makes it possible to use touchscreen monitors for a bigger pitch.

Zim also offers an aisle-side armrest, fulfilling the new DOT requirement for passengers with disabilities and allowing easy egress to the aisle, even if the meal table is deployed.

The launch customer of the BC-01 is Canadian airline Air Transat, which worked with Zim Flugsitz in an eight-month development programme for the seat. The seat also has ETSO authorisation.

www.zim-flugsitz.de



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Geven

Piuma

The Piuma, which in Italian means 'feather', is flying high from its initial audience of mainly low-cost and start-up carriers, to having more than 230 shipsets installed on six prestigious airlines for single-aisle economy class use. The high-strength aluminium alloy primary structure helps lower the weight, while a 28in seat pitch and new cushions, foams and backrest aid passenger comfort.

January 2012 saw the seat enter the Airbus Long Haul Catalogue. Furthermore, a new long-haul version of the seat, the Piuma Alta Quota, has already been selected by an A330 launch customer for line fit delivery in Q3 2012, as well as being selected by Alitalia for a major retrofit of its B777 fleet, a contract award for the new Sukhoi Super Jet, and exclusive baseline product for the ATR 72-600.

Looking to the future, Geven is collaborating closely with one of the big airframe manufacturers, in bringing

forward a specific study plan in research of new materials and solutions for both the seating product and the IFE integrations of the future.

The success of the Piuma and Piuma Alta Quota has led Geven to go further and create a new seat concept – the Piuma Evo. The goal of the design is to create the lightest seat on the market without sacrificing reliability, maintainability, or comfort. Each structural element has been scrutinised in order to achieve even more weight reduction, while the introduction of new materials with high mechanical properties in place of the standard ones is being explored to improve structural performances, while reducing weight.

Development work on the Piuma Evo is expected to be complete by early 2013.

www.geven.com

EADS Sogerma

Equinox

The Equinox business class seat offers a full-flat horizontal bed with a consistent surface shape at a minimum pitch of 58in. The design was developed following intensive R&D investigations to solve the complex equation of including a high number of pax and a premium full-flat horizontal bed.

The Equinox is proving a success since its launch in April 2011, with Airbus including it in the A350 XWB ACS together with the company's Solstys premium business-class seat, and Boeing including the seat in the B787 catalogue. EADS Sogerma has also been awarded the Best Cabin Seats Supplier by Airbus in recognition of its customer support function.

www.sogerma.eads.net



SEATS IN OPERATION



became Canadian launch customer of ZIM's Business class seat BC-01.

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COMMUNICATION DIVISION AND HTG MEDIA.

eyes on the prize

58 applicants made it on to the Crystal Cabin Awards shortlist, the only international recognition for innovations in the field of aircraft cabins. In a closely fought contest, 18 companies went through to the final stage of voting – and the ultimate prizes



visionary concepts

WINNER: ALMADESIGN, LIFE

Project LIFE (lighter, integrated, friendly and eco-efficient aircraft cabin), a joint €1.75 million programme between Embraer and a consortium of Portuguese companies led by AlmaDesign, won the Visionary Concepts category. Couro Azul, Amorim Cork Composites, SET and industrial engineering institute INEGI, created the consortium that made the Concept-Cabin project possible, integrating sustainable, light and functional solutions for the interior of eco-efficient aircraft.

This concept for an innovative executive aircraft cabin has been created with a focus on the use of natural and sustainable materials. Combining state-of-the-art technology and materials such as leather and cork, LIFE presents a vision for a sophisticated cabin with a low environmental footprint. The concept's design language is based on a symbiotic relationship between natural and artificial elements. The design has been developed to increase an aircraft's productivity, with an executive area and meeting space (business use) and a leisure lounge (private use), equipped with full bathroom, bedroom and an interactive sphere with immersive infotainment system.

RUNNER-UP: DIEHL AIRCABIN, CHANGING ROOM

Many passengers use the aircraft lavatory area for changing clothes before landing, because there is no dedicated room available. Often at that stage, lavatories are not only areas with restricted space, but also questionable hygiene. Also, the lavatory is then occupied for a long time and can't be used for its intended purpose. A separate changing room, as proposed by Diehl Aircabin, provides a convenient environment with a textile floor, a large mirror, and shelves for items such as shirts or cosmetics. One possible installation zone is the entrance area, where the module can be attached to the wall of a lavatory or galley. The airline will not lose revenue space, and the kinematic allows for easy installation. During cruise flight, the module can be extended by the cabin crew; in the fully extended position, the wall of the changing area is fixed to the floor. For emergency or landing conditions, the module can be collapsed very quickly by a member of the flight crew.

