

Aircraft *interiors* INTERNATIONAL

NOVEMBER 2013

THE INTERNATIONAL REVIEW OF AIRCRAFT INTERIOR DESIGN AND COMPLETION



catalogueseating

ARE AIRCRAFT MANUFACTURERS KILLING CREATIVITY? INDUSTRIAL DESIGNERS DISCUSS HOW TO ACHIEVE SEAT CUSTOMISATION WITHIN THE CONSTRAINTS OF THE CATALOGUES

sourceinspection

HOW TRUSTING SUPPLIERS TO INSPECT THEIR OWN OUTPUT CAN STREAMLINE DELIVERY

audiotchnology

NEXT-GENERATION IFE AUDIO SYSTEMS WILL BRING BETTER SOUND AND MORE FREEDOM

materialsfocus

SUPPLIERS AND SPECIFIERS SHARE THEIR THOUGHTS ON LEATHERS, TEXTILES AND FLOORING

lightingtrends

NOW THAT LED MOOD LIGHTING IS A COMMON FEATURE, WHAT'S NEXT IN CABIN ILLUMINATION?

NEW SITE ON THE RECARO WORLD MAP

RECARO has opened a manufacturing plant in China



With the opening of the plant in Qingdao, RECARO Aircraft Seating is expanding its capacities to serve China and the Asian market. The new RECARO location will produce aircraft seats for the local market, with production already beginning this year – with the same RECARO standards of quality and the same processes of excellence that the company has established at its locations around the globe.

RECARO Aircraft Seating is starting local production in China as one of the first international aircraft seat suppliers and is now present with production facilities in all three major aviation markets – Asia, Europe and America.



024

“Airlines bridle at the idea of standardisation restricting their ability to customise the accommodation”



064



076

talkingshop

Various research projects suggest that consumers are becoming paralysed by choice. For almost anything one might wish to buy, there is a wide range of options available – sometimes too wide – which can cause anxiety rather than satisfaction. With this in mind, one might imagine that the airframer catalogues are a boon for cabin specifiers – look up the class needed, select a suitable model, and it will be delivered promptly, trimmed in your brand colours. No stress, no hassle. Perfect.

And indeed for many airlines this is the ideal scenario. However, as the battle of brand differentiation intensifies in the skies, many airlines want their product to stand out from the crowd – who wants to turn up at a party and see someone in the same outfit? In this issue's cover feature we have garnered opinion from designers, suppliers and airlines around the world about what they think of the catalogues, what benefits they think large and small seat suppliers can offer, what types of suppliers are best for different sizes of airline, and the challenges that efforts at standardisation and platform sharing can bring – and of course the benefits that the catalogue approach does afford many customers. While catalogues can help customers make the right, rational decision, it seems they can also stir up emotions.

Adam Gavine, editor

regulars

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El Al reveals its new design direction; the latest industry figures; Air France's new economy seats; how wearable technology will enter the passenger experience, branding tie-ins, Priestmangoode's amazing new project, and Transaero's extravagant new cabins

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HOUSE STYLE

The B737-900 interior was designed in-house at El Al by a team that spanned many disciplines, with a core team of 20 including inflight product developers, engineering, marketing, PR, graphic designers, and architects and interior designers from the lounge division. Since the latest work is a subtle evolution of the brand, it was not felt that an external design agency was required. However, as part of the aircraft purchase agreement, some advice and services are offered by Teague, and El Al found the consultancy's rendering and fly-through CGI work useful when checking how the cabin CMF interacted with the LED lighting programmes.



El Al carries around double the meal trays of other carriers so it can offer a kosher option to everyone



blueheaven

The latest addition to El Al's fleet brought an opportunity to refresh the cabin design, which will influence further fleet upgrades

- 01. While business class features the grey from the El Al logo, economy has the dark blue
- 02. The El Al team made sure that the seat coverings in business were complemented by the LED lighting

As El Al proceeds with its fleet renewal programme, with the latest arrival being the first of eight B737-900ERs, the airline has taken the opportunity to push forward some product innovation and improve cabin perception.

A key element of the cabin is the Boeing Sky Interior, and the El Al team worked on a five-stage LED lighting programme, using deep blue at night to reflect El Al's brand colour, shades of blue during boarding and deplaning, and more natural tones during service to give the food a sense of warmth and freshness.

Following a year of evaluating various seat models, the B/E Aerospace Millennium was chosen for business class, with the 16 seats configured at 44in pitch. The seat fabrics, from Tapis and Rohi, are now in grey tones rather than blue, evoking the El Al logo, and with a sheen designed to complement the lighting. In addition, business passengers are given a Bluebox Ai portable IFE handset, which can be slotted into a custom-designed holder in the in-seat video arm.

In economy, B/E was again selected for the seats, with the Pinnacle model winning in terms of passenger comfort and weight. The pitch is relatively tight at 30-31in, but through the use of lightweight and thin, yet supportive foams, it feels more like 32in, according to El Al's design team, while the high literature pocket creates a little more knee-room. With routes of up to four hours,

the seats couldn't be the very lightest short-haul models, so the Pinnacle at a 5in recline proved the best choice in terms of comfort, as well as maintenance and durability. IFE is viewed on passengers' own devices via the Lufthansa Systems BoardConnect solution.

As Amitai Halfon, head of innovation and design at El Al, says, "With B/E we achieved what other competitors couldn't at a 30in pitch. B/E gave us the biggest seat count without diminishing living space for passengers.

"There is a good boost of investment coming in. Upgrading eight B737-900s definitely signifies a new era at El Al. Our B747-400s are next to be upgraded, and will offer flat beds, taking the premium classes to a world-class standard. The coming years will involve long-haul fleet planning and buying new aircraft to support that," adds Halfon.

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BAE SYSTEMS

PLANE FOOD

Air France passengers will also receive an upgraded meal service, with a second hot dish and little extras such as candies and ice cream. The three million young travellers under the age of 12 who fly with Air France every year can now enjoy fun new features on board, including new games kits – best of all – cutlery that slots together to create a toy aeroplane.



Air France is 80 years old this year! Visit 80years.airfrance.com to browse the airline's history



viveladifférence

The programme of upgrades at Air France is continuing. The latest improvements are new economy and premium economy seats, and revised IFE displays

01. Is it a fork, is it a plane? The Eugeni Quittlet-designed kids cutlery is both
02. For those wishing to view their own content on the screen, a USB port is mounted below each screen

As many international airlines are soaring in the various passenger satisfaction indices as a result of modern products and a contemporary approach to service, a few carriers are beginning to feel left behind. Air France was such a carrier, but its €500m 'Best & Beyond' scheme is intended to bring the offering up to scratch.

The latest products in the airline's strategy are revised economy and premium economy seats. The economy seat, intended for long-haul use, has been designed to optimise ergonomics and legroom, while new seat foams, adjustable headrests and fully retractable armrests also aid comfort – as well as saving around 3kg of weight.

When designing this new seat, Air France consulted its customers in order to offer a product that meets their needs, and also worked with ergonomists. This is the first major change of the carrier's long-haul economy seat design for 10 years.

Further seat features include an enlarged tray table, a headphones holder, a large seat pocket with two additional storage spaces, and USB and power sockets.

Meanwhile, the premium economy seat – which has now been in service for four years – has been redesigned to feature more comfortable seat cushions and a multiposition footrest.

Both classes are also due to receive upgraded HD touchscreen IFE, with the premium economy display growing from 10in to 12in, and the economy display growing from 6-8in to a standard 9in. The display,

complete with new GUI, is designed to be similar in feel to browsing on a tablet.

In addition, the IFE content has been enhanced, with over 1,000 hours of programming available on demand, including a 'world movie' selection (films in their original language version such as Chinese, Japanese, Korean, Indian, etc).

Better still, passengers can start enjoying the IFE content as soon as they board, up until when they arrive at their destination, gaining on average an additional hour of entertainment, independent of the take-off, landing and taxiing phases.

In June 2014, Air France will begin equipping 44 B777s from its long-haul fleet with nearly 10,000 of the new seats, with the programme expected to take two years. In January 2014, the airline is also due to unveil its future business offering. In April 2014, the entire Best & Beyond project will be unveiled around the new La Première cabin.

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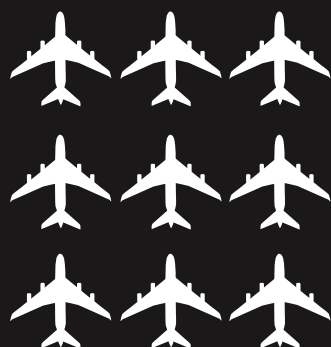
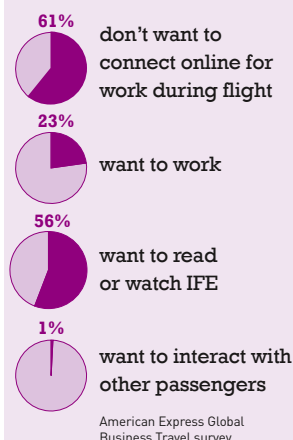
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US\$42.6bnworldwide in 2013 – an increase of **89%** from the 2010 estimate of **US\$22.6bn**

IdeaWorksCompany and CarTrawler research

Of US business travellers:

The Chinese passenger aircraft fleet will triple over the next 20 years, creating demand for

5,580

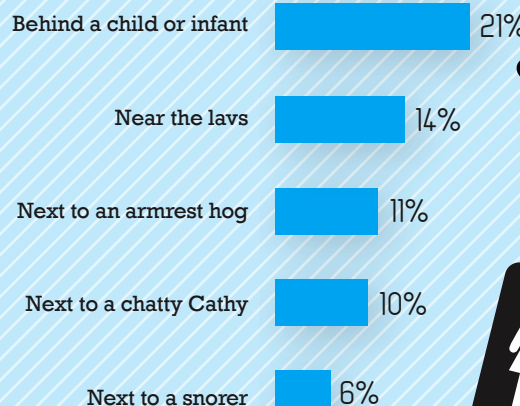
new aircraft (240 regional, 3,900 single aisle, 1,440 twin aisle) worth

US\$780bn

Boeing Current Market Outlook

fly**by**numbers

A few of the latest industry statistics garnered during the final quarter of 2013

The worst seat for a US business traveller is:

American Express Global Business Travel survey

The global IFE market will grow at a CAGR of **12.8%** from **US\$2.08bn** in 2012 to **US\$5.27bn** in 2020

Global Inflight Entertainment Market Assessment, Frost & Sullivan

**Top four entertainment activities on PEDs during flight:**

- 1: Music
- 2: Games
- 3: Reading
- 4: Movies

OnAir research

**90%**Almost **90%** of US, UK and Singaporean travellers would give up a seat amenity such as extra legroom for a faster and more consistent wireless connection

Honeywell survey

43%

of commercial aircraft will have broadband by 2017 – up from 17.5% in 2012

IDATE research

The global commercial aircraft seating market will reach **US\$3.5bn** by 2016

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

Of US leisure travellers in 2012:**40%**

bought an inflight meal or snack

23%

bought inflight movies or entertainment

18%

paid for inflight wi-fi

23%

paid for priority boarding

PhoCusWright survey

61% of Australian travellers would pay more to sit in a child-free zone**21%** would not pay more**11%** found the idea offensive**7%** had no preference

TripAdvisor survey



JETBLUE VIEW

JetBlue has been busy considering how wearable devices such as Google Glass might help its customers, with possibilities such as flight information, voice-activated wayfinding, and even translation through the microphone. Other voice-activated commands could include checking in and selecting seats, displaying IFE content options; and even real-time inflight geotainment information. As JetBlue says, "We can certainly see a lot of potential for this technology."



ourglass

When wearable technology such as smart glasses takes off, it could have a big effect on the travel experience, for both passengers and staff

01. Future vision:

No need to seek out flight displays, as the information you need will be projected into your field of view

We're on the brink of a major new technological age, going from carrying technology such as smartphones and tablets, to wearing technology such as smart watches and smart glasses. The glasses in particular, being championed by Google and Vuzix, have the potential to redefine the way information is disseminated throughout the travel process by overlaying information into the passenger's field of vision. The glasses can display and capture information, photos and videos from the wearer's field of view, operated via voice commands, head gestures and simple tap controls.

Travel IT expert SITA Lab has evaluated how two types of smart glasses – Google Glasses and Vuzix M100s – can be part of the passenger experience of the future. The company predicts that such devices can be used to mobilise staff, keeping their hands free, while keeping them connected to the traditional check-in and reservation systems. Interaction can be via video analysis of what a staff member is looking at, like a boarding pass or bag tag, or voice recognition, or a combination of both. Passengers will be able to look at the airport parking garage and be shown the current capacity, be updated on flight status, be given wayfinding and retail information in the terminals, be guided to their baggage, and even be told where to catch a cab and how much it should cost. No seeking out maps, no looking for flight status screens, less time wasted in the terminal and no language barriers.

As part of the tests, SITA Lab developed the SWIFT Boarding app, which uses the smart headgear's built-in camera as a scanner and the head-up display. The aim was to enable agents in the boarding area to securely scan and verify a boarding pass and passport simultaneously using the smart glasses. Both documents are held side by side while the app matches the two to ensure they belong to the same person.

The lab staff said that as a proof of concept, the SWIFT application was a success and the scanning functions worked. However, they also found that the devices are not fast enough yet to be able to meet the high-speed passenger processing needs of airports, as they couldn't match the industry's one-second benchmark.

Jim Peters, SITA's CTO, said, "It is no major surprise that our research into this developing technology shows that there are issues to address. This is inevitable with any new technology."

He added, "For any type of use in the air transport industry, the technology needs to be more robust to avoid breakages and the cost will have to come down. The camera quality will also need to be enhanced. Currently it requires near-perfect light conditions within the airport for the scanning of documents to be successful. Other areas to be addressed include bandwidth for widespread use, battery life, and any cultural and social issues."

Many of the same issues were identified by SITA Lab in the early days of the smartphone, and the evaluation staff expect they will disappear as new devices come out over the next 12-18 months, leading to new and innovative uses.

Find out more about SITA Lab's findings in the Features section of our website

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namedroppers

Airlines looking to strengthen their brand and experience are making deals with major brands to get household names in the sky

According to many brand studies, Emirates is the world's most powerful airline brand



1 Branded coffee
It seems like wherever you are in the world, you're never far from a Starbucks – even at 30,000ft in the air. You can enjoy a cup of the Seattle coffee chain's joe for free on board United or Horizon, and for a price on carriers such as easyJet or ANA. And for java aficionados, Porter and Alaska serve the Starbucks gourmet Pike Place Roast variety. Meanwhile, Virgin America and Singapore serve Italian brand Illy; Delta serves Seattle's Best Coffee (a lower-cost subsidiary of Starbucks); JetBlue passengers enjoy the Dunkin' Donuts brew; and Swiss customers in first class can savour a fresh Nespresso.

2 Heavenly bedding
Hotel chain Westin makes a big deal of the comfort of its 'Heavenly' range of beds and bedding, even offering the range for sale to satisfied guests. Delta execs clearly like it, as they commissioned their own range of inflight Heavenly bedding, to help ensure its BusinessElite flyers have a restful sleep. Long-haul passengers receive a sleeping pillow and comforter, while those on flights over 12 hours also receive a lumbar pillow. It's a good deal for Westin too, as Brian Povinelli, brand leader for the chain, says: "We are delighted to bring the Westin Heavenly experience to thousands of Delta travellers around the world, especially at a time when Westin is experiencing growth in key markets around the world."

3 Football fans
Looking to piggyback on an internationally known brand to increase its global recognition, Garuda Indonesia made a slightly left-field decision: Liverpool Football Club (LFC). In 2012, the airline signed a three-year partnership to become the official airline for the club, with the aim of increasing its exposure via the global brand and awareness of LFC and its international fan base. There is, of course, an advantage for LFC too. As the club's managing director Ian Ayre says, the brand "has its base in a region where we enjoy such a passionate fan base. Indonesia is an ambitious country with a rapidly growing economy that the club has great affiliation with."

4 French flair
Many airlines offer passengers a little designer luxury in the form of a branded amenity kit, but Singapore Airlines went a step further, commissioning French fashion house Givenchy to immerse passengers in its style. Across all classes, everyone can enjoy a little Givenchy, from bedding and cushions in first and business, to the chic seat fabrics in economy. Even the tableware, pyjamas, slippers and eyeshades are designed by Givenchy. Curiously, having designed around 200 items for the airline, Givenchy does not supply the amenity kits – Salvatore Ferragamo was selected for that task.

5 Absolut power
Korean Air pulled out all the stops in specifying its A380, trading seating density for interesting social spaces for premium flyers. Big names were interested in becoming associated with the unique experience, especially since the airline was reported to have made around US\$720m (£450m) in ancillary revenues last year. Lancôme got involved in the design of the popular duty-free shop; and for the three bar and social areas, vodka brand Absolut saw an opportunity. Absolut was afforded design input into the spaces, but didn't opt for overt branding other than the bottles on display (also available for purchase, of course), the cocktail menu, and the blue and white finishes. Refreshingly subtle.

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ITALIAN INFLUENCE

Transaero is a rapidly growing airline, with orders in place for A380s and B787s. However, before those aircraft join the fleet, nine B777-200s will also enter service. These aircraft will feature seats from Aviointeriors, including the Venus in first class, the Perseus in business, and the Columbus Three – launched this year – in economy. The seat retrofit programme will begin in April 2014, to be concluded by the end of the year.



When Transaero's A380 arrives in 2015 it could be the densest in the world, with 652 seats

littleluxuries

With a four-seat first class cabin featuring lie-flat beds as well as generous business and economy configurations, Transaero is getting aggressive in medium-haul routes

- 01. Imperial class has a dedicated crew. The seats are the Aviointeriors Zeus model
- 02. The grand tea set is inspired by traditional Russian designs

Transaero Airlines is regarded fondly for some of its Russian traditions, such as the elaborate tea ceremony conducted in Imperial class – its first-class offer. Sadly though, such luxuries were the sole preserve of long-haul passengers on the airline's B777 or B747-400 fleet. However, the carrier has now added an Imperial class service to its medium-range routes, creating a slightly unusual configuration for six B737-800s operated on flights from London, Paris, Tel Aviv, Paphos, Astana and Almaty to Moscow.

Transaero's B737-800 fleet is being converted to a 144-seat configuration, to include a four-seat Imperial-class cabin, an eight-seat business cabin with reclining seats at a 43in pitch, and an economy cabin offering a generous 34in pitch. In addition, MAC Interiors has been updating the lavatories and galleys.

For mid-haul routes, this is a strong product, with first-class passengers being given the option of a ride in a Mercedes-Benz E-Class from Moscow to Domodedovo Airport, where they are welcomed and guided through check-in to the lounge. Indeed, given the small size of the cabin, the fully flat beds and the dedicated VIP flight attendants, this comes close to the private aviation experience.

The experience only gets better during service, with the menu on flights from Moscow comprising a variety of meals from Café Pushkin, one of the most luxurious and famous restaurants in the Russian capital. The

dishes on offer include recipes from nineteenth-century Russian imperial cuisine, as well as European dishes.

The stunning tableware in Imperial class was custom-made by the Imperial Porcelain Manufactory and the Gus-Khrustalny Crystal Factory to special designs. The two factories are important in Russian culture because they became purveyors to the imperial court in the mid-18th century.

To top off the experience, all Transaero passengers can enjoy high-speed broadband internet access on board, using a Row 44 system.

As Olga Pleshakova, CEO of Transaero Airlines, states, "I am sure passengers will highly appreciate the luxury of Imperial class, the comfort of travel in business and the wider seat pitch in economy class compared with the traditional standards on narrow-body aircraft."

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SPACE RACE

Priestmangoode isn't the only design consultancy to have taken on an out-of-this-world project. In 1987, Seattle-based Teague worked with NASA to create the Space Station crew quarters. This was the first space travel design to take into consideration the comfort of an astronaut's personal travel space.



To see an animation of the World View experience, visit the videos section of our website

stargazers

Priestmangoode is well known for its aircraft and train interior design, but with the World View project, it is now taking transportation design up a level

- 01. The trailer unit doubles as ground transport and launch pad
- 02. The large panoramic windows are constructed from several smaller units in order to increase strength

Paragon Space Development Corporation in the USA has devised the World View project, which is planned to take eight passengers on helium balloon flights reaching 98,425ft – the edge of Earth. For the true space experience, as well as stunning views of their mother planet, passengers will experience weightlessness during the suborbital two- to six-hour flights – and all for a relatively reasonable US\$75,000.

A great design is required for the pressurised, space-qualified World View Spaceflights Capsule – remember, as well as being space travel, this is luxury travel. In addition to enhancing the flight experience, the craft must be able to operate in, and protect the human body from, the near-vacuum, radiation, micrometeoroid, and extreme thermal environment of space.

The design of the vessel, which is being created by London-based transport consultancy Priestmangoode, is rather different to the aerodynamic rockets one might typically associate with space travel. This is because the flight is about the experience and the view – not speed. Indeed, the ascent takes 90-120 minutes, and the descent 20-40 minutes. As Nigel Goode, director at Priestmangoode explains, "We didn't just want to design a vessel, we wanted to define what commercial space travel could be. We wanted to create a stylish, elegant, luxurious environment for this unique experience. It was all about finding the right balance between form and function."

As ever in transport, safety is paramount, so the large panoramic windows are constructed from an array of small high-pressure units. With flights proposed to begin before dawn so passengers can observe the

sunrise, the curvature of Earth, the thin blue atmosphere and the blackness of space, the large viewing windows are key to the experience. There is also a cupola viewing dome for unrestricted view of the curvature of Earth.

Other features include a lightweight structure, a permanently deployed parafoil to maximise safety, a science capsule attached to the top of the exterior for potential scientific data readings, deployable landing gear (skids), a reserve parachute for safety, and a trailer unit that serves as ground transportation and launch platform.

The interior details are currently being developed, but as Goode says: "This is a dream project to work on. It's incredibly exciting to be part of this nascent industry. Inspired by our work designing luxury aircraft interiors, our design vision focuses on enhancing comfort on board the capsule to create a truly transformative human experience."

Priestmangoode is now working on the interiors of the World View capsule – watch this space.



