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SHOW ISSUE

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THE NEW BENCHMARK

The RECARO economy class seat CL3710



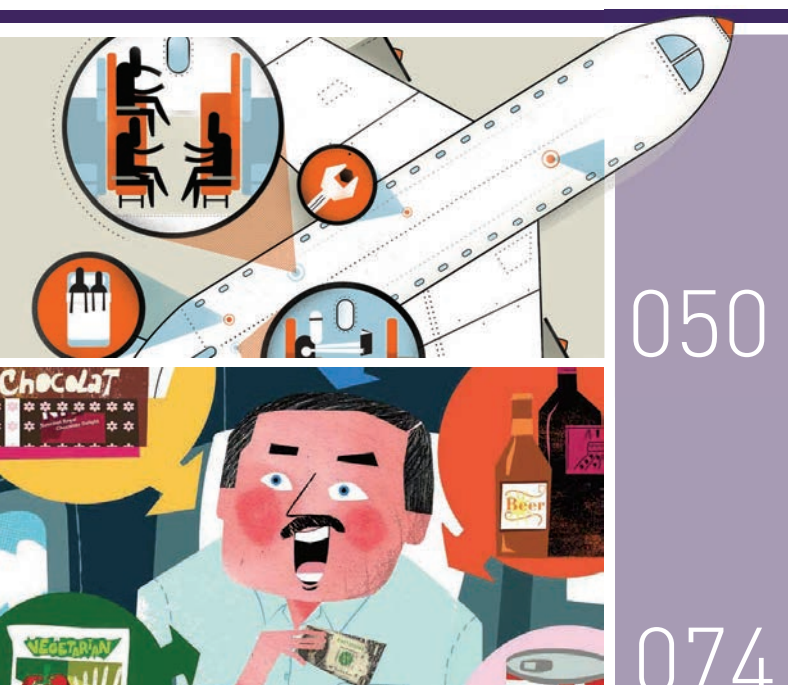
The new RECARO CL3710 long range seat gets top marks when it comes to weight, comfort and design. This seat combines outstanding customization possibilities with a list of industry pioneering features.

Less weight: Designing the CL3710, the RECARO team carefully analyzed every component from the engineering, material and manufacturing aspects to arrive at the lowest possible weight. This effort resulted in a per passenger seat weight less than 12 kilograms making it the lightest in its class.

More comfort: The CL3710 offers the maximum shin clearance at seat pitches starting at just 29 inches. The newly designed head rest offers an exceptionally wide range of adjustability both in height and width, complemented with an extra neck support adjustment creating superior comfort. In addition, the extremely narrow and tapered armrests offer optimal hip space.

026

“Tactility and the experience of quality are vitally important and will be the key that will set airlines apart for a quality experience”



haptictactics

It's interesting to see how people engage with objects. Stroll round a boutique and you'll see people running a hand across racks of clothes to get a feel for the quality. Walk into a car showroom and you'll find people stroking seats and pushing buttons to confirm the vehicles are well engineered. Even a handshake is used to judge a person: if it's wet and limp, the same may be true of the shaker.

This is, of course, also true of aircraft interiors. If the seat feels flimsy, what else is the airline skimping on? However good the cabin looks, it is that tactile sensation of quality that confirms to the passenger that the seat is a safe place, a place to enjoy and in which to relax, and a place they might like to return to next time they travel. It's such a simple concept, but difficult to get right, especially within the constraints of aviation safety.

We explore the world of tactile enjoyment in this issue, from expert opinion on the importance of materials being honest (p26), to the simple pleasure of adjusting the first class seat in BA's new A380 (p60), and the influence of automotive interior quality in the aircraft cabin (p38). For your next cabin project, remember to take a hands-on approach.

Adam Gavine, editor

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regulars

009 news

Aircraft become flying catwalks with the latest crew uniforms; airports play clever to keep you amused; one of the world's oldest airlines has a rebirth; the interiors industry in numbers; flydubai starts a new business; and Air Canada launches Rouge, a holiday carrier for grown-ups

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A bag that is less likely to get lost during travel than its owner, and LAWA's ideas for the new Tom Bradley International terminal, which embrace technology to give passengers the full LA experience

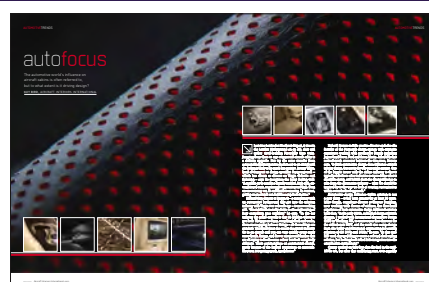
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Modern aircraft interiors look great, but to be a real sensory experience, they must also feel great – literally. We close in on cabin design

ADAM GAVINE,
AIRCRAFT INTERIORS INTERNATIONAL



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A luxury car interior often forms part of the whole passenger experience, so key elements of automotive quality need to be fed into aircraft interiors

GUY BIRD,
AIRCRAFT INTERIORS INTERNATIONAL



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Seats unsold in the economy cabin? Fear not, that valuable space can still be sold to create a more comfortable experience, and some extra revenue

PAUL WILLIS,
AIRCRAFT INTERIORS INTERNATIONAL



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ADAM GAVINE, AIRCRAFT INTERIORS INTERNATIONAL



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Meet Richard Stevens, founder of the Forpeople design agency, and newly appointed creative director at BA



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Cover image: Ross Crawford – Ahoy There



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There may be big changes on the horizon for IFE displays, making their smooth integration with seats more difficult

GUY BIRD,
AIRCRAFT INTERIORS INTERNATIONAL



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Carbon fibre and plastics are continuing to change the shape of aircraft interiors. Is one material superior, or can they work together?

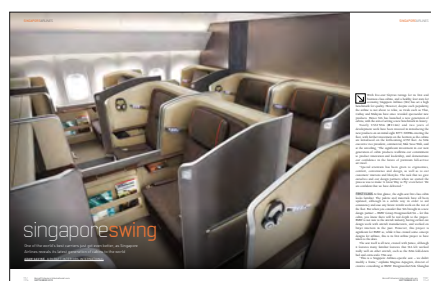
JAMES CARELESS,
AIRCRAFT INTERIORS INTERNATIONAL



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Pan Am may be gone, sadly, but its legacy and lessons live on, and it still serves as a benchmark in branding

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This long-awaited project brought together the design strengths of JPA and BMW Designworks USA to create a new standard in quality and comfort

ADAM GAVINE,
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2



4



highfashion

Cabin crew are raising the style stakes, as the latest uniform designs show

Red is a popular colour for uniforms as research shows it suggests authority and passion

1

Rouge go hipster

Some critics found the livery and cabin designs of Rouge, Air Canada's new low-cost subsidiary, surprisingly conservative. But the same can't be said of the crew uniforms. Justin Timberlake fans will love the men's uniforms, produced by Montreal-based VF Imagewear in less than four months. The outfits incorporate the airline's signature colours of burgundy and slate, with bright accent colours on accessories including the ties and jaunty trilbies. The female version is similar – and includes the trilby option – with colour introduced through scarves and hairbands. Even the shoes are quirky, designed by trendy Canadian shoe designer Fluevog. We're lovin' it.

2

British twist at Virgin

Keen to be seen as British, contemporary and a little alternative, it made sense for Virgin Atlantic to enlist quintessentially British designer Vivienne Westwood for the first redesign of its uniforms in more than a decade. For female crew, the iconic red will remain, but the cut has become more feminine, with bust pleats, a nipped-in waist, curved hip line, and deceptively simple-looking pencil skirt style with a cheeky dart and double pleat at the back – all harking back to 1940s French couture. Male crew get a burgundy wool three-piece suit inspired by the cuts of London's Savile Row, with grey shadow details under the lapels and pockets adding a contemporary twist. A modern classic.

3

Fijian flair

Following the rebranding of Air Pacific back to its original name of Fiji Airways, we have seen a wonderful new livery to complement the new cabins, trimmed in earth tones, which signify respect in Fijian culture. What better way to add colour than the new crew uniforms, cut from a vibrant aqua cloth that echoes Fiji's skies and oceans? The uniforms are in the style of traditional Fijian Sulu Jaba and Bula wear, with Masi motifs echoing the new livery. The uniforms were created by Alexandra Poenaru-Philp, a Parisian designer who now lives in Fiji. Her love of her new home really shines through in the designs, helping passengers get into the holiday spirit.

4

Caped Columbians

As AviancaTACA becomes Avianca – with bold new branding, livery and interior treatments – the airline is also giving crew a new look. The women's uniform has always been one of the most striking, not only in South America but around the world, so it is nice to see it has been largely retained in the new design. Different versions have been produced for the various roles, but the sight of female cabin crew in the iconic red hat and cape remains a key part of the Avianca experience. Yes, the cape design has been simplified, and the hat is now a little more trilby (they must be in fashion) than the bowler hat of old, but when it comes to crew looking glamorous in red, Avianca gives Virgin some serious competition.

5

Qantas isn't square

With the airline's first new uniform design for 10 years, Qantas was keen to make a statement, and this bold yet sophisticated range does just that. Australian designer Martin Grant, the man behind the redesign, has always been a fan of the airline's branding, particularly the red triangle and the flying kangaroo. Hence, against a backdrop of French navy Australian wool suiting and dresses, the red triangle motif has become a major feature, whether revealed once a coat is buttoned, or expressed through diagonal stripes. And, once again, trilby hats make an appearance, this time in a knitted fabric made from recycled bottle tops. Like the Avianca hat, this one is for female crew only – sorry chaps.

lovewaits

Flight delayed? Travellers at these airports will have plenty to keep them amused



1



2



3



4



5

Average airport dwell time is two to three hours. Ideas like these really boost the pre-flight experience

1

Get swinging

Passengers at Hong Kong International Airport who arrive early for their flights, or who have a lot of time between connections, can slip out of T2 and onto the SkyCity Nine Eagles Golf Course. The nine-hole course has been created to United States Golf Association standards, with the green of its signature hole, Island Green, situated on an island in an artificial lake. Another excellent facility is Incheon Golf Club, located in the International Business Center at Incheon International Airport, just a five-minute shuttle ride from the terminal. The club is open from 05:30am to 11:00pm, ideal for flights at unsociable hours, and is great for a spot of practice as it features a 330m, 120-bay driving range, an 18-hole putting course, and a swing-analysis room.

2

Let yourself go

If you're in Singapore, why not take a ride on The Slide@T3, the world's tallest slide in an airport (not that there's much competition). Thrill-seeking guests climb their way up four-storeys (12m), before making the leap and shrieking their way down the slide while reaching top speeds of up to 6m/sec. Nervous sliders can even get a preview of the speed, by having a short whizz down the one-and-a-half storey slide at Basement 2, free of charge. Shoppers can really indulge themselves, as every SG\$10 spent at Changi Airport in a single receipt can be redeemed for a ride on the slide. Best of all, the slide is located landside and is open to the public, so you can even take your new Singaporean business contacts along for some fun.

3

Have a flutter

Singapore's Changi Airport never fails to deliver something different, and its nature trail is no exception. After rambling through the rooftop cactus garden, or the sunflower and orchid gardens, passengers can enjoy the world's first airport butterfly garden. This tropical butterfly habitat features flowering plants, lush greenery and a 6m-high grotto-waterfall, with different tropical species fluttering around. Individual enclosures let you witness the breeding and feeding of butterflies at close range, and you can see butterflies transform from pupae and prepare to take their first flight in the Emergence Enclosure. Adventurous visitors may also enjoy the garden's collection of 200 carnivorous and insectivorous plants.

4

Action!

Film buffs with time on their hands will love the cinemas that have been appearing in various airports. And some are not just token efforts: the 350-capacity IMAX Theatre in Chek Lap Kok Airport features the largest IMAX screen in Hong Kong. The projection technology has many features including options of 2D or 3D movies, crystal-clear images, and a laser-aligned digital sound system, as well as immersive theatre design. At Singapore's Changi Airport, die-hard movie fans will find cinemas in Terminals 2 and 3, although they won't be showing the latest blockbusters – instead, you can watch movie screenings on the Fox Movies Premium channel, with the screenings available free-of-charge, 24 hours a day.

5

Puppy power

Many people hate flying, and many hate the airport experience, but who doesn't love puppies? Anxious or stressed passengers at LAX can take advantage of the Pets Unstressing Passengers (PUP) programme, which is intended to provide stress relief and comfort through interaction with cuddly canines. Trained dogs and handlers roam around the departure gate areas of each terminal, offering airport information, and a lick if you ask nicely (from the dog, but you never know). The dogs and handlers are an excellent addition to the customer service team. Passengers will love seeing the warm, wet noses and wagging tails that help create a friendly, positive experience at LAX. And if you think that's cool, wait til you see page 22.

COMPLIMENTS



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February 2013 saw Avianca open its new 2,000m² VIP lounge in the international terminal of Eldorado Airport in Bogota, Columbia, intended to benefit the members of its LifeMiles frequent flyer programme as well as business class passengers. These premium passengers can also look forward to new VIP lounges appearing soon in Cali, Barranquilla, Medellin, Cartagena and San Salvador.

Tracing back to 1919, Avianca is, after KLM, the world's oldest airline

latinlovers

After a long engagement, Avianca and TACA have united to become the new Avianca, with fresh branding and interiors

Following four years' work in merging Latin American carriers Avianca and TACA into one entity, the parties decided it was time to celebrate their coming together with a new brand, livery and interiors. Information from market research and analysis, carried out by New York-based brand strategy and design firm Lippincott, revealed that the Avianca brand name had a suitably strong history and brand equity to take the airline into the future. Welcome to the new Avianca.

A key part of the merger process, according to Lippincott, was to ensure that staff from both airlines worked toward the creation of a shared vision, mission and set of values to guide the new brand identity, align the culture and inform an enhanced customer experience.

"Often, when two brands merge into one, the customer experience isn't aligned until down the road, but we all felt it was important to harmonise the customer experience first, and then apply a new brand identity, rather than the other way around," stated Steve Lawrence, senior partner at Lippincott.

This brand identity extends all the way from staff uniforms, corporate offices and ticket offices, to airports and lounges and, of course, the aircraft interiors. Avianca's fleet of more than 150 short-, medium- and long-haul aircraft, which comprises Airbus, Boeing and ATR families, will all be fitted with new interiors designed to reflect Latin America's passionate culture. That's not to say it's a sea of red; indeed, the dominant tone throughout the fleet is a sophisticated grey, with red picked out in accents, alongside mood lighting, divider curtains and IFE home screens.

Travellers on the flagship A330s will experience a slightly upgraded standard of product over the narrow-body fleet. For example, on the A320s, Weber 7070 seats

are fitted in business, clad in dark grey leather, and set at a 40in pitch, with 7in recline and 10.6in IFE displays. On the longer A330 routes, business passengers can relax in a Sicma Majesty at a 65in pitch, trimmed in a sophisticated dark grey textile, with 170° recline and a 15.4in IFE display.

Economy passengers also receive an improved product, with A320 flyers offered a leather-clad Recaro BL3510 at a 31-32in pitch, with a 4in recline and 7in IFE. A330 flyers get Weber 5750s, set at a 32in pitch, again with 4in of recline, but with added features including 9in IFE, power outlets, a footrest, an IFE remote, and a grey textile similar to that found in business.

Following the recent launch of TAM's stunning new interiors, the new Avianca is continuing to show the world the sophisticated side of Latin American culture. However, where the new airline has really expressed itself is in the crew uniforms, which bring bold reds into the cabins and comprise some of the favourite elements from Avianca's and TACA's past uniforms. Hence items such as a red cape and bowler hat really enable the crew to express that famous Latin American glamour.

- 01. Business pax on the A330s enjoy a little extra privacy due to the seat shell
- 02. The shorter routes of the A320s called for a more durable leather seat trim
- 03. The colour and passion of Latin America is expressed through the cabin crew's uniforms



The world aircraft fleet will double over the next 20 years, with passenger traffic growing **5%** annually. There will be world demand for more than 35,000 new aircraft by 2032, valued at

US\$4.8bn
(€3.7bn)

Boeing Current Market Outlook



The number of hours of disrupted technological activity on domestic flights attributable to the FAA ban on the use of electronic devices during take-offs and landings has grown by **104%** since 2010. In 2013, **105.8 million hours** of technological activity will be hindered as a result of the ban, compared with **51.7 million hours** in 2010

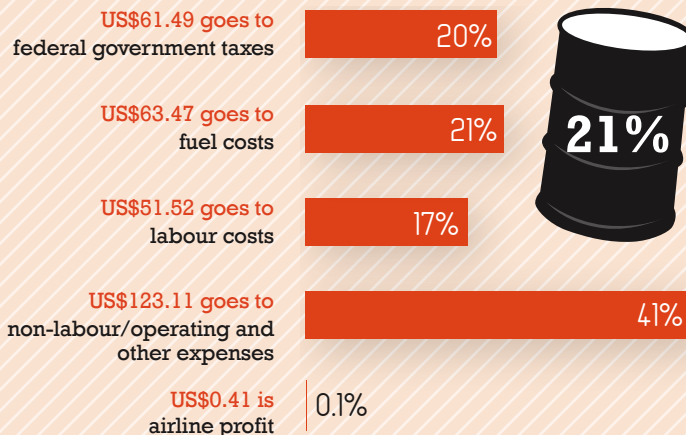
Tablets Take Flight study,
DePaul University, Chicago



growthindustry

The latest industry statistics show great promise, and highlight a few areas to improve

From a US\$300 (€230) US domestic round-trip ticket:



- **42%** of US pax think a hot meal should be included on flights of more than four hours
- **37%** think the food options are too limited
- **31%** think food choices are too expensive
- **24%** think airline food is poor quality
- **20%** think the portions are too small
- **17%** don't like fellow pax bringing smelly food on board
- **15%** think there is a lack of healthy options

YouGov Omnibus survey of 1,000 US travellers

In 2010, the global commercial interior market was valued at **US\$8.4bn** (€6.5bn). The market is expected to grow to approximately

US\$12bn
(€9.2bn) by 2016

Opportunities in the Aerospace Interior Market 2011-2016, Research and Markets

Airline ancillary revenue was

US\$37.1bn

(€28.4bn) in 2012, 101% more than in 2009

IdeaWorks Company research



US consumer satisfaction with their airlines is **69%**, a 3% increase on 2012

American Consumer Satisfaction Index

The IFEC market will grow from today's US\$2bn (€1.5bn) to US\$3bn (€2.3bn) by 2017

Global Commercial Aviation IFEC Market (2012-2017), research and markets



By the end of 2018, **91%** of US travellers will own a smartphone and **89%** will own a tablet

Travel's Mobile Centric Future, Hudson Crossing

97%

97% of airlines plan to invest in mobile passenger services and personalisation by 2016

2013 Airline IT Trends Survey, SITA

The global commercial aircraft seating market is set to grow at a CAGR of **5.56%** over the period 2012-2016

Global Commercial Aircraft Seating Market 2012-2016, Research and Markets

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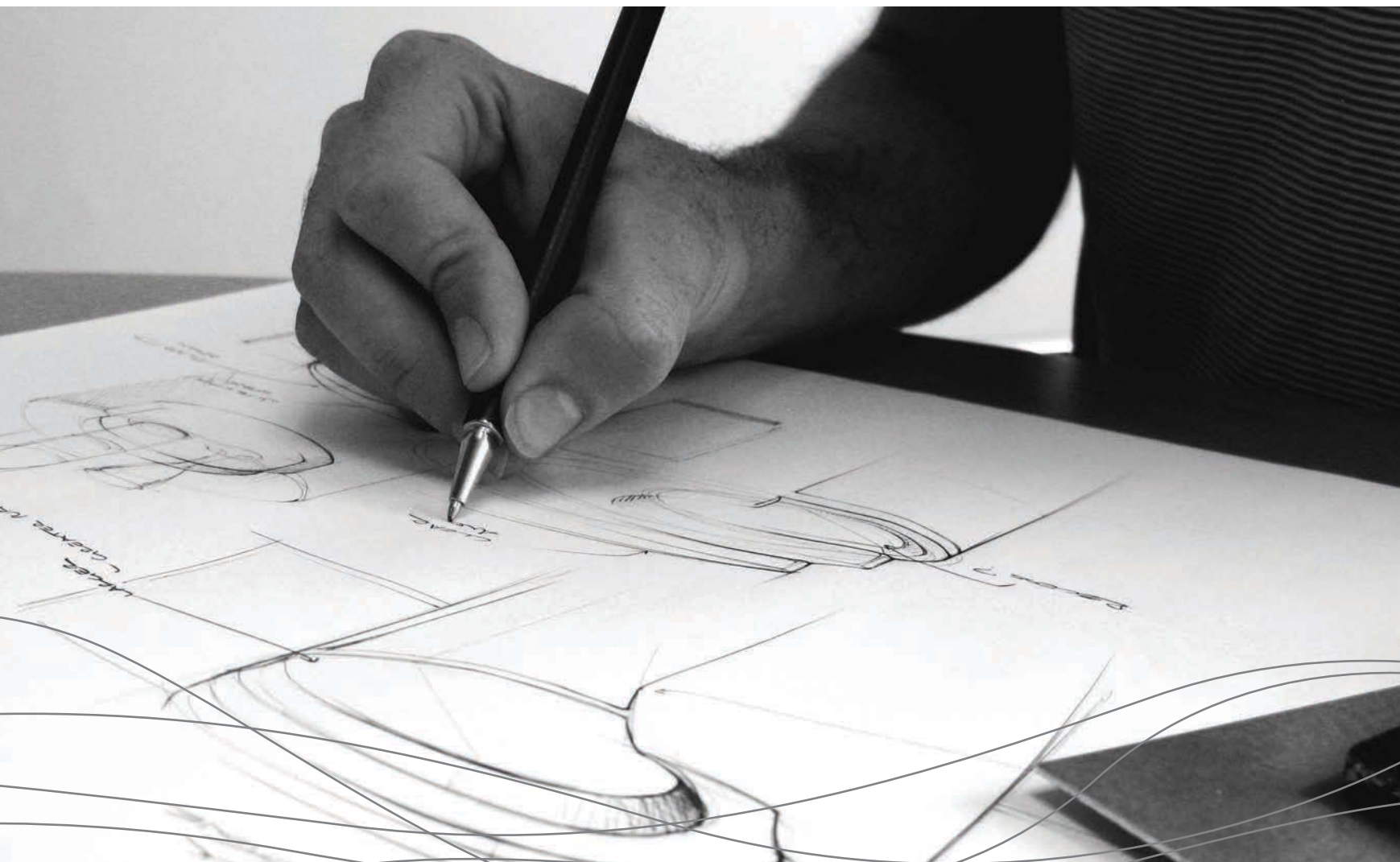
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This is Air Canada's third entry into the lower-cost market – remember Zip and Tango?

Paint the fleet red

The Rouge fleet currently comprises two three-cabin, 282-seat B767-300ERs for transatlantic flights, with economy (Rouge) offering 230 slimline seats at a 30in pitch; premium economy (Rouge Plus) offering the same seats at a 35in pitch; and the top product (Premium Rouge) offering 24 seats at a 37in pitch, with a little extra width and enhanced cabin service. The Premium Rouge seat is the same as the new premium economy seat just launched on Air Canada's refreshed B777-300ERs.

The B763s have been taken from Air Canada's main fleet and converted by Avianor in Montreal, as will the two A319s joining shortly for North American routes, with 118 slimline seats in economy at a 29in pitch, and 24 in premium economy at a 35in pitch. The airline will begin taking delivery of two brand-new B777-300ER aircraft later this year, with further B767s and A319s from the Air Canada fleet to follow as the parent's B787s begin to arrive.

redalert

Introducing Rouge, Air Canada's holiday spirit

Air Canada had a problem: it was losing leisure travellers who were increasingly choosing a new generation of credible local low-cost airlines. The solution was to create a sub-brand, a leisure airline that could support these markets where the master brand didn't fit as well.

There is nothing unusual about this scenario, apart from the swift timescales involved in getting the airline off the ground, which led to a three-month window for everything – strategy, positioning, name, brand identity system and interior cabin design – to be considered and executed.

"Roughly three months from a blank sheet of paper to a complete airline scheme, ready to go with artwork and samples. It was our life for 24/7," said Paul Wylde, CEO of the eponymous studio charged with the task.

"The initial brand positioning idea that we developed was 'naturally chic', the idea being derived from the unique Canadian traits of sophistication with accessibility," stated Wylde of the cabins. "There is a style to Canadian service that, although elegant and sophisticated, remains refreshingly approachable. All of the initial design development was inspired by this idea."

Thus Rouge doesn't feature the bold and bright 'holiday' colours seen on many leisure airlines, with

the predominant cabin colour instead being a slate grey, with touches of bright red and burgundy, staying close to its parent brand. However, in the soft product and the fun crew uniforms (see page 9), accents of sky blue, fuchsia, golden yellow and dark purple bring in the vibrant colours of exotic destinations.

The Rouge logo, itself an asymmetric crop of the Air Canada logo, was cropped and scaled in strategic ways to form abstract pattern devices that were applied to the curtains and as a silver tone to the decorative laminates on the bulkheads, as well as finding their way onto various customer touch-points including corporate print, stationery, menus and the uniform design.

As Rouge's newly conceived slogan says: 'Vacation ahead'.

01. The asymmetric crop of the Air Canada rondel on the tail is universally loved by crew and operations, and signals confidence with modernity, according to Wylde
02. The cabins are equipped with 'player' IFE, which streams film and TV content wirelessly to passenger devices. Player is free for Premium Rouge customers, and CAD\$5 for other passengers

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The background of the advertisement is a photograph of an airplane cabin interior. It features white vertical blinds that are partially open, revealing a glimpse of the cabin's interior, including a blue overhead storage bin and a glimpse of the floor. The lighting is soft and even.

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Foster + Partners also worked with Cathay Pacific on the renovated first class lounge in The Wing, the airline's flagship lounge at Hong Kong International Airport, which opened in February. The 1,697m² lounge features areas such as The Haven dining area, a free-flow champagne bar, and the Cabana, a relaxing area featuring showers, baths and day beds.



Foster + Partners is currently working on plans for the proposed London Thames Hub airport

fostercomfort

Cathay Pacific has made further refinements to its already brilliant first class, with a little help from a new, yet familiar, name in interiors

- 01. The artworks at the front complement the overall cabin palette
- 02. Another idea from the lounge, the high-gloss dark grey textured material on the seat shells is exclusive to first class
- 03. The walnut finishes echo the lounge design

Following hot on the heels of the news that BMW DesignworksUSA secured the contract for Singapore's new first class (see page 114), another major new name has emerged in commercial aircraft interior design: Foster + Partners. Cathay Pacific announced the partnership as it unveiled its first project: a newly refreshed first class product for its current and future B777-300ER fleet, with a number of new features.

Cathay has worked with the London-based architect before, on its flagship first class lounge in The Wing at Hong Kong International Airport, and Foster aimed to create a seamless experience, thus carrying forward many of the lounge's colours and finishes into the cabin.

Cathay's cabins are already highly regarded, so an intensive redesign was not required, more a refresh. The seat shells are finished in a high-gloss dark grey textured material, which cocoons the warm-tone natural leathers and custom textiles of the seat. The side console is all-new, and the overall interior of the suite has been revised to have fewer panels, resulting in a cleaner look. It also feels a little more luxurious, as more surfaces have been wrapped in leather, the stitching is a little finer, and even the latches now feature leather pads for a softer touch.

The overall cabin is also enhanced by a set of three hand-crafted sculptural artworks on the front wall. Made of copper and steel, and created by Maria Lobo and Linda Leviton, these artworks have been individually etched and painted by hand.

Several refinements were made following feedback from the airline's Marco Polo Club frequent flyers, including a more adjustable meal table, more room in the personal closet, additional space inside the console compartment, a drink holder on the new side console top, and new wash basins and counter tops in the lavatories.

Other enhanced features include a new 4.3in LCD touchscreen controller for the seat recline, lumbar and lighting functions; flexible reading lights with five levels of brightness; higher quality Bose noise-cancelling headphones; a higher-quality mattress and bedding; and amenity kits from Ermenegildo Zegna and Trussardi, featuring Aesop skincare products.

Mike Holland, head of industrial design at Foster + Partners, said of the project, "While this was our first project for a commercial aircraft, it was a unique opportunity to bring together architecture and industrial design, and it drew on our previous commissions for yachts and private jets. Our challenge has been to take the design principles of the new lounges into the aircraft, while working within stringent safety requirements and retaining Cathay Pacific's award-winning seat. Achieving this successfully drew on the expertise of Foster + Partners' wide team, from architects to industrial designers and interior specialists – we are now further developing this expertise with projects for next-generation aircraft."



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Business flyers with Flydubai will have access to more than 900 hours of movies, music and games through the Lumaxis Fiber-To-The-Screen (FTTS)

IFE system, with 12.1in touchscreen monitors that the airline's CEO, Ghaith Al Ghaith, says are "better than any other". Economy passengers, meanwhile, can enjoy the same content on 8.9in seatback monitors.



Flydubai's network increased by 49% in 2012 to 64 destinations, with seven new routes announced this year

nicheinterest

Flydubai is proving to be a dynamic airline, as its latest business-class decision shows

01. Launched in 2012, the Comoda is proving a success, with Germania, Transasia and South African Airways also specifying the seat
02. While some airlines have selected Comoda with a PED rack, Flydubai has opted for FTTS 12.1in seatback IFE

Dubai-based low-cost carrier Flydubai is enjoying success due to a clever choice of niche routes, especially short-haul commuter routes including Dubai to Doha and Kuwait City. This success is set to continue, as the airline has recognised a new niche: some of these wealthy business commuter routes have no business-class option on any carrier.

Therefore, following customer research, the airline has launched a business-class cabin and complementary services on certain routes. The cabins will initially be fitted to the 20 new aircraft arriving between now and 2016, and will also be retrofitted to certain aircraft later this year as the market demands.

At present the airline's fleet of 30 B737-800 NGs are specified in a 189-seat high-density economy configuration with Recaro BL3510 seats. The plan is that 12 business seats will be added 2+2 to the new fleet additions, at a pitch of 42in, which will reduce economy accommodation to 162 seats.

Business travellers will enjoy the Geven Comoda business seats, trimmed in blue and cream Italian leather. The 21in-wide seats, which have been likened to a sports car seat in design, weigh 21kg per passenger place and offer comfort features such as 7in recline, lumbar support, a leg rest that elevates to 60°, an adjustable and extendable headrest, and a dedicated universal power outlet.

Ghaith Al Ghaith, CEO of Flydubai, says the new business class has been in development for 18 months, and the seat was chosen due to its light weight and because its modern styling complements the Boeing Sky Interior of the airline's B737s.

Business flyers will also enjoy a dedicated cabin crew who will offer cold food on short flights, and the choice of a three-course meal from a Halal menu on flights of 90 minutes or longer.

Further perks will include priority check-in and a more generous baggage allowance, with a lounge and baggage collection to follow. Also, a dedicated team is available to attend to queries and assist in ticket booking, meal selection and telephone check-in.

The airline does not foresee a need for premium economy any time soon, though. As Al Ghaith states, "We believe our current economy product is premium."

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case study

BRIEF: Baggage is one of the biggest sources of stress for travellers. Whether lugging it to, from or around airports, or the frequent nightmare that is a lost bag, the current system is inefficient and out of date. Solution please.

DESCRIPTION: Airbus, Rimowa and T-Systems teamed up in a cross-industry innovation project to create the Bag2Go concept, an intelligent suitcase that enables passengers to control and monitor their luggage. The digitally enabled bag can weigh its own contents, communicate with check-in and security, and is fully traceable by the passenger throughout the journey via a smartphone app (except on the aircraft, when it powers down automatically).

