Aircraft interiors INTERNATIONA

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Pressure is mounting to make the inflight experience more accessible and enjoyable for passengers with reduced mobility

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BIG ISSUES

he future is in your hands – well, your guide to the future at least. If you're looking for the latest news, insights, issues, opinions and facts from the aviation industry, with *Aircraft Interiors International* you have come to just the right place. From innovative seats to errant animals, cabin accessibility issues to amenity kits, future trends to aftermarket analysis, all that and much more is within these pages. And I must say it was (mostly) a pleasure to work on every one of those pages.

A particular pleasure was looking beneath the covers of Singapore Airlines' all-new A380 business class (p122). While the First Suites have grabbed the world's attention – good news at a time when many predict the demise of first class – the innovation in the business class cabin doesn't seem to have received the recognition it deserves.

This may be because it is difficult to vie for attention with swiveling chairs and sky-facing views, but beneath the elegant form of the business seats lies a monocoque structure the like of which has never been flown in commercial aviation before. Bringing the concept to the skies presented a huge challenge, but it was worth it for Singapore, and could be a stepping stone to the next generation of seat design.

Another pleasure for this issue was learning how aircraft cabins are becoming more accessible for passengers with special needs, be they physical, mental or emotional. Flying should be accessible to all, and the industry is getting there – although

there is still some work to be done, in terms of regulation, communication and innovation, as Marisa Garcia found out (p46).

However, the airline industry also has to be wary of unscrupulous pet owners who may seek to exploit the regulations regarding bringing emotional support animals on board (p58). Everyone loves their pets, but some people truly rely on their animal companions at all times, and bringing unnecessary zoological chaos into the cabin is not helping their cause.

Moving from the animal kingdom to the business world, *Aircraft Interiors International* is proud of being the first publication to get the inside story on Adient Aerospace, speaking not just to the nominated CEO, but also the nominated COO and VP of innovation and design to get the full picture (p68). With the support of both Boeing and the world's largest automotive seating company behind it, Adient Aerospace may be the newest company in interiors, but it is on the fast-track to being the Next Big Thing in aircraft seating. It really is a company worth watching.

Our new-look website is also worth watching, and indeed reading and hearing, with its multimedia content. If you haven't visited yet, head over to aircraftinteriorsinternational.com. The site has been created for you, so if you have any comments or suggestions for content, if you would like to submit a blog, or if you simply want to say hello, get in touch with me at adam.gavine@ukimediaevents.com.

Adam Gavine, editor





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A fond farewell to United's beautiful queen of the skies

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MODERN CONVENIENCE

New ideas could improve one of the low points of the passenger experience: a visit to the lavatory

High and dry

We've all entered an aircraft lav to discover a wet floor. That is just water though... right?
Water or not, that wet floor gives the impression of unsanitary conditions. Boeing has devised a solution with its Clean Cabin Dry Floor, a floor system with multiple layers of grid panels that eliminates the problem of liquids pooling on hard flooring. Any liquids spilled on the floor are pulled through multiple antimicrobial wicking layers and sent into the existing aircraft infrastructure, keeping the floor dry. The system replaces the existing lavatory floor pan and uses a standard module and custom surrounds. The flooring is scalable to any aircraft lavatory geometry, and indeed to other areas of the cabin such as

Stand up ... for efficiency

Urinals have not proved a popular option on aircraft, mainly because a one-for-one swap of toilet and urinal brings no added value to the airline or passenger. Zodiac Aerospace has had an idea though, intended for the centerline double lavatory unit in economy class. Named the Durinal Suite, one lav space would be retained, and the other split into two urinal cubicles. The reduction in traffic to the conventional lav could help with keeping it cleaner, and even open the opportunity for it to be designated as a female-only facility.

The main advantages are for the airline though. The modular urinal towers share an efficient, two-stage flush system, located centrally in the lavatory for reduced noise levels. Further efficiency is achieved as all lavatory functionality beyond the basic need is stripped away to reduce weight, space and maintenance requirements; for example, the washbasins are replaced by an antibacterial hand wipe dispenser, which also reduces water consumption. Used wipes are placed in a compact trash container shared between both compartments, which is accessible from the aisle for emptying.

Beauty spot

People spending time in the lav to freshen up and use the mirror can cause frustration among queueing passengers, as well as congestion in the aisles. Imagine if the arrangement was changed so it was similar to that of many bars and restaurants, with a central sink area with mirrors, separate from the toilet cubicles.

This is the arrangement proposed by Jamco with its Lav-Com concept, intended for installation at the rear of wide-body aircraft, away from seating zones. Less time would be spent in cubicles, improving their availability, while the central area could have large mirrors for freshening up or applying makeup, with amenities nicely laid out. Being a much larger space than a typical lav cubicle, there is also an opportunity to create

more flattering lighting effects.

See some amazing lav concepts in the Features section of our website



There have been big developments with Airbus's narrow-body offerings. In January, the company built a new member of the A320 family, the A321neo ACF (Airbus Cabin Flex), featuring a modified A321 fuselage that enables more flexible cabin configurations for up to 240 passengers. The most major modifications are the new rear section, the redesigned rear galley and lavatory module, and the redesigned passenger door configuration, with the door forward of the wing removed and new over-wing emergency exits in the center section

introduced. The ACF variant is currently an option (with delivery to the first customer, Air Lease Corporation, scheduled for mid-

OLD VERSUS NEW

Technical specifications

First flight Span Length Cabin length Max. cabin width Accommodation Service

B757-200 (four door) February 19, 1982 38m (125ft) 47.3m (155ft) 36.07m (118ft) 3.76m (12.3ft) 228 pax 1981-2004

A321neo LR January 31, 2018 35.8m (117ft) 44.51m (146ft) 34.44m (113ft) 3.70m (12ft) 240 pax From Q4 2018

2018) and it will become the standard A321neo specification by "around 2020", according to Airbus.

In turn, the A321neo ACF forms the basis of the A321LR, a longer-range variant. Airbus engineers have worked intensely on the aircraft, adding a third fuel tank in the forward underfloor hold, as well as making minor modifications to the wings and fuselage to enable an increased MTOW of 97 tons (the A321neo has a 93.5-ton MTOW) and a range of 4,000 nautical miles (7,400km/4,600 miles) when in a 206-seater, two-class layout the longest range of any single-aisle jetliner, as Airbus says.

A key market Airbus has identified for the LR is intercontinental routes such as the heavily trafficked North Atlantic. Indeed on February 13, as part of the jetliner's 100hour flight test campaign in advance of airworthiness certification (expected in Q2 2018), Airbus decided to fly it from Paris to New York. The flight was a success in terms of engineering and marketing, and the first A321LR delivery is targeted for Q4 2018 with an as-yet unnamed customer.

As industry legend John Leahy, Airbus's ex-COO for customers (who retired in January), said, "The longer-haul, single-aisle market is a lucrative one that the A321neo will now dominate, thanks to the aircraft's superior comfort, economics and range. This new version of the A321neo is a high-revenuegenerating aircraft that will open up new opportunities."

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DESIGN MATTERS

How important is good design for airlines? A definitive answer could be possible as Gensler has quantified the direct impact of design on human experiences

Design and architecture company Gensler has conducted an investigation intended to identify the key drivers of a great experience and validate that design has a quantifiable impact on experience. The multi-year project combines qualitative, ethnographic research, including 30 two-hour interviews with people in five markets across the USA, with quantitative research from a USA-wide, panel-based survey of 4,000 respondents.

Named the Gensler Experience Index, the research takes the known drivers of creating a human experience – product, brand and service quality – and combines them with design factors. Gensler says that design factors have not been factored into the formula before, and that the results demonstrate that design is the key differentiating factor between a good experience and a great experience. Of course, designers have always believed in the importance of their work, but this project supports their view with hard data.

"Our clients are constantly asking 'How is design the differentiator in creating great experiences?' We are seeing an exponential increase in people's expectations of place making and space," stated Andy Cohen, co-CEO at Gensler. "Our clients are looking to create human experiences that help them stand out. We're now able to prove that design is the factor that takes a good experience and makes it great."

Gensler asserts that businesses that don't invest in design are overlooking an opportunity to improve sales,



build consumer loyalty and engage employees, as visually appealing spaces engage people's emotions and keep them coming back.

As the company said of the research findings, "The expectations a user brings to an experience and the quality of interactions, combined with the qualities of space, together inform how it will be perceived."

QUALITY QUANTIFIED

- The quality of experiences at the best-designed spaces were rated nearly twice as high as those at the worst-designed spaces
- Spaces designed to accommodate multiple activities – from working to socializing to exercising and everything in between – are far more likely to result in great experiences
- People are 10 times more likely to share their in-store experiences on social media if those stores have unique design features. Could this also apply to aircraft cabins?

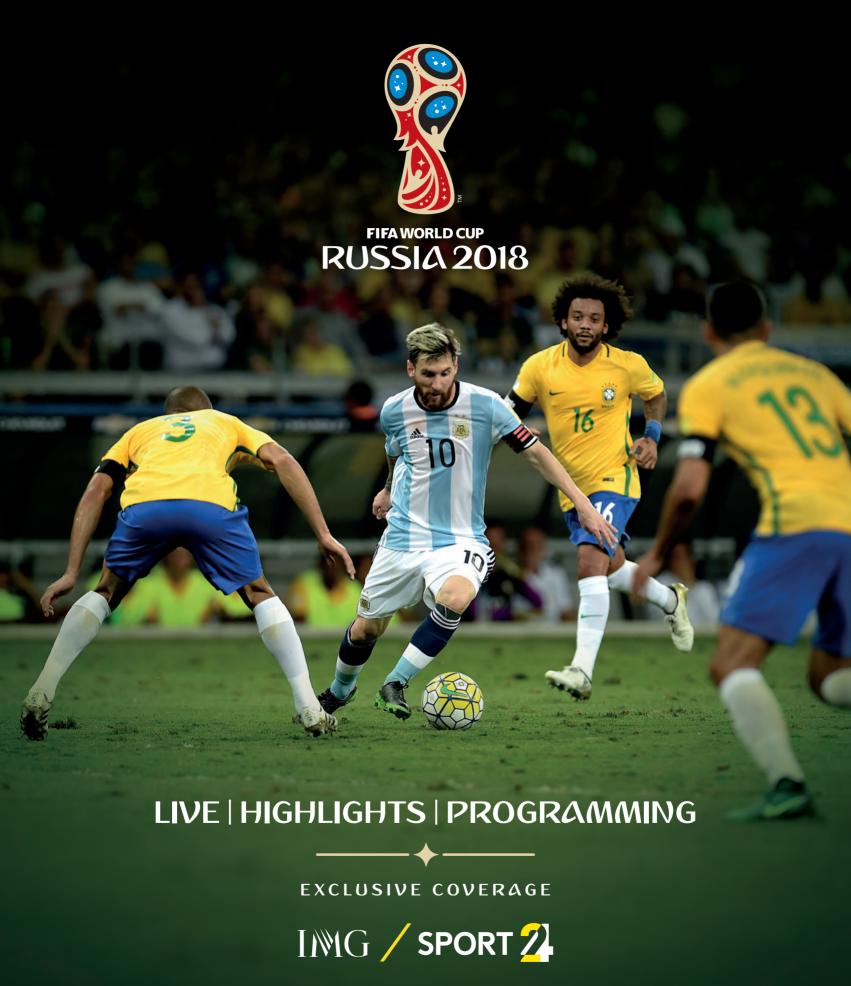
PASSENGER PURPOSE

According to the Index, a person's experience in a space is driven by their purpose or intention in visiting that space. For aircraft with various zones, such as social or retail, passenger intentions can be represented in the Experience Framework by five modes:

- Task mode: Seeking to accomplish a specific purpose
- Social mode: Intending to interact with others
- Discovery mode: Open to exploration
- Entertainment mode: Seeking diversior
- Aspiration mode: Seeking personal growth or to be connected to a higher purpose.

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BIG AMBITIONS

Flydubai has strived to create a wide-body feel in its B737 MAX 8 interiors – the first B737s to feature flat beds

It is flydubai's 10th birthday this year, and the airline is celebrating in style as it receives the first of its 76 Boeing 737 MAX aircraft. The Boeing Sky Interior of the aircraft – the first being the MAX 8 model - makes for a good baseline for an appealing passenger experience, but the airline has gone further, creating a mini wide-body experience ideal for its routes of more than six hours.

The airline has considered every element of the inflight experience, working with JPA Design to tailor the entire interior with a view to maximizing the use of space and enhancing comfort, with many elements being bespoke, including the bulkheads and mood lighting programs, curtains and carpets, and even the business class serviceware.

The headline development, however, is in the 10-seat business class, which features the first fitment of fully lie-flat seats (78in beds) on a Boeing 737. The spaceefficient Thompson Vantage model was selected and customized for the project, with a little extra work required to make it suitable for installation in the tapered front of the cabin. The most noticeable change is that the curved seat shell was raised to 46in to create an enhanced sense of privacy and to give a 'seamless aesthetic' in the cabin, according to JPA.

Other alterations included a redesign of the console area to increase stowage; the addition of a refreshments tray, dedicated water bottle stowage and a retractable hook for headphones; and the positioning of the headphone socket directly adjacent to the headrest.

The wide-body theme continues in the 156-seat economy cabin, for which the Recaro CL3710 was selected, a seat model more commonly found on twinaisle aircraft. However, the seat may be even more comfortable on flydubai aircraft as the airline has given economy guests a generous 30in pitch, an increased recline and a six-way headrest. A new custom feature is the dual seatback pocket, its sculpted form designed to be 'knee friendly'. The pocket is transparent, so passengers are less likely to leave something behind.

John Tighe, design director at JPA said, "flydubai put their energy in the right places and are pragmatic when they need to be. Airlines need a design culture and flydubai is an airline that cares about design."

- 1. FLYDUBAI DEVELOPED PREMIUM SEAT FABRICS WITH ROHI STOFFE, WHICH MIX GRAY AND BLUE WITH HIGHLIGHTS OF ORANGE, REFERENCING FLYDUBAI'S BRAND COLORS
- 2. THE BUSINESS CABIN LOPA COMBINES DOUBLES WITH SPACIOUS 'THRONE' SINGLES, WHICH GIVE SOLO TRAVELERS AN EXTRA FEELING OF LUXURY. FLYDUBAI DID NOT OPT FOR DOORS ON THE SINGLES, UNLIKE JETBLUE, WHICH CREATED MINI SUITES FROM THE VANTAGE PLATFORM FOR MINT CLASS ON ITS A321S

SEAT-CENTRICITY

In 2009 flydubai signed up as launch customer of the 'Fiber To The Screen' (FTTS) IFE system from Lumexis, which uses fiber optics rather than copper piping to reduce the cost and weight of the system. Unfortunately Lumexis suspended business operations in 2016, so the airline had to seek out a new systems supplier.

The airline has selected the seatcentric RAVE system from Zodiac Inflight Innovations, with 15.6in displays in business class and 11.6in in economy, both being 1080p HD touchscreens. The displays in business are surrounded by dark, low-shine materials to minimize glare, and users have the choice of navigating the system using the touchscreen or a retractable glassfronted TV controller stowed in a bespoke compartment in the seat arm. The GUI has also been customized by JPA.

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A simple, elegant and effective evolution of the cabin divider has the potential to increase passenger comfort and cabin density

Current aircraft dividers are static and inflexible, but thanks to its clever curves, the Silhouette Move cabin divider not only enhances passenger comfort but also increases revenues. The key, according to its creator, Rockwell Collins, is that the divider can adapt to meet the relevant aviation regulations of each phase of flight, rather than being rigidly adherent to TTL regulations at all times.

At cruising altitude, when the TTL regulations no longer apply, crew can pivot the divider back to allow the seats in front to recline. This feature takes advantage of the space between the divider and the seats in front – space which is unused with flat dividers. This degree of recline for the seats in front does not come at the cost of the leg

space behind because the panel section does not extend to the floor. This feature opens up the under-seat area, creating generous space for legs and carry-ons.

Silhouette Move is a simple solution, made even simpler with Rockwell Collins' assurance that the design meets HIC requirements without requiring alternative restraint devices or airbags.

Even better, the curved divider's HIC compliance enables seats to be positioned closely, while adding 1ft³ (0.02m³) of space per passenger seated in the bulkhead row. This is sufficient for an additional row of seats to be fitted, resulting in an estimated return on investment within four months for a domestic single-aisle aircraft, according to the company's calculations.

A320 family. The unit is designed for installation at the rear doors to separate the galleys and lavs from the main cabin. This location typically requires the installation of cabin attendant seats, which means the partition will have to be able to withstand 16g dynamic loads. The combination of weight savings and strength has been found through the use of a 'bionic' structure, referring to a construction inspired by nature which, combined with composite materials, has enabled a claimed weight reduction of at least 40% over products currently available. For a left-hand side partition with double attendant seats and stretcher-flap option, this results in a weight saving of 26kg (57 lb) per unit, according to Bucher.

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ANOTHER LEVEL

How can you give passengers more space without reducing seat count? The only way is up...

High-density economy cabins have been a source of concern for one Silicon Valley company, which states, "Confining passengers to suffocating spaces is more than an unpopular trend for the airlines industry – it is a hazardous one." The company in question, lpVenture, is not an aviation designer or manufacturer, but rather a specialist in partnering with innovators to develop technology patents, and then monetizing those patents through licenses and sales.

IpVenture believes it has a space-creating solution on its hands with a design for safer and more

spacious economy seating with no loss of seat count. The key to this claimed achievement isn't an exotic new lateral LOPA, but instead making use of unused vertical cabin space, with a bi-level staggered-seat approach.

The company says that this layout (pictured above right) enhances safety by increasing each passenger's space and giving them easy access to the aisle. Passengers in the



Air lair

In 2012, Factorydesign was challenged to create a fantasy concept for Zodiac Seats UK and responded with Air Lair, a double-deck system of individual pods, said to offer 30% additional passenger accommodation in the same footprint as a single-deck layout. The concept lies somewhere between premium economy and business class.

"What we were trying to say was that thinking about the cabin in layers was important," stated Adam White, director of the studio.

The concept had a very mixed reaction, but White is still asked about the validity of Air Lair as an idea, as more airlines are seeking new ways to optimize cabin space.

Perhaps the concept was just a little ahead of its time. "That would be our ultimate wish," said White.

"That people are able to look back at Air Lair in a few years and say, 'That was the first moment when I thought that what we have launched today was possible'."

Flex appeal?

Tangerine developed the Flex concept as part of an airline pitch, with the design giving window passengers a reclining seat and a separate bunk located above the center seats in a wide-body, accessed via five steps. While the inner passengers do not have access to the mezzanine-level bunks, their seats do convert into lie-flat beds.

The concept sketches show the inner seats facing sideways in the cabin, but that is not a necessity for the arrangement to work, so long as there is sufficient space for the center seats to be converted into flat beds. There is clearly a disparity in the passenger offer for window and center occupants, which would have to be addressed in the ticket pricing.

However, the concept does have a big drawback, as Tangerine CEO Martin Darbyshire explained: "The scary thing is that the number of seats that you get is not bigger than using a current lie-flat solution in a fairly dense form. I think that is really going to call into question the validity of the concept for a lot of airlines."

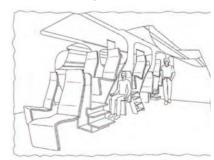
Airbus ascends

Airbus made international news in 2015 when it filed a patent application for a double-deck business class cabin. The company files around 600 patents each year, but this one really provoked strong public reaction, from oaths never to fly again if the design took to the skies, to the inevitable comparisons with sardine cans that meet most high-density ideas. The patent described rows of seats alternately arranged at lower and higher levels, with the upper 'mezzanine' seating making use of upper lobe space.

The design makes more optimal use of available cabin space, and passengers would have flat beds and direct aisle access, so what upset the public so much? Perhaps it was the rather unappealing patent drawings...

lower-level window seats can slide backward, creating space for them to move behind the adjoining seat to

access the aisle, even when that seat is reclined. The upper-level seats are accessed via a small set of stairs, with a small 'landing' at the top that, as well as creating legroom, also gives passengers space to turn to sit down, with no stepover. This space to maneuver also means that evacuations will be swift and orderly fashion, according to IpVenture.



See p120 to find out the progress of lacob Innovations' economy class tiered seating desig

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DOUBLE VISION

A strong trend is beginning in business class for a feature that was once the preserve of top-tier first class cabins: double beds



VIRGIN TERRITORY

Double beds in business class are nothing new: in 2004 Virgin Atlantic fitted four pairs of double Upper Class Suites on two of its Boeing 747-400 aircraft. The suites, located in the center herringbone section, remained separate until cabin crew were requested to create the double space. They then unclipped the middle partition to create a 2m² space, which could be used as a double seating area, or a sleeping space with the beds deployed. "It has been one of my long-held ambitions to have double beds on board our aircraft," commented Sir Richard Branson, chairman of Virgin Atlantic, at the launch.





FOUR'S COMPANY

In 2017, Qatar Airways revealed its Qsuite, in which pairs of adjoining suites can be opened up to create a double bed. Arranged in a quad layout, there is also an option to make four suites into a social space by sliding away a system of adjustable panels and moveable TV monitors. If only three passengers sitting in a quad want a shared experience, privacy doors ensure that the remaining traveler can enjoy their flight undisturbed. This is made possible by the integration of complete privacy doors, designed in such a way that part of the door can be removed by the passenger in case of emergencies.



BED OF INNOVATION

The center doubles on Singapore Airlines' new A380 business class are separated by a divider panel, which can be part lowered to allow conversation with a travel companion, or fully lowered

to go into 'couples' mode. With the beds deployed, a double bed is created, which the crew dresses with bed linen. The innovation in this seat goes much deeper than the beds though: see page 122 for the full story.





HONEYMOONER

The Solstys III business class seat from Stelia Aerospace is now available as a mini suite. The Solstys Suite variant was launched at Aircraft Interiors Expo 2017, and includes a door, moveable privacy partitions, and the ability to convert twin seats into double beds in a honeymoon passenger configuration.



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SMART IDEAS

Technology, communication and fashion come together with Lufthansa's FlyingLab, an airborne laboratory for the next-generation passenger experience

Lufthansa has been nurturing the ideas of young innovators to gain inspiration for a more individualized and comfortable flight experience. The 'Telekom Fashion Fusion & Lufthansa FlyingLab' competition, run in partnership with Deutsche Telekom, has seen three teams develop ideas that include seating, IFE, uniform and communication concepts.

To progress these ideas from the drawing board, the teams had the opportunity to create functional prototypes at the Fab Lab workshops in Berlin, Germany, where they could use technologies such as 3D printing and laser cutting. They could also demonstrate how their ideas and prototypes work in real operations during a flight from Frankfurt to Houston on an A380, which Lufthansa designated as a 'FlyingLab'.

"Technology and fashion are part of Lufthansa's DNA. We've been working on functional clothing for 60 years,"

said Kai Duve, head of Frankfurt cabin crews at Lufthansa and a member of the competition judging panel. "The challenge helps us expand our pool of ideas and gain valuable outside impetus. We can find out what our passengers really want on board."



TEAM FEEL.FLIGHT

This team has devised a chatbot system intended to improve communication and service. Passengers can communicate with the chatbot through messenger apps such as WhatsApp and Facebook Messenger, and once requests are received, the system classifies them, arranges them by priority, and coordinates the appropriate service response. Some requests, such as flight information, can be handled by the chatbot itself, freeing-up crew to attend to classifications that require a personal touch, such as galley requests or nervous flyers. Small displays linked with microcontrollers embedded in the

cuffs of the crew's uniforms mean they can respond quickly to requests and have relevant information easily to hand.



TEAM LYRA

Communication between passengers and cabin crew was also the theme at Team Lyra, which developed the Lyra Connect app. Once passengers connect with the app (using their own mobile devices), they can ask for refreshments, information or assistance. The request

then appears in the field of vision of the next available flight attendant thanks to the use of smartglasses. Crew can attend to simple requests such as drinks

orders straight away, but if more detail is required they need only stand by the relevant seat, where a signal field installed in the floor transmits additional passenger information to the glasses, such as preferred language or special requirements.