RUNNER-UP: ZODIAC AEROSPACE, GENESIS SEAT CONCEPT

The Genesis seat is a bold concept in the way airlines can make use of highly constrained aircraft space, by introducing a unique folding system which offers a dynamic space that can satisfy the cargo and travelling needs of customers. In addition, the Genesis seat provides new user-centred solutions aimed at integrating the amenities of the premium class with the economic convenience of a tourist class, and the same aircraft can be used for multiple purposes.

premium-class products

WINNER: C&D ZODIAC: C3 ULTRALOUNGE

The C3 concept was created to redefine the premium travel experience. Upon entering the cabin, the passenger is greeted with a vaulted ceiling, free of overhead bins. Instead of the traditional twin aisle, there is a single large aisle with multiple cross aisles, which speeds up the boarding process.

Each seat has a personal stowage compartment attached to a rectangular lie-flat suite equipped with all the amenities expected in a premium cabin. This unique arrangement allows for club seating using the drop-down ottoman, companion seating using the drop-down privacy divider, and conference seating, which combines the benefits of both styles. The benefits also extend to the airline, with fuel saved through reduced weight and simplified cabin service through the use of cross aisles. Every aspect of the cabin experience is improved, from boarding to eating to sleeping and beyond, in this now award-winning concept from C&D Zodiac.

RUNNER-UP: EMTEQ, FLAT PANEL LED TILE

The Flat Panel LED Tile is EMTEQ's new state-of-the-art, thin, illuminated lighting tile. Available in different sizes, it can be placed behind many surfaces – floors, countertops, walls, vanities, and ceiling fixtures – to provide lighting accents for an enhanced ambiance.

RUNNER-UP: JPA DESIGN: CATHAY PACIFIC'S BUSINESS-CLASS SUITE

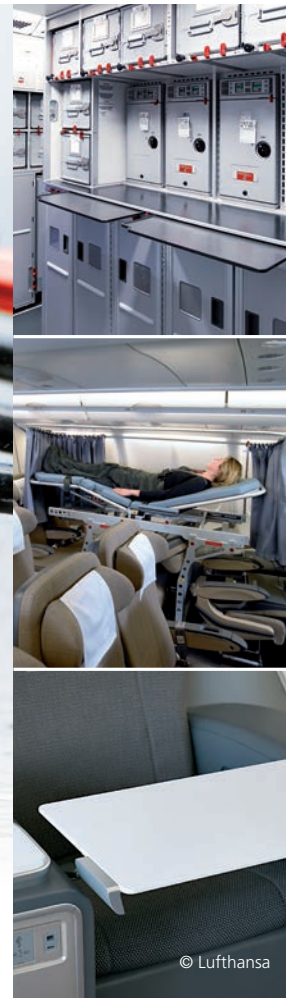
The away-from-the-aisle layout of Cathay Pacific's business-class suite ensures privacy, as does its wingback chair design. Outboard seats are angled towards the windows, giving passengers a perfect view, while centre seats are perfect for travelling with a companion. The centre seats slide forwards to enhance companion interaction, and when reclined, privacy is assured.

The bed is one of the longest and widest in its class. The foams were ergonomically designed, and a unique bed extension feature increases bed width by 6in while the retractable armrest can be lowered to further increase sleeping space.



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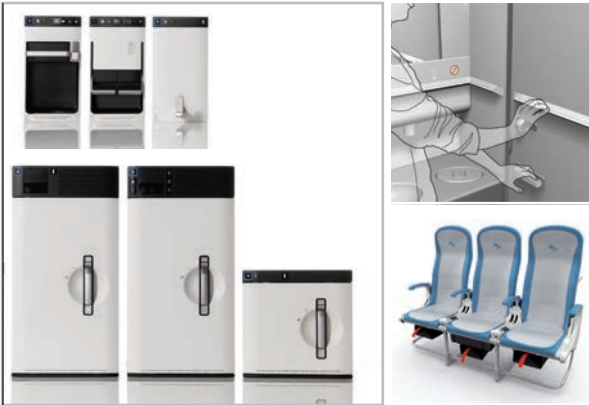
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industrial design and technical concepts

WINNER: B/E AEROSPACE & TEAGUE, ESSENCE INSERTS COLLECTION

Billed as the first complete family product line of its kind, the B/E Aerospace Essence Inserts Collection brings new life to the galley area. From concept through to delivery, B/E Aerospace worked with Teague on the range, which consists of 10 individual products with a single design language including a steam oven, convection oven, bun warmer, beverage chiller, SCS connected chiller, refrigerator and freezer, beverage maker, espresso maker, water boiler, and hot cup. See page 24 for more details.

RUNNER-UP: PUBLIC DESIGN LAB, THE HONG KONG POLYTECHNIC UNIVERSITY, BRAILLEWISE

This respected Hong Kong institution was praised for its BrailleWise concept, which is designed to assist the visually impaired in accessing aircraft lavatories easily and independently. A special strip provides not only physical assistance, but also psychological comfort to the visually impaired by allowing them to easily locate all items in the washroom. BrailleWise is convenient and has low costs in terms of planning, production, installation, maintenance, and daily management. It fits many lavatory configurations and can be easily modified to fit changing needs in the future. The simple design allows for easy cleaning, and minimises the requirement of Braille information on different individual facilities.