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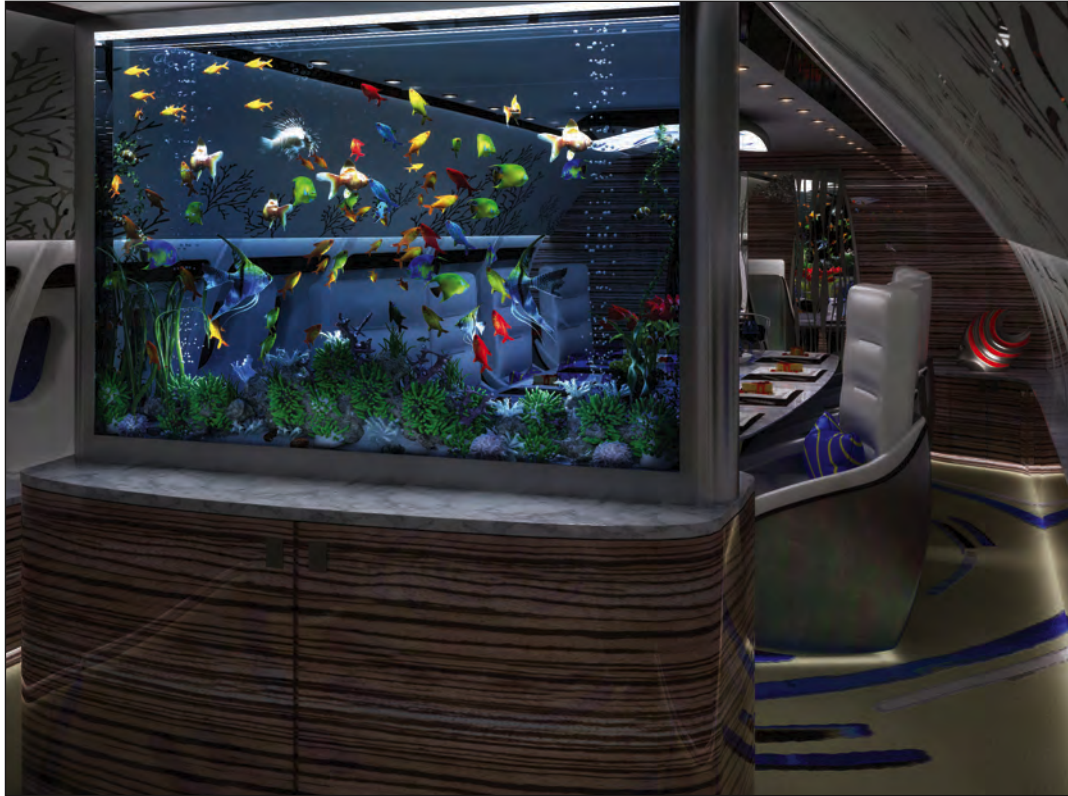


flyingfish

BRIEF: Challenged by a client to design a unique interior for his new A320, Jean-Pierre Alfano, creative director of AirJet Designs, was looking for a little inspiration. Ideas were thrown around, but when the client mentioned a recent scuba diving adventure, it spawned a dramatic idea – an underwater-themed aircraft.

DESCRIPTION: Underwater motifs? Fishy DVDs to make TVs look like fish tanks? All that was a bit obvious for Alfano, whose ambitions took him far beyond, with a real tropical fish aquarium as the centrepiece of the cabin. The aquarium is in the middle of the aircraft, just over the wing box, thus addressing weight and balance certification requirements, as well as creating a dramatic divider between the dining and lounge areas. The tank is mounted on a credenza, into which it can be lowered using motors, for cleaning and maintenance. The unit also houses the lighting, filtration, heating and feeding features. Of course, there are issues with taking a large tank of fish airborne, so the aquarium has been designed to withstand flight turbulence loads and changing cabin pressure during flight, and a specially designed watertight canopy and cover prevents any spillage.

The aquatic theme is continued throughout the aircraft, with coral motifs on the valances, a wool and silk hand-tufted carpet with circular blue forms mimicking waves and water ripples, and composite seat shells that have an iridescent, metalised mother-of-pearl finish – like a shell.



VERDICT: It's amazing to see a fanciful notion developed to such an extent. Some designers would have implemented elements such as the patterns and finishes, and it still would have looked great and met the brief, but to take an idea such as an aquarium, and to engineer it to achieve certification, is inspiring – from both a designer and client perspective. The aircraft is scheduled to be completed in mid-2015 – complete with tropical fish livery.



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choicedecision

The catalogue approach to premium seating has created some controversy, but designers are pursuing modular concepts that could make customisation a less complex proposition

BERNARD FITZSIMONS, AIRCRAFT INTERIORS INTERNATIONAL



Airframers looking to turn out wide-body aircraft by the dozen, and haunted by the spectre of deliveries delayed by the late arrival of seats and other cabin elements, have moved to tighten control of the supply chain. Boeing has its Dreamliner gallery of pre-certified products for the 787, while Airbus has instituted the contracted-supplier approach to cabin furnishing.

Airlines tend to resist what they see as interference with their commercial freedom. But when it comes to premium class cabins, they also bridle at the idea of standardisation restricting their ability to customise the accommodation seen as epitomising their brand.

Tom Plant, VP and general manager of seating products at B/E Aerospace, says that while his own company is delivering on or ahead of schedule, he is aware of impacts to some carriers' aircraft deliveries caused by problems with the availability of seats. The root cause, he suggests, lies in some suppliers' engineering capacities and competencies.

"These are very complicated products," he says. "And they are complicated in a number of different ways. They have an awful lot of parts, are very complex and take a long time to design. Then they're quite difficult to

dynamically test. And on top of that, the flammability requirements have become much more stringent in the past four years or so."

A single programme can require a "massive" engineering and certification team, which in some instances can exceed smaller suppliers' total headcount: "So I can see how there can be some struggles in execution and competency on the engineering side."

Plant sees standardisation growing already in premium classes. "There isn't as much innovation as there used to be," he says. "The economic times are still quite tough from an international travel perspective, and carriers aren't quite as aggressive in doing some new things as they used to be, so I think that's helping. But beyond that, the OEMs – Airbus and Boeing – are tightly controlling some of the offerings. They are catalogue products that are standardised and they are maybe only letting some of the really big carriers do some of the complex innovations these days."

Even when airlines want to share a common design, flammability testing is an obstacle. "The flammability process of a business seat is almost as complex and difficult as the dynamic testing," says Plant. In addition,





02



03



- 01. A teaser image of the Dovetail concept, designed by JPA for Jamco
- 02. Lufthansa shunned the Boeing catalogue and commissioned its own bespoke business seat
- 03. Austrian Airlines was an early adopter of the Thompson Vantage seat
- 04. Austrian passengers who enjoy the Vantage can also find it on fellow Lufthansa Group carrier, Brussels Airlines

the changes to colours and materials needed to match each airline's branding inevitably mean more testing. "So unless we have a lot fewer airlines in the world and a lot less differentiation, I don't see any ability for the suppliers to standardise their products to a larger degree than we're already seeing."

CATALOGUE CAVEATS The catalogue approach has drawbacks of its own. "It actually creates a lot of issues and sometimes it doesn't solve the problems," Plant says. The OEMs push in their catalogues to try to have it run like an automotive scenario, where you're buying a car and there are little features and options that you can pick. You can't make drastic changes, you can't change a Ford Focus into a Jaguar, but you can choose whether to have a cup holder."

The variety of IFE systems, with different manufacturers and multiple screen sizes, means it takes a massive amount of engineering to develop all the options: "And then the delivery volumes are quite small compared with the automotive environment, and not everybody picks all the things that you've put all the engineering into," he says.

So there are too few options to satisfy high-end customers, but too many for the volumes that are really available in the market. "It's an interesting dichotomy,"

flame barrier

Premium seats now come with so much furniture that they have to meet the same heat release and smoke density requirements as required for cabin structures, says B/E Aerospace's Tom Plant. A galley wall, for example, has a constant thickness so only one build-up of cross-section materials needs to be tested. "When you apply that methodology to a business seat, and start cutting sections through it, all the features and stowage boxes and video units mean the cross-section constantly varies throughout. Boeing and Airbus want you to prove that each piece of that cross-section is going to meet the requirement. So on a business seat you could have the same type of test 50 times."

Then there are variations among customers. "People will want different colours of leather, a hard touch in one place, a soft touch in another. That all increases the complexity of the test plan, and I think the competence of a supplier in being able to deal with all that stuff ultimately drives the delivery of the product. It's really nailing down the technical stuff. That's what has always driven the industry and it always will."



04

“

IT'S AN INTERESTING DICHOTOMY,
AND IT'S ONE OF THE REASONS
WHY THE CATALOGUES HAVE
HAD CHALLENGES ”

Plant says, “and it's one of the reasons why the catalogues have had challenges at both Boeing and Airbus.”

DISTINCT PERSONALITY While Austrian Airlines and Brussels Airlines have followed the lead of fellow Lufthansa Group member Swiss in adopting Thompson Aero Seating's Vantage model, Lufthansa itself spent five years working with London design studio PearsonLloyd and seat maker B/E Aerospace to develop the business seat it introduced to market last year.

“It's a very complex market to be developing seats for, so you can understand why it makes sense in terms of cost to deliver more of a standard solution for the airlines,” comments PearsonLloyd director Luke Pearson. “The difficulty is that airlines have different personalities, the clients they fly have different personalities, and if you're wanting to provide a tuned service, a standard product doesn't always suit.”

Pearson had worked previously on the Upper Class product that Virgin Atlantic introduced a decade ago. “Their persona, the brand, what they're pushing in terms of the service proposition, is entirely different from Lufthansa,” he says. “So what they charge for the seat, the economics of the project, and how many seats they need to have in their cabin, are all different.”

what's good and bad about using smaller suppliers?



Daniel Baron, LIFT Strategic Design: “They are eager for the business and show more flexibility from the get-go. Whether or not that translates into actual realisation of the customer's design goals, however, depends very much on the internal engineering resources during the programme and full support from the top management.”



Jaime Moreno, Mormedi: “The advantages are fluent communication and flawless decision making, which usually translates into creating a better product. The disadvantage is that groundbreaking ideas are sometimes discarded due to the lack of economic back-up.”



Jochen Müller, müller/romca: “The benefits are a high degree of interest in innovations, small development departments staffed with all-rounders, and flexible processes. The disadvantages are that they sometimes have a lack of experience, and offer fewer out-of-the-box solutions for individual problems.”



Paul Wylde, paulwylde: “Not having the challenges of the larger suppliers. The smaller companies have an intimate and entrepreneurial spirit which is crucial for airlines when trying to innovate.

Remember that many airlines, especially legacy carriers, suffer from their own complicated internal organisational problems, and being siloed is a barrier to the breakthrough innovations they are so eager to deliver. The better suppliers ask the ‘why’ question and not just the ‘what’ and become valuable partners in the ideation and design phases.”



Jacques Pierrejean, Pierrejean Design: “Working with a small seat supplier can have some risks, mostly related to certification, the delivery on dock time, and perhaps not such reliable quality due to a product which may not be standard. On the other hand, the airline has the freedom to adapt the seats with additional functions following its expectations and commercial targets.”



Nigel Goode, Priestmangoode: “There aren't many small seat suppliers, as it's not just about the seat, it's about the network, the servicing, spare parts, etc. From a designer's point of view, working with large suppliers has definite advantages. They tend to attract major airlines who want something different. They also tend to have greater resources for R&D, so offer an environment more conducive to innovation and creative thinking.”

what's good and bad about using large suppliers?



Daniel Baron, LIFT Strategic Design:

"Chances are they have experienced a wide range of engineering and aesthetics challenges over the years, so they should be well-equipped to handle anything. That said, staff turnover and supply chain management issues can negate the positives. This explains why suppliers go on and off the airframers' offerability lists."



Frédérique Houssard, Designescence:

"A definite advantage with large suppliers would be their extensive experience in the field. However, sometimes defining seat customisation features can be a little more time-consuming with large organisations, but this is all relative. Much depends on the contract and constraints associated with them: cost, timing, type of seat, etc."



Tim Manson, JPA Design: "Larger seat suppliers are well resourced and very capable of delivering high quality and high volume of products. They have great depth of knowledge of their manufacturing techniques and processes. Given a sympathetic schedule and with a creative design team they can bring a lot to the table and really achieve fantastic results."



Jaime Moreno, Mormedi: "The team is used to working with designers, open to groundbreaking concepts, and is not afraid to innovate. They can be very proactive in

bringing those ideas to life, and they have the economic back-up to execute them. The main disadvantage is that they generally have a slow decision making process."



Jochen Müller, müller/romca:

"The benefits are high performance, large-scale development departments, a wide range of out-of-the-box solutions, experience, and well-oiled processes. The disadvantages are that there are too many specialists and too few all-rounders, ingrained processes, and a lack of flexibility."



Paul Wylde, paulwylde: "The benefits of large suppliers are knowledge, experience, proven delivery and access to highly specialised people that, if orchestrated and

aligned correctly, can deliver breakthrough innovation. They are slowly 'pushing upwards' from being delivery-focused suppliers to strategy-led partners. The disadvantages are complacency, led by their own internal cultures. They can be regimented, siloed and conservative. Many have grown through acquisition and merger and face huge internal culture alignment challenges. Inter-departmental divisions are not uncommon in the absence of an overall unifying business idea that aligns seats with architecture, galleys with lavatories, etc. The larger suppliers can be slow, very bureaucratic, introspective and even, at times, arrogant. They understand their monopoly and sometimes use this as leverage for their own advantage. I have also heard clients refer to their lack of customer (airline) empathy."

"In economy," he says, "where numbers are much higher and expectations lower, it makes sense to buy a seat that's been well tuned for weight and efficiency. The build on those seats has often been optimised by the manufacturers and really it comes down to a subjective choice – whether you want the trim and finish to be different or not."

Business class is another matter, he says: "The airlines clearly have a different sense of what they want to offer, how they differentiate themselves. But it's terribly costly and it's complicated, and of course Boeing and Airbus have slightly different rules. So it does make investment a challenge."

PLATFORM SHARING JPA Design was behind one of the latest exercises in extreme customisation, the recently unveiled next-generation business class seat that Jamco is supplying for Singapore Airlines' new Boeing 777-

300ERs and Airbus A350s. As managing director James Park acknowledged at the unveiling in July, "It is rare that such design freedom is possible." But the firm is also pursuing a modular approach inspired by automotive industry practice.

JPA design director John Tighe says the concept of platform sharing – where common chassis and other components are applied to a whole range of vehicles that effectively share the design, development and engineering costs – may be one way forward for premium seat designers.

"Going back 25 years, platform sharing wasn't happening in a meaningful way," he says. "By 10 to 15 years ago it had become hugely prevalent, but the vehicles that were being produced were fairly standard." Large sections of vehicles were identical, so there was negligible differentiation between brands such as Volkswagen, Škoda and SEAT.


Now, he says, "Platform sharing, which at one point was depressing designers, has actually become the tool





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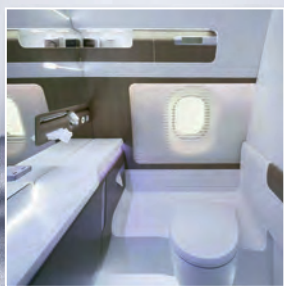
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that is allowing them to create a far greater range of vehicles. They've gone through the growing pains of this modular approach of creating vehicles or designs or products of any kind. Now it's quite a sophisticated system and they're reaping the benefits of it."

The holy grail of platform sharing or catalogue products, Tighe suggests, is to minimise costs by using similar parts where they do not affect the customer experience, while ensuring that the customer touchpoints can be bespoke for each version. He cites the example of Aston Martin, which over the past 10 years has gone from using unmodified Ford switchgear to having its own bespoke switches.

"Behind the scenes, the electronic and mechanical parts of these bespoke switches are still generally off-the-shelf," he says. "But the passenger perception is that the item is bespoke." BMW, meanwhile, offers a much wider range of cars than it did 10 years ago: "It has become very sophisticated at spinning more options with distinct characters off similar underlying structures, filling more niches and selling more cars.

"The airline industry is still in that growing pains period where it's not quite sophisticated enough in its method of sharing and using similar items to get slightly different results that feel to the customer like a very different product."

BATTLE LINES Aviation consultant Ben Bettell maintains that attempts to standardise premium class seats are doomed to failure, partly because of the recertification that even apparently minor changes can require, but mainly because "premium class seats for airlines are the battleground for differentiation". And that is particularly crucial for airlines that aspire to be leaders rather than followers.

In the main, Bettell says, "The top 20 or so airlines are looking for differentiation – not standardising with another airline's product." As are their customers: "The true travelling sky warriors know what they want and it is why



are catalogues stifling creativity in seat design?



Daniel Baron, LIFT Strategic Design: "Unfortunately, the catalogue approach has the potential to create a perception among the less mighty airlines that they can't achieve a sufficient level of differentiation, that there are the chest beaters who get their way and 'rest of world'. At the end of the day, creativity, or poor supplier performance, will drive all airlines to demand a larger catalogue."



Frédérique Houssard, Designescence: "Creativity is not necessarily rooted in having absolute freedom. It is also fed by the constraints imposed upon it. Therefore, if the catalogue approach can offer a certified seat base (which helps keep costs down), perhaps creativity can be funnelled into the options for trim and finish."



Tim Manson, JPA Design: "The time and cost associated with developing, marketing, engineering and manufacturing catalogue seats is not insignificant. Considering the particularly stringent requirements for catalogue products, it's understandable why the range of available products is not expansive or particularly stimulating. The commercial environment is naturally promoting a low-risk approach, whereas creativity requires a degree of risk-taking to be different and innovative. Suppliers, large or small, are understandably more inclined to adopt a low-risk design strategy. Seat suppliers are in a difficult position, but for those who are truly committed to an innovation culture, there should be a rewarding future."



Jaime Moreno, Mormedi: "The challenge is to come up with a good catalogue offer in the first place – in this complex industry a modular platform approach is the only way to survive, but it seems that more could be done to create a well thought through product strategy and offering that keeps cost at bay but offers choice and quality."



Paul Wylde, paulwylde: "Depends how you look at it – on the surface, yes. Yet, some of the best creative solutions come out of restricted opportunities, inspiring airlines to use other ways of leveraging innovation and differentiation. Soft product, colour and material, catering, service, etc, can be extremely memorable and successful."



Nigel Goode, Priestmangoode: "It isn't necessarily stifling, though it is restrictive – although that's more the case for smaller airlines. Large airlines place significant investment in their cabin interiors, where the seats are used as a key differentiation tool against other airlines. As large airlines have more clout, it's easier to develop bespoke products. A large number of the projects we work on are about taking off-the-shelf products and altering them slightly to better fit our needs."



are smaller suppliers better for smaller airlines?

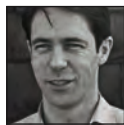


Daniel Baron, LIFT Strategic Design: "Smaller airlines need the same dedication to design and quality and on-time delivery as larger airlines, but at a cost that's still affordable. After all, they don't have an economies of scale advantage. If smaller suppliers can deliver, all power to them."



Frédérique Houssard, Designescence: "I do not think that is necessarily always the case. It depends mainly on the complexity of the product concerned (carpets, seats, etc).

Depending on the situation, some large seat suppliers can also make small quantities (bearing in mind that it can become complicated, and therefore more expensive, if an airline wants something bespoke)."



Tim Manson, JPA Design: "Smaller suppliers' attitude to deliver, and enthusiasm to meet customer needs goes a long way to winning good favour. They tend to be very customer focused. Some of the smaller suppliers are also very capable and the smarter ones expressing a desire to innovate tend to make better progress and stand out. Smaller companies are vital to the industry as not all airlines can be serviced by the larger companies, and in reality larger companies are less interested in smaller orders. Remember, all large

suppliers were small at one point, and as they say, size isn't everything."



Jaime Moreno, Mormedi: "On one hand, a smaller supplier might give a small airline VIP treatment, while a large supplier might place that small airline at the end of the customer line. On the other hand, they might have a limited product offer."



Jochen Müller, müller/romca: "In terms of their ability to deliver the required number of units, a smaller supplier of seats would, on the face of it, be suitable

for a small airline. But smaller manufacturers also often have much more flexible processes and can make things possible that the "lumbering giants" would have difficulty achieving."



Paul Wylde, paulwylde: "Not necessarily, it depends on the team that support you. Buying a supplier is buying a group of people. If you have the right people within a larger supplier, investments and engagements can be successful and a pleasure. Thinking small is the new big. A smaller team is more intimate, responsive, adaptive and, of course, cost-effective. And, it avoids the inter-departmental politics that stifle larger organisations."

they choose to fly with airlines that offer not only great customer service, but a seat product that delivers the experience and the real differential."

For the airlines, he says, "Differentiated premium class seating is where they make the most money per passenger flown, and where they can actually showcase their brand." Even with modular add-ons, "the same seat, good or bad, is in essence still the same seat".

In any case, says Bettell, there is really no such thing as a standardised seat: "If it's in a different location, if it has

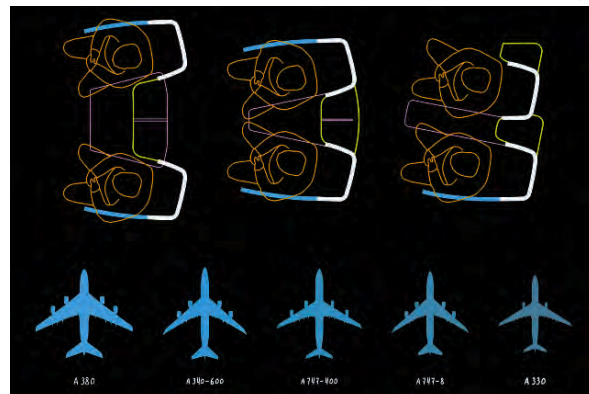
different IFE on it, different leather, different fabrics, you're still creating a product that has to go through a major certification effort. The certification is unique to a specific aircraft or airline. If you standardise on elements or modular type products, it only eases things partially. It's not a solution."

CIRRUS VARIATIONS JPA's Tighe is especially proud of the Zodiac Cirrus seat that his firm originally designed with Sicma for US Airways and has revamped since for several other airlines: "I think it's one example of a product whose pros are strong enough that some airlines who traditionally went for fully bespoke solutions had to look at it seriously and say, 'Can we make this our own? Can we make enough changes to make it feel like it's owned by us?'"

"The strongest example of that is Cathay Pacific, which took the seat and, with JPA's help, created a fairly distinct version that has several unique features. And they really feel that it's their product. Other airlines run a similar layout, but Cathay tailored it to suit its exact needs."

The seat's design, he says, allows certain elements to be changed without too much impact on structural parts: "You can alter the angle to fit on several aircraft types, you can alter the shell profile to alter privacy, you can change

05. How the seating offer varies across the Lufthansa fleet



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the table. But it does cost a large amount of money to do that and we hope that in the future we can help create new products that actually streamline the customisation process even further.”

CATALOGUE POTENTIAL There are reasons to be negative about the catalogue approach, Tighe accepts, “but there are some positives and some opportunities, and we feel it will develop in a good way to actually allow more customisation for more airlines”.

The approach may not work for the top 10 or so airlines, “but for smaller airlines it actually opens up more opportunity. They can get products on their aircraft that might not previously have been open to them. Hopefully in the future they’ll be able to make small but meaningful changes to that product more quickly and cheaply, so in the end more airlines have more customisation”.

JPA, he says, has many ideas on how to design seat elements that can be changed quickly or selected from a range of options: “So you end up with a scenario that’s more like specifying your Mini Cooper online rather than an endless sea of possibilities.” One application is a project with Jamco called Dovetail that was shown privately at the last Aircraft Interiors Expo in Hamburg and could make its public debut at the 2014 event.

Described as uniquely configured and optimised for a range of aircraft types, Dovetail is said to offer aisle access, improved passenger space and a range of enhanced passenger experience features. “That’s an example of a product that we’ve designed with a degree of customisation in mind from day one,” Tighe explains. “It’s certainly got an awful lot of interest from airlines.”

DEMOGRAPHIC DIFFERENCES Still, there are demographic and cultural differences to consider, suggests PearsonLloyd’s Pearson. “Airlines fly to different destinations, they’re picking up different people, and I think the proposition should be tuned to the type of passenger,” he says. “It’s not the same passenger flying all over the world; there are certain airlines that are working in certain markets with a certain type of customer.”