The case is fitted with a radio and software module, and an E-Ink display. The passenger inputs all flight data via the app, which is then transmitted to the airline, which generates a barcode and sends this to the display on the suitcase. This barcode assigns a unique identifier for checking in the baggage and forwarding it to its destination, enabling baggage pick-up and drop-off services to be offered from home to destination. The barcode data also means the suitcase can travel independently of its owner, right to the destination, even if a connecting flight is not made. The bag also registers whether it was opened during its journey and informs the owner when and where this occurred.

According to Airbus, the Bag2Go concept is just the beginning of the story, as it is also an enabler to build new aircraft configurations.



VERDICT: Clearly, there are many positives for the passenger, but a major selling point is that the bag uses 2G barcodes, so airports and airlines won't need to invest in RFID systems. However, Rimowa is not affordable for all, especially with the extra premium for Bag2Go. To solve this, Airbus is looking at rental programmes, and also at licensing the design. Just think of the possibilities standardised bags would bring: more efficient baggage containers freeing up aircraft space, and further into the future, standardised cabin bags would make stowage bin design and loading much simpler.



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experience
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BRIEF: Airports can be the weak link in the passenger experience: stressful, impersonal and soulless. Los Angeles World Airports (LAWA) has a vision to use technology to immerse the passenger in LA culture.

DESCRIPTION: LAWA commissioned seven media features at the new Tom Bradley Terminal at LAX. They combine to create the largest immersive airport multimedia system in the Americas, giving passengers a feel for LA, and the glamorous destinations served by the terminal, in a way that is soothing and engaging.

The experience begins with the Welcome Wall, an 24m-tall LED display of lively images that greet passengers. Thus acclimatised, they encounter the heart of the experience: the Time Tower, a 22m, four-sided clock tower, clad with 600m² of LED screens that show everything from jungles to tributes to the silent-film era. The tower also includes an interactive surface that reacts to the gestures of passengers by triggering customised, real-time visual effects.

Other features include 10 8.5m-tall columns that provide visuals and sounds that change to reflect the movement of people as they walk by; the Story Board, a 36m-long composition of LED screens showing visuals of LA and destination cities; and the Destination Board, a generative video data cloud displaying flight information and visual data about destinations. Finally, as you head for the gates, you encounter the Bon Voyage Wall, which shows slow-motion films of people and places in LA, reminding passengers where they are and why they should return.



VERDICT: What else can we say, it's amazing! Technology may be considered cold by some, but in this application it becomes not just an impressive architectural feature, but a source of joy and contentment. Even a bustling airport can be a lonely experience for a solo traveller, but these interactions give a feeling of being connected with the environment. For families, the installations are a source of entertainment and wonder. And, most importantly, they bring back the magical feeling of travel – whatever class your ticket.



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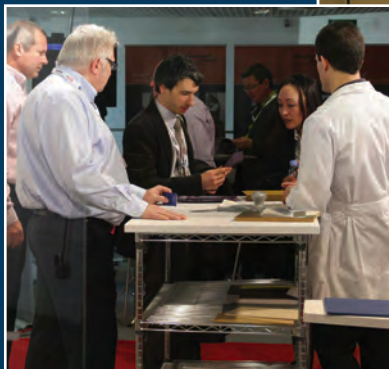
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touchy subject

To get that all-important edge on the competition, designers need to appeal more to passengers' sense of touch. A panel of experts share how they feel about the importance of tactility, and its application

ADAM GAVINE, AIRCRAFT INTERIORS INTERNATIONAL



Think back to the last time you looked at a car in a showroom. The styling and the relevant numbers would have attracted you to the model, but when you stepped inside, what did you do? Instinctively, everyone wants to get a feel for the quality and engineering of the product, so they stroke and tap surfaces, press buttons and try the soft-close features. We often trust our hands more than our eyes – indeed, the first sense we develop, at the prenatal stage, is touch. Therefore we want to confirm that that lovely, solid-looking object also pleases the tactile senses. So what works in an aircraft interior when you need to convey comfort, depth of engineering, safety and luxury – all while accommodating weight constraints?

“It’s a super-interesting topic. I think it is what will set airlines apart in the future. Tactility and the experience of quality is vitally important and will be the key that will set airlines apart for a quality experience in the future,” comments Magnus Aspegren, director of creative consulting at BMW DesignworksUSA’s Shanghai studio.

Indeed, touch has been an important factor in Aspegren’s latest projects, which include Airbus, Samsung and Singapore Airlines’ new first class. For the latter, Aspegren says the touch elements were “extremely important. We wanted to create a tactile experience whereby wherever you put your arm down, or your fingers

landed, those areas would have a very satisfying tactile experience, so you have that communication when you’re sitting. When you open a compartment it should have a certain weight in its movement that really communicates quality. That is extremely important. You have to sit down and build the scenario of how somebody would use the seat and use an environment like this, and make sure you create the proper responses along the way.”

BACK TO BASICS A quality feel is key to the onboard tactile experience, the very foundation. As Aspegren says, “Features are nice and features are good, but you can go too far with them sometimes. I think if you’re really looking for quality, then after a while features don’t really bring it. It comes more from the sense that something is solid and is made from quality materials and has some weight to it.”

One of the most disappointing sensations for Aspegren is when a material’s tactile response is not correct for what is intended to be a high standard of product. “One thing I really have a problem with is when I’m sitting in a really nice seat and then I open a compartment and it’s very flimsy. That really doesn’t give me a sense of confidence and comfort. A genuine experience is the best.”

Paul Priestman director of Priestmangoode, agrees, adding, “You want a sense of solidity.” Other factors for







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the audi approach

Believe it or not, an entire 15-strong team at Audi spends its days pressing, tapping, pulling, sliding, turning, feeling and touching, to give controls a specific operating feel and actuation sound, and ease of movement – impressions that help define the way an Audi feels – and to ensure that feel is consistent across the model range.

With a full-time emphasis on haptics, the Team for Actuation Haptics, set up in 1995, has efficient processes and is involved from the initial concept drawing stage, contributing pre-defined haptic criteria with the aim of making something subjective a little more objective. The team also runs comparative trials, using test people from neutral organisations, and with universities, to gain new scientific findings in the field of haptics, especially in the area of sensory perception. They have used their research to develop technical specifications with which suppliers are required to comply, and which are regularly amended with new findings.

“The customer wants to have clear feedback when initiating a function,” says Jörg Müller, co-coordinator of the team. “When the driver presses a button, for instance, the way in which the effort required increases is important. Haptic response also includes acoustic

feedback, such as a clearly audible click. The proper combination of haptic and acoustic feedback gives the customer the confidence that the function was initiated.”

This primarily involves the force, process, movement, direction and sound of the controls. One particularly important question is whether the shape of the control element makes clear how the element is operated – what the team calls “operating logic” or “blind operation”.

Actuation haptics and operating acoustics are usually perceived subconsciously. “If the customer finds that every switch and lever in an Audi is in the right spot and the switches respond the way the customer intuitively expects them to, then we can be happy,” adds Müller.

It is not yet possible to determine from analyses whether there are different preferences between groups of customers, though the team has found that women make more marked haptic distinctions than men, and that in some markets

customers are more tolerant of faults than in the home market of Germany.

The team consists of employees from a broad variety of backgrounds within Audi, such as component development, controlling, quality assurance, design and marketing, in order to get a broad mix that simulates a representative cross-section of customers. The team assesses controls according to the following criteria: ease of motion, moderate operating paths, defined end stops, precise guides, uniform actuation sound and clear feedback at the shifting point – primarily tactile feedback, but acoustic as well.

Think you’d have a feel for it? Getting a place on the team requires a few special qualities, according to Manfred Mittermeier, fellow team coordinator: “It’s important that you take haptics seriously. Another requirement is a high degree of sensitivity. Not so much a sensitivity based on physical characteristics such as the fingertips, but more to do with a process of awareness that happens in the mind. We measure, compare, analyse and discuss both the technical and design feasibility of new concepts with development engineers and suppliers. Of course, you can’t please every customer, but generally if the haptics please 80% of customers, it is considered a good result.”



ONE OF THE INSIGHTS WAS THAT NO ONE CONSIDERED THE FLOOR AS A TOUCHPOINT



Priestman are the temperatures of materials – you don’t want to put your bare arm on a cold piece of aluminium.

Another hands-on designer is Richard Stevens, founder of the Forpeople design agency and also creative director at BA, who says that the tactile experience “is really, really important”. He says that one element which is touched for hours at a time, but is little considered, is the floor. When Stevens worked as a designer at Ingeni – a Ford-owned multidisciplinary design studio that is, sadly, no more – he was brought in by Boeing, together with Teague, on a year-long project looking at touchpoints on the B787, such as the dimmable windows and stowage bin operation. “One of the insights we discovered was that no one considered the floor as a touchpoint. Many people on a flight take off

their shoes and connect constantly with the floor, so just that insight is a key touchpoint in delivering a feeling of quality, and we need to design every element of that.”

MATERIAL MATTERS So what materials are pleasing to touch? “The aviation industry is interesting here,” Aspegren feels. “Because your material choices are limited, you constantly have to save weight, and there are fire and smoke issues. We choose materials such as a durable and

CONTENTMENT
ILLUSTRATION BY ROSS CRAWFORD - AHOY THERE

RELAXED



01



02

“

IF YOU CAN GIVE A MEMORY OF DIFFERENT TOUCH SENSATIONS, THAT'S AMAZING ”

01. When designing Singapore's first class, BMW ensured the controls had a nice feel and click, and lined the stowages with leather

02. TAM's first class also features leather-lined stowages, so the initial colour reveal is backed by a sensation of luxury

lightweight Tedlar for shells, held in place with real aluminium trim, so that you can feel that it really is metal. When you walk in and touch the edge of the seat and find it's real metal, you really get the sense of quality. The metal gives a temperature communication that is very satisfying. We also use some surfaces that look like wood. It's not always possible to use real wood in a commercial airliner, but it's important that when you look at materials and what they communicate to you, you want them to stay close, both from a tactile and a visual point of view, to being true to their nature. We're trying to really be more correct in our interpretations of materials.”

Howard Sullivan, director of the YourStudio spatial design agency in London, which works with airlines including Cathay Pacific, Iberia and British Airways, states, “Ideally, you want the interior to feel as good as a really good car interior like an Aston Martin. It's harder to use real wood veneers in aircraft though, so sometimes the effect is created through a more smoke and mirrors approach. I have a bugbear about fake materials though – if you're going to use wood, use wood. If you're not going to use wood, don't pretend. Try to keep things simple, clear and uncomplicated. Anything that risks seeming gimmicky or fussily designed risks seeming fanciful or silly, when you want people to feel calm. If you can give someone a memory of different touch sensations, that's an

amazing thing to do. It's kind of answering the emotional needs of humans, allowing them to explore their senses and be stimulated on board.”

Someone who works closely with materials trends, CMF, and high-specification textiles and surfaces for the transportation and consumer industries, is Emma Rickards, principal at West 6, who has worked with the likes of British Airways, Panasonic, Iberia, Virgin Atlantic and Hyundai. Rickards is happy with the increasing levels of quality in the materials products being supplied to the industry, which are mixing pleasing feel with safety requirements. “There's nothing I feel is seriously lacking. The fibres have all moved on,” she states. “All the mills are now capable of producing lustre and softness while meeting industry requirements. The days of harsh heavy-duty fabrics are long gone.”

So what new materials does Rickards think could enhance the feeling of touch? “Rubbery materials have a supple softness and a low level of sheen – what I would call shine-off rather than gloss. There is still a place for gloss but in small quantities,” she says. “Neoprene and other man-made fabrics have a lovely quality where you can lose yourself in the surface. It's all about knowing what it's going to feel like before you touch it.”

“In terms of leather, I'd use something that doesn't feel too shiny and therefore slippery. The latest leather touches I saw at the Milan Furniture Fair were a clay-like leather that is very light absorbent, with no slick sheen, and looks almost velvety. Your fingertips know what it will feel like before you touch it. If an aviation leather specialist could make a product look like that and perform on an aircraft, I'd be really interested in using it.”

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SENSUOUS HIGH TECH

GOOD VALUE This all sounds very luxurious, but delivering a rewarding tactile experience doesn't necessarily mean a lot of additional expense. Consider the very thin and light cabin materials that are essential for reducing aircraft weight, but in themselves don't have the heft that implies quality and solidity when touched.

Priestman is a fan of simple, low-cost ways to really enhance the quality feel such as soft-action lids and levers, and material deadening. To make a thin, hollow surface feel more substantial, he suggests giving such materials some rigidity around the edges so that they don't flex as much, perhaps backing them with foam and ensuring that they don't resonate against any neighbouring surfaces. "Aircraft are sound boxes that really resonate rattles and squeaks by the nature of the cabin shape," he says.

"We designed some cosmetics packaging for [UK beauty brand] No7 and the compacts had a damper so they opened slowly when the button was pressed and didn't twang. The damper cost a fraction of a cent but gave the product a great feeling of quality. If you can do that for a compact then we should see it in aircraft," adds Priestman. "Aircraft are amazing machines, and to have a floppy bit of plastic on your armrest doesn't give you a great sense of security. But then you do want it to be light."

Another view is given by Sullivan, who suggests that any expensive materials chosen for their joy of touch can be used selectively. "In flight, everything must feel solid," he says, but adds that this is only key for the main touchpoints. "For example, an interior designer in LA once told me that, when specifying a show home, you should make sure that everything people might touch, like the handles and taps, is really expensive. No one will look at the kitchen carcasses."

For people's Stevens adds that the airline tactile experience can perhaps be a little less intensive than that of the automotive world. "The auto industry is an interrogator and deliverer of the very best haptic qualities. But with the airline experience you don't necessarily need to go to the same level of quality because you're not interrogating those details quite as much, because you have the service as an overlay of the experience. So there's more of a balance that can be offset between product and service, whereas in the auto world it's all about the product you're engaging with. There is still no excuse not to focus on it, but it's something to bear in mind."

PRESSING ISSUES The items we really engage with on board are the controls, with each button and surface giving us subliminal impressions of the airline's quality of engineering. But what is the correct feel? Should the controls be soft, or operate with cold, metallic precision?

feel-good factor

Our experts share the things that make them feel good because they feel good



Magnus Aspegren, BMW DesignworksUSA Shanghai:
"BMW's iDrive is a piece of engineering you hold in your hand."

When driving you often find your hand rests on the iDrive, and I find it a very successful product from that point of view. It could work on an aircraft – it just depends how much information you put in there."



Emma Rickards, West 6:
"I love the feel of Henry Moore's sculptures and Skandium's 'rubber touch' ceramic storage jars. Also,

the Kvadrat 'Molly' fabric by Åsa Pärson is 100% simplicity and 100% textile. Living Proof's shampoo bottles have a lovely smooth matt surface with a dash of white gloss at the lid. And my Lainey Keogh knitted evening dress is fabulously tactile and in a heavenly shade of moss green. When I wear it I feel as though I have been rolled in moss."



Paul Priestman, Priestmangoode:



"Apart from Mrs Priestman – a car key. A lot of work goes into this object, which represents probably the second most expensive thing you own, and is all about touch and clicks."



It will be interesting to see how these things disappear into apps or iris recognition, etc. Also my notebook. I had a digital diary and have gone back to a notebook, and I keep all my old notes. With digital devices you don't have that. Being hounded by technology with emails, etc, I think we need to go back to having some 'me' time."



Howard Sullivan, YourStudio:



"I love the feel of SLR cameras. The lenses have rings with knurled edges that you twist, and you can feel them move against each other. They feel solid and expensive and well engineered."





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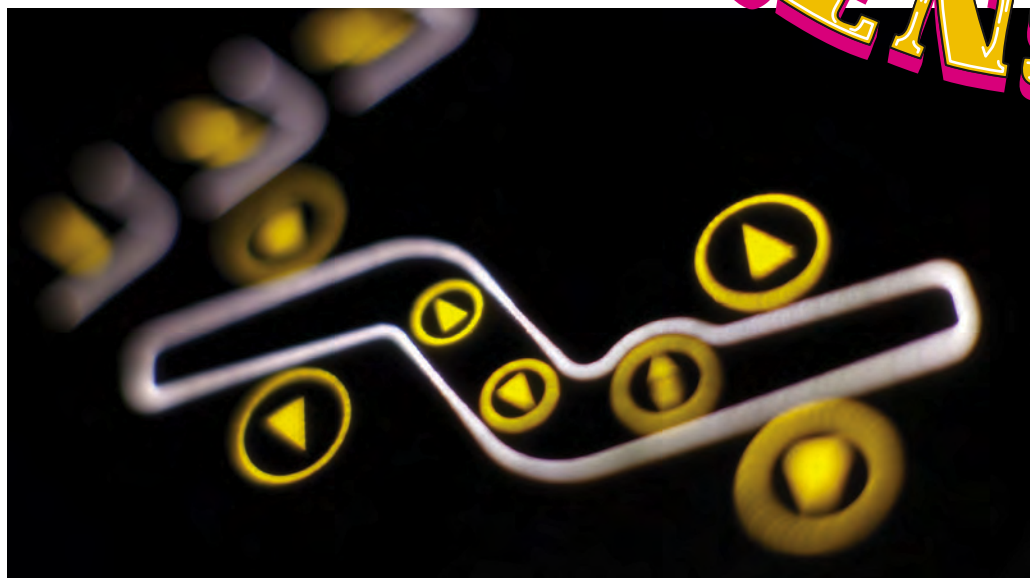
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SENSE

TOUCH



03



04



AN AIRCRAFT IS AN AMAZING MACHINE AND
I THINK WE NEED TO COMMUNICATE THAT
IT'S STILL A TRANSPORT ENVIRONMENT



Rickards states that getting the action of controls right is absolutely crucial and requires great attention to detail. The control itself, its function and its placement need to be intuitive, and then decisions need to be made about whether the button or switch should be metal or plastic, or whether it should have a bezel to give it an extra bit of detail and an extra treat for the fingers.

"It's nice to get a little bit of definition or a little touch of detail or pattern into the moulding, just a little something individual for airlines that specify their own knobs," she states. "The buttons and controls could surprise and delight you and not just be functional or too technical. Functional simplicity, especially if it's intuitive, has an awful lot to be said for it. It's about getting the right degree of resistance, the feeling that the knobs and buttons will perform the function you want them to."

Sullivan adds, "The joy of switching has been lost a bit. For example, most smartphones have only one button, which gives you no sensation of what it's doing when you press it. Loads of things are touchscreen now, but in the 1940s, Bakelite switches had more character. You should dare to have personality and engineer something special that's a real joy to use. Technology has advanced and there will be a lot of new technology on board over the coming years, so it's nice to think about counterbalancing that with some other things that are still quite old fashioned."

BMW's Aspegren, meanwhile, enjoys a tactile feel that evokes precision engineering. "I think we should be honest that we're in a machine, but not put fear into people – everything should feel reassuring. It would be inappropriate to create a Louis Quatorze-style feeling on

board. An aircraft is an amazing machine and I think we need to communicate that it's still a transport environment. People are very responsive to that."

"Thus, when we design control panels we work carefully on what we want the tactile feel to be," he adds. "For example, when you press the seat adjustment button it should give a really nice communicative click that provides the appropriate level of tactile response for the experience. You can definitely do this in aircraft. We work with switch samples with different tactile feedback, try them on mock-ups and choose the ideal solution."

Priestman adds, "You have to design for practicality, and sometimes you want a clunky mechanical switch, sometimes something softer. You have to be intuitive as you're trying to express a function."

This is all very simple in theory, but Stevens finds it difficult to find just the right switching products for airline projects. "Suppliers to the commercial airline industry need to deliver the right haptic qualities, whether that's latching, actuators or materials, at a level that is much higher than it is today. That's probably one of the biggest battles we have with suppliers. In the automotive industry

03. Lufthansa's business class seat controls mix a high-tech appearance with a soft-touch feel

04. Modern radios may sound better than classic old Bakelite models, but they don't necessarily feel better

SENSITIVE



editor's favourite

I frequently hear designers saying how they strive to surprise and delight the passenger. I must admit I was both surprised and delighted when I turned the exquisitely formed knob set to the side of the British Airways first class seat, after I was attracted by its quality metallic finish, backlit in a vivid blue. Initially, I thought it was a volume control for the IFE, and was enjoying its beautifully damped action. The surprise came when it turned out to be the seat actuation control. A lovely object and a joy to use, not just because of its feeling of precision and resistance, but in the way it simplifies a complex process.

The design, according to BA's creative director, Richard Stevens, came from an insight following the launch of BA's original lie-flat first class seat. It seems that customers were hugely excited about being in the first lie-flat bed on an aircraft, but in a very British way, they didn't want to call over a crew member and draw attention to the fact that they didn't know how to operate the seat using the buttons. Generally, passengers waited until a crew member came along to offer a drink before they asked.

So the design teams thought about the most simple interaction passengers could have with the seat, which would be a simple knob: turn it one way to go up, the other way to go down.

"Investing in that as a touchpoint was really important, explains Stevens. "Things like that come from really solid understanding and insight that drive the design. The idea wasn't to have an amazing metal knob, it was to deliver a really intuitive experience."

“

OLD-FASHIONED SENSORIAL ELEMENTS IN
YOUR HAND WILL BECOME MORE IMPORTANT
AS THE TECHNOLOGICAL SIDE GROWS ”

you can specify haptic qualities down to Newton forces, but they won't sign up to that in this industry. That's something I think will change, but it's the most painful part of a programme. Other designers would say the same. At the moment it comes down to how much you're willing to pay. There are different qualities of latches and so on, but they're still not as good as you would expect."

SMOOTH OPERATOR Passengers are becoming increasingly accustomed to using touchscreens on their smartphones and tablets, but do they provide a satisfying touch sensation on board? Our experts are not convinced, and don't predict the simple pleasure of pressing a precisely damped button disappearing anytime soon.

Sullivan states, "Moving forward I think the world of products is really going to escalate in terms of touch because the whole Jonathan Ive pared-down minimal metal thing will lose its novelty and I think the next thing will be to

surprise people a bit more and give them something that isn't ubiquitous."

Another fan of quality analogue pleasure is Priestman, who adds, "We're all getting more used to using pieces of glass, but you get a lot more tactile feedback from the click of a button and it is also more intuitive. That's one of my concerns. Is this direction making life better or worse? I think about the ageing demographic, and does glass exclude partially sighted or blind people? Some of the most popular products are designed for young people, and the demographics of the world are going the opposite way. It's about designing something the right way, which is inclusive. I think having young designers designing for young people isn't actually correct or responsible. With some touchscreen concepts you can get tactile feedback, but are we just getting caught up in a technology that isn't as good as buttons?"

Rickards is in agreement: "My feeling is that old-fashioned actual sensorial elements in your hand will become more important as the technological side grows. Perhaps they'll grow in a duality as I don't think mankind likes to give up the fundamentals of colour, material and finish, and the surprise and delight it can give you when you get a wonderful sensation from touching something. It can have all sorts of roles, and comfort is one of them – it might be a reaction against everything being done on screen. Real values will spring up again." ☒

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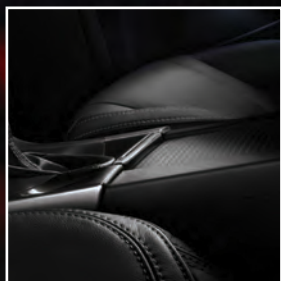
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autofocus

The automotive world's influence on aircraft cabins is often referred to, but to what extent is it driving design?

GUY BIRD, AIRCRAFT INTERIORS INTERNATIONAL





 Last time I arrived at Heathrow Airport, it was via the London Underground on an old, slow and rather tired-looking Piccadilly Line train. Jumping from there to any commercial aircraft cabin is a definite upgrade. But try the same transfer from a reasonable but inexpensive modern car to an aircraft and the feeling is likely to be much less positive. Jeremy White, head of transport at design specialist Seymourpowell – which has clients as diverse as Virgin Galactic and Samsung – says he recognises the latter feeling well: “A modern car is usually a digitally enabled, high-tech, air-conditioned oasis, so passenger expectations are high. Even on an economy car, fit and finish is amazing. In contrast, getting on an aircraft can feel like a step back in time.”

Howard Guy, director at Design Q – a consultancy with an automotive background that got into the aviation industry with Virgin over a decade ago – is more scathing still. “Fit and finish is really down to the engineering of how something goes together,” he says. “In the car industry the prime concern is that it’s faultless wherever you look. The gaps are 3mm, everything’s flush and works, there are no gaping holes or fixings – all those things are standard. That hasn’t been the case in the aircraft industry. Sit in an aircraft and you can very quickly count many screw heads, fixings, and five or six material finishes that are all trying to be the same colour but look completely different. That’s commonplace on commercial aircraft, partly because of the [safety] restrictions on materials. However, it is getting much, much better.”

Richard Stevens is BA’s creative director and also the founder of the Forpeople design agency, with extensive experience working with automotive brands including Jaguar Land Rover, Ford and Aston Martin. Asked if he has noticed much crossover between the two areas, Stevens says, “I think automotive design does influence aircraft interior design, but not in the way you might assume. One of the biggest issues with the airline industry is that it typically defaults to other industries to try to define what it should be doing, and I think that’s the wrong influence to take from the automotive industry – what we should be inspired by is the way we look at creating customisation within a standardised approach.”

Automotive design influence within aviation is not a new thing – it has been present for at least 20 years. Mike Crump, consultant director at Honour Branding, now working with dozens of airlines, has first-hand experience of how automotive design infiltrated aviation back then. “In the early 1990s, as head of design at British Airways, I worked with International Automotive Design (IAD) in Worthing, UK, to create a new first class seat for the airline’s new B777, and the result was a step-change from the bulky and functional engineering-led seating solutions of the 1970s and 1980s,” he says. “At that time IAD used clay modelling to create a soft and sleek styling solution, but looking back it had little integration into the overall cabin environment.”

Crump worked on BA’s first class flat bed in the mid-1990s too, but after that trailblazing start, it is arguably



01-03. Looking for styling and quality inspiration? The Aston Martin Rapide offers incredible fit and finish, and even seatback ICE

more recently that the automotive influence has spread within the industry, and beyond seat design to controls, switches, lighting and more. So why the disparity between the quality of the two industries' interior outputs, and why is that now changing?

PROCESS MAKES PERFECT Design Q's Guy says that fundamentally, the two industries historically took very different approaches, largely for reasons of manufacturing scale. "The motor industry deals in incredibly high volumes and high front-end development costs that gradually pay back over a four- or five-year period. That's the way the car industry has always been, whereas the aircraft industry has worked by treating each airline or programme on its own merit, and because the volume is

not huge, it made things in a very simple, machined way, rather than a sophisticated, tooled way. So in the past, there wasn't a great deal of effort or money spent on producing parts designed to be made in many thousands. Everything was more piecemeal – 5,000 parts as a maximum, that sort of thing – or machined out of a solid billet of aluminium."

But while the 'numbers' argument is still relevant, "the aircraft industry suffers from a numbers problem, and with smaller numbers, build quality can suffer", as Seymourpowell's White puts it.

Guy believes that, depending on the project, this can be resolved. "When you're doing a total of only 1,000 seats in first class, there is a limit to what you want to spend," he reasons. "But there are a lot of things in the industry,



super(car) fly

If you're a petrolhead, you'll be familiar with Jason Castriota's designs. US-born Castriota (pictured below) spent many years working at the iconic Pininfarina styling house in Turin, where he penned several upscale cars such as the Ferrari 599 GTB Fiorano and Maserati GranTurismo. In 2008, Castriota moved to arch rival Stile Bertone, where he was design director until 2010, when he became design director at Saab. He now has his own eponymous design consultancy with offices in New York and Turin, and has recently entered the world of cabin design, with his first project being the interior of the SyberJet SJ30 light business jet.

These are Castriota's thoughts on the automotive world's influence on aircraft interior design: "Automobile designers and engineers have long been fascinated by aircraft and have always sought to apply aerospace know-how to the road. Arguably two of the world's most beautiful automobiles – the 1967 Ferrari P3/4 prototype race car and the Jaguar E-Type – were both designed and built just like the state-of-the-art aircraft of their era, with strong, light tubular frames and riveted aluminium body panels that aided rigidity. Today, one of my most exciting projects to date – the SSC Tuatara – is like a jet fighter on wheels. We have looked to maximise the aerodynamics – F22 vertical stabiliser fins and all – to make a run at the production car world speed record in 2014.

"However, after decades of aerospace influence on automotive design, we are now witnessing an interesting trend – that of the automobile influencing aircraft interior design. In fact, renowned design studios BMW DesignworksUSA and Porsche Design have recently designed premium aircraft interiors with great success. Given the great advances in design, comfort, ergonomics, materials and connectivity in automobiles over the past decade, many car owners are now more attached to the interior of their cars than they are to the exterior styling. Today, car companies are working alongside technology companies to maximise the human interface and ease of operation, and create a seamless and unparalleled experience. Soon, every car will be running smartphone technology with haptic feedback and a wi-fi hotspot.

"With car interiors featuring so many advances in such a short period of time, it is not surprising that [air] passengers seek to have the very same level of comfort, luxury and convenience that they have grown so accustomed to in their daily drive. This sort of friendly competition and collaboration is a great driver of innovation, and I am excited to see where the journey takes us next."

certainly on the seating side, where seat makers are selling to all of the airlines, so collectively you're talking about hundreds of thousands of seats, so it makes sense to manufacture in a way that is more economical in order to get a better return. It has to be considered on a job-by-job basis."

And if you get into designing other components needed within the aircraft cabin, Guy believes the business case stacks up even further. Design Q has illustrated this, having worked on the whole interior of the new Bombardier Challenger 350, the first deliveries of which are due this year. He explains, "That aircraft should live for eight years (with a six-year interior lifecycle) so, say, 800 aircraft, but you've got six sets of parts going into the one aircraft that are sort of the same, like each seat, a side



aviation's influence

Like all good collaborations, aviation and auto design industries getting closer has produced mutual benefits. Howard Guy of Design Q, a design consultancy working in both fields, explains, "The cool thing about working in a consultancy like ours, is that one day you're working on a car, and the next day it's a private jet or a train. On the one hand you're trying to influence the aircraft industry to do something in a way that you know works because of the car industry, but we're now being hired by luxury car companies to introduce into the car the subtleties and tricks – such as deploying tables and foldaway iPads – that you get in a business or first class aircraft seat. The recent Range Rover and Jaguar Ultimate editions are two examples. All are born of aviation knowledge, which is why they came to us. It's going full circle – the two industries are fuelling each other."

Daniel Clucas, senior designer for Acumen, agrees, and adds that aviation's clever packaging abilities could be another area auto design could learn from: "With airlines demanding more space for their passengers, along with more seats on the aircraft, we are always striving to make the best use of every square inch. This innovative 3D approach would translate well into auto interiors, which often feel cramped and claustrophobic. Giving every available nook and cranny back to the passenger really enhances any interior environment."

04-05. The quality touches in the Bentley Flying Spur are stunning, such as the knurled volume control



ledge, etc, and if you count up the parts that replicate themselves throughout the cabin of one aircraft, you can multiply that 800 by six, and suddenly you've got a reasonable business case. They're the same sort of numbers as Aston Martin or Bentley [which make cars in the thousands, not tens of thousands per year]."

Guy thinks old-fashioned processes and mindsets are sometimes to blame too. He believes the aviation industry was not just averse to using tooling because it's expensive to make and justify for smaller production runs, but also because of the way the industry designed and tested. "This approach was partly due to the risk of testing," he says. "If you test something that's machined and it fails, you can modify it quickly and re-test it. But if you have a tool that makes a part, you can't change the part once it's tooled because you've just sunk GB£1m into tooling it. If it fails, you're stuffed. So there has been a mindset over the years that meant people wouldn't invest great sums of money because of the risk that it would fail. In the car industry, the onus is on the engineers to ensure all the models made in CAD are tested electronically with a sophisticated simulation of how the component needs to work. So when you finally make the part, you are 99.9% sure it's going to pass. I'm talking first-hand here, as when we started looking at economy seats for Pitch, the 'game change' was to design and test the model electronically – for 16g crash testing and all that sort of stuff – before we built anything."