RUNNER-UP: SICMA AERO SEAT, DRAGONFLY

The Dragonfly seat for short and medium-haul, narrow-body aircraft weighs 7.5kg, which the company claims is 20% less than its lightest competitor. Easy to maintain, Dragonfly allows airlines to offer economy-class passengers comfort, even at very short pitch, thanks to a very slim backrest and short armrests. Dragonfly is fully compliant, developed and tested, and 85% of its components are recyclable. The seat is finding demand, as July 2011 saw Air Austral purchase the seat for its two A380s, used for long-haul flights between Paris and Réunion Island.

passenger comfort

WINNER: LUFTHANSA SYSTEMS, BOARDCONNECT

Lufthansa Systems won over the jury with its BoardConnect wireless infotainment solution. The system is designed to save costs, while at the same time opening up new revenue opportunities and increasing customer loyalty. The system provides video-on-demand entertainment via wireless LAN on the passengers' own WiFi-enabled devices, and there are numerous additional passenger services, from electronic in-flight magazines, to information and shopping.

Unlike traditional solutions, the system works entirely without cables (with the exception of the connection between the on-board server and access points). This means it can be installed in the aircraft (whether a new fit or retrofit) without requiring long ground times, and is also lighter.

Condor and Virgin America are the first airlines to have installed the system in their fleets, and Qantas has completed a successful BoardConnect test spanning several weeks in one of its aircraft.

RUNNER-UP: SCHOTT, HELIOJET

HelioJet – a joint development of SCHOTT AG and Lufthansa Technik AG – uses LEDs, glass elements, and fibre-optic know-how to illuminate cabins in a homogenous and energy-efficient manner. Compared with LED stripe solutions, HelioJet offers a more homogeneous light distribution and light stability over time while using a considerably lower number of LEDs, so the mean time between failure is up to five-times higher. HelioJet is currently in a 'trial fit' phase with a major European airline, with FAA/ESAS certification scheduled for mid-2012. Schott and Lufthansa Technik signed an agreement to cooperate more closely on developing and marketing advanced solutions for cabin lighting in passenger aircraft in August 2011, and this lighting system is the first product of their co-operation.

RUNNER-UP: SUPRACOR, STIMULITE HONEYCOMB

An alternative to traditional foam cushioning, seat cushions and sleep surfaces made from Stimulite honeycomb provide comfort and support in a low profile, creating more living space in the cabin. A flexible form of aerospace honeycomb that is fusion bonded without adhesives, Stimulite relies on the strength-to-weight characteristics of structural honeycomb to provide uniform load distribution at a fraction of the thickness of foam cushions. Perforations in the cell walls circulate air to eliminate the heat build-up associated with foam cushioning, while the 'footprint' of the cells and their flexing action promote circulation. The 787 Dreamliner and 747-800 aircraft feature Stimulite mattresses in the crew rest, and the material is currently being evaluated by various seating OEMs and airlines for passenger seating.





greener cabin, health and safety

WINNER: C&D ZODIAC, C&D ZODIAC SIDEWALL & LINING SYSTEM

The C&D Zodiac sidewall & lining system is a composite film that can be applied to the sidewalls and ceilings of all commercial aircraft. The system uses thermoformable Composite Aerospace Board, co-developed by Crane & Co and SABIC Innovative Plastics, as its primary material to reduce energy consumption, waste and labour in the production process, while creating a more eco-friendly product in service. By eliminating several steps needed to process conventional composites and making the press process 30-times faster, more than 800kg of CO₂ emissions per shipset are eliminated in the product life-cycle. The resulting product also reduces acoustic transmission by 9% and can be recycled at the end of its life, reducing landfill waste and improving the passenger experience. The film is available as both a retrofit and linefit application, and is now flying on AA's 757 aircraft.

RUNNER-UP: AIRBUS, BIONIC BRACKET

Combining the principles of nature's design with 'additive-layer-manufacturing', the Bionic Bracket, developed with co-operation from TUHH and iLAS, shows a paradigm change in part design. By reducing bracket weight by 45%, enlarging the structural stiffness by 30%, and using as much as 95% of the initial raw material in the finished part (compared with typically only 5% for traditional milling processes), the Bionic Bracket is currently one of the most eco-efficient aluminium components available. This new approach illustrated by the Bionic Bracket could be very useful in the design of customised cabin parts in all areas of the cabin. In the future, it may be possible to use the same methodology to design and manufacture larger parts up to complete airframes, as shown in the Airbus Concept Cabin.