Much of PearsonLloyd’s work is in the office market. “Product there,” he



“
THE PROPOSITION
SHOULD BE TUNED TO THE
TYPE OF PASSENGER. IT’S NOT
THE SAME PASSENGER FLYING
ALL OVER THE WORLD”

are industry takeovers reducing competition and choice?



Daniel Baron, LIFT Strategic Design: “Consolidation can have positive effects if synergies in design and engineering are actually realised. At the same time, things could go south quickly if a monopoly or duopoly situation results in rampant price gouging or delivery delays. It’s in the airframer’s own interest to develop and nurture a larger pool of suppliers.”



Frédérique Houssard, Designescence: “The standardisation imposed by certain seat suppliers often applies to the line-fit market (even if we have seen in the last couple of years certain large groups present their “turnkey solutions” for the retrofit market). However, the force of competition will always be there because the airline market is ever-changing. Airlines will always be receptive to the best new solutions at the most competitive price, and that leaves the door open to smaller companies who are sometimes faster to innovate. Too much standardisation stifles innovation and that runs counter to global dynamics.”



Jaime Moreno, Mormedi: “Not necessarily, in many occasions the merger ends up with the companies creating better products.”



Jochen Müller, müller/romca: “That is certainly true to an extent. But we have already experienced the other side of the coin, where a merger suddenly gave rise to motivation and the capacity to act in an insecure company simply by putting an end to years of uncertainty. A merger often represents a new start for the workforce and creates a collaborative spirit within the company that no one would have thought possible before. Of course, the opposite can also occur – with motivation and innovativeness dwindling, especially when employees are let go. This is where the quality of a company’s management is revealed: if a merger is well-managed, it will have positive effects for all concerned.”



Jacques Pierrejean, Pierrejean Design: “That will become a real problem in the near future. If the industry keeps evolving the way it does today, it will be difficult to avoid finding the same seat on all airlines! In my work I look for companies open to new ideas, and I have found a number of seat manufacturers meeting my need for creativity. Now the number of seat suppliers is limited and most of them want to control the design in-house without the help of an external design studio.”

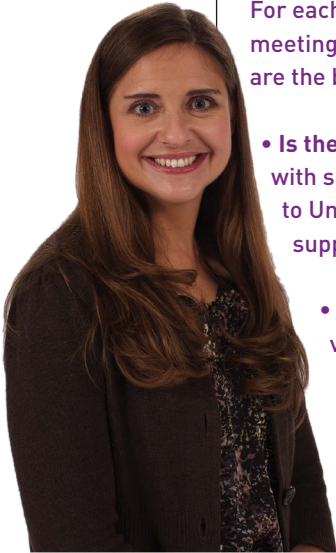


Nigel Goode, Priestmangoode: “Companies within the same group wouldn’t really compete, so yes, they do reduce competition. However, from a quality point of view, that may not necessarily be a bad thing, as one company ends up specialising in one particular type of product and can focus all of its R&D on that one product.”

the airline view: United

Having recently made headlines with its 'signature' seat plan, we asked Maria Walter, MD of product development and brand management at United, for her views on the seating market.

- **What do you look for in a seating supplier?** We look for a supplier who can provide customer-friendly seats. We've even invited some of our premier customers to our Willis Tower headquarters, in Chicago, to test seat concepts we're considering. Those results, combined with what we believe best suits our business goals, will help us select a seat supplier.
- **What are the benefits and disadvantages of working with very large/very small seat suppliers?** For each project, we select the supplier who can develop the best seats for our customers, while also meeting the business needs of an airline as large as United. We believe the partners we work with are the best at meeting these objectives.
- **Is the catalogue approach stifling creativity in seat design?** This can be challenging, so we work with suppliers to develop signature seats that set us apart. Seat design is of the utmost importance to United, so we partner with suppliers to create innovative seats that are comfortable and that suppliers can produce in a timely and cost-effective manner.
- **Are industry supplier takeovers reducing choice?** We find the environment is still very competitive, with plenty of choices available for a healthy supply of options.
- **Do you work with design houses when selecting seat models?** Priestmangoode is our design house of record, and we involve them in all of our seat selections. In fact, Priestmangoode created the new signature seat design that we recently unveiled and plan to install on hundreds of domestic mainline aircraft and regional aircraft operated by United Express.



06. Singapore Airlines opted for a bespoke seat from Jamco for its new B777-300ER business class, created with JPA Design

says, "is very tuned to the user – the user is always the driving force." The restrictions airlines operate under means there is often pressure to take a standard product and expect the user to find it appropriate, "and I think it should be celebrated that there's a drive from certain airlines to say, 'Actually, we want a specific product'. I don't think it's just to do with cosmetic branding. I think it goes beyond that. And I think it's very healthy."

Transparency is another factor in an age when, as Pearson points out, "There's an app you can get for your phone that tells you what seats are on each aircraft and it will tell you what reviews say about whether they are in a good position or not. I think this will put a lot of pressure on the airlines to continue to request developments that are tuned into their brand experience."

Airlines don't just fly people from one place to another, he argues, but offer a service that embodies a brand promise. "We wouldn't have three major car manufacturers in Germany all offering different propositions if it weren't for that," he says. "They've all got four wheels, but the people who buy those cars are often very brand loyal for specific reasons. So even within one country you've got different demographics requiring a different service."

B/E's Plant has another angle on the relationship between aerospace and automotive practice. "We've had

various interactions with people in the automotive arena," he says. "The automotive guys always seem to be intrigued by how much complex new development we do with a ground-up product, and how little we actually spend on it from a development standpoint, versus what they spend on developing products that go into cars. They look at us and they seem to recognise that we are an extremely low-volume industry compared with what they deal with, and yet we accomplish as much, if not more, variety of design on a lower budget." ☒

06





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Delegating responsibility for source inspection to seat manufacturers can streamline the delivery process. So what exactly happens behind the scenes?

BERNARD FITZSIMONS, AIRCRAFT INTERIORS INTERNATIONAL



In recent years the two biggest airframers have begun to delegate source inspection to seat and other suppliers, a change that Recaro Aircraft Seating says can save time and money for supplier and OEM alike.

Recaro's plant in Swiebodzin, Poland, was authorised to carry out source inspections for Boeing and Airbus in 2010, and the company has since been progressively adding source inspection for Airbus types. Approval for source inspection of seats was granted for its two biggest plants, in Swiebodzin and at its Schwäbisch Hall headquarters in Germany, for the A320 family in January 2011, for the A330 and A340 earlier this year, and for the A380 in August.

The latest approval makes Recaro the first Airbus supplier authorised to carry out supplier source inspections for a product used in the A380, the company says, and the first seat manufacturer authorised to do so for all the seats it supplies to Airbus. The first delegation of source inspection for Boeing was agreed in 2001: today more than 90% of the current production of Boeing seats is delegated.

01. The CL3510 economy seat production line at Schwäbisch Hall, Germany



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02



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Recaro describes source inspection of seats as a process similar to the detailed incoming product inspection usually performed on arrival at the OEM or airline, except that it is conducted at the premises of the supplier, or source. The OEMs and airlines have different procedures for granting approval for supplier source inspections, says Mirjam Bruhns, director of quality and process management at Recaro: “For example, one of the OEMs delegates by customer programme; the other by seat model, aircraft model and production site. However, the OEMs have delegated the source inspections to Recaro for almost all current seat models to be installed in nearly all models of Boeing and Airbus aircraft.”

To earn that approval, she says, a supplier has to demonstrate a constantly high level of quality for a sustained period. Then, after several deliveries without discrepancies or problems, joint inspections are conducted before the approval is finally given. The organisation also has to show that processes such as corrective action and problem solving are mature and reliable.

The result, Bruhns says, is that all the parties involved – seat manufacturer, airframer and airline customer – save time and money. “Our industry is constantly reducing lead times and looking for improvement in efficiency,” she says. “The source inspection delegation supports both simply by eliminating a quality gate that is no longer necessary.

Beyond this, it shows our customers, as well as the OEMs, that we have reliable industrial processes constantly delivering high-quality products.”

Recaro points to an operational excellence initiative that started in 2007 and includes a zero-defect production strategy, along with a shop-floor management system that helps the company recognise problems early and solve them permanently. “Shop-floor management more or less describes our culture,” she says.

“That culture includes the way we develop our employees as well as our continuous improvement philosophy towards excellence in everything we do,” she elaborates. “For example, all problems such as quality defects are discussed in daily meetings on the shop floor with all involved parties – up to senior management – who are necessary to solve them permanently. These routines

02. Following the final Recaro inspection, seats can now be shipped directly to the customer

03. Shop-floor management is key to the Recaro process, whereby workers can recognise deviations in production at an early stage and react quickly



THE ORGANISATION HAS TO SHOW THAT PROCESSES SUCH AS CORRECTIVE ACTION AND PROBLEM SOLVING ARE RELIABLE





“

AIRBUS POLICY IS TO GIVE RESPONSIBILITY OF PRODUCT QUALITY TO WHERE IT BELONGS – THE SUPPLIERS ”

04. Staff celebrate the joint source inspection for A380 economy seats (left to right): Dr Mark Hiller, Recaro Aircraft Seating; Yves Wahn, Airbus; Mirjam Bruhns, Recaro; Oliver Roennfeldt, Airbus; and Thomas Ligensa, Recaro

mean we have closed feedback loops with very short lead times whenever a problem occurs.”

The result, she says, is “a high dedication of our people when it comes to producing seats with the highest quality, which leads to successes like delegated source inspection”.

SUPPLIER RESPONSIBILITY Tom Plant, B/E Aerospace's vice president and general manager of seating products, says that in the past all four major OEMS – Airbus, Boeing, Bombardier and Embraer – had on-site source inspectors assigned to suppliers' factories. As the product came off the end of the production line, they would make sure the supplier's paperwork was correct, that the seat had been inspected, that it met all the dimensional criteria, that it had all the specified parts, and that it had the right certification paperwork and was ready to go out of the door to the OEM's factory.

Around five years ago, he recalls, “Boeing and Airbus both got quite keen on delegating source inspection because it was felt that it was potentially a non-value-added activity that the suppliers should be doing themselves, and that they should be controlling their own destiny.” So suppliers that had a certain quality rating or

met the necessary criteria would qualify to do the inspections themselves.

B/E Aerospace was the first supplier to take on the responsibility for the Airbus single-aisle family. “That's where it started because that's where the big volume is for deliveries,” Plant says. “We went to a line-side delivery scheme where we did our own source inspection. We put our seat on what we called a ski fit, which is like a special pallet, to facilitate the loading of the seat into the aircraft. Then Airbus made that kind of scheme standard and asked other seat suppliers to follow it.”

Within the past year, he says, the Airbus twin-aisle group has moved to delegate source inspection for the A330 and A340 to B/E, Recaro and other suppliers. B/E has also delegated source inspection authority from Boeing for many follow-on deliveries, but Boeing apparently prefers to retain control of new, head of version programmes.

Airbus says its policy is to “give the responsibility of product quality to where it belongs – the suppliers”. The benefit of this, the airframer adds, is “an ensured level of product quality because the suppliers will have a natural interest in eliminating quality ‘escapes’”. ☒

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what'scooking

To be engaging to passengers, galleys and their additional functions such as entranceways and social areas need to convey the right image, through careful maintenance, repair and overhaul

ANGELA SINGLETON, AIRCRAFT INTERIORS INTERNATIONAL



A well-maintained galley plays an important role in effective food and beverage service, but many airlines are using the galley as more than a mere functional space. With laminate fascia in myriad colours, stylish trims and corporate logos, the new-look galleys are also being used as space-efficient entranceways, self-service snack bars, meeting points and even libraries.

While galleys are tough, certified to a high specification capable of withstanding high loads and surviving impacts of more than 9G, an effective maintenance, repair and overhaul (MRO) programme is vital to keep a well-used and multifunctional galley in service and looking fresh.

THE INDUSTRIAL DESIGN VIEW According to Peter Tennent, a director of London-based design agency Factorydesign, options for updating galley spaces are limited at present. He says airlines should consider moving galleys away from being the boarding point for passengers, to covering them up or designing them better in the first place.

Factorydesign has worked closely with aircraft and component manufacturers, as well as international airlines,

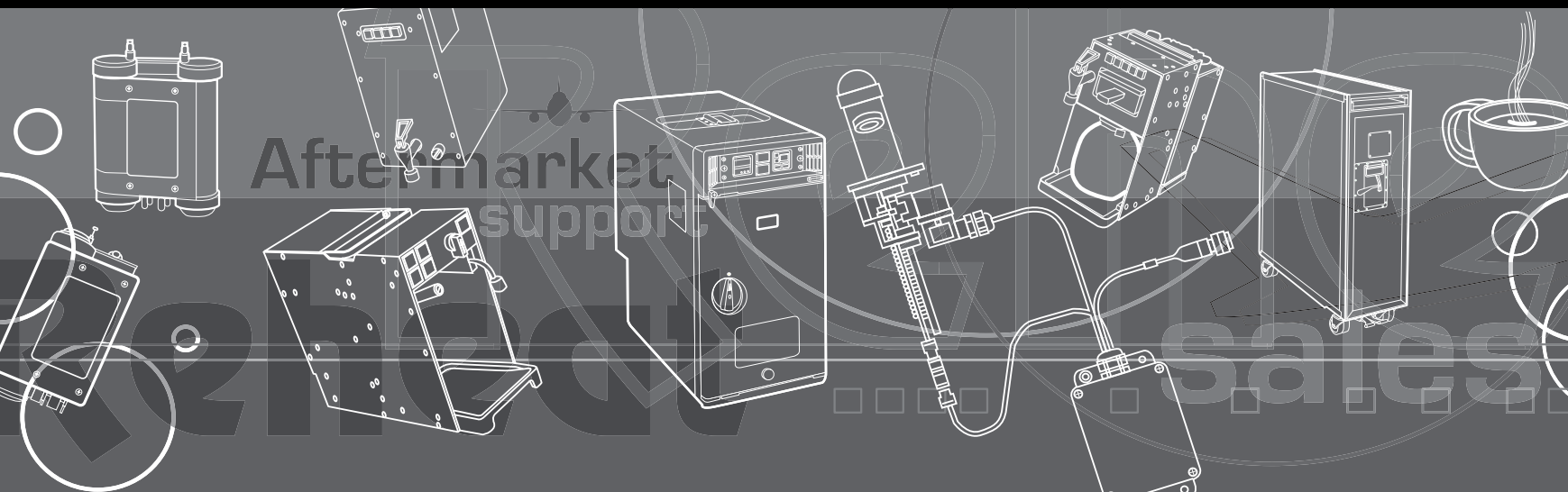
including British Airways, Singapore Airlines and Virgin Atlantic, on new designs for cabin interiors, seats, lavatories and galleys.

“Of course efforts are being made now with doors, blinds and coloured carts and, as shown by the SPICE (Space Innovative Catering Equipment) galley from Airbus, even radical alternatives are available. But it will take a brave airline to embrace the comprehensive levels of change required to treat their galley operations differently,” says Tennent. Until the airframe manufacturers and revenue management have an epiphany, he says, airlines will be stuck with what amounts to a commercial kitchen just inside their front door.

“Some say the kitchen is the ‘heart of the home’ and an increasing number of quality restaurants are putting their kitchens on show; however, we don’t invite guests into our home through our kitchen. Restaurant goers may be interested in what is going on in the kitchen but only from a distance, and many would be mortified if they were led to their table past a steaming cooker. Yet much of the aviation industry still insists on boarding passengers through the



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01-02. The door covers of this Driessen galley can be quickly interchanged, whether to fix damage or to present a new image

01

galley,” says Tennent. He adds, “A commercial airline galley is a battleground. Despite space being constrained to an absolute minimum, crew must work rapidly and efficiently to deliver quality cuisine. Consequently, the absolute necessity of a galley is that it works – and works efficiently. However, even well-operated and carefully maintained galleys soon show signs of the pummelling they get during loading, unloading and in-flight.”

SO WHERE TO BEGIN? Chris Wenstrom, technical sales director at UK-based AIM Aviation, which offers, among other products, galley solutions across the Airbus long range and Boeing wide-body platforms, states that bringing an old-style galley up to date can involve cosmetic quick fixes such as new finishes, films or inserts to improve passenger perception upon entering the cabin. “Each customer has their own design and we have the flexibility within our MRO processes to offer a personalised service and fine-tune the design to client requirements,” he says.

“If reinstalling a modern lightweight galley isn’t a viable option, then updating an old one makes sense,” he says. “A galley can be refreshed by refurbishment and replacement of aesthetic cappings, decorative laminates, workdeck surfaces, retaining latches, catches, doors and a refresh of internal painted surfaces. Initially, an incoming inspection report is raised, from which a scope of work is defined in line with the standard of refurbishment agreed with the customer. The required level of work to refurbish the galley will vary for each unit and the costs need to be agreed in each case before work proceeds. Once costs are agreed, the strip-out and replacement of components, replacement of decorative laminates and paint refresh can go ahead.”

Wolfgang Reinert, a spokesman for Lufthansa Technik in Germany, adds that galley MROs should be carried out in a scheduled aircraft layover wherever possible.



02

“Preparing ahead so that you have the correct materials and manpower is absolutely necessary to decrease the layover time and release the aircraft as soon as possible into service,” he says. “Dirt, scratches or dents in a galley create a bad impression with passengers, but appearance checks can be additional to the MRO programme.”

A FRESH APPROACH So how can an airline ensure its galleys look fresh and inviting? Wenstrom’s advice for the best way to keep a galley in service is to perform regular maintenance in line with the aircraft’s Component Maintenance Manual (CMM), which instructs how to inspect, strip and repair each item.

“Problem areas that take time to fix arise when regular maintenance is not conducted and damage is allowed to propagate. An important thing to remember is that preventative maintenance is key,” Wenstrom says.

Wet areas such as sinks and work decks require particular attention, as do high-use areas containing rotatable insert equipment. “During every A-check, it is advisable that a review of the sealing is performed and repairs made where necessary. All moving parts, such as latches, catches and sliding tables, should also be examined at A-checks and any worn or damaged components should be replaced before the point of failure,” says Wenstrom.

Galley equipment is often heavy, with a full bar trolley weighing up to 70kg. On some aircraft, 10 or 12 trolleys may need to be manoeuvred within a 1m-wide galley space, which means certain areas often sustain damage during meal service.

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Trolleys and boxes can also become distorted and dented when they are taken from the aircraft to the catering facility and vice versa. The doors and drawers can get stuck, making it difficult for crew to access the equipment within them.

“The size and weight of both containers and trolleys, in combination with the speed of catering replenishment during aircraft turnaround, can lead to damage of decorative cappings, box extractors, doors, turn buttons and compartment dividers,” says Wenstrom.

Apart from the decorative cappings, which can be replaced via a repair scheme, the other items can be replaced using spares. Doors can be returned to companies, such as AIM, for repair, although time pressures may require replacement via a new spare. Compartment dividers would require a straight replacement, and generally colours are matched up as accurately as possible. “Small batch colour variances can occur, but during service and use they eventually match,” says Wenstrom.

CORROSION Another area that comes in for excessive wear and tear is the galley flooring. Designed to withstand high compression loads, galley floors can still be subject to corrosion over time. “Where necessary, floors should be reinforced, particularly in high load, high usage areas,” says Wenstrom.

A honeycomb composite floor panel can be protected by a range of materials, such as a polycarbonate plastic sheet or by stainless steel or hard anodised aluminium, depending upon use. Repairs to floors can generally be conducted in situ.



03

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WHERE NECESSARY, FLOORS SHOULD BE REINFORCED, PARTICULARLY IN HIGH LOAD, HIGH USAGE AREAS

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“Repair schemes can be generated within a working day, dependent upon the scale of the problem. The repair kit lead-time varies, but our target is to support re-entry into service and we offer the customer various solutions to achieve this,” says Wenstrom.

AIM Aviation recently conducted a refurbishment programme to replace outdated catering equipment and refresh the decorative finish of galleys/monuments for one particular airline client. “Although the galleys were more than 25 years old, very little corrosion, if any, was present,” says Wenstrom.

Lufthansa Technik’s Reinert adds that the wiring within the galley monument doesn’t generally give rise to in-service issues or require maintenance, but he says that corrosion caused by leaks is rife in some galley areas.

“Special attention needs to be paid to hidden problems like moisture from tea, coffee, water and waste. Seals within the galley should always be inspected to decrease the possibility of corrosion.”

Reinert advises that further inspections (not just ones specified in the CMM) should be carried out to find the reason for any leaks and to verify that all NTF (non-textile flooring) coverings are installed correctly.

“Depending on the airline, galleys may have to be removed to verify that there is no seat track corrosion,” he explains.

03. Fun meets function in Air France business class as the galley also serves as a bar and social area
04. Inserts, such as the B/E Essence range, can help give a domestic kitchen feel to a galley



04

bucher's secret resource

Bucher has its own 700m² test centre near its headquarters in Uster, Switzerland, where it operates test stands and a three-zone climatic chamber. The static test stand is extremely flexible and can handle a broad range of monument sizes, from small storage lockers to large galleys.

Manufacturers including Airbus, Boeing, Eurocopter and Pilatus have had testing carried out at the centre, which can test statics, temperature, insulation and acoustics. Test weights and a hydraulic press allow for the application of up to 50 tonnes of pressure. A complete four-way galley test takes five working days, including assembly and disassembly. The centre's infrastructure also enables the staff to run up to two static tests in parallel, while preparing or running a cooling test or noise test – ideal for A380 tests, for example.

05. Everything in the Zodiac Galleys MaxFlex range is pre-certified, so the configuration can be quickly changed at any time

Angèl Roy, inside sales manager at US-based Triumph Interiors, adds, "In our experience, the 'wet' areas are those needing the most attention in MRO programmes, including flooring, sinks, coffee stations and waste areas."

Triumph repairs and refurbishes airline interiors for commercial and regional airlines, including Delta, Continental and Southwest Airlines. "We see a lot of floor damage and corrosion due to fluids collecting at the bottom of galleys," says Roy.

"When work is needed on a galley, it is best to remove it so corrosion areas, especially flooring and walls, can be reached and repaired. Typically, it takes us two to three weeks to repair and refurbish a galley."

TRY SOMETHING NEW If you feel your galley is too tatty for refurbishment, or too heavy to keep, given that galley structures can now be constructed from aluminium and plastic, it could be time to try a new solution.

Minimising galley weight is a priority for Zurich-based Bucher, which offers integrated solutions and services for line-fit and retrofit cabin work. The company's Starlight galley is claimed to offer an alternative to sandwich panels,

whose honeycomb-like elements create the impression of being lightweight, but which, according to the company, have often proved incapable of withstanding daily use. Bucher now only uses sandwich panels in areas where damage is unlikely.

The basic elements of a Starlight unit are a stable sectional aluminium frame and 1.1mm-thin, corrosion-resistant aluminium sheet, which weighs 2.7kg per square metre. Also, Starlight's containers and serving trolleys slide on plastic tracks and doors, and the shutters and extension tables can be moved almost without a sound – this is in response to cabin crew reporting that, with passengers on the other side of the bulkhead, noise can be difficult to manage in an old-style galley that has a series of steel units opening and closing. To speed delivery time, Bucher offers galley layouts that have already been tested and certified for aircraft including the A320, A330, A380 and B747-8i.