His point is backed up by others. Priestmangoode's Nigel Goode reckons, "The car industry is great at ironing



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06

out all the problems before manufacture.” He says his company – which is behind Lufthansa’s first class and TAM’s striking new interiors – has invested heavily in software by RTT, which was initially developed and focused for automotive design. Priestmangoode has also employed ex-Nissan and Aston Martin colour and trim designers, due, he says simply, to their greater skills “in putting things together”.

Armed with this knowledge pool and similar computer back-up, Design Q’s Guy elected to use, as just one example, the superforming design process found in Aston Martins and Rolls-Royces for Bombardier’s new 350. And logically, he chose an [unnamed] auto supplier to carry it out. “We brought this process you see on the interiors of cars, with sophisticated pressed metal parts that wrap around the car, into aircraft. Because it’s a metal, it’s very easy to certify as it doesn’t burn, but no one has done this before. So straight away there is a link between commercial aircraft and the car industry.”

MANUFACTURING AN AESTHETIC? For Seymourpowell’s White, more automotive-inspired ways of making aviation

parts could directly inspire the structural as well as the surface aesthetic. “With the drive towards lightweight fully composite seats borrowed from racing seat manufacturing techniques, I wonder if we’ll get some automotive visual cues [on aircraft], purely from how the thing is manufactured.”

Most agree that the skill and quality levels seen in the automotive design and engineering processes are the key influencers now seen within aviation cabins, but many are wary of using automotive aesthetics for their own sake. As White cautions, “Where I think it doesn’t work so well is where people try to put dynamic lines or auto styling into seats and things, like you’re sitting in your own bumper car.”

06-07. Food for thought with PEDs? BMW’s iDrive system mixes in-seat controls with a tablet-like display

07

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08

09

Priestmangoode director Goode echoes this sentiment, adding practical concerns: “Although they look great, sports car style seats with ribs, lumbar and bolsters aren’t suitable for aircraft, as in business and first they need to be flat for comfort when working as your bed too. Car seats are [normally] just about facing forwards, and car cabins are more function-led and enclosed. Aircraft cabins are more like lounges or hotel reception areas.”

Forpeople’s Stevens adds his view: “I think that everyone is striving to get aircraft interior build quality to be comparable with the automotive industry – it’s about getting that quality and repeatability, and is the obvious source of inspiration for premium transport. The only other areas are premium hospitality, which leads you into a ‘home from home’ look and feel that isn’t really relevant. So automotive is one extreme, hospitality is another, but the premium aircraft experience should be something unique, and we need to define exactly what that should be.

auto flies higher

Some designers think that aircraft interiors will always lag behind automotive interiors. Richard Stevens at Forpeople is among them: “From a design perspective, drawing comparisons with the automotive industry from a customer-facing quality perspective is really difficult because they have volumes and economies of scale that you don’t have in cabin products. It’s all very well for designers to say they want to achieve automotive levels of quality – it’s a great aspiration – but there are lots of reasons why that it is a real fight. But that is what customers expect, and we can’t make excuses for not having that quality if they’re paying a premium to fly with a premium carrier.

“The design lead times are not dissimilar when creating a ground-up design, and might even be a little shorter in the airline industry. However, when you begin a cabin or seat design programme, the nature of the business is 10 years behind automotive. Automotive designers are thinking about what will be around in five or six years, and what they need to work towards to feed that into the programme, whereas the airline industry and its suppliers just consider what is available now. So by the time it gets on board, a lot of it is obsolete, whether that’s technology integration, or the materials and elements that make up the cabin interior.

“The automotive way of thinking is inspirational in terms of projecting that far out, whereas with airlines, they design something for now and it goes on board in five years’ time – they don’t predict that shift.”



LUFTHANSA’S FIRST CLASS IS AN EXAMPLE OF A HIGH-END AUTO APPROACH



“The idea of flying is magical, but the real experience is always a let-down – it never lives up to the expectations. So if you could design a unique experience, then you’re bringing an element of that magic back. No one is doing this particularly well; no one has a clear vision of what the future of air travel should be – just what it looks like now.”

AUTO NOW, HOTELS NEXT? However, Goode still believes his company’s first class seat for Lufthansa is an example of a high-end auto approach in the way it designed all the disparate parts to appear as one, adding, “Everything was customised as a whole entity, not just a collection of bits. Even the controller for the Panasonic IFE was bespoke.”

Automotive-trained Daniel Clucas, senior designer for design consultancy Acumen – currently working with Etihad Airways – agrees with Goode about the hotel industry’s influence on aviation, but as with Lufthansa’s first class, sees more ‘joined-up’ automotive methods spreading through aviation design in the future.

08-09. We have finally found something that Porsche doesn’t do well: ICE integration



10

10-11. The absolute pinnacle: could cabin quality ever match that of a Rolls-Royce?

“There is a trend at the moment for business and first class seating to emulate the ‘furniture’ look of a lounge or hotel,” Clucas observes. “This can mean the seats look very disparate, with softer, more organic aircraft interior linings. The best automotive designs create holistic interiors, where every element is integrated and harmonious: for example, you could tell a door lining and chair came from the same model. I see this transferring into aircraft cabins as design firms are given more influence over not only the seats, but the whole cabin environment.”

Ultimately, despite their differences in historical approach, business model and process, the two industries have one irrefutable link in their shared customers who, through advances in information access and feedback potential, will increasingly vote with their feet, and money, on the designs they’re prepared to settle for.

As Laurenz Schaffer, president of BMW Group DesignworksUSA – a veteran business in both fields, from MINI, BMW and Rolls-Royce to the recently launched Singapore Airlines first class – concludes, “Significant differences between the two industries are the very different standards that need to be fulfilled. The biggest difference is the product volumes from an investment and return standpoint. The greatest similarities are the customer expectations. Eventually, both products play a key role in the complete travel experience.” ☒

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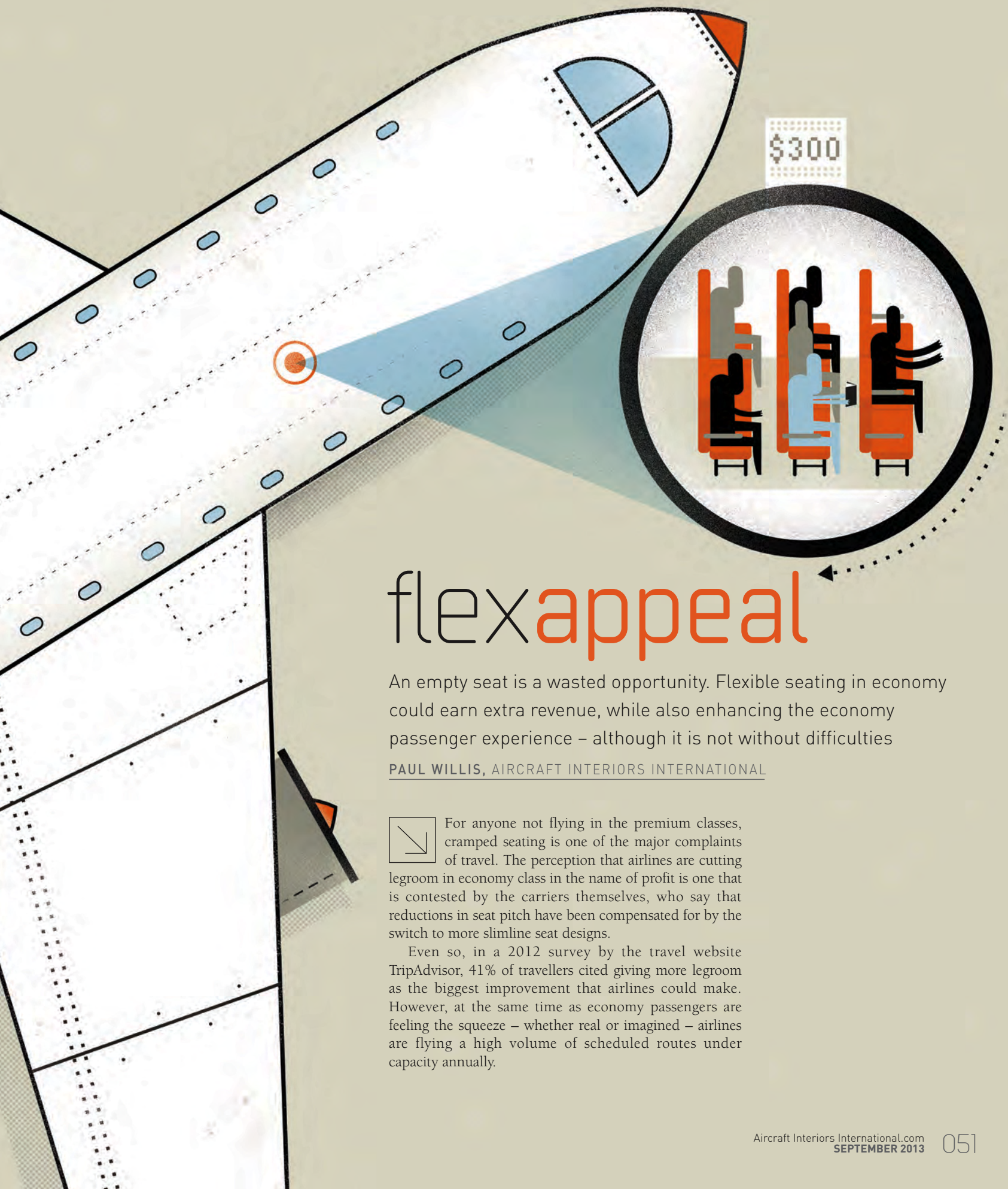


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flexappeal

An empty seat is a wasted opportunity. Flexible seating in economy could earn extra revenue, while also enhancing the economy passenger experience – although it is not without difficulties

PAUL WILLIS, AIRCRAFT INTERIORS INTERNATIONAL



For anyone not flying in the premium classes, cramped seating is one of the major complaints of travel. The perception that airlines are cutting legroom in economy class in the name of profit is one that is contested by the carriers themselves, who say that reductions in seat pitch have been compensated for by the switch to more slimline seat designs.

Even so, in a 2012 survey by the travel website TripAdvisor, 41% of travellers cited giving more legroom as the biggest improvement that airlines could make. However, at the same time as economy passengers are feeling the squeeze – whether real or imagined – airlines are flying a high volume of scheduled routes under capacity annually.

big ideas

June saw Teague announce the winners of its Take Travel Back “Big Ideas Contest”, intended to gather insights and ideas from the travelling public that could usher in faster, smarter, more enjoyable ways to get to places, removing ‘pain points’. And the winning theme involved flexible seating.

The contest was won by Vicky Garay, who suggested having un-installable seats that could help create an improved passenger experience as well as weight savings. The portable seats can be easily installed or uninstalled, depending on how many seats are required for the flight. The benefits, according to Garay, are weight savings, more passenger space, and greater passenger goodwill towards the airline, although clearly the potential revenue opportunities are another benefit. However, the logistical problems of where to store uninstalled seats need to be solved.

Another flexible idea came from an entrant known simply as Stefan. Stefan’s big idea was to develop theatre-like fold-up seats for easier ingress and egress in tight pitches, reducing the need for contortionism. Stefan will be interested in AIDA Development’s Foldable Passenger Seat concept created for Airbus, which features a foldable seat pan, enabled through a single-beam design.

There may be some big issues to overcome with these ideas, but it’s interesting to hear the solutions that normal travellers have devised while encountering annoyances during their flights. To read about the many other ideas submitted, visit Teague’s dedicated site at www.taketripback.com.



ECONOMY SEATING IS DESIGNED TO
WORK FOR MR AVERAGE. IT MAKES
NO ALLOWANCE FOR VARIATION



To solve these two problems, aircraft designers and manufacturers are pushing the idea of flexible seating. According to the concept, airline seats could be reconfigured in situ to match current demand, or they could be removed on undersold flights and the remaining seats reconfigured to give the remaining passengers more room. While this is the basic idea, many designers believe the concept could be taken further to create seating tailored to the exact needs of individual passengers.

Jeremy White, head of transport at Seymourpowell, says the concept of flexible seating starts first and foremost from an appreciation of difference. “Depending on culture, gender or generation, we experience the world differently. This is true also for space,” he says.

White says the first person to take note that our experience of space was culturally specific was Edward T Hall, a US cultural anthropologist who coined the term ‘proxemics’ in 1963 to describe the study of this relationship. He recognised that someone from Japan, for example, has a far different understanding of personal space than someone from India.

Added to this, our experience of space is affected by physical factors. Put simply, we’re not all the same size and shape.

White explains, “The trouble is that when you standardise, you reduce things to the lowest common denominator. Economy seating is a good example. It’s designed to work for Mr Average. It makes no allowance for variation.”

Peter Miehke, COO of AIDA Development, a German design and manufacturing company, is currently working on concepts for flexible seating to solve this problem. “It’s theoretically possible to introduce a setup whereby the seats on an aircraft match exactly the number of people booked on the flight,” says Miehke. He proposes that on flights that aren’t at capacity, the space between the remaining seats could be widened to increase pitch.

On most aircraft, seat mounts are bolted into seat tracks running the length of the fuselage. Miehke says it wouldn’t be too difficult to replace the bolted-in seats with a more detachable system. He says that airline staff could move seats around via mechanical quick releases that would unlock the seat and enable it to be slid back and forth along the existing tracks.

Electronic sensors could be used to help guide staff in reconfiguring the seating, and an alarm could sound to tell them when the seat has reached the new position. If enough seats were taken out, it might even be possible to recline seats horizontally on long-haul flights to become beds.

In such a scenario, says White, passengers could pay extra for the exact amount of space they required. “Ultimately airlines need to move away from the idea of selling seats to instead selling space,” he says. “In the kind of model I envisage, someone who needs more space – a pregnant woman, for example – could buy that extra room from another passenger who needs less space.”

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L i n e a r E v o l u t i o n

Passengers could also pay a premium for seats facing in different directions, either towards the window or aisle, or facing backwards.

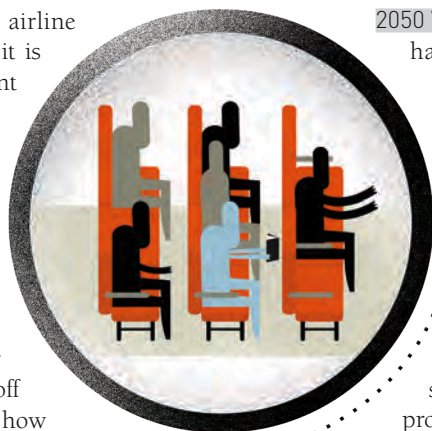
Another designer, who has worked in aircraft design since 2005 for leading aviation companies such as B/E Aerospace, says rotation would bring with it its own set of problems. The designer, who asked not to be named for contractual reasons, says, "When you turn a seat to face sideways or backwards, the forces on it are going to change. This may mean the seat has to be reinforced. This could add extra weight to the aircraft and ultimately impact fuel consumption."

If a revenue model wherein individual passenger space becomes completely customisable seems a bit out of reach right now, there are perhaps more realistic scenarios.

Miehlke says it should at least be possible to use the extra space on undersold flights to create more premium seats. Because the pitch of business class seats is generally around 50in and economy seat pitches average around 30in, airlines would have to take out a lot of seats to create the space for business class seating. More likely would be some economy seats being replaced with premium economy seats at an extra 5-7in pitch.

"There's also the chance that the airline could offer extra space for free when it is available, creating a tremendous amount of goodwill and increasing the chances of brand loyalty," adds Miehlke.

Assuming seats could be moved around in this way, airlines still face the problem of what to do with the surplus seats. One solution could be to store them at an airport. But, as Miehlke notes, this could result in major logistical problems: "If your flight is undersold and you've taken off 30 seats and left them in Lagos, then how are you going to get them back? A better idea is to keep the seats on board the aircraft."



let it slide

The Side-Slip Seat, created by USA-based Molon Labe Designs, is a concept intended to aid ingress and egress and reduce turnaround times – and it may become a flying reality soon. The aisle seat slides over the middle seat during boarding to create around an extra 24in of aisle width. When extended, using a button on the armrest, the middle seat remains set back, so all three passengers get armrest space. The staggered design also creates an extra 2in of width per seat triple on a B737, and 3in extra on an A320, which is added to the middle seat, in a similar idea to the new Airbus extra-wide seat concept. This means that the person in the undesirable middle seat feels less crowded.

Following successful demonstrations of the prototype seat at Aircraft Interiors Expo, Molon Labe has decided to move forward with FAA Part 25 Certification of the design. After a few small minor aesthetic changes to the conformal prototype (based on future customer airline feedback), the company will begin the process of making the Side-Slip Seat an available product.

2050 VISION In its 2050 Concept Cabin, Airbus has allowed designers and creatives to imagine what the future airline interior might look like. According to the concept, the cabin is divided into zones based around passenger needs. In the efficiency zone, passengers can book seats specifying exact width and pitch. For this to be realised will require seating that is both flexible and extremely lightweight.

"We could realise this vision with a special material for the seats that can be programmed to adjust to a passenger's exact body dimensions," says Ingo Wuggetzer, VP of cabin strategy, innovation and design at Airbus.

check it out

Hong Kong-based industrial design company Paperclip Design has devised Checkerboard, a convertible seating system that enables easy conversion between two classes of seating, in terms of pitch as well as width. In economy mode the seats are typical short-haul, short-pitch triples, with seatback tables, top-mounted literature pockets, and a high pivot recline.

However, when business-class seats are required, alternate seats both across the cabin and fore and aft are folded in a 'checkerboard' pattern. The entire backrest is folded forward on

the vacant seats, which creates extra legroom for the seat behind while also providing cocktail tables for the adjacent seats. The final stage in the process is to raise the middle armrests, which increases seat width by 2-4in and also raises privacy screens mounted under the armrests, as well as exposing a reading lamp, coat hook and power socket. The process can be carried out by cabin crew so, for example, if economy is configured as six-abreast at a 30in pitch, the equivalent of a four-abreast business class at 40in pitch can be created at very short notice.

Further benefits of the staggered configuration are guilt-free reclining in business class, easier aisle access, and privacy from people sitting behind.



change for bed

Patented in December 2012, the Chameleon concept by Elidea is currently being pitched to the industry. In standard form, Chameleon has a similar appearance, weight and bulk to a regular economy seat – hence the name. However, the headrest can be removed and plugged into the seat pan to provide a seat extension, with no complicated mechanisms or actuators involved. In this way, a row of extended seats effectively forms a widened lying surface. Four seats in a row create a bed up to 2m long

and about 75cm wide. Most of the structure and cushioning is already provided in the headrest so the extension is created with minimal extra weight or bulk.

The extra weight compared with a standard economy seat consists only of the fixing points on the backrest/seat pan and the release mechanism in the headrest. To convert the seat into bed mode, crew raise the armrests, release the headrests, and move the headrest to the seat pan. Experiments carried out by Elidea indicate that these steps take less

than 15 seconds per seat, 45 seconds per triple or 60 seconds per quad.

When extended, the seats have no effect on the seat pitch of the rows behind or in front, and the company says that an airline could simply replace existing economy seats with no changes to cabin configuration.

The creator recommends that users of Chameleon implement the Empty Seat Model to ensure that extendable seat rows are deployed on unsold empty seats. An airline's booking system can be configured such that, depending on the likely load factor for a flight, Chameleon seats only become bookable once the predicted maximum of standard economy tickets have been booked. Once the last person has checked in, the number of available Chameleon beds can be determined and prepared by staff prior to boarding. If a flight is full, no beds are deployed.



“The seats would be made from lightweight nano polymers, would be only 1cm thick, and would be stowed in parking slots at the back of the cabin.”

PRACTICAL ISSUES Supposing seats could be made lightweight enough to be stowed, reconfiguring the remaining seats throws up other technical problems, not least of which is the aircraft wiring.

In the current wiring system, cabling running down the sidewalls connects the seat-embedded IFE systems to a head unit at the front of the aircraft, as well as feeding them power.

Our anonymous designer says power is easy to re-route to a seat that has been moved around, but that IT is more difficult.

“With power it would just be a question of plugging it into the new source, but unlike power, data is very specific,” he says. “For example, the media on the IFE embedded into the back of a seat on a long-haul flight is often wired to a console on the seat behind. So if either of these seats is switched around, the network is disrupted.”

The designer says wireless systems such as the BoardConnect service from Lufthansa Systems could solve this problem. Replacing embedded IFE with handheld devices that could be given out at the start of flights and clipped into seatbacks would also have the added

advantage of making seats lighter and therefore easier to transport, he says.

Even assuming all these technical and logistical issues could be solved, there still remains one major barrier to flexible seating: certification. Any significant changes to an aircraft interior have to be certified by state aviation bodies, and this includes seat layout.

This means that if airlines want to change their seat layout, they would need to have every possible permutation of the seating configuration certified separately. The certification red tape extends also to keeping emergency exits clear and on long-haul flights to a minimum space requirement between seats and monuments. In the USA, the Federal Aviation Authority requires that every new aircraft model must have a 90-second evacuation drill certification before it can fly.

The importance of these stringent safety rules was shown recently when an Asiana Airlines B777 crashed on landing at San Francisco International Airport. Despite the aircraft's fuselage bursting into flames, the aircraft was evacuated within minutes, and of the 307 people on board, only one died during the crash itself.

To maintain this 90-second timeframe airlines must keep exits clear, while the seats in front of the exit are often required to have special features, such as zero or limited recline or, if they have a seatback tray table in front, the table latch is only permitted to rotate towards the aisle to

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slide away

AIDA Development has created the Movable Aircraft Passenger Seat (MAPS) concept, designed to make use of unsold cabin space to achieve higher comfort and create a new source of revenue.

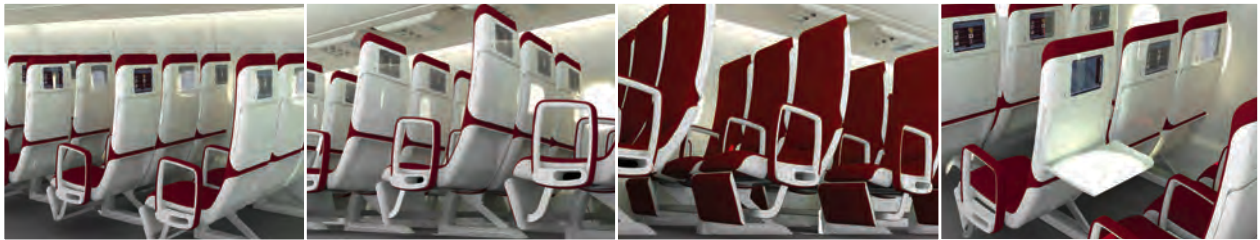
An electrically driven actuation system slides individual passenger seat rows, adjusting them at variable pitches from standard 32in (Basic mode) to comfortable 36in (Comfort mode), creating flexibility in the cabin layout, with the option to charge a premium for the

Comfort seat mode. Variable pitch adjustment is also made possible by movable overhead PSUs or, alternatively, by integrating systems such as air-conditioning, oxygen, lights and communication into the seat structure itself.

A variable cabin layout requires an intelligent cabin management system. Based on the available booking information, the system computes the optimal cabin configuration for a particular flight and, shortly before boarding, slides

the relevant seat rows into their designated position. Once boarding is complete, the cabin management system also helps to monitor several functions, such as safety belts closed and backrests upright, hence minimising aircraft turnaround time at the gate.

"A lot of details still need to be worked out. But we are sure this concept will soon get a great deal of attention from a lot of airlines as well as travellers," says Peter Miehlke, COO of AIDA Development.



avoid blocking an exit should the latch get bumped by a passenger while exiting. If moving the seats contravenes any of these regulations, then the aircraft automatically loses its certification.

While designers accept that certification is necessary, they complain that the complexity and expense of the process inhibits innovation.

White says, "The certification process is mainly self-imposed by the airlines, but it makes change very difficult to achieve. Crash testing is very expensive and many airlines are unwilling to invest money in new technologies that risk being failed by the certifier."

THE ART OF CERTIFICATION Given these difficulties, White says a more workable version of flexible seating in the short term could be achieved by altering only seat width: "In the current climate, it's much easier to adjust width. You can do this by introducing both collapsible and sliding arm rests that allow three seats to become two, or five to become six."

If the extra expense and logistical and regulatory issues make flexible seating sound like a distant pipe dream, advocates of the concept shouldn't lose heart. Precedents already exist. According to Claire Nurcombe, aircraft interiors marketing manager at Airbus, some clients request for aircraft to be equipped with multiple layouts.

Airbus works with airlines to create a seat layout, and then the carrier selects seat designs from the Airbus catalogue. The seats are delivered via a third-party contracted supplier to the Airbus assembly line, where they can be fitted to the aircraft. In the case of the A350, Airbus manages the supply chain itself.

The multiple layout solution usually happens on seasonal routes, says Nurcombe, with airlines changing their configuration to accommodate annual events such as the Hajj pilgrimage to Mecca. Other clients have varying winter and summer layouts.

"The way they get around certification is to limit themselves to one or two layouts and to get these certified along with the baseline," she says. Nurcombe adds that some Airbus layouts have been designed with extreme flexibility in mind. "There are airlines that do operate quick-change configurations," she says. "One of our customers can remove two or three rows of business class seats and replace them with economy seats in a single night."

Nurcombe says that while Airbus is broadly supportive of the idea of flexible seating, decisions about layout are ultimately in the hands of the airline. Because of this, most designers are cautiously optimistic about how and when change might come.

"It looks unlikely right now," says White. "But there are enough creatives out there and there's a lot of people thinking about it. All it takes is one bright spark to come along with a killer idea." ☒

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As A380s and B787s join the British Airways fleet, the new interiors focus on quality and consistency, upon which the brand can build its future

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Typical. You wait 17 years for BA to get a new long-haul aircraft model, and two come along at once. It's worth the wait, though, when the aircraft are an A380 and a B787-8. "This is the big one," said BA CEO Keith Williams at the launch as he stepped out of the first of the airline's 12 flagship A380s. "This is a momentous moment for the airline. In 17 years we haven't had any new long-haul aircraft, so to get two in a week is not what we anticipated at the time [of ordering], but we're delighted to have them. They are the future of the airline."

The new aircraft form part of a £5bn investment into improving the BA passenger experience, both in the air and on the ground, but one must remember that the design work on these aircraft began in 2008, in the midst of a recession. Thus the new interiors show some British reserve, being a refinement of the latest product on the refurbished B777-300ER fleet rather than all-new designs, especially since specifying new product wouldn't have fit with the development cycle.

As Frank van der Post, BA's managing director of brand and customer experience, says, "A lot of investment has gone into the customer experience. It's a major investment into the future of BA. We wanted to give people the comfort of the surroundings they know and appreciate, but we wanted to evolve the design."

Richard Stevens, BA's new creative director, adds that the idea was to wipe the slate clean and offer a better quality of product at a detail level, improved across all cabins. Stevens is well placed in his role because he has years of experience in designing BA product in his other role as founder of the Forpeople design agency, based in London.



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01



“

MUCH OF THE FIRST CLASS
DEVELOPMENT WORK LIES
UNDER THE SURFACE ”

FIRST CLASS Enter Door 1 on the A380 and a spacious entryway greets you with some wonderful options: left into the cockpit, upstairs to Club World, or right into first class and beyond. Let's turn right...

Overall the cabin feels familiar, with the same colours, materials and finishes as found on the latest B777-300s. Sadly one feature found on the triple sevens and B747s isn't present on the A380: the bespoke sidewalls with glass-effect windows, complete with blinds and ambient lighting controlled from the seat.

This omission was a disappointment to Stevens: "Those sidewalls change the feel of the first class cabin, but they aren't in the A380. There's work to be done to try and bring a consistency of experience for the customer on both Boeing and Airbus products. You can't just put the same products on an Airbus and a Boeing, but if we do something right and we find something customers like, we need to find a way to incorporate it on both. So on the A380, while the first class CMF is the same as on other aircraft, the cabin feel is different because it doesn't have the bespoke sidewalls."

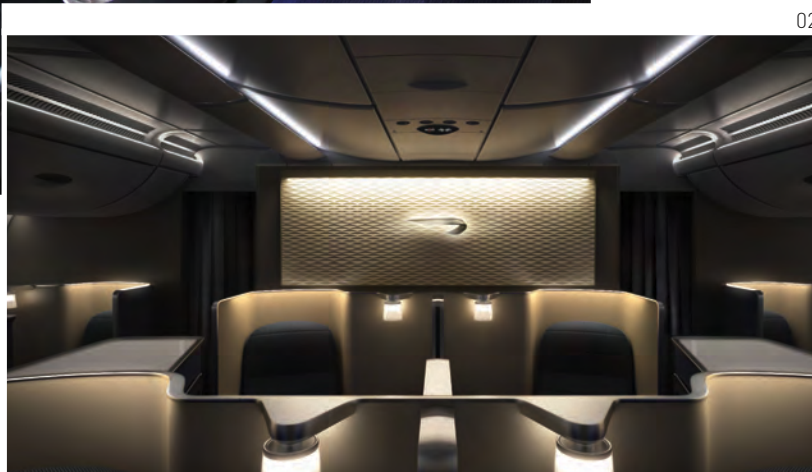
The 14 seats are the same super first class product from B/E Aerospace as launched in 2011 and found in the

B777-300s. However, in keeping with those aims of enhancing the product and its space, the suites are now configured more in-line, and have a larger footprint, which allows for some 30% more personal space, as well as 60% more stowage space in and around the suite, including a seat-side stowage box containing power and USB sockets and the IFE handset, and a wardrobe that is large enough to accommodate a bag, sleep items such as duvets and pillows, and to hang a coat. These stowage features meant that no central overhead stowage lockers were required in the cabin, although the changes did mean that the seat needed to be recertified.

Much of the first class development work lies under the surface, as BA put a lot of effort into improving the robustness and durability of the products in service through subtle enhancements and investments in better materials. For example, in this latest seat, all the metal parts are now anodised, with exactly the same finish as many Apple products, so they don't suffer from the chips and scratches that plated or painted parts can, improving customers' perception of quality and reducing maintenance requirements.