TEAM SMART CHAIR

The Smart Chair project focuses on personal space, with the seat design giving every passenger a fully customized flight experience, from IFE to comfort options. Flyers wanting an immersive entertainment experience or to shut out distractions in the cabin can lower a visor-like structure over their head to enter their own personal world of sight and sound. Guests on FlyingLab couldn't get the full effect as the seats are still in the visionary concept stage the Fab Lab facilities and limited budgets couldn't be expected to run to a functional, airworthy prototype.

The Smart Chair team also worked on a crew uniform made of fabrics that are thermoregulated, breathable, antibacterial and antiallergic.

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WALK ON BY

An aircraft seat concept is being developed that could cut boarding and disembarking times in a B737 by five minutes

A collaboration of cabin experts has developed an idea that they believe could reduce boarding and deplaning times on a B737-800 by five minutes. The premise is simple: by doubling the aisle width from 16in to 32in, sufficient space will be created for passengers to move past as others stow baggage, and for wheelchairs to access the aisle easily, all contributing to passengers being seated in less time. The solution is also fairly simple: the extra aisle width is created by 'compressing' all three places in a seat triple by around 2.6in.

The discomfort of the narrowed seat is only temporary, as once boarding is completed, when crew are checking the backrest and table positions prior to take-off, they press a button on the aisle seat, which activates a mechanical actuation system, expanding the seats to their full width and latching them into place. Should any passengers not fit within the narrowed seats, their seats could be expanded earlier. After landing, the aisle-side passengers can push the button to release the latches, narrowing the seats for deplaning.

The seat has been devised as part of the PASSME project (Personalised Airport Systems for Seamless

Mobility and Experience), a project aiming to address the anticipated increase in demand for commercial flights in Europe by 2050.

Optimares is developing the primary seat structure, with Almadesign working on the styling of the seat, DLR providing simulation, and TU Delft also working on testing and development. The partners believe the seat design is viable and they are currently going through the patent process. Indeed the mechanical actuation system uses standard components already used in the seating industry and adds only a 5% weight penalty, which could be offset by the operational benefits.

The partners do not anticipate any major certification issues as the system is only deployed when the aircraft is stationary, and it has been designed in accordance with FAA/EASA regulations.

A prototype of the seat has been tested at TU Delft's labs within a mock-up B737-800 fuselage, and the partners report that the results matched their simulations, indicating a five-minute reduction in turnaround time for a standard single-class configuration with 180 passengers.

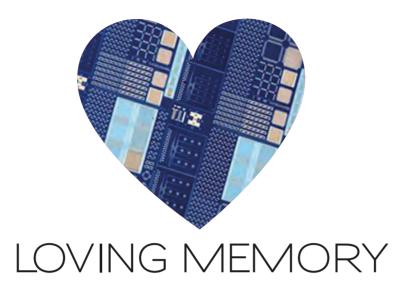
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Could memristors that alter their resistance and store multiple memory states spell the end for the resistor in cabin electronics?

Transistors are used in large quantities in integrated circuits (chips) to process data in electronics, acting as microscopic switches that control the flow of electrical current by turning it on or off. The size of transistors has been steadily decreasing to meet the demands of the electronics sector for ever-smaller form factors and ever-greater performance, but they are reaching their physical limit. To illustrate how small transistors have become, the processing chips that power smartphones contain an average of five billion transistors. So how could they be made even smaller?

The solution could come from a new generation of nanoelectronics being developed by scientists at the UK's University of Southampton. The scientists have been experimenting with the component materials of transistors, with a view to developing a simpler and smaller alternative. The team proposes the memristor (memory resistor), which they believe "could hold the key to a new era in electronics".

The basis of this bold claim is that, as well as being smaller and simpler in form than transistors, memristors also offer greater performance, as the innovative functional oxide materials in their composition means they are capable of altering their resistance and storing multiple memory states.

Put simply, these tiny low-energy marvels can retain data by 'remembering' the amount of charge that has passed through them, creating the potential for computer systems and electronic devices that switch on and off instantly, never forget and can even independently adapt to their environment without

human intervention. These qualities make memristors ideal for next-generation data storage, or for electronics in difficult-to-access spaces in the cabin – a relatively simple application, as the university is suggesting the technology is ideal for environments ranging from outer space to within the human body. The research team says it has demonstrated a memristor technology that can store up to 128 discernible memory states per switch – four times more than previously reported.

As Themis Prodromakis, professor of nanotechnology at the University of Southampton, said, "This is a really exciting discovery, with potentially enormous implications for modern electronics. By 2020 there are

expected to be more than 200 billion interconnected devices within the Internet of Things framework and they will generate an incredible amount of data that will need processing. Memristors are a key enabling technology for nextgeneration chips, which need to be highly reconfigurable yet

affordable,
scalable and
energy
efficient."

BACK TO THE FUTURE

The University of Southampton collaborated with external experts for the memristor project, including Leon Ong Chua, a professor in the electrical engineering and computer sciences department at the University of California, Berkeley. Chua could be considered the father of memristor technology, having first conceived the theories behind, and ideas for the development of, the memristor in 1971. Thirty-seven years later, in 2008, a working solid-state memristor was created by a team at Hewlett-Packard, which was interested in using the technology in its computer architectures. A decade later, Chua's idea is still arousing interest.

See p32 for more university research news



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Embraer has developed a seat concept for regional aircraft that uses high-tech materials to adapt to your body throughout a flight

ABOVE: CONVENIENCE OPTIONS INCLUDE A FULL-WIDTH SHELF AND LIGHTWEIGHT STRAPS TO HOLD PERSONAL BELONGINGS

ABOVE RIGHT: THE FLEXIBLE BACKREST AND ANATOMIC HEADREST PROVIDE COMFORT THROUGHOUT THE JOURNEY

S-TRIP TEAMS

The S-Trip has been developed with a strong integrated approach between industrial design, structural engineering and ergonomics, with many high-performance materials and textiles specified. During the development phase, Embraer is partnering with Texiglass for the research and technology work, with further technology support from suppliers such as Toho Tenax America (a carbon-fiber expert), Acumen (an industrial design studio), Alltec (an injection molding expert) and Kobleder (a knitted textiles specialist).

High-density cabin configurations on regional aircraft could be about to become more comfortable, if a design concept by Embraer comes to life. Named S-Trip, this slimline seat is designed to afford comfort in several ways, most notably its 19.3in-wide seat cushion.

The seat cushion has interesting features in addition to its generous width. For example, instead of crushable

foam, which can 'bottom out' and lose its supportive properties, a suspended flexible comfort system has been devised that maintains comfort over several hours, even as passengers adopt new lateral positions on the seat. The system comprises a composite basin-shaped hollow structure, with a series of webbings running across that structure for even distribution of pressure throughout the seating surface.

Embraer has recognized that some airlines are opting to remove the recline function in regional aircraft, so S-Trip is a fixed back design. However, the ability to move position is important for seated comfort, so the ergonomic shape of the fixed backrest has been designed with spine profiles in mind, as well as what

passengers are likely to do during a flight and how they will move – eating, sleeping or working, for example.

Whatever the activity, the carbon-fiber composite backrest structure flexes to support the passenger's posture, with a little extra comfort afforded by the 3D knitted mesh textile. S-Trip even looks comfortable, as the slim backrest and back shell help create a feeling of spaciousness in the living space.

S-Trip could be more than just a nice concept, as Embraer has performed a variety of simulations and component and coupon-level tests on the seat design to evaluate its compliance with structural integrity, occupant protection and flammability tests. Simulations and virtual analysis have also been used to evaluate the structural and comfort performance of the seat, followed up with physical prototypes and user evaluations. The prototype has not yet been tested according to FAA and EASA regulations, but Embraer is confident of its performance. Watch this space...

Visit aircraftinteriorsinternational.com for all the latest seating news



HARD SCIENCE, SOFT APPROAG

New developments in soft robotics science could bring actuators that are low cost and self-healing, and which generate powerful movement with a gentle touch

A next-generation actuation technology is being developed by the Keplinger Research Group at the University of Colorado that has potential application in the aircraft cabin. The project does not involve the typical hard metallic actuator components such as rigid pistons and motors, but instead focuses on soft materials that can react with a wide range of motions when voltage is applied to them. The science, known as soft robotics, mimics the expansion and contraction of muscles, enabling them to perform delicate movements when needed, while also having the power to lift heavy objects – perfect for actuators that can achieve a gentle transition between seating positions in business or first class, or lowering divider screens, for example.

The research team has developed three types of HASEL (hydraulically amplified self-healing electrostatic) prototype, each focused on generating lifting, gripping or contracting power. That power comes from a liquid insulating layer in the actuators, which works much like hydraulic fluid, enabling movement. This layer also enables these actuators to 'self-heal', so that if electrical damage occurs, they immediately recover their insulating properties and resume operation.



The team has run demonstrations of the actuators in the lab, including one that involved lifting a gallon of water several times per second. The results are promising, with the only big challenge at present being the high voltage required for operation. However, Eric Acome, a doctoral student in the Keplinger Group explained, "We are already working on solving that problem and have designed devices in the lab that operate with a fifth of the voltage."

Something that certainly doesn't seem to be an issue is cost. "We can make these devices for around 10 cents, even now," added Nicholas Kellaris, a fellow doctoral student in the Keplinger Group. "The materials are low cost, scalable and compatible with current industrial manufacturing techniques."

The next research stage in the HASEL project will be to focus on further optimizing materials and geometry, and exploring advanced fabrication techniques in order to continue improving the platform and enabling more practical applications for the actuators. With such low cost and weight, and such high power and reliability, the introduction of soft robotics in the cabin could be an interesting proposition.



THE RESEARCHERS HAVE SECURED PATENTS FOR THE TECHNOLOGY AND ARE CURRENTLY EXPLORING COMMERCIAL OPPORTLINITIES WITH THE ASSISTANCE OF THE LINIVERSITY'S TECHNOLOGY TRANSFER OFFICE

THANKS TO TRENT KNOSS FOR INFORMATION ABOUT THIS PROJECT, AND TO GLENN ASAKAWA FOR THE PHOTOGRAPHY, COLORADO, EDU/TODAY

PROTOTYPE ONE

One idea is a donut-shaped elastomer shell filled with an electrically insulating liquid and hooked up to a pair of opposing electrodes. When voltage is applied, the liquid is displaced, which changes the shape of the soft shell. For a demonstration, the researchers positioned several of these actuators opposite one another and when they

were electrically activated, a gripping effect resulted. The grip releases when voltage is turned off.



PROTOTYPE TWO

Another HASEL design is made of layers of highly stretchable ionic conductors that sandwich a layer of liquid. When electrically activated, the actuator expands and contracts linearly. In lab tests, this capability has been

used to lift a suspended gallon of water and flex a mechanical arm unit.



PROTOTYPE THREE

The Peano-HASEL actuator consists of three small rectangular pouches filled with liquid, rigged together in series. The polymer shell is made from the same lowcost material as a potato chip bag and is thin, transparent and flexible. Peano-HASEL devices contract on application

of a voltage, much like biological muscle, but their electrically powered movement can operate at speeds much faster than human muscle.



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The aerospace coatings market is coatings market is forecasted to reach US\$1.98bn by 2022, at a CAGR of 6.90% from 2017 to 2022

ABOVE: FROST SPREADS
MORE QUICKLY WHEN DROPS
ARE CLOSER, AND THE CHAIN
REACTION IS SLOWER WHEN THE
DROPS ARE FARTHER APART

The humble beetle could be the key to a means of preventing frost on aircraft parts, condensers and windows, or other areas where moisture is not wanted. The inspiration for the project at Virginia Tech is the Namib Desert Beetle, which lives in one of the hottest places in the world, yet collects airborne water. The bumps on the insect's shell attract moisture to form drops, but the sides are smooth and repel water, creating channels that lead to the beetle's mouth.

Inspired by this remarkable anatomy, the researchers developed beetle-inspired chemical micropatterns. "We made a single dry zone around a piece of ice," said Jonathan Boreyko, assistant professor of biomedical engineering at the university. "Dew drops preferentially grow on the

hydrophilic dots. When dots are spaced far enough apart and a drop freezes, the ice is no longer able to spread frost to the neighboring drops because they are too far away. Instead, the drops evaporate, creating a dry zone around the ice."

The researchers have created only a 1cm (0.4in) surface so far, but they believe the area can be scaled up with hydrophilic patterns on top of a large water-repellent surface. Frost and unwanted moisture could become less of a problem – for example, fog-free mirrors could result.

SELF-PRESERVATION

A team of paint and lacquer technology experts at the Fraunhofer Institute for Manufacturing Technology and Advanced Materials in Bremen, Germany, is developing and testing a range of self-healing coatings. One approach being pursued is the incorporation of micro-encapsulated corrosion inhibitors into a coating. If the coating becomes damaged, the microcapsules break open at that point, the healing agent is released, and it then cures in the crack. This mechanism enables cracks to be repaired, preventing crack propagation and serious corrosion damage to underlying materials.

SYNTHETIC VIRUS

Cabin hygiene could benefit from a synthetic 'virus' that kills bacteria on contact. Biochemical researchers at the UK's University College London (UCL) and National Physical Laboratory claim they have designed proteins that can be used to build tiny hollow shells that emulate the outer structures of natural viruses. These synthetic virus 'drones' can recognize bacterial cells before targeting and destroying their most vulnerable part – their membrane.

"We used high-resolution and real-time imaging to see the impact of the synthetic viruses on bacterial model membranes and found that they are extremely destructive," stated UCL EngD student, Hasan Alkassem. "Seconds after landing on the surface, the synthetic viruses disassemble and form rapidly expanding holes in the membrane, causing it to leak. Experiments on intact bacteria then showed that this caused the bacteria to die."

AUTOMATED PROCESS

Scientists at Mankiewicz have recently developed a range of water-based metallic basecoats with shining pigments and metallic colors, which can create optical depth with a 3D effect. They have also created a way to apply such paints at higher speed and better quality, using automated systems that range from automated mixing to fully automated robot application, which they say removes the risk of human error and can achieve perfect results. This surface can, in turn, be topped with a smart coating that offers antimicrobial properties, reducing disinfection costs and prolonging cleaning cycles.







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IDLE THOUGHTS



THE BRIEF

There is a clear trend toward flexible and personalized flight experiences, and we would like to see a new idea that reflects this trend in economy class, giving customers the option of having a much improved flight experience for a minimal extra outlay. And just to make things a little more difficult, this passenger offer should not harm airline revenues; indeed it should help maximize seat revenues for the airline.

THE SOLUTION

Economy passengers will be able to put their feet up with the Eco Zlounge devised by Zodiac Aerospace, a simple concept that makes the most of having an empty seat in front by creating a lounger. The engineering is as simple as the idea, with kinematics based on proven mechanisms.

When load factor allows, a passenger can upgrade to the Eco Zlounge, thus ensuring the seat in front is reserved. After take-off, when the passenger is ready to recline, cabin crew simply rotate the seat cushion of the seat in front and slide it backward to create a horizontal surface extending between the seats. The mechanism also creates an opening in the seatback so that the occupant's feet can extend into the seat space in front, with an automatically deployed 'privacy hood' covering the feet.

The kinematics allow the cushion to move independently from the seatback meal table and the IFE display on the upper part of the seatback, leaving the passenger free to put their feet up and enjoy a meal and a movie.



VFRDICT

Any idea that optimizes cabin space, creates revenue streams from unoccupied seats and gives passengers new options can only be positive. Indeed, this concept could give airlines with high-density economy cabins a means to offer 'economy plus' without having to increase seat pitch in any rows or reduce seat count. However, the design is best suited to window seats or the central seats in a twin-aisle aircraft, as a large stepover is created when the lounge function is deployed.

The privacy hood is a nice touch, so the passenger's feet don't get knocked by people in the row in front, and they in turn don't have to see a wriggling pair of feet next to them. We just hope Eco Zlounge customers are wearing fresh socks.



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SPLIT PERSONALITY



THE BRIEF

There is fierce rivalry in business class, with airlines launching increasingly impressive and luxurious seating products. We'd like to see something new in this class that raises the stakes in passenger comfort without making a big sacrifice in cabin density.

THE SOLUTION

Rockwell Collins proposes the Valkyrie seat, intended to remove any comfort compromise in business class designs where the seat transforms into a bed. The company posits that if neither the seat nor the bed are entirely dedicated to their functions, then the comfort of both surfaces can be suboptimal. The solution is simple, and indeed its principle is nothing new, having been applied in first class with several airlines: to have a separate seat and bed, both optimized for providing a specific type of comfort. The principle is not new, but applying it within the smaller envelope of a business class seat is.

The Valkyrie concept gives passengers a dedicated seat for lounging, eating and working, but when the passenger is ready to sleep, the seat can be folded away and a full-size mattress pulled out from the console to create a dedicated sleeping surface. It's a simple idea that could offer the best of both worlds within the business class footprint.

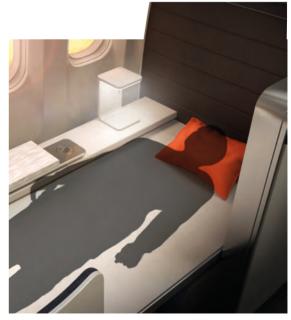






VERDICT

Valkyrie is an interesting proposition for airlines considering dropping first class or upgrading their business class product, and its simplicity is appealing. Certainly some passengers may prefer being able to move from a reclined position to a flat bed at the press of a button rather than having to stand up to deploy the bed, but then many happily do this today with flip-over seats. One simple question remains, though: why hasn't this been done before?



STEWARD: "SIR, WOULD YOU LIKE YOUR FRIED EGGS OVER EASY, OVER MEDIUM, OVER HARD OR SUNNY SIDE UP?

PASSENGER: "AHHH, YOU MUST HAVE AN AEROLUX AL-SK 15-100 SERIES SKILLET IN THE GALLEY!"

STEWARD: "BUT, OF COURSE, SIR, THIS IS YOUR BUSINESS JET



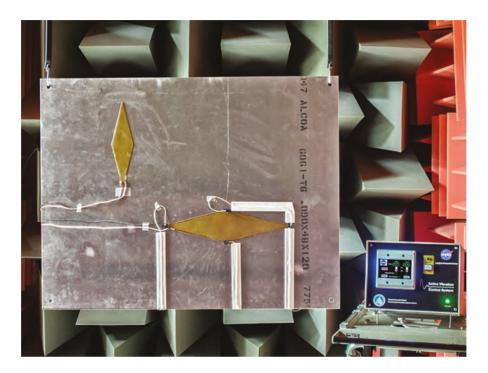


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SMOOTH OPERATOR







Let's get back to basics. We love all the suites, bars, massage functions, beds and expensive amenity kits, but to ensure all these luxuries are fully enjoyed, there should be no unwanted vibrations in the cabin. How can we ensure every surface in an aircraft feels stable and solid?

THE SOLUTION

NASA's Langley Research Center has developed a compact point sensor and piezoelectric actuator system that its scientists say can actively sense vibrations in flexible structures and, even more importantly, reduce them. A highly directional, four-sided diamond-shaped piezoelectric actuator can be mounted on or within a structure (the diamond shape simplifies actuator coupling), and four miniature accelerometers added to each side to create a matched pair of sensors and actuators.

This matched pair enables simple analog control electronics, with accelerometer responses collected, amplified and then fed back to the actuator, which will, if necessary, apply appropriate force to counteract vibration in a flexible structure. The resulting control action is a simpler equivalent of active damping, but just as effective.

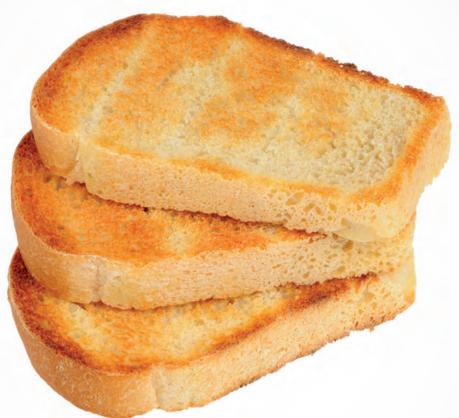


VERDICT

Any measure that reduces unwanted and unpleasant vibration in an aircraft is welcome, as it enhances the feeling of safety, comfort and luxury at a fundamental level. After all, no amount of cushions and pyjamas can counteract a subliminal feeling of discomfort when you're at 35,000ft. Better still, the analog nature of the system is simpler than piezoelectric control approaches, and offers good performance in a compact package, with no knowledge of the dynamics of the structure required. Of course, 'simple' and 'simple to NASA' are quite different things, but if the technology works as they say it does, it could help in the quest for a smooth passenger experience.

SOMETIMES IT'S THE SIMPLE THINGS

DONE SUPERBLY





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THE PASSENGER EXPERIENCE FOR
PASSENGERS WITH REDUCED MOBILITY

Words by Marisa Garcia. Illustration by Ahoy There

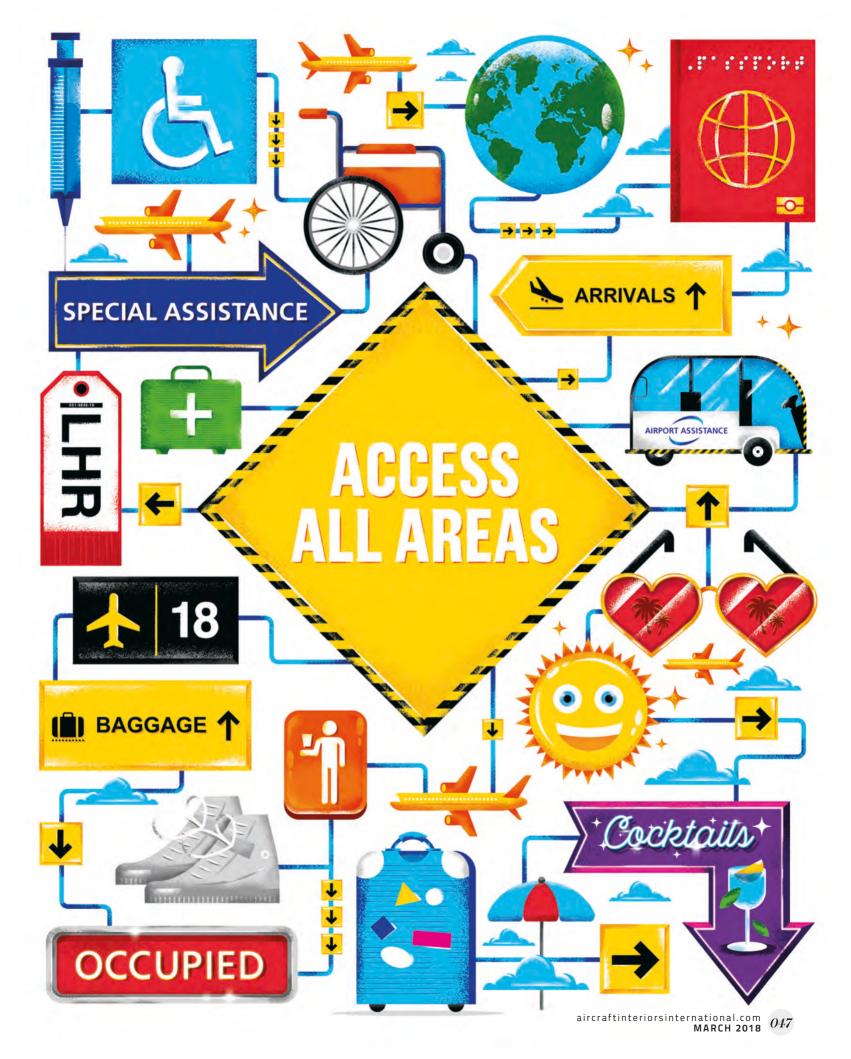
he airline industry has an opportunity to actively engage with disabled travelers and persons with reduced mobility (PRMs) in the design of an accessible cabin. According to the World Health Organization (WHO), 70 million people need a wheelchair. While not all of those individuals travel by air, lifestyle changes and expectations of the disabled and PRMs will mean that more of them want to. In addition, the increasing number of elderly passengers places special demands on transportation infrastructure to design more accessible infrastructure and vehicles.