FLEXIBLE APPROACH Another option for an update is introducing Zodiac Galleys' MaxFlex range, which are popular on narrow-body Airbus and Boeing aircraft. To improve galley design and performance, the company can incorporate a number of special design features into the galley shell such as illuminated logos, corporate roller-blinds, light features and special décor, while to save weight, new materials have been introduced, such as plastic fillers, new panels and profiles. A variety of 'add-ons' to the system mean the galley can be used for innovative lobby and service concepts, including a snack area for passengers, a duty-free unit for shopping, and more hanging space for jackets on winter flights.

We'll end as we began, with the words of Factorydesign's Peter Tennent, who claims that changes to galley design will come through innovation, technology and material advances and, hopefully, some enlightened initiatives from airlines and vendors. "Thinking differently about layout, operation, location, looking at the galley spaces in a different way, adding more flexibility and paying attention to the details will all help improve these spaces in future," he concludes.

"When the first real advance is made, everyone will see what can be achieved and the pace of improvements will accelerate as airlines battle to be best. And that will only serve to enhance the passenger experience." ☒



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guidinglights

Now that LED technology is more established in cabin lighting, how is it being applied, and what's next? A range of lighting suppliers, and the designers that apply their technology, give their views





JAKE FRANKE

engineering manager, emteq

What trends are you noticing in cabin lighting?

One trend we are seeing is requests for cabin signage to blend with the interior. While an exit sign is required, we are able to change the aesthetic so it is less obtrusive to the cabin design. We are also seeing requests for cleaner metal fixtures instead of plastic ones that can look cheap.

What is your top tip for a good lighting installation?

When installing LED lighting, it is important to consider all materials being used – including the lenses and panels the lights are shining on and through – to match the quality of the new lights. Additionally, sufficient space needs to be allowed to optimise the light's positioning, enabling it to aim properly.



NICK GOODWILL

transportation designer, jpa design

What trends have you identified in lighting?

Where lighting was once used for functions within the cabin, it has spread to be used more widely and for more interesting applications. This is due to the increasing versatility and smaller size/lighter weight of the lighting sources available. Also, airlines are realising that lighting is a cost-effective method to achieve brand differentiation and alter the feel of cabins. Applications are becoming more sophisticated: dramatic lighting schemes at entryways can create 'wow' first impressions, while softer ambient lighting in the cabin and dotted around the seat offers subtle clues to function, and sets the mood for the flight.

Is the use of LEDs for multiple colour cycles during flight being toned down?

The novelty of RGB multicolour cabin lighting does appear to be wearing off. Airlines and suppliers are increasing their research to understand the effect of light on the passenger experience. Lighting has also become an increasingly important part of a holistic approach to cabin design. Our work with Singapore Airlines on the new business product is a case in point; great effort was taken to craft the finishes in that cabin, so in turn we paid similar attention to the lighting. Through workshops and an iterative design process, light intensities and hues were carefully considered to

ensure that they functioned well and enhanced the CMF on board.

What new capabilities or effects would you like to see enter the cabin lighting market?

There's huge scope for a better connected cabin where various onboard elements communicate and exchange data with one another, and there are some exciting opportunities to integrate lighting into this – a seat that knows what state you are in can then tailor the lighting within your space to suit, which has real clinical well-being benefits. Elsewhere, projection systems and flexible screens can offer a lot of potential to create new cabin experiences.



NIGEL GOODE

director, priestmangoode

What trends have you identified in cabin lighting?

Rather than focusing solely on the general lighting of the cabin environment, we're looking at how to integrate lighting in the monuments, the details of the seat environment, in order to provide more atmospheric lighting (something the automotive industry is doing to great effect). Also, the scope of lighting design within the cabin is changing as the size of monitors and devices has increased. These create more light pollution, so as designers, we're working on lighting schemes that minimise light pollution and create a comfortable passenger experience.

Is the use of LED cabin lighting for multiple colour cycles during flight ongoing or is it being toned down?

Whatever the industry, there's often a tendency when a new product is developed to overuse it to try and show off all its

capabilities, which is certainly something that we saw with the introduction of LED cabin lights. Now, the use of these is much more pared down. We use LED and coloured lighting to complement the cabin interiors. Our designs for South African Airways, for instance, include a blue lighting strip along the overhead bins, working to reflect the colour palette of the new interior. From a holistic brand point of view, it's a great tool.

What new capabilities or effects would you like to see enter the aircraft cabin lighting market?

I think there's scope for developing more bespoke lighting solutions, particularly at the higher end of the market. Our first class cabin for TAM Airlines, for instance, includes a completely bespoke reading light. It can go a long way to creating a more homely feel on board the aircraft.

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ED CALLAHAN

director of global business development, emteq

What trends are you noticing in aircraft cabin lighting?

Aside from the obvious transition from fluorescent and incandescent lighting systems to LED, we are definitely seeing a trend towards upgrades that are plug-and-play – reusing existing mounting provisions and wiring as much as possible. The more complicated a system is, the more likely that integration and installation costs will exceed the cost of the lighting kit itself. An upgrade that minimises that portion of the investment makes sense. While not all aircraft lend themselves to a drop-in upgrade, many do, including the Airbus family, B737NGs, and some B757s. In many cases, the drop-in lighting upgrade can be done overnight, getting the aircraft back into service quicker. In most cases, an airline can really maximise its investment with simple mood lighting as part of these drop-in upgrades.

What features are design houses and airlines requesting for their lighting systems? Have you had any unusual requests?

When an airline decides to proceed with a mood-lighting upgrade, the discussion progresses to implementing that system in a way unique to that airline. The airline should capitalise on that investment to really stand out, differentiating its fleet and enhancing its brand. With minimal additional effort, Emteq's systems can provide effects that make a world of difference. With our Quasar II full-spectrum mood-lighting system, Emteq has been working with airlines to develop custom scenes and unique lighting features. One of the more unique requests has been working with Icelandair to create a Northern Lights dynamic effect unique to its fleet.

What will the next generation of cabin lighting bring?

Emteq is working on several exciting technologies that will make future upgrades even easier to do, will integrate the lighting more into the aircraft interior, and will give greater capabilities to the airlines to differentiate themselves.

What is your top tip for a good lighting installation?

It has been our experience that the best results occur when we work together with the airline and MRO to integrate the lighting. Emteq is able to support this by completing the actual design data package. With some of the more advanced mood-lighting installations, building a mock-up – either at our facility or on the aircraft – is extremely beneficial so that all features and installation details can be agreed upon prior to installation.



PAUL WYLDE

ceo, paulwylde

What are the current trends in cabin lighting?

Same as they were 15 years ago – an essential component of the overall cabin experience that can offer adaptability, flexibility, versatility and drama. It can be used as a branded icon to enhance theatre; as a functional tool to aid service delivery and enhance comfort; or as a psychological asset that can enhance the feeling of space – for example Boeing's Sky Interior. The trick is to build lighting around a meaningful narrative that makes sense – welcome light, relaxing light, service light, landing light, etc.

Has the popularity of multiple LED colour cycles died down?

Were they ever that popular? The urge by some to use lighting for the sake of it was as wrong before as it is wrong now. The hospitality and retail sectors

use dynamic lighting effectively to create experiences that are distinctive and memorable. I think some airlines really didn't know what to do with lighting and explored abstract concepts for the sake of it. Lighting is simply another channel that, when integrated with other elements of the cabin experience, can create a holistic statement.

What new capabilities would you like to see enter the aircraft cabin lighting market?

Advice on why to use lighting instead of how.

Which airline has the best cabin lighting?

The ones where lighting enhances the overall experience in a meaningful and elegant way, and is not an overpowering and distracting element in its own right. I'll allow the readers to make up their own minds.



FRÉDÉRIQUE HOUSSARD

founder, designescence

What trends have you identified in lighting?

The main trend is to synchronise lighting with the flight rhythm so as to help alleviate the feeling of jetlag in passengers. Cabin lighting synchronisation helps to give mild aesthetic cues to passengers concerning the different phases of the flight (boarding, breakfast) and helps the body adjust gradually to time changes on long-haul flights. On short-haul flights, I think a trend is to use cabin lighting to emphasise the airline branding.

Is the quest for multiple colours in cabin lighting ongoing or is it being toned down?

I do not think the diversification of colour

cycles is meant only as a means of showing off this new technology. For me, it has been about exploring all the new possibilities it makes available to designers. It is about experimenting to find the right combination of colour, intensity, brightness and, above all, the duration of the lighting at the appropriate time during the flight. All of these sublime effects allow for lighting to now play an important role in the whole cabin design scheme, which is unprecedented.

What new capabilities or effects would you like to see enter the aircraft cabin lighting market?

Why not work with the dark side of lighting?

We could create theatrical poetry by casting shadows in the cabin. It is also a way to seize and make the most of the magic of lighting. Another possibility could be for independent lighting scenarios for each passenger, working mostly around each passenger seat as a start. It would be interesting to let passengers have more control and diversity for their lighting options, going beyond the simple reading light. Much of this would depend on the type of seat we are working with (business as opposed to economy), but it would play into the state of well-being for the passenger.



OLAF SCHULTZ

senior product and sales manager, schott aviation

What trends are you noticing in cabin lighting?

As a study for Schott Aviation with representatives from airlines, completion centres and design offices has revealed, LED technology is expected to remain the industry standard for at least the next 5 to 10 years. OLED will not play an important role anytime soon.

What are design houses and airlines requesting for their lighting systems?

They ask for LED lighting systems that facilitate the next generation of LED cabin lighting. At the same time, these systems should be easy to install and easy to operate. And of course, they should be efficient and long lasting in an economic sense.

What new capabilities or effects would you like to see enter the aircraft cabin lighting market?

Colour and mood-lighting will play a much bigger role soon. Managing colours,

plus the integration of cabin light into the cabin management system, will become important capabilities. Cabin lighting is not an isolated function. Advanced systems will provide integrated solutions – both from a technological perspective, as well as from the user's point of view.

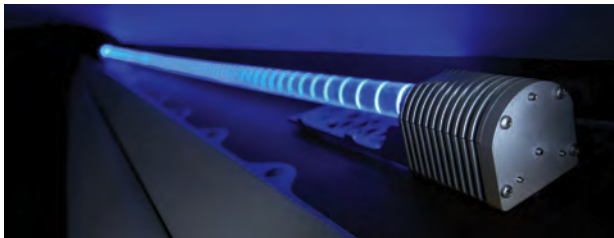
What will the next generation of cabin lighting bring?

Well, as I already indicated, we will see advanced systems, such as the 'nice HD' cabin management system from our partner Lufthansa Technik; this is specially designed for the integration of our HelioJet cabin lighting technology in order to drive exclusive and requested light-scenarios of all kinds. And, of course, the future will be colourful.

What is your top tip for a good lighting installation?

Fit HelioJet. At each end, one LED feeds light into an optical light converter, which mixes the light and distributes it evenly over the entire distance of the light element. There are no colour shifts and no 'light dots' – just top lighting. It works in white and also in red, green, blue and white. The coloured version offers 16 million different colour shapes, which are perfectly matched.

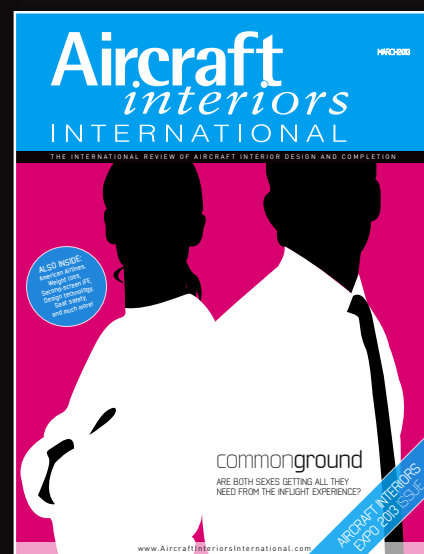
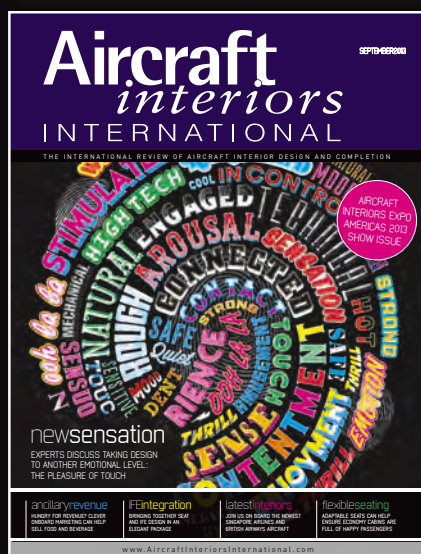
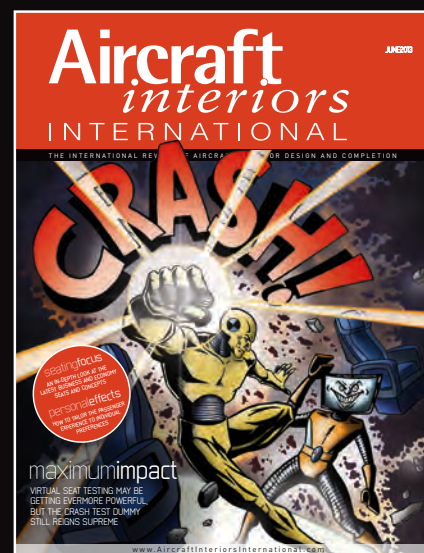
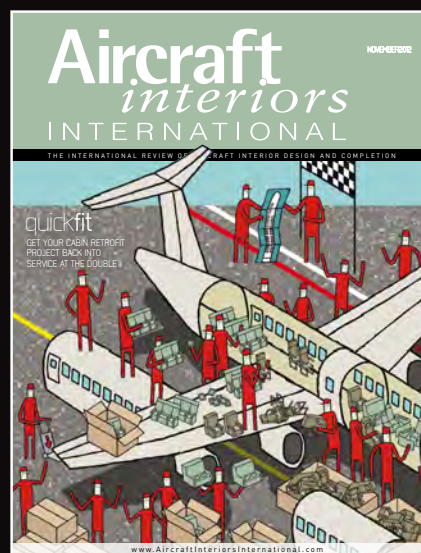




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JENS ROMCA
partner, müller/romca

What trends have you identified in cabin lighting?

Now that the initial euphoria over the availability of 16.7 million different colours has subsided somewhat, the focus has slowly shifted to simply achieving a good quality of light in the aircraft cabin. The meals, the ambient materials and the passengers themselves should look natural, fresh and attractive, and that can be achieved only with finely coordinated lighting colours. At any rate, 'colourful' is not what we're aiming for. Warmth is a factor that is all too often neglected. Some cabin interiors end up looking like the inside of a refrigerator. LED technology for homes is much more advanced in this respect than the LEDs currently available for aircraft cabins.

Is the quest for multiple colours in cabin lighting ongoing or is it being toned down?

Different lighting scenarios still make

sense and are in demand. Nowadays, the colours can be coordinated better, too – there have been big advances in the corresponding software. Now that every electronics store offers ambient lighting for living-room wall units, no airline can score points with LED lighting. The focus now is on using lighting to bring out the best in the cabin interior. That is why it is so important for interior designers and lighting developers to work together.

What new capabilities or effects would you like to see enter the aircraft cabin lighting market?

I could well imagine using ambient light, for example, to underscore general safety or advertising videos. Another development we will see is individual control of the lighting colours in each passenger's immediate vicinity. But, above all else, we would like to see LEDs with characteristics similar to natural or halogen light – namely

warm, bright and fresh – and they should make the materials and skin tones look attractive and natural. Why put all that effort into achieving an optimum mix of materials if the harmony is lost as soon as somebody turns on the light? A good white light should have the following characteristics: natural rendering of colours across the entire spectrum; colour temperature adaptable from cool to warm; and clear rendering of colours, even in dimmed light.

How can an airline achieve excellence in cabin lighting?

If an airline commissions us to develop its cabin interior and cabin lighting, we recommend that it sets up a well-equipped lighting laboratory together with us. In such a lab, we can take the time to experiment with the original cabin components and the latest LED modules in order to develop the best-possible lighting scenarios.



JAIME MORENO
ceo, mormedi

What trends have you identified in cabin lighting?

Cabin lighting is now seen as a must in aircraft interiors. It has ceased to be an element in the decoration, and has become part of a system. The trend is to help mitigate the effects of jetlag by simulating the natural movement of the sun, but at the same time, complementing and enhancing the finishes used in the cabin and seats.

Is the use of LED cabin lighting for multiple colour cycles during flight ongoing or is it being toned down?

The trend is going towards a more subtle and targeted use of mood lighting. Now that LED cabin lighting has been experienced

by airlines and passengers, it's not just about how many combinations or colours can be achieved, but to apply them in a very measured way. Not only are the colours dimmer, but we are using natural shades to help passengers to relax and enjoy the flight.

What new capabilities or effects would you like to see enter the aircraft cabin lighting market?

More personal control over different lighting options for different activities, such as reading, resting and eating, in the seat area is a key feature passengers really care about, and not just in business class. It would be nice to see personal

mood lighting in seats, as not every passenger has the same schedule and the goal should be to give a special and unique flight to all passengers.

Which airline has the best cabin lighting?

It's quite difficult to choose just one, because there has been a lot of effort in this area. But to name just a couple, Finnair, in its A330s, offers a cabin lighting system that simulates the sun's natural rhythm and combines quite well with the seat colours and cabin. Also, Emirates' night sky effect in its B777-200s is unique, and both Air New Zealand on its B777-300ERs and LATAM on its B787s offer a quality mood lighting experience.



DIEHL

What trends are you noticing in cabin lighting?

In terms of technology, the trend is clearly towards LED lighting. This light source is superior to the fluorescent tube and all previous light sources because it is lightweight, energy-saving and has a much longer lifespan. In terms of light mood, the well-being of the passenger comes to the fore and demand for coloured cabin lighting increases.

What are design houses and airlines requesting for their lighting systems?

The targets are two-fold: on the one hand, the aim is to enhance a light mood that increases passenger comfort and creates a welcoming atmosphere; and on the other hand, increases efficiency. Low investments, low system weight and low power consumption are the drivers for their decisions.

What will the next generation of aircraft cabin lighting bring?

Enriching the appearance of a cabin, accent and design lighting, such as for bars and monuments, will play a more prominent role. The next steps for illumination will move towards customisation, i.e. customers will want to further differentiate themselves by using individual solutions.

What is your top tip for a good lighting installation?

In order to achieve the light appearance results that you expect, it is highly important to integrate the cabin lights with the cabin lining at an early stage of the aircraft's development. Colours, surfaces, shapes and space envelopes in the cabin can all be considered later, once this has been done.



DANIEL BARON

managing director, lift strategic design

What are the current trends in cabin lighting?

We've seen a shift from mood lighting for the entire cabin, to area- or feature-specific lighting. This is fantastic, as both play an important role in shaping the ambience of the environment.

Has the popularity of multicolour cycles died down?

The early adopters have probably said, "Look, I no longer have a burning need to feel like Mars is rising over my crème brûlée." We're seeing more subtle 'flavours' of lighting that help create gentle differentiation, as opposed to a set from *The Wizard of Oz*.

Which airline has the best cabin lighting?

The one whose seats are so comfortable that I'm asleep!



LUKE PEARSON

director, pearsonlloyd

What new capabilities or effects would you like to see enter the aircraft cabin lighting market?

LED systems allow designers to deliver very tuned solutions in terms of the aesthetic experience. While these can and do give psychological cues to wake or sleep, we know how unnatural it is trying to induce sleep in a noisy air conditioned environment at the wrong time. However, we know that LEDs operate in the blue end of the spectrum, so we still have a situation where our circadian rhythms are being wrong-footed when it comes to sleep. Going forwards, a greater understanding of this, and an ability to deliver physiologically correct lighting levels, will be the goal.



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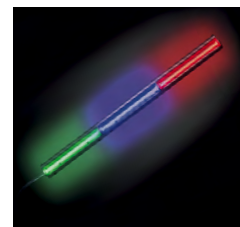
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In the final instalment in our series on the aircraft industry gaining influence from outside sectors, we ask designers how residential design trends are informing cabin design

GUY BIRD, AIRCRAFT INTERIORS INTERNATIONAL





01. The design classic that has influenced many aircraft seat designs: the Eames Lounge chair (photo courtesy of Herman Miller)

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- 02. McEneaney's inspiration: the Sheats Goldstein Residence in LA
- 03. Kelly Hoppen sees home style having a huge influence on cabin design
- 04. David Caon thinks every cabin designer is influenced by residential design

03



04

When modern society spends so much time in the air, it's logical enough to try to create a space that looks a little more like 'home', or at least makes those customers feel 'at home'. But with domestic interiors and aircraft cabins fundamentally such different spaces – one intrinsically private, the other public – what common ground, if any, can be found?

Unlike the widely accepted inspiration of hotels and the hospitality sector on aircraft designers and, to a lesser extent, the 'process influence' of virtual design and testing techniques widely used in the automotive industry to improve how things fit in aircraft interiors, the relevance of residential trends to aircraft design initially got a more muted response from our panel of experts.

Take Luke Pearson, director at PearsonLloyd, the studio behind Lufthansa's recent business seat. "Personally, I think it's having very little influence, but then it's difficult to put a direct lineage on influence," Pearson begins rather unpromisingly. He does relent a little, however: "I think there's a slightly less bombastic assertion of brand and a richer material and colour palette emerging that is slightly calmer on the eye and that might have a connection to a domestic landscape where airlines want to be less corporate. It might also be a direct spin-off from the increase in boutique hotels, which took a direct influence from domestic architecture. There is a series of connections."

SEEKING A HOME FROM HOME David Caon, creative director of Caon Studio in Sydney, Australia – who worked on the acclaimed Marc Newson A380 interiors for Qantas – takes a similarly pragmatic viewpoint, but thinks a shift

awesome abodes

Asking aircraft design experts about private domestic interiors that had influenced their aircraft work resulted in an eclectic set of bricks and mortar. Australian David Caon of Caon Studio was bowled over by a visit to the wonderfully spherical Palais Bulles ('Bubble House'), designed by architect Antti Lovag for fashion mogul Pierre Cardin and completed in 1989. "It's as much a house as it is an experience," Caon enthuses. "And what struck me immediately was that it is at once futuristic and at the same time possessing of an innate sense of home. So I think it's a poignant reference for aircraft design work as in reality the [aero] environment will always be an inherently alien and bespoke one where we want to feel comfortable, safe and human."

Based in Los Angeles, Patrick McEneaney of BMW Group DesignworksUSA is spoilt for choice in terms of cutting-edge private architecture. Through his firm he recently went on a number of house tours for inspiration, but cites the early 1960s Sheats Goldstein house by John Lautner in particular. "It would be impossible to replicate directly in any aviation context," McEneaney quickly clarifies. "But what was remarkable was how visionary the project was. It has this monolithic concrete structure with an incredible flying roof – like a giant airplane wing – and on the underside is this unique diamond-shape pattern that creates the structure. You really notice the floor and the roof, not the walls. It has a swimming pool side that is viewable from the bedroom below and a dramatic built-in desk and cabinetry. The way it ties interior and exterior space together is interesting and under-explored inside a jet."



05



06

“

I SEE RESIDENTIAL DESIGN
INFLUENCING AIRCRAFT
DESIGN MASSIVELY ”

05. PearsonLloyd's business seat design for Lufthansa uses leather on the centre console to evoke a lounge chair feel

06. Lantal's Pneumatic Comfort System was used to create home-like levels of well-being

in aero design has taken place. “Essentially, it's impossible for a designer of aircraft interiors not to have been influenced by residential design due to the simple fact that it's such a fundamental part of everyone's life and environment,” he attests, not unreasonably, before adding, “but what may be happening is that designers are trying less to make their cabin interiors appear different from designs that are found on the ground.