01. The first class seat remains elegant and simple, with few buttons and controls

02. All the cabin architectural finishes are new for both aircraft. A nice touch is the backlit speed marks mounted on 3D formed bulkhead panels



02



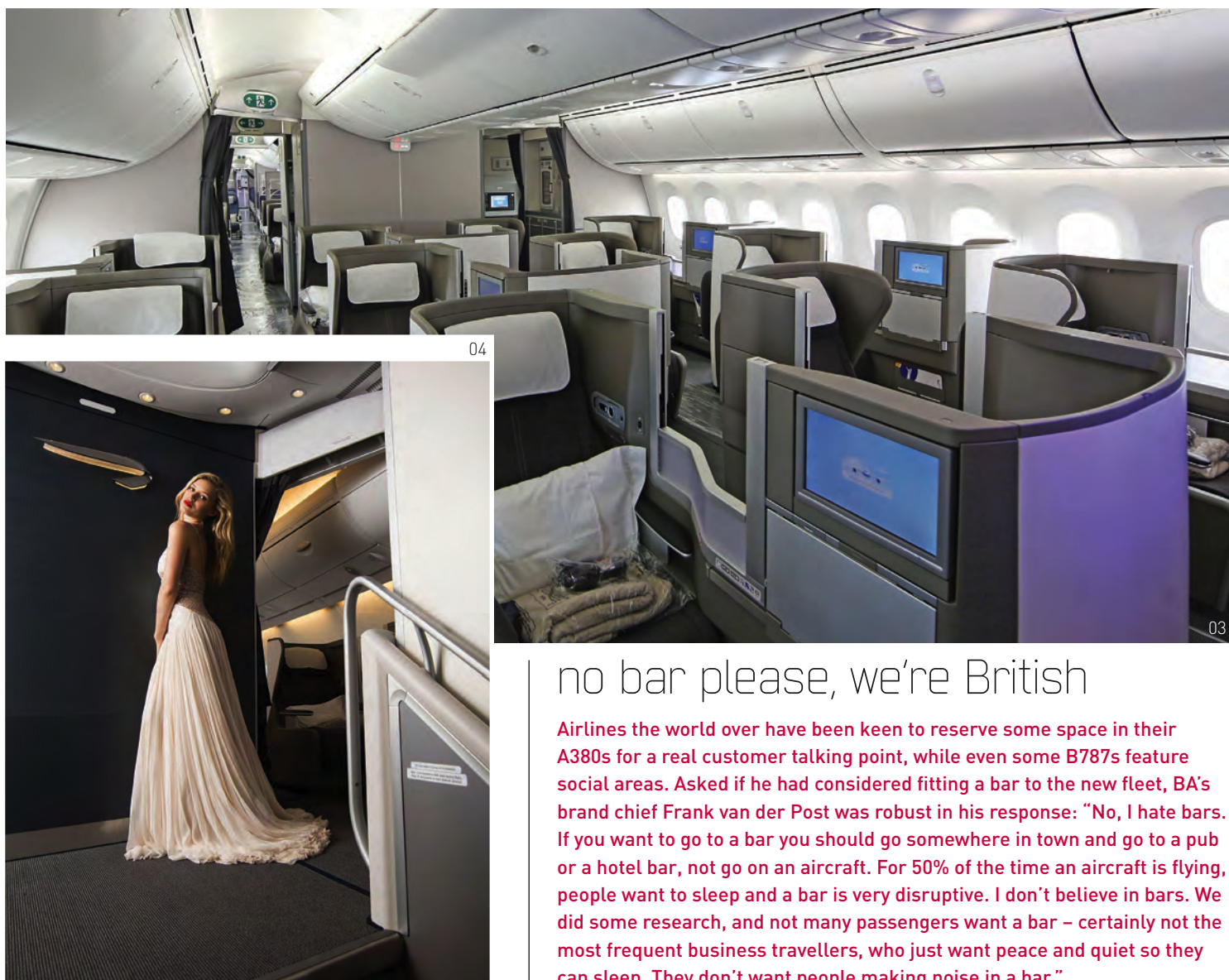
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no bar please, we're British

Airlines the world over have been keen to reserve some space in their A380s for a real customer talking point, while even some B787s feature social areas. Asked if he had considered fitting a bar to the new fleet, BA's brand chief Frank van der Post was robust in his response: "No, I hate bars. If you want to go to a bar you should go somewhere in town and go to a pub or a hotel bar, not go on an aircraft. For 50% of the time an aircraft is flying, people want to sleep and a bar is very disruptive. I don't believe in bars. We did some research, and not many passengers want a bar – certainly not the most frequent business travellers, who just want peace and quiet so they can sleep. They don't want people making noise in a bar."

"Those are the kinds of areas where we've invested a lot of time and effort in the new aircraft," says Stevens. "It was really about maximising the potential of that seat in the A380 cabin. It was an opportunity to take the learnings from the product and improve on it."

The B787-8 does not have a first class cabin, but a BA source has stated that one is currently being designed for the B787-10s, and potentially the B787-9s, which will be arriving from 2015.

CLUB WORLD One thing BA definitely got right with the B747 configurations was the splitting of business class into cabins over two floors. Frequent flyers have their favourite spots on both decks, and those flying on the A380 can still enjoy their favoured locations, with the 97 seats split into a 44-seat cabin on the main deck and a 53-seat cabin on the upper deck.

The main deck cabin features the famous and distinctive bespoke yin-yang seats from B/E Aerospace, configured 2-4-2. However, there has been more extensive CMF work

than in first class, to match the treatments on the A318s that travel on the all-business London City to New York JFK route, such as the herringbone seat fabric and the darker seat shell finish, which is designed to better react to light than the previous generation. This CMF does not feature on the B777-300ERs.

There have also been some refinements to the product, with the footstools redesigned to be simpler and more intuitive to use, with better functionality, and revised positioning of seat controls.

Of particular note is the controls for the shields. The yin-yang configuration puts you face to face with your neighbour, which creates problems for delicate British etiquette in deciding when to raise the barrier and break contact – made worse by the location of the shield button at the top of the divider, which is good for crew access, but makes the process more awkward for the passenger. Now there is a second button below the shield, within easy reach when sitting, which eases the moment of snubbing your neighbour.

03. The new Club World triple configuration gives real privacy to middle occupants

04. Going upstairs on the A380 has an elegant and exclusive feel. Here, model Georgia May Jagger is dressed for the occasion



05



06

service is key

With a new baseline for quality established, the BA brand and offer is just going to get better and better, especially when the future enhancements alluded to start to come online. Of particular interest will be the influence of managing director of brand and customer experience, Frank van der Post. He joined BA fairly recently, in early 2011, and thus too late to influence the A380 and B787 cabins, but his previous experience in the hotel industry, with senior positions at Jumeirah Group and InterContinental, will soon start to show on board, as it already has with some service and hospitality aspects at BA.

As creative director Richard Stevens says, "Frank and his team have inspired a new way of thinking and changed the mindset within the business."

So what does van der Post have in store for BA passengers? "At the end of the day, the A380s and B787s are only a few new aircraft in a very big fleet. We recognise and realise that our B777s and B747s are great, so we can't do something too different with the new aircraft as we would stretch the brand too far. We have spent a lot of time, effort and money in the past couple of years to elevate the brand, and to improve the onboard catering and wine, and the focus now is very much on the service hallmarks, trying to drive them into the organisation.

"Service is important to the customer, no matter what aircraft they're flying on. I think you have to be quite careful to what extent you single out the aircraft in the customer experience, as the service is a make or break element. There's a lot of competition out there, but BA has a great reputation for quality and service, and we need to make sure we capture that and further enhance it."

As Stevens says of the configuration, "While there's a loss in seat density, there's an improvement in terms of proposition. The middle seat is also wider, so what you lose by not being next to a window or aisle, you gain with a little extra space and privacy."

Those in the middle also gain a small extra surface for stowing small items. Sitting in this seat with both shields up, you do feel rather cut off from the rest of the cabin, but for those seeking privacy, the middle seat is now desirable.

Club World passengers entering Door 1 on the B787 don't get the same sense of occasion as they do upon boarding the A380, as revenue models did not allow for a dramatic entry space or social area. However, the galley area they enter through can be accessed during flight when a portion becomes the Club Kitchen in the galley area, to enjoy a snack or have a chat without disturbing sleeping passengers. A380 passengers can also enjoy this facility – but no bar (see page 65).

05. Friendly and attentive service is key to the brand, across all classes of travel

06. Premium economy really does feel premium, because of the small cabins

"It's a general enhancement. The seat is almost exactly the same as before, but with detail improvements. The programme was about iterative developments and improvements," says Stevens, adding that, "The work the guys at Tangerine [the industrial designers who have been involved with the yin-yang configuration from the start] did on the seat geometry and optimised comfort of the seat positions is brilliant – the best in the industry. Other airlines may have wider or longer beds, but the seated comfort is very good, and you don't see many people adjusting themselves to get comfy."

However, those flying business on the A380 upper deck, or in the 35-seat B787 cabin, will notice a major new development of the seat: a new 2-3-2 configuration, created simply because the familiar 2-4-2 layout wouldn't fit in these spaces. These middle seats are better for lone travellers, because they don't have the 'double bed' feel of the 2-4-2 version.

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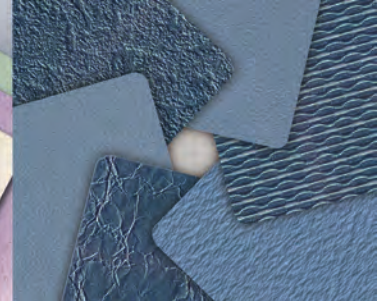
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WE'RE GAINING TRUE KNOWLEDGE
IN SEAT COMFORT AND HOW
YOU ENHANCE THAT ”



PREMIUM ECONOMY Seasoned BA B777-300 flyers will recognise the World Traveller Plus seats, a Recaro product customised for BA, finished in the B777 CMF specification. The seatback is a unique design, driven mostly by the need to accommodate the widescreen IFE display. The USB controls are also incorporated on the backshell as they would be awkward to access on the centre console within the 38in pitch.

It's a good premium economy offer, and a major step up from the ageing seats found on the B747s. As Stevens says, "We designers get frustrated when we're told we have to make do and enhance an existing off-the-shelf platform, but I flew it recently from Tokyo and it's a pretty good product."

On the A380, premium economy is split into a 44-seat cabin on the main deck and 53 on the upper deck. Of the two options, the upper deck is the better choice as, although it is a little less intimate, the window seats benefit from side stowage areas that also increase personal space.

On the B787, premium economy passengers will be pleasantly surprised to find that, after passing through the 35-seat business cabin, their cabin is a little more intimate, at a mere 25 seats.

ECONOMY Economy passengers also get the same Recaro seats found on the B777s, with a 31in pitch, but while it's the most off-the-shelf product on board, Stevens is still proud of the standard of comfort.

"In both economy and premium economy, we did a lot of work on improving seat cover comfort systems. So while

the cushion technology is standard on these platform seats, the dress covers have been designed to try and enhance comfort levels. One of the big things for me as part of Forpeople is that we do a lot of work with Herman Miller [makers of the famous Aeron ergonomic office chairs], so we're gaining knowledge in true seat comfort and how you enhance that, and a lot of that knowledge can be fed into aircraft seats.

"A lot of airline seat designers only have experience of designing seats for aircraft, and a lot of the suppliers that deliver the seats are companies that deliver engines and mechanisms which happen to have a seat on them and

07. The first of BA's 24 B787s arriving by 2017

08. Captain James Basnett flies the flag after safely delivering the A380 to Heathrow

what is the British Airways brand?

This is a key time for BA to define its brand. We asked Frank van der Post, the airline's brand chief, what he thinks the British Airways brand stands for: "Flying know-how, British style, excellent service, and being well-positioned as a premium brand in the European theatre. I think that's the way people see BA and the way our customers see the brand. We've always been innovators – we were the first with flat beds in first class, and we've got the yin-yang business configuration. So the brand stands for a number of things.

"It stands for engagement with people, too – we did a fantastic job with our sponsorship of the London Olympics and we won awards for that work, and that is part of innovation too. You try to respect the heritage, but at the same time look to contemporise the brand to make it relevant to today's traveller and consumer – that's what we're trying to do."



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09



10



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09. The premium economy seatbacks are bespoke to accommodate the 10.6in IFE
10. The break-up of spaces gives economy a nice feel

transform from seat to bed, but they're not leaders in seat comfort and there needs to be a change."

BIG IDEAS, SMALL SPACES The sheer capacity of the A380 could lead to soulless economy cabins if configured insensitively. BA has long been praised for its breakup of cabin spaces though, especially the premium spaces on its B747s, and this work shows on the new aircraft.

On the A380, the 303 economy seats are split into 199 on the main deck and 104 on the upper deck. In turn, economy on both decks is split into two cabins, with the rearward cabin on the upper deck configured with a mere 36 seats. This is a remarkable space for an economy flyer, and would serve perfectly as a testbed for new ideas, much like the rear upper deck on Malaysia's A380, where innovations such as child-free areas can be trialled.

BA's van der Post states, "I think the way we split the cabins on the upper and lower deck with smaller cabins gives it a very intimate feel. If you look at the customer feedback from the B747 upper deck, people really like it because it has almost a private jet feel, and that's what we

on an unconnected note

One technology not on board either aircraft is wireless connectivity. "We're still in the process of deciding our strategy on connectivity and wireless," states BA's IFE manager Richard D'Cruze. "We'll be running a trial on one B747 this year, fitted with a Panasonic Global Communications Suite, which offers wi-fi, mobile phone connectivity, and media streaming so we can stream content to customers' tablets, as well as live TV. We'll run the trial for a year and, based on the strategy and based on the results, that will help guide our strategy of where we go with IFE and connectivity. It's a big investment."

BA has some experience in this field as it offers OnAir technology on its all-business London City to JFK route, but at present D'Cruze is still not convinced by the market. "At the moment, take-up of wi-fi is pretty low at around 4-5% on long-haul flights, so that's a lot of weight to carry with not much usage. The jury is still out. Technology is evolving, but right now there isn't a true home internet experience in the air – it's a bit laggy and not as fast as on the ground."

But could it find a home as BA's short-haul IFE? "If you want to provide IFE on short-haul, wireless streaming is the way to do it as you don't have to fit a heavy IFE system. The drawback is you can't stream early-window Hollywood content, and that's where the customer satisfaction is."

tried to create in the A380 experience. The A380 is a much bigger aircraft so it's a little harder to get that feel, but you won't find massive spaces with hundreds of people – it's all carved up a little and I think that's going to be the big win."

On the B787, this feel is even more pronounced, with five separate spaces: a 21-seat business cabin; a 14-seat business cabin; a 25-seat premium economy cabin; a 63-seat economy cabin; and a 91-seat economy cabin.

CONSISTENCY This break-up of spaces is great, but it does bring a danger of losing design consistency. A case in point is the B747 Club World, which was designed independently of the other cabins, giving it a distinctive, but inconsistent, feel – complete with lampshades mounted below the centre stowage bins. As Stevens says, "There is a disparate feel on the current fleet due to the different design influences."

However, the new fleet is a more cohesive proposition, as van der Post explains, "We really looked at having an integrated design from nose to tail, which you can do with new aircraft. I wanted to make sure you get the same sense of feel, luxury and experience, no matter where you sit."

This means that BA resisted the temptation to follow many other carriers in specifying economy seats in different colours to break up cabins and add visual interest. "I feel very strongly that you need to keep the design integrated, and the more colours you bring in, the more risk you run of messing it up badly," states van der Post. "Where the colours are going to come in – and these designs are not out yet – is



11



12

“

THE BIG STORY INTERNALLY
WAS ABOUT CONSOLIDATION OF
MATERIALS AND HOW WE COULD
GET BETTER QUALITY ”

in the soft furnishings such as duvets and pillows. Once the new aircraft start flying, we will also introduce a couple of new features that will bring in new colours and touches.”

Hence many CMF elements run throughout the new aircraft, such as a diamond-patterned fabric that is found in first, premium economy and economy, albeit at different quality levels and in different shades. The lavatories are also consistent throughout, as are the galleys and the bulkhead brand panels, but one element that runs throughout really pulls the spaces together – the flooring.

The lavatories feature new laminate flooring, the galleys durable round stud floors, while all aisles feature carpet – crucially, the same carpet. Some BA B747s feature up to five different types of carpeting, but with the high volumes required creating orders in the millions of pounds, an opportunity was recognised.

“We felt strongly that if we could specify a really good-quality carpet that works throughout and complements all the cabin interiors, then we should do that,” says Stevens. “This has made real efficiencies for the business and it also enhances the passenger experience as we can get a better

the IFE experience

IFE is, of course, a crucial element of the flight experience, so what do the new aircraft offer? A key element is the quantity of content: more than 1,600 hours of programming, including more than 130 films and 650 TV shows, more than 550 albums and 225 radio shows, more than 200 hours of non-English language programmes, and a range of content for children. This is possible through the inclusion of MPEG2 and MPEG4 video and terabyte servers, and ties in nicely with the recent offering of gate-to-gate IFE.

The A380's system is the Thales i-5000, as also found on certain of the BA B777 and A321 fleet, while for the B787 the i-8000 architecture provided a better fit. To find out why the Thales system was selected, we asked Richard D'Cruze, BA's IFE manager: “We had competitive bids from Panasonic and Thales. In terms of the customer offer they were very similar, but there were commercial factors – we had an existing relationship with Thales for a lot of the flight deck avionics, so we knew them and we got a good commercial deal. For the customer, the offers were similar – they both have terabyte servers at the front and they both have high-resolution monitors.”

So why not one of the latest TopSeries models? “The TopSeries Avant wasn't available at the time when we made the selection, but we have the option to move to Avant on later aircraft. Right now, the i-5000 and i-8000 offer a great customer experience, and all our A380s and B787-8s will be delivered with the systems, but we're considering Avant as the system for the A350s and B787-10s,” explains D'Cruze.

So even the IFE ties in with the consistent passenger experience, although obviously with different screen sizes: 15.4in in first; 12.1in in business; 10.6in in premium economy; and 8.9in in economy. The first class display is smaller than that of some rivals, but following ergonomic trials it was decided that a smaller display closer to the seat was better than a larger screen set further back. “With the B787-9s, we are looking at mounting a 23in monitor further back, but it doesn't fit with the logistics of the current cabin,” states D'Cruze.

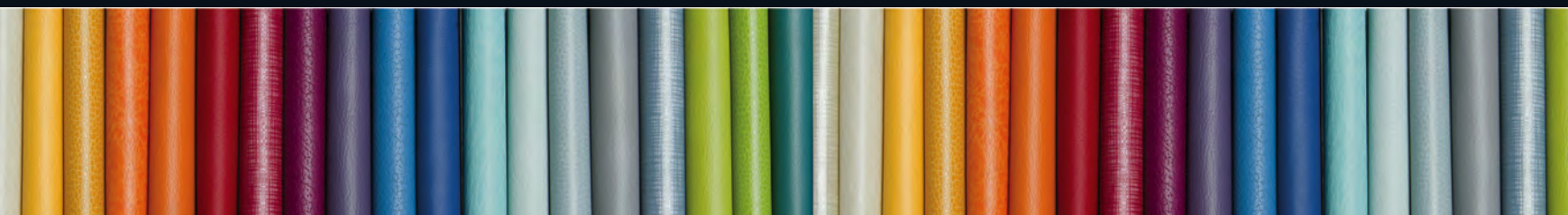
quality of carpet through the larger orders. The big story internally was about consolidation of materials, and how we could get better-quality products by having larger volumes of materials throughout the aircraft rather than each cabin having different materials. That gives consistency of experience so people at the back get better quality – often the same as in first class.”

THE NEXT STEPS While on the face of it the new interiors are not as dramatic as many anticipated, there is clear evidence of a drive towards improving the experience for all, with meaningful product and CMF enhancements creating cohesive spaces on board with a premium feel – a contemporary BA feel. However, as Stevens said at the beginning, this is just the slate being wiped clean: “The next step will be a much bigger step towards where passengers want BA to be. This is just the starting point...” ☒

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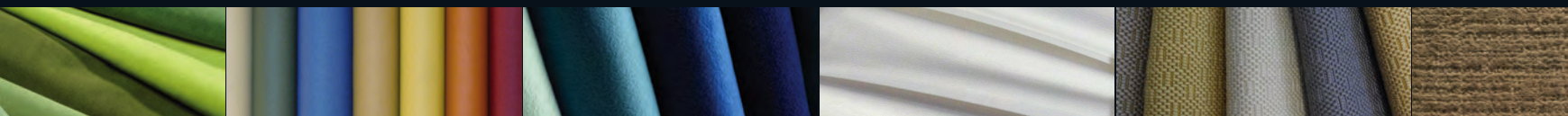
- 11. The Club World seat – a landmark in seat design – has been subtly refined
- 12. 380 crew celebrate the arrival of not just a new aircraft, but a new BA



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Is an aircraft now simply a retail space in the sky? According to the CarTrawler Review of Ancillary Revenue Results for 2012, carried out by IdeaWorksCompany with 116 airlines around the world, ancillary revenue reported by airlines has more than doubled since 2009. The 'unbundling' everything-has-to-be-paid-for model, once restricted to low-cost airlines such as easyJet and Ryanair, versus the everything-included model of global carriers, has been modified to chase revenue from the add-on and à la carte services that have become increasingly important for global carriers. CarTrawler's list is dominated by global carriers, headed by United Airlines and Delta, and this year has seen the arrival of Korean Airlines and Air France/KLM in its top ten. "The most aggressive airlines easily have more than 20% of their revenue produced by à la carte fees," says Jay Sorensen, president of the IdeaWorks ancillary revenue consultancy.

In the context of high fuel prices and economic recession, airlines are looking to maximise revenues by using integrated IT systems and sales techniques that no longer simply rely on impulse buys from the trolley or the inflight magazine, but through the internet or personalised emails as soon as the passenger has bought a ticket. It's a turnaround for the promotion of choice and the marketing image of paying for quality rather than getting

low quality for free. "I think the passenger is more and more willing to just pay for the things they need, and so are the airlines. You don't want to load 200 sandwiches, fly them to Venice and then just throw them away, so if you know what you need in terms of sandwiches, you can be more efficient in terms of load costs," says Markus Nilsson, head of sales and marketing at Swedish-based ancillary revenue logistics expert Paxport.

At easyJet, winner of Best Airline for Inflight Food and Beverage at the 2013 Airline Retail Conference in Paris, Sharon Huetson, head of inflight retail, won't release figures but confirms, "Food and beverage sales have been growing continuously over the past two years, especially in the categories of hot food and fresh food. More than 50% of our passengers actually buy something to eat or drink during a flight. The product has evolved quite significantly over the past couple of years, and we're trying to offer a really good, quality product."

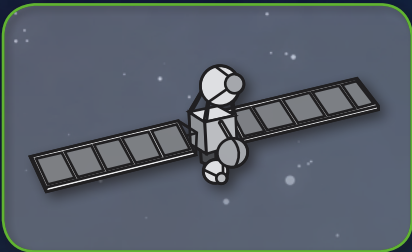
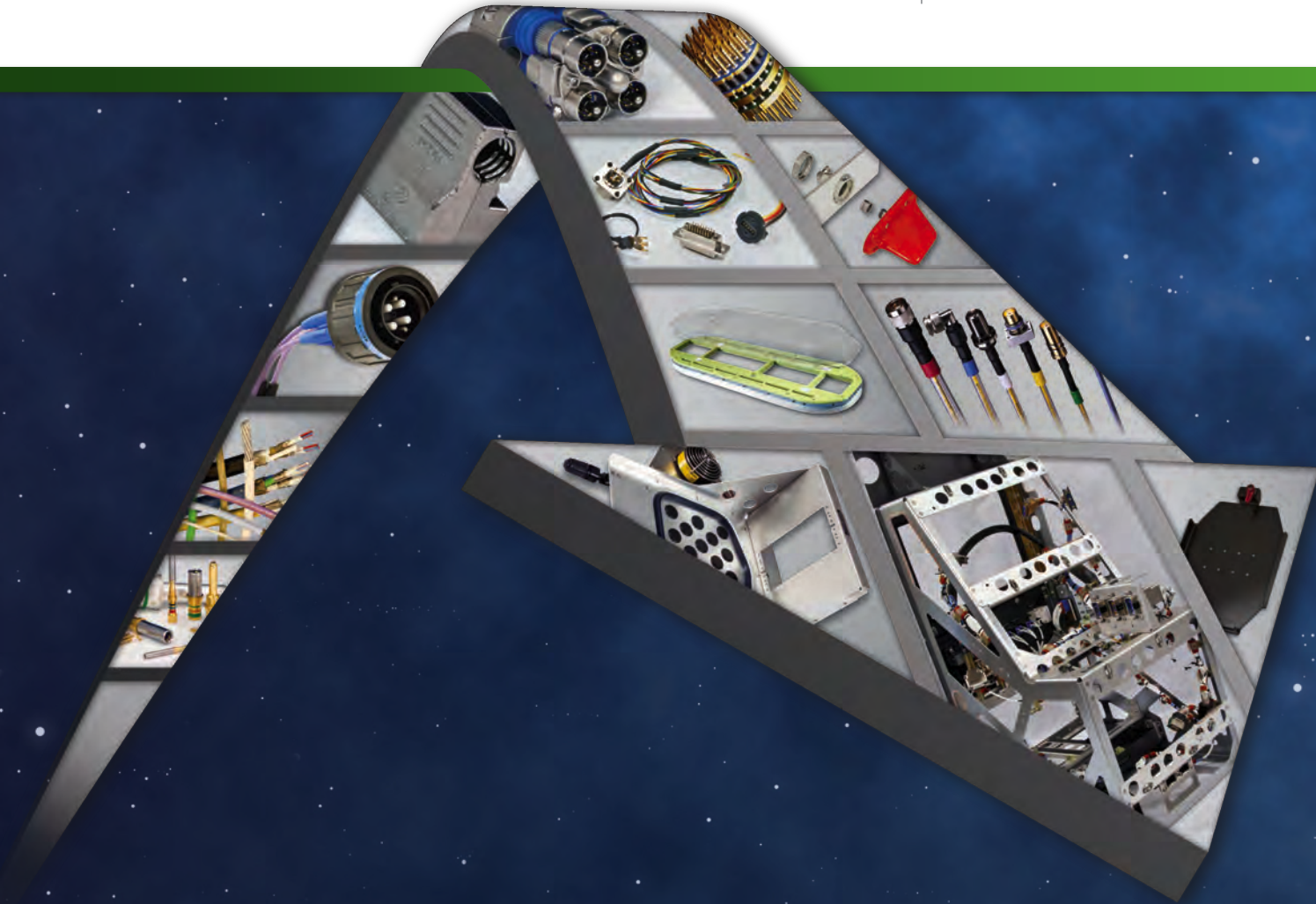
"You have a captive audience on a flight, but that doesn't mean it's a great place to sell," adds Sorenson, who views baggage as currently the greatest opportunity for airlines seeking to increase ancillary revenue, as it has greater margins than food and drink. However, he adds, "There has been a big about-turn with the idea of selling top quality."

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01

SIGN OF THE TIMES Since July 2012, on long-haul flights, where a free meal is still included in the ticket, Air France has also offered economy and premium economy passengers on flights out of Paris Charles de Gaulle the option of ordering à la carte menus that can be bought at the same time as ticket reservations, or between 90 days and 24 hours before the flight. Five menus, priced from €12 (US\$16) to €26 (US\$35), target different temptations: French tradition, organic, Italian, seafood and well-known quality brand Lenôtre. With over 34,000 paid-for meals ordered in the first year, Air France is planning to extend the experience over 2014 to more departure airports. Is it more choice for a price or, as Sorenson puts it, “the long process of testing the water of eliminating free food in economy”?

Meanwhile, on Air Baltic, passengers are encouraged to pre-book meals, with the promise of being sure to get what they want and being served before other passengers, from a large choice of three-course hot or cold meals, including gluten-free, lactose-free, vegan and kosher options. Since May, it has taken individual choice to a new level, boosting/replacing its existing ‘Air Baltic Café’ offer with a ‘drag and drop’ system that allows passengers to compose their own menu from individual items that will be personally put together for each passenger.

So how do passengers behave on aircraft, who buys items, and what do they buy? Nilsson of Paxport observes that contrary to clichés about business travellers on expenses budgets, it is actually more likely to be holidaymakers who indulge on inflight purchases. Branding guru and best-selling author, Martin Lindstrom

trolley dash

For Gate Retail, the ancillary revenue arm of airline catering giant Gate Gourmet, maximising revenue can also come from rationalising the sales presentation. For easyJet, it rethought the logistics of its trolleys, reducing the numbers from two sets of trolleys for two sets of crew, to a single ‘all-day’ set of two food trolleys, two back-up trolleys, one boutique trolley and a muffin container, and simplifying the packing procedure. As well as fuel savings from reducing weight, the new trolleys have also sped up sales. And with a 140kg saving on each aircraft, total cost savings on simplified packing, handling and weight are estimated to be €2.9m (US\$3.9m) annually across the fleet.



FLYERS ALLOW THEMSELVES TO BYPASS THEIR ‘PERSONAL RULES’, OFTEN ENTIRELY CHANGING THEIR PURCHASE PATTERN ”

confirms, “This is very similar to studies we conducted last year among cinema-goers. Here we learned that people completely set aside their diets when entering the cinema – as a result, buying popcorn, candy and sodas with an excuse that this is ‘a special occasion’. Similar behaviour happens with private travellers – when they are on their way to a destination, they allow themselves to bypass their ‘personal rules’, often entirely changing their purchase pattern.”

Huetson at easyJet observes two distinct patterns: “People are generally wanting healthy things, but there are also people who want a treat as well, so we try to get a balance between healthy things and treat items, to appeal to a broad range of all of our customers.” With a menu that changes seasonally, easyJet has recently introduced Pip organic fruit juice and Little Miracles energy drink with

01. Eyelevel’s CartMax draws on retail experience to create a more compelling point-of-sale within the standard trolley



ILLUSTRATION BY MIKEL CASAL



top idea

Inflight sales are bound to go up if passengers can actually see the products being offered, rather than just pictures. Recognising this, British product designer Kenneth Griffiths has devised Trolley Topper, a display system that can display a wide range of inflight products in the small footprint of a trolley top. Taking up no more lateral space than the width of an Atlas trolley drawer, elevated, stepped compartments, with further hanging over the side, can securely hold products while aiding visibility to passengers.

The slot-together nature of the system means that crew can configure it in several different ways, to create the most effective point-of-sales display for a particular flight route, customer demographic, or to help sell a particular product. Having trouble shifting chocolate bars? Try putting them in the hanging pockets at passenger eye level.

When not needed during service, the system can be folded and stowed away within the trolley. Trolley Toppers can also be printed, during manufacture, to carry advertising for suppliers, thus combining advertising revenue with potential extra inflight sales revenue.



PEOPLE ARE PAID ON THE 25TH OF THE MONTH, SO ON THE 27TH THEY WILL SEND YOU AN EMAIL AND TRY TO UP-SELL



ginseng, green tea and pomegranate, alongside the more classic Pepsi and 7Up, while also aiming to meet special dietary requests with products such as a gluten-free chocolate macaroon, and popcorn (both a treat and low calorie). It has also introduced two salads in its fresh food offering. Other products with 'local appeal' evoke different destinations: House of Edinburgh shortbread from Scotland; Bonne Maman financiers chocolate orange from France; Grate Britain All-British Cheddar Crackers; and Russian Standard Vodka, added to mark the launch of flights to Moscow. This product list reflects the fun, innovative image that the airline wants to create. "We're trying to get a coffee shop-type feel," says Huetsen, who compares easyJet's menu to Costa or Starbucks in terms of both offer and pricing, rather than to other airlines.

TECHNOLOGY OR PEOPLE? Classic onboard sales are increasingly complemented by online upfront sales. Paxport

works with airlines to develop "ancillary revenue solutions", creating a preflight communication strategy not only to pre-sell meals and services, but also to integrate passenger data information, whether to know the preferences of a frequent flyer so the cabin crew can immediately offer a gin and tonic to someone who bought that drink on a previous flight, or to adjust the seating plan to maximise sales.

Once the ticket is sold, Paxport steps in with the website it has built "that will be virtually identical to the airline's website", creating a preflight shop for baggage, meals or seat booking, while lowering the threshold for passenger access to encourage return visits. Paxport then develops a preflight communication strategy for the airline, with an automatic flow-on procedure – "maybe up to 10 different programmes for the passenger depending on their behaviour," says Nilsson.

Paxport also develops a fixed communication plan. Nilsson explains, "In Sweden, people are paid on the 25th of the month, so on the 27th they will send you an email and try to up-sell you the product. If you have bought the ticket six months ahead, they will send you a list of all the products six times, right up until the moment of the flight," starting with the product with the highest margin or the most relevance, such as insurance or car hire. "Food and beverages, and seat selection are the services that will

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be offered in the final couple of weeks, because then it's more relevant, because the mindset is 'I'm going in two weeks' time, where should we sit? Should we eat?'"