RUNNER-UP: DIEHL AEROSPACE: ECO-LINE ALL-LED LIGHTING

With its Eco-Line aircraft cabin illumination platform, Diehl Aerospace provides an all-LED cabin lighting solution with savings of 35% in weight, 50% in power, and a lifetime several factors longer for new aircraft, as well as for aircraft in service. Diehl Aerospace invested in its Eco-Line platform development as a response to expected market demand and the need for environmentally friendly technology. The cabin illumination platform is based on a family concept allowing fast and uncomplicated adaptation to virtually any type of aircraft. The product targets mission profiles, supporting both white and full-colour mode light. Two years of innovative work on new power concepts, logistics for LED binning and materials, resulted in prototypes that have now been validated.

material and components

WINNER: TTF AEROSPACE, TSKIN

TTF Aerospace's TSKin is an abrasion-resistant lining system that can be quickly installed into any overhead bin, providing a fresh look for old bins and preventing damage to new bins. TSKin is a multilayered sheet, easily installed in a 'peel and stick' application (a 737 installation takes around six hours). The skin is intended to be removed, replaced and recycled, eliminating weight growth to the aircraft and providing a lifetime of fresh bins. Advantages include the removal of catalysed fillers, paints and solvents used for rebuilding stow bins; improved damage resistance and easy cleaning; lighter weight than a fill and paint cycle (36-63.5kg) with better appearance; if local damage occurs a single sheet can be replaced as needed; recyclability; and a proprietary water-based adhesive that can be removed without residue.

RUNNER-UP: DIEHL COMFORT MODULES (DASELL), MODULAR GLUED CABLE BRACKET SYSTEM

DASELL has developed a concept to standardise and simplify wiring installations with the modular glued cable bracket system, which reduces weight and maintenance costs with a click-and-snap mechanism for wiring installations. The main goal of this concept is to have a high flexibility with a limited number of parts and a reduction in production time. All individual parts are equipped with a snap-and-click mechanism, with no tools required for installation of the parts.

RUNNER-UP: SELL (CO-OPERATION PARTNER 3M), FST ADHESIVE APPLICATIONS

Sell, together with 3M, has developed FST, an adhesive that allows Sell to implement new designs and appearances for cabin interior monuments. It also offers improved passenger safety by complying with current and future fire, smoke and toxicity regulations, as well as with the standards of regulators and OEMs. The FST adhesive helps to reduce the structural weight and to improve the operational efficiency of the airline, while increasing the capacity of cabin interior monuments. ☒





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Headphones offering active noise reduction, comfort and efficient customisation

soundchoice

Designed to combine comfort, quality and style, Long Prosper Enterprise's latest product, the LPE-P3NC, is a fully equipped active noise cancellation headphone model for first-class and business-class cabins. The design has customised around-ear earpads to enhance passenger comfort, as well as high-fidelity sound quality to suit the premium cabin.

The active noise cancellation yields a 20dB reduction in noise, which the company says blocks out more than 85% of engine noise. The full coverage of the earcups also contributes to noise reduction. The company says other benefits include a battery life of more than 40 hours, and high durability – both crucial for the long-haul market.

The headphones can be customised to reflect the image of each airline, by redesigning the earcups. The company believes its approach of modifying just the earcups, and not the other components, minimises lead times and also eliminates additional tooling and design costs.

Everything about the product is designed with the industry's specific requirements in mind. For example, its metallic finishing is achieved using a special painting technique that Long Prosper

Enterprise says is environmentally friendly. Meanwhile, in terms of availability, LPE-P3NC is a fully certified CE and FCC consumer-grade product and can be shipped within three weeks.

With more than 30 years of experience as a major supplier of headphones to airlines, Long Prosper Enterprise is familiar with IFE systems and has expertise in manufacturing headphones to be compatible with them.

The company also plays close attention to the fast-moving consumer electronics industry. By working closely with several famous chip manufacturers, Long Prosper Enterprise aims to optimise its noise cancellation technology without compromising sound quality. The company is also working with Austriamicrosystems on its next-generation noise cancellation headphone model. By combining feedback and feed forward noise cancellation technology, it hopes that the forthcoming model will create another trend in the airline industry.

The company also offers a comprehensive range of services for its airline clients – including warehouse logistics, managing inventory levels based on customers' needs, and the refurbishment of headphones.

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Reader Enquiry No. 501

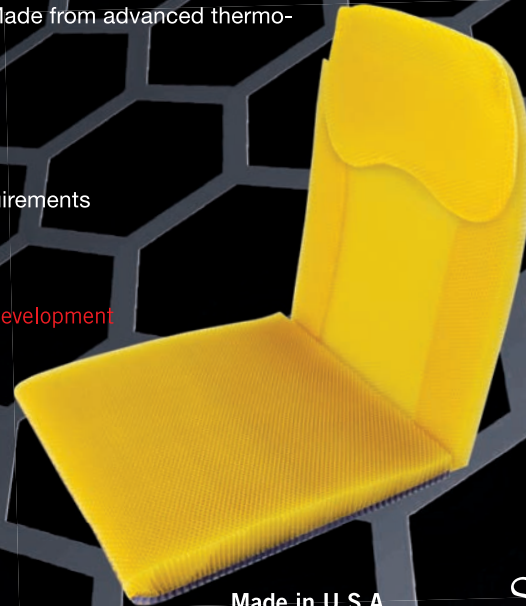
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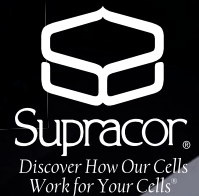
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More than 80 years' experience in manufacturing interiors and furnishings have paved the way for a move into the VIP aircraft sector