The last update to WHO's *World Report on Disability*, published in 2011, says that disability is rising and will be a greater concern in the years ahead because of the increase in aging populations and a global increase in chronic health conditions. Today's infrastructure is not ready to address the needs of this growing population.

AIRLINES ARE LAGGING

While there has been a focus on making ground transport such as rail, buses and taxis more accessible in developed countries, aviation, as a global service with unique operational requirements, has generally lagged behind. In recent years a number of airports around the world have launched programs to improve accessibility, but not all. Airline services for disabled and PRMs, both on the ground and in the air, remain largely unchanged and are inadequate to meet the needs of the majority of wheelchair-bound passengers.

"Specific barriers also exist in relation to persons with disabilities being able to express their opinions and seek, receive and impart information and ideas on an equal basis with others and through their chosen means of communication," the authors of the WHO global disability action plan for 2014-2021 state. "People with disability have unique insights about their disability and situation but have been excluded from the decision-making process about issues that affect their lives. In line with Article 4 of the Convention on the Rights of Persons with Disabilities, persons with disabilities through their representative organizations should be fully consulted and actively involved in all stages of formulating and





BREAKING BARRIERS

Today's transportation infrastructure needs enhancement to fully meet the needs of PRMs, according to the World Health Organization's World Report on Disability.

"Many built environments (including public accommodation), transport systems and information are not accessible to all," the report's authors warn. "Lack of access to transportation is a frequent reason for a person with a disability being discouraged from seeking work or prevented from accessing healthcare."

So what is to be done? The report recommends that: "In transport the goal of continuity of accessibility throughout the travel chain can be achieved by determining initial priorities through consultations with people with disabilities and service providers.

"Introducing accessibility features into regular maintenance and improvement projects, and developing low-cost universal design improvements that result in demonstrable benefits to a wide range of passengers."



wheelchair can travel by land and sea but air travel has not adapted," he says. "I did a little bit of research, to find out what's happening. It's not a lot."

The lack of adequate facilities not only generates discomfort and indignities in the process of boarding and deplaning, but it also negatively impacts the wellbeing of disabled passengers to dangerous levels in flight. He explains, "On longer flights, people dehydrate. They won't drink before the flight or on the flight because they know that they can't get to the toilet, and that's scary. My children will have a catheter or wear a pad for the duration of the flight. If you want to take it through stages, then the next stage up is someone who has a bit of upper body strength and can get to the toilet."

Working in collaboration with other disabled passenger representatives, and interested industry stakeholders, Wood has identified some solutions that have already been suggested by industry designers. These include the Air Access seat by PriestmanGoode, which consists of an aircraft seat that is convertible to a wheelchair when needed, and the Crystal Cabin Awardwinning entry by Hamburg University of Applied Sciences (HAW) for the Smart Onboard Wheelchair, which can be rolled directly over the onboard toilet.

"The ideal for me is if there is a balance between aviation and wheelchair use, a process where the seats are flexible – where if a wheelchair is booked it can be a wheelchair seat," he says.

Wood believes that many more disabled passengers would travel by air if they could be secure in their ability to board and navigate the aircraft cabin, as well as be confident that their expensive wheelchairs are properly handled when stowed.

implementing policies, laws and services that relate to them."

THE WAY FORWARD

Representatives are reaching out to airlines and engaging in open dialog with aviation stakeholders. They are eager to learn more about the unique requirements of airline operations and to help airlines, airports and designers identify and develop deliverable products that meet their needs.

Chris Wood, founder of the Flying Disabled campaign in the UK, believes that airlines can gain by accommodating the needs of the disabled and PRMs because many of them want to travel and are finding other paths to explore the world. He explains that the experience of traveling with his children, who depend on wheelchairs, encouraged him to become an advocate for safer, more dignified travel.

"It was two years ago, coming back from a flight with my daughter. As I came out of the aircraft, I was scratching my head, wondering why anybody in a



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SPECIAL ASSISTANCE

TOUCH-ME

The Touch-Me concept, being developed by the University of Lisbon in partnership with TAP Portugal, is intended to support visually impaired passengers, by giving them a sense of where they are sitting in the aircraft, and their relative position to the different elements of the cabin such as exits and lavs. The key is a new type of information card with a 3D map of the cabin in relief, and a pin marking their seat for navigation. In addition to wayfinding, well-being and safety benefits, the idea can also serve as a useful communication tool between crew and visually impaired passengers.

If airlines were more aware of this demographic and more accommodating to their needs, Wood believes they would gain more loval passengers.

To help raise awareness and spur progress, Wood hosted the Wheelchair in the Cabin Symposium at Virgin Atlantic's Base in London in September of last year, which had participation from airlines, government entities, OEMs, industry bodies and regulators, as well as global representative groups advocating for the needs of disabled travelers.

Wood believes that by engaging with aviation stakeholders and raising awareness of the challenges, he can help foster positive change. And, even as a single father of two disabled children, he is tireless in his efforts.

"I've been approaching Oneworld and SkyTeam, and I'm also approaching people to create an accessibility category in the Crystal Cabin Awards. I'm also discussing with Skytrax and Airline Ratings the possibility of creating an accessibility ratings category. All three have been looking at accessibility in air travel," he says.

Recently Wood announced positive progress on the creation of an Airline Accessibility award from the Skytrax organization.

TAKE WHEELCHAIRS ON BOARD

Michele Erwin, founder of All Wheels Up in the USA, was prompted to become an advocate for greater accessibility in air travel after trying to arrange a trip to Walt Disney World with her son, who has spinal muscular atrophy (SMA). She is determined to find a way to make wheelchairs safe for in-cabin use, ensuring greater comfort for disabled and PRM travelers while

benefiting airlines by approving the

use of passenger wheelchairs on board.

Obese passengers also have special requirements. Visit the Features section of our website to find out how their needs are being met



PAX NAV

As well as the University of Lisbon (see above), Hamburg University of Applied Sciences is also looking into navigation for visually impaired passengers. Their idea is PaxNav, a passenger guidance system concept that can be used in airports and aircraft that uses established wi-fi and Bluetooth technologies to accurately locate a person and direct them to specific locations such as their departure gate or their seat inside the aircraft. This enables visually impaired passengers to be guided through the travel processes without the need for human help.

FLY EQUAL

Fly Equal is an Embraer project intended to offer opportunities for airlines to present a differentiated product that enables every passenger to fly with the same autonomy, comfort and safety. As well as the human benefits, Embraer thinks the concept could help airlines attract more passengers with disabilities or reduced mobility, passengers over 60, and obese passengers.

Fly Equal allows the passenger to enter the aircraft with his or her own wheelchair or mobility aids, transfer to the seat at the appropriate transfer angle, and store their wheelchair or other equipment in the cabin in front of their seat. Other special features of the seat design include a seat suitable for obese passengers, a retractable seat, a backrest with handle and visual identification, and a safety briefing with audiovisual resources.

While the hybrid aircraft seat/wheelchair designs would be useful to persons who can transfer themselves from the wheelchair to the aircraft seat, albeit with some assistance, Erwin tells us that the transfer process is inadequate for other disabled passengers. She also believes that the process of checking wheelchairs for the hold comes at great risk to airlines and to travelers who rely on expensive and critical mobility vehicles.

"Something like 98% of people with wheelchairs won't even travel by plane because of the safety risks to themselves, and their wheelchairs," she states. "There are people who won't travel because of the risk of catastrophic damage to their wheelchair."

Erwin believes that making space for passengers' own wheelchairs on aircraft, just as they might find on buses or other forms of ground transport, makes sense for airlines because of costs.

"We feel that it may be more economical to provide a wheelchair spot. Some airlines pay up to US\$2.6m yearly in wheelchair repairs, and then there are lawyers' fees and compensation, and lawsuits due to disability issues," she says.

"Another point is that airlines can save money on the

tarmac. Instead of spending 45 minutes waiting for someone to be transferred from their wheelchair into an airplane seat, someone could just roll onto the plane and get locked down."



One solution that All Wheels Up has identified as potentially viable is the use of Q'Straint







ROOM AT THE BACK

SANTO (Special Accommodation Needs for Toddlers and Oversized) is an idea being developed by Sii Deutschland that takes advantage of the unused space typically left between the last seat row and the aisle in the tapered section at the rear of the cabin. By introducing a one-and-a-half seat element, including a fully retractable armrest, the seat offers enough seating space for two grown-ups and a child, or provide enough width for travelers in need of more space. This concept could have revenue potential, as well as the potential for a more inclusive passenger experience.



every angle

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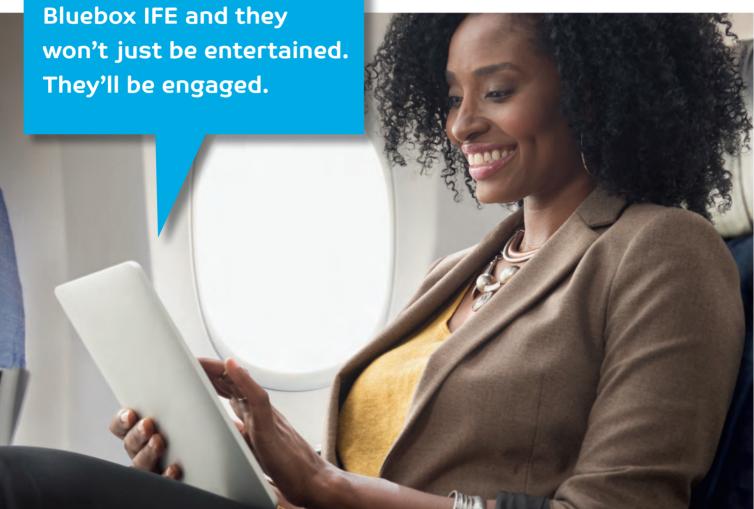
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LOCK IN INNOVATION

The Air Access concept created by PriestmanGoode is intended to ease the transition of PRMs from gate to aircraft, while also making the process more dignified. Ground services staff assist the passenger into the Air Access wheelchair in the departure gate or on the jetway, where there is ample space to maneuver, and when seated, the passenger is wheeled onto the aircraft. Once onboard, the 360° pivoting wheels enable it to be slid sideways into the fixed-frame aisle

seat without the passenger needing to get up. When the two elements are positioned, they are locked together for the duration of the flight.

PriestmanGoode's vision is for Air Access seats to be installed in every aisle seat of the aircraft (and indeed any aircraft type). In a wide-body this would mean four seats per row, meaning dozens of PRMs could travel on any given flight. No revenue is lost if there are no PRMs traveling, as all travelers can use the seat.

does a commercial tie-down system look like, one that everyone would be happy with? It should not just pass the 16g test, but also ensure that there's not going to be a head strike issue for someone sitting behind the chair. We're looking at solutions to this on buses, such as having a separate partition for the wheelchair. We're still in the R&D stage, and we don't know what it is going to look like at the end of the day, but Q'Straint is the number-one company in the world for restraint systems and it was an automatic choice for us to work with.

"Since nothing currently exists for commercial air travel, we're starting out with what they have on the market," she adds. "We'll take what works best and then develop something that is suitable for use by

commercial airlines."

RIGHT: WITH THE AIR ACCESS CONCEPT, EVERY AISLE SEAT COULD BE PRM-ERIENDLY

integrated four-point fasteners, a type of wheelchair restraint that is already used in buses and trains. These restraint systems are already proved to exceed the 16*g* requirements of aircraft seat testing, but there are some other details to overcome.

"While a tie-down system with straps may work for private flights, it may not work for commercial flights because there are a lot of questions about the straps and whether people may trip over them," Erwin explains. "So we're asking: what

INVOLVING THE REGULATORS

All Wheels Up is also actively engaged with regulators throughout the process.

"We have the support of the FAA. It gives us guidelines for testing and wants to make sure that we are not wasting any of our money as we're a non-profit organization. It ensures we are testing to the right guidelines," she says. "We also have a lot of support from Congress in the USA, which is completely on board and there are bills on the floor to hopefully

fund what we are doing."

Like Wood, Erwin is interested in actively helping the aviation industry better understand the

BELOW: VIRGIN ATLANTIC'S USER
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VIRGIN'S ACCESSIBLE IFE

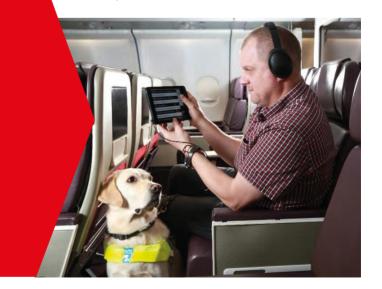
In December 2017 Virgin Atlantic became launch customer for an accessible IFE (aIFE) platform to entertain passengers with visual impairments.

The system provider, Bluebox, worked closely with Virgin Atlantic and representatives from The Guide Dogs for the Blind Association (Guide Dogs) to get input and feedback on the platform throughout the development process.

The platform is a customized iPad-based user interface that builds upon the accessibility

features of Apple's iOS platform, such as VoiceOver and Zoom, but enhances these for the unique requirements of IFE.

James Macrae, CTO at Bluebox explains: "For example, rather than using a traditional screen reader function to read out on-screen text, information like film synopses are read out after a single tap of the film title. By putting these in the background, we kept the interface uncluttered and simple to navigate, while still providing information to help the passenger choose their selection."





ROLLING SUCCESS

The Smart Onboard Wheelchair designed by students at the Hamburg University of Applied Sciences with support from Airbus is intended to give passengers with limited mobility a little more independence on board. A passenger in the wheelchair can roll over the toilet seat unassisted, aided by a specially shaped seat. This is an easy innovation to implement across a fleet as no structural changes to the aircraft lavatory are required. The project has been tested by wheelchair users, and according to the researchers, their verdict was that the chair is 'easy to handle, stable, and safe'.

difficulties that disabled and PRM travelers encounter in air travel, and wishes to collaborate on solutions. She tells us that her organization would welcome greater collaboration with aviation OEMs, designers and knowledgeable engineering groups like the Society for Automotive Engineers (SAE), which helps draft seating regulations and testing requirements. She also views the role of the organization as a helpmate of positive change for the airline industry, not an adversary.

"We're here to work with the airlines. We're not here just to say the airlines are not doing something right. We're here to see how we can partner together," she says. "We're a research organization and we're going to research how to prove to the airlines that accessible air travel can increase revenue, not lose it. We want to show them how they can have more loyalty, as well as stop having to pay refunds for damaged chairs."

Like other representative organizations currently calling attention to the needs of disabled and PRM passengers, Wood and Erwin believe it's critical for aviation's stakeholders to understand the issues and the sense of urgency.

"It will take one of the manufacturers to lead the way, to be proactive, and to say this is coming and let's sort it out rather than leave it for another decade and then have it rushed," Wood says. "More people, like the elderly, are going to be suffering. I work a lot with aviation but it's a matter of who can trigger change."

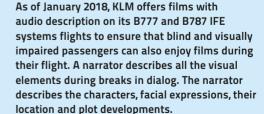
Perhaps the words of Prof. Stephen Hawking, in the foreword of WHO's World Report on Disability may serve as inspiration: "We have a moral duty to remove the barriers to participation, and to invest sufficient funding and expertise to unlock the vast potential of people with disabilities. Governments throughout the world can no longer overlook the hundreds of millions of people with disabilities who are denied access to health, rehabilitation, support, education and employment, and never get the chance to shine."



"It is critical for aviation's stakeholders to understand"



ABOVE: AUDIO DESCRIPTION IS ENHANCING THE IFE EXPERIENCE FOR MANY KLM PASSENGERS



The first films with audio description are Home Again, Kingsman: The Golden Circle and the Lego Ninjago Movie. More films will be added in the coming months.



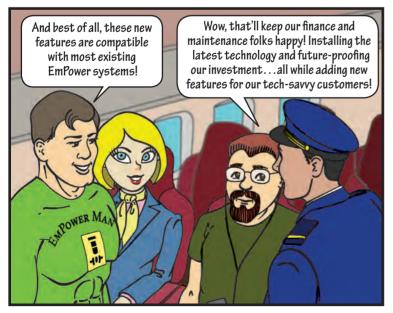
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PERMITTING EMOTIONAL SUPPORT ANIMALS IN THE CABIN HAS BECOME A DIVISIVE TOPIC, WITH VAGUE REGULATIONS ALLOWING ABUSE OF THE SYSTEM.

SOMETHING NEEDS TO BE DONE, BUT WHAT?

Words by Marisa Garcia. Illustration by Anna Davie

ague regulations allowing support and service animals on board aircraft have become a divisive topic, pitting consumer interest groups in the USA against each other and against airlines and regulators. At the heart of the debate is a difference between animals trained and certified for service to the disabled, and those that provide passenger comfort, without undergoing training, known as emotional support animals (ESA).

Airlines are required to comply with USDOT Part 382 'Nondiscrimination on the basis of disability in air travel,' which includes allowing service animals but makes no clear distinction between trained service animals and comforting pets.

As an FAA spokesperson explains, airlines can "make determinations on a case-by-case basis". But while leaving

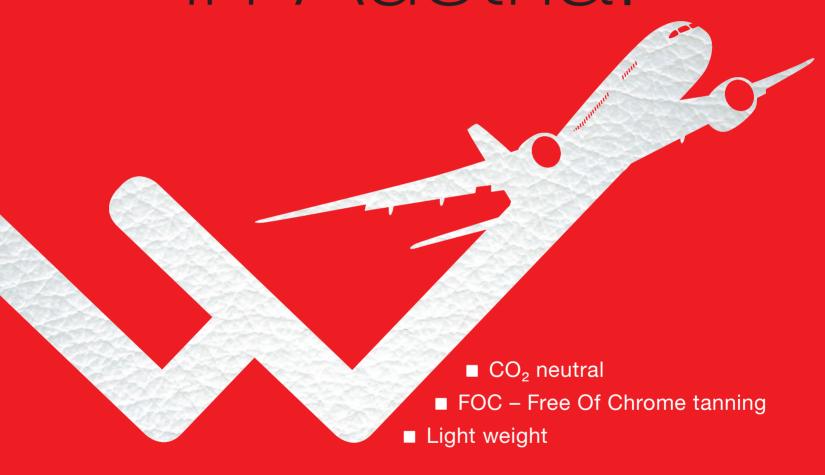
that determination up to airlines gives them some agency in deciding what is best for operations on board, it puts airlines in an awkward position with consumer groups.

The spokesperson adds that the FAA does review the potential issues of animals in the cabin and how they affect safe operations. "When we developed guidance about the location and placement of service animals on aircraft years ago, we carefully reviewed several databases to see if service animals in the cabin had any negative effect on passenger safety in flight and during an aircraft evacuation [under 8900.1, Volume 3, Chapter 33, Section 6, Para. 3-3576 (B) and (C)]," the FAA spokesperson states. "Looking at many years of data through 2017, we found nothing further indicating that the presence of a service animal had any negative effect on aircraft evacuations."





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"Regulators need to address and define clearly what is meant by ESAs"

But this review doesn't address the reality of day-to-day operations, or increasing numbers of passengers flying with a wide range of animals as ESAs.

SERVICE VERSUS SUPPORT

Andrea Gründer, senior manager for special cargo at IATA, believes the vague definition and categorization of these animals is problematic for airlines that want to comply while maintaining hygiene and safety.

"I think US regulators need to address and define clearly what is meant by ESAs and put a frame around it. Then you have the support and service animals, which are really used to assist people. Service animals are to be distinguished from emotional support animals," she says.

"Airlines within the USA have to follow the rules when it comes to ESAs and they have a lot of difficulty when certain type of animals arrive at the gate and need to be transported in the air. There are many different types of animals that have gone on aircraft: ducks, miniature ponies, a turkey. When it comes to service dogs, or service animals, they are trained and know how to behave. And they have to be

LAB REPORT

In June 2017 a passenger on a Delta Air Lines flight was attacked by another passenger's emotional support dog during boarding, while the aircraft was still at the gate. The 50 lb chocolate lab-pointer mix was sitting on its owner's lap in the middle seat.

The owner, a member of the US Marine Corps, said the animal had been issued to him for emotional support. The passenger who was attacked sat next to them in the window seat and was trapped when the animal lunged for him. Reports state that the dog was growling aggressively at the injured passenger before the attack, and that after the initial bite, the owner tried to restrain the dog but was unable to stop it from striking out again.

The victim suffered multiple bites in the face and had to be transported to hospital, where he was treated for severe injuries, requiring 28 stitches. The dog's owner was not charged.

MAY 2003

Cuddles the miniature guide horse is spotted on an American Airlines flight from Boston to Chicago. Aside from her indispensable help given to blind owner Dan Shaw from Maine, USA, Cuddles proved rather useful on this flight: as she was too large to fit in the main cabin, they were both upgraded to first class.



In 2004 a miniature
Appaloosa guide horse named
Confetti also made the papers when
this rather charming-looking animal
was spotted taking her first airplane
ride, standing in the bulkhead seat
area. The flight was with Delta,
which happens to be the name
of owner Cheryl Spencer's
previous guide dog.

attached. Whereas there is no such training requirement for ESAs, and they are loose.

e "For me, that can potentially create some safety issues in the event of an incident in flight. We are working with the USDA and the CDC and US regulators, and our colleagues in Washington, to work on the definition of ESAs. But it's very

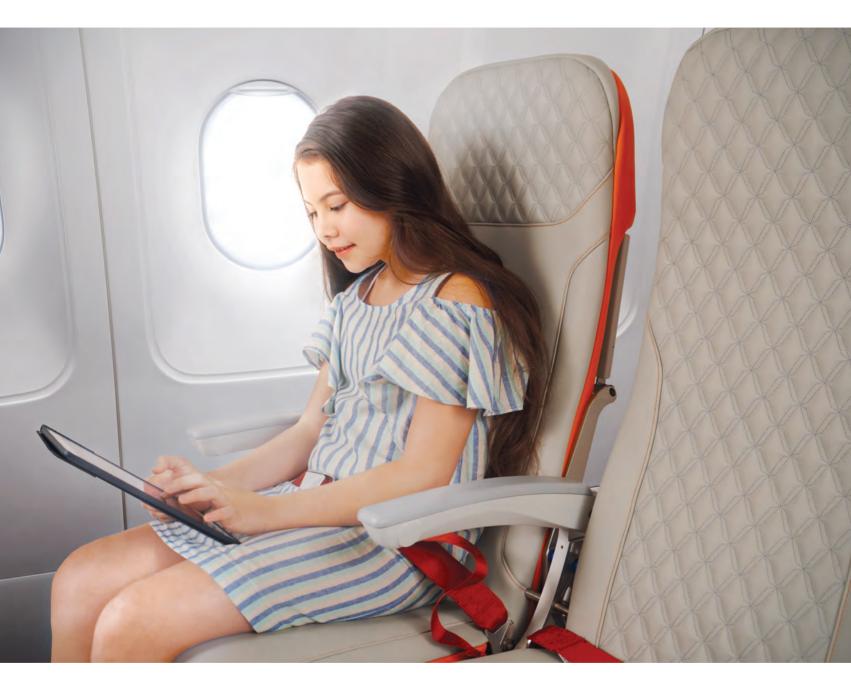
important to distinguish between service animals and emotional support animals."

ANIMAL INCIDENTS

Alison McAfee, spokesperson for Airlines for America (A4A), told us that the association doesn't specifically track ESA incidents, but is aware of the problems the vague rules cause for member airlines and other US operators.

"Generally, what we can say is that US airlines are committed to offering the highest levels of customer service and routinely go above and beyond to ensure a pleasant

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flight experience for all of our passengers, especially those in need of additional assistance," McAfee states. "We remain fully engaged and are working collaboratively with the DOT and all stakeholders, including disability advocacy groups, to reach solutions that offer the greatest benefit to the traveling public.