“In the past, there has been a tendency to strive for an aesthetic that could be described as ‘futuristic’. What we are seeing now are designs emerging where this type of aesthetic is not necessarily the goal. My assumption on the origin of the futuristic aesthetic would be that it was a reaction to the environment, the available materials and the limitations, both in terms of space and certification requirements. These are factors that are not faced in a residential project and therefore a designer enters those projects with a very different mindset. I think it could be described as a natural progression as much as it could be labelled a trend.”

Christine Ludeke, previously Swiss's first in-house designer and now heading up her own practice in Zurich, Switzerland, has a theory that adds credence to Caon's futuristic one. “Many heads of airlines were ex-pilots or engineers,” she says, “so the focus used to be on technical

pross, but now everyone pretty much has the same aircraft, so the competition and differentiation has to be made on ‘softer’ levels, such as interiors and the whole inflight experience.”

Ludeke thinks some of this recent shift towards a more ‘homely’ or residential-referencing aircraft cabin, can be traced back to the early 1990s, when airlines started offering more things that related to the home, rather than just sitting on an upright seat in a metal tube for a bunch of hours. “When British Airways presented its first ‘private’ first class suites with a new, herringbone, layout, it was still rather abstract, but started to bring in the concept of ‘home’. In fact, with the advent of private ‘sleeping’ spaces in both first and business, the intimate act of going to bed gave rise to a more intimate, i.e. ‘residential’ design approach.”

Well-known commercial and residential interior designer Kelly Hoppen – who also worked on British Airways' turn-of-the-century first class cabin experience – has an unusually wide perspective to draw from for this topic, and is in no doubt: “I see residential design influencing aircraft design massively. The interior of an aircraft should feel comfortable, cosy and inviting, just like a home. You need to remember you are creating a single seat that needs to be somewhere you can eat breakfast,

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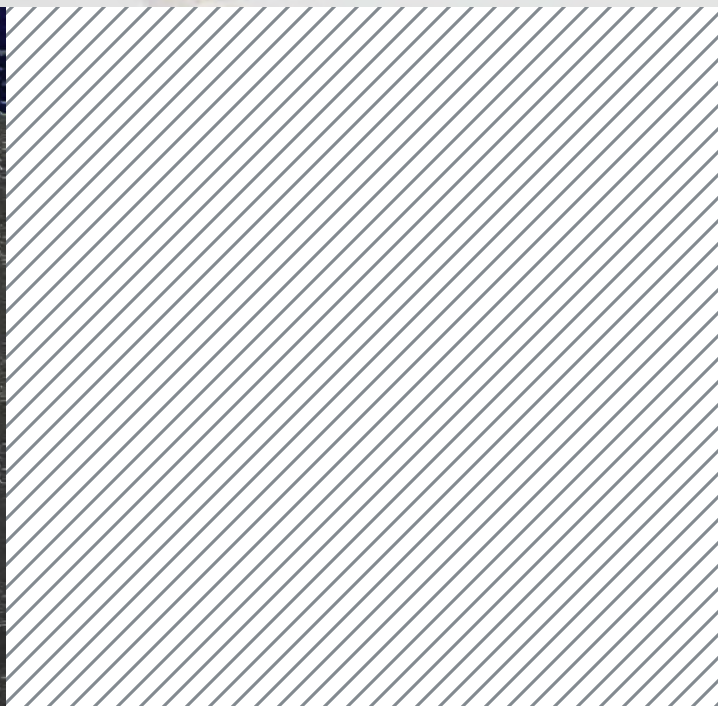
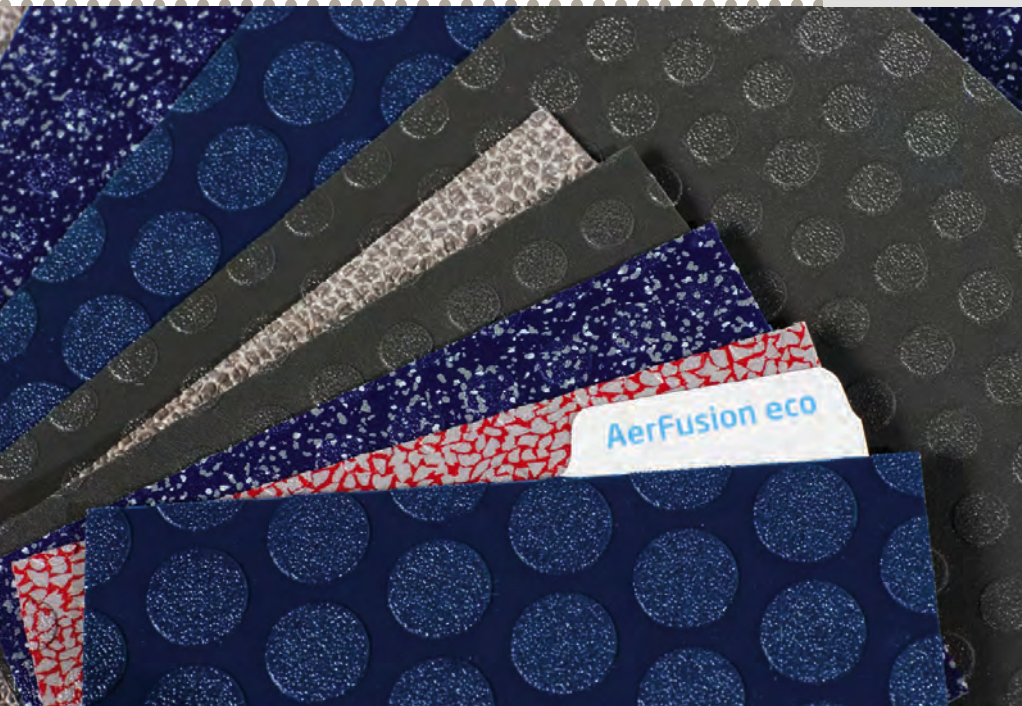
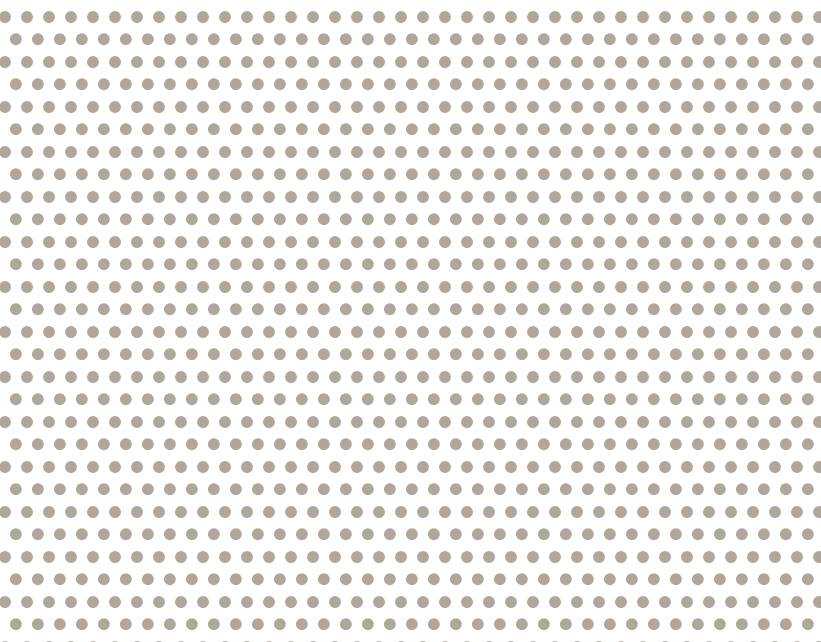
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watch TV and sleep. You are incorporating three or four aspects into one tiny space so everything has to be about making the customer feel relaxed. Being a nervous flyer, I am very aware of my surroundings, and that is why designers need to appeal to each sense and make sure everything you touch, feel and smell has a calming effect.”

RESIDENTIAL FIRST In terms of modern-day tangible designs that have taken the residential approach, Daniel MacInnes, project head at Priestmangoode, cites his firm’s TAM Airlines first class cabin as a good example. “The focus of our work is on creating a seamless passenger experience from home to destination,” he says, “and referencing residential interiors in the details is one of the ways in which we’re able to do this.

“For our TAM Airlines cabin, it was all about looking at the social aspect of home. The standard footstools opposite the two central seats were replaced by a sofa to enable passengers travelling together to sit and socialise as they would in their own home. So for this we looked at lounges and living rooms, and the fabrics, materials and details of the furniture you would have in a residential environment. For TAM we used wools, leather, suede and zebrano wood.”

Rightly, MacInnes doesn’t see residential design cues being a one-size-fits-all influence though. While TAM’s first class cabin was about recreating a social residential space,

“by contrast, our cabins for Jet Airways and Etihad were very much about creating a private space on board the aircraft”, MacInnes continues. “For these types of projects, we look at the more personal spaces in a home – bedrooms and studies – while materials and finishes depend very much on the culture. Our first class cabin for Thai Airways International uses a lot of wood and a colour palette reflective of the Thai culture, while our interiors for Etihad feature predominantly leather.”

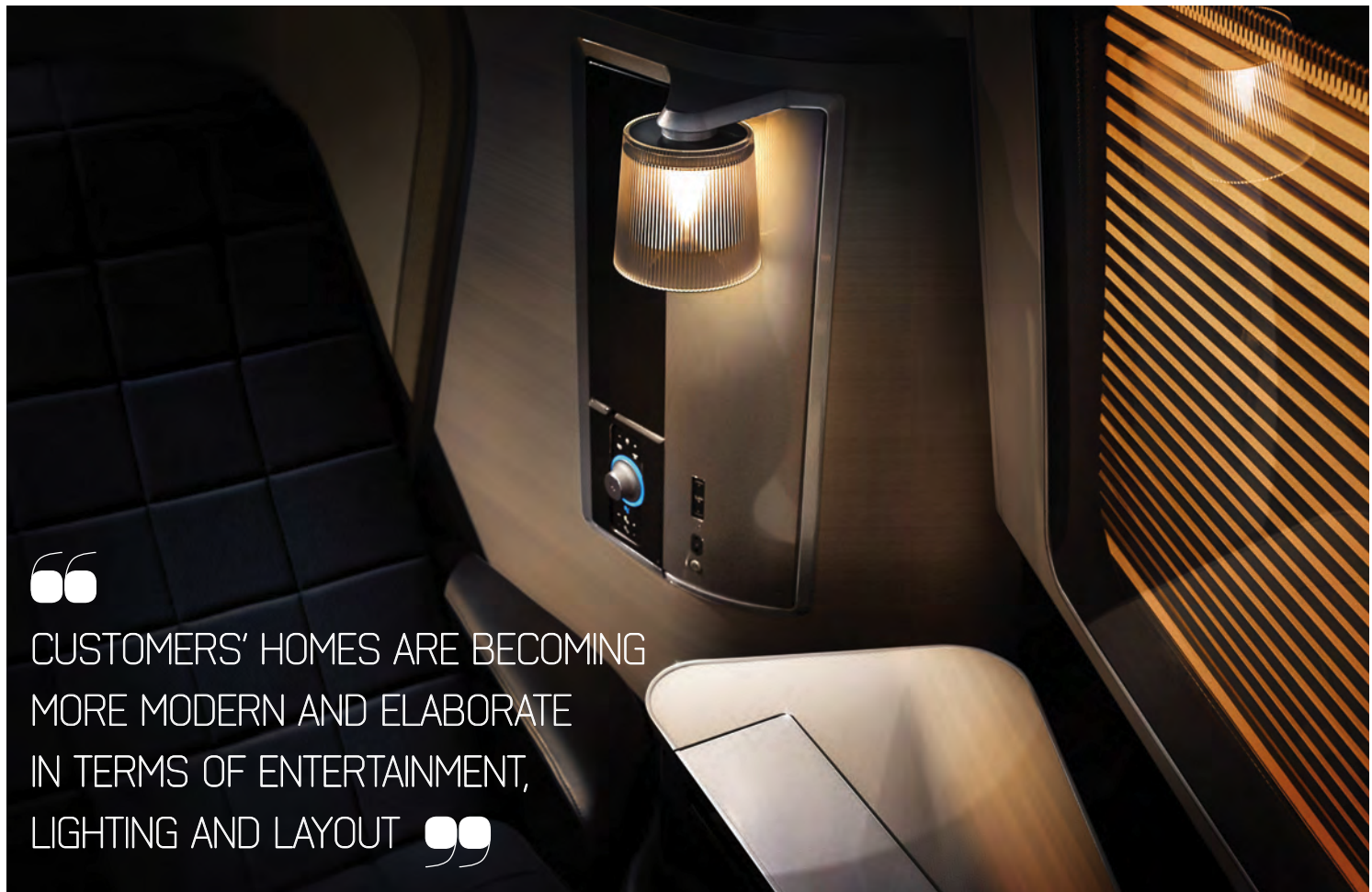
COLOUR CALM Despite his comments earlier, PearsonLloyd’s Luke Pearson does concede his company’s recent Lufthansa business seat has a heavy residential vibe. “Our philosophy was that the leather centre console would create a warm cosy den within the shell, very much like sitting in a classic lounge chair. The silver fabric on the seat was specifically designed to be a neutral palette so the person’s clothing became the accent colour. Previously these seats were blue, which was a very dominant brand presentation. This one felt more subtle and allowed the

07. An early rendering of TAM’s first class. Note how the seat ‘floats’, giving a more homely feel
08. The TAM first class design drew from contemporary Brazilian home style

“

THE FOCUS IS ON CREATING A SEAMLESS EXPERIENCE FROM HOME TO DESTINATION

”



“

CUSTOMERS' HOMES ARE BECOMING
MORE MODERN AND ELABORATE
IN TERMS OF ENTERTAINMENT,
LIGHTING AND LAYOUT ”

09

09. From the seat control knob to the false window, to the lamp, BA's first class draws on residential design
10. The Swiss first-class seat was influenced by the Eames Lounge chair (see opening spread)
11. Swiss passengers can even enjoy a relaxing breakfast together – just like at home

space to become more personal. So in a sense, [and then he chuckles at his apparent U-turn], although I said residential wasn't an influence for us, for this project we were very influenced by the work we do in the domestic furniture world.”

But is this residential influence possible in economy class or elsewhere when budgets are less generous and space at even more of a premium? Patrick McEneaney, associate director of creative consulting at California-based BMW Group DesignworksUSA – is a believer, although not perhaps in a direct aesthetic sense. “It's a good challenge,” he admits, “but I think a strong focus on entertainment choice is one way to make economy class feel more homely, having the activities without necessarily the look and feel of a residential interior, by being able to choose between direct TV, 300 movies and carrying your preferences on board, to create a living room experience around entertainment.”

GREAT(ER) EXPECTATIONS Part of the reason residential design is influencing aircraft design in positive ways is that airline customers' homes are becoming more modern and elaborate in terms of entertainment, lighting and layout – and the same customers are expecting and demanding something similar up in the air. Where once a TV stood on a stand in a corner of the living room, too bulky to be moved easily, let alone connected to the internet, domestic



10



11

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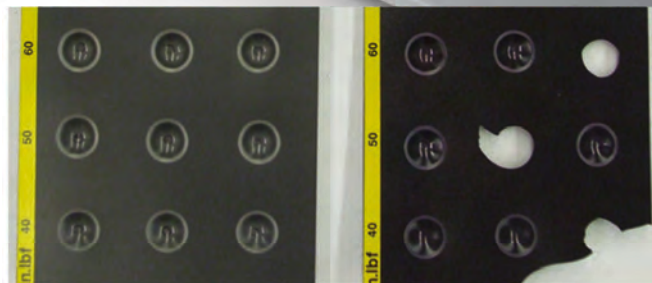
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“

ONE SPENDS A
CERTAIN AMOUNT OF
TIME IN AN AIRCRAFT...
YOU WANT THAT TIME
TO BE AS ENRICHING
AS OTHER ASPECTS
OF YOUR LIFE ”



12



13

12. Knitted fabrics are a popular home choice, and were selected for the Greiner Aeras seat, designed by Ludeke Design
13. Modern finishes and lighting are enhancing lav designs such as this creation from Yokohama

family life today can revolve around numerous portable screens and tablets, all connected at one time, while lighting is no longer a solitary bulb hanging from the centre of the ceiling to merely illuminate the room. LED strips, up- and down-lighters, neon and more, can all affect 'mood' and 'ambience'.

As Christine Ludeke of Ludeke Design asserts, "Consumers today are more sophisticated, and knowing from their offices and homes how spaces can look and feel, they increasingly appreciate and even want that in their aircraft experience. It's a time/value thing. One spends a certain amount of time in an aircraft, especially on long-distance flights, and you want that time to be as enriching as other aspects of your life."

Away from the basic seat space, both Ludeke and BMW's McEneaney see residential experience extending to less currently glamorous aero areas such as lavatories, as McEneaney reasons: "The connection to personal space is more obvious there, so when you're putting on make-up or refreshing your face on a long flight, that's where you might want the tactility you'd expect in a residence."

While Ludeke applauds the "richness in materials and surfaces from residential sensibilities" now able to pass aircraft-worthy legislation to give designers more options,

she does sound a note of caution about being over-influenced, citing when Swiss's first class seat directly referenced the famous Eames Lounge Chair.

"It was interesting to see a seat so clearly associated with home furniture, but the space was still an aircraft interior, with very specific characteristics, which frankly can also be cool," she says. "There can be a jarring disparity if the referenced elements are not integrated in a suitably sensitive way. In the case of this first class seat, the problem was that certain aspects that made the Eames seat what it is, became mere styling attributes on a much heavier seat frame, due to its aircraft seat requirements."

In summary then, using outside influence can be a positive attribute, but don't fall foul of hoping that a simple cut-and-paste approach from residential to aircraft design will instantly turn your aircraft interior into a home from home. Proceed with caution. ☒

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Most passengers' experience of high-tech audio is the booming surround sound of movie theatres and home cinema setups, where technologies such as DTS and Dolby Digital are the norm. Can advanced audio technologies hope to find their way into IFE solutions? And should they? "I think it's a natural progression. We generally find aircraft cabin technology is anything from two to five years behind the domestic curve," says Gareth Southall, lead designer at Virgin Atlantic.

There is obvious resistance to the idea of headphone-free audio technology in the cabin, and Shiada Drysdale, customer experience manager at Virgin Atlantic, typifies the concerns of IFE managers: "Perhaps in the future, but we are conscious of noise bleed into the other cabins and the potential nuisance it could be to other passengers who wish to have a quieter environment."

HEADPHONES With the self-evident acoustic challenges of advanced audio solutions in the round tube of an airframe, headphones offer the most logical area for enhancement, and they can already feature technologies such as pseudo surround sound. "Advances in digital audio encoding, digital CODECs and system designs coupled with compatible headphones can create an even greater surround-sound experience. Probably in the premium classes first, then spreading to economy cabins as systems mature and costs decrease," says Steve Sizelove, product research manager at Panasonic Avionics.

But headphones might not be the only viable option in the coming years, as Sizelove explains: "Other technologies will be used in the future to create interesting surround-sound effects in ultra-premium cabins. These solutions might include luxurious surround-capable headphones,



“

THEY USE ULTRASONIC WAVES TO CHANNEL AUDIO INTO A DIRECTIONAL BEAM”

careful placement of true surround-sound speakers, bass transducers rather than subwoofers, and even use of new technologies such as directed audio, which turns ‘bad’ characteristics into interesting surround solutions.”

It’s an enticing possibility: could the next wave of IFE audio technology really offer directional sound technology whereby passengers will not require headphones to listen to their choice of movies, music and games? And can do so without disturbing their neighbours?

DIRECTIONAL SPEAKERS In the consumer arena, technologies such as directional sound are slowly becoming available, although they have been a long time coming. Parametric speakers, those that produce directional beams of sound, aim to channel sound directly on the intended subject, rather than the radial spread of sound from conventional speakers. Until recently, such technology has been largely limited to what’s known as long-range acoustical devices (LRADs), commonly used by riot police to direct pain-inducing noise.

The latest consumer-orientated directional sound technology forerunners are widely termed ultrasonic solutions (various implementations exist, including the Audio Spotlight and the HyperSonic Sound system). At the risk of over-simplification, these technologies achieve directionality by using ultrasonic waves to channel audio into a directional beam.

Sound domes are another possibility. The principle here is to use spherical surface sound reflection to reflect sound waves from the dome’s hemisphere onto the listener,

resulting in a far greater intensity of sound for those under the sound dome than for those just to the side.

For an area that had moved slowly since the 1950s, advanced audio technology is now starting to move apace. For example, experimental solutions such as the SteganoSonic employ transducers to convert digital information into ultrasonic waves, enabling it to send not just audio but also data in highly directional bursts.

For airline applications, it is not merely IFE that could benefit from such technology. It’s not difficult to appreciate the benefit for cabin crew of being able to direct announcements and information to particular seats, for example. It’s the kind of technology and possibility that is starting to pique the interest of airlines. However, Panasonic’s Sizelove is quick to explain the challenges for aircraft applications: “We have been evaluating directional sound technology and potential applications in our industry since 2003. Our opinion today is little changed from that time. Directional sound is a very interesting technology worthy of continued evaluation, but it has several technical issues that today keep it from being viable for use in aircraft environments. These issues include expense, impact on system architecture such as the need for amplifiers, audio quality in terms of fidelity and volume, or sound pressure levels and characteristics of the supersonic technologies involved that include beam directionality and reflection.”

However, despite these technical considerations, Panasonic has not been put off. “Even with these technical considerations, the opportunities presented by directional





driving innovation

Audio zones are also being considered for other modes of transport. How many car journeys are ruined by arguments about which type of music to play or which radio station to tune into? All the while, the driver also needs audio feedback such as satnav instructions and vehicle warning sounds. The solution? Multiple independent listening zones within a car, so the various occupants can listen to different audio without interfering with one another – without using headphones.

This technology is currently being developed by Jordan Cheer, a research fellow in Active Control at the Institute of Sound and Vibration Research at the UK's University of Southampton. His work covers both active control of noise and vibration and sound field control for audio reproduction.

To understand the physical acoustic limitations associated with generating personal listening zones in a car cabin, Cheer conducted numerical simulations, which highlighted that the four standard car audio loudspeakers in the test vehicle were only able to achieve control at low frequencies due to the modal characteristics of the car cabin enclosure. To achieve personal listening zones over the full audio bandwidth, Cheer found that it is necessary to introduce additional loudspeakers positioned in closer proximity to the car cabin occupants' heads. This has been achieved by positioning two small directional loudspeakers at each headrest.

The full personal audio system has been implemented in a small people carrier and uses the four standard car audio loudspeakers at low frequencies, and eight small headrest-mounted loudspeakers at higher frequencies. The audio signals driving the individual loudspeakers have been processed to generate independent listening zones in the front and rear of the car. The system is able to achieve 15dB of isolation between the two listening zones.