starquality

LOHER Raumexklusiv presented its efficiency and expertise in VIP aircraft interior design to the trade for the first time at this year's EBACE show, displaying a wide array of exclusive cabin interior exhibits. One of the highlights of the show was the signing of a general agreement with Airbus Corporate Jet Centre (ACJC), a specialist in VIP cabin completion and associated services.

By signing this agreement, both companies established a stable foundation for their strategic partnership. The signing is pictured above. From left to right: Bruno Cousin, head of procurement at ACJC; Benoit Defforge, CEO of ACJC; Alfred Loher Jr, director of LOHER; and Rainer Luft, sales director at LOHER.

ACJC and LOHER Raumexklusiv work to achieve quality, innovative products. Certified under 21G, 21J and Part 145, LOHER has expertise in unique selling points for furnishers of premium-quality interiors. This makes it the ideal partner for ACJC in terms of creating synergies by combining experienced project teams in exclusive VIP aircraft interior design at the very highest level.

LOHER Raumexklusiv's quality and innovation were recognised by the Bavarian Quality Award 2012 – given to the company by the Department of Trade and Industry in Munich in March 2012.

At Aircraft Interiors Expo 2010 in Hamburg, the company presented a concept for an extravagant VIP lounge galley that enables culinary delights to be prepared fresh and to the highest levels. This technically sophisticated, compact galley with a bar area was intended to create new standards in aircraft interiors. Equipped with the very latest technology, it meets the highest standards of ergonomics and functionality.

LOHER Raumexklusiv, now managed by Alfred Loher and his sons Alfred Loher Jr and Roland Loher, was founded back in 1931, specialising in developing, planning and manufacturing exclusive interiors and furnishing items for villas, boardrooms, yachts and private jets.

The company has 215 staff and 14,000m² of floorspace at its disposal for production. There are also plans underway to build a further 40,000m² production site for aviation and yacht production, which is expected to be completed in late 2013.

The enterprise has been DIN EN ISO 9001 certified since 1996, and DIN EN ISO 9001-2008 certified since 2009. In 2011, it was DIN EN 9100 certified (Aerospace Quality Management) for the first time.

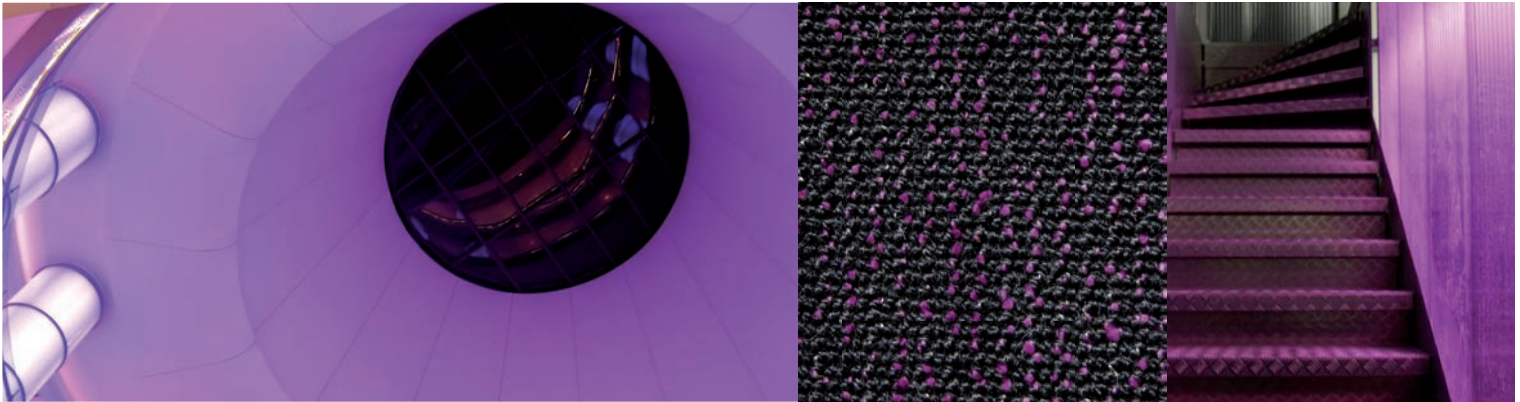
LOHER Raumexklusiv has been officially licensed by the German Federal Aviation Office as a manufacturing plant for aircraft interiors under Part 21 Section A Subpart G for C1/C2 ratings (appliances and parts) since 2006, enabling the company to operate in the market as an independent supplier. In 2007, it also obtained a licence as an approved maintenance organisation under Part 145.