"Current DOT regulations require that airlines accept a wide variety [both in size and species] of service animals, ESAs and psychiatric service animals [PSA], but limit the industry's ability to inquire as to the nature and legitimacy of a passenger's claim of disability.

"As a result, airlines have received numerous complaints that indicate the current rules are being abused by people who are not truly in need of animal assistance or are able to secure false credentials online, enabling them to evade airline policies on domestic pets

ANIMAL ANTICS

Delta has reported carrying around 700 service or support animals daily, or 250,000 animals per year, or one ESA for every 780 passengers served, based on 180 million passengers flying with Delta per year. The airline has also reported an 84% increase in reported animal incidents since 2016. These include urination or defecation in the cabin and biting. Beyond the dog attack reported in June 2017, Delta also said its employees have reported acts of aggression from ESAs, including barking, growling, lunging and biting.

There have also been incidents of trained service animals being attacked by untrained support animals – a problem that can result in undue stress or injury for the disabled passengers who rely on these trained companions.

The airline also reported that customers have stretched the limits of the types of animals qualifying as ESAs, including gliding possums, also known as sugar gliders, snakes, spiders and other exotic animals.

NOVEMBER 2014

Hobie the emotional support pig was initially welcomed by all (well, most) on board a US Airways flight due to fly from Connecticut's Bradley International Airport to Washington DC. Prior to take-off, Hobie let out a series of squeals (and other offenses) and had to deplane.

in the cabin and leading to incidents, some of which involve animals causing inflight disturbances. This negatively impacts our crew, other passengers, and those with service animals who genuinely need them."

THE SOLUTION

"Ensuring that the rules regarding service animals are clear, and the definition of service animal is in line with the Americans with Disabilities Act, will help to ensure customers receive the best possible service," explains McAfee.

She states that dialog is ongoing with the USDOT to get greater clarity on what a service animal is and what a pet is.

t

JANUARY 2016

Easter the emotional support turkey becomes a star of social media when it is snapped flying from Seattle to Salt Lake City on a Delta flight. In Comfort Plus class, no less!

DELTA TIGHTENS ITS LEASH

New animal guidelines at Delta, effective March 1, require that all customers traveling with either a service or support animal show proof of health or vaccinations 48 hours in advance of boarding.

They also extend the requirement of proof of need from a letter prepared and signed by a doctor or licensed mental health professional, confirming that the animal has been trained to behave, even in the presence of untrained household pets.

To help passengers better understand the new

policy, Delta has created a dedicated Service Animal Support Desk, responsible for verifying documentation of vaccination and training, and confirming the customer's reservation to travel with the animal, before they arrive at the airport.

John Laughter, Delta's senior vice president for corporate safety, security and compliance, emphasizes that this new policy is not in conflict with the airline's commitment to support passengers with legitimate needs, and in fact the airline consulted

with its Advisory Board on Disability when drafting the new rules. The 15-member panel includes disability advocates and diverse Delta frequent flyers with a range of disabilities.

"We have received extensive customer feedback through calls, emails and social posts – many from among those within the disability community – urging Delta to take action," Laughter says. "This policy is our first step in better protecting those who fly with Delta with a more thoughtful screening process."

"There is a lack of regulation, which has led to serious safety risks"

Delta Air Lines announced this January that it would take steps to protect its customers, employees and other service and support animals from untrained animals on board, by implementing new advanced documentation requirements for emotional support animals. In its new policy, Delta drew a distinction between vague ESAs and trained support animals, in support of passengers with legitimate needs.

The airline expressly mentioned the issue of vague definitions by stating that there is "a lack of regulation, which has led to serious safety risks involving untrained animals in flight".

To remain in compliance with the Air Carrier Access Act, support animals are carried in the cabin without charge, which creates another gray area: are passengers transporting animals with them in the cabin to avoid paying for the safe transport of their animals in the hold? It is something that is difficult for airlines to judge, or argue, given the lax definition of 'emotional support'.

"The rise in serious incidents involving animals in flight leads us to believe that the lack of regulation in both health and training screening for these animals is creating unsafe conditions across US air travel," says John Laughter, Delta's SVP for corporate safety, security and compliance, of the new policy.

Delta also raises questions of cabin safety, based on the wording of the Air Carrier Access Act under Title 14 Code of Federal Aviation Regulations §382.117. It states that airlines "must permit the service animal to accompany the passenger with a disability at any seat in which the passenger sits,

IS IT A CON?

OCTOBER 2016

Daniel Turducken Stinkerbutt (Daniel to his friends) is a duck that provides support to Carla Fitzgerald, who has been battling post-traumatic stress disorder ever since a car accident in 2013. A few feathers were ruffled among passengers when Daniel took his first flight, but he has won public affection with his good passenger behavior, and his snazzy diaper and red slippers.

unless the animal obstructs an aisle or other area that must remain unobstructed to facilitate an emergency evacuation".

But the airline said that untrained animals have moved to occupy other seats, stretch across the aisles, and even move about the cabin during the flight.

Delta also asserts that the same regulation requires airlines to ultimately decide if any factors would disqualify a service animal from the cabin. This includes cases where the animal might "pose a direct threat to the health or safety of others" or "whether it would cause a significant disruption of cabin service".

But some passengers moved quickly to protest Delta's new policy. A petition posted by one traveler on Care2, an online community, gathered nearly 60,000 signatures within four days of Delta's announcement, demanding that the FAA clarify the regulations. "This policy is



NOVEMBER 2017

A college student arrived at Baltimore-Washington International with Pebbles, an emotional support dwarf hamster. Owner Belen Aldecosea says that she had pre-approved Pebbles' flight with Spirit Airlines, but the hamster was refused boarding for the flight to Miami on account of rules relating to rodents on board. Rather sadly, Pebbles found herself being flushed down the toilet by her owner, who is seeking legal recourse.

MARCH 2017

Donna Wiegel was waiting to fly from Baltimore to Chicago on a United flight operated by GoJet when she noticed a cat in the gate area. Due to her respiratory problems she asked to be seated as far away from the cat as possible but found herself within a couple of rows. Upon complaining she was removed from the flight in case there was a medical issue.



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The ODO responds to Delta

Open Doors Organization (ODO) is a US-based non-profit organization founded in 2000 with the intent to creating a society in which all persons with disabilities have the same consumer opportunities as everyone else.

The ODO aspires to "teach businesses how to succeed in the disability market, while simultaneously empowering the disability community".

The organization is unhappy with Delta's new policy relating to ESAs (see p63) and in its latest newsletter, stated that, "Since Delta announced its new policies, disability organizations have presented a united front, one by one rejecting any requirement for advance notification by handlers with non-psychiatric service animals. While, yes, there is a problem with emotional support animal fraud, Delta's approach seems ill-targeted and not even legal."

Eric Lipp, executive director of ODO stated that, "The new Delta policy on service animals, not emotional support animals, we think violates the Air Carrier Access Act (ACAA). We believe that the spirit of the ACAA is being broken on many levels. Carriers need to think carefully, and not be afraid to ask us."

asking for more than just a note from my doctor outlining my issue," Alison P objected on her Care2 petitions page. "This policy is asking for passengers to present proof of the animal's training. ESA certification training can cost thousands of dollars and is not actually required to become an ESA. It is unacceptable for Delta to arbitrarily decide that the classification of an ESA is incorrect."

Alison P cites a company called the Official ESA Registration of America as stating that ESAs do not require specialized training. The problem is that there is nothing official about this company; it merely sells certificate kits, harnesses and vests to those who want to classify their pets as ESAs. The company promotes itself as working with mental health professionals and certified therapists to obtain the certificates, but the requirements are only to fill out a form and have a phone call consultation with the therapist the organization assigns to the case.

"By receiving a prescription from one of our therapists for an ESA, you'll never have to compromise where you live or where you travel again. Signing up for an ESA assessment with one of our therapists is quick, easy and applies to

A4A URGES ESA REFORM

Airlines for America (A4A) has been concerned by possible abuses of the ESA rules.

On January 31, 2018 Sharon Pinkerton, SVP of policy at A4A wrote to James Owens, deputy counsel at the USDOT, asking that rules were amended to reflect air carriers' duties to protect passengers.

"During the past several years, but in particular during the recent holidays, airlines have experienced a surge in passengers bringing animals onboard that haven't been appropriately trained as service animals," she wrote.

"This has resulted in our crew members and passengers being bitten and subjected to other offensive and injurious behavior. Our air carriers are responsible for the safety of our passengers and crew and make it our top priority. We need to ensure that aisles and exits are clear in case of evacuation, prevent exposure to dangerous animals that may injure other passengers, crew, or other animals or otherwise jeopardize health and safety.

"It's also incumbent on us to act in a manner ensuring that the rights of passengers with legitimate psychiatric or physical needs to fly with their trained service animals are not impinged by others who may be abusing the rules."

animals of all shapes and sizes," the company writes on its website, where it sells ESA Evaluation letters from US\$130 to US\$150.

The potential for abuse of the system is a growing problem that pits the needs of the disabled against those who merely want a way to travel with their pets,

with a problem being the vague language of regulations governing these rights.

By consulting with its Advisory
Board on Disability prior to
enacting the new rules, and
keeping within the intent and the
letter of the laws for accessibility,
Delta may have drawn a line that
helps clarify the policy for other
airlines and their passengers.

JANUARY 2018

Ventiko, a New York-based performance artist and photographer, arrived at Newark Liberty International Airport with Dexter, a therapy peacock, to catch a United flight to LA. Even with the offer to pay for a seat for Dexter, United Airlines stated that he "did not meet guidelines for a number of reasons, including its weight and size".



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THE CEO

he biggest aircraft interiors announcement of 2018 may already have occurred. In January, when Boeing announced that it is forming a joint venture with Adient, a global leader in automotive seating, the industry became curious, but both companies were mostly tight-lipped about the details. However, the few details that were revealed showed a clear intent: to address what they describe as "the aviation industry's need for more capacity in the seating category", together with superior quality and reliable on-time performance. As the venture, named Adient Aerospace, a 50.01% Adient, 49.99% Boeing partnership, approaches regulatory approval status, the main players at the company are ready to break cover.

Let's start with nominated CEO Alan Wittman, who will be leading the team to execute the business plan to enter the aircraft seating market. Wittman is a very familiar name in the interiors industry, having worked at Boeing since 1991, with roles including heading up Boeing's Seat Integration Team.

"The seating sector has been a persistent challenge for the industry"

BELOW: WE ALSO SPOKE TO WITTMAN IN HIS CAPACITY AS A SEAT EXPERT AT BOEING – SEE THE FEATURES SECTION OF OUR WEBSITE

BELOW LEFT AND RIGHT: BRIEF GLIMPSES INTO ADIENT AEROSPACE'S DESIGN THINKING THE AIRCRAFT SEATING MARKET IS WORTH US\$4.5BN TODAY AND IS ON A STRONG GROWTH PATH. HOWEVER, IT ALREADY HAS MANY BIG SUPPLIERS. WHAT MADE YOU CHOOSE THIS SECTOR?

As Boeing and Adient started to get to know each other last year it became clear we had an opportunity to

create something different and something better.

Together we realized that Adient, with its
global automotive expertise and operational

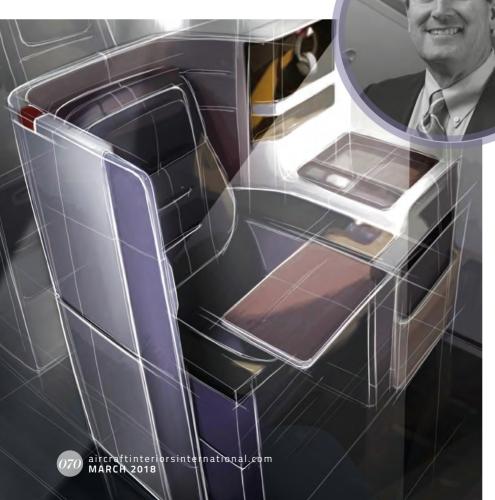
excellence, delivering more than 25 million seats to the auto industry every year, could really create a compelling new choice for customers.

We are bringing together two global leaders in their respective industries:
Adient with its automotive seating expertise, and Boeing with its deep understanding of aerospace requirements and customer expectations.

Most aircraft seating companies are quite a bit smaller and some have struggled with various issues. We see Adient Aerospace differentiating itself from the competition through what Adient knows from its expertise in comfort, craftsmanship, operations, and the ability to manage a complex global supply chain. We see a huge opportunity to deliver a superior customer and passenger experience by delivering premium quality seats with intelligent product design, all driven by Adient's strong and sophisticated innovation network.

CAN ADIENT AEROSPACE REALLY OVERCOME SUPPLY ISSUES THAT EXISTING SUPPLIERS HAVE SUFFERED?

Up until about six months ago, I spent the past five years leading the seating supply chain for Boeing aircraft. The seating sector has been a persistent challenge for the whole industry, certainly for Boeing and the other OEMs. Airlines and leasing companies routinely express



About Alan

Alan Wittman is the nominated CEO of Adient Aerospace, LLC. As CEO, Wittman will lead the team to execute the business plan to enter the aircraft seating market.

Since joining Boeing in 1991, he held various engineering and leadership roles across the company, including product development programs in interiors,

payloads and structures for the Boeing 737, 767, 777 and 787 aircraft programs.

Most recently Alan was director of business operations for the Dreamliner program. Prior to that, Wittman led Boeing's Seat Integration Team, working with airlines and suppliers to integrate and certify all cabin seating and IFE

products for Boeing's range of airplanes.

Alan is passionate about innovation and developing high-performance teams.

In his personal life, he is married with three children, and holds a Bachelor of Science in mechanical engineering from Lehigh University in and an Executive MBA from Seattle University.

dissatisfaction about everything from a lack of seating options, to reliability, to basic manufacturing capacity. And then of course there has been a lack of on-time performance and quality. We definitely believe that pulling together Boeing's and Adient's expertise and operational excellence will provide a compelling new choice and raise the bar for the whole industry.

And since we announced our intent to create the JV, the feedback from airlines and leasing companies has been highly encouraging.

PRODUCTION AND SERVICEABILITY WILL BE KEY SELLING POINTS: CAN YOU SHARE ANY DETAILS?

Initially, Adient Aerospace's HQ, technical center and production will be co-located in Kaiserslautern, Germany, near Frankfurt. We intend to create high-quality and reliable products with great product support

leveraging Boeing's established global service network as well as its Aviall parts distribution subsidiary. We want to make sure our products will operate reliably all over the world and we can support them well, utilizing our existing network.

WHAT ARE YOUR DESIGN GOALS?

Adient seats will offer unique human-centric comfort, with a strong set of comfort processes and technologies. We think Adient Aerospace will bring the most extensive use of comfort technology and modern design into the aircraft seating industry.

You know when people around the industry ask why can't we get the kind of quality, comfort, craftsmanship and style found in high-end automotive seats into airplanes? It is exactly our intent to do that.

The seats will be available for line-fit and retrofit installation on aircraft produced by Boeing

"Pulling together Boeing's and Adient's expertise will raise the bar"

BELOW: A SKETCH OF AN INITIAL BUSINESS CLASS PROTOTYPE

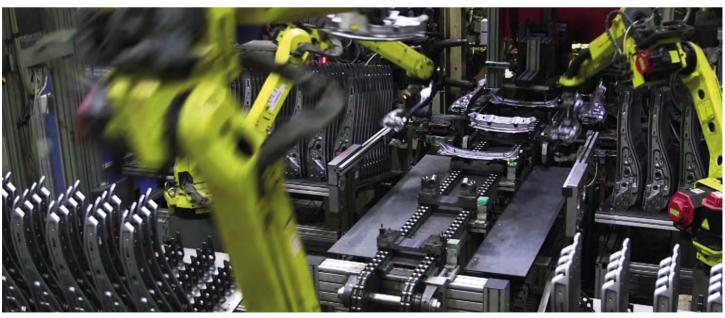
BOTTOM: ADIENT IS ACCUSTOMED TO HIGH-VOLUME, HIGHLY AUTOMATED SEAT PRODUCTION and other commercial airplane manufacturers.

WHAT STAGE OF MARKET READINESS ARE YOU AT?

We have already built demonstrators and prototypes, and we are carrying out preliminary testing. Last year we developed a business class demonstrator, and we have also developed other initial products. So we now have several products under development, some in the early development stages and some reaching fairly high stages of maturity. We have been collaborating with Boeing to share these product designs with potential customers and get feedback.

In terms of when we intend to start delivering seats, at this point, most of our product development efforts are focused on lie-flat business class for wide-bodies. We do not yet have an established delivery schedule as we were focusing on getting the business up and running. But we are in the course of developing this schedule in the coming months, once we gain all relevant regulatory approvals.









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THE CO

hen it comes to the running of Adient Aerospace, nobody knows the details better than nominated COO Jason Fahlbush. Indeed Fahlbush has been an instrumental figure in bringing Adient into the aerospace market and in negotiating the joint venture with Boeing. Let's get his perspective on some key numbers and operational factors.

WHY AEROSPACE?

Adient was looking at opportunities to grow and diversify the business as part of a five-year market strategy, and at a way to use transferable competencies beyond the company's core automotive business. Adient manufactures 25 million seats a year, and roughly one in three cars has Adient seats or seat components. So clearly we're looking for opportunities to use our skill set and global range of capabilities in other markets.

We needed a market large enough for us to make best use of our capabilities and implement a high degree of transferability. And aerospace is a large and growing market with a nice clip of growth ahead of it for the next 20-30 years.

WHAT DO YOU THINK ADIENT AEROSPACE WILL BRING TO THE SEATING MARKET?

Three things jump out in the aircraft seating market. There are clear opportunities for improvements in comfort, craftsmanship and operational excellence.

We've seen studies that the on-time delivery performance in the aircraft seating sector has had periods as low as 65%. In automotive, typically if you're not able to deliver 99% or better on-time delivery at the right quality level, we're making organizational changes to ensure that we deliver at that level.

When we look across these three areas of comfort, craftsmanship and operational excellence, we really see an opportunity to enter the market and make a difference. We're also adding much-needed additional capacity to the market.

IS THERE A VERTICAL TO THE BUSINESS PLAN? Our automotive business is highly vertically integrated, from R&D and industrial design, to mechanisms, structures, stamping and component

manufacture, and of course assembly. We also have our own development and manufacturing capabilities for foams, fabrics and trim covers.

DOES THAT MEAN YOU WILL MANUFACTURE EVERY PART OF AN AIRCRAFT SEAT?

While we do have the capability to make pretty much the entire automotive seat, we still go through a 'make or buy?' process where we evaluate capability, capacity and specification.

> We also look at the opportunity itself: Is this where we want to allocate limited resources? So we have a blend of in-house and outside supply in our core automotive business.

Aircraft seating is a very different business to mainstream automotive seating. In aviation a typical order volume is around 300 pieces for a given customer; in mainstream automotive you're talking about a few hundred thousand seats per year over five years. However, we also have small volume, highly customized product lines and assembly processes for ultraluxe automotive OEMs and brands like McLaren, Maybach, etc.

We'll be looking for the right mix of capacity utilization and capabilities. There are some very capable suppliers in aerospace.

When it comes to vertical integration opportunities in our aircraft seating business, I think we'll take a look at all of those options, and if vertical integration makes sense then absolutely, we'll pursue the best blend that delivers the optimal value for our customers and shareholders.

DO YOU THINK ANY AUTOMOTIVE SEATING PARTS OR MATERIALS CAN BE CARRIED OVER?

We do see good opportunities to use automotive processes and potentially parts in aerospace designs. Both sectors have very high safety requirements for dynamic testing, flammability, etc. Leveraging automotive processes is key to delivering our comfort and quality goals. Some materials won't translate directly, but there are many similarities.

"In automotive, if you're not able to deliver 99% or better on-time performance at the right quality level, we're making organizational changes"



Jason Fahlbush is the nominated chief operations officer (COO) of Adient Aerospace. As COO, he will be responsible for the daily operations of the company, and will report to Alan Wittman. Fahlbush was appointed leader for Adient aircraft seating in August 2016 and is responsible for realizing the company's entry into the US\$4.5bn commercial aircraft seating market. Since his appointment, he has led the successful collaboration agreement negotiations with Boeing, the development of the aircraft seating team and initial product portfolio, and has been a member of the JV core deal team since its inception.

Prior to taking the lead for Adient aircraft seating, he served as executive director within Adient's

specialty seating group, overseeing adjacent market growth initiatives. Jason has been with the Adient/ Johnson Controls Automotive Experience since 2011. Overall, Fahlbush has served in a variety of leadership roles of increasing responsibility over his 20+ year career across multiple industries, including automotive, telecommunications and publishing.

Jason is married with one son and holds an Executive MBA from Michigan State University and a Bachelor of Science in telecommunications from the University of Kentucky. In addition, he is an active duty veteran of the United States Marine Corps. A firm believer in work-life balance, Jason enjoys travel, golf, tennis, fishing and upland game hunting.

TESTING CAPABILITY

Certification for aircraft will be a new challenge for Adient, but it does have a very useful asset: impressive inhouse test capabilities. For example, its Kaiserslautern facility in Germany has been testing aircraft seats for external clients since the early 1990s. "And that's not the only test sled that Adient has in its network," says Jason Fahlbush. "We have another test sled near Cologne, one in Shanghai, one in India, one in Yokohama, and another one in Michigan. So we have a lot of experience with dynamic testing, but also a variety of other testing capabilities, such as durability, fatigue, static-load, and a comprehensive network of advanced Finite Element Analysis [FEA] teams to

For example, the FST requirements are different between aerospace and automotive. Adient's current portfolio is geared towards the FST requirements of automotive, so we'll have to evaluate which of those products can transition over to aircraft directly versus which ones will require further development, and the cost/benefit trade-off.

BELOW: ADIENT'S HIGHLY VERTICALLY INTEGRATED APPROACH TO AUTOMOTIVE SEAT PRODUCTION COULD INFORM ITS AEROSPACE ACTIVITY

BEYOND PRODUCTION, WILL ADIENT AEROSPACE DISRUPT THE SECTOR?

We find it interesting that while some people in the aviation industry are very much asking for disruptive technology, we also get the sense that there is some resistance to that pace of innovation coming too quickly. Clearly we'll have to continue to work on finding the right balance of coming into aerospace as a new entrant, establishing credibility and then introducing disruptive technologies. But we also understand you can't come in and start talking about crazy ideas because nobody's going to take you seriously. That's

Classes

Adient Aerospace's current focus is on business class, but does the company have ambitions to create seating for other classes?

"Our ambition is to satisfy airline needs from tip to tail, but really we're going to focus on business class, premium economy," says Fahlbush.

"And what I can share with you is that we are already working on multiple classes of seats and also LOPA strategies – though I think that's probably as much as we want to say. We ultimately intend to provide a complete portfolio of products for all airlines and OEMs."

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THE DISRUPTOR

y job is to disrupt," says Richard Chung, Adient, LLC's VP of design and innovation, and one of the main creative forces behind Adient Aerospace's forthcoming product portfolio. "The traditional aircraft seat supply industry has not fully met market demand. From what we have observed, and by talking with aircraft customers, we have found that customers want more choice, innovation, features and functions to provide a better passenger experience.

"The industry needs disruptive technologies and disruptive thinking that changes how we approach solving the problems of flying and having an enjoyable experience - and we are coming up with great solutions that will change the game."

COMING FROM THE AUTOMOTIVE SECTOR, WHAT TRENDS DO YOU THINK WILL INFLUENCE AIRCRAFT SEATING?

Starting in around 2020 the automotive industry will start the big transformation toward autonomous technology, and what we will see is a convergence trend across all mobility segments.

Today in automotive it's really about driving and owning a car, but tomorrow it will be about riding and having a great passenger experience going from point A to point B. And when you're not driving, the entire experience becomes centered around seating, and that is very much in parallel with the aircraft interiors industry. We are fascinated to see where we can leverage our expertise in innovation, comfort and craftsmanship.