Whether selling up front or not, emails play a key role in raising awareness, says Nilsson: "The last thing that an airline wants is for the passenger to eat in the terminal before the flight."

Nilsson continues, "Many airlines could actually achieve a lot lower cost and higher revenue by just knowing their customers. If you know who bought food or drinks, or what they have done in the past, you can actually do what we call a 'special seating'. For example, you can group all passengers who have booked a certain meal between rows 4 and 10, and passengers who haven't booked a meal between 15 and 25, because then the cabin crew would know that they probably have money to spend and the crew can focus their time on these passengers."

With its latest product, Paxport goes one step further in a joint venture that allies its passenger data software with the Connected Crew software developed by Dutch company MI Airlines for cabin crews' onboard tablets, providing integrated information between ground and air. "Effectively, we are connected to each other, so the airline can use the tablets to access the information we have about passengers. They can also do other things like sell goods on board, so you can open up a tab on the tablet so you don't have to pay every time," says Nilsson. He believes that this system means everyone is a winner: the airline can track what is selling and "if you are a passenger you get the

bright and bold

Another take on the trolley-top retail unit is Eyelevel's CartMax, a flat-packed, fold-out, recycled cardboard unit that sits within the deep tray compartment of a standard airline trolley. The company has used its sister company's experience in designing and manufacturing point-of-sale display equipment for the retail industry to create a colourful unit with several branding options on the exterior panels to support inflight sales activity.

"People buy with their eyes, and retail in general has always provided strong points of sales for their goods. You'd never see a supermarket display products without graphics to attract attention, and CartMax simply takes this proposition and puts it on aircraft," explains Matthew Delamere, managing director of Eyelevel.

The unit provides a number of options for airlines to increase revenue. CartMax can be used as an advertising medium, enabling the airline to sell the "space" to outside sponsors for periods of time; it can be utilised as a medium for the airline to promote offers on board such as menus from new café ranges; or alternatively, airlines can make carts more relevant by having the images changed according to the time of year such as during Christmas or major sporting events, thereby encouraging the sales of corresponding items.

attention of being served or offered something you want, rather than being offered something you have already ordered", with personalised service from staff who know your name and preferences.

At easyJet, the approach is more people based. Although the menu can be viewed on the website and an email is sent out 48 hours before take-off, all sales take place on board. With information from the menu card and a seatback ad that changes every month, the priority is on the "great relationship with the crew", says Huetson. Without doing a hard sell, awareness of the products is part of the crew training. "We do spend a lot of time with the crew. Any time we do a menu change, we present the products and get crew to taste them, and sometimes we get the supplier to come and present their products."

BRANDING Starbucks coffee on Thomson, easyJet, United Airlines, Alaska Airlines and Delta; Dunkin' Donuts coffee with jetBlue; Häagen-Dazs ice cream and an exclusive deal with Lenôtre on Air France – the placing of key brands can play a strategic role in inflight sales. Coffee, traditionally the most criticised feature of airline catering, is a prime example

in your face

If you really want to promote your food and beverage offer – or one of your suppliers would like to pay to do so – why not have an advert for it placed right in front of each passenger for the duration of the flight? This is the business of Brand Connections Sky Media, which can arrange for advertising on tray tables, to create additional revenue streams through advert sales and extra inflight sales. Sky Media has sold a variety of commercial media and promotional campaigns on US Airways, United, jetBlue, Delta and Ryanair, and says that the use of tray tables to promote inflight products has achieved ‘significant results’. During a recent test campaign, the tables’ media pushed up sales of a specific beverage by 80%, according to the company, while on standard cart items, increases of between 6% and 9% were achieved on both the US and European carriers. According to Sky Media, assuming that tray table advertising can achieve an incremental €190 (US\$250) per day in sales per aircraft, then multiplied across a fleet, the annual sales volume boost an operator can achieve becomes significant.



“

IN SOME AREAS IT'S IMPORTANT TO HAVE ESTABLISHED BRANDS THAT PEOPLE RECOGNISE, FOR EXAMPLE, SOFT DRINKS ”

02. A chocolate, bar, whisky, or a cuddly basset hound perhaps? Ideas such as the Trolley Topper might help influence impulse purchases

of persuading passengers to part with their money for the reassurance of a recognised brand, and transforming what was typically the cheapest element of all-inclusive deals into a high-value product.

“When coffee is given away for free, it's a low-profit item that comes at the end of the list, and we give it to the lowest bidder. However, when you're going to charge, you need to think of quality,” says Sorenson at IdeaWorks. For him, brand tie-ins are “a question of mutual satisfaction. The purveyor has to be satisfied with the product, as does the operator, and you have to find a partner that makes sense. It makes little sense for Virgin Atlantic to partner with Dunkin' Donuts, but for jetBlue, yes”.

Lindstrom likens brand tie-ins to ‘real-estate’ sold to the brands in order to secure visibility and a competitive advantage. Often airlines strike very attractive deals with those brands (due to their high volumes) and as a result, either secure the products at ‘private label’ price levels or even at cost, “as this is a way for the brands to let people sample new flavours and even, in special cases, test new products”.

Fitting in neatly with the airline's ‘coffee-shop’ image, easyJet has been selling Starbucks coffee on its flights since 2009. However, elsewhere the airline deliberately seeks out lesser-known brand tie-ins. “In some areas it's important to have established brands that people recognise, for example for soft drinks,” says Huetson. “But with other categories we try to look for up-and-coming new brands that have something innovative, new brands with great ideas. We don't want to look and feel like anywhere else and we look to source with smaller companies as well: Love Da Pop popcorn is a new brand that is great fun.” ☒



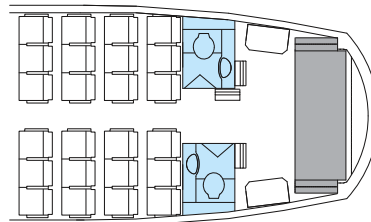


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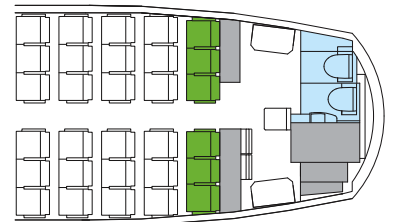
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come together

Seatback IFE has never been such a complex design issue, with increasing screen sizes conflicting with more slimline seats, and the future of seatback screens potentially heading for big changes

GUY BIRD, AIRCRAFT INTERIORS INTERNATIONAL

01. A great example of IFE integration. Panasonic worked closely with Zodiac Seats US (Weber) on this project



British comedian Marcus Brigstocke once answered his own mock-serious question “How can you tell if you’re working class?” by joking “When your TV is too big for your living room”. The gag works on a couple of levels because it gently prods prejudices and stereotypes about taste, money and lifestyle priorities, while acknowledging that the so-called 21st century working class are probably doing okay if they can afford a 50in plasma screen (however poorly it may or not fit in their front rooms).

Screen size and its successful integration into aircraft seats is a similarly tricky technical and aesthetic subject for companies involved in the now fairly mature IFE business, and just one of a few big (pun intended) issues to be tackled. With several decades in the game, Tom Plant, B/E Aerospace’s VP/GM for seating products, remembers the start of the seat-embedded IFE trend well. “The very first screen we integrated was a 4in one, in the late 1980s or early 1990s,” he recalls. “Virgin was an early adopter, then 6.5in screens went mainstream and 9in became commonplace. The same thing has happened in business class. We went from 10in to 19in (now on Emirates), and some carriers are asking us about 21in screens now.”

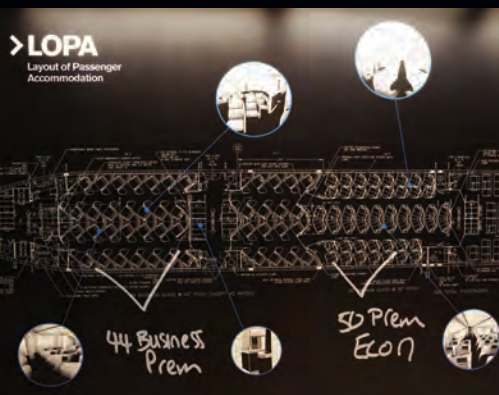
But the size war could be about to cool down, something Plant seems to be in favour of, as he explains:





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02



“Now everyone on a wide-body programme wants 11in screens in economy, but I’m seeing a lot of airlines taking a look at these big screens from an ergonomic point of view and the natural viewing angle you have on a typical 32in seat pitch, and realising it can seem overwhelming to many people. If you make it much bigger it won’t fit the seat.”

Nigel Goode of design studio Priestmangoode also backs a screen size escalation amnesty, for practical as well as aesthetic reasons. “Graphical user interfaces (GUIs) are quite a big part of our offering,” he begins, “but the monitor size we used on Lufthansa’s First product is relatively small, as we didn’t want too much light pollution, so we had to optimise it to work within that space. It’s also worth remembering that when the display isn’t switched on, it’s just a big black block in front of the passenger.”

A voice of reason also comes from Teague’s director of client relations, Chris Pirie, who, while tacitly acknowledging that size matters, feels that what you do with it is much more important (to hijack a very different, but somehow related, analogy). “Some airlines drive size for marketing and differentiation reasons,” he concedes, “but quality and integration are what’s truly important. The IFE experience is best when it’s intuitive, designed for usability, and when the screen size is purposely paired with the viewing distance.”



SOME AIRLINES DRIVE SIZE... BUT QUALITY AND INTEGRATION ARE WHAT’S IMPORTANT



GETTING INTEGRATED The key word here is ‘integration’. Is IFE integration getting taken more seriously than before, and if so, why? For Joe Patti, director of product marketing for IFE and connectivity at Thales, part of the reason for the change is a new openness to making designs more tailored: “The industry seems to have reacted to the strict size and shape standards imposed on past airframe programmes, which resulted – in many cases – in less aesthetically pleasing IFE/seat integration examples. Since that time, the industry has been more open to customised (and in some cases proprietary) packaging approaches that provide improved results.”

Patti cites the example of Thales’ TopSeries Avant equipment, which is “designed in participation with seat suppliers to provide improved aesthetics, smaller gaps, more efficient heat extraction and less intrusion into passenger space”. He says the new line is due to appear on Qatar Airways and Korean Airlines aircraft in the coming months.

Despite these celebrated complex examples, B/E’s Plant reckons another trend is a move towards more simplicity.

02. British Airways’ Club World IFE is cleverly integrated in that, if you don’t want to watch the display, it can be kept out of your eyeline



03



04



05



THERE ARE A LOT OF OPPORTUNITIES
IN TERMS OF BOOSTING REVENUE



- 03. The display and bezel contours on Iberia's new economy class merge perfectly
- 04. Even tablets can be integrated with style, as Geven's PED rack for the Comoda seat shows
- 05. EADS Sogerma's new Celeste seat has been designed with sleek integration of IFE in mind

He says B/E is at the beginning of a retrofit IFE programme for Lufthansa using supplier IMS (now part of Zodiac) that is designed to be more cost-effective and simple, "compared to network or head-end controlled-type applications". He explains further, "Being more seat-centric, the system architecture, amount of wiring and the size of the connectors are all smaller and thus easier to integrate into the seat, so that afforded us an opportunity to simplify the seat structure and mountings, and reduce the parts count."

Seat-size trends due to carriers seeking greater passenger density have also had an effect on IFE integration. Plant pinpoints the change as taking place about three years ago: "Older wide-bodied aircraft had somewhat thick and bulky seats, but a big trend started for slimline seats, to create more living space for passengers."

"The IFE system has historically been bulky to integrate and there was a limitation to how much you could slim down the profile of the seat, so underneath the seat you tended to have multiple big IFE boxes. By the time you've put a box around them to allow for cooling and airflow,

and put a shroud over the top, you'd have these huge boxes that, in economy class in particular, you'd hit if you stretched your feet out. Delta's economy seats with Panasonic were one of the first good examples that B/E did (and Zodiac too) that penetrated the fleet in a big way and changed that."

MOBILE SAVVY But just offering standalone systems isn't enough anymore. Arguably the harder task in the near future will be offering these new quality IFE systems with near-seamless integration to customers' often slicker mobile devices. Teague's Pirie acknowledges as much and picks out Virgin as another good example: "It has clearly got an eye on the future with new services and/or platform solutions such as Cabin Connect that take the need for connectivity as well as passengers' own devices into consideration. There are a lot of opportunities there in terms of boosting revenue and elevating the experience for users."

Thales, too, is flying the TopSeries AVA product, which offers wireless content-streaming to passenger devices, in



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06

class and flight specific

It's all very well making IFE less embedded and more connected, but many argue that approach only works for certain flights. While B/E Aerospace's Tom Plant has spotted "some interesting things with connectivity on low-cost and short-haul aircraft" – including handing out iPads or having streamable content for their own devices – he says there are differences of opinion regarding this approach for business and long-haul flights.

"Some airlines think that on a 14-hour flight, if you don't have 30 movies and 15 TV shows to distract you, it's a pretty miserable experience. So some airline CEOs think embedded IFE is a 'must-have', and we'll never get away from it. Then you get customers that carry iPads and have enough content on them to not need the aircraft's IFE system. How this is going to shake out is still in flux."

What he thinks is unlikely, though, is splitting up the economy cabin seats into IFE-embedded and mobile-savvy ones, with a possible premium attached to the former. "I think that would be cost prohibitive, due to the number of different part numbers that would generate, and the logistics levels. I think carriers would prefer one solution."



a LATAM A320 aircraft that has no embedded in-seat equipment. After a period of playing catch-up, most modern cars now offer some level of connectivity with smartphones – to play music as well as make and take phone calls – and aircraft must do something similar, as Teague's Pirie makes clear: "Expectations of technology have changed significantly in recent years. What once filled a library now fits in your pocket, content is on demand, and many devices and platforms are now connected. Once expectations shift on the ground, they must also shift in the air."

TECHNOLOGY LAG But as car makers have also found out, keeping up with the high-speed nature of smartphone, laptop and now tablet computing can be tricky. You only need investigate the centre cubbyhole of a 2013 Mercedes A-Class to experience the problem first-hand. It offers

multiple cables for all manner of devices but none that fit the iPhone 5's new port, although the car's Bluetooth function offers a wireless solution. Whether you blame Apple for that or not, the problem is still a real one, and as Nigel Goode of Priestmangoode concedes, the solution is still not clear-cut: "The trouble with giving up real estate for third-party devices is putting all your eggs in one basket." Five years ago, the obvious dominant phone brand to partner with might have been Nokia. Today it could be Apple, BlackBerry or Samsung, but in five years' time who knows?

Thales' Patti suggests "embracing open standards, such as Android, that are ubiquitous in tablets and smartphones", but that does rather suggest the non-embrace of tablet trailblazer Apple as a result, or maybe just infers that Apple should open up a bit more about its forthcoming products to key companies in

06. The Thales TopSeries 17in display on Qatar's B787 has been given a domestic-style 'floating' appearance



07



08



THE LAG IN TECH IS THE BIGGEST SINGLE ISSUE THE INDUSTRY HAS TO OVERCOME



- 07.** To achieve a more homely feel, TAM's new first class features a 'library' between the 23in screens
- 08.** The displays in Lufthansa's business class can slide to ensure the optimum viewing angle

advance if it wants its customers to benefit from connecting with them straightaway.

B/E's Plant believes this "lag in tech is the biggest single issue the industry has to overcome". "The IFE's product lifetime is small in the world of electronics and yet the product lifecycle of the rest of the stuff in aircraft interiors is quite long," he continues.

"There's a total mismatch. The solution to this from an aircraft interior and seat supplier's perspective probably doesn't gel well with the business models of IFE companies. The IFE firms have high development costs and would like to embed their systems more, but the vast variety in the market, added together with all the different seats out there, makes for a huge variety of integration possibilities. Once it's embedded, it becomes very costly to take out and embed a new system. What you'd probably like to have is more modularity and commonality to keep up with the pace of change in the commercial market."

Teague's Pirie also sees the need for future-proofing by designing in flexibility, but hails a success story in this area too: "Teague's work on Rockwell Collins' Venue cabin

management system a few years ago is a wonderful example of future-proofing. At the time, Rockwell had 3,000 individual stock-keeping units for hardware. We reduced it to one, by creating a flexible software solution customisable for any cabin. Venue's design, cost and easy-to-use features made it ideal. It's much easier and cost-effective to update software. Personal devices are an excellent consumer product reference – the form factor hasn't changed much over the years, but the software has changed considerably."

Either way, just as IFE is getting more integrated into the seat – technically and aesthetically – it will face further upheaval trying to integrate all manner of mobile devices into its suite of tricks, too. And while many believe a fixed or deployable screen in the seatback will remain a 'must' for some time to come (see previous page, *Class And Flight Specific*), from a purely logical point of view, it's hard to argue with Plant's thoughts about where IFE will go within another decade.

He concludes, "I've worked in the industry for 20 years and we've gone from no IFE to extremely complex, almost spaghetti-like wiring for integrated video systems, to now becoming more simplistic and people having the view that with more personal devices we might get away from embedded systems. To a degree, it's coming full circle. If you look at the advances in electronics in our lifetime, it's hard to imagine that in five or 10 years we'll need seatback video anymore. But I'll guess we'll have to see what happens." ☒

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The battle between carbon fibre and plastics as lightweight cabin materials has been decided with a draw, in the form of the latest composite materials

JAMES CARELESS, AIRCRAFT INTERIORS INTERNATIONAL



Advanced composites, including carbon fibre reinforced polymer (CFRP), glass fibre and fibre reinforced polymer (FRP), are rapidly gaining territory inside aircraft, as OEMs and third-party suppliers exploit the incredible lightweight strength of composite components. This growth is so strong that “aircraft interiors represent a larger market by volume for composite materials and manufacturing than structures”, according to Chris Red, principal of Arizona-based Composites Forecasts and Consulting.

The numbers tell the tale. Red expects the global aircraft interiors market demand for composites to reach 150,000,000-154,000,000kg over the next decade. In the same period, the aircraft structures market is expected to consume 95,000,000kg of composites. “The overall trend in composites in aircraft interiors is heading up,” Red says, with market volume “expected to grow 45-50% between year-end 2011 and 2022”.

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THE CASE FOR COMPOSITES Compared with other materials used in aircraft interiors, composites provide some unique advantages. The biggest advantage is their ability to deliver the same functionality and strength as other materials while weighing less.

“Like other aircraft parts, aircraft interiors are designed to be lightweight while still being functional,” explains Dr Joseph F Rakow, principal engineer with Exponent Failure Analysis Associates.

“Composite materials are often an attractive option because they are lightweight. Carbon fibre parts in particular are used where low weight and high stiffness are needed.”

As one of the world’s top producers of petroleum-derived products, Saudi Basic Industries Corporation (SABIC) understands the many uses and varieties of industrial plastics, and how to make products made from these materials achieve optimal performance inside aircraft. This is why “we use carbon fibre as a reinforcing filler in several of our thermoplastics resins and materials”, says Kim Choate, global director of mass transportation with SABIC’s Innovative Plastics business unit.

“One good example is Thermocomp EC008PXQ resin for structural components,” he continues. “Coupled with SABIC’s application technology expertise, this product

“

SHORT-TERM PROFITS CAN OFTEN OUTWEIGH LONGER-TERM PAYBACK

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provides an alternative lighter weight option to metals such as aluminium for components for seating and overhead applications, while meeting the stringent FST and OSU compliance requirements and the requirements of OEMs such as Boeing and Airbus.”

It is aluminium and titanium components, rather than conventional unreinforced plastic, that CFRPs are best suited to replace, Red notes. “Composites are more durable and lighter and can provide structural elements.” However, their higher cost compared with conventional aircraft metals can sometimes persuade aircraft operators to stick with the older, heavier options: “Not all airlines share the same operating costs or willingness to invest in composite components versus less expensive alternatives, even with major long-term savings,” he states. “Short-term profits and expenses can often outweigh longer-term payback.”

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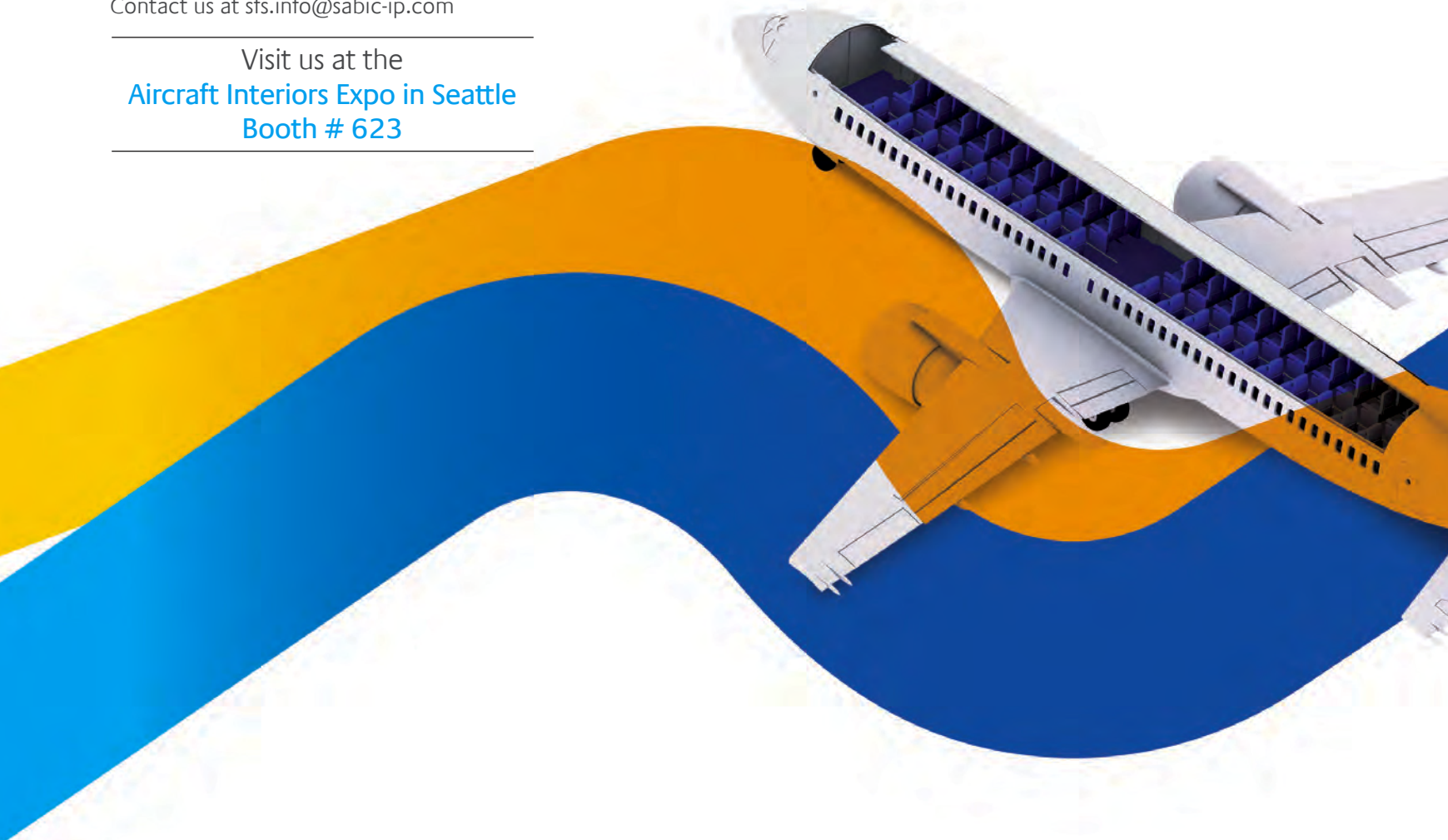
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02

composites on wheels

While not a fixture inside an aircraft, galley carts are another application that recently has gone composite. Specifically, Norduyn has developed the N9000 Certified Series Galley Cart, which has a monocoque carbon fibre reinforced frame with thermoplastic composite wall inserts. Billed by Norduyn as “the lightest trolley in the world”, the N9000 carts were developed in collaboration with SABIC and Spiriant systems (previously LSG Sky Chefs).

“The N9000s are 40% lighter than traditional aluminium-frame trolleys, which translates into reduced fuel-burn and a smaller environmental footprint,” states Chris Red, principal of Composites Forecasts and Consulting. These carts are also better insulated – resulting in less energy being needed for cooling – and their CFRP skins can be tinted to make aircraft interiors bear carrier branding. Finally, the N9000 galley carts can be fitted with RFID tags, making tracking easy and reliable.

“Patrick Phillips, Norduyn’s director of business development, spoke about the N9000s at a conference last year,” Red notes. “He said that Norduyn’s initial customer for the carts had ordered 40,000 units and had already received 14,000. Based on an average Boeing 747 having about 100 carts on board and three extra sets available to re-supply the aircraft upon landing, Phillips stated that this airline customer was already saving more than 9,000 tons of fuel a year and 28,000 tons of CO₂ on the units in service, producing a return on investment in 15 months.”



METAL ALLOYS REPRESENT A MOVING TARGET FOR COMPOSITES



Moreover, “Metal alloys represent a moving target for composites,” observes Red, “because technologies and manufacturing processes related to metals are constantly improving as well.”

As well as reduced weight, composites offer the stylistic and decorative advantages offered by conventional thermoplastics. This is because carbon fibres can be incorporated in items that serve decorative functions inside the aircraft cabin, with the textured look of the fibres serving as eye-catching surfaces. The result is that interior fittings can be stronger, weigh less and yet look even more beautiful than their conventional plastic counterparts.

THREE DECADES OF PROGRESS Composites seem like a 21st century product. But the reality is that composite-based components have been making their way into aircraft interiors for the past 30 years.

Beginning in the 1980s, composites were used in cabin/cargo liners and panels, class dividers, galleys, lavatories, stowage bins and floor panels. “Even though not many new aircraft were introduced between then and 2000,” says Red, “cabin updates and refurbishments allowed more composite components to penetrate the market.”

After the turn of the millennium, composites began to be employed in crew cabin modules and cockpit doors – the latter use being driven by the need for heightened cockpit security in the wake of 9/11.

In the 2010s, composites have been used to make seats with built-in IFE monitor brackets, plus plinths, clips and tray tables. “Being able to replace aluminium seatbacks and trays with CFRP reduces weight while making it easier to customise the seatbacks for IFE equipment,” says David Leach, global segment manager for composites at Henkel Adhesive Technologies – Aerospace. “We’re also seeing CFRP being used in galley panels and fixtures, reinforced floors and cabin interior panels.”

The weight/strength combination offered by composites has been a motivator for OEMs to use these materials more. So has the reduced fuel burn that composites make possible, again contributing to the bottom line of far-sighted aircraft operators.

02. If the figures really add up, composite carts have the potential to save a lot of fuel

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COMPOSITE SEATS CAN BE 15-20% LIGHTER
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03

“More recently there has also been concern related to compatibility of aircraft interiors with a more composite fuselage,” adds Red. “With regard to some of the new commercial jets with greater composite airframe content, the increased cabin pressure, humidity and longer service life favour composites over aluminium in many applications. Also, the potential for undesirable chemical interaction between aluminium and carbon fibre airframes makes the frame clips and other attachment points – traditionally made out of aluminium – attractive candidates for composites.”

Using more composites inside a composite aircraft makes sense structurally and chemically, but it can also help to reassure nervous passengers who feel safer in familiar ‘metal aircraft’. Most suppliers use composites in their designs, including Recaro with its CL 3610 economy seat, which uses carbon fibre as an exterior decorative material. The use of this material conveys a visual statement of strength and durability, while allowing a thinner, lighter seat that reduces fuel burn and even enables more seats to be installed in the same cabin space without sacrificing passenger legroom or comfort. The CL 3610 was chosen by Qantas for its A380 economy sections and a newer model, the CL 3620, has since been introduced.

RETROFIT OPTIONS It isn’t just new aircraft that can benefit from composite-based interior products. The same lightweight components can also spruce up older interiors and reduce fuel burn in the process – sometimes to the point of making older aircraft economically competitive once again.

“One of the biggest near-term opportunities appears within seating,” according to Red. “Recaro Aircraft Seating and B/E Aerospace have both had some success in developing seating for the coach cabin using composites. These seats can be 15-20% lighter than the aluminium incumbents.”

The payoff? “For a single-aisle aircraft, a 15-20% seat weight reduction could save about 450kg of weight per aircraft, with each kilogram resulting in US\$250-300/year in reduced fuel burn,” says Red. This is why replacing older aluminium seats with lightweight CFRP models is catching on among carriers: “Lufthansa has recently made this move on a portion of its A320-series fleet,” he says. “For older aircraft, such weight savings can enable them to remain competitive for longer.”

LIMITS TO GROWTH All told, the advantages of composites explain why they represented about 20-25% of total interior weight on previous-generation aircraft,

03. Rather than being hidden within, this Recaro CL 3610 makes a feature of its carbon fibre content



AIRBUS IS NOT ACTIVELY
LOOKING TO REPLACE TODAY'S
PLASTIC MATERIALS



Red notes, and could “remove as much as 41% of total aircraft interiors weight on the new generation of single-aisles. It seems unlikely that composites will be able to displace too much more than that going forward. There are some applications that are best served with traditional materials.”

This is very true, according to John Darlington, product manager for interiors with TenCate Advanced Composites: “For decorative, non-structural injection moulding applications – such as PSUs and IFE surrounds – where aesthetic colour and texture is the customer’s primary goal, it is not beneficial to use composite materials. Add the flexibility of traditional injection-moulded plastics for providing a wide range of interior shapes and colours, plus their simpler production process compared with composites, and one can see why conventional plastics still have a place in aircraft interiors.”

On a larger scale, aircraft interiors “engineering is a trade-off between visual appearance and structural performance,” Darlington adds. “Where injection moulding or non-structural thermoformed parts are required, there is a commercial need to have plastic parts. They can be cost-effectively produced in large volumes to customer colour needs. Thermoforming can also be very

cost-effective in smaller volumes and customisable to project needs.”

Cost also matters, which is why Exponent Failure Analysis Associates’ Rakow thinks: “Plastic and composite materials will continue to dominate the aircraft interiors market. Cost will likely continue to drive glass-reinforced plastic materials to be more prevalent in aircraft interiors than carbon-reinforced plastic materials.”

“Our aircraft interiors already use plastics that are lightweight and optimised and certified for use in aircraft cabins,” states Airbus spokesman Martin Fendt. “In short, Airbus is not actively looking to replace today’s plastic cabin materials with plastics that are reinforced with carbon.”

THE BOTTOM LINE Even with these limitations, there is no doubt that composites are going to increase their share in aircraft interiors, and will become even more attractive as new products, components and applications are developed.