The incorporation of LOHER Engineering GmbH in 2009, and its official certification as a design organisation by the EASA under Part 21, Section A, Subpart J, was a further milestone, enabling the company to offer expertise across the board, even for the most complex projects.

Besides the German Federal Aviation Office, LOHER Raumexklusiv has been audited by three European aircraft outfitters as a supplier of aircraft interiors.

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For more information on the Trend Report and Desso's design vision, contact us at aviation@desso.com.

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suspendbelief

Dahti, a division of Illinois Tool Works, is a leading innovator in the design, development and manufacturing of state-of-the-art seating and other products which have a high demand for comfort. Based in Rockford, Michigan, the company serves a variety of prominent clients throughout North America, Europe and Asia.

Serving as a preferred partner for businesses across the globe, companies choose Dahti because it forms unique partnerships with clients, helping businesses to develop state-of-the-art ergonomic solutions. Acting as a problem-solving partner, Dahti doesn't just offer short-term solutions; it also specialises in long-term, future-focused collaboration. By joining forces with clients to develop ingeniously strategic solutions tailored for their unique needs, it provides high-value solutions that establish a competitive edge.

Dahti has a long history of innovation, technological know-how and creativity. Offering more than 60 years of combined experience in elastomeric suspension, Dahti staff are listed as inventors of more than 50 patents associated with the company's seating technologies. Dahti's state-of-the-art elastomeric structure technology is a highly compliant membrane that offers superior comfort. This cutting-edge product is made from high-tech synthetic crystalline rubber and protected under US and international patents.

Recently, Dahti partnered with Virgin Atlantic to incorporate elastomeric technology into its new Upper Class seat (see page 42). This seat is more comfortable, lighter and thinner than previous generations. The elastomeric technology has been able to withstand the difficult testing required of airline seats and Dahti is excited to be bringing innovation to such a dynamic industry.

Although Dahti specialises in suspended seating with elastomeric structural support, its expertise has allowed it to branch out into other areas with a high demand for comfort. Dahti technology is at work in a broad spectrum of industries, including aviation, furniture, fitness, recreation, automotive, marine, lawn and garden, cinema, turf, education, stadia, auditoria, healthcare, and mass transit.

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lookforward

Everyone has heard the saying "Don't put off for tomorrow what you can do today". At Geven Aircraft Seating & Interiors of Italy, tomorrow is in the making today. In conjunction with Airbus and the University of Naples on a wide array of projects, Geven is exploring the design, material and process solutions of the next generation of seating products.

Ongoing research involves new materials and the new technology required to industrialise applications, in the quest for lighter but reliable and cost-effective solutions.

Candidate materials include the absolute latest state-of-the-art composites and all viable combinations of the latter with other lightweight durable materials.

New innovative featherweight foams and padding combinations are being fine-tuned at the same time. Projects are devoted mostly to new seating generation solutions, but are not limited to that area, and stretch over the entire cabin. Most recently, Geven has conceived ideas for futuristic IFE integration and in-cabin connectivity possibilities – all carefully peppered with the unique Italian design and appeal.

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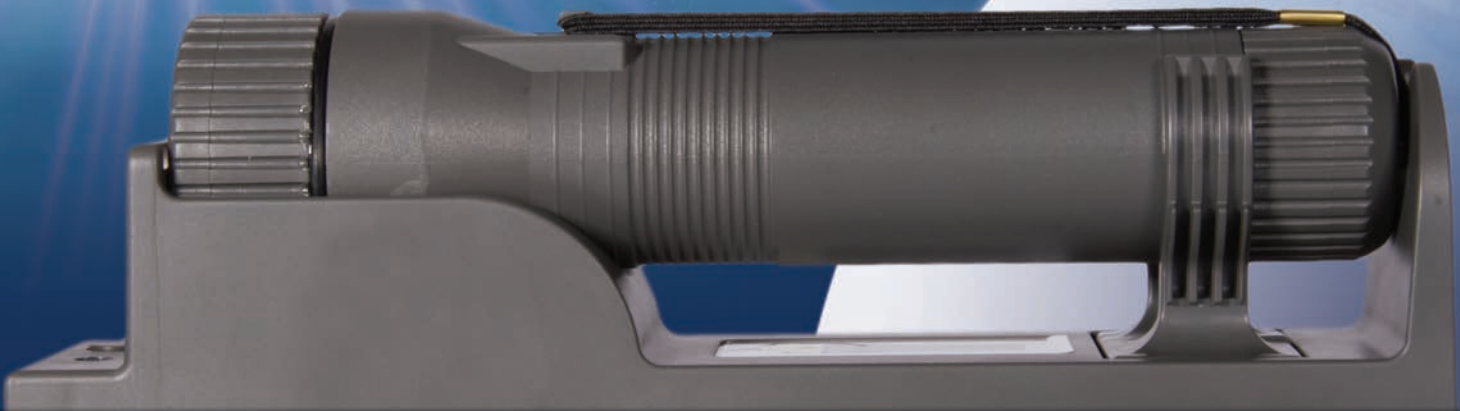


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cleancabins

Collonil, a leading supplier of top-quality leather and textile care, based in Berlin, is stepping up its activities in the aviation field. After unveiling its new aircraft interior products at this year's Aircraft Interiors Expo, the brand has now launched its new website, www.collonil-aviation.com.