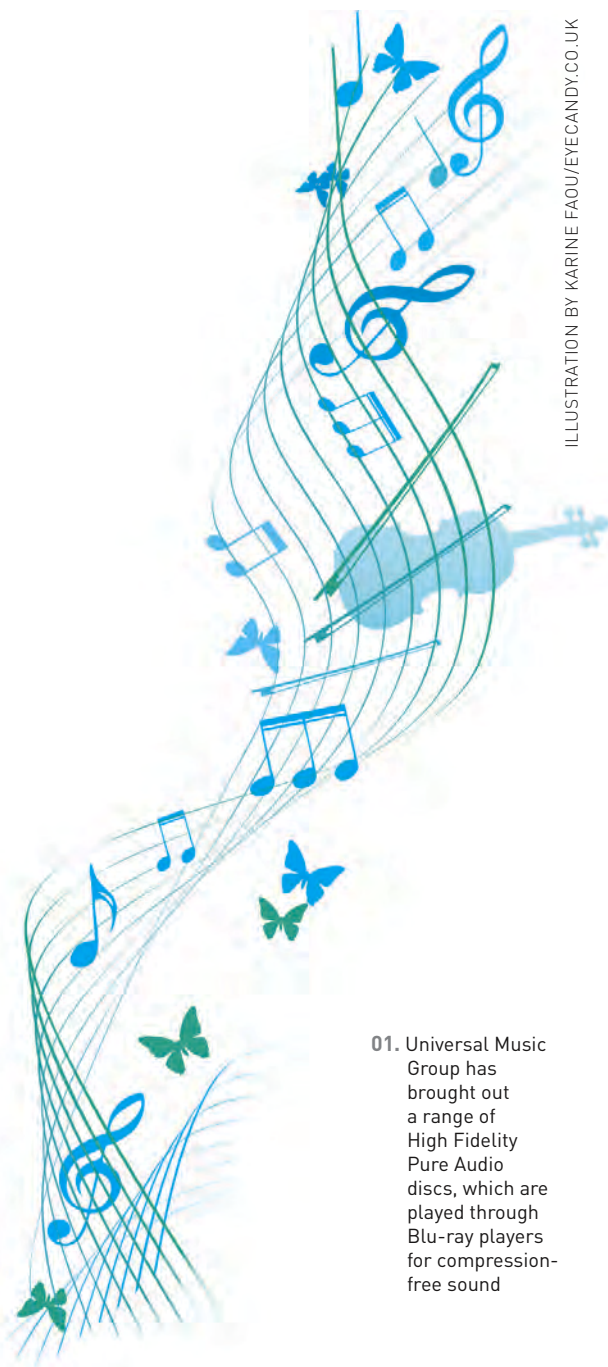


ILLUSTRATION BY KARINE FAOU/EYECANDY.CO.UK

01. Universal Music Group has brought out a range of High Fidelity Pure Audio discs, which are played through Blu-ray players for compression-free sound



01



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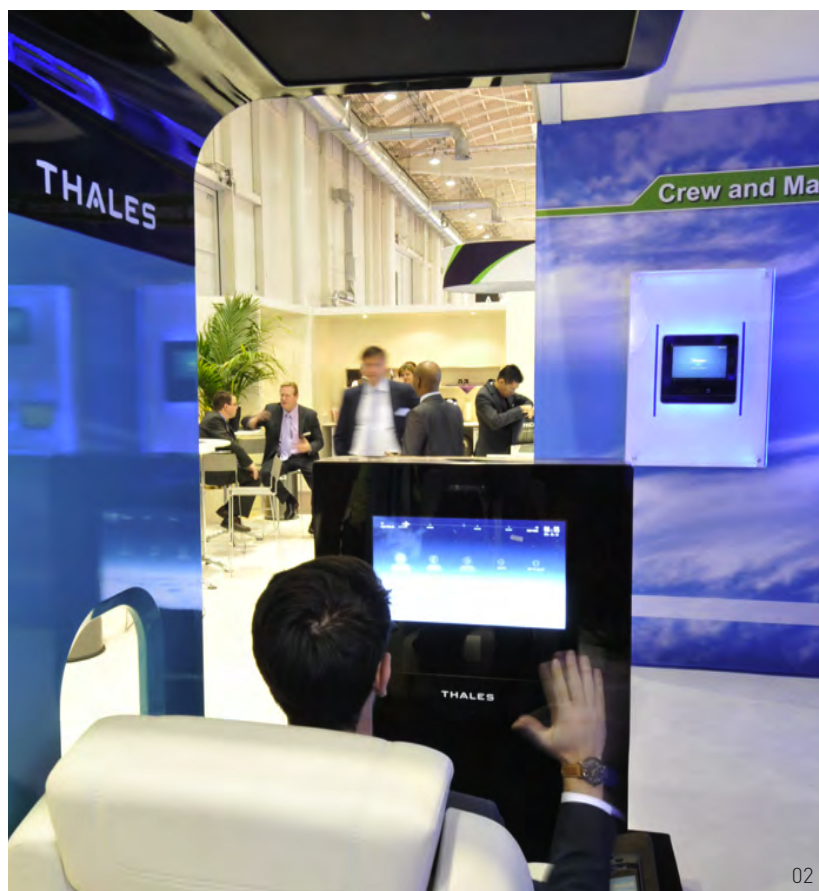




sound are compelling enough that, in addition to our evaluation of third-party off-the-shelf solutions, we have made considerable investment in in-house research and development to develop custom-directional audio solutions which address these current technical problems and may enable exciting cabin audio concepts,” says Sizelove. Unfortunately, at present, the results of Panasonic’s labours are not ready for public consumption.

SNEAK PEEK “Through various trade shows I have seen some incredible interactive IFE and directional sound experiences,” says Virgin’s Drysdale. As might be expected, the headline-grabbing solutions tend to be those created by the larger IFE solution providers. Thales is the first of the major suppliers out of the gate with a directional sound solution, as Brett Bleacher, director of advanced products at Thales, explains: “Directional sound technology has already been integrated into several IFE show demos, including our Thales Immersive Seat. We are working with several seat manufacturers and other seat pod developers to incorporate three different directional sound technologies into both first and business class seat configurations.”

Thales’s first solution uses specialised speakers, the second uses specialised transducers, and the third uses specialised speakers plus the reflection of sound from a Plexiglas dome. Bleacher’s explanation of how these surround systems actually work sounds like the domain of science fiction: “Directional sound uses a technique called beam-forming, whereby the audio sound is digitally signal-



02

processed to specifically direct and bend the audio sound beam toward the user’s ears.” Although the audio algorithms producing the beam-forming are proprietary, Bleacher admits that “much of the hardware makes use of existing speaker and transducer technologies”.

Panasonic Avionics is hot on the heels of Thales. “In the near term we plan to offer systems with magnetically attached headphones; enhanced ultra-low bass; improved 3D surround sound; ‘open-ear’ dialogue capabilities; voice, such as movie dialogue, enhancement; improved noise cancellation; plus audio solutions which assist travellers with accessibility considerations related to sight impairments,” explains Panasonic’s Sizelove, adding that, “Further out we are investigating the feasibility of bringing to market infant and emergent technologies related to directional sound, surface acoustic resonance and cell-free power solutions.”

With the big guns of IFE already lining up their offerings, will this only ever be a two-horse race? “There are smaller companies out there at trade shows showing

02. The Thales Immersive Seat concept showcases technology such as directional sound and gesture control



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THE CATALOGUE APPROACH OF AIRCRAFT MANUFACTURERS MEANS IT'S TOUGH AND EXPENSIVE FOR AIRLINES TO INNOVATE

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interesting products. It's down to the airlines to support these products and try to get them on board," says Virgin's Southall. "It's a very tough market to get into, though. The investment to get a product to market is a big gamble for smaller technology companies. The new catalogue approach being adopted by the big aircraft manufacturers also means it's very tough and expensive for airlines to innovate. It usually means installing things post-delivery, which is very expensive," he explains.

LEGISLATION As if the acoustic challenges weren't enough, there are the legislative considerations, which Sizelove details: "Radio-frequency wireless solutions have technical and legislative considerations such as bandwidth, channelisation, charging-in-flight, frequency spectrum usage and transmitted power. Other technologies bring forward concerns related to long-term exposures and passenger health and safety." Although it's not all bad news, as he goes on to explain: "Let's not forget though that there are legislative considerations which present opportunities for bringing innovative and compassionate solutions forward to assist those with accessibility requirements."

CLASS WARS As with any emerging technologies, due to the fiscal considerations, the premium classes are likely to hear the advancements before economy. Sizelove paints a vivid picture: "Premium classes, especially the latest

ultra-premium cabins, are kind of the antithesis of economy class. These cabins afford greater flexibility to explore new and exciting solutions related to wireless technologies, premium functionality, comfort and performance. Solutions could range from simple high-quality wireless headphones to headphone-free audio capabilities that don't disturb other passengers."

Bleacher summarises the reality of installing the next wave of audio technology in economy classes. "Limitations in real estate, cost, configuration and interference/bleed limit the technology to first and business class. The performance and cost of this technology prevents installation within the coach class sections."

It's not merely the physical cost of the equipment, it's the associated costs and implications. Take wireless headphones as just one example. Besides the physical limitations of passenger proximity in economy classes, cost, power and weight restrictions filter the possibilities. "A wireless audio solution is difficult to implement, not only because of inherent wireless technology concerns, but also, and perhaps more so, due to the necessity for a battery power cell in each headset. Whether rechargeable or disposable, a power cell increases total cost of ownership and system and operational complexity to a point that, with today's technologies, greatly reduces desirability and even feasibility as a mainstream offering in economy class," says Sizelove.





CUSTOMER REQUESTS ARE
NO GUARANTEE OF THE LIKELY
POPULARITY OF A SYSTEM

However, passengers may not necessarily need to bump up the classes to experience the new technology, as Southall explains: “Different areas of the cabin have different requirements, and customer seating areas may only really need headphone-based technology. More open social areas such as galleys and bar areas are where technologies such as directional sound, sound curtains and noise cancelling could be interesting. Hopefully, the aircraft manufacturers and IFE suppliers will look into this in the future.”

WHAT CUSTOMERS WANT? Although advanced audio technologies such as surround audio in the IFE space are edging towards becoming a mainstream reality, is it something that passengers actually want? “We haven’t seen any feedback to suggest so, but we are open to looking at new innovative solutions,” says Virgin’s Drysdale. However, it’s also worth remembering that customer requests are no guarantee of the likely popularity of a system or service. Consumers don’t always know what they want. Now ubiquitous consumer products such as the iPhone or iPad didn’t reach fruition purely due to pent-up consumer demand.

LICENSING Incorporating branded sound solutions such as DTS and Dolby (audio encoding that is almost universally employed in feature films) into directional sound solutions presents some technical challenges. “DTS and Dolby are still being evaluated to see whether DTS, Dolby or surround-sound technologies such as 5:1 or 7:1 can be

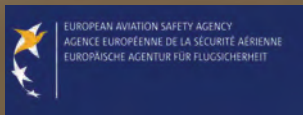
implemented within the directional sound technology,” explains Bleacher.

In addition, there is the usual legislative red tape. “Any new technologies are of course subject to certification from the aviation regulators, aircraft manufacturers and the IFE supplier, which takes time, money and dedication to achieve,” says Southall. However, the challenges of high-tech audio incorporation are certainly not drowning under the weight of certification or approval issues for licensing. “Games, films and even some music offer similar considerations related to audio programming and associated branded compliance, regardless of the technologies utilised. Compliance with DTS, Dolby and the like will be handled pretty much as they are today, including coding, lab verification, etc,” says Bleacher.

However, independent productions offer scope for innovation. “An interesting trend is the rise of independent content production, in which audio programming is a bit of a blank slate, offering opportunities for new and exciting audio experiences starting at the source content and extended through appropriate application of technical solutions,” reveals Bleacher.

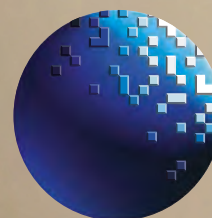
While the first installed examples of aircraft-based directional sound solutions are still some way off, there at least exists both proof of concept examples and empirical evidence to suggest that the solutions are coming in the near future. These audio advancements may eventually prove to be more seismic shifts in what passengers come to expect from the IFE experience than all the more heavily vaunted visual advancements that have gone before. ☒

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Compare notes as textiles, leathers and flooring suppliers
and specifiers share their thoughts on the industry



"We're seeing the continued influence of automotive trends in terms of cover design"

Archie Browning, sales director, Andrew Muirhead
Browning is confident that genuine leather provides the best value and lifespan for airlines



What trends are you noticing in your field? Mainly an increasing interest in lightweight and low-carbon products alongside a general increase in company environmental credentials.

Are aircraft leathers drawing inspiration from other areas of application? Yes. We're seeing the continued influence of automotive trends in terms of cover design (panelling/stitch detail) and an increased use of lamination to create a clean and crisp finished cover.

What's the most important thing for an aviation customer to consider when selecting a seat trim? Value – and by that I mean how much it costs and how long it will remain in service on the aircraft. As with many things, if you buy cheap it simply will not last, and on an aircraft that is a false economy.

Are aircraft leathers now as light as they will ever be? Voyager, which is the lightweight product from Muirhead, is a great leap forward. However, we will continue to evolve it and doubtless further reduce weight.

Are there any difficulties with getting certain leathers through aviation testing? None of the leather-only tests are a problem. But when you introduce combination tests, including foams, etc, it can become more challenging.

What do you see as the main issues currently in the aviation leathers industry?

Cheap products with a lifespan of perhaps three years being sold into the sector as genuine aviation leather. I have seen them fail on many occasions as well as looking very poor after as little as two years' service. It is less expensive per square foot but offers no real value. It can also deter airlines from using leather, which is a shame when genuine transportation leather has been known to fly in economy for up to 12 years, offering excellent value.

What will the next generation of aviation leathers bring? A product that increasingly lends itself to the trends listed above, such as lamination and automotive.

Are you bringing out anything new in 2014? Yes! However, we plan to discuss the launch at a later date.



Chad Evans, VP of aviation leather sales, Moore and Giles

Evans predicts a more residential approach to material choices

What trends are you noticing in your field?

Colour and texture. Textured leather is making a comeback for seat and lower sidewall applications, including a variety of finishes and textures complementing the current palette.

Are aircraft leathers drawing inspiration from other areas?

We are drawing lots of inspiration from the automotive and hospitality areas. The hospitality industry caters to the end user, who has very specific expectations of interiors.

What will the next generation of aviation leathers bring? Moore and Giles was the first company to introduce a combination oil/wax pull-up leather to the residential market back in the early 1990s. In this day and age, we would love to see more natural leathers used in aircraft seat applications. There are customers who would like their aircraft seats to look like 20-year-old cigar chairs by Ralph Lauren. We have tanners around the world that produce this type of leather for us. I can see more VIP customers taking their interiors to another level with residential-type finishes and textures.

Are you bringing out anything new in 2014? We have introduced new colours and textures for 2014. Papillon and Maui are new to the industry. The leather is hand tipped, giving it the appearance of shagreen but with zero plate lines. We will see more seat applications with this type of leather as you can cut larger patterns without plate lines.



Matthew Nicholls, group MD, Yarwood Leather

Nicholls says that to create the best passenger experience, seat trims should be chosen very early in the design process



What's the most important thing for an aviation customer to consider when selecting a seat trim? The cut and sew

process, who will make it and whether the leather has been engineered to fit the cover correctly. Too many times we see very little thought given to the seat cover design until it's way too late. Any good furniture designer will tell you that the seat cover design can turn a sow's ear into a silk purse – and vice versa if it is not managed correctly.

Are aircraft leathers now as light as they will ever be? Our current lightest is still the class leader at 400gsm versus



everyone else at around 600gsm and e-leather at 450gsm. I can't envisage seeing a product get down in the 200s as it would be like a cobweb.

What do you see as the main issues currently in the aviation leathers industry?

Interestingly, one of the biggest challenges is customer education. The aviation leather supply chain typically devolves the decision-making process to the airlines. They have a good contingent of highly educated and very experienced engineers, but rarely any technically qualified experts in the field of leather science. While leather is not a mission-critical structure in terms of safety, it is the primary interface between the passenger and the airline. We often find that leather is treated as an afterthought; it is frequently left until the end of the procurement process and given too little time to specify, develop and manufacture. If the process was begun earlier and the start of the design process for a leather seat was the leather, I believe you would see a huge benefit in perceived value, quality, style, design and luxury. After all, leather is still considered one of the original luxury products.

Manuel Zottler, sales manager, Wollsdorf Leder

Zottler is noticing greater demand for leather in the short-haul market, as well as for 'green' and slightly finished product



What trends are you noticing in your field?

We are noticing three trends – weight saving, reducing maintenance costs and the use of 'green' products like chrome-free tanned leather. In business and first class we see a trend towards slightly finished high-end leather articles with a good feel. We are also noticing a trend towards specifying leather for short-haul aircraft because of its easy cleaning characteristics and lifetime of up to eight years.

Are aircraft leathers drawing inspiration from other areas?

Economy seats are looking more similar to car seats with regard to design and upholstery, whereas in business and first class the seats are more influenced by

sofas and chairs. We have a fully integrated tannery and cater for automotive, upholstery and aviation, so we transfer trends and technical experience from other fields to aviation.

What's the most important thing for a customer to consider when selecting a seat trim?

It is important to understand that the first costs of a seat trim are not the final costs over the complete lifetime. Bovine leather might be more expensive initially but over a lifetime it is cheaper than fabrics and faux leather. We currently offer a warranty period of up to eight years for all our products.



Patrick Dorgan, chairman, The Leather Institute

The maintenance view



Do you think aircraft leathers are drawing inspiration from other areas?

Aesthetics and performance are a delicate balance and many leather suppliers have been able to step up to meet the new requirements. Automotive finishes are of interest due to their longevity.

What's the most important thing for an aviation customer to consider when selecting a seat trim? Customer appeal and longevity – can it be maintained properly in the long haul?

Are there any challenges with cleaning lightweight aircraft leathers? Great care has to be given to ensure that the life of the leather is not affected by the methods used to make it lighter. We have seen some light leathers that have a very short life. Many of the faux leathers have lighter weight and have their place, especially in areas that are not in contact with the body. Natural leathers also have many benefits, such as comfort, support and feel, and are generally used in areas of body contact.

What do you see as the main issues currently in the aviation leathers industry? The customer judges the aircraft by its interior – if it looks great then there is an additional comfort level as they believe that the entire aircraft is maintained in pristine condition.

What will the next generation of aviation leathers bring? Nanotechnology will usher in a new line of products that will be easy to maintain.

Philipp Dahm, MD, rohi stoffe

Fabrics are key to branding, and a natural approach can work best



What trends are you noticing in your field? Having all visible and tangible items 'on brand' is of the utmost

priority to airlines. Thus, most airlines are focusing on the textile interior, which is comparatively easy to customise with regard to certification interfaces and cost. Local influences are mostly translated in details. Fabrics have the most options to represent and transform branding, local influences or heritage through colours, patterns, texture, details, etc.

Are any new types of textiles being developed for aircraft? rohi's design team is constantly on the look-out for ways of further improving and enhancing proven qualities, optics, haptics and technology, and to turn trends from the residential market into designs for aviation. While some fabrics such as silk, satin and chenille do not perform well with respect to the specific demands of commercial aviation, there are still lots of options to transform their character into airworthy fabrics.

What's the most important thing for an aviation customer to consider when selecting a seat trim? Firstly, does the fabric support the expected brand experience? The soft furnishings are a seat's dress. Would you ever allow a certain dress into your wardrobe if it didn't match your personality? We are absolutely convinced that even if it was inexpensive, you would not wear it. Secondly, even if it looks right, you do not want to buy the same item multiple times as it wears out. In our experience, it's all about lifetime costs. Considering the

impact on brand experience, the relatively insignificant cost of fabric can't be the sole key driving factor, considering the overall effort and investment in an aircraft cabin.

Are textiles now as light as they will ever be? Most probably. Not necessarily durability, but mainly appearance and comfort limit weight savings on textiles. Weight always matters. Nevertheless, the weight of a seat cover as a standalone item is not the only priority when airlines decide on interior textiles. It is a compromise between visual appearance, touch and feel, maintenance and weight that makes the difference for an airline with regard to lifetime cost plus attractiveness to passengers.

Are any textiles particularly difficult to get through aviation testing? Luckily we don't have this issue, as rohi does not use man-made fibres for seat-covers and relies on proven wool blends only. This natural fibre is not only the result of centuries of evolution, but is also well known for its outstanding characteristics with regards to seating comfort, durability and sustainability.

What do you see as the main issues currently in the aviation textiles industry? From time to time, poorly engineered products and 'me too' items are offered to the market at very low prices while being unfit for use.

Are you bringing out anything new? The rohi design team, together with our partners at Anker Carpet, is in the final stage of creating a new concept.



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Desso

Weight is key in the flooring industry



Is aircraft flooring drawing inspiration from other areas of application? Our aviation carpet designs are based on trends seen in various industries, such as fashion, and also from colours and textures seen in nature. The trends we spot are bundled into a yearly trend book to inspire design studios, OEMs and our customers.

Are any new types of materials being developed for flooring? Desso strives to find material that contributes to going beyond sustainability. For a recent project we converted old KLM crew uniforms into yarn, from which a new carpet was made for the restyled KLM World Business Class.

What's the most important thing to consider when selecting a floor covering? The lowest total cost of ownership is an important selection criterion. Contributory factors are the weight, durability and installation time of the carpet. For example, an initial engineering investment might be needed when switching to a new lightweight solution, but then products such as the Desso FuelMaster have been proved to pay for themselves.

Is aviation flooring now as light as it will ever be? Our Stratos FuelMaster weighs 1,090gsm, which is the lightest premium carpet on the market. Lighter carpet is not feasible now, without compromising quality. But our R&D team is always searching for lighter materials, so who knows what will be possible in the future?

What do you see as the main issues in the aircraft flooring industry? That natural resources will become scarce unless a new environmentally positive business model is created in which materials are managed more responsibly.

Juliette De La Feronniere, aviation market manager, Gerflor

Could we have reached the lowest weight possible in current flooring products?



What trends are you noticing in flooring? While safety and the highest technical performances remain essential, a new trend is for airlines to look for innovative and refined decorative patterns, such as multicoloured woods and ceramics. This trend is noticeable worldwide.

Is aircraft flooring drawing inspiration from other areas of application? The new colour and ambience trends noticeable in other industries or markets do have an influence on aircraft interiors, although the link is not direct.

Are any new types of materials being developed for flooring? Gerflor constantly works on new developments and innovations. Our research includes tests and research on new raw materials, and optimisation of existing processes or implementation of new ones in order to offer very high-performance sustainable solutions. Our motto is "To go further".

What's the most important thing for an aviation customer to consider when selecting a floor covering? Aviation customers should be looking for complete solutions, ensuring the highest safety, as well as operational efficiency and competitiveness. They should ensure the floor covering has the highest performance in all aspects, such as safety (flammability and anti-slip performance), properties having a direct impact on the airline's costs (weight, watertightness to reduce corrosion, durability and ease

of maintenance) to aesthetics (for image and differentiation). This is essential.

Is aviation flooring now as light as it will ever be? Gerflor developed Batiflex AV 135, the world's lightest non-textile floor covering, which is successfully in operation at major airlines worldwide. With a weight of 1,720gsm, it offers major weight savings compared with products of former generations. We keep looking for ways to decrease weight even further without affecting the essential properties or overall performance of the product. However, decreasing weight even further might require completely new concepts.