"The industry needs disruptive technologies and disruptive thinking"

WILL AUTONOMOUS VEHICLES BE A DIRECT INFLUENCE?

We are working with partners on technologies and concepts to discover the undiscovered needs of consumers and passengers. For example in

September 2017 we entered into a partnership with Autoliv, a leader in automotive safety, and our aim is to create the safest seat for autonomous vehicles. One might assume that there's no risk of impact with autonomous cars, but there will still be legacy vehicles on the road, as well as people and animals.

The most interesting point is that the vehicle occupants may well not be sitting in today's typical configuration, perhaps being rear facing or side facing or other locations within the vehicle. This brings an interesting parallel with airline seating, which has business class seats in oblique, rear facing and other positions, all of which need to be comfortable and safe. This makes us very excited.

WHAT IS YOUR PHILOSOPHY FOR COMFORT?

Until now, the approach of many has been that the most comfortable seat has no discomfort. So it's all about relieving pressure points, relieving uncomfortable areas on the contact surface, and minimizing angles of discomfort. But as we go forward, the focus is now on actively providing a better experience, which could be as simple as a massage function, but could also be a smart seat that interacts with the occupant to give a greater degree of comfort and an improved experience.

I can't go into the details because some of our work is still confidential, but we're looking to create the best experience across a flight, whether reclining, working, eating, being entertained or sleeping.

Our aim is to provide airline customers with seats that offer passenger density and a great experience, and we're open to offering different configurations to achieve that.

WHAT OTHER TRANSPORT TRENDS ARE YOU MONITORING?

We have a very high capability in consumer research and market intelligence, and through that we're finding that consumers want a smooth, seamless transition between leaving home and arriving at their final destination, even if that involves a number of different modes of transportation. Many companies involved in mobility are thinking about how to blur the boundary between their competencies and other areas of mobility.

We're finding that people have the same experience expectations, whether traveling by car, bus, train or airplane. What we find delightfully surprising is that airlines always look at seats from luxury cars such as Mercedes-Benz or BMW as inspiration, saying, 'We want to bring that luxury into our airline seating.' But then our automotive customers say that they want to bring in the feeling of a business class aircraft seat. We feel that we can satisfy them both because we understand them both.

It's going to be interesting to see how we can synthesize these converging trends into a new type of experience.

About Richard

Richard Chung has led innovation and design for Adient since October 2016. In this role, he leads teams located in the company's five global technical centers and focuses on developing future products, technology and processes. In addition, he discovers new business opportunities in automotive and adjacent markets such as aircraft to position Adient as the leader in mobility seating.

Before joining Adient, Richard served as global vice president of industrial design and craftsmanship at Yanfeng Automotive Interiors. He also worked at Johnson Controls (Adient's former parent company) as vice president of industrial design – Asia-Pacific, where he was involved in more than 130 vehicle seating and interior development programs for various customers.

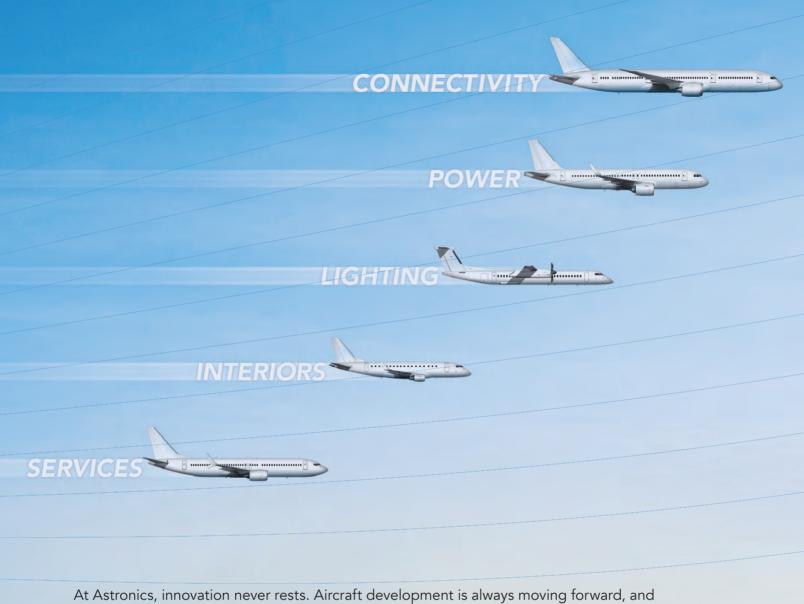
Prior to joining Johnson Controls in 2000, Richard worked for 13 years at Ford Motor Company, leading the North American Small Car design studio, the interiors studio for the Ford Transit, as well as Ford's Global Craftsmanship organization.

Richard graduated from Art Center College of Design in Pasadena in 1987 with a Bachelor of Science degree in transportation design.



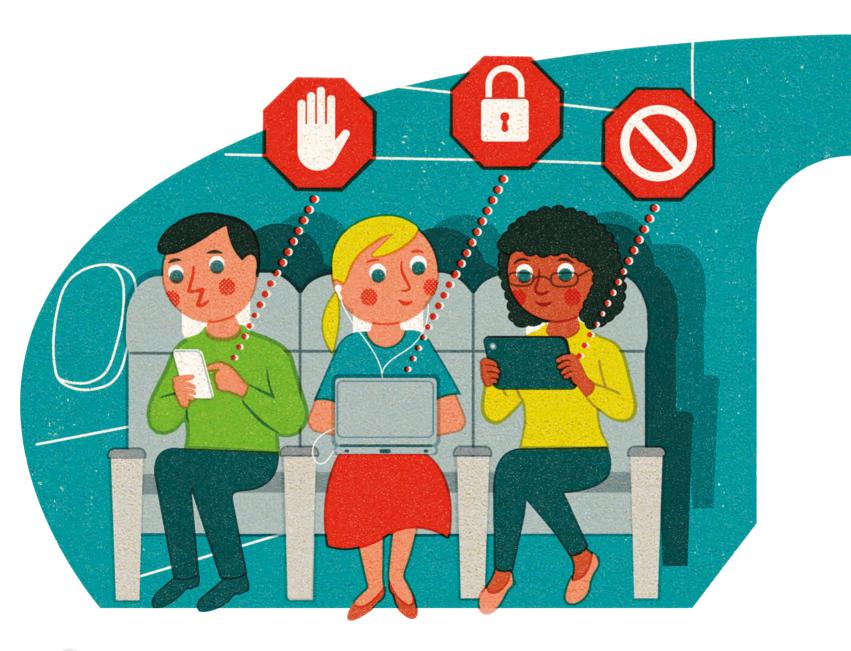
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ate last year, Mathy Vanhoef, a postdoctoral researcher in the imec-DistriNet computer science research group at Belgium's University of Leuven, discovered a vulnerability in the WPA2 protocol, which has been the most secure option for protecting wi-fi networks over the last decade.

He found that by using what's now known as a key reinstallation attack (KRACK), hackers can access and abuse information assumed to be safely encrypted, either with the purpose of stealing information such as passwords and credit card numbers, or of injecting malware into websites.

So how does a KRACK work? When someone wants to join a protected wi-fi network, the WPA2 standard uses a four-way handshake during which a key is issued and, once input by the wi-fi user, this key encrypts their data. On Vanhoef's website, krackattacks.com, he stresses, "To guarantee security, a key should only be installed and used once."

However, this hasn't been the case under all implementations of the WPA2 protocol. Sometimes, because the key can be lost, it is reissued multiple times until the wi-fi access point receives acknowledgement. It is by forcing the same key to be reissued that hackers can access a user's encrypted data.

A growing number of airlines are using inflight connectivity – Euroconsult counts upward of 80 to date – and with the EU's General Data Protection Regulation (GDPR) set to come into force in May this year, it's more important than ever that airlines are well placed to deal with any new vulnerabilities. But should KRACKs be high on their list of priorities?

LUFTHANSA SYSTEMS' BOARDCONNECT SYSTEM COMPLIES WITH THREE TYPES OF SECURITY REGULATIONS





"Many connected passengers deal with professional and confidential information"

Security researcher Martin Strohmeier, who is based in the Department of Computer Science at Oxford University, thinks KRACKs aren't relevant to the majority of carriers. He points out, "Many public wi-fi systems, including those on aircraft, are not affected by KRACKs. That's not as good as it sounds, because it means no WPA2 security is used in the first place – you just click a button or provide an email address to sign in. You don't need a KRACK to access the network, you can simply use publicly available sniffing tools to eavesdrop on communications or manipulate data."

Consultant Florent Rizzo, who works for Euroconsult, explains this is because the data is transmitted in cleartext, which he says isn't ideal: "Many connected passengers are business passengers who don't want to be the target of an eavesdropping attack as they deal with professional and confidential information."

A SUPPLIER VIEW

Michael Dierickx, director of security engineering at Panasonic Avionics Corporation, confirms that "Panasonic does use WPA2 encryption to cover specific aircraft wireless domains that require an additional layer of security," but in this case, the supplier seems to be in the minority.

This appears to be because airlines are already far more heavily regulated than, for example, a café or store using an open wi-fi network, and so a lack of WPA2 encryption doesn't equal a lack of wi-fi security.

Indeed, Panasonic doesn't just use the WPA2 protocol to protect passengers. Dierickx continues, "Even when we implement personalization features in our system, we encrypt all sensitive personal information in a manner compliant with the strictest international privacy law. We also use industry standards such as Transport Layer Security and perform regular penetration testing on all of our systems."

Similarly, Jan-Peter Gaense, head of passenger experience products and solutions at Lufthansa Systems,

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says its BoardConnect in-flight entertainment and connectivity (IFEC) solution, which is already running on more than 450 aircraft, with another 250 set to go live by the summer, adheres to three different types of security regulations.

There are regulations set as part of the FAA's certification process: the Motion Picture
Association of America's regulations for streaming and video content (under which Lufthansa Systems is audited regularly), and the Payment Card Industry
Data Security Standard to help reduce card fraud. Gaense confirms there is frequent overlap regarding the best practices for each.

"Being under the governance of a huge professional organization means we undergo regular independent audits to check we're adhering to industry best practices," he says. "As such, Lufthansa Systems became one of the first suppliers to be able to provide patch software to mitigate any new security risks while an aircraft is flying."

WHAT DO AIRLINES THINK?

It is understandable that suppliers are eager to stay ahead of the game in terms of security when it looks as though airlines depend on them to mitigate any risks identified. As a Southwest Airlines spokesperson said, "Southwest actively monitors for these types of vulnerability disclosures and, if they occur, we engage with the vendors to ensure they are taking, or have taken, necessary steps to mitigate any vulnerabilities. If mitigation activities are identified for Southwest as a result of the vendor conversations, risk assessments and remediation execution plans are put into effect and acted upon."

So why don't more suppliers incorporate WPA2 as well, just in case? Strohmeier says it's about convenience. "It's feasible to give out a pre-shared key [password] in a café by writing it on a blackboard, but it's more difficult on a larger scale or in a changing

environment. Implementing a separate key for every passenger would be even more complex.

Furthermore, a pre-shared key doesn't prevent eavesdropping by anyone who also has the key, so if you give one out to everyone on a plane, the security situation doesn't really change." Strohmeier clarifies that KRACKs occur when the hacker doesn't already know the key.





SITAONAIR CTO GREGORY
OUILLON HAS NO PLANS TO
IMPLEMENT WPA2 ON BOARD

"A pre-shared key doesn't prevent eavesdropping by anyone who also has a key"

SITAOnAir's chief technology officer Gregory Ouillon backs up this theory on convenience, saying, "To allow for easy access to a truly public inflight wi-fi service, SITAOnAir does not use WPA2 for onboard passenger services. To date, we have had no customer requests to change this and we do not plan to shift our approach."

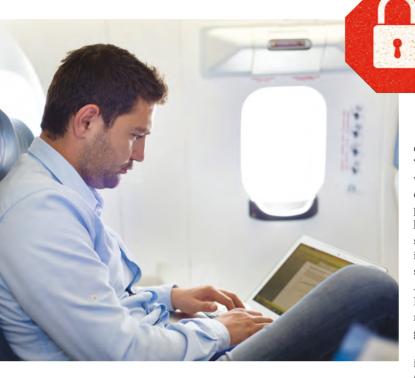
Instead, SITAOnAir carries out audits of equipment manufacturers and operational procedures. Ouillon also discloses that the company's own application employs "strong end-to-end authentication and encryption mechanisms", but that it is also working on the development of security frameworks.

DANGER IN THE COCKPIT?

While KRACKs may not apply to the cabin, Rizzo suggests they may still pose a threat in the cockpit. "Hackers tend to find the easiest way to penetrate a network. If the door is closed, they enter by the window," he explains. "Pilots and crew members use electronic flight bags and those are usually protected with WPA2, which, as we have ascertained, is now considered flawed."

Luckily, it seems the suppliers have already thought of that. Panasonic's Dierickx states, "For those airline customers that use Apple products for their crew, these devices should be safe because iOS is not vulnerable to this attack."

He adds that Panasonic's own systems aren't at risk either, as they don't implement the vulnerable feature (Fast BSS Transition, also known as 802.11r) in their configurations. Likewise, Ouillon says, "For crew services, SITAOnAir employs a range of encryption technology,



"WPA3 is promising because it provides protection against brute force attacks"

including IPSec and SSL, as well as two-factor, 802.1x and PKI authentication protocols."

If airlines and suppliers have made the software systems associated with inflight connectivity as secure as possible, the remaining responsibility falls on passengers to protect their own personal electronic devices, which are at risk of hacking both in the air and on the ground.

Rizzo recommends they use encapsulation protocols such as Virtual Private Networks (VPNs), Secure Sockets Layer (SSL) or Secure HTTP (HTTPS), which are "generally supported by any service provider". In addition, Vanhoef says it is important that people always install the latest security updates on their devices.

WPA3 IS COMING

Whether KRACKs are relevant to airlines or not, the aviation industry could soon benefit from the Wi-Fi Alliance's introduction of WPA3, which will include four new security capabilities for personal and enterprise wi-fi networks. The alliance is a non-profit organization that promotes wi-fi technology and certifies wi-fi products if they conform to certain standards of interoperability.

LUFTHANSA SYSTEMS HAS NOTED SEVERAL OVERLAPS IN BEST PRACTICE FOR SECURITY DURING THE FAA'S CONNECTIVITY CERTIFICATION PROCESS

A press release from the organization in January explains how WPA3 is an improvement on WPA2: "Two of the features will deliver robust protections, even when users choose passwords that fall short of typical complexity recommendations, and will simplify the process of configuring security for devices that have limited or no display interface. Another feature will strengthen user privacy in open networks through individualized data encryption. Finally, a 192-bit security suite, aligned with the Commercial National Security Algorithm (CNSA) Suite from the Committee on National Security Systems, will further protect wi-fi networks with higher security requirements such as government, defense and industrial."

The third enhancement, which covers "user privacy in open networks" is perhaps the most exciting prospect for airlines and suppliers, but if they didn't typically implement WPA2, will they do so with WPA3?

"WPA3 is promising because it provides protection against brute force dictionary attacks. Fortunately, Panasonic uses certificates instead of passwords, so this risk has already been mitigated," says Dierickx. "We are looking at options to incorporate WPA3 in the future but, at this point, there is no specific timeline of when this project will take place."

Rizzo thinks it won't be implemented for some time, saying, "It is difficult to estimate the time it takes to deploy associated firmware and software, but the update phase on connected aircraft could take months, especially if we talk about software that has to follow the constraints of the DO-178C aeronautical development standard."

The good news is that many vendors have already worked with solutions providers to integrate necessary software patches addressing the WPA2 vulnerability. And while this particular type of attack may not have a direct impact upon airlines, the fact that cybersecurity is consistently in the spotlight means that both carriers and suppliers are consistently being forced to re-evaluate the ways in which they protect the security of airline passengers, which can only be a good thing.





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TOP: HERRINGBONE SEATS ARE RELATIVELY NEW ADDITIONS TO THE B787 CABIN INTERIORS MOCK-UP AT BOEING. PHOTO: JOHN WALTON

ABOVE: STARTING WITH SINGAPORE AIRLINES, THE EARLIEST A380 LEASES ARE COMING TO AN END

ABOVE RIGHT: SEATBACK SCREENS PLAY A KEY ROLE IN KEEPING THE INCREASINGLY CLOSE-QUARTERED MASSES IN EVER-NARROWER ECONOMY SEATS PACIFIED. PHOTO: AIR FRANCE

BELOW: NEWER GENERATIONS OF B787 SEATS IN ECONOMY OFFER ATTRACTIVE PASSENGER EXPERIENCE BENEFITS. PHOTO: LIFT BY ENCORE he aircraft interiors aftermarket finds itself at a crossroads of contradictions in terms.

Growing customer requirements mean almost impossible demands in the context of ever-heightening certification levels, while passenger expectations have never been greater.

But what do airlines want? Aviointeriors' managing director Ermanno de Vecchi sums it up neatly: they are making multiple demands "for increased density, more personal space, short lead times and high levels of personalization".

Airbus's increasingly busy services team, which has recently won major refurbishment work from Qantas and Singapore Airlines, concurs: "With passengers being increasingly aware (because they travel more) and vocal (because of social media and websites), the airlines have a clear incentive to maintain their cabins to the latest standards. This is true not only for a specific aircraft type but across whole fleets, because passengers expect to have a similar experience whenever they board an airline's plane, regardless of its age."

The trend toward more individual cabins reflecting airline brands and their brand promises is also reaching the aftermarket, and in particular smaller airlines,

according to Lift Strategic Design CEO, Daniel

Baron. This presents its own set of challenges. "Awareness of branded cabins in the aftermarket sector is increasing, even among the newbies. The challenge is to inject design thinking at all levels of organizations in which resources are quite limited and where discussions can easily get temporarily sidetracked by day-to-day operational issues that require immediate attention. In addition, the people running brand-new airlines may have joined from completely unrelated industries, so they require

lots of concentrated information to get up to speed," he says.

Structural challenges within the industry are also affecting the aftermarket: fewer windows for cabin refurbishment during maintenance checks, higher demand in the business class sector, and the particular lifecycles of key aircraft types all make for the proverbial interesting times for cabin design, redesign, refurbishment, production and installation.

OPPORTUNITIES FOR CABIN REFURBISHMENT DURING MAINTENANCE CHECKS ARE FEWER AND FURTHER APART

Modern airliners are designed to require less maintenance work and to need that work less frequently than older jets – a clear win for airlines, except when it comes to opportunities to upgrade their seating.

Zodiac Aerospace's vice president for communications, marketing and strategy, Laurent Stritter, explains, "Until the Boeing 777, C-checks of aircraft took place every 12 to 18 months, with the opportunity to refresh and clean the cabin, including replacing of parts, seat cover cleaning, etc. In particular, these C-checks require access under the cabin floor for electrical and control-cable checks, which meant that seats were taken off the aircraft, where they could be refreshed."



"Today," Stritter tells Aircraft Interiors International, "with Boeing 787s and Airbus A350s, the trend for aircraft C-checks is for them to be carried out during several shorter visits during aircraft operations, when there is less time to refresh the cabin. Therefore cabin refreshment is done on an ongoing basis."

Stritter adds that this is somewhat paradoxical, not least because the frequency with which many airlines feel the need to renew their design has shrunk from an 8- to 10-year period in the 1990s to a 5- to 6-year window today.

Airbus's services team concurs, citing a four-year window for cabin innovations and trends, while Ben Bettell, project director for aircraft interiors at Counterpoint Market Intelligence, a UK-based aerospace and defense consultancy with a specialty in aircraft interiors, says, "Premium aircraft seating typically has a refurbishment cycle of on average three to four years and a retrofit cycle of seven to eight years."

BUSINESS CLASS IS A KEY QUESTION

The speed at which airlines are feeling the need to renew their business class offering is accelerating particularly quickly.



Aviointeriors' de Vecchi tells *Aircraft Interiors International* that he sees more airlines looking for new business class products, without a corresponding requirement for a refit further back in the aircraft.

De Vecchi is blunt about customer requirements from seatmakers, airlines and passengers: "You cannot offer an old seat when you are asking for a high ticket price. You need also to consider that when entering an aircraft the business class seats are usually the first seats you see, so they are a big part of defining the airline brand."

Yet the market may be reaching an inverse plateau in terms of refurbishment lifecycles, says David Kondo, head of cabin interior development at Finnair, an airline that is in the process of seeking a refurbishment of its Airbus wide-body fleet.

"I think we're at the tail end of an extremely reactive period of 20 or so years, when all airlines were racing to get flat beds in business class, then true lie-flat, and then direct aisle access, which was ABOVE: CABINS SUCH AS FINNAIR'S A350 ARE A SIMPLER PROSPECT FOR LESSORS, AS THE BRAND COLOR IS APPLIED THROUGH THE LED LIGHTING SCHEMES

BELOW: AIRLINE CUSTOMER CUSTOMIZATION DEMANDS FOR A GALILEO SEAT FROM AVIOINTERIORS LED TO A HUGE AMOUNT OF WORK (SEE BELOW)

THE INDUSTRIALIZATION CONUNDRUM

Airline demand for customized interiors has never been higher, and these airline demands are entering the refurbishment process too.

"In the aftermarket," sums up Zodiac Aerospace's Laurent Stritter, "we see requests from customers where even the spares are customized to color and brand image. This has an impact on industrialization. For suppliers, time to market has become a key factor, with the paradox that the certification constraints are increasing, with more time needed for development."

Aviointeriors chief executive Ermanno de Vecchi adds, "The refurbishment market is currently looking for a very short lead-time availability." As an example, Aviointeriors' Galileo business-class seat, produced within six months of the first customer contact in one project, required changes in internal processes, tools, simulations and staffing, plus the subsupply chain.

In the case of wide-body aircraft with premium cabins, seat refurbishments can get complex because there are so many parts whose CMF need redefining, says Lift Strategic
Design CEO Daniel
Baron. "Top management at
an airline might say 'make the color
like our brand', but changing the color of
injected plastic parts may be unfeasible
economically because the quantity is
small or the lead time too short."

In addition to the seats, Baron notes, "There are monuments that have to

complement seats, plus surrounding cabin CMF. And at the end of the day, suppliers are not obliged to say 'Yes of course we will halt production of 500,000 parts to make 50 of your new turquoise end bays!' Three

words: It ain't happening."





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driving a trend to shorter cabin lifecycles. Now that flat beds are almost standard across airlines [in long haul], I think we'll see cabin lifecycles stabilize instead of continuing to decrease as airlines now turn their attention to the details and improved soft product."

Counterpoint data shows that the category it calls "forward-facing lie-flat seats with step over" accounted for fewer than 20% of installations in 2016 and is falling fast. "We predict that as the OEM catalogs and approved suppliers' seats change to all-aisle access, the popularity of forward-facing step-over seats will reduce even further as second-tier airlines will have choices from the new OEM gallery products," says the company's Ben Bettell.

Indeed, as Finnair's Kondo puts it, direct aisle access "is now a hygiene factor for business class, and is expected".

EARLY B787 CABIN REFITS SHOW MUCH PROMISE

As the Boeing 787 approaches the end of its first decade in service, the aircraft is ripe for a set of cabin refits, the nature of which will be driven by a number of factors.

For a start, while major aircraft systems maintenance checks are fewer and further between than with older aircraft types, the more intensive maintenance windows for early Dreamliners are coming up – and those early retrofits are concentrating on business class.

In the pointy end, early business class products on the B787 were outdated – and in many early airline cases remain so – as a result of decisions made early in the aircraft's production lifecycle. A combination of unfortunate generational timing, a lack of perspective on the direction of travel demands within the industry, and delays in the aircraft's early deliveries, led to the installation of what are now uncompetitive seats, with many of the first B787s lacking direct aisle access.