Collonil offers highly effective products for all of the main aircraft interior care segments, thus responding to the airlines' aim of providing effective care for the interiors of their planes in the face of rising global passenger traffic.

Following the successful market launch of its interior products in 2011, Collonil now supplies national and international airlines, including Emirates, Turkish Airlines, Lufthansa Technik and DC Aviation. It aims to build on these initial successes with further international expansion.

The interior collection currently includes: Collonil Leather & Textile Cleaner and Collonil Leather Lotion for leather surfaces in the cockpit and cabin areas, as well as Collonil Cabin Interior Cleaner for cleaning plastic surfaces and displays. All of the products were specially developed to meet airlines' unique needs. There are also a large number of special products which are used as specific problem solvers, such as a highly effective ink remover, and quick cleaning tissues for quick, intensive seat cleaning.



The Collonil Aviation Interior product range is manufactured and marketed worldwide by Salzenbrodt GmbH & Co. KG, Berlin, a company with more than 100 years' experience in leather and textile care.

Thanks to a strategy based on consistent quality and innovation, the Collonil brand represents the highest level of expertise in the care and treatment of leather products, and has also made a name for itself with its high-tech care products for clothing and car textiles. The company has subsidiaries in Austria, Denmark and France, and its products are exported to more than 100 countries in all regions of the world.

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comfortzone

The conflicting requirements of reducing aircraft weight while increasing passenger comfort present a real challenge for interior suppliers – especially seat manufacturers. While a seat may feel comfortable for the first 20 minutes of a flight, the real test is how it feels after two hours, or even 20 hours. Because the majority of the comfort comes from the seat's padding, seat manufacturers need a highly efficient cushioning material.

Offering an alternative to foam cushioning, seat cushions made from Stimulite honeycomb provide long-term comfort in a low profile that is lightweight and gives passengers more living space. A flexible form of aerospace honeycomb that is fusion-bonded without the need for adhesives, Stimulite relies on the proven optimum strength-to-weight attributes of structural honeycomb to deliver uniform load distribution at a fraction of the thickness of foam cushions. Perforations in the cell walls

circulate air to prevent heat build-up, while the 'footprint' of the cells and their flexing action promote circulation.

For more than 20 years, Stimulite honeycomb has been providing long-term seating comfort to wheelchair users who can sit for up to 16 hours a day and are at risk of pressure sores. More recently, military jet pilots, including F-18 Hornet pilots, have relied on Stimulite cushions to ensure comfort on their long-haul missions. Such applications demand a robust and durable material, and Stimulite has delivered long-lasting comfort. Made in California from non-toxic thermoplastics that are recyclable, it meets all flammability requirements and is certified by Boeing, which features Stimulite mattresses in the crew rest of the 787 Dreamliner and 747-8 aircraft. A finalist for this year's Crystal Cabin Award for Passenger Comfort, Stimulite is setting new standards for aircraft seat comfort.

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TIMCO Aerosystems is the interiors division of TIMCO Aviation Services, one of the world's largest MRO providers. This affiliation gives the company immediate access to the challenges airline customers face with cabin interiors over time, and supports opportunities for building solutions into new products. The alignment has led to a design focus on functionality, passenger comfort, weight savings, durability and maintainability, and has resulted in the company's FeatherWeight line of seats, galleys and lavatories.

According to Rick Salanitri, president of TIMCO Aerosystems, "The real-world grounding is one of the attributes that makes our approach to new product design unique in the aircraft interiors market. We've relied on our experience as a respected MRO provider to make lighter products that deliver fuel savings, as well as increased lifetime reliability and passenger comfort."

An example is the identification of patterns of corrosion TIMCO found building up over time near its base maintenance customers' lavatories. TIMCO Aerosystems has subsequently built innovations in its own lavatories, including use of new materials as well as alterations in conventional approaches to design, that should significantly mitigate this problem.

Jose Pevida, TIMCO Aerosystems' vice president of engineering, sums up his company's unique proposition: "The strongest endorsement of what we offer our customers comes from the fact that so many of them are customers for both our MRO services and our interiors products. As an engineer, it is immensely satisfying to know that we are not only creating unique and interesting designs that fulfil their immediate needs, but that our products and services are ultimately delivering long-term value for them."