For those who design aircraft interiors, this is a fact worth bearing in mind. The future is clearly linked to composites, and their amazing abilities to reduce weight while providing strength and, in many cases, eye-catching textures and appearances. ☒

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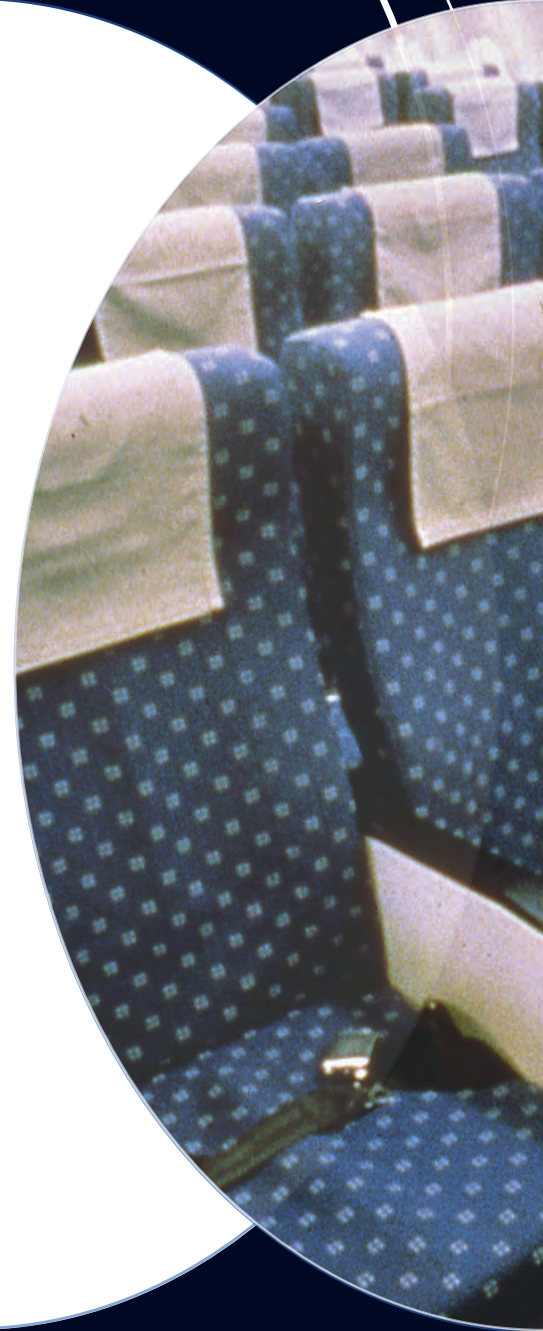
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01



01. Economy flyers enjoyed pure wool seat covers with a motif echoing the Pan Am Globe
02. The industry was surprised when the business class product was of an almost first-class standard. Sound familiar?
03. Even Pan Am Stratocruiser passengers in the 1950s knew how to travel in style



When the Airbus A350 took to the skies for the first time at Toulouse, France, on 14 June 2013, airline-livery aficionados must have had some major memory flashbacks. Those billboard-style letters on the fuselage! The radiant blue identity against that bright white background! Where have we seen this combination before? Thank you, Pan Am, for your ever-inspiring legacy.

In 1986, Pan American World Airways started work on Pan Am Blue, a corporate-identity programme designed to build on the mega-brand status of the airline. The initial task was to create an aircraft-interior environment that would directly complement – and live up to – the dramatic aircraft-exterior livery that had been introduced earlier in the decade. For its new Airbus A300s, for which it was a launch customer, Pan Am had implemented an amazing new paint scheme: along the sides of the fuselage, in a powerful shade of radiant turquoise blue, the airline's name was displayed in oversize letters against a bright white background.

This new treatment was a first in the airline business: the huge letters, stretching almost to the top of the aircraft, made the identity of the airline unmistakable and clearly visible from a great distance. Effectively, every single take-off and landing suddenly became a flying billboard for Pan Am and, naturally, there were heated arguments between aviation design purists and other factions. But there was no turning back. The new livery was progressively applied

to the other aircraft types across the Pan Am fleet – not difficult on the huge Boeing 747s, for which Pan Am was famous as the first scheduled operator in 1970 (Juan T. Trippe, the formidable founder of the airline, had issued the original specifications and ordered the aircraft from Boeing in 1966). However, specially graded stencils had to be individually cut to compress the information details for the sides of the fuselage of smaller aircraft such as the de Havilland Dash 7, and the ATR 42 (for which Pan Am was a launch customer).

To the relief of traditionalists, the airline decided not to change the design treatment on the tailfins and continued to proudly display the Pan Am Globe, commonly referred to by Pan Am Family members as the Blue Ball.

The graphics pioneered by Pan Am sparked a new trend: airlines everywhere started to focus on the 'bigger is better' design philosophy by increasing the size of logo markings on their aircraft exteriors to provide clear corporate-identity statements and ensure instant recognition. In the competitive post-deregulation era it is now rare to see old-style small-size letters on the fuselages of aircraft that fly for scheduled airlines.

The Pan Am Blue programme was headed by US designers Philip and Gail George, whose acclaimed accomplishments extended across the hospitality sector, including restaurants, hotels, furnishings and other airlines. The big challenge in 1986 was how to make the



02

Pan Am aircraft interiors relate directly to the company's much-debated new livery. After detailed consultations with all stakeholder departments, the decision was taken to move ahead with three simultaneous upgrades: first class, Clipper (business) class and economy class would each have a distinctive cabin upholstery treatment.

This was a different approach from the design strategy implemented by British Airways during the privatisation branding headed by Landor Associates and launched with great success in 1984. To achieve speed of completion and economy-of-scale cost-savings for the aircraft interior, British Airways installed the same seat-cover fabric in all classes of service, on all aircraft, across the entire fleet, with the exception of Concorde.

THE DEBUT In June 1987, the three eagerly awaited Pan Am Blue cabin schemes first appeared in combination with the exterior paint scheme at the time of the roll-out and delivery of the first Airbus A310-300 aircraft. At the same time, in the Pan Am hangars cabin retrofit lines were already in progress, upgrading the other aircraft types in the fleet. It was a fast-track throughput because the airline was preparing to celebrate its 60th anniversary in 1988.

THE COLOUR PALETTE The original shade of bright blue used by Pan Am for major paint applications was a specially mixed formula. Over the years, however, because of the



03

“

THE PAN AM BLUE FIRST-CLASS CABIN DECOR WAS DESIGNED TO CONVEY THE RICHNESS OF LUXURY TRAVEL

”

airline's far-flung international network, it was inevitable that some variants of the shade (derived from other sources) had crept into use. In 1986, as a cost-saving measure and to achieve consistency, the decision was made to move to the closest possible colour available via the commercial Pantone Matching System (PMS). In this way, supplies for paint touch-ups could easily be purchased by any department of the airline at professional paint stores worldwide.

PMS Process Blue was selected as the closest option to serve in place of the airline's traditional formula, and the other selected colours were midnight navy blue (PMS 295), red (PMS 185), silver grey (PMS 877), light grey (PMS 421), plus white and black.

As with the similarly 'patriotic' livery schemes of Air France and British Airways, the linking of the shades of dark blue and bright red with white evoked a visual reference to the US flag.

FIRST CLASS By the standards of the day, the Pan Am Blue first-class cabin décor was designed to convey the richness of luxury travel. As pioneered on the airline's twin-aisle aircraft, the then-state-of-the-art Sleeperette seats featured extendable footrests. The term Sleeperette Service had been used in the 1950s when the airline flew Stratocruiser aircraft with onboard sleeping accommodation.

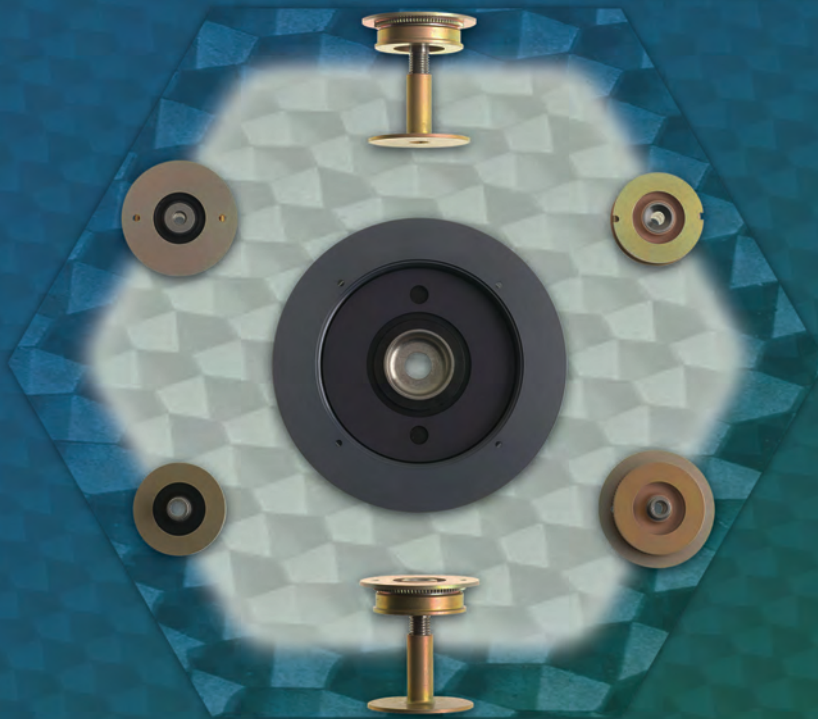
The handsome new first-class seat covers featured a combination of Lackawanna genuine leather dyed





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04

midnight navy blue, with matching one-piece Australian Merino sheepskins covering the centre-insert panels. In previous years designer Philip George had installed leather seat covers at Braniff, and he wanted to upgrade the overall comfort at Pan Am by adding layers of sheepskin, reminiscent of the early days of open-cockpit flying. There had been a prototype experiment using strands of sheepskin that could be brushed clean, but the seat-backs and seat-bottoms had moulted and gone bald rather rapidly, so the first trial was jettisoned in favour of the more resilient product. At the down-line cleaning stations the airline had to issue new vacuum cleaners with extra-strong suction to extract trapped debris from the thick pelts. In the end it was all worth the effort because Pan Am passengers really loved the plush, cosily insulated first-class seats.

On the B747 aircraft the credenza, or console, in the middle of the first-class cabin received special treatment to provide an impact when passengers entered the area. The gleaming silver-finish side-panels and top surfaces were surrounded by thickly padded, cocktail-bar-style bumper rails covered in midnight navy blue leather.

Following the success of the installation of seat-back telephones in the domestic Pan Am Shuttle fleet, and conscious of the international revenue-generating potential, the airline moved ahead with the supplemental-type certification process to offer an onboard telephone service on its B747 aircraft. This was an industry first, and took the form of a curtained kiosk-type installation near the front of the upper deck of the aircraft.

The elegance of the new cabin décor was enhanced by the introduction of upgraded menu choices, including a

Passenger comfort items

- Mandatory safety information holders
- airsickness bags
- Inflight duty-free price list
- Writing portfolio including stationery, envelopes, mailgrams
- Playing cards
- Magazine covers
- Panorama children's magazines
- Newspaper labels
- Coat tags
- Baby bassinets
- Cockpit waste bag
- Blankets for first and business class
- Giveaway IFE headsets for first and business
- Amenity kits for first and business
- Eye shades and container package
- Slipper socks and container package
- Blankets for economy class
- Inflight sampling box for economy class, funded by joint marketing suppliers
- Headset provisioning box for economy
- Headset collection bag for economy
- Non-giveaway IFE headsets for economy



05



IT WAS ALL WORTH THE EFFORT BECAUSE PASSENGERS REALLY LOVED THE PLUSH, COSILY INSULATED FIRST-CLASS SEATS



luxurious caviar and iced vodka service. Pan Am also developed an ingenious, wraparound, leather amenity kit containing a zip-up compartment and separate pouches for fragrances, toiletries and cosmetic products. The remnants from the cutting process of the navy blue hides already purchased by the airline provided the small pieces for the fabrication of these accessory items. This fashionable and practical design was copied in a glossy-black finish by Northwest and subsequently imitated by other airlines, including Air Canada and British Airways.

CLIPPER CLASS This was the first dedicated and branded business-class cabin in the history of aviation. On the airline's B747 fleet, the generously comfortable seats of the first-class cabins were taken out and reused in the Clipper cabins. The layout was 2-2-2 – pioneering at that time because it was similar to the configuration of first class.

The new Pan Am Blue dress seat covers were fabricated using herringbone-weave tweed purchased from Aabe. The stitched-in headrest covers and seat-back literature pockets were made of leather, again using the remnants of hides left over from the first-class seat covers.

04. The uniforms are by Lacroix, darling
05. Why waste leather cuttings when you can make a wraparound amenity kit instead?





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comfort figures for the A310-300

	First Class (Sleeperette seat)	Clipper (business)	Economy (Slimline seat)
Seat pitch	55in	38in	32in (31in for some rows)
Seat recline	60°	33°	30°
Configuration	2+2+2	2+2+2	2+4+2
Seat width (double)	53in	53in	40½in
Lavatory ratio per pax	1:6	1:30	1:38½



06



07



08

At a communications seminar for Pan Am People, Philip George explained that he had derived inspiration from the sight of surface-stitched leather elbow patches, buttons and pocket trims on the traditional tweed jackets worn by members of the English gentry during their hunting, shooting and fishing weekends at their country estates. There had been an earlier experiment with a similar upholstery scheme using a combination of shades of tan, but after assessing the maintenance implications the airline decided to concentrate purely on the scheme that used shades of blue. This was subsequently specified for all the twin-aisle aircraft in the fleet and the premium cabins of the airline's single-aisle aircraft.

ECONOMY Traditionally the décor schemes in economy had been designed to provide a family-style environment for pleasure and leisure flyers. Combinations of heavy-duty upholstery and holiday-brochure colours were the norm. But Pan Am was well aware of an emerging trend: by the late 1980s more budget-conscious corporate travellers were flying in economy, so the designers decided to create an atmosphere of calm, businesslike efficiency.

The new soft-furnishing treatment featured silky-smooth pure wool seat covers, woven to incorporate an abstract version of the Pan Am Globe. Initial trials with fabrics from Testori in two shades of blue were assessed for maintenance implications, and eventually the deeper shade was selected for fleet-wide implementation. This high-quality fabric replaced more than a dozen predecessors – in colours ranging from scarlet to cherry and cerise – that had been in service in economy for many years.

COORDINATING ELEMENTS To achieve a level of consistency, a number of common elements were developed for use in all three classes of service, including:

- Carpet – known as Clipper Sail
- Drapery – heavyweight blue multistripe wool fabric
- Sidewall panels – silver-blue, grey pearl Tedlar coverings
- Aisle corridor walls and monuments – grey horizontal stripe Tedlar coverings
- Blue bin strips
- Black seatbelts and silver-style finish seatbelt buckles displaying the Pan Am Globe
- Onboard signage in the Helvetica typeface
- Galley treatments – silver-style finish
- Lavatory treatments – silver-style finish with highly polished stainless steel washbasins.

BULKHEAD COVERS A fleet-wide audit of the twin-aisle aircraft showed that, prior to the implementation of the Pan Am Blue programme, the airline had been using 40 decorative bulkhead treatments. Imagine the upkeep ramifications! The decision was made to move to just one key design element, which became known as the Polar Projection. As explained by the designers, this piece of creative artwork showed the outline of the Pan Am Globe superimposed over the shape of the landmass of the continents of the world, as might possibly be viewed – with, it needs to be stated, some geographical and artistic licence – from outer space somewhere above the North Pole.

The designers also pointed out some reassuring visual links between the futuristic Polar Projection and a key antecedent identity emblem that Pan Am had displayed on the fuselage of its aircraft since its earliest days. For

06. The blue and silver theme continues in the lavatories, with an attractive polished steel washbasin

07. The Clipper class dress covers were made of a herringbone tweed fabric from Aabe

08. This 1986 schedule suggests fun times, while keeping strong branding



09. The meal trays demonstrate the depth of the branding work. If only there were a blue salad leaf...

Food and beverage equipment

- Menu cards
- First and business class meal service china
- Economy class meal-tray setup
- Cocktail napkins
- Stir sticks
- Styrofoam cups
- Plastic beverage glasses
- Tray mats
- Meal service napkins
- Linen bag
- Condiments and condiment holders
- Clear cutlery bag
- Snack box
- Small food items: butter wrapper, butter container, sugar packet, creamer, almond packet, peanut packet
- Light fare container and lid
- Light fare bag
- Country lime pitcher
- Match books [permitted in the 1980s]



09



PAN AM CONTINUES TO LIVE ON AS ONE OF THE GREAT LEGENDS IN AVIATION HISTORY



example during the 1930s, on the celebrated Clipper seaplanes, underneath the heritage PAA 'flying wing' there was a depiction of the planetary globe combined with outlines of continental-landmass areas.

As a major element of the Pan Am Blue scheme, the Polar Projection was displayed inside aircraft on the rear-facing front bulkheads in blended shades of matte silver-grey. The design was set into a raised silver frame, in the style of a painting hanging in a gallery, and passengers described the creation as "mesmerising". Decorative menu covers provided a souvenir for passengers in all classes.

The first-class menu displayed the Polar Projection on the cover in beautiful shades of midnight navy blue and silver. The Clipper class menu, half the size of the first-class menu, displayed the Polar Projection in blended matte tones of silver-grey surrounded by a red border. The economy menu displayed the Polar Projection in bright Pan Am Blue against a shiny white background. Inside the multipage notebook format, the meal choices were displayed in several languages. And a wide range of destination- and travel-related advertising covered the entire cost of the print and production order!

The Polar Projection was immediately seized on for use on company documentation, TV footage, principal sightline points at corporate premises, and the back walls of airport check-in desks.

INFLIGHT ACCESSORIES While old-style existing stocks were being depleted, the airline moved ahead with the

design and development of a new range of accessory items, all specified to link directly with the new Pan Am Blue interior décor. The action-plan list is detailed on page 109.

THE EXTENSION In parallel with the cabin upgrades, the Pan Am Blue programme was extended to cover new uniform trials (led by the haute couturier Christian Lacroix), passenger documentation, ticket offices, airport check-in desks and lounges, corporate premises and ground vehicles.

THE MEMORY LINGERS ON In 1991 the airline ceased operations. However, Pan American World Airways is still today classed as one of the most-recognised corporate identities in the world, along with iconic brands such as Coca-Cola, IBM, McDonald's and Sony. Merchandising lines are available at airports and from sales catalogues offering memorabilia items, including vintage Pan Am cabin bags, travel accessories, network-destination posters and model aircraft. Detailed source information about the pioneering triumphs of the airline may be obtained from the Pan Am Historical Foundation (www.panam.org).

Thanks to the sustained loyalty of the airline's former customers and professional business associates, plus the deep and constant devotion displayed by groups of alumni employees, the inspiring legacy of Pan Am continues to live on as one of the great legends in the history of aviation. ☒

Jennifer Coutts Clay is the author of Jetliner Cabins (jetlinercabins.com). She is currently working on the e-book edition. Jennifer formerly held the positions of controller of corporate identity at British Airways – based in London, UK – and general manager of product design and development at Pan American World Airways – based in New York, USA





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One of the world's best carriers just got even better, as Singapore Airlines reveals its latest generation of cabins to the world

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With five-star Skytrax ratings for its first and business class cabins, and a healthy four stars for economy, Singapore Airlines (SIA) has set a high benchmark for quality. However, despite such popularity, the airline is not about to relax, as rivals such as Thai, Cathay and Malaysia have since revealed spectacular new products. Hence SIA has launched a new generation of cabins, with the aim of setting a new benchmark in luxury.

Nearly US\$150m (€114m) and two years of development work have been invested in introducing the new products on an initial eight B777-300ERs entering the fleet, with further investment on the horizon as the cabins are introduced on the forthcoming A350 fleet. As SIA's executive vice president, commercial, Mak Swee Wah, said at the unveiling, "The significant investment in our next generation of cabin products reaffirms our commitment to product innovation and leadership, and demonstrates our confidence in the future of premium full-service air travel."

"Special attention has been given to ergonomics, comfort, convenience and design, as well as to our customers' interests and lifestyles. The task that we gave ourselves and our design partners when we started the process was to make 'A Great Way to Fly' even better. We are confident that we have delivered."

FIRST CLASS At first glance, the eight-seat first class cabin looks familiar. The palette and materials have all been updated, although in a subtle way in order to aid consistency and ease any future retrofit work on the rest of the fleet. But when you consider that SIA brought in a new design partner – BMW Group DesignworksUSA – for this cabin, you know there will be real depth to the project. BMW is not new to the aircraft industry, having carried out design work with aircraft manufacturers, and worked on bizjet interiors in the past. However, this project is significant for BMW as, while it has created some concept designs for airlines, this is its first airline project to have taken to the skies.

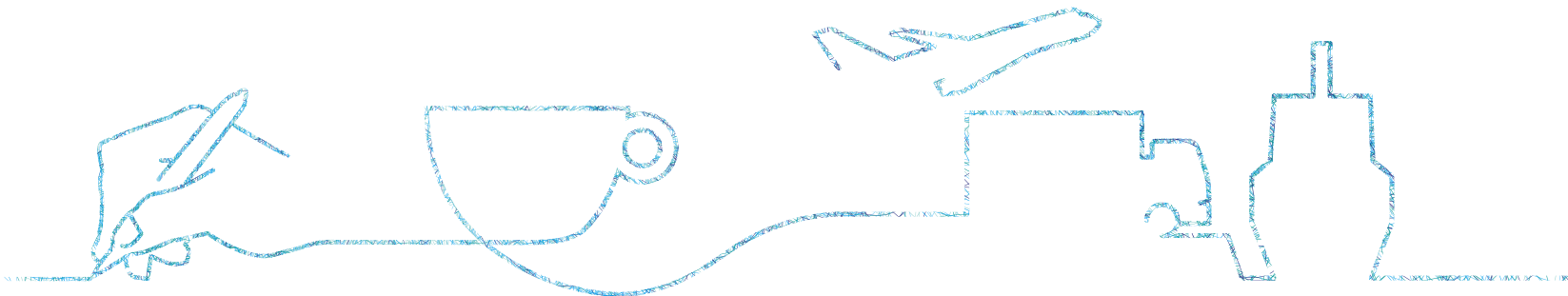
The seat itself is all new, created with Jamco, although it features many familiar features that SIA felt worked really well on other aircraft, such as the 82in fold-down bed and extra-wide 35in seat.

"This is a Singapore Airlines-specific seat – we didn't modify a frame," explains Magnus Aspegren, director of creative consulting at BMW DesignworksUSA's Shanghai

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Creatively designed

Intelligently engineered

Efficiently delivered

studio, who headed the project. “We took some of the key things from previous seats that were successful in first class and created a new product with the key ingredients included. We of course did not discard what was learned and what was successful in the past. You take what’s successful and build on it, change it and update it, and make a successful new design solution using the positive things from the past.”

Triple-seven flyers don’t get the full suite experience of the A380, instead enjoying a more open experience that the partners feel offers more exposure to SIA’s strongest product of all: the service.

“We didn’t feel there was a need for an enclosed space for this particular product,” explains Aspegren. “We realised that the thing that really sets SIA apart is the unique and excellent service it provides. It is really remarkable and extraordinary in that sense. So we decided to create an environment that was more experiential. We looked at economy class as efficient, business as more business oriented and more about function, and first class about being more experiential.”

Thus, while the cabin as a whole has a lounge feel, the seats were designed to have a definite exterior and interior, so once inside the cool grey shell, its contoured side panels highlighted by underlighting on the exterior metal rubstrips, you feel like it is your own space, a feeling accentuated by the warm beige and brown palette within, the carpet that contrasts with the aisle carpet, and the ambient lighting within. The vibrant colours are provided by the crew uniforms, shown to their best against the



01



02

why BMW?

It’s exciting to see a new name involved in commercial aircraft interiors, but what made SIA decide to work with BMW DesignworksUSA? Director of creative consulting Magnus Aspegren gives his thoughts: “Singapore Airlines was looking for a little more understanding of what the premium/luxury market can be, and also to find further opportunities in that field. We have been discussing opportunities for quite a long time, and when this opportunity came up, we decided to collaborate,” he explains. “I think what they were intrigued by is our experience in premium transportation, and they were keen to learn from the experience that we could bring to the commercial aviation industry.”

BMW DesignworksUSA has a lot of premium experience – with automotive design obviously – but also projects with Embraer, Dassault and Pilatus, as well as yachts and motorboats, and trains. The studio has also worked on several airline cabin projects and concepts, with this being its first project in the skies.

For the SIA project, BMW’s studios in Singapore, Shanghai, Munich and Los Angeles were all involved, the idea being to have a diverse team with different backgrounds and experiences to support the project.

“That’s the key to how we typically work – we involve team members from different locations for different experiences, because these products will be used internationally by people with different backgrounds,” explains Aspegren.

So is this just the beginning of a growing relationship with commercial aircraft design? “We’re working on things in the industry that will emerge in the future, both with airlines and suppliers. We hope that the airline industry overall can see our capabilities, and the Singapore project is a good start.”

“

THE THING THAT REALLY SETS SIA APART
IS THE UNIQUE AND EXCELLENT SERVICE

”

neutral palette. “Overall the seat is acting as a background for the more experiential setting,” says Aspegren.

That renowned service also means that the seat doesn’t need to have a lot of functions, the focus instead being on offering the highest quality. This is achieved through smooth actuation, attention to materials for a quality tactile feel, and attention to detail such as the leather-lined stowage compartments with nicely damped lids. A stylish new passenger control unit next to the armrest makes actions such as adjusting the lighting, moving the seat, calling crew or turning off the IFE simpler – and also means that crew can switch off the IFE for passengers without disturbing their slumber.

Of course comfort is critical to luxury, so a lot of development work went into selecting the right foam for optimal support. The full-grain leather seat covers could have been simply glued to the foam, but this wasn’t considered to be a quality approach. Thus the materials were stitched together, in a diamond pattern that not only oozes luxury in a style reminiscent of a Bentley, but also adds support and is less prone to large scratches. The

01. The width of the first class seat allows several seating positions and makes it easier to sleep on one’s side
02. The first class palette creates a subtle backdrop for the stars of the experience: the crew

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03



04

quilted leather even extends to the footrest, and when the seatback is folded down to create the bed, a quilted headboard is revealed. An additional mattress is laid down by crew when making the bed, for a restful night's sleep.

FEELING IS BELIEVING To optimise the feeling of quality, the shiny parts aren't lookalikes, they are real metal, including brushed aluminium and bronze finishes on some parts, and those leather-lined stowage compartments, which feel great and help protect valuables.

This attention to detail is a key part of how BMW DesignworksUSA works, according to Aspegren: "We work with a first, second and third read. So you look at the object from a distance on the first read and ask if it looks pleasing and communicates the brand. Then, on the second read, you might notice that the panels have nice sculptings and you can see that it is an exclusive product. Then on the third read, when you're actually touching it, you get that tactility and feel there's a certain level of quality – for example through a tactile embossed leather.

"We tried to move away from what we feel many airlines have, which is a good first read so they look pleasing from a distance but maybe not so high quality when you start moving and touching things, and we go all the way into a third read. There are surprises along the way and it's really more experiential in the sense that the luxury doesn't reveal itself all at once – rather it grows as you experience it."

a KrisWorld of wonder

The latest SIA B777-300ERs also feature a new generation of the airline's KrisWorld IFE system, based on the latest Panasonic Avionics eX3 hardware platform. This is the first introduction of the system and forms part of a US\$400m (€303m) deal signed in 2012 that will see SIA fit eX3 on its newest B777-300ERs, as well as its forthcoming A350s, with potential retrofits to come across the rest of the fleet.

The new KrisWorld features larger LCD screens and video touchscreen handsets across all classes. LCD screens have grown from 23 to 24in in first class, 15.4 to 18in in business, and 10.6 to 11.1in in economy. Economy passengers will also be able to browse through the more than 1,000 on-demand entertainment options by swiping or scrolling through the touchscreen monitor.

SIA also worked with Massive Interactive to integrate the functionality of the video touchscreen handset into the core design of the KrisWorld user interface – for example, the handset can serve as a second screen, showing the moving map while a film is played on the main screen. The handset can also be used as a touchscreen trackpad to navigate KrisWorld.

Further developments include 'Quick Search', where a flick of the handset pulls up a playlist of entertainment choices; the Notification Centre on the KrisWorld dashboard, which contains information relevant to the flight, reducing the number of onboard announcements; and greater personalisation, through content recommendations.



THE LUXURY DOESN'T REVEAL ITSELF
ALL AT ONCE – RATHER IT GROWS
AS YOU EXPERIENCE IT



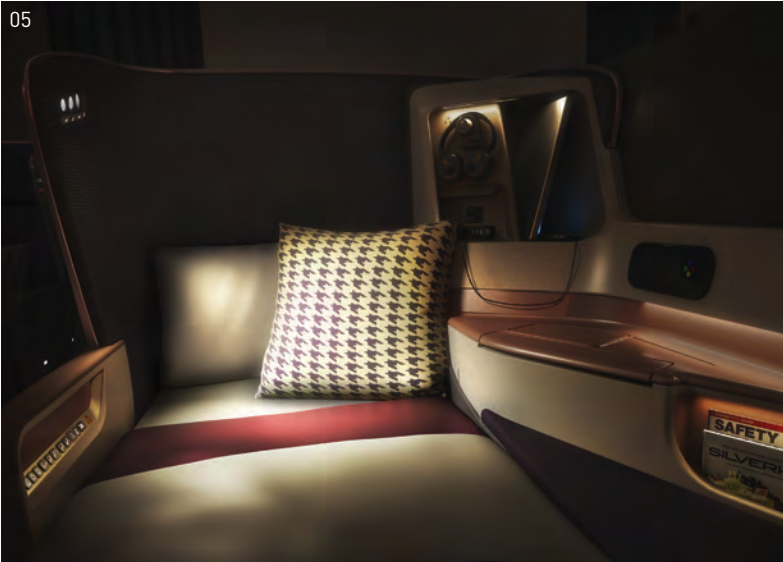
BUSINESS CLASS Following the success of the previous business class, SIA once again turned to JPA Design to create the new generation. The basic cabin layout is the only element that is carried over, retained because the configuration is very space efficient, allowing 42 28in-wide seats to be fitted, all with direct aisle access. When the seat is converted to a fully lie-flat bed, the sleeping platform is angled in a tessellated inverse herringbone configuration.

"All options were considered over the course of an in-depth study that JPA carried out with Singapore Airlines, but it was felt that the current layout optimised space for both the airline and its customers, who enjoy a spacious personal environment and a high degree of privacy," explains James Park, managing director of JPA Design.

Extensive work on this all-new seat – again a bespoke Jamco model – has created an extra 2in of bed length, taking it to 78in, with a better shape for sleeping. The flip-

- 03. The display in economy is a generous 11.1in
- 04. A passenger's eye view of business class, which has almost a hotel feel

05



07



06



local interest

JPA Design's Singapore office was conveniently located to take on the business class design project. However, while those staff were involved, the project was led by JPA's London-based design team. The design teams worked very closely with SIA staff and this meant spending a lot of time at their HQ in Singapore.

"This is an approach that JPA has taken a number of times and we are used to embedding our designers alongside our clients' teams as a way of ensuring both that the client gets the design they want and that JPA understands not only the brief, but also the very important branding and cultural aspects inherent in such a major project," explains James Park, managing director of JPA.

05. Extensive tests were carried out with lighting experts to determine optimal light colour and intensity

06. The absence of central stowage bins in the business cabin really adds to the feeling of space

07. The multi-option LED reading lights ensure that appropriate lighting levels can be selected by the customer throughout their journey

over bed design has been retained as SIA feels it offers a chance to enjoy the crew experience, as well as greater comfort. All this, plus significantly increased stowage capacity, has been achieved within the same footprint as the previous generation seat while retaining the 28in seat width, which the airline promotes as the widest business offer in the sky.

The seat has two different recline positions, aided by an increase in recline angle from 128° to 132°: Lazy-Z, where the passenger enjoys a cradled position with their weight and pressure centred and balanced; and Sundeck, where the customer's legs can be placed up onto the ottoman, and the seat base and leg rest move to form a large, comfortable surface to relax upon.

The palette in business is a little more playful than in first, with JPA developing an expressive colour and trim palette, which offers continued elements of discovery. The combination of alternating shell colours in silver and champagne, complemented by a distinctive copper trim, helps elevate and enhance the feeling of space within the cabin as a whole. The inner seat colours also alternate, with taupe leather to complement the silver shells, while aubergine sets off the champagne shells. The sensory

experience is enhanced by the bespoke woven textiles around the seat, while a nice touch is a continuation of the diamond-patterned leather, only now in an oversized pattern. Further consistency was achieved with nice touches such as the symbols and fonts on the controls being the same throughout the aircraft.