The relative narrowness of the B787's fuselage, compared with the B777, has also been a problem for fleet consistency and



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THE GROWING CAST OF BRANDED CABIN CHARACTERS

We are now in the era of branded cabins, where residential design is de rigueur. And these branded cabins aren't limited to new aircraft, as Qatar Airways' launch of its Qsuite on existing B777-300ER aircraft shows, meaning more collaboration, more coordination and more strategic program management across disciplines is needed.

From the designer's point of view, the role begins with identifying priorities in terms of brand consistency. As Lift Strategic Design CEO Daniel Baron says, "With any refurb program, it is critically important for the designer to understand what exactly the beast is, by researching, asking lots of questions, physically reviewing products; communicating the range of options and ramifications to all stakeholders; making sure management understands the realistic expectations; and then working closely with suppliers to ensure that all bases are covered and the results are in sync with targets."





has, in some cases, resulted in delays and suboptimal passenger experience as the result of trying to certify herringbones.

Yet that perfect storm of problems may soon clear, with a combination of factors set to stimulate aftermarket demand.

First, the Dreamliner is now mature, and Boeing's production line is in full swing. Second, most seatmakers have now completed their design, certification and manufacturing processes to fit current-generation seats onto the B787. Third, a new generation of compact staggered seats, such as Zodiac's Optima and Stelia's Opal models, is adding new and interesting options for regional routes. And fourth, the trend of branded cabins is taking hold, and airlines are increasingly unwilling to allow their late-2010s market positioning to be torpedoed by late-2000s seats on the Dreamliners that many passengers still view as brand-new aircraft.

Further back, the rise of premium economy over the past few years in particular means that airlines are adjusting their cabin mix as they learn more about how much aircraft real estate they can turn over to this profitable class. And in regular economy, as seatmakers try to carve out every centimeter of space in new seats to add comfort to the almost ubiquitous narrow 3-3-3 seating on the Dreamliner, the lifecycle of the first generation of seats is coming to an end.

B777s AND A380s

Boeing's 777, meanwhile, is now in its third decade of service and shows no sign of weakening demand, as Counterpoint's Bettell explains: "The longevity of this aircraft makes the B777 a truly amazing aircraft. As of today, only 7.8% of the 1,396 B777s delivered since 1995 have been either scrapped, stored or written off. Many Tier 1 airlines are flying aircraft that were delivered in 1995 and 1996 and showing no signs that they have plans to retire them from service."

Leasing companies, too, are trying to keep the aircraft where it is. "Although there are reports of B777s coming off lease, the leasing companies will try hard to give sweetheart deals to keep the aircraft with the original lessor, on a shorter lease. After all, the build rate of the B777 is down as we await the arrival of the B777X," Bettell says, noting that "although Boeing has delivered 138 B777 Freighters, conversions of older passenger aircraft are not evident, as was the case with B747 derivatives."

"The market is slightly affected due to new models entering it, among them the B777X and A330neo. If the

ABOVE AND ABOVE LEFT: SEATS
CAN BE GIVEN A NEW LEASE OF LIFE
AS WELL AS A NEW BRAND IMAGE.
PHOTO: AVIANOR

THE FIRST B787-9 C-CHECK

On August 30, 2017 Boeing Shanghai Aviation Services and XiamenAir celebrated the completion of the first B787-8 base maintenance check, (C-check) and wi-fi modification. The work, carried out at Boeing Shanghai's



hangar at Shanghai Pudong Airport, is considered important by the company in solidifying its position in the global market for B787 heavy maintenance and connectivity modifications as it enters the China market.

"We are very pleased with the B787 C-check and wi-fi modification performed by Boeing Shanghai. Their expertise in the field contributes significantly to program reliability, safety and improving flight services for our customers," said Tang Jianqi, general manager of aircraft maintenance and engineering at XiamenAir.





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ABOVE: TOO BRIGHT FOR YOUR NEW BRAND IMAGE? FASILY RECTIFIED AT THE NEXT AIRCRAFT CHECK PHOTO: AVIANOR

ABOVE RIGHT: IN EARLY 2018 ETHIOPIAN MRO FITTED NEW ANGLED LIE-FLATS TO 10 OF ETHIOPIAN AIRLINES' DREAMLINERS. THE PROGRAM, COMPLETED WITH ZODIAC SEATS UK, COST IN EXCESS OF US\$300,000 PHOTO: ETHIOPIAN AIRLINES

new wide-body market continues to soften, it will have a knock-on effect on the retrofit market, as new aircraft deliveries with new interiors tend to prompt a refit of existing aircraft fleets."

However, the number of aircraft due to come off lease, and a reduction in new aircraft production at the upper end of the market, mean that there is volatility.

"The A380 build rate is falling to six per year, which will affect the interiors market by volume," Bettell predicts. "The first A380 to come out of service is parked with no takers, as we understand," states Bettel, referring to the first of five Singapore Airlines A380s coming to the end of their 10-year leases. "There are currently only 13 operators of the aircraft, so we believe that take-up for aircraft coming off lease will be very slow. Malaysia Airlines intends to phase out its A380s in 2018 and the lease companies need to find homes for them. The aircraft is very complex, and without exception it

is a flagship aircraft for airlines. These aircraft will all have unique interiors, which will need to be changed at an enormous investment in time and money in the event another operator takes a releasing deal."

"We cannot foresee any of the remaining 12 flagship airlines operating an A380 with another airline's internal livery or cabin layout," Bettell says. "Apart from the different catering and ticketing logistics to deal with, for an airline the A380 is a flagship aircraft and it would give the wrong brand message to the passenger if there were a different interior and configuration than expected."

It seems clear that the aftermarket is at a turning point, and much will become clear in the next months and years, particularly as the future of larger second-hand wide-bodies of the previous generation becomes clear.

Also crucial will be the state of the emerging market for factory fresh re-engined twinjets, plus the new breed of long-haul narrow-bodies in the form of the A320neo and B737 MAX families, which will start flying routes that previously required a smaller wide-body aircraft.

But as both major large aircraft airframers look to take more of this work in-house via services contracts, a key question will be whether they can meet increasing customer demands for agility and customization.



REMARKETING VIEWPOINT

Air Partner's remarketing division reports seeing high levels of narrow-body activity in the aircraft sales and leasing market, but warns that the wide-body sector is 'very different'.

Tony Whitty, managing director, comments, "Over the last few years we have remarketed several different types of wide-body aircraft, including B747s, A340s, A330s, A350s and B777s. Currently, the market is still waiting for the first used A380 aircraft transaction, which might be the transaction involving Portuguese charter airline, Hi Fly. The transition of used wide-bodies in passenger configuration continues to be very slow; unless the type can be converted to cargo, operational lives are continuing to shorten.

"The price of fuel clearly is a significant factor as many major scheduled airlines have kept their older wide-bodies far longer than originally planned. Therefore, to a certain extent, this has meant the

market is not as saturated as it might have been.

"What the used market really needs is some of the major scheduled carriers to acquire significant fleets of wide-bodies. Those with excellent maintenance and technical capability are best placed to do this: whether this happens or not will depend a lot on how aggressive Airbus and Boeing are on the sale of their new wide-bodies, plus other factors, such as the price of fuel."



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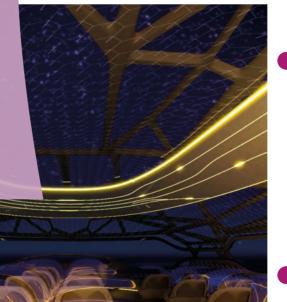
Ingo Wuggetzer has noticed more automation and virtual reality technologies being used on the ground and being proposed for the cabin, which he says "could help airlines provide new service levels and new passenger experiences on board".

One example is a virtual reality IFE system that Airbus is developing with Inflight VR, a tech startup, which brings in virtual reality headsets in order to create a more immersive entertainment experience.

Axel Becker sees further applications though: "It is easily imaginable that cameras in the IFE systems linked to facial recognition and mood detection technology could, for example, detect your mood and your physical condition to provide the crew and the airline with the right information as how they can offer the best service to each passenger. It could also have security and safety benefits."

ABOVE: 3D VIRTUAL REALITY IS PROVING USEFUL IN CABIN DESIGN WORK, AND HAS FURTHER POTENTIAL IN INFLIGHT ENTERTAINMENT

BELOW: IN 2012 AXEL BECKER WAS PROJECT LEAD ON AIRBUS'S CONCEPT CABIN VISION FOR 2050 irbus takes a customer-centric approach to its cabin development – not just with airline and lessor customers, but the ultimate end users: passengers. This approach involves consideration of airline needs, revenues and efficiency, and predicting the comforts and services that passengers will want tomorrow. At the forefront of predicting the future for Airbus are Axel Becker, manager of trends research for Airbus's cabin programs; and Ingo Wuggetzer, vice president of cabin marketing. Let's find out what trends they are finding, and how they found them.



WHAT TRENDS DO YOU FOLLOW FOR CABIN RESEARCH?

Axel Becker (AB): We maintain a strong aviation and cross-industry network, looking at other industries such as automotive, trains and cruise ships – basically all other industries dealing with transporting people from A to B, or with hosting customers or passengers for a certain amount of time in any type of compartment.

DO SUCH TRENDS READILY APPLY TO AVIATION?

AB: The aviation business is always a little bit more tricky than other forms of transport. We have higher standards in terms of regulation and certification,

THE FORCE OF FEEDBACK

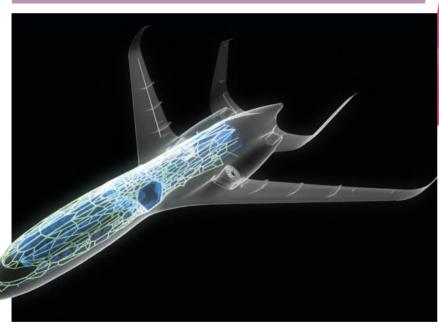
Beyond the cabin, Airbus's trend research team has noticed that passenger expectations of the airline booking process may be changing due to customers becoming used to being well informed during the purchase process. This is also linked to the question of personalization. Travelers want information about the products

Airbus has identified two types reviews posted on social media. With connectivity on board, passengers can easily provide social media feedback during a flight, letting the world know instantly if there are any service issues.

"The second type is the more Amazon-style booking experience," of trend research. "This could give airline and even the same route.

This will grow over time and we are moving toward what is now common

Becker adds that, "We also see airlines using chatbots more often as part of the booking process. In some cases you do not know if you are talking to a real person or a chatbot. There are a couple of new technologies available that will change the booking experience and the customer relationship management of airlines with passengers.'



and we have bigger weight issues. It's also more complicated to introduce new services, products and innovations into aviation than in other industries.

HOW DO YOU GATHER INFORMATION ON TRENDS?

AB: We do a lot of research from our desks, but we also attend conferences and shows. For example, the CES in Las Vegas, Nevada, is interesting, as is the Frankfurt Motor Show, AIX and APEX; and during or after such shows, we discuss our findings with trend and futurist experts from aviation and other industries. This work

ABOVE: THE INTELLIGENT CABIN WALL MEMBRANES OF THE 2050 CONCEPT CAN BECOME TRANSPARENT TO GIVE OPEN PANORAMIC VIEWS

ABOVE RIGHT: AIRBUS'S IFLYA380 AUGMENTED REALITY APP HELPS MEET THE NEEDS OF DIGITAL TRAVELERS



insights with our own colleagues from R&T, innovation and engineering, our key people and also with our suppliers to come up with the right product and services

at the right time.

Ingo Wuggetzer (IW): We involve our customers continuously during product development. We use trends

"This work takes place long before it becomes competitive"



takes place long before it becomes

competitive in aviation, so we can discuss trends research with suppliers or MROs with no conflicts.

There are two main purposes to our trend research and market insights. The first is, we present our insights to airline customers so they can better understand our view of the future, and then we discuss the implications in terms of the cabin products and services we will need to develop in the future. We then transfer the results of those discussions into our own value chain and discuss these



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research as a clear input to anticipate future concepts, services and features, to inspire our customers, and also to create a vision, like we did with the Concept Cabin vision for 2050 [revealed in 2011], which was entirely passengerneeds driven.

Trend research enriches our approach and also provides interesting, valuable results about future innovative product solutions.

WHAT RESEARCH METHODS DO YOU USE?

AB: We look at different trend levels, but start with macro trends; for example, what is happening in certain demographics and how the passenger landscape of tomorrow is changing. We go beyond the pure passenger segmentation analysis that all the airlines are doing. It's about looking at specific types of passengers.

CAN YOU GIVE EXAMPLES?

AB: At the moment we're looking at aging passengers, overweight passengers, female passengers and digital natives brought up during the age of the internet – specific groups that will grow in importance. We know

ABOUT AXEL

The manager of trend research at Airbus Cabin Programme, Axel Becker, joined the company in 2006, tasked with working on trend research and scenario methodology for cabin innovations. In 2012 he was the project lead for the Concept Cabin 2050.

Prior to Airbus he had a similar role at Mercedes-

Benz, where he worked at its research labs in Berlin and Palo Alto.

"It was a similar approach, looking at what's changing in the world, what's changing customer behavior, and what the driving factors are for tomorrow," he explains.



"We go beyond the pure passenger segmentation analysis that airlines are doing"



there will be more elderly people from most industrialized countries traveling in the future. There are also more overweight and obese passengers flying in the USA and parts of Europe.

Also, digital travelers are young people that have always had the internet to help them plan travel. They have clearly different requirements with regard to connectivity, in terms of having mobile devices and demanding information as they travel. But they don't want all the information; they only want information specific to their needs.

ABOUT INGC

Ingo Wuggetzer is responsible for Airbus's cabin marketing activities, including trend and market research to identify future customer needs, and customer campaign activities.

In his former role as Airbus's VP of strategy, innovation and design, Wuggetzer established a consumer-centric approach, covering trend and market research.

On this basis, he set up a cabin product and technology strategy as a guideline for future cabin innovations – some examples of the innovations he has helped deliver are the A350 XWB cabin design and the Concept Cabin Vision 2050.

Prior to joining
Airbus in 2005, Ingo
was at Lufthansa for
10 years, during which
time he held positions
as senior manager for
corporate strategy, and
also general manager of
cabin development and
product innovation.

WHAT IS THE TIMEFRAME OF YOUR RESEARCH?

AB: Trends like demographics are long term. But the future starts tomorrow, so we also look at short-term trends, such as connectivity and entertainment insights.

Our timescale really depends on the topic, but I would say in terms of new generations of cabins and aircraft, we're talking timescales of 5, 10 or 15 years. If we're talking about visions, it could be 25 to 30 years in the future.



Supplier consolidation: issue or opportunity?

Get some interiors people together and it never takes long for the conversation to turn to the subject of suppliers consolidation.

While the supplier landscape does not come under the aegis of Ingo Wuggetzer's official trend research work, we asked his opinion anyway: "It's an

industrial trend that also happens in other industries. Sometimes we have an issue; sometimes we have an opportunity. It really depends how you manage this and how you structure the consolidation.

"For us in general, it's better to work with fewer suppliers in terms of complexity. If they are managed well and provide good, qualitative, high-level solutions, that is definitely better. You always need to have a certain number of suppliers to have good competition for creating the best innovations, which benefits passenger products."

BELOW: INGO WUGGETZER
IS ALSO A MEMBER OF THE
CRYSTAL CABIN AWARDS JURY



DO YOU THINK THE CURRENT SYSTEM OF FIXED CABIN CLASSES WILL REMAIN IN 10 YEARS' TIME?

AB: This is one of the hottest topics in trend research. You can clearly see how classes have changed over time, and there are two main observations.

The first is that we are seeing finer granularity of cabin classes. First class is not disappearing, but we see that it is probably better suited to high-value trunk routes. We are increasingly seeing a blurring of first class and business class products and we are seeing different types of business class products emerge. We are also seeing strong segmentation efforts by airlines in economy cabins, with premium economy, economy plus, classic economy and high-density economy on offer.

And it is not just about the seat. Airlines are also segmenting other elements such as connectivity, catering, baggage, boarding and lounge access. This kind of segmentation will be further developed by airlines.

IW: I would like to add that in our long-term perspective for 2050 we see something that is purely needs-driven,



"For 2050 we see something that is purely needs-driven that goes beyond classes"

something that really goes beyond classes. Passengers will just select the features and services that they want to experience during their flight. They may be grouped into different zones because the seat and the environment will enable the elements they have chosen for that flight [social, work or entertainment, for example]. In the long run, we see that there might be the potential to go beyond classes.

SO EACH PASSENGER CAN ORDER THEIR OWN INDIVIDUAL EXPERIENCE?

AB: Exactly. Today, to a certain extent, cabin interiors limit airlines' ability to personalize the whole experience. This is starting to evolve and in the long run, you can have a really, really personalized environment, not only in terms of services, but also in terms of product.



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SKYRIDER

It was back in 2010 that Aviointeriors presented the Skyrider economy seat concept, but many will still remember the extraordinary press coverage this peculiar configuration received, with its motorcycle seat-inspired design enabling a 23in seat pitch with a semistanding position. The attention was welcome though, as the concept was presented to help Aviointeriors understand how the market would react to something completely different.

There were two main drivers for the study: recognizing that people in different parts of the world have different travel tastes, and investigating a way to facilitate aircraft travel for people who cannot afford a standard economy class ticket.

The concept has gone quiet for a few years, but it is about to re-emerge in the form of Skyrider 2.0 — and this time it is being presented as a real-world, certifiable seat. Aviointeriors says it has identified eastern LCCs flying short and medium routes as key customers as they have more fifth percentile flyers, which makes them better suited than western markets, and they may be attracted to the lowest possible fares.

The main modification in 2.0 from the initial concept is that it now locks onto not just the rails on the floor, but also to the cabin ceiling. The seat is one piece, with the hatboxes on top, and enables proper load distribution.

Aviointeriors says that the design reflects its aim to create not only different seats for different classes, but also different types of seats for different parts of the world, especially where load factors are very important.



Induction Cooking Platform

Lufthansa Technik's Induction Cooking Platform opens up a new way to prepare fresh food on board, with the platform able to serve as a pan, toaster or pot so that crew or onboard chefs can exercise their culinary skills. These multiple capabilities are packaged in a 287 x 570 x 269mm unit (11 x 22 x 10.6in; ARINC size 4) that can fit into any aircraft galley. The platform also includes an integrated fume hood and odor filter system to eliminate cooking smells, and a pot containment system that covers and holds the applications securely in place - particularly useful during turbulence.

In August 2017 Lufthansa Technik began the ETSO process for the platform and also began work on creating a service bulletin for its installation. The company said it was confident that the product would be ready for installation in early 2018.

Company spokesperson Wolfgang Reinert confirmed to Aircraft Interiors International that qualification and testing for STC certification is still in progress, adding that the first integration into an A320 is due to take place in June 2018 during the layover of a VIP aircraft in Hamburg. He also stated that Lufthansa

Technik is in close contact with commercial airlines for possible integration in first class operations.





CHAIR

When Lufthansa Technik's Chair modular VIP seating concept was revealed in 2015, complete with a presentation at the finals of the Crystal Cabin Awards involving mime artists, some thought it would remain a design study. The design, created with Pierrejean Design Studio, is based on a pedestal upon which a baseline core skeleton or structure is mounted. This pedestal and structure is intentionally left incomplete, enabling designers to create their own version of Chair to meet the needs of a particular cabin, whether a dining room, video lounge, office or bedroom. The height, width and depth, and the overall look and feel of the seat, could be

configured to suit the space, and the shape, upholstery and padding specified for the design, all under one certification.

It's a clever idea, and while it didn't win the award, it has been progressing, gaining two ETSOs from EASA for the 9g-certified and 16g-certified family of seating in May 2016, meaning that production could begin (this ETSO designation can also be used for FAA TSO certification).

Lufthansa Technik has also received its first order for the seat, from an undisclosed

VIP customer, with production to be undertaken by Inairvation, a joint venture Lufthansa Technik set up with F/List for the sales and

marketing of the seat.

Oliver Thomaschewski, head of seating and structures at Lufthansa Technik's original equipment innovation division, says, "This order means the final breakthrough for our vision, which we had when we started development of this highly innovative and flexible product a few years ago. We are extremely happy and proud that we have been able to bring this idea into the real VIP aircraft cabin world."

BUTTERFLY

The original Caterpillar convertible seat design by Paperclip Design won a 2014 Crystal Cabin Awards, but following some correspondence from a certain off-highway equipment supplier, its name metamorphosed into Butterfly. This long-haul concept can be swiftly transformed between a premium economy class and business class flat-bed suite to match demand on each flight.

Butterfly is composed of staggered double seats, with the aisle seat offset backward, and for a premium economy configuration both seats are used. At eight abreast on a wide-body cabin, the seat width is up to 21in between armrests, and features include large cocktail trays, seat pockets on the side and an adjustable ottoman.

For business class application, double seats become a space for a single passenger, with the inboard seat flipped over to form a flat surface, creating a private suite complete with seat, a

side couch that can also be used for companion dining, and direct aisle access.

For sleeping, passengers simply flip the aisle seat over as well to form, together with the side couch, a large diagonal sleeping surface. At a 44in pitch the bed is 77in-long tip-to-tip, and up to 44in-wide at the hip area.

Butterfly is being developed further, with Paperclip having entered into a business partnership with Airbus through the Start-up 2 Partner framework in 2016, with the intention of bringing this flexible seating design to market by around 2020.

"We are currently undergoing pre-development work together with Airbus, a seat manufacturer and some airlines. At the moment the concept is being developed for two different platforms – the A320 and A330 – which will have different market positioning," states James Lee, director of Paperclip Design in Hong Kong.



Visit the Features section of our website for an interview with Paperclip's James Lee

Paperclip armrest

This well-publicized armrest is where it all began for Paperclip, with James Lee dreaming up the design in 2006 while studying at MIT. The design – in the shape of a paperclip – is intended to solve the problem of 'elbow wars' in high-density seating. Using a double-deck geometry, double the armrest space becomes available so that neighbors can share the feature amicably. The armrest can be incorporated into existing economy seats, or even in other applications such as train or cinema seats.

If you don't like the styling, it can be specified in different shapes, forms or materials, as long as its basic criteria remain: the two levels must be approximately 3in (7.5cm) apart, with a roughly 8in (20cm) gap between the backrest and the upper level.

Paperclip Design is focusing on the Butterfly project at present, but intends to come back to this project in the near future.





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Some thoughts on design



A studio that generates many concepts as part of its product development process is Tangerine, which has created airline projects including British Airways' Club World and

Virgin Australia's new premium cabins. A recent project for the studio was a headrest for Cathay Pacific, which the studio views as a critical component of comfort that is fundamental to improving the experience of economy class passengers. In the eyes of CEO Martin Darbyshire, almost all economy class headrests currently available are 'me-too' solutions, but the new design could spell the end of Cathay passengers bringing neck pillows onto the plane.

"In the economy class seating sector, manufacturers struggle with full order books and are under huge pressure to meet tight delivery schedules. It is difficult for them to justify the resources or spend on developing new, customized elements. As a consequence, most of the innovation in the sector is iterative, rather than looking at a complete change of approach.

"Tangerine believes that there is a big opportunity to create enhanced concepts that really improve the overall customer

experience, and we have begun work on a new concept to address this.

"Our approach to design in this area has been stimulated by working on a number of projects with airlines that are always looking to create points of differentiation for their brand that would not require reinventing the wheel. As such, we could see a gap in the market."

When Tangerine worked on the cabin interior and economy class seat design for Cathay Pacific's new A350 fleet, the studio created the idea of 'ears' on the headrest which would hinge outwards from the outside edge rather than hinging outwards from the center. You can read more detail about the design on the Aircraft Interiors International website. You can also try out another headrest design by Tangerine at Aircraft Interiors Expo in April, Stand 2U75.



BOOMERANG

In 2016 the studio of Alexander McDiarmid created a design language for business class, inspired by the boomerang, an object they felt had a flowing, simple and organic form and profile that lends itself to cabin design.

The Boomerang business class suite is a 'what if' styling and CMF exercise focusing on the psychology of the space, the perceived and real passenger experience, and how CMF choice can affect and contribute to it.