What do you see as the main issues in the aircraft flooring industry? The main challenge seems to be anticipating the effect of modification or innovations of other aircraft interiors products or structures on floor coverings, and defining lab test methods and requirements valid for all aircraft still in service or in development.

Are you bringing out anything new in 2014? Gerflor recently launched new multicoloured innovative patterns in Batiflex AVR 160 Solo and Stone. These products combine innovative multicoloured patterns, with the highest safety (low flammability, low smoke density and toxicity, very good anti-slip properties) and performance. In 2014, Gerflor will launch two new floor coverings, which are currently in the final stages of development.

"A new trend is for airlines to look for innovative and refined decorative patterns such as multicoloured woods"

Frédérique Houssard, founder, Designescence

More diversity is required in
cabin materials



What trends are you noticing in aircraft leathers, textiles and flooring?

The trend for some time now has been towards using lighter, but also recycled, recyclable and sustainable materials, while optimising their durability and aesthetic qualities. Regarding colour trends, we are seeing more natural colours, especially for business. However, the notion of a 'trend' in the world of airlines is relative. Other criteria can be more relevant, such as the colours associated with the airline's identity, or its cultural roots. We should also note that there is a class of colours for aviation that is driven by maintenance concerns.

Are there any materials you wish you could specify in an aircraft?

Yes at the moment the majority of textiles are in wools or polyesters, but it would be interesting to see plant-based textile materials, such as bamboo. I would also like to see materials that are environmentally friendly and the result of new technologies. For example, we see many uses for stretched canvas in home/commercial decorating. It is a lightweight material that we could potentially stretch across ceilings or walls with different motifs printed on it, and it is also helpful for soundproofing. Along the same lines, it would be great to see a development in the market for decorative appliqué (sticker motifs). There is a lot of potential for creativity here and more importantly cost control – you could decorate wall panels, lavatories or practically any surface and take it down when needed without having to dismantle the panel or wall.

Do you have any concerns regarding the aircraft materials industry?

I would like to see more diversity in the materials available to the aviation industry. This implies the need for more R&D from materials suppliers.

Jason Estes, director of aviation sales, Tapis

Highly engineered materials are the way forward



What trends are you noticing?

We are seeing more catalogue product standardisation, with OEMs and seat and component manufacturers helping to streamline the certification process. Weight reduction is still a big focus in all aspects of aviation.

Are aircraft textiles drawing inspiration from other areas of application? The seat itself has received inspiration from the residential market for the cocooning experience, and from the automotive market for ergonomics. Aircraft textile designs are based on the particular client, their branding, region of the world, etc. They tend to draw inspiration from many markets, such as fashion, yachting, residential and others.

Are any new types of textiles being developed for aircraft? Depending on the market segment, customer expectations will vary. In the commercial market, textiles are being designed and engineered to best suit application needs. Highly engineered materials will be the only products meeting tomorrow's requirements.

What's the most important thing for an aviation customer to consider when selecting a seat trim? Comfort, durability and maintenance. It is important that the customer selects a luxurious material that falls in line with the corporate brand and also performs to their expectations for comfort, durability and maintainability.

Are any textiles particularly difficult or impossible to get through aviation testing?

Only a handful of textiles on the market today can meet the most stringent flammability requirements. The variety of composite build-ups and adhesives used has created the biggest challenges

to aviation textiles in general. Tapis has worked with several seating and component manufacturers to improve its products' flammability characteristics to help streamline the certification process.

What do you see as the main issues currently in the aviation textiles industry?

The lack of visibility regarding flammability performance of fabrics with age and machine wash. And the potential for microbial spread due to lack of maintenance.

What will the next generation of aviation textiles bring?

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"Only a handful of textiles can meet the most stringent flammability requirements"



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Luke Pearson, director, Pearsonlloyd

Finger on the pulse



Are there any materials you wish you could specify in an aircraft interior that you can't currently, due to regulations, etc?

For me the future is about touch and feel. We need to get materials to feel more tactile. Developments in seat upholstery would be a major gain. Outside the aircraft arena we can use natural fibres for upholstery support, which draw sweat and allow air and moisture circulation away from the body. Foams offer great support but don't breathe well. This would be an area where I'd like to see a major development. I am sure development in micro-fibre technology will lead to breakthroughs here.

"Developments in micro-fibre technology will lead to breakthroughs"

Jochen Müller, director, müller/romca

A few tips to being a valued materials supplier



Are there any materials you wish you could specify in an aircraft interior that you can't currently, due to regulations, etc?

Using textiles and leather has become a real problem. In the case of 'traditional' seats, they can still be deployed to a certain extent – but not with dividers, consoles and bars. It would be wonderful to be able to use a clear, transparent plastic.

What could leather, textiles and flooring companies do to help cabin designers more? Deliver high-quality material mappings for our renderings.

Do you have any concerns regarding the aircraft leathers, textiles and flooring industry? We always find our industrial partners to be very cooperative, especially some of the fabric vendors. Quick sample service, friendly and competent staff. Heaven on Earth!

Juliane Trummer, director of insight and strategy, Mormedi

Suppliers with courage, vision and strength sought



What trends are you noticing in aircraft leathers, textiles and flooring?

The trend is definitely to go for a more natural look and feel, and to bring cosy materials and colour palettes to the cabin. Tactile materials, detailing and craftsmanship are highly appreciated in cabin interiors. The challenge is to be congruent with the brand attributes while giving the passenger a cosy experience. Passengers want to relax while flying and airlines try to create a 'feels like home' ambience to help.

What could leather, textiles or flooring companies do to help cabin designers more? Cultivate a two-way communication – be more open to external input but also share their latest developments and thoughts using samples as a sales tool in order to help designers convince clients and close sales.

Do you have a favourite material to use in aircraft interiors? Laminates, because they are an excellent solution, perform very well, allow many options of finish, such as woods, metals and satins, and can easily be replaced in the event of damage. Natural fabrics play a considerable role in making you feel more comfortable in the seat environment.

Do you have any concerns regarding the aircraft leathers, textiles and flooring industry? For many years, it seemed that most suppliers offered very similar products. Perhaps due to certification issues, very few were able to really innovate and come up with new outstanding materials. It seems that now we are slowly seeing a much needed change. There is a lot of catching up to do and a huge opportunity in this space for the company that has the courage, vision and strength to be a pioneer.

Paget Scott-McCarthy, materials, trend and brand manager, JPA Design

Scott-McCarthy discusses honesty and transparency in materials



What trends are you noticing in aircraft leathers, textiles or flooring?

Overall there is a growing awareness in aviation of trends that are prevalent in parallel product, interior and fashion industries. We see 'honesty in materials' as a trend that will also become dominant in aviation. For example, exaggerated woven elements in fabrics and pared-down structures in seat design. A current trend in the interior and fashion industries is for three-dimensional fabrics with exaggerated surface texture. In leather, the variety of embossed designs being offered for aviation has strong potential for the future. This is currently strong in the product and interior industries, and was noticeable at this year's Milan Furniture Fair.

How could leather, textiles or flooring companies help cabin designers more?

Many of these companies are proactive, prepared for problem solving, and keen to update their designs and approach. They are pushing boundaries and innovation and this is exciting for cabin designers to work with. In turn, a growing number of material suppliers have designers working within their team. This aids communication for a swifter and more succinct design process, great problem solving and a smoother process overall. The end result is also faster delivery of the final finish for the client. And of course any shortening of lead times by suppliers is always a help.

Do you have a favourite material to use in aircraft interiors? We are keen on materials that can provide depth and versatility as they can be key when working with catalogue products. Combining material types is also a favourite of ours as it can create great contrasts or great subtlety.

David Lawson, marketing director, Botany Weaving

Considering everything from corduroy to nanotechnology



What trends are you noticing in aircraft textiles and flooring?

The designs and constructions of interior textiles are

becoming more sophisticated and of a higher quality. Airlines, with increasing frequency, are employing product design consultancies, who through their desire to create unique and pioneering product and interiors are in turn pushing the mills to respond by developing innovative textiles.

Are aircraft textiles and/or flooring drawing inspiration from other areas of application? Yes. In fact we all feed off each other for ideas and trends. Like our competitors, Botany supplies carpets and fabrics to more than just the airline industry, so we're all exposed to and influenced by a range of markets. This filters through to the products we develop for aviation use.

Are any new types of materials being developed for aircraft? Tweed, corduroy or satin perhaps? You've been studying your trend magazines! Tweed and corduroy, yes, but not satin! That was in 2010. Fabrics are now coming with texture, surface interest, a three-dimensional aspect. They use finishing techniques to make them seductive and intriguing, and metallic yarns to add bling.

What's the most important thing for an aviation customer to consider when selecting a seat trim? For textiles there is no 'most important thing'. The critical decision is the airline defining how they wish to be perceived, i.e. their brand image. Then using that to develop a cabin environment, where individual elements of the space help reinforce the brand.

Are textiles and/or carpets now as light as they will ever be? I doubt it! Technology is moving faster and is increasingly more exhilarating, promising a future where we cannot readily imagine what weight a fabric or flooring material will eventually drop to. But in the immediate years, weight reduction will be controlled by the demands of the materials to perform in testing and in service.

Maria Kafel Bentkowska, CMF designer, Priestmangoode

A closer working relationship and a more homely approach could benefit cabin design



What trends are you noticing in aircraft leathers, textiles and flooring?

The latest trend is a softer look and feel, with materials that look more domestic. It's all about trying to make the passenger experience as comfortable as possible, while pushing materials and qualities to perform more, both aesthetically and functionally.

Are there any materials you wish you could specify in an aircraft interior that you can't currently, due to regulations, etc? There are many materials in the hospitality and retail market that would be wonderful to use in aircraft interiors – such as technical meshes, Gorilla glass and carbon fibre. The industry has moved forward in the past couple of years but the difficulty lies in using these materials visibly

throughout the cabin, not covering them up.

What could leather, textiles and flooring companies do to help cabin designers more? There needs to be a closer working relationship between designers and material engineers to push the limits from both sides. Design is sometimes sidelined from the development process.

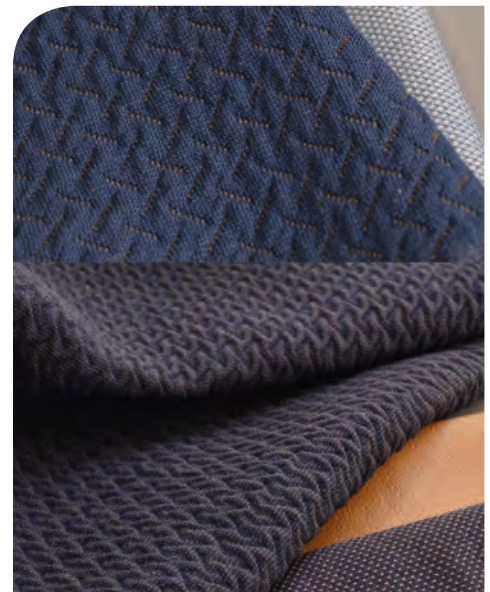
Do you have a favourite material to use in aircraft interiors? When I started working on aircraft interiors, I really did not like décor foils because of their 'plastic' look and feel. However, I believe that through pushing the boundaries of what suppliers are asked to do, the material has become a lot more interesting. Fabrics are also great to work with as they are so tactile and less limiting within the industry.

Are any materials particularly difficult or impossible to get through aviation testing? The pints of Guinness and Smithwick's we serve on the Botany stand at AIX Hamburg (which everyone is welcome to try!).

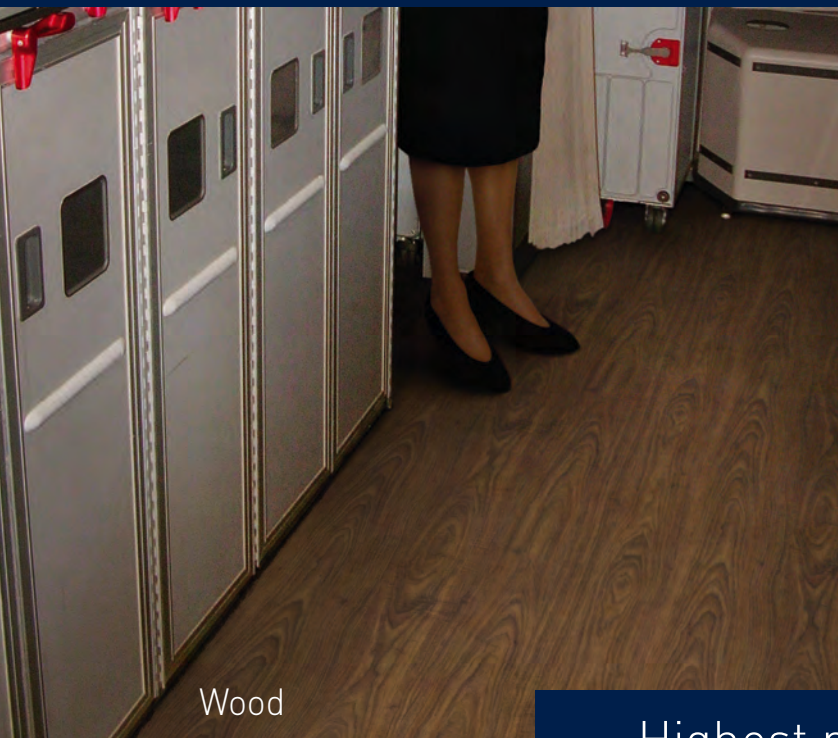
What do you see as the main issues currently in the aircraft textiles and flooring industry? At the risk of upsetting the airframe manufacturers, it's the increasing influence they have on what can be offered to airlines, and how interior designers are having to conform more to documents than to interiors that are inspirational and pleasurable to spend a journey in. And why is everything needed yesterday?

What will the next generation of aviation textiles and carpets bring? I wish I knew, but I won't be surprised if they come from a new source, be it 3D knitted fabrics, or an industry involved in nanotechnology. In the near future, at Botany we'll be using vari-twist yarns and multiple tension warps to create a range of fabrics that goes beyond today's traditional constructions.

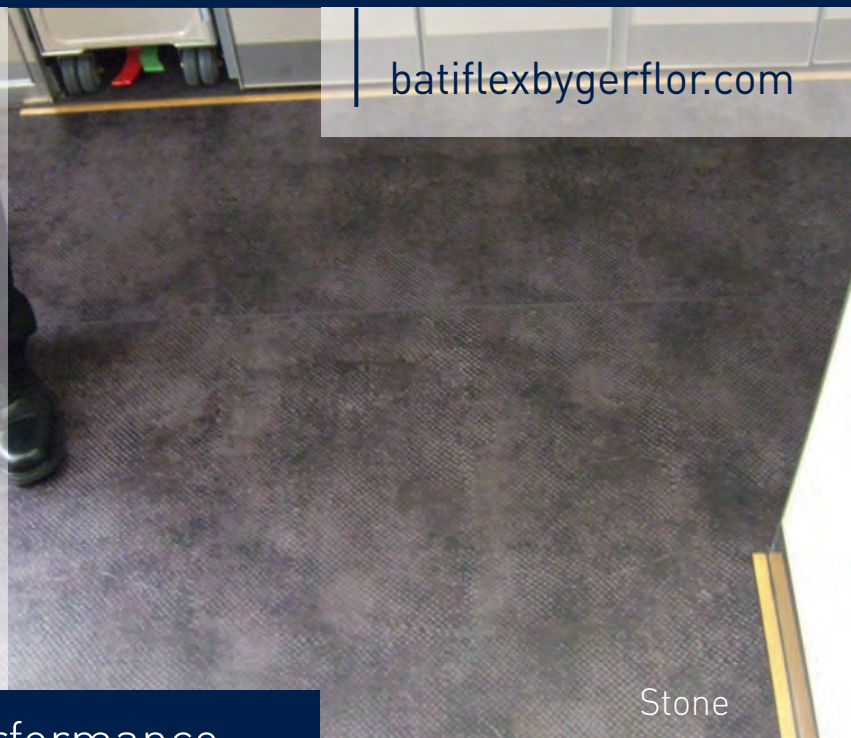
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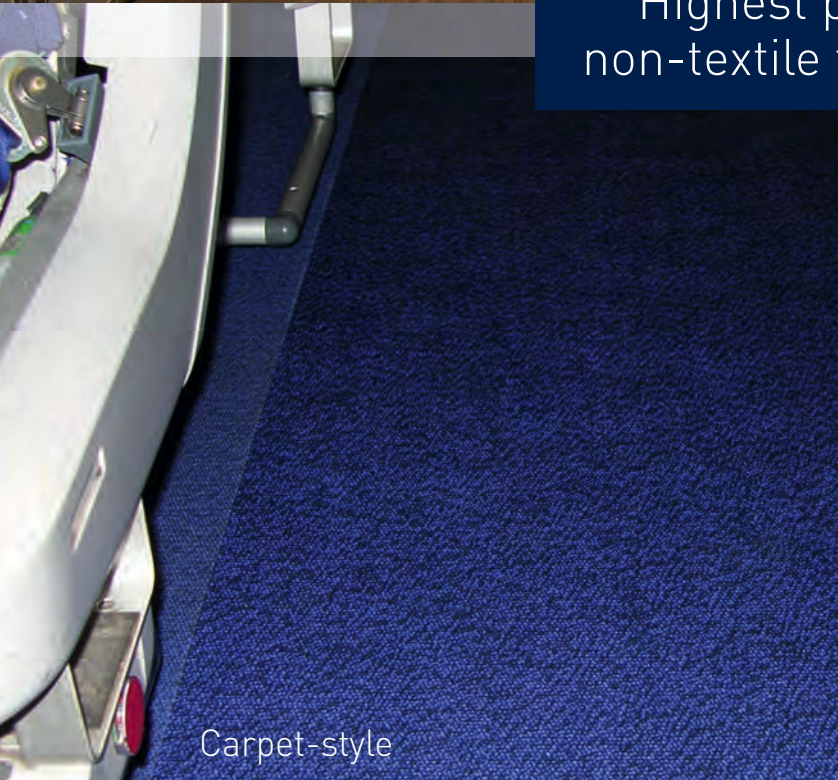
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Orazio Di Giovanni, interiors division deputy directory, Alcantara

Alcantara takes an alternative view to aviation leathers



What trends are you noticing in your field?

We are seeing a move to lighter weight materials as an alternative to leather for seat coverings and vertical surface décor, driven by the high cost of ownership of natural leather. Although leather is a luxury item, its initial cost and higher weight per square metre when compared with alternative products, its requirement for frequent conditioning and ink-mark removal, and its propensity to stretch over time, drives up the cost of ownership. On vertical surfaces, it has been difficult to find a natural leather that consistently meets the 65/56 heat release requirements in combination with the structural panels that make up a seat or panel structure. An alternative like Alcantara can offer sensorial pleasure, aesthetics, functionality and sustainability, overcoming most of these high cost-of-ownership factors.

Are aircraft materials drawing inspiration from other areas of application?

An important new trend that will influence aircraft interiors is high-resolution digital printing. This technology can create very subtle pattern effects, but can also create bold graphics to give a more vibrant feel to space on board an aircraft.

What's the most important thing for an aviation customer to consider when selecting a seat trim?

Flammability compliance is of course the foremost requirement. Beyond that, the objective for the airline is long-term cost of ownership. This translates into durability, availability and affordability.

Are natural leathers now as light as they will ever be? Natural leathers have likely reached their lower limit in terms of weight. Skiving leather is effective in the short-run, but eventually affects the tear strength of the product, leading to reduced service life. Some producers have compensated by laminating a backing to the hide. This stiffens and reduces the stretch of the product, and the additional material and processing step drives up the cost per square metre.

What do you see as the main issues currently in the aviation leathers industry?

Cost of ownership, when compared with newly emerging viable alternatives, is the biggest challenge. Additionally, the cost of leather has risen steadily over past years. This will continue to put pressure on the price of upholstery-grade leather, further broadening the gap between traditional leather and new technology.

What will the next generation of cabin materials bring?

Exciting trends in patterns, textures and colours. The premium leather-alternative products are much lighter in weight, easier to maintain and lower in cost. A few, like Alcantara, are capable of being produced with alternative finishes and embossed effects with highly durable heat-transfer prints, and can even be digitally printed with fantastic effects. These options offer the designer a much broader palette of textures, colours and patterns with which to create a unique on-board environment to enhance an airline's corporate brand.

Emma Rickards, principal, West 6

Get an early start, says this materials trends, CMF and high-specification textiles and surfaces expert



What trends are you noticing?

Aircraft cabins are becoming less corporate all the time. CMF trends that we are tracking in domestic interiors have growing resonance within airline cabin interior finishes and floorings. For example, there's renewed interest in 3D and textural textiles in the residential market, and this can be incorporated into high-performance leather seating through heat embossing and the use of clever stitch details and quilting to create dimensional qualities and to sculpt the shape of the seat. This approach also pays to attention to detail, which is another key ongoing trend that we can never get enough of.

Are there any materials you wish you could specify in an aircraft interior? Some of the heavier textural qualities emerging in the residential context are hard to use in an aircraft because of weight restrictions, even though lovely wool-rich yarns exist to create them.

What could leather, textiles or flooring companies do to help cabin designers?

When searching for that totally fresh and new cabin environment that everyone's wanting to create, we spend a lot of time observing CMF trends in alternative industries and market segments, for example automotive and sportswear. Suppliers with an increased awareness of CMF trends as they emerge into the marketplace are better able to develop new products and provide designers with the key ingredients they need.

Do you have any concerns regarding the aircraft leathers, textiles or flooring industry?

There is a tendency for manufacturers to be expected to operate under increasingly short lead times. This sometimes means that new avenues cannot be explored to their full potential, as high-spec testing for compliance is very demanding and can be hugely time consuming. If airlines could offer slightly longer lead times, they would benefit from wider and more innovative choices, and this could result in increased efficiencies and greater customer satisfaction.



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Introducing Giotto,
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the Aviointeriors
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Driven by the success of product ranges such as its Columbus family of seats, Aviointeriors is beginning to think bigger as it considers its future growth.

Enter Giotto, Aviointeriors' newest creation, the result of the company sticking with the principles that have inspired its activities for more than 40 years, and of investing heavily in research.

This business class seat will soon become a reality and Aviointeriors is confident that visitors to Aircraft Interiors Expo 2014 in Hamburg will have a chance to view a prototype.

Giotto features an exciting layout that combines clean lines with brilliant engineering solutions. The delicate convergence of style and engineering, which blend together in a harmonious way, shapes the idea of a fresh approach towards a product that is expected to be truly innovative.

Designed for a staggered configuration, Giotto answers all the requirements of a business class product. It ensures easy access for all passengers, and the space used to get to the aisle has been enhanced by means of some clever methods. Some potential encumbrances, such as the literature pocket, have been moved to a more efficient position, in order to make

passenger access easy. Following studies conducted in order to maximise the sitting space and the living space around the seat, when in bed mode, the seat goes fully flat, offering unique comfort to passengers.

A little extra care has been given to the details, with some adroitness in the design. The wide legroom enhances the feeling of openness, especially while sleeping. Furthermore, in addition to the reading light, a small one-touch light directly mounted on the seat enables the occupant to continue reading without having to move, even if the seat is completely reclined.

"Innovation means making a complex product like a business class seat simpler, while still providing maximum comfort and reliability, and minimum weight, within the cost target," says Aviointeriors technical director. Francesco Varriale.