This creates "personality and a play on scale: a modern theme of classic luxury design which will meet the expectations of business travellers for years to come. It has been an extremely satisfying and enjoyable project to work on", says Park.

ECONOMY CLASS Economy class has also received attention, building on its four-star Skytrax rating for seat comfort, again enhanced by that five-star service. This cabin was designed in-house by SIA, with an inch more legroom added, and comfort further enhanced by new backrest seat cushions with side bolsters for better back support, and a sculpted headrest cushion, which supports an increased range of height adjustments for better neck support. A nice touch is an echo of the diamond pattern in the seatcovers, again oversized so it resembles a check. Could it be enough to take all three cabins to five stars? ☒

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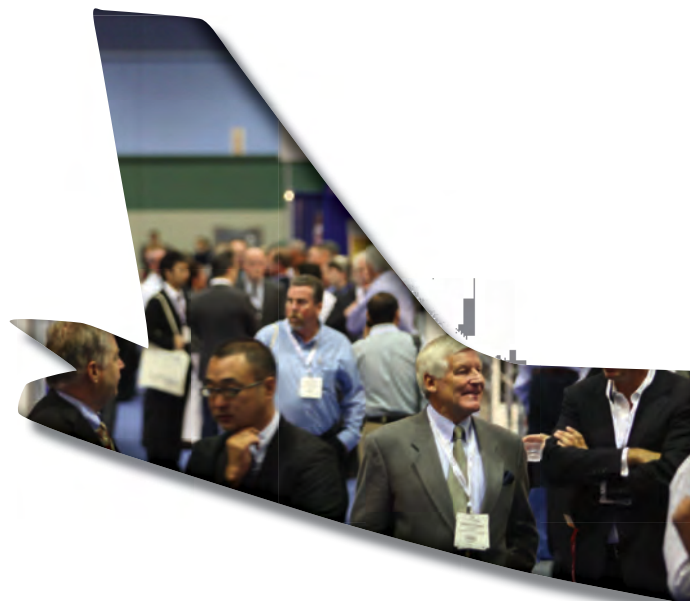
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The biggest event in the Americas' aircraft interiors industry calendar is nearly upon us once again: Aircraft Interiors Expo Americas 2013, being held in Seattle, Washington, on 1-3 October. The show is said to be the largest dedicated aircraft interiors event in the Americas region. As ever, it will showcase the latest airline interior design and airline cabin management systems, including those from major names such as Zodiac Aerospace.

The 100+ suppliers at the event also include a strong showing from the materials world, including Andrew Muirhead, BASF, AkzoNobel, Botany Weaving, KYDEX, Perrone, Replin Fabrics, SABIC and Magee Plastics; with the seating sector represented by companies such as Aviointeriors, EADS Sogerma and, of course, Zodiac.

An exciting new development for the 2013 show is the one-day Seating and IFE Integration Symposium on 1 October, at which experts will discuss how to further harmonise the great work done by seating manufacturers and IFE companies.

Furthermore, the expo is co-located with CompositesWorld 2013, which takes place on 2-3 October and will feature a conference on the latest in materials innovations. Star guests include Michael Kuntz, associate technical fellow at Boeing, and Bjorn Ballien, programme manager at Henkel Aerospace.

In the meantime, we have gathered a few of the highlights that you can expect exhibitors to be talking about in Seattle. See you there!

Stand: 930

Explore Columbus

If you missed the launch of the Columbus family of economy seats at Aircraft Interiors Expo in Hamburg earlier this year, you will have another chance to try them out in Seattle. The Columbus family offers flexibility through a range of options, and there are three basic models suitable for operations from regional to long haul. The slimline design also

affords a little extra legroom at the tightest 28in pitch.

In its most basic form, the Columbus seat weighs 8.5kg/pax. Columbus Two, the medium-haul version, with a basic weight of 9.5kg/pax, features recline, provision for audio controls in the armrest, and a range of other options. This model has caught the interest of Greek carrier Aegean, which has signed a Letter of Intent to retrofit the seats to its fleet of 12 A320s initially, followed by a further 14 A320s and four A321s.

Vasilis Kardasis, technical director of Aegean, explained, "Columbus Two is designed to be comfortable for installations at a 28in pitch, a feature that will allow us to operate our fleet with a 180 pax layout, including five rows of business class."

"This proves the quality of the design at the minimum weight of the seat category," added Mario Schisa, CEO of Aviointeriors.



Stand: 623

Low-gloss sheets

SABIC has expanded its portfolio of products with LEXAN XHR 6005, a new low-gloss sheet that brings velvet texture aesthetics after thermoforming. The company has also developed a new LEXAN XHR A13 film, designed to add robustness in multilayer laminate constructions used in decorative applications such as ceilings, galleys and partitions.

SABIC claims that the low heat-release

properties of the LEXAN XHR sheet series mean that it can deliver better weight-out than conventional PVC/PMMA products for better fuel economy, while fully complying with the OSU 65/65 standard and FST requirements (FAR25.853) of major airlines. The series is also qualified for Airbus AIMS04-06-001 material specification, and can be colour matched in sheet and resin form. The product is available in gauges between 2-7mm.



NEW
PRODUCT!

Stand: 1043

THERMOPLASTIC FANTASTIC

Boltaron's new 9850 grade of thermoplastic alloy for thermoformed parts of aircraft interiors offers lower heat release and higher impact resistance than any other FAR 25.853 (d) rated sheet product, according to Adam Mellen, director of the company.

The new sheet carries an FAR 25.853 (a) 1 F heat release rating of 50/50, and exhibits Izod impact resistance of 5.0ft lbs/in (265 J/m), compared with 3.0ft lbs/in (159 J/m) for competitive sheet products having lesser (65/65) heat release ratings, improving the durability of aircraft interior components, according to Boltaron.

"Sheet products developed to meet stringent FAA fire ratings must typically sacrifice impact resistance in order to do so, but the 9850 sheet retains outstanding impact qualities while improving passenger safety in the event of a fire," said Mellen.

The sheet is also said to offer extreme formability, allowing it to draw readily to the mould, into deep recesses and onto sharp corners, while maintaining uniform wall thickness and consistent surface quality – making it suitable for thermoforming of high-performance interior components of commercial, military and private aircraft.

Typical applications include class dividers, dashboard enclosures, galley and lavatory components, video screen bezels, personal service units, seat parts, sidewall panels, tray tables, window shades, air ducts, bulkhead laminates, light housings, window reveals and mouldings.



1,700+ VISITORS,
INCLUDING
BUYERS FROM
63 AIRLINES,
ARE EXPECTED

Stand: 620

Antimicrobial coating approved

Hygiene-sensitive areas such as surfaces in aircraft lavatories or galleys are sources for unwanted and fast-growing bacteria and other microorganisms. These microorganisms can be dangerous for humans because they can lead to infections; they can also damage products.

Mankiewicz's antimicrobial paint not only fulfils the strict FST-demands of the aviation industry, but most important of all, kills bacteria without any toxic side effects. A silver as well

as a matching paint technology were developed by the Hamburg-based coatings manufacturer. Moreover, this technology can also reduce disinfection costs and prolong cleaning cycles.

The paint's antimicrobial properties were tested and proven for six years in various long-term tests by independent institutes, and meet the JIS 2801 specification. Mankiewicz says the product is a possible option for use in Airbus and Boeing aircraft.

Don't miss the exhibition preview
and industry networking party on
1 October from 5:00-8:00pm

Stand: 320

Really premium economy

Be sure to ask EADS Sogerma about Celeste, its new premium economy cradle seat intended for the A350 XWB, which has entered the Airbus Contracted Supplier (ACS) catalogue. The seat has been in development for the last 18-24 months.

The design, created in-house by Sogerma, can be configured 2-2-2, 2-3-2 or 2-4-2, depending on operator preference, with a choice of seat widths ranging between 18-22in and a minimum pitch of 38in. The fixed-back design is available with either a single electric actuator or a gravity-driven system to recline the seat by up to 35° – the amount of recline depends on the pitch.

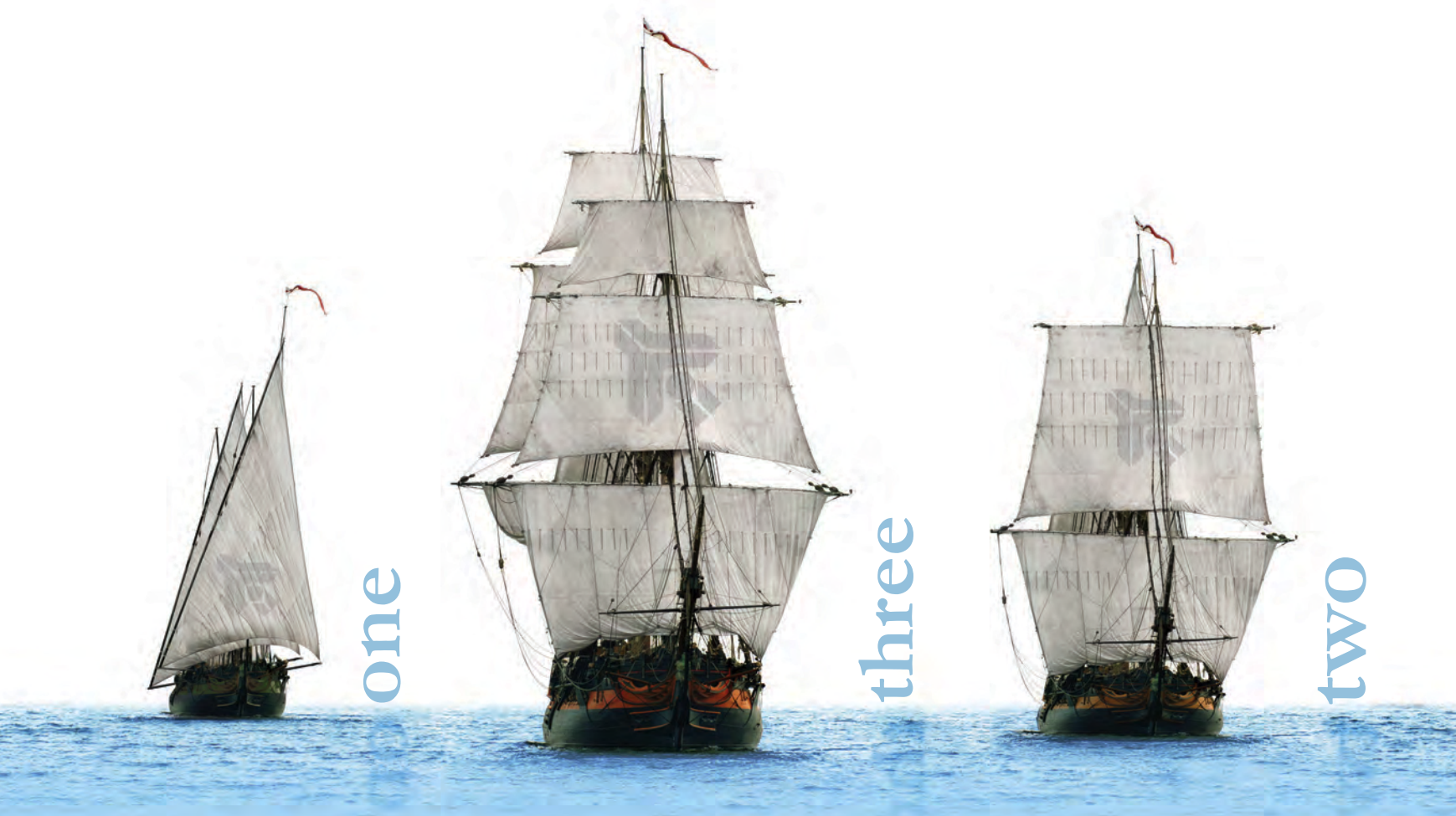
The styling is clean and modern to reflect the innovative new aircraft, and is expected to weight in at 20-30kg per pax, due to extensive use of composite materials.

In standard form, Celeste offers premium economy passengers an integrated IFE screen of up to 12in (though this can be increased), two moveable armrests, a seatback tray table, cocktail table,

a bottle holder, and a space to store a PED, complete with in-seat power.

Celeste can also be ordered as a business class seat for a 2-2 configuration on narrow-body aircraft, with seat widths ranging between 18-22in. In this guise the design remains largely similar, with the same actuation options, but pitch grows to 40-45in and hence the tray table moves to the centre console; the recline increases to 45°; a privacy divider is added between the seats; and the IFE screen can grow to 18in.





Columbus

towards the new air travel world

Columbus is a flexible seat line that comes in three “basic” models tailored to your needs:

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Two. 9,5 Kg/pax of lightness in convenience.

Three. 12,5 Kg/pax of lightness in comfort.

Simplicity and ingenuity have always led to great conquests; Columbus seat, in its three variants, is ready to make operators discover a new world of fuel savings and easy maintenance.

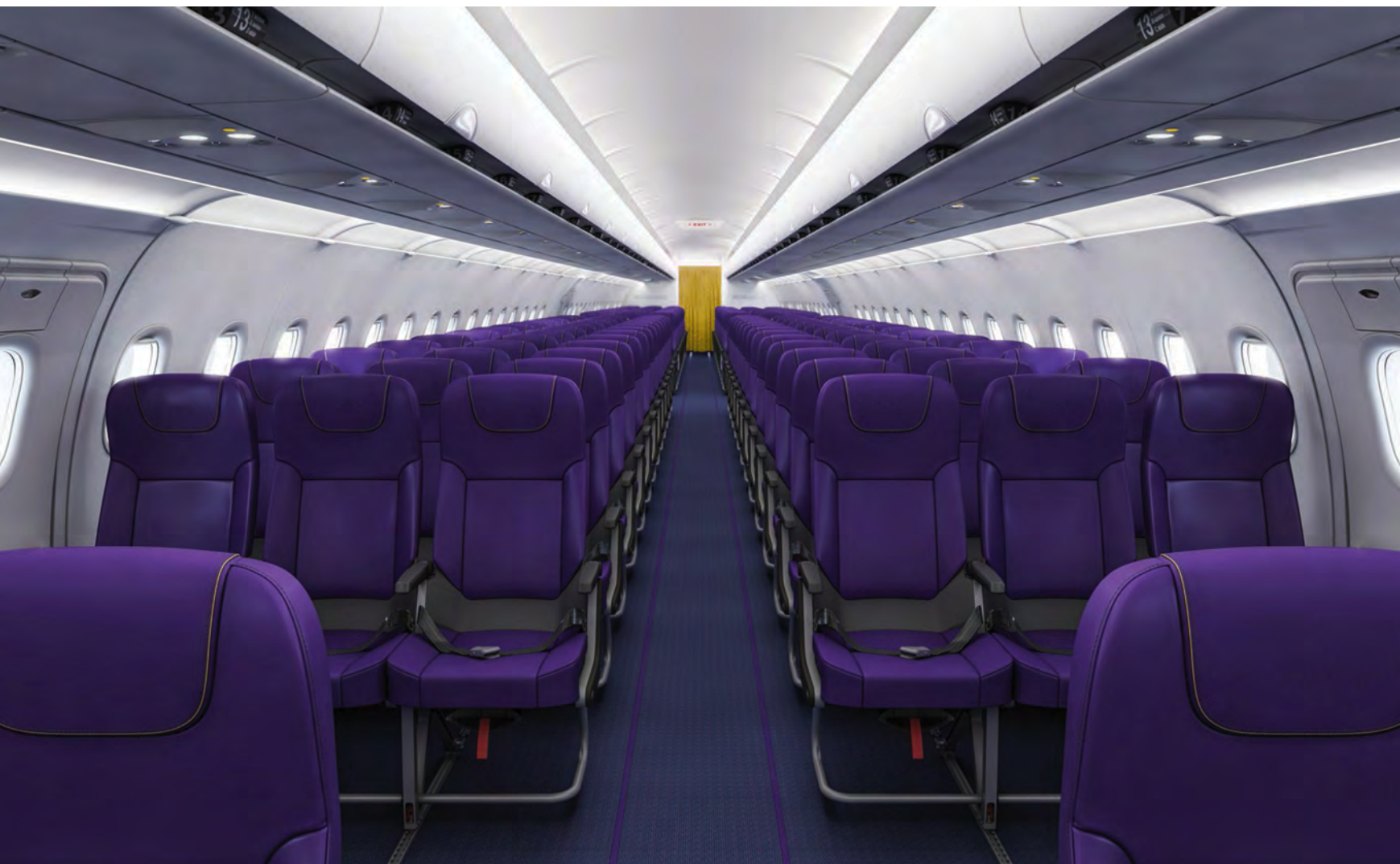


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Stand: 1241

Core strength

3A Composites Core Materials claims to offer the world's broadest selection of high-performance core materials for advanced solutions, through its Airex and Baltek product ranges. Using a 'Hybrid Core Concept', the company offers a wide range of core materials from which customers can choose the option that best fits their individual requirements.

In addition to the product portfolio, the company has expertise and toolset to support customers in crucial design phases. Visit them in Seattle to learn how the products offer a variety of advantages for aerospace applications, including great weight-saving potential, excellent mechanical and high insulation properties, easy processing and radar transparency.



UP TO
70%
WEIGHT
SAVING

Stand: 510

Take a peek at PEEK

Tri-Mack Plastics Manufacturing Corporation has developed a range of Victrex Peek composite brackets for use in aircraft structural applications. Tri-Mack specified the material due to its excellent technical features and 25-year track record within the industry.

In addition to up to 70% weight savings compared with some aerospace metals, the manufacturing process used by Tri-Mack leads to faster part manufacturing cycle times, according to the company.

"Thermoset composite parts typically take several hours to complete," said Tom Kneath,

director of sales and marketing at Tri-Mack. "The Victrex Peek thermoplastic composite brackets have cycle times that are measured in minutes."

Victrex Peek thermoplastic composites are designed to provide excellent resistance to commonly used aerospace service fluids that can typically undermine the longevity of metals. The composites can also, according to the company, offer between four and five-times higher fatigue strength, specific stiffness and specific strength when compared with traditional metals such as aluminium.

Stand: 823

Original painting

AkzoNobel Aerospace Coatings has the honour of being the supplier of the paint system and vibrant colours that decorated the first Airbus A350 XWB.

The company says this is not the first time that its base coat and clear coat systems have been selected for painting the first versions of a customer aircraft. Airbus decided to use the new system as it requires less paint and less solvent than other systems, according to AkzoNobel.

"Our colours decorate the first flying A350," said Jérôme Mancy, EADS' global key account manager. "The aircraft was painted in Toulouse – it's the first Airbus with both fuselage and wing structures made primarily of composites. We have a very good relationship with Airbus and many of their aircraft are painted with AkzoNobel coatings."



Stand: 731

Hit the floor

Gerflor will be presenting its new and extended range of non-textile floor coverings at the expo. Featuring compact and extremely lightweight designs, with foam or laminate backing constructions, the Batiflex range has been extended to include several new patterns and colours.



The range now incorporates classic 'Solo' dots; 'Opus' contemporary elegance; a realistic 'Carpet' design; natural 'Stone' grain appearance; and refined 'Wood' patterns.

Batiflex floor coverings exceed FAR 25.853 low-flammability and FAR 25.793 anti-slip requirements.

In addition, a new product, the Batiflex AV 270, has been specifically engineered to absorb compression, with outstanding resistance to buckling and waving.

While in Seattle,
why not enjoy
a guided tour of
Boeing's Everett
factory, located just
out of town

NEW
EVENT!

Seating symposium

New for the 2013 event is the launch of the Seating and IFE Integration Symposium, a one-day event taking place on 1 October, which will bring together experts from airlines, airframers, OEMs, suppliers and designers with key responsibility for seats and FEC systems.

Experts from these fields will lead presentations and discussions covering areas including the impact of smartphone technology and its effect on seat design; the monetisation of virtual technologies within the cabin; industry standards on the integration between the seat and IFE; new models for

collaborative working practices; plus many more topics.

The speaker list is ever-growing, with familiar names including Vern Alg from ALG Consulting; Jim Cangiano, VP of sales and marketing at Recaro Aircraft Seating Americas; Jeffrey Everhart, senior product line manager at Thales Avionics; Neil James, executive director of product management at Panasonic Avionics; Rich Salter, CTO at Lumexis; Jason Adams, aircraft interiors and IFE supply chain manager at Delta; Zuzana Hrnkova, head of aircraft interiors marketing at Airbus; and Jose Pevida, VP of engineering at Timco.

Stand: 530

Privilege position

Geven, the Italy-based aircraft seat manufacturer, is currently developing Privilege, a new three-abreast business seat, to augment the range of options available to its ATR customers.

We don't have details yet – hopefully, more will be revealed in Seattle – but we can report that the company is enjoying considerable interest in its Comoda business seat, designed to offer a truly business class experience to the single-aisle market without adding weight or reducing cabin space. It looks pretty stylish too!

In other Geven news, the company has designed a beautifully integrated PED rack option for its Comoda business class seat, which can hold and tilt a range of tablets. The design works especially well when the seat is also fitted with a conveniently located power outlet for charging. The PED rack is available today and is already being delivered to three major carriers.



Stand: 1114

Fast-tack adhesive

Representing leading manufacturers involved in aerospace, including 3M, Dow Corning, Henkel, Bostik, Dymax, Lord Corporation, PPG Aerospace/Semco and many others, Ellsworth Adhesives will be presenting the new 1000NF fast-tack

water-based adhesive from 3M to Expo visitors. The high-performance, one-part adhesive is formulated for fast bonding, and adheres to many types of flexible foam, fabric, polyester fibrefill, plastic and metal surfaces.

VISITORS FROM AIRLINES CAN USE
THE VIP LOUNGE AT BOOTH 431

In other news...

Stand: 1341

FIREBLOCK

CCP Composites will be exhibiting its new Fireblock product. The winner of a JEC Innovation Award, Fireblock is a series of non-halogenated, fire-retardant resins and gel coats for a variety of applications. Based on char-producing intumescent technology, these materials swell and produce an oxygen-blocking char layer on the composite surface when exposed to flame/heat. The low density and poor thermal conduction of the char layer protects the underlying body of material from damage during continued heat or flame exposure. Fireblock meets many industry standards, including FAR 25.853.

Stand: C11536

FOAM SWEET FOAM

Zotefoams and Technifab will showcase the Zotek F (PVDF) range of foam materials and finished products at the Expo. On display will be a selection of technically engineered commercial solutions for ECS ducting, flex-hosing, plenums and window seals. Interior applications such as carpet underlay, soft-touch trim and pipe insulation products will also be on display. The Zotek F range has been engineered to offer outstanding FST (flame, smoke and toxicity) performance and exhibits very low heat release, meeting FAR 25.853(d), offering greater options for 'soft touch' composites.

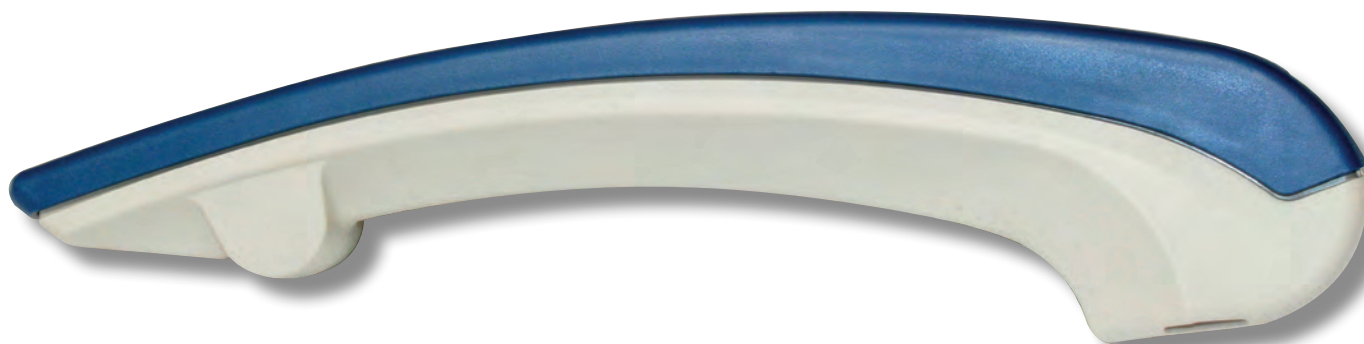
Stand: 811

PANEL SHOW

Many visitors will be keen to ask Diehl about its iPanel concept, which won the material and components category of the Crystal Cabin Awards this year. The concept is an integrated electric wiring system designed to save weight and mounting effort. The electrical conductors are run inside the panel to power the light, the amount of electrical space needed is optimised, parts such as inserts and domes are no longer needed, and the number of additional parts is reduced by 90%, while weight is reduced by around 30% compared with conventional systems.

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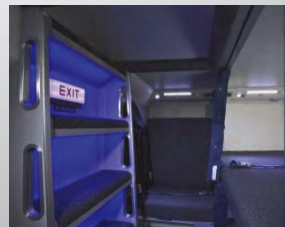
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NEW
BUNDLED
OFFER!

Stand: 751

STG takes the floor

STG Aerospace has been chosen by Boeing to be an SFE supplier of photoluminescent floor-path marking systems for the Boeing Next-Generation 737 and 737 MAX.

Boeing has extended STG's current contract for 737 aircraft by a further 10 years, and will continue to install the company's SaftGlo photoluminescent emergency floor-path marking system as the line-fit option. Since the start of this contract in 2000 Boeing has installed over 2,500 kits as line fit on Next-Generation 737 series aircraft.

Nigel Duncan, chief executive of STG Aerospace, said, "We are proud to provide Boeing with innovative, high quality and proven-reliability SaftGlo products. We are delighted that Boeing has chosen to renew our current 737 PhotoLum contract, and also extend the contract to include 737 MAX.

Boeing customers can benefit from the through-life cost savings and excellent operational performance of SaftGlo on their aircraft."

With over 8,000 aircraft fitted worldwide, SaftGlo is a proven non-electrically powered emergency floor-path lighting system that reduces costs for OEMs and airline operators and has virtually no maintenance requirements, saving further time and money.



Stand: 721

Fantastic plastics

Kydex will feature its collection of compliant thermoplastics, including a next-generation addition to the range that expands on the effects of its pearlescent KYDEX 6503 by combining a pearlescent effect with full compliance with fire, smoke and toxicity requirements. The products in the collection are available in a wide range of palettes that allow design expression throughout the cabin.

The collection of compliant thermoplastic materials is available in a variety of finishes

including opaque, pearlescent and translucent, affording designers the freedom to employ multiple products to create a cohesive, multi-layered design.

New technologies are allowing thermoplastics to step away from using capped material to achieve an effect or to incorporate imagery. Kydex will also showcase the latest of pattern in product, colour as texture, and fabrication techniques that transform and elevate both the brand and passenger experience.

Stand: 1123

ATTRACTING PROPOSITION

Young Engineers, a specialist in the design and manufacture of aircraft interior fasteners and hardware, has developed a new product: magnetic fasteners. For designers and installers seeking to temporarily but securely attach name plates and logos, secure loose items or prevent rattling, the company has designed a series of magnetic fasteners that can be potted into honeycomb structures. The

fasteners use rare earth magnets that will not lose their strength even after years of service, and are currently

available in two different styles (magnet to magnet and magnet to metal stud), with magnetic forces between approximately 1-30 lb.



Stand: 330

FOAM IMPROVEMENT

Solvay Specialty Polymers has created a second generation of its Solef PVDF foam, Solef 82050, a fully mouldable PVDF foam that passes the key aircraft FAR and AITM tests, certifying complete resistance to flame, total heat release, low toxicity on combustion products and reduced optical smoke density. Due to the development of the base polymer matrix, the new foam displays increased mechanical properties and a higher temperature rating compared with the first generation of Solef. In addition, the material is claimed to allow up to a 50% density decrease over the existing product, which is already claimed to be 16 times lighter than Solef PVDF resin. The product is offered as moulded items, which are manufactured by JSP in partnership with Solvay Specialty Polymers.

Stand: 2001

Dress to impress

Skandia has introduced a new 'all-inclusive' service which, the company says, provides business aircraft MROs and regional jet operators with a more efficient method to meet the requirements of 16g Replacement Dress Cover Certification with regards to the modification of a TSO'd aircraft cabin seat under the guidelines of FAA AC 21-25A.

"Changing the dress cover on cabin seating seems like a simple process, but obtaining all of the engineering data and documentation is actually a very time-consuming process, especially for smaller MROs and regional operations," said Skandia's vice president, Jarod Triplett.

"This new all-inclusive service is the direct response to requests by our customers to provide a way that they can get all of the required paperwork in a more efficient manner. In a market where business aircraft owners and regional airline operators alike are trying to save time, this is one new offering that has been created to do just that."

Triplett said the package will offer the typical customer significant time savings compared with the current method of doing all of the elements individually, including contracting the engineering drawings through an independent DER (Designated Engineering Representative) and doing burn testing at another approved facility. "Now they just need to come to us and we can take care of all the various elements to streamline the entire recertification process. When you consider how many times a regional operator may need to re-dress its seats, this service will offer significant all-round efficiencies."

Triplett also stated that although many of these services have been long-standing offerings from Skandia, this new all-inclusive 16g Replacement Dress Cover Certification package is the first time the company has offered them as an all-inclusive bundled solution.

Stand: 423

TURN METAL TO PLASTIC

Injection-moulding specialist Reliant Worldwide Plastics may be known to you as a supplier of parts for commercial aviation seating. However, the company is ready to expand its scope, with a new method to make metal-to-plastic conversions.

This combination composite-thermoplastic system is named Reliant-LITE. According to the company, by substituting metal seat components for plastic components, weight savings of up to 50% are possible while maintaining the strength of an aluminium part.

CEO Craig Clark explained: "We take a continuous carbon graphite fibre in a sheet resin that is about the thickness of a sheet of paper, with multiple continuous strands encapsulated in polyphenylene sulphide (PPS) resin. We then overlay the sheet in multiple layers, and through heat and a vacuum, make a plate. The plate looks like a composite, but there's no glue involved – it's a chemical reaction through 750°C heat and pressure."

Multiple carbon fibre components can be moulded using this process, and when they need to be joined to create a single part, a thermoplastics positioning system allows Reliant to overmould them with plastic in a repeatable way, in any colour, using what the company calls Homogeneous Connective Technology. "The overmould and the chemical reaction make it one homogeneous part, with reinforced structure inside it where needed," stated Clark.

According to the CEO, a seat leg made from Reliant-LITE will be 41% lighter than its aluminium equivalent – "the strength requirement is 150 lb and our parts managed over 200 lb in tests."

Stand: 831

Fire blocker for dress covers

National Nonwovens is introducing Ultra-ProTechtor, a fire blocker for aircraft seating dress covers. The product is a non-woven lightweight flame barrier that uses Ultem polymer and Ultem fibres, developed by Sabic Innovative Plastics.

"Ultra-ProTechtor has been engineered to provide ultra-flammability protection with superior performance at a lower weight and lower cost," said Anthony Centofanti, CEO at National Nonwovens. "Although it was initially designed for the aerospace market, Ultra-ProTechtor can also greatly

benefit other markets that have modes of transportation requiring fire blockers."

The product's construction is intended to provide increased stability along with low smoke density and toxicity, water repellency, low heat release and high puncture resistance, and improved fire-blocking protection at a lighter weight. In addition, it is claimed to offer excellent seam, tear and tensile strength for less stretch, and it is also formaldehyde free.

Ultra-ProTechtor was tested and met FAR25-853-A and C amendments 5-116-appendix

F part II by two independent US laboratories.