The studio was adamant about using natural effect materials as it perceives them as bringing a calming effect to interior spaces, with the outer and inner shells clad in a light wood décor, with a relief of curved – indeed boomerang-like – brushed metal inlays that wrap around the suite and transect the full-length

shelf in the suite, which conceals three lockers and the pull-out table.

Since the reveal of Boomerang, the studio's superyacht work and its other aircraft, helicopter and private jet livery and interior design work have taken priority. However, Alexander McDiarmid still believes in the unique design and may be revisiting it soon.





NEWFACE

In 2015 NewFACE (Future Aircraft Configurations for Eco-Efficiency) was revealed, with the aim of developing future interior and exterior aircraft design configurations. There have been developments with the Utility concept developed during the project.

The Boxwing cabin interior inspired the CMF solutions for the TAP Portugal A320 retrofit program, developed by Almadesign. Boxwing also addressed the objective of reducing turnaround time by using a 2+2+2 interior layout. The same objective is being pursued in the PASSME (Personalised Airport Systems for Seamless Mobility & Experience) project being developed by Almadesign, seat manufacturer Optimares and Delft Technical University. The team is developing an aircraft seat concept that is hoped to reduce boarding and deboarding times by 30% (see p26). The PASSME seat is shortlisted for the Crystal Cabin Award 2018.



Prototype galley

Last year AIM Altitude revealed a prototype galley with enhancements that included a table that could be recessed away, a spring-loaded foot step, and flush sinks that extend the working area. Items like a semi-transparent cover for the electrical systems panel made the galley more visually appealing, along with clip-on trim that enables elements to be quickly refreshed.

Perhaps the most interesting element of the concept was the pantry, a unique way to store galley equipment. It was designed to mimic the smooth-rolling and easily accessible design of pantry cupboards in modern domestic kitchens.

Zoe Wenn, industrial designer at AIM Altitude gives an update: "Following the introduction of our prototype, we have been developing a couple of the new features with an airline customer. They were impressed with the functional enhancements, aimed at making life easier for busy crews. We have worked together to progress the features, to refine them, and incorporate them within the customer's existing style of galley. Hopefully some of the conceptual features, demonstrated as a step toward the next generation of galley, will be seen and used in service in the near future."



StepSeat

USA-based Jacob Innovations has created several ideas for several classes, all of which maximize the use of the available vertical space in the cabin to increase comfort without sacrificing cabin density. The original is the StepSeat, an economy class concept that sees alternate seats mounted on 'steps', which are small platforms the height of a conventional step. This arrangement increases legroom for all seats and enables occupants to recline to around 45° within the fixed shell.

The inventor, Emil Jacob, says that while access to the seat looks rather narrow in the renderings, the access space is actually almost the same as with

a conventional economy seat at a tight pitch. More space, more comfort, with no density penalty: Jacob must be busy...

"We are in talks about developing the StepSeat model with a number of parties," he states. Unfortunately he cannot disclose more details at this stage due to NDAs, but this is an interesting project to monitor.



RECARO SMART CABIN RECONFIGURATION

In 2017, Recaro Aircraft
Seating unveiled
a concept that
enables crew to
flexibly adapt
seating between
flights to reflect
the load factor.

Recaro says
that the Smart Cabin
Reconfiguration concept is
"without a doubt a disruptive
innovation" in that it offers
an unprecedented degree of
flexibility, enabling airlines to
respond quickly to changing
customer needs. When a flight
is not fully booked, this simple
sliding seat concept enables
seat spacing to be increased.
Crew simply lift up the seat pan,

release the floor locking mechanism and push the front seats apart along a rail system.

"The Smart Cabin Reconfiguration concept sparked enormous interest among airlines. As a

result we conducted in-depth discussions and reviews with airlines and, motivated by the positive market response, we are continuing work on this concept."

Recaro adds that the advantage of the Smart Cabin Reconfiguration seating product can only be fully exploited if other operational components are also flexible, such as booking systems and fleet management.



Design Investment is Mercedes-Benz Style's choice as design enabler for the VIP aircraft cabin concept in collaboration with Lufthansa Technik.





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change and drives innovation. Singapore Airlines (SIA) knows this only too well, having set a new benchmark in luxury for commercial aviation when it launched its flagship A380 in 2007. That golden moment was all too brief though, as rivals began introducing ever more luxurious interiors for their superjumbos, all vying for the title of being the world's most luxurious airline. With the airline's landmark first A380s leaving the fleet after a decade in service and five fresh models joining, now

ivalry is good: it motivates

The halo product of the new US\$850m interiors of the new A380s (and the 14 retrofits) is the first class cabin. Its six suites with their beds and separate swivel chairs have been attracting international attention since the first aircraft was

is a good time to introduce a new product

and mount its latest claim to the crown.

BELOW: THE CARPETING WITHIN THE SEATING AREA IS SLIGHTLY DIFFERENT TO THAT IN THE AISLE, WHICH HELPS DEFINE THE PASSENGER SPACE

OPEN ATTITUDE

Some airlines have introduced doors in their business class seats. Were doors considered for the new A380 business class?

"We considered them and we tested them quite thoroughly. They're a big buzzword at the moment, and I can understand that," states JPA's John Tighe. "They work very well on some products and there is also a bit of a marketing element to some of them, that's for sure.

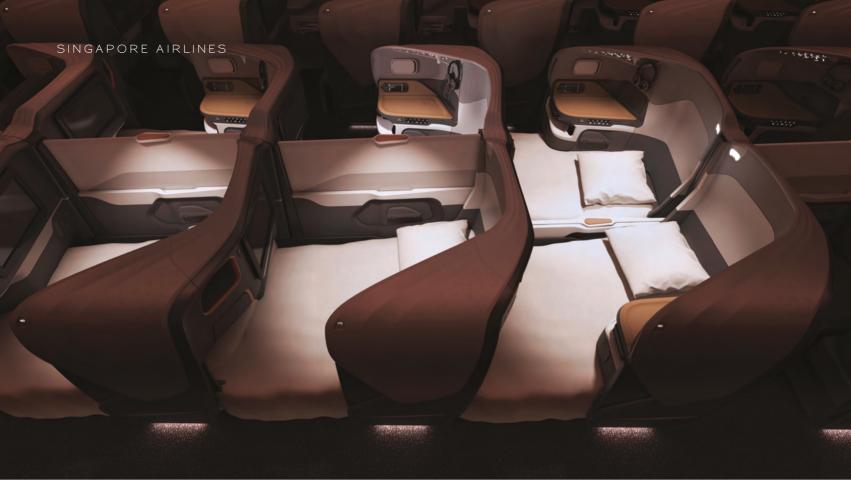
"However, I think people who actually spend lots of time traveling in certain versions of business class seats with doors will find them quite claustrophobic and slightly pointless. It can feel like you have a large surface close to you, which can feel quite constraining.

"With most business class seats, if doors were added they would be at such a low level that they're not really serving their purpose as a privacy feature. However, they can give a perception of private space.

"Doors also add weight and effectively reduce seat width and bed length as they take up a few inches of space. No matter what layout you're looking at, you lose a few inches of width.

"You need a really good reason for adding doors."





ABOVE: THE SINGLE AND DOUBLE BED OPTIONS. THE BEDS TO THE FRONT OF THE CABIN ARE POSITIONED AT LESS OF AN ANGLE, CREATING MORE OF A TRUE DOUBLE BED EXPERIENCE revealed in December 2017. However, an arguably more impressive level of innovation is to be found in the profit engine of the aircraft: the 78-seat business class.

The designer of the new cabin, JPA Design, also created the business class seating for the airline's first A380s, which launched a decade ago, and designed its Next Generation seat that launched in 2013 on the airline's B777-300ERs and in 2016 on its A350s. However, when a new project comes up, the studio still has to go through a rigorous pitch process lasting several months, and win it on merit.

The pressure was on for the pitch, especially since the airline

SUPPLIER SELECTION

Even though SIA has a long-running relationship with JPA Design for its business class cabins, and with Jamco for the seat manufacturing, both had to go up against rivals and pitch the airline for the new A380 project. Following JPA's successful proposal, a competitive tender went out to seating suppliers, with all the major suppliers considered and interviewed, and site visits conducted.

"It was a very thorough procedure, because ultimately the airline and JPA needed to be confident that the manufacturer could actually realize the monocoque technology," states Tighe.

"In general, seat vendors will have vested interests in particular technologies. They will be experts in building a seat in a particular way and they will have experience building a seat using a particular material, and they'll want to continue doing things that way because it's their culture. With monocoque, the manufacturer would have to break that culture. It was a challenging project for everyone, but also a leap forward."

was looking for more than an evolutionary step in the current product. As John Tighe, JPA's design director, recalls, "The A380 is such a landmark aircraft for SIA that, when the new A380s were coming, they felt like they needed to make a bigger statement and provide a really significant passenger experience benefit."

The winning idea was a unique proposition for the seat structure that JPA has been working on internally for several years, which uses a monocoque (single body) structure. JPA believes that the separated or pallet-mounted metal structures of many of today's business class seats do not really work together to provide strength; rather they act independently, with multiple load paths running down to the floor.

The studio has a strong belief that this is not the most efficient way of doing things. Instead the monocoque concept – which JPA has patented and Jamco is manufacturing (see *Supplier Selection*, left) – is based around a core chassis, which is made of carbon fiber reinforced plastic (CFRP) in SIA's case, although it could be made of other materials. Put simply, the pleasingly curvy aesthetic of the seat is not a decorative shell: it is the structure itself. Visual appeal aside, the



It started as a challenge.

And ended up setting an example.



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LET'S GET TOGETHER

Privacy is offered in the center A380 seats by a divider panel. In the fully raised position occupants have their own space, but if their neighbor is a traveling companion, a simple push downward will lower the panel to the level of the seat cushions. With 25in-wide seats, this makes the space close enough for neighbors to talk, but they won't be rubbing shoulders.

If passengers then want to go into 'couples' mode with the panel pushed all the way down to below the level of the beds, then they have to ask the cabin crew – a good way to add a little more crew interaction, and also useful for preventing any uninvited bedfellows.

The crew disengages latches on both sides of the divider, and then the panel drops down gently and secures itself in position, with a gas strut supporting the movement. With the addition of a bedsheet, the double bed looks seamless.

benefit, according to Tighe, is that the structure is far more rigid overall than many seats on the market today, which benefits safety and makes the seat feel sturdy, secure and high quality.

The one-piece monocoque chassis is a strong, slim and sculpted form, which enables the internal structures to be moved further away from the passenger, creating extra foot space, as well as a lot of free space underneath the seat. Indeed with a slim and compact seat mechanism

in place, the space underneath becomes sufficiently large for carry-on luggage, bedding, or simply lovely, lightweight air.

"It's certainly a big leap forward. It's the first time this has ever been done on an aircraft," says Tighe of the design. "We believe it's genuinely a game-changer."

BAGGAGE BELOW, SPACE ABOVE

With space under the seat for a carry-on bag, central overhead stowage bins are not required in this upper-level cabin. This is not a new development, as SIA did not have central bins in its previous business class, located on the lower level. As passengers are bringing more and more cabin baggage on board, though, it was proving a challenge to accommodate it in just the outer bins of the previous-generation cabins. Of course the airline could start a strict baggage policy, but that is difficult to enforce at business class fare levels, especially for an airline promising a premium experience. However, that space opened up by the monocoque seats enables the airline to keep resisting center bins in the face of growing baggage levels, and to keep enjoying the aesthetic and weight benefits of that free space overhead.

"I think if we hadn't created monocoque, there was a real possibility that just having outboard bins alone wouldn't have been enough today. That was a very real risk," says Tighe.

COMFORT TRICKS

The monocoque design boasts real structural engineering innovation, and a few design tricks have also enhanced its

THE TRAYS AND COCKTAIL
TABLES ARE POSITIONED SO
THE CREW CAN SERVE DRINKS
AND SNACKS WITHOUT
INTERRUPTING CUSTOMERS,
WHO IN TURN CAN ACCESS THEIR
REFRESHMENTS MORE EASILY

comfort. The previous A380 seats had a contoured back, which was great for seated comfort, with no compromise needed for sleeping comfort as it featured a flip-over bed surface. However, the new design deploys directly from TTL into a bed, so that shared surface has to provide comfort in both modes. Thus the bolsters on the back seat cushion 'hug' the passenger when sitting upright, expanding as the seat moves into a 'sun deck' lounging position, and finally going flat to create a comfortable 78in (2m) bed.

"Similar ideas have been used in other areas, such as the headrest," explains Tighe. "Those are the kinds of tricks we have to use to get the best of both worlds with comfort. Many seat surfaces today are flat because the bed needs to be flat, but they're not very comfortable for sitting; whereas with the SIA seat, we pulled a few tricks by adding some moving parts to give the best of both worlds."

FAMILIAR FEELING

IPA considered many cabin

LOPAs for the SIA project,

including some that are "revolutionary, never been seen before", as Tighe recalls. The team then built mock-ups and did in-depth analysis of the benefits these layouts would bring to the passengers. Ultimately, however, it was decided that for this particular project the current forward-facing, 1-2-1 in-line seating layout still works very well, and maintains brand and experience DNA. Some design tweaks have made the new seat a little more space-efficient though, raising seat count from 66 to 78.

"If you're going to move away from a layout, you've got to have something that is head and shoulders above it. That's quite difficult to do in the modern seating world as ideas have been well developed. Every type of layout was considered, but for this particular project there wasn't another layout that delivered a better blend of comfort and density," states Tighe.

MAIN IMAGE: PASSENGERS CAN EASILY PUT THE SEAT INTO BED MODE THEMSELVES, OR ASK THE CREW TO MAKE IT UP WHILE THEY PREPARE THEMSELVES FOR SLEEP

INSET: THE SEATBACK STYLING RECALLS THE DISTINCTIVE B777-300ER/A350 SEATS, WITH CURVED FORMS REDUCING THE VISUAL MASS

SLIP INTO BED

The flip-over beds of the previous seat were a popular feature with many passengers, and presented an opportunity to experience the airline's famous service as the crew prepared the bed with sheets and duvets.

Changing to a passenger-operated actuation system was a big decision for SIA, but Tighe doesn't predict a problem: "My personal take on it is that passengers are now more used to doing things exactly when they want to and not having to wait. It also makes it easier for people who just want to watch a film and gradually go to sleep."

Fans of the full SIA experience can still request that crew make up the bed nicely though, and indeed have to ask them to make up the double beds (see p129).





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LET'S GO FARTHER



"There were two major challenges," says Tighe. "Firstly, convincing everyone that the monocoque design was the right thing to do. An airline has lots of departments, and you need them all to be on board with the idea. The product department might be on board, but the engineering department might be a bit more risk averse, and then you have the finance people, and you have to make sure they're all convinced. We had to work really hard to make sure that everyone believed in it. Once they did, everyone fell in line and pushed forward."

Unsurprisingly, the second major challenge was certification. The third is a problem only just emerging now:

The solution for JPA lies in monitoring trends and technology, and visiting shows such as CES (see p134) so it is aware of the newest ideas from several industries that can be applied in future projects.

how to make it better for the airline's next product update.

THE UPPER DECK, JUST BEHIND FIRST CLASS, THIS CREATES AN ALL-PREMIUM UPPER DECK WITH THE 78-SEAT BUSINESS CABINS OFFERING 12 MORE SEATS THAN THE

BUSINESS CLASS HAS MOVED

FROM THE LOWER DECK TO

PREVIOUS ARRANGEMENT

Keen-eyed readers may have spotted a subtle difference to the center doubles though, as they now angle slightly toward the aisle. The reason is quite compelling: it helps enables their transition into a double bed (see p129 to find out how). The front three rows are angled slightly less than those behind so the beds are more parallel to each other.

"The front three rows are the 'honeymoon' suites, which create a true double bed where you can sleep parallel to each other," says Tighe. "For the subsequent rows, it's slightly less of a double-bed experience as they are slightly angled away from each other, but it's still a very nice experience."

THE FINAL HURDLE

New seating projects are a constant source of challenges, but one element proved particularly difficult in developing the monocoque design: certification. This came as

no surprise to JPA and Jamco though. As Tighe states, "An unfortunate fact of the interiors market is that it is in many ways quite traditional in terms of testing and certification. For example, the A350 is largely a composite aircraft, but using composite within a seat's primary load path is still pretty much a no-no. It's doable, but only just."

Airbus, Jamco and JPA collaborated in order to try to streamline the certification

process for the monocoque seat. The final approved structure is slightly different from the initial proposition, but the teams expected some degree of modification.

The good news is not only that the seat is flying at the end of this four-year project, but that the certification process for future monocoque projects should be less challenging. "The engineers and the test certification people had a few sleepless nights, but if you're pushing the industry to try to change ways of doing things, then there will always be resistance. But in the end we got everyone on side, and it was a good team effort to get where we are. A few compromises came in, but that's always the case. The first one of anything is always the hardest and this is a massive leap forward."

FUTURE PLANS

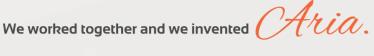
With the first monocoque seats now flying, what are JPA's other plans for their patented design? "We hope to develop monocoque in a number of different ways. One of those directions will be a more pared-back, simple, lightweight business class option, which would be suited to very different

"Also, as a complete concept, monocoque could be taken in many different directions. You could create super-light seats for economy, premium economy, business or first class. JPA and Jamco would like to see the monocoque concept go further, and we're talking to various people about doing that."

THE SIGN OF ITALY.

We pooled our ideas, integrated our technologies, and wove together our experiences. Together, we managed to do something out of the ordinary: to create a product that offers the highest cabin seating density and, at the same time, superior in-flight comfort.

Our design is focussed on the passengers and spoils them with shapes and details that make them feel at home. These are integrated within a dynamic personal space that changes based on individual tastes, and adapts to perfectly match all needs. The creativity and technology of two "made in Italy" excellences join hands to give rise to an evolved business class: new levels of comfort for passengers and new opportunities for airlines.





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IMAGINE A CABIN
THAT LEARNS
PASSENGER BEHAVIOR



Many still regard AI as a notion still in the realms of science fiction, but LG Electronics is working to make it handle the mundane tasks of everyday life.

LG's AI research lab in South Korea is accelerating the integration of AI into a wide range of products under the ThinQ brand, which consists of products that have been developed with DeepThinQ 1.0, LG's AI technology with deep learning capabilities that it showcased at CES.

The DeepThinQ 1.0 platform boasts AI functions such as voice, video, sensor and spatial recognition, as well as human body detection, developed and refined through analysis of user habits over time. Thus products developed on the DeepThinQ platform, which could range from smartphones to home appliances, running on any operating platform such

as Android, Linux or webOS, can understand not only their external environments, but also the behavioral patterns of their users.

AIRCRAFT APPLICATION: For

the cabin, the preferences of frequent flyers could be learned, and their favorite seat settings automatically implemented and satisfaction monitored. For example, facial recognition could identify a frequent passenger, call up data from their previous flights to ascertain their preferred temperature or lighting settings, and then apply those settings to the seat. The passenger's facial expression could be monitored throughout the flight, and the settings automatically adjusted if sensors detect that the user is looking unhappy or uncomfortable.



Bringing displays together

MULTIPLE SCREENS

IMAGINE SEAMLESS.

Multi-monitor surround setups can provide panoramic viewing that extends well into your periphery. There's an unsightly catch, though: where the bezels of adjacent screens meet, the join line interrupts the sense of immersion. Asus demonstrated a solution with a concept that hides adjoining bezels behind 'optical camouflage' to create a more seamless picture.

This 'Bezel-Free Kit' was developed with a backlight provider which specializes in optical materials. Thin lenses are placed along the seams where screens meet; these lenses contain optical micro-structures that refract light, bending it inward to hide the bezels underneath.

The lenses are made from PMMA, a transparent thermoplastic that is more durable than glass and which lets 90% of the light from the monitors shine through, making the picture under the lenses slightly dimmer than the rest of the screens, but less distracting than the opaque seams created when two bezels are pushed up against each other. This is as far as the effect can be taken with PMMA, and to reduce the dimming further would require glass lenses, which are too fragile to be practical for mass production.

Installation is simple, with custom clips that hold the monitors together at the top and bottom of each seam, which helps align them at the correct angle. The lens sits between, reducing the kit

to just three parts per seam. The kit's optical obfuscation is designed to work at 130° because it offers the best balance of comfort and immersion in internal testing.

AIRCRAFT APPLICATION:

Having multiple displays with a wraparound effect would look great in long-haul business and first class, with content able to be split or shared between the screens. Whatever the option, this type of simple solution could open up the possibility of multi-screen seats.



A WALL OF 'WO

There were many huge TVs at CES, but Samsung showed something really special with The Wall. The MicroLED technology in this modular TV delivers incredible definition, without restrictions to size, resolution or form (the display version was 146in), and without a bezel. The micrometer (µm)-scale LEDs are much smaller than current LEDs, and serve as their own source of light. The self-emitting display can be transformed into any size, and is claimed to deliver incredible brightness, color gamut, color volume and black levels.

Samsung views this technology as the next stage in screen development, with benefits including that it does not need color filters or backlight, and has a light lifetime and low power consumption.

Consumers could create their own display at home, with the exact TV sizes and shape to suit their needs - indeed it does not need to be a TV, it can serve as a wall-sized display, for example.

AIRCRAFT APPLICATION: This fantastic technology could be used to create custom-shaped displays in seats,

> but a better application would be bulkheads, entrance areas and social areas, where big, space-filling displays could show everything from airline branding and destinations, to major live sports events.

> > **IMAGINE DISPLAYS** WITH NO EDGES - OR LIMITS





Simple but useful

Not everything at CES was futuristic, but then not everything had short-term potential. The Sanborne. however, is a clever little idea that can be implemented at home today. and possibly in the air tomorrow.

Sanborne is an upgrade to the typical toilet seat; it emits a gentle, guiding light during the night, thus eliminating the need to switch on glaring bathroom lights during night-time visits. The batterypowered LED lights in the seat emit a blue glow and make it easy to see whether the seat has been left up or down, with a self-activating timer to ensure energy efficiency.

The inventor, Delta Faucet Company, has also developed a skill for Alexa that allows consumers to control faucets without using their hands – indeed they can use only their voices. Voice instructions for Alexa include turning water on and off, measuring water quantity and even warming water

AIRCRAFT APPLICATION:

Such a seat could be a real benefit, reducing light spill into the cabin when the lav doors are opened during night flights. A soft-close lid and a quick-release system for easy cleaning round-off the product, also making the lav a little easier on the ear and a little cleaner. Combined with the touchless faucet, the risk of germ spread is also reduced.

IMAGINE A TOILET SEAT THAT CAN ENABLE A SAFE APPROACH TO THE LAV WHEN THE CABIN LIGHTS ARE OFF, AND REDUCE LIGHT SPILL WHEN OPENING THE DOOR





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Clever card

IMAGINE ONE SLIM CARD REPLACING A FAT WALLET

The Wallet Card by Dynamics, the world's first connected and secure payment card, was very well received by the public and the CES judging panel alike. Remarkably the inventor of the card, Dynamics, fitted a full IoT telecommunications platform with almost 200 internal components into a card the same size and shape as a normal credit or debit card.

The card, developed with banks, payments networks and carriers including Visa and Mastercard, features a cellphone chip and cellphone antenna so that data can be transferred between the Wallet Card and bank, anywhere in the world, and a battery and organic recharging chip so that the card charges itself through normal operation.

The magnetic stripe, EMV chip and contactless chip are all programmable, so that multiple card profiles can be downloaded to the card. The cardholder can change between cards - whether debit, credit, multicurrency or loyalty cards – using the 65,000 pixel display and user interface, and when a particular card is selected, the relevant magnetic stripe, EMV and contactless data is called up. In the event of fraud or data compromise, the bank can instantly delete the compromised card account number and replace it.