The Giotto must not only rise to these technical challenges. It must also satisfy business passengers, who are increasingly expecting a more individual experience. "With this project we want to make a decisive step that gives continuity to the efforts of renewal of both our company and our range of products," states Mario Schisa, CEO of Aviointeriors.



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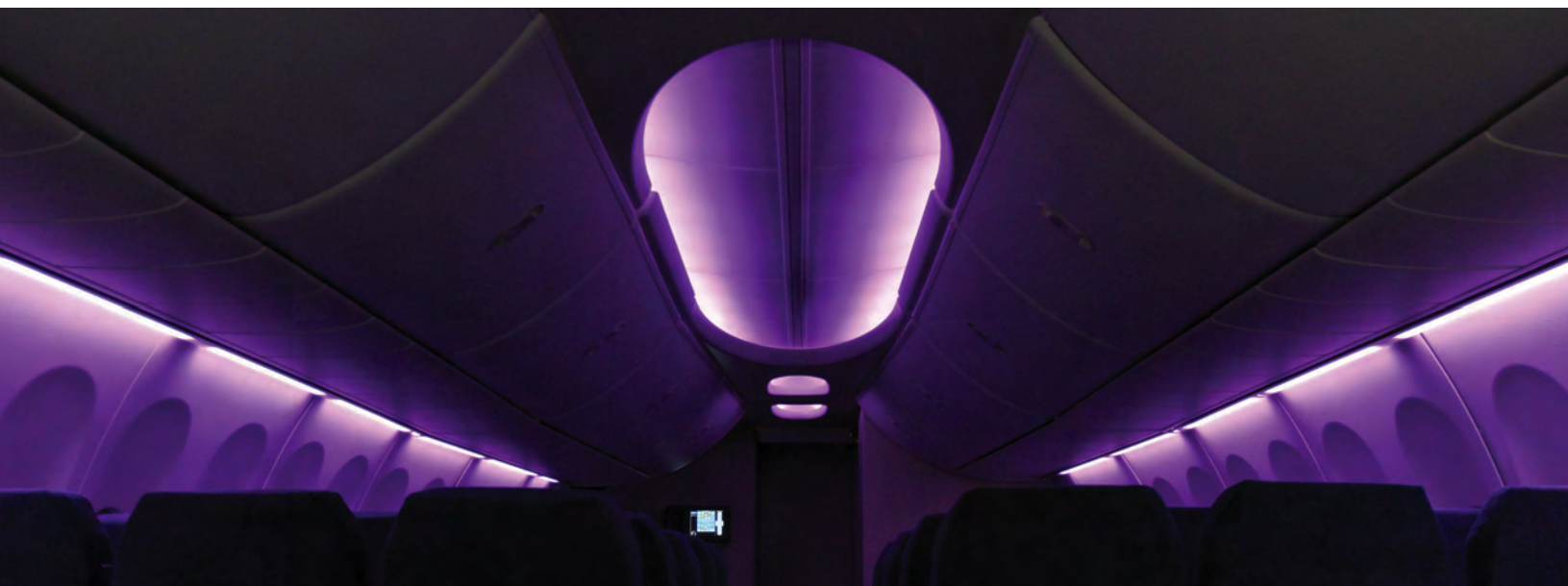
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The product range for aviation leather can be used for all interior applications such as seat covers, arm rests, headrests and panelling. Wollsdorf Leather offers whole leather hides, die-cut parts as well as complete components.

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BAE Systems' Commercial Aircraft Solutions division has a history of excellence and innovation in manufacturing high-integrity avionics, flight and engine controls, and a broad range of cabin and cockpit electronics. More than 1,000 Boeing 777 aircraft are flying today, equipped with BAE cabin systems, with a total installed base of 12,000 aircraft worldwide. In addition, more than 600 in-service B737NGs are fitted with Boeing Sky Interiors enabled by BAE Systems' Attendant Control Panel.

BAE Systems' newest development product for commercial cabin systems is IntelliCabin, a highly integrated system that provides a unique flying experience for passengers and reduces crew workload. It integrates seamlessly with existing cabin systems, providing dynamic LED lighting, in-seat power for all passengers, simplified cabin functions for crew members, and built-in monitoring capabilities to limit aircraft turnaround time.

IntelliCabin is a cabin system with the passenger in mind. It integrates all functions to create the cabin of the future, helping to craft a pleasant environment for passengers. The system eliminates the need for bulky power boxes under the seats, which can restrict leg room or space for luggage; provides power

solutions for all seat classes; controls dimmable windows, cabin temperature and mood lighting; and increases crew availability to passengers by centralising and simplifying control through mobile devices.

IntelliCabin works with BAE Systems' Attendant Control Panel and is expandable to operate via the flight crews' personal electronic devices, enabling attendants to spend more time with passengers. The system is leaner, yet more robust than existing cabin systems, reducing the number of components an airline needs to install, and can cut in-seat power requirements by 50% compared with existing systems. It also integrates with other cabin subsystems, such as tablet-based IFE systems on wide-body aircraft. In addition, its pay-for-power capabilities give customers the option of added revenue if applied to economy seats.

"BAE Systems prides itself on its history of excellence and innovation in high-integrity avionics and controls," says Dr Ehtisham Siddiqui, vice president and general manager of commercial aircraft solutions at BAE Systems. "With IntelliCabin we have set a new bar for in-seat power systems in the industry."

BAE Systems designed the IntelliCabin system to appeal to passengers, crew and airlines alike, with the goal of providing the ultimate flying experience, and with special attention paid to safety, efficiency, comfort and service. The system, developed at BAE Systems' facility in Endicott, New York, is available now, while the in-seat power system will be available in the fourth quarter of 2014.

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Business class has gone through some amazing changes over the past 15 years, and Zodiac Seats has played a big role in that evolution

bigbusiness

Business seats have been familiar to frequent flyers for decades – probably since commercial aviation became accessible to most people.

Even though many travellers have not been lucky enough to experience business class, most of us have, at some point, walked down the aisle in this section (with some envy) and then continued all the way to the back of the aircraft...

But if we look back at what the offer was 20 years ago, we realise that the first class seat was nothing but a nice lazyboy seat with thick cushions, with the differentiation from business class coming mainly from the quality of the food and from the overall service.

A major change was made in the business cabin segment 15 years ago when Zodiac Seats France (formerly Sicma Aero Seat) introduced an industry first: a seat that could be converted into a fully flat bed. The seat was the Air France Goldwing (branded as the Espace 180).

Tremendous changes have been implemented throughout the premium cabin since that day, with extensive evolutions of the business class segment along the way.

No one can argue that current business seats aren't 10 times better than these old first class seats. And no one can dispute the fact that these improvements in business class have directly influenced all parties involved.

The passenger experience has been dramatically improved, with more space and stowages, fully flat beds in business, and direct aisle access for all when sophisticated seats such as Zodiac Seats' Cirrus are specified.

The airlines also benefit, in terms of more profit coming from the business class section,

and the wide offering of business seats now available (subsegments include traditional, high density, high end, etc) enables them to install the right product for the routes being flown. For example, the Zodiac Seats offering in the business segment starts with the Auralite, then the Vantage II, all the way to the Skylounge.

The OEMs have also had to adapt their activities in terms of certification and installation, as business seats are now so much more complex (with some requiring airbags to pass the crash tests, for example), and so much bigger, with large composite shells surrounding the seat.

The question is: what's next? What are the trends that will influence the next evolution of these seats? How will the demands for more connectivity, and the use of new technologies and materials, allow this industry to further enhance the passenger experience?

Zodiac Aerospace's goal is to design solutions so powerful, so revolutionary, that they redefine the industry: the company has teams imagining, and then re-imagining the perfect seat, and then going out and creating it. All the Zodiac Seats business units – from France, the UK and the USA – have worked together on seat developments.

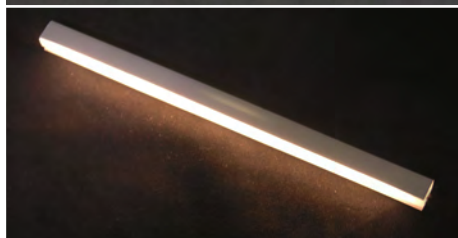
You will see some ideas and concepts at the Zodiac Aerospace booth at Aircraft Interiors Expo 2014 in Hamburg. Indeed the holistic approach developed by Zodiac Seats to address the challenges of business class will be visible in the various concepts being shown (or hidden in so-called secret rooms) to gather market feedback before being turned into reality.

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The new geometry of Timco's 3040 FeatherWeight seat makes optimal use of cabin space while enhancing the passenger experience

featherweight

Timco Aerosystems has introduced a new premium economy seat model to fulfil the needs of a key airline customer group within the fast-growing premium economy segment. The new 3040 FeatherWeight premium economy seat is designed for seat pitches from 38in and up, while still embodying important elements of comfort for the passenger.

Jeff Luedeke, senior vice president of sales for Timco, explains that existing premium economy seats on the market, including Timco's own 3050, have been widely accepted by the market, but that some customers have been seeking a seat for shorter pitch configurations. He explains, "Customers in this segment still want to provide a premium level of service and comfort in their 'PY' cabin, but they also want a seat that will fit a denser layout. Our new 3040 seat has been specifically designed to fulfil these requirements."

On the 3040 model, Timco engineers worked to produce a shorter centre console, more clearance area under the seat, and a redesigned armrest. The result is a seat that can be installed at a pitch as narrow as 38in without inhibiting the ease of egress for passengers – even when the seatback of the forward seat is at full recline. And for the seated passenger, the perceived 'living space' has actually increased due to the greater hip clearance from the new armrests.

According to Rick Salanitri, president of Timco Aerosystems, "The new 3040 is part of our next-generation cabin optimisation programme. We are focused on giving airlines the ability to offer passengers the highest levels of comfort within their cabin layouts. At the same time, we know

that real estate is a precious commodity on the aircraft." He adds, "You will see from us more product solutions like the 3040 that deliver key attributes for the passenger, while also providing improved economics for the operator."

The new 3040 is designed to accommodate state-of-the-art IFE systems, and includes other features such as footrests, power supply and USB port connections. The seat joins Timco's existing line of weight-saving seats, identified by the FeatherWeight branding nomenclature. Through the use of finite element modelling, engineers have reduced mass and made maximum use of innovative materials, to help meet airlines' concern for minimising fuel burn.

Timco is already in discussions with several candidate customers for the new 3040 seat, and believes the seat will find a home on a wide range of aircraft including wide-body and narrow-body types. The company expects to present seat samples for display at Aircraft Interiors Expo 2014 in Hamburg next April.

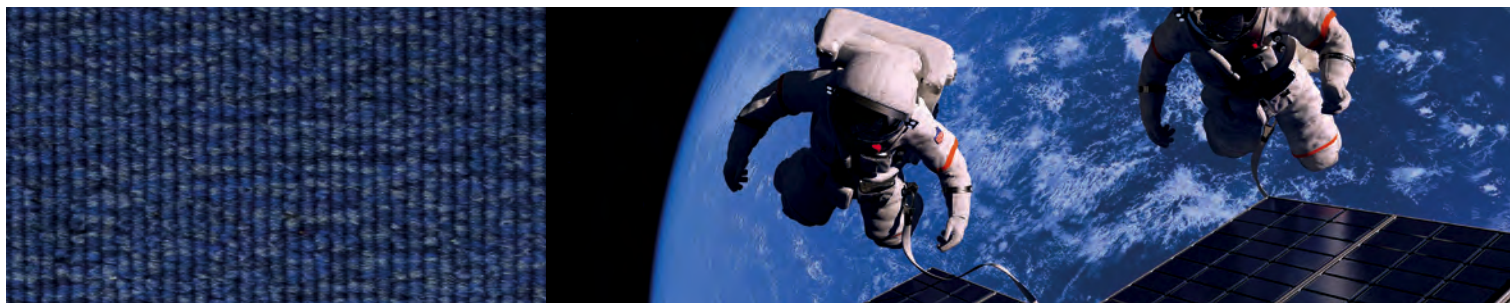
Timco Aerosystems, a business unit of Timco Aviation Services, provides a full spectrum of cabin solutions including state-of-the-art design engineering; interiors products including the FeatherWeight line of seats, lavatories and galleys; integration project management; and certification services under its FAA ODA Authority. Timco Aviation Services is one of the world's largest independent aircraft MRO companies, providing airlines with base maintenance; engine MRO; interior products design and manufacturing; passenger seating; as well as line services through the Timco LineCare network.

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topfloor

At last year's Aircraft Interiors Expo, Schneller introduced PanGuard, a new lavatory flooring solution combining the benefits of Schneller non-textile flooring products with the protection of a formed floor pan into a seamless, custom integrated solution.

PanGuard was developed when Delta Air Lines approached Schneller with a request to help ease the lavatory cleaning process. Delta was keen to minimise the possibility of moisture becoming trapped between the flooring and the floor pan.

After exploring several options, Schneller was selected to create a hybrid product that would combine the non-textile flooring product with the floor pan into a single, integrated solution. The finished product – PanGuard – not only achieves the original objective outlined by Delta, but also creates additional benefits.

The product eliminates the possibility of trapped moisture between the non-textile flooring and the floor pan; improves the overall aesthetics of the lavatory with seamless, high definition flooring designs; reduces the weight of each lavatory by at least 1kg; and minimises supply chain delays and installation costs through a one-step solution.

Based on the success of initial installations, Delta went on to have PanGuard installed across its entire fleet by mid-2012.

PanGuard is one of the latest additions to Schneller's wide-ranging non-textile flooring



portfolio and will be available to all aftermarket customers with extensive aesthetic options.

Schneller is a global leader in the development and production of engineered decorative laminates and non-textile flooring for aviation and ground transportation. It provides continuous roll and sheet production from its ISO-9001/AS9100 certified production facilities in the USA, and sales and services support offices in France and Singapore.

Schneller
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 Reader Enquiry No. 505

modernmaster

All around the world, airlines are crying out for new ways of reducing costs. Increasing fuel prices and intense competition mean that efficiency is a top priority for many airlines. New technologies have made it possible to create products out of lighter materials. This approach to weight reduction can also be applied to aircraft carpets. New technology has allowed Desso, a manufacturer of custom-made aviation carpet, to create great weight savings. Airlines worldwide are flying with Desso's lightweight carpet, saving significant amounts of fuel every single day. Desso's customer Norwegian Air Shuttle is to be the first European airline to use Desso's FuelMASTER lightweight carpet.

Airlines often use a conventional carpet weighing around 1,700gsm; the Desso FuelMASTER weighs only 1,090gsm, saving airlines 610gsm. On a B737 or an A320 this equates to approximately 65kg per aircraft. For each airline savings can vary, but let's assume 1kg equals €80 fuel savings; therefore an airline could save €5,200 per aircraft on an annual basis. The total saving depends on the size and number of aircraft an airline operates – but the more carpet, the more savings.

Airlines flying with the FuelMASTER therefore save on their fuel costs and at the same time reduce their CO₂ emissions. So airlines with a focus on sustainability have a solid and 'green' reason to choose a lightweight carpet. Though the design possibilities might be slightly limited, to ensure a lightweight carpet, the FuelMASTER's wide range of colours combined with different patterns allows for plenty of possibilities to safeguard an airline's brand identity. The new technology used by Desso for aircraft carpet might just be the weight saver your fleet has been looking for.

Desso
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"2013 marks an important milestone for Bucher – the company's 60th anniversary. An ideal opportunity to formulate a new, highly promising range of solutions:

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We invite you to celebrate our anniversary with us and to discover solutions and services that create long-lasting value for you."



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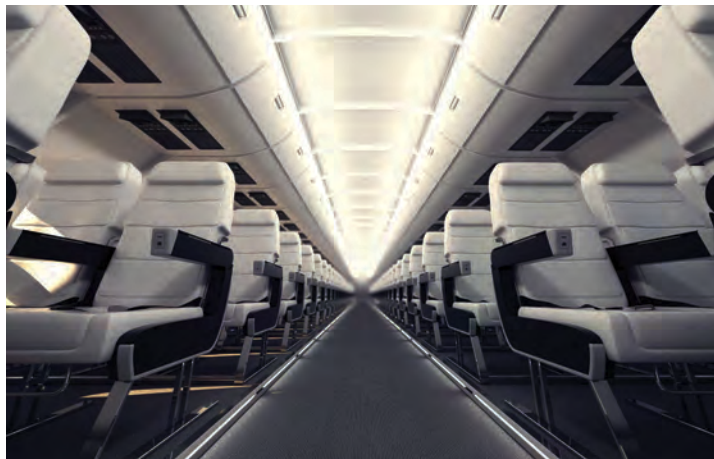
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Reader Enquiry No. 507

onevision

When Delta Air Lines asked Mohawk Group Air to help create a unique customer experience, Mohawk was delighted to accept the challenge – a design collaboration between the largest supplier of aircraft carpet and one of the world's largest airlines. This was an opportunity to create a coordinated branding experience throughout Delta's airport space and on board its aircraft, a "first" in the aviation flooring market.

Delta wanted a streamlined look that would function wherever its customers went. Using Delta's custom design, Mohawk developed a continuous brand image that translates everywhere – on the aircraft, through the jetway and terminal, all the way up to the corporate offices. Mohawk was able to apply Delta's preferred patterns and colours across multiple flooring types, including woven, modular and tufted broadloom.

Completing a project of this scope for Delta required a high level of expertise and a broad range of capabilities. Mohawk's unique position makes it a perfect fit for projects of this nature.



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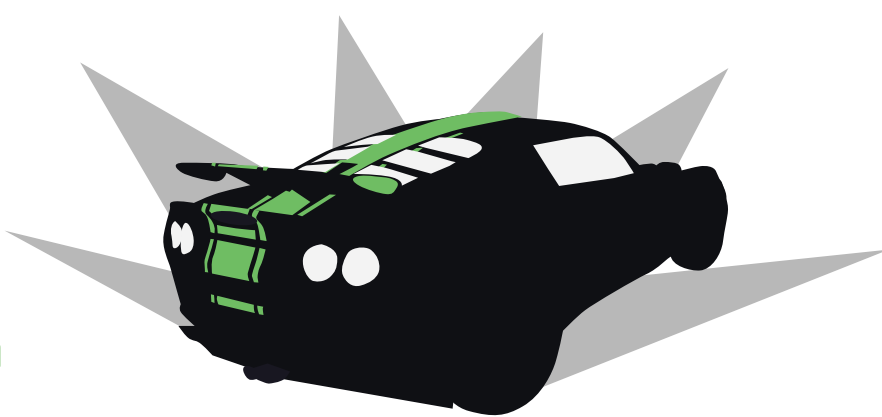
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john^{tighe}

WANT TO KNOW MORE ABOUT THE PERSONALITIES THAT DRIVE SOME OF THE INDUSTRY'S MOST SUCCESSFUL COMPANIES? IN THIS ISSUE, JOHN TIGHE, DESIGN DIRECTOR AT JPA DESIGN, DISCUSSES THE BENEFITS OF HAVING WORKED FOR 'THE TRIPLE': AVIATION MANUFACTURER, AIRLINE AND DESIGN STUDIO



1 WHAT IS YOUR BACKGROUND? My passion in life has always been cars, bikes and aircraft. After a brief flirtation with becoming an architect (curtailed by work experience with the least enthusiastic architect on the planet!), I completed a Transport Design Masters degree at Coventry University and then looked for a position in aviation because I loved the challenge of balancing technical and aesthetic requirements.

2 HOW DID YOU GET STARTED IN AIRCRAFT INTERIOR DESIGN? For the first few years of my career, I worked for a major aviation seat and furniture manufacturing group that is now part of the Zodiac group, which was a great apprenticeship. It taught me how important it is to have an in-depth understanding of manufacturing techniques. However, I wanted to focus on the creative side more, so I channelled all my energy into getting work with a London design studio. It was at JPA Design where I became involved in exciting projects with some steep learning curves. After a few years, I was offered a position at Gulf Air in Bahrain, which was a brilliant opportunity to see the inside of an airline. I learned an incredible amount as the head of product. In the meantime, JPA Design had won some significant contracts, so there was the exciting opportunity to come back as design director, which has been keeping me busy for the past few years. I feel lucky to have amassed the rare 'triple' of aviation manufacturer, airline and design studio experience in a relatively short time.

3 WHAT TRENDS ARE YOU NOTICING IN CABIN DESIGN? Economy class is receiving the design attention it needs, and is much improved. Generally, the design of the cabin and its contents is getting better. Slowly, the manufacturing companies are realising the value of good design and good product, and this in turn is creating a demand. However, many still fail to invest in design as they should. The best products being introduced are innovative but also have in-depth aviation experience behind them.

4 WHAT DO YOU SEE AS THE FUTURE OF EMBEDDED IFE? Many think the iPad will kill embedded IFE, but I'm not so sure, as it hasn't killed off the cinema. If anything, it has exaggerated the difference in the overall experiences. If you think of onboard entertainment in a grander cinematic sense, the opportunities are endless. Flexible screens can create a whole cabin, which is a potential canvas for moving images and textures. 3D

interfaces and content combined with interactive gesture controls can be highly engaging for the user and will also solve various real-world problems, such as the touchscreens in economy class disturbing the passenger in front. The experience can be much more focused and richer than sitting with an iPad.

5 JPA IS ALSO WELL KNOWN FOR ITS RAILWAY AND HOSPITALITY WORK. DOES THAT INFLUENCE YOUR AIRCRAFT WORK? Definitely, it is at the root of the JPA Design culture; we think about the total travel experience. It is human nature to remember the extremes of any experience, so we look to ensure that there are many high points and no low points within the user journey. This is very difficult to achieve, but this aim drives the way we approach trains, hotels, lounges, aviation and other design projects. Passengers often experience cars, buses, trains, aircraft, lounges and hotels in succession, and it is inevitable that their quality will be compared, despite the wildly differing construction methods and design possibilities. Designing for all stages of the journey increases your understanding and ability to improve the overall experience.

6 WHAT IS YOUR PROUDEST ACHIEVEMENT? It has to be the latest Singapore Airlines Next Generation business cabin. Much of my time for the past two years has been lavished on this product, and it's a great feeling to take a step back now and look at the exciting experience we have created with Singapore Airlines and Jamco. I am also proud to be instrumental in the introduction of lightweight leather for business class while I was head of product for Gulf Air; saving US\$120,000 of fuel every year gives me a real buzz!

7 HAS YOUR SINGAPORE OFFICE PROVED A SUCCESS? ANY PLANS FOR MORE OUTPOSTS? Our Singapore office is doing excellently, and has been for almost 20 years. We are constantly evaluating the opening of offices elsewhere and have representatives dotted around the globe, so feel our coverage is very good. Airlines invariably represent the culture of their home nation and working with them gives us access and a deeper understanding of that country and its people.

8 WHAT'S NEXT FOR JPA DESIGN? JPA has always been synonymous with industry insight and true innovation and that will continue to underpin our approach. We're growing, both in aviation and in the other travel and luxury related markets we operate in. We're working with more clients than ever before and it's really exciting to be involved in such a dynamic organisation. We're also collaborating with world-renowned universities and research facilities to encourage inventive thinking and cutting-edge materials knowledge.

9 HOW DO YOU RELAX WHEN YOU'RE NOT WORKING? I do as much mountain biking as possible and the odd triathlon, and take my little Lotus car out as often as I can.

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