The material is claimed to be inherently more fire resistant than aramids, with a higher limiting oxygen index (LOI) rating than either Nomex or Kevlar. LOI is an index that rates the fire-resistance properties according to the minimum concentration of oxygen, expressed as a percentage. The higher the number, the greater resistance of the polymer to support a flame; Ultra-ProTechtor has an LOI of 44, while Nomex has an LOI of 26 and Kevlar has an LOI of 31.

Stand: 940

Leather-lined airliner

Thomson Airways, the first UK airline to fly the B787 Dreamliner, has selected Andrew Muirhead to supply high performance, low-carbon leather throughout its new B787 fleet.

Jason Mahoney, director of engineering at Thomson Airways, stated, "Our customers want to fly in both comfort and style. As the first UK airline to fly the Dreamliner, it was vital that we chose the highest-quality leather throughout our cabin, creating stylish, durable and comfortable interiors, ensuring that our customers enjoy the most relaxing in-flight experience possible."

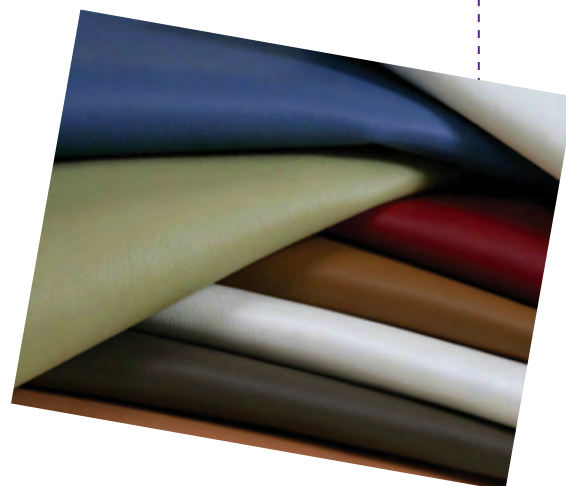
Muirhead's sales director, Archie Browning, added, "Thomson's Dreamliner is a revolutionary aircraft and we have worked hard with the company to supply the full fleet, the most fuel efficient of all commercial jetliners and one that features

leather throughout. The Muirhead brand is a renowned high-quality supplier to the aviation industry, and is a key supplier to most of the Dreamliners delivered in the world to date. We are delighted to be working with Thomson, the first UK company to fly the Dreamliner, offering new levels of service, comfort and environmental efficiency to the travelling public."



Andrew Muirhead also recently supplied leather for Virgin's Little Red

YOU CAN MEET THE AIRCRAFT
INTERIORS INTERNATIONAL TEAM
AT STAND 1030



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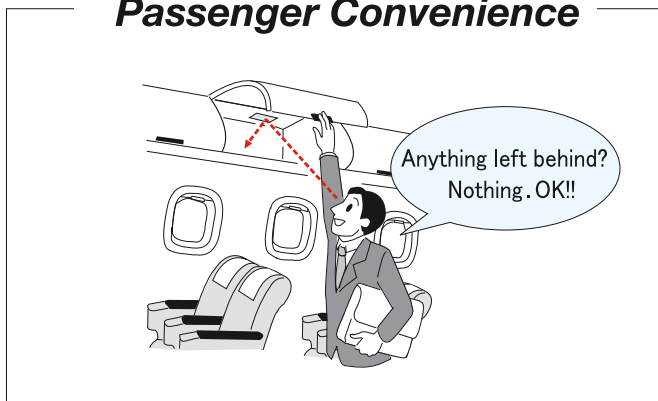



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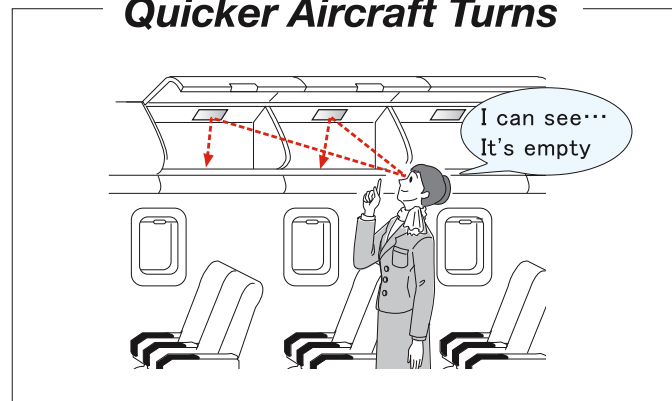
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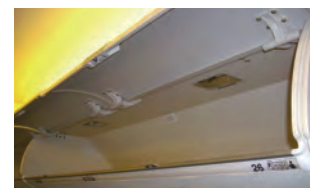
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Tapis has expanded its range of aviation fabrics to give designers the freedom to create their dream interiors

tailormade

Since its inception in 1977, Tapis Corporation has provided superior fabrics to the aviation industry, and continues to be an industry leader in innovative design and implementation.

Tapis's customising capabilities offer an opportunity to create an original cabin design, while assisting clients in fulfilling their design vision. Tapis has a brand-new custom Ultraleather specification that has superior flammability characteristics, and can be formulated to pass FAR25.853, Appendix F, Part IV and Part V (heat release and smoke density) as well as FAR25.853, Appendix F, Part I (ii) and (i) (12- and 60-second vertical flammability). This new Ultraleather provides customers with a reliable and proven solution that gives them the flexibility to use the product with various composite build-ups, and move smoothly through the certification process.

Tapis has created custom grains, colours, finishes and technical specifications, including ink-resistant and anti-microbial properties, with Ultraleather products for leading airlines around the world, including Singapore Airlines, Etihad Airways, Swiss Air, Kingfisher Airlines and JAL. On each occasion Tapis created a customised programme to meet the airline's precise needs for texture and colour. For example, the Promessa fabric has many different grains that can be customised for an airline's seating programme.

Ultraleather is extremely lightweight, at less than half the weight of traditional leathers. As a result, Ultraleather reduces fuel consumption, driving costs down and reducing the overall weight of the seats and cabin. There is also less shrinkage than with traditional leathers, offering 100% yield. This translates into 100% usable

fabric. And independent testing from the University of Cincinnati in Ohio, US, shows that Ultraleather meets or exceeds all industry-standard testing criteria used for the most durable leathers on the market today.

Many fabrics in the Tapis product line complement each other, enabling even more customisation and balance in the cabin. Ultrasuede is also a great seat material and has been used in combination with Ultraleather as seat inserts. Ultrasuede is made of 100% recycled ultra-microfibres, and the technology used in its production lowers energy consumption for more ecologically sound manufacturing. Emirates, Virgin Atlantic, British Airways, LOT Polish Airlines and El Al Airlines are just five airlines currently using Ultrasuede.

TapiSuede is comprised of 88% high-purity recycled polyester and 12% polyurethane. TapiSuede is the only man-made suede that uses entirely recycled polyester, which is a mixture of post-industrial and post-consumer recycled material. These fabrics are durable, luxurious and, like Ultraleather, environmentally friendly.

The TapiSuede BHC-SS maintains the same characteristics as the standard TapiSuede, but is extremely lightweight and meets the most stringent flame-retardant requirements for commercial aircraft. The durability, flexibility and ability to function on many panels with various adhesives make TapiSuede BHC-SS an excellent choice for aircraft interiors.

Grospoint, Geneve and Brussels comprise Tapis's 100% wool fabric collection, and are specifically designed for bulkheads, sidewall panels, stowage areas, chair bases, drawer liners and more.

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Reader Enquiry No. 501

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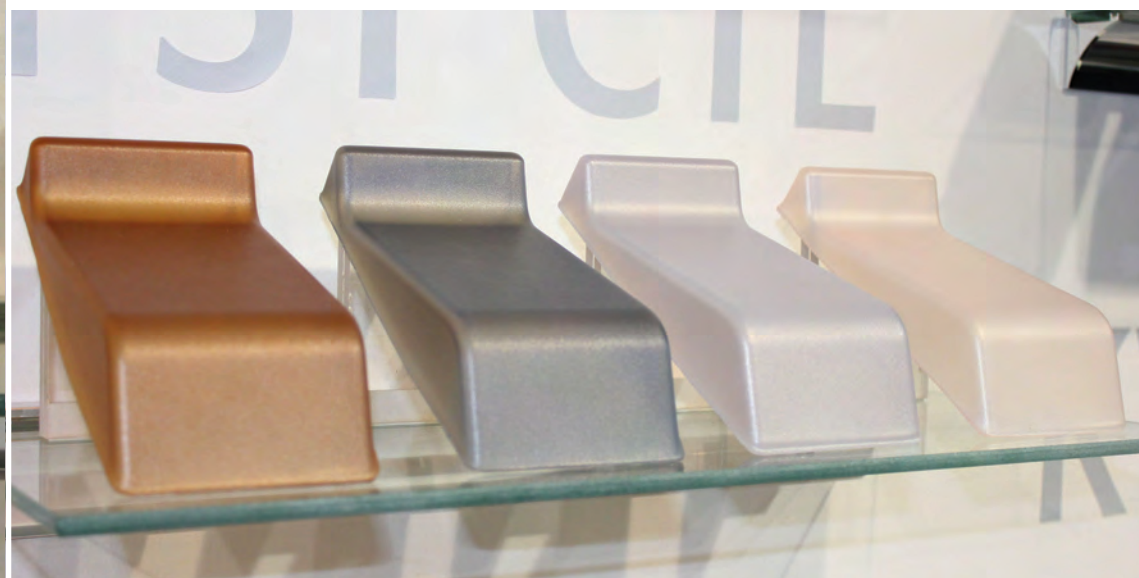


The product range for aviation leather can be used for all interior applications such as seat covers, arm rests, headrests and panelling. Wollsdorf Leather offers whole leather hides, die-cut parts as well as complete components.

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FEEL THE CHARACTER.



The thermoplastics industry can help aircraft interior designers achieve their goals

refinedpalette

In recent years we have seen notably closer and earlier collaboration between the designers and manufacturers of cabin interior components. This closer relationship engenders a tremendous opportunity for designers and engineers to advance cabin aesthetics. The blending of the worlds of design and manufacturing has become more common, and so has the importance of manufacturers anticipating what designers need.

First on a designer's wish list is a wide range of options for colours and materials. Lower costs for custom colours, and new colour engineering processes and techniques, are allowing designers to experiment with hues and saturations that traverse diverse palettes, settings, cultures and brands. Refined colour palettes enable a declaration of design throughout the cabin.

"Of course, colour is always central to design," says David Scott, global creative at Kydex. "It evokes mood, feeling, weight, and influences space perception. Customarily, a palette will have a principal colour and up to three complementary colours. One of the most powerful ways to work a colour palette is to have different thermoplastic products in the same colour palette with different effects and luminosities. That takes you to one level. Adding texture, metallic finishes and even imaging takes you even further. Often you are working with a standardised catalogue of products, such as seats, that make it difficult to achieve the unique. Having a suite of possibilities at your fingertips, from one manufacturer, is a windfall."

Advances in thermoplastic materials have made it possible for the industry to offer a wide array of source materials. But it goes further

than that, Scott explains: "The materials also have to lend a degree of continuity with a finer degree of finish to convey the prestige of high-end materials in business class, while maintaining the design statement through to the coach cabin."

When manufacturers and designers work together it often results in a brand-new material, or a reworking of an approved product with a different effect or design aspect. There is a certain magic in taking a doodle on a napkin to a computer screen, and on to a real-time build for experimentation. Many designers and engineers are turning to thermoplastics for small-run pilot examples to meet the demand for shorter development cycles and custom solutions for breakthrough designs.

Scott also praises smaller runs as being key to a designer's ability to distinguish and elevate their customer's brand, because they enable the implementation of small, important details. Gone are the days of a piecemeal, compartmentalised approach in aircraft interior design. "Airlines want subtle and cultivated brand looks that carry thematically," he says. "Imagine, for instance, a lotus blossom printed on a napkin, infused in a thermoplastic screen, and then repeated on a seat monument or sidewall. We're all reaching for that select personalisation."

It sounds like a long wish list, but in essence designers want what we all need to achieve success in our endeavours: choice, partnerships and possibility. And the technology and forward-looking dispositions to make it happen. Sounds like we can deliver on that request, doesn't it?

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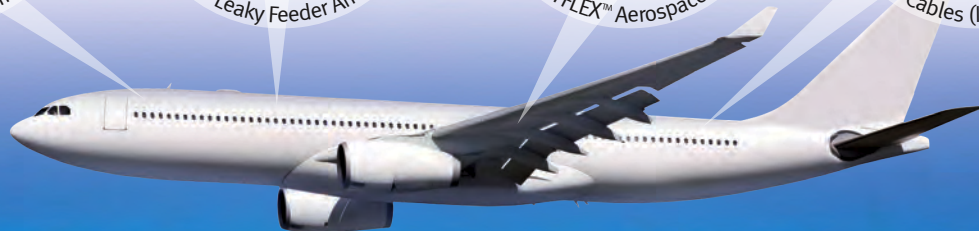
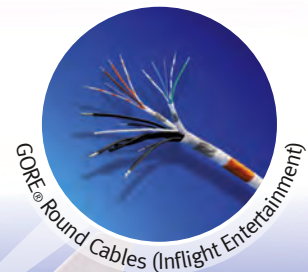
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For airlines that want an off-the-shelf environmentally friendly carpet or a custom-made design, or urgently need a small quantity of the above, Tisca Tiara offers a one-stop shop

dothetwist

As the latest innovation in the aircraft textile industry, Tisca Tiara has introduced a 100% polyamide aircraft carpet that is 100% free of halogens, sulphur and antimony oxide – all chemicals that are very toxic and harmful.

The carpet also achieves outstanding test results in service and meets Airbus and Boeing specifications. Tisca's T-PAC Eco range demonstrates the highest levels of durability, robustness and resistance to wear and tear, and allows for easy maintenance, cleaning and care, all of which result in low lifecycle costs. Moreover, this novel carpet shows no shrinkage in tests, and a very high dimensional stability.

T-PAC Eco can be fully customised in terms of design, weight and width. Any custom design, colour and texture can be realised exclusively for clients, who can also choose from countless designs that are available off the shelf. The carpet is available in various weight classes – from ultra-lightweight and kerosene-saving versions, to plush and thick comfort configurations suitable for first and business class. The carpet can also be produced without seams in any width up to 4.60m, exactly according to clients' specifications. This flexibility allows airlines to minimise waste and offcuts during cutting and installation, and ensures faster and easier installation that can result in a cost reduction of up to 30%. In addition, this flexibility in production minimises the consumption of resources and raw materials, and thus conserves the environment and further supports operators' efforts to become more environmentally friendly.

In short, Tisca Tiara's new aircraft carpet enables airlines to reduce their operating costs

by minimising replacement and refurbishment costs; by reducing cleaning and maintenance costs; by minimising offcuts and waste during installation; by lowering kerosene consumption; and by reducing aircraft ground times. It also helps them to become more eco-friendly.

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

"By operating many different fabric and carpet production technologies under one roof, we are a true all-inclusive manufacturer, and thus able to satisfy any textile need of the aviation industry, without having to subcontract or source from other companies, which makes everything easier, faster, cheaper and safer for our customers. This unique market position makes Tisca Tiara the ideal one-stop shop for all aircraft interior furnishing needs," says Matthias Tischhauser, mobility textiles executive at Tisca Tiara group.

The company has state-of-the-art production facilities, and customised products are manufactured in short delivery times and with small minimum order quantities. The in-house design and development department realises the most extraordinary customer requests with creativity, passion and flexibility. Furthermore, the company keeps a vast range of fabric and carpet collections available in stock and ready for immediate shipment, with no minimum order quantity. It is also proud to be completely privately owned, without the involvement of any third parties, which makes it entirely independent from banks or any other financiers.

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Quadra has been designed to improve many elements of passenger comfort, from social aspects to finishes and a feeling of safety

safe passage

Airlines benefit when their passengers become frequent flyers. While clever marketing may win new customers, a much more complex set of criteria results in repeat business.

So why does a passenger choose one airline over another? There are obviously the tangible reasons such as price and convenience, but often decisions are made on a deeper subconscious level. Optimares, an Italian airline seat designer, made it its mission to explore some of those intangibles and partner with airlines in improving customer loyalty.

Optimares realised that for airline seat design to evolve, a new approach was required: the company would have to rethink the travel experience from scratch. The design team began by considering the passengers' needs – not just the physical aspects, but the psychological dimension as well. As they developed Quadra, a new line of economy-class seats, ergonomics became just one part of the holistic concept of comfort.

Surveys conducted over the course of five years yielded some surprising results. Passengers were experiencing feelings of anxiety about some of the subtle social aspects of flying. For instance, the 'recline' moment can be fraught with tension. From the passenger's point of view, either the person in front of you invades your space by reclining, or you are concerned about invading the space of the person behind you.

Quadra solves this issue with a new 19° recline system that enables passengers to increase their

personal space without infringing on others. A sense of privacy is achieved while still maintaining the ability to interact.

Another surprising revelation from the ongoing dialogue with passengers was that quality communicates reliability, and therefore conveys a feeling of safety. Modern travellers have an advanced capacity for appreciating quality materials, finishes and product functionality. Because the seat is the passenger's point of contact with the aircraft, it is essential that a fundamental sense of security allows the customer to relax and enjoy the journey. Furthermore, a quality seat conveys the sense of the passenger's importance to the airline.

Quadra manages to address passengers' needs while still meeting the airline's core requirements, with an ultra-slim seat profile design available in widths of 16-18.5in, a minimum installation pitch of 29in, and a weight of 9.5-14kg.

Flying is stressful for the majority of travellers, even the most frequent flyers. From the moment they enter the airport system they are subjected to long queues and all of the tedium and indignities of the security process. Many aspects of travel are beyond a carrier's control, but once the passenger crosses the threshold into the aircraft, it is up to the carrier to deliver a positive and memorable experience. While there are many facets to an enjoyable flight, a comfortable, highly functional seat can form a solid foundation for customer satisfaction.

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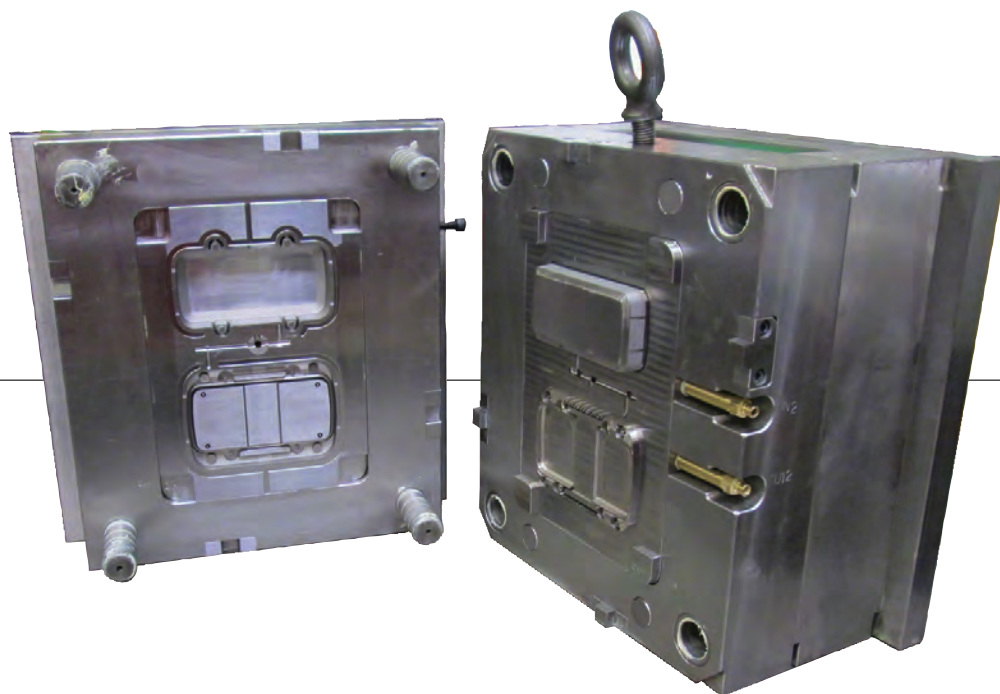


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To make the most of the advantages of moulded plastics, and to keep management and engineering happy, a few guidelines need to be followed

hightolerance

The use of plastics in aircraft interiors is growing fast. Now is the time to understand how to control its imperfections and avoid delays.

First, it is important for engineers and management to understand how moulding plastic differs from machining an alloy. When designing with aluminium, for example, the engineer generates an engineering drawing with manufacturing tolerances from the part model. The vendor loads the part model into its CNC machine, produces a part, and submits it as a First Article for approval. If a dimension is out of tolerance, it is easy to correct with a few keystrokes in the CNC program: part matches print engineering, and management is happy.

With plastic it is almost a certainty that some dimensions on the first sample will not match the print. As the molten plastic cools in the mould, the polymer strands constrict. Calculating the shrink associated with that transition is an imperfect science. Mould flow analysis can help predict how the mould will fill and how much the part will shrink and warp. Process controls at the moulding machine enhance the chances of producing a part that meets print specifications. However, unless the part is extremely crude and/or small, it is most likely that some dimensions will be slightly out of tolerance.

At that developmental point, potential conflicts between vendor, engineer and management may arise. The understanding of plastic as an imperfect material can prevent those conflicts. Then the question remains: do you update the drawing to reflect the as-built dimensions, or invest time and money to change the tool to change the part? The key to management making

the right decision is an understanding that to change the plastic part requires making a change to the mould that produced it. Unlike the keystrokes required to change the aluminium part, the process involves disassembling the mould, either burning away areas of the mould steel or welding onto it, and then burning it, polishing, re-texturing, cleaning, reassembling, and having QA validate the dimensional changes.

Awareness of the cost and schedule effects is critical, as is determining if the part meets form and functionality requirements. If it does, then it's quicker and easier to update the print. You are back to a few simple keystrokes, and part matches print. An updated print is submitted to the vendor, which submits a FAIR (First Article Inspection Report) and a COC (Certificate of Conformance). Engineer and management are happy.

The key to making the final step quick and easy is centred on the drawing. Companies must understand how to work within their procedure for releasing drawings. Engineers are most experienced with generating prints for machined parts. As a result they specify tight tolerances associated with the machining process. With plastics, the injection moulding process is key to tolerance.

In addition the engineers will need to omit all non-critical dimensions or make them reference-only, to limit the number of updates required. They can then release a 'preliminary' drawing for the tool build. Finally, they go through their internal sign-off steps to release the final drawing just once to match the as-built part. Engineers and management are happy.

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Reader Enquiry No. 506

golden anniversary

Frank Henry Lambert established the company that bears his initials in 1963. In the 50 years since, FH Lambert has grown into a world-renowned specialist in decorative metal plating.

Born and raised in Watford, Hertfordshire, UK, Lambert started out making jewellery at home. He completed an apprenticeship with Roy King – a manufacturer and designer of jewellery – and later bought the company, incorporating it into his own business, FH Lambert.

As well as designing and making jewellery, at this time Lambert was also producing up to 2,000 watches a week for companies including Bulova, Favre-Leuba, IWC Schaffhausen, Longines, Omega and Tissot. In 1986, when he felt that the tide of market demand was turning to cheaper digital watches, Lambert made the decision to specialise in electroplating instead.

The company adapted its current facility to its requirements in 2011. The large site has a wide array of precious metal plating tanks, enabling it to specialise in many variations of gold, silver, rhodium, chrome, nickel, copper, antique-look and lacquer coatings. FH Lambert's work has featured in some of the finest aircraft interiors – on types ranging in size from the Hawker 125 to the A380.

Throughout its 50-year history, FH Lambert has remained a family-run business. Today it is led by Lambert's wife, Sandy, and their three sons, Jamie, Daniel and Paul, although Frank Henry remains very actively involved as chairman.

"After meeting such interesting people and tackling such challenging projects, I would like to thank all my loyal customers and suppliers who have worked with us throughout the company's existence," he says. "I feel proud and very confident with Jamie, Daniel and Paul taking the company into the next 50 years."

lightweight rails

Rollon Group, a leader in the production of linear motion systems for various sectors, has revealed the latest innovation developed by its R&D team: a telescopic guide rail that is 30% lighter than the standard product.

The new DE Series is one-third lighter than the basic product, and was designed to meet the needs of aircraft interior builders. These rails combine the benefits of reduced weight and volume, with quality and reliability. The hardened raceways of the rails can run for over 100,000 cycles, even under high loads (around 130kg applied to the end with the rail in the fully extracted position), and maintain their ability to self-align with the mounting surfaces. This enables the aircraft interior apparatus to slide smoothly without any friction, while providing improved ergonomics and greater comfort for passengers.

The construction features of the new lightweight linear component make it particularly suitable for applications such as the movement of first and business class seats in aircraft, as well as the movement of tracking, headrests, armrests and pull-out tables. The DE Series is also available with an anti-corrosion treatment.



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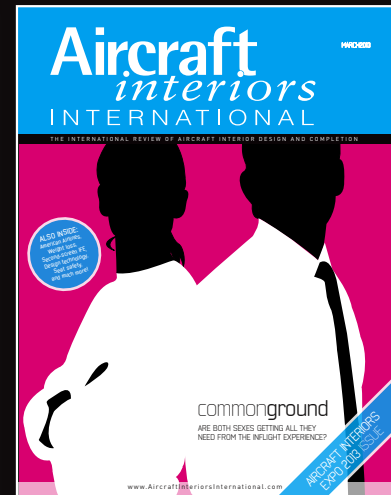
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The Aircraft Interiors International website hosts a digital version of both this September issue and the Aircraft Interiors International 2013 Showcase – plus a digital archive of past issues – as well as all the latest news, videos and exclusives you need to stay informed. You can also register to receive FREE future issues and learn more about our advertisers via our FREE online reader enquiry service.

ledsmadeeasy

Following the recent success of its 387 LED solution, CML Innovative Technologies has announced the latest additions to its range of aviation LED lamp replacement products. The newest products in the range offer plug-and-play bi-pin LED solutions for Boeing applications including exit signs, no smoking/fasten seatbelt signs, and attendant call lights.

With a life of 50,000 hours, the new solutions offer more than seven times the life of incandescent lamps, and are intrinsically resistant to shock and vibration, leading to less downtime and reduced maintenance costs.

With onboard power being at a premium, these products consume 75% less energy and generate significantly less heat than incandescent lamps.

Ash Foster, technical manager at CML Innovative Technologies, explains, "This product has been designed, in conjunction with major European airlines, to offer the benefits of LED technology in a plug-and-play solution. This gives airlines the opportunity to modernise their cabins and reduce maintenance costs at minimal expense."

Alan Palfrey, sales and marketing manager, adds, "Customers have requested innovative lighting products that let them enhance and modernise their aircraft interiors at minimal cost. Our range of LED lamps enables them to achieve this objective, while offering all of the benefits that LEDs can provide, such as long life, low power consumption and minimal heat."

With FAA-PMA approval currently pending, and anticipated for late 2013, CML welcomes enquiries and sample requests.

CML Innovative Technologies is one of the most recognisable brands in aviation lighting and is one of largest suppliers of miniature lighting solutions, with 1,200 employees worldwide. With an annual turnover of approximately US\$175m (€133m), CML is a vertically integrated designer, manufacturer and seller of a wide selection of miniature lighting systems and components.



CML Innovative Technologies
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richardstevens



MEET RICHARD STEVENS, FOUNDER OF FORPEOPLE AND BA'S NEW CREATIVE DIRECTOR. **STEVENS HAS DESIGNED EVERYTHING FROM SEATS FOR AA, DELTA AND SAS – AS WELL AS THE ORIGINAL BA CLUB WORLD – TO ASTON MARTINS AND LAND ROVERS, AND HAS COMPLETED PROJECTS FOR THE LIKES OF BANG & OLUFSEN, BOEING AND NIKE**

1 HOW DID YOU LAND THE BA ROLE?

The big thinking behind what we do, and I think this is why BA was interested in getting me into the business for a while, is that we believe we are specialist, but in different areas. We take a lot of pride in understanding people in their everyday lives, whether that's with consumer electronics, luxury products, packaging, automotive or airlines, and that knowledge can be shared between companies as it is knowledge based on people, not the products we are working on. So our strategy is about growing our understanding of people, and growing people in our business. If we went down the route of being airline designers – which is right for some but not for us – we don't see how we could be relevant to lots of different airlines when we would be trying to do effectively the same thing in an aluminium tube. We work with BA and Boeing but no one else in the industry, as we believe that, rightly or wrongly, we can bring real value from our insights in other industries into that one airline.

2 YOU'RE STILL THE HEAD OF FORPEOPLE, SO HOW DOES YOUR BA ROLE WORK?

It's an interim role and I've had to relinquish some of my client relationships for the period so that I can focus on BA, but I still have director responsibilities at Forpeople. BA has never had a creative director before, so now everyone thinks everything needs to be creatively directed. I'm not there to be some sort of celebrity designer – I'm there to help with some big opportunities and some issues. My role at BA is born out of the fact I have a lot of experience with the company and the fact that Forpeople has worked across a lot of its departments.

3 SO WHAT DOES THE ROLE INVOLVE?

I am doing little actual product design work at BA. A lot of the work is about threading together new journey experiences that focus on the future of the digital, ground and air experiences – some of which are design driven – and how they can all work together. My role is really about that – about the consideration of all those things coming together as one experience, consistently delivered, which is better than anything anyone else delivers. My role is also to help define what creative design can do for that business, and it's very different from what many think it is – the old-school mentality that design is all about decoration. BA needs to be a leader in redefining design and using it to benefit customers and the business, and my role is to help with that.

4 DO YOU GAIN MUCH INSPIRATION FROM CONCEPTS?

Some of the future cabin concepts I've seen, like people playing virtual golf, are nonsense, but the thinking and rationale behind them isn't. Airframers are making some real leaps that are very exciting, but not necessarily at the broad conceptual level. It's the parts of concepts that go into the detail or process level that can unlock a new way of thinking, and that's pretty inspirational. It's the small things that are happening that are going to unlock big opportunities. Concepts are great but you need the enablers. That's the hardest thing to find, but it's the most exciting.

5 YOU'VE WORKED A LOT WITH LAND ROVER BRANDING. DOES THAT INFLUENCE YOUR BA WORK?

There are similarities between a brand like Land Rover and British Airways, in the sense that they are projecting a premium perception of Britishness around the world. No one would question that Land Rover has nailed that now, and BA needs to be there. Part of my job is defining what Britishness is, and it's not about slapping union flags everywhere. You need to have a very clear and confident understanding about what you're doing and why you're doing it, and then communicate that through the business and then through the experiences you're giving to customers. We do find synergies from automotive companies from a brand perspective. When Tata took over Jaguar Land Rover it gave JLR the freedom to say what it believed was the right thing to do going forward, and then let them do it. The most exciting thing about BA, and part of the reason I decided to join, is that it is at that point now and it's massively exciting. And if we get it right, I think BA can be back where it was 10-15 years ago. There's a momentum in the business that believes that. The big thing BA learned from being a sponsor of the London 2012 Olympics is that when it connects with everything that's positive about contemporary Britishness, it can work. BA went from nowhere in the superbrands ranking to number three this year. All because of the way it projected itself during the Olympics, which was very un-BA.

6 YOU WORK WITH SEVERAL INDUSTRIES. WHAT MAKES AVIATION SPECIAL?

Even if you work in another industry, you always get drawn back into aviation because from a design perspective, there's nowhere to hide. A lot of the consumer electronics or automotive work we do is conceptual, although it does influence projects that go to production. The work is not typically a roadmap to production because these companies use a lot of design work to feed insights, whereas the airline industry doesn't have that luxury. Typically if you start an airline programme, something will come to fruition.

7 SO WHAT'S NEXT?

Forpeople just had its ninth birthday, and by our tenth we will have had two major product launches outside the airline industry. One of those will be with Coca-Cola, which I think will redefine how people think of us. I think most people only know us for our work with BA at the moment.

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