AIRCRAFT APPLICATION: Airlines and passengers will love this card. It reduces the worry of losing cards while traveling, and

means users will always have their full range of loyalty cards with them. Security is boosted too, with this digital card platform using highly secure, over-the-air cellular connections. Airlines could even send inflight retail promotions or coupons to passengers during flight, which would appear on the card display.





Kohler, a kitchen and bath products company, was showing Kohler Konnect, a platform that allows consumers to automate everyday tasks in the kitchen and bathroom through voice control. Consumers can interact with the system by using voice commands, hands-free motion control and personalized presets managed through the app to operate the faucet, control the intelligent toilet, adjust the lighting embedded in a

bathroom mirror, run a shower, or automatically fill a bath to a desired depth and temperature.

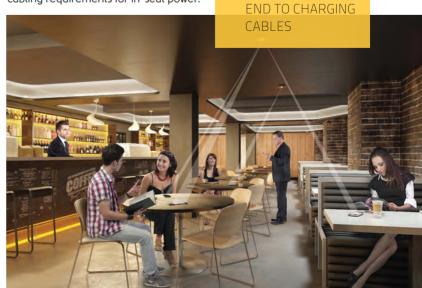
AIRCRAFT APPLICATION: Any idea that reduces the risk of surface contamination and spread of germs is welcome in the cabin, and hands-free control of lav functions, and even galley functions, would be beneficial - as long as people aren't too loud with their commands!

Wi-Charge, a wireless power startup, was showing how it can use infrared lighting to enable full wireless charging coverage within a room. The infrared beams transfer power between a charging hotspot usually mounted on a wall or ceiling for room coverage – and devices within a 10m range. Devices can recharge automatically without any user intervention, and there is no radiation risk; indeed the FDA in the USA has made Wi-Charge the first US company to receive regulatory safety approval for long-range wireless power. Of course, application is not limited to residential use: all manner of businesses and social areas can offer wireless charging hotspots to customers or visitors. Wi-Charge won the Smart Energy category at the CES 2018 Innovation Awards.

AIRCRAFT APPLICATION: Wireless charging technology is now entering the aircraft cabin, with the introduction of charging surfaces on seats. Such infrared technology could take things a step further, providing a great passenger

service as there is greater take-up of wireless charging, as well as reducing cabling requirements for in-seat power.

IMAGINE AN





When you're managing a cabin full of weary passengers, an in-flight entertainment (IFE) systems failure can be a nightmare. At Positronic, we build high reliability power and signal connectors. But our true call is to provide certainty. Rock solid, mission-critical performance upon which you can bank life and limb, family and fortune. We consider it an honor. We consider it an inviolable trust.



Naked ears

C-Lab, Samsung's in-house idea incubation program, nurtures innovative ideas from Samsung employees and supports the most promising ideas with investment and business consulting to help them launch their own startups. Among the C-Lab exhibits this year was S-Ray (sound-ray), a portable directional speaker that enables people to listen to their entertainment without earphones, and without bothering people close by. Directional speakers aren't a new idea, but the S-Ray is a much smaller and lighter package.

IMAGINE NOT NEEDING HEADPHONES IN FIRST AND BUSINESS CLASS

AIRCRAFT APPLICATION:

There have been concept business seats featuring directional sound for IFE in recent years, such as Thales's Immersive Business Class Seat concept, but S-Ray could inspire further development in terms of directional precision, and reduced form factor and weight.



FRIENDLY MOTORING

Byton is a new Chinese car manufacturer that presented an electric vehicle that is half next-generation smart device, half car, with unique digital capabilities and innovative human-vehicle interfaces. The centerpiece of the car is the Shared Experience Display, which extends across the entire 50in width of the dashboard, enabling the driver and passengers to interact with the vehicle. That interaction can be achieved via Alexa voice recognition control, touch control, biometric identification, Air Touch sensors that enable hand gesture control, or even physical buttons.

This platform seamlessly connects the occupants' apps, data and devices, with personalized services and configurations also available, which are

configurations also available, which are automatically adjusted according to users' preferences.



AIRCRAFT APPLICATION: Byton could influence people's HMI and device-sharing expectations within the travel experience. An interesting feature is that

when Byton customers enter another Byton vehicle, the smart technology helps make it feel as if it is their own car. The idea of an aircraft seat recognizing you and adjusting to your preferences is not new, but this car could drive home the benefit. There is even inspiration for end-to-end IFE, as when a Byton owner approaches their car while playing entertainment on a smart device, the car can pick up that content, and continue to play it seamlessly on the car's systems.

MAGIC TOUCH



Vivo grabbed a lot of attention with the world's first in-display fingerprint scanning smartphone. A one-touch optical

fingerprint scanner embedded in the display provides an elegant means of fingerprint authentication that does not require a separate scanning surface, enabling a truly full-screen display. The UI is invisible and does not disrupt the overall visual experience, but when fingerprint recognition is required, a graphical UI appears on the screen.

AIRCRAFT APPLICATION: Such technology could be invisibly integrated into IFE displays and handsets, enabling a convenient and secure way to connect the seat to personal preferences, or to pay for inflight upgrades or retail, all while retaining a slick aesthetic.

IMAGINE CONNECTING SECURELY WITH IN-SEAT TECHNOLOGY WITH NO UGLY HARDWARE



SIROCCO SS



focused on the detail.

Emotional escape

Interaxon showcased Muse, a brainwave-sensing headband that is designed to help users meditate by freeing themselves from physical, emotional and mental obstacles through realtime audio and visual feedback on their meditative state via a companion app.

The meditation technology itself is an interesting possibility for passenger relaxation. But Interaxon's big story at CES was that the company is looking to take the technology further, introducing a software development kit (SDK)

so that partners can create applications that empower users to interact

IMAGINE BFING WHEREVER YOU WANT TO BE

with VR/AR environments using the brain-sensing technology. This neuroadaptive technology detects evoked brain responses to visual, sensory and cognitive stimulation, to improve human interaction with augmented and virtual worlds.

AIRCRAFT APPLICATION: Of course not every passenger would wish to engage this deeply with a machine, but for those that do, even today's longest

16-hour flights could pass quickly if they can spend their time experiencing any environment they can imagine.

HARNESSING DEEP SI FFP

Health technology specialist, Royal Philips revealed SmartSleep, the world's first wearable solution for improving deep sleep quality. According to the company, SmartSleep is clinically proven and builds on more than 2.6 billion nights of sleep data collected by Philips over the past 10 years.

The wearable system emits sound tones that enhance the 'slow waves' produced by the brain during deep sleep. Two small sensors detect when the user is in slow wave sleep. monitoring sleep levels and

> **IMAGINE SCIENCE** HELPING ENSURE THAT PASSENGERS SLEEP WELL



responding with tones if they are ready for a boost. An algorithm customizes the timing and volume of tones to boost slow waves, to make the most of deep sleep.

AIRCRAFT APPLICATION:

This is a clever technology that would be relatively simple to deploy. Anything that could help airlines ensure their passengers get a good night's sleep on board is of areat interest.

IMAGINE IF PASSENGERS

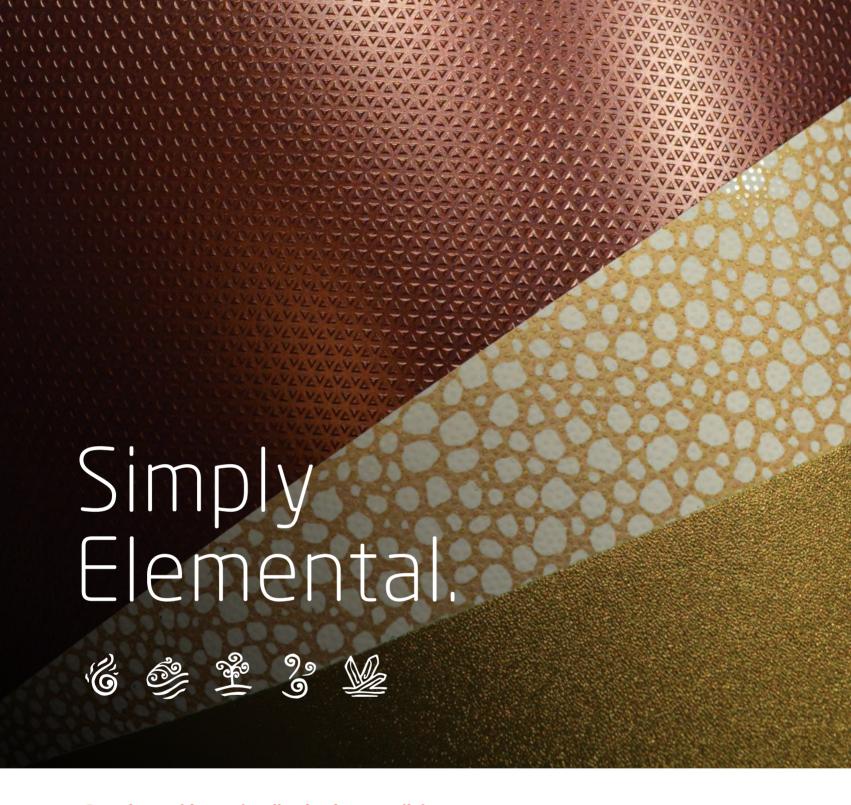
Music therapy

Electroencephalogram brain scans (EEGs) are typically used to diagnose medical conditions such as epilepsy or sleep disorders, but they are also now being explored as a way to detect emotions. This capability could be possible with the EEG headset, a prototype of which has been developed by nano-electronics specialist Imec, and the Holst Centre research hub.

The headset can measure emotions and cognitive processes in the brain and then, using Al technology, the headset can learn the musical preferences of the wearer and play appropriate music to influence their emotional state. For example, if the system detects the wearer is stressed, it can play their favorite happy music via Bluetooth to help them relax.

AIRCRAFT APPLICATION: The researchers are looking into applying the technology in immersive gaming, but it provides could potentially be turned into a happier, more contented feeling: great for the passenger, and indeed their fellow passengers and crew. The headset hardware could be suitable for long-haul travel as it is more comfortable and uses less power than typical medical headsets, and as it is pre-fitted with electrodes, it can simply be slipped on, with no need for expertise in electrode placement.





Experience this year's collection in a new light.

For the Aircraft Interior Expo in Hamburg, we are introducing Schneller's 2018 design collection. Inspired by the elements, "Simply Elemental" takes its cue from the natural world and the five elements: fire, earth, air, metal and water.

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Learn how we can help you deliver unique and beautiful floor-to-ceiling finishes for your cabin interior.











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Let's collaborate at WTCE Hamburg 10-12 April 2018, stand 4D50.





Retro cool

TAP Air Portugal is celebrating its 70th anniversary by offering flights with a holistic retro concept featuring past liveries, 70s-style crew uniforms designed by Louis Féraud and 1970s content on the IFE – and even check-in and meal service have a retro feel, as do the Executive Class amenity kits. The cotton canvas 'Retrobag' with leather trim contains a number of traditional cosmetic brands and other items from Portugal.

"We had to go back in time to create an authentic retro version of an amenity kit, and at the same time, we had to satisfy a modern customer," recalls Wolfgang Bücherl, managing director at Skysupply, which created the kits.

The full TAP anniversary experience includes everything in a retro style, from the boarding card holder, flight certificate, souvenir postcard, period covers on the newspapers and UP inflight magazine, and even the headrests, tray mats, crockery and meals. Coca Cola and Sagres Beer is served in glass bottles with period labels, to complete the retro feel.

GUESTS IN EMIRATES' NEW B777 FIRST CLASS SUITES ENJOY THE LAP OF LUXURY, AND TO TOP OFF THE EXPERIENCE THEY RECEIVE AN 'INSPIRATION KIT', WHICH FEATURES AN INFLIGHT WELLNESS COLLECTION FROM EUROPEAN LUXURY BRAND BYREDO, EXCLUSIVE TO EMIRATES. THE SWISH KITS INCLUDE A TOWELETTE, FACIAL TONER, EYE CREAM, PILLOW MIST AND SLEEP OIL. PASSENGERS FEELING RELAXED AND INSPIRED CAN USE THE NOTEBOOK AND PEN TO JOT DOWN THEIR TRAVEL MEMORIES AND IDEAS FOR THEIR TRIP

JAPAN AIRLINES HAS COMMISSIONED ETRO, THE INTERNATIONAL ITALIAN FASHION HOUSE FAMOUS FOR ITS BOLD AND COLORFUL PATTERNS AND ITS FRAGRANCE COLLECTION, TO DESIGN KITS FOR ITS FIRST AND BUSINESS CLASS PASSENGERS, IN COLLABORATION WITH WESSCO. WITH THESE EXQUISITE BAGS, JAL IS THE FIRST AIRLINE TO FEATURE ETRO'S UNIQUE STYLE. GUESTS WILL ALSO FIND THE BRAND'S RECENTLY LAUNCHED SHANTUNG FRAGRANCE WITHIN THE BAGS



what makes a great amenity kit?

"Well thought-out brand collaborations are key to creating programs that go beyond the status quo and excite tomorrow's traveler"

Petros Sakkis, chief marketing officer, Wessco

Star treatment



The aisles are alive, with...

There is a distinctly Von Trapp Family vibe to Austrian Airlines' latest kit, which draws on the fantasy of hiking Austria's beautiful Alps wearing lederhosen and Tyrolean hats. It may be a stereotype, but these qualities are packed into 'myAustrian Rucksack', a backpack-style kit.

"We created a small, lovable backpack that reflects Austria as it is perceived worldwide," says Wolfgang Bücherl, managing director at Skysupply, which created the kit.

The gray-red-white colorway gives a nod to the country's colors, while its felt fabric is associated with 'Gemütlichkeit', an Austrian term for comfort and warmth. The material draws on Austria's history, as felt was traditionally used for clothing, from hats to shoes. A neat detail is the Edelweiss flower pin attached to the front of the backpack, which can be a keepsake, badge or brooch.

KITS WITH HEART

While Austrian's kits are inspired by Alpine living, Lufthansa has taken the world-famous Oktoberfest as inspiration for its latest limited edition amenity kits, created with Spiriant. The heart-shaped, faux-leather kit embraces the fun, celebratory side of German culture, but the contents offer serious luxury, with a range of La Prairie skin products. The kit is fun, multifunctional, limited edition and covetable: everything an amenity kit should be, as Lufthansa says.

Visit our
website for
regular amenity
kit updates and a
guide to creating
a great kit



"A crucial part of an enhanced passenger experience is to enjoy the unexpected. You have to remember that frequent flyers receive the same type of amenity kits all the time and that's why a truly exceptional amenity kit should be exciting, special and surprising; a kit that goes beyond typical expectations and makes customers smile"

Addy Ng, director of amenity kit design, Spiriant Asia Pacific



First class passengers with Malaysia Airlines now receive something that goes beyond the amenity kit, being what the airline describes as "a gift collection". The collection includes a midnight blue sleeper suit with red trim and a pullover top, a range of accessories, and a souvenir gold key chain – and of course, amenity kits. The 'his' and 'hers' kits include a fragrance, and skincare products by Payot, a luxury

cosmetics brand that specializes in scientific formulas.

The gents' kit is a pouch, while the ladies' kit is a charming purse-style pouch. Both are available in black or navy blue, with a contrasting red lining that brings out the airline's signature color.

Malaysia Airlines created the kits with Formia, and encourages its first class passengers to keep the items as a luxury reminder of their flight experience.





FEELTHE REVOLUTION

TOUCH THE FUTURE

Visit the Ultrafabrics® Takumi Gallery in Tapis Booth 7C20 at AIX in Hamburg





Introducing Alessi

Iconic and quirky Italian homewares brand Alessi has entered the airline market, creating a stylish and functional line of service products and tableware for Delta's Delta One, First Class and Delta Premium Select cabins. The range, which was revealed in New York's White Space Chelsea Gallery no less, includes flatware, cutlery, glassware, ceramics, tabletop accessories such as napkin rings, salt and pepper shakers, servingware and trays.



what makes a great amenity kit?

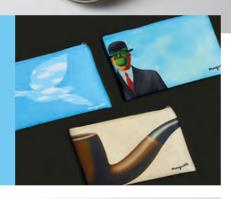
"Sophisticated travelers want a touch of luxury, comfort and effortlessness to enhance their journey. The most coveted amenities are those that bring an element of surprise and inspiration to travelers, such as clever accessories and luxurious gifts that are treasured throughout the journey and beyond"

Leonard Hamersfeld, director at Buzz



CECI EST UN KIT

Art lovers are in for a treat on board Brussels Airlines, as its latest business class kits are inspired by Belgian artist René Magritte. Launched to coincide with the 50th anniversary of the artist's death, the airline worked with Galileo Watermark to design neoprene bags featuring Magritte's major works.



CULTURAL KITS

Art lovers will also appreciate the Qantas Curates range of amenity kits, which feature work selected by professional art curators from leading Australian artists, photographers and digital influencers, in styles including pop culture, photography, fine art, abstract landscape, indigenous art and textile design. These brightly colored kits are highly coveted, and highly collectible too, with 16 different designs available (eight for men and eight for women), with two updated designs being launched every few months until April 2019. The kits, developed with Buzz Products, include Aspar by Aurora Spa skincare items.



Fresh arrival

To celebrate Singapore Airline's 70th anniversary, a limited edition amenity kit was gifted to Suites, first and business class passengers, in a collaboration with The Laundress, a New York-based company that specializes in an eco-friendly line of detergent, fabric care and home cleaning.

The amenity kit features 'Crease Release' to help keep clothing looking sharp, 'Fabric Fresh' so clothes arrive as refreshed as their wearers, and a 'Wash & Stain Bar' in the event of any dining mishaps. The kits, developed by Buzz Products in two versions, also include items such as lip balm, hand cream, hand sanitizer and a loofah in travel sizes that are useful for onward journeys.



march 2018

Rescue package

Swiss International Air Lines (SWISS) is prepared for the worst, with special amenity kits on standby for passengers who require an unexpected overnight stay due to flight delays and rescheduling. The overnight kit is offered as a token of appreciation and understanding for inconvenienced travelers in circumstances beyond the airline's control.

The kit, developed with Formia, is a lightweight, two-tone nylon pouch with soft faux leather handle. Offered in his and hers versions, both feature an assortment of grooming essentials and toiletries by the cosmetics and lifestyle brand Acca Kappa. This reusable kit includes a T-shirt and a drawstring bag that can be used to store other travel items or laundry.



From the ocean, for the ocean

Research collated by Galileo Watermark suggests that by 2050 there will be more plastic in the ocean than fish.

As Kenny Harmel, head of aviation at Galileo Watermark, says, "The statistics are as worrying as they are impelling. The aviation industry is a significant contributor to plastic waste and our airline partners are working toward more sustainable options across all aspects of their sourcing requirements."

The company's contribution to reducing the problem is OCN plastic, a sustainable alternative to standard recycled plastic and to the creation of more virgin material. Plastic reclaimed and repurposed from oceans, seas and waterways can be recycled and repurposed, and indeed Galileo Watermark is doing so to create plastic cosmetic packaging for its OCN cosmetic

FOR 2018, PREMIUM ECONOMY FLYERS ON QANTAS B747s AND A380 SERVICES RECEIVE A KIT DESIGNED WITH AUSTRALIAN LIFESTYLE BRAND COUNTRY ROAD. THE DESIGN IS STYLISH AND SIMPLE, THE CANVAS BAG FEATURING A SIMPLE PRINT WITH A WHITE AND GOLD FOILED LOGO AND INCLUDING A BRANDED FYE MASK



range, the first launch in its ocean recycled plastic collection.

The next stage for the company is to introduce a textile range and a hard plastic range suitable for meal service, showing that ocean plastic is not merely waste but a resource.

To ensure OCN products do not end up back in the ocean, Galileo Watermark is working with travel hospitality partners to develop an infinite lifecycle, by creating

a closed-loop solution that will collect, re-recycle and repurpose the plastic.



what makes a great amenity kit?

"Understanding: in order to deliver a considered concept that will resonate across the board, both aesthetically and commercially, we need to know our customer and their customer. This understanding enables us to design something beautiful yet functional, select the appropriate materials, include the right contents and choose relevant brand partners"

Paul Hunter, global sales director, Galileo Watermark



A DOUBLE BLOW

The run of a highly coveted United Airlines kit ended in January. To mark the end of the airline's B747 operations, a series of jumbo-themed kits were presented to Premium Transcon and United Polaris flyers, B747 branded items and a selection of trading cards featuring images of United's B747 aircraft through the years. Customers could collect all 15 cards in the series to complete their set. It's a fond farewell to the aircraft, and the kits. If you loved United's classic B747s, see p276.

Many kits will be launched at WTCE. For more details, see p156 and p220

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Try these kits for yourself at WTCE

YOU CAN SAMPLE MANY OF THE LATEST AMENITY KITS AT WORLD TRAVEL CATERING & ONBOARD SERVICES EXPO IN HAMBURG, GERMANY, FROM APRIL 10-12. HERE ARE A FEW HIGHLIGHTS...



ART COLLECTION

At this year's WTCE, Anaik will be presenting a fresh, cutting-edge and stylish range of products to enhance passenger comfort. Following the current trends for kits in metal boxes, Anaik has developed what it promises will be "an eye catching, vivid and unconventional

'art collection'". The kits include items that have been developed with a particular focus on the environment, as you can find out at Stand 4A68.





ORANGE AND THE NEW BLACK

Visit Bayart Innovations' stand (4E100) to get your hands on City Dream, a unisex rubber bag that offers strength and easy cleaning, as well as a little style. The city names on the pouches, which can help advertise an airline's destinations, are crisply finished thanks to a laser cutting process.

The pouch contains an eyemask, earplugs, comb, toothbrush, nail file, mirror, and socks, all of which can be ordered in an airline's corporate colors. To help an airline's green image, the accessories are manufactured from bamboo; better still, the stylish design will encourage passengers to keep the pouch after the flight.



QUELLE SURPRISE!

Trendy colors and chic patterns combine for the creative new comfort kits for Air France guests. Premium economy passengers receive a soft kit in felt fabric, ideal for the winter season, with the iconic Air France brand accent lifting the look. In business class the kits have been inspired by arabesques shapes and baroque influences, containing Clarins cosmetics and sustainably sourced toothbrush, comb and shoehorn made from corn starch.

Air France commissioned Albéa Travel Designer (Stand 1A50) to design the kits, as well as to coordinate the supply chain, from product sourcing and purchasing, to logistics and quality control.

what makes a great amenity kit?

"It should include products that provide passengers with an uplifting onboard experience. The amenity kit is a distinct part of the overall experience, so it is essential that the offering is a perfect match between high-end products, co-branding and a stylish, unique concept"

Sylvie Lee, business development manager – travel, Anaik



As well as the rubber pouch design (see above), Bayart Innovations is introducing a smart business class kit made from a single piece of polyurethane, with no stitching. The kit is smooth on the outside and grainy inside, and Bayart says the finish is of such high quality that it could be used as an evening clutch bag at the destination.



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Meet Lantal's newest innovation and ingenious alternative to all known leather and artificial leather products: TEC-Leather. Its soft touch and excellent thermal properties deliver a stunning improvement in passenger well-being. The high-quality material features ultra-convenient cleanability paired with extraordinary resistance to stains and dirt. It reduces laborious cleaning and maintenance of seat covers to a minimum.

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A multifunctional space

"Appearance and refinement will be key drivers in the galleys market," predicts Ross Burns, group lead industrial designer at AIM Altitude.

"There will be a strong emphasis on aesthetics, with branding features and disguised functionality helping to blend the galley with the rest of the cabin. To achieve this frequent transformation from an attractive entrance area to an operational galley will require clever engineering and innovative use of materials, with robustness and reliability being crucial.

"In the aisle, galleys are likely to incorporate more of a 'shared space' or multifunctional area, enhancing the passenger experience and introducing strong branding elements with integrated, customized panels."



Galleys can also
serve as social
serve as social
spaces. Find ideas
spaces. Find in the
for the future in the
for the future section of
Features section
our website

SYLVIA SYNERGIES