TIMCO Aerosystems
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lukepearson



Want to know more about the personalities that drive some of the industry's most successful companies?

In this issue, meet Luke Pearson, joint founder and director of design agency PearsonLloyd, which uses its varied experience to influence aircraft interior designs for the likes of Virgin Atlantic and Lufthansa

01 WHAT IS YOUR BACKGROUND? I started my professional design research doing industrial design at Central St Martins College of Art and Design in London, and then went on to study furniture design at London's Royal College of Art, which is where I met Tom [co-founder of PearsonLloyd, Tom Lloyd], who was doing industrial design, having done furniture design for his BA. So we had a natural synergy and interest in terms of the culture of furniture and the craft of industrial design.

Both of us went on to work for various consultancies for a few years and we met up and formed PearsonLloyd in 1977. We did mostly contract furniture design – quite high-end stuff – and we did quite a lot of technical work such as desking and storage systems, which furnished us with a lot of skills in terms of production and engineering. And the contract furniture that was more upholstery-based gave us the ability to show ourselves as aesthetic designers dealing with the sensorial experience of touch and feel, and making it evocative and emotional.

02 HOW DID YOU GET STARTED IN AIRCRAFT INTERIOR DESIGN? When Joe Ferry from Virgin Atlantic [the airline's previous head of design] arrived on our doorstep we were all around 30 and still felt like kids getting into our careers, but here was a young man at the helm of something very interesting. He asked if we'd be interested in giving a pitch together with some other companies and giving our vision of upper-class travel. That was the brief and it was very open.

So we started thinking, 'What does upper-class travel mean?' I grew up with aircraft travel being very special and expensive, and an investment you made; you didn't just do it willy-nilly for a weekend. Virgin had historically played with the idea of the romance of flight and we feel very strongly that it is something special. With people travelling so regularly and cheaply, it has removed them from the awe of being 35,000ft up. Aircraft are phenomenal things – tens of tonnes hurled into the air by huge engines, yet people just get on and read a paper or fall asleep. It's extraordinary and there should be more excitement. So when they asked if we'd like the project, we said, "Absolutely."

03 WHAT IDEAS WON YOU THE VIRGIN PITCH? We tried to evoke what luxury travel meant. The seat should feel like a luxury environment with some homage to the aircraft itself aesthetically, but it should not be technical to sit in – luxury travellers don't want to feel like they're sitting in a performance car, they just want to relax. At the same time, we want the

environment to feel like an aircraft, not something alien. The design was about trying to produce a sense of the aircraft itself – but in the cabin. Similar to the engineering panels outside the aircraft, we tried to hide everything in the seat. It was a little like James Bond's Aston Martin – you touched a button and something would happen, but you didn't know it was there – there were just little clues. We wanted it to be fun and stylish.

04 DO YOUR OTHER DESIGN PROJECTS INFLUENCE YOUR AIRCRAFT WORK? We work on lots of different areas so we find that gives us a great enthusiasm for the area we're working on as it always feels new. For example, we're working on healthcare, and urban environments such as street furniture. There are similarities, as they're all to do with an end user interfacing with an object and it working well and communicating well.

Our projects definitely influence each other. We do a huge amount of work in workplace design and there are very clear crossovers in terms of producing an environment that supports somebody efficiently without them being tired by having to interface with that environment. So we make things intuitive, easy to use, calm and appropriate.

05 WHAT IMPACT HAS NEW TECHNOLOGY HAD ON THE CABIN? With technology such as flash memory there is no need to have complex IFE systems. There are tens of kilos of copper wiring under the deck of an aircraft, taking the cables from a central control to and from IFE boxes. Even if we move to IFE boxes that have everything contained inside them so there's a relatively small amount of data being transferred and small power usage, you've still got a heavy certified structure limiting what's used by the end user, and it's in the back of the seat. Everyone who has a laptop or iPad, for example, knows you can lie on your side and watch a movie, and I think that will be the next jump. Certification is an issue, as is theft, repair and damage, but I don't think they'll be that difficult to overcome. But we are also having to respond to the fact that there are many aircraft out there with IFE systems in place that cost a huge amount of money, so at what point do carriers swap over to a radically different proposition at huge expense? It will happen, but it'll be a matter of time. It seems like an obvious change and might even liberate seat design ultimately.

06 WHAT PRINCIPLES DOES PEARSONLLOYD WORK BY? Innovation, simplicity, timelessness, value and quality. I hope our projects embody that. We're quite traditional and idealistic.

07 IS THE DESIGN INDUSTRY REWARDING TO WORK IN? We're lucky – we work in an industry with nice people and everyone is enthusiastic. For example, the people at Lufthansa [PearsonLloyd's latest project – see page 26] have complete passion; the people at B/E Aerospace have total drive. You get to meet people you'd never meet otherwise, experience things you'd never experience, go places you'd never go, and all those things go back into the framework of the design process and give us more knowledge to take to projects and clients.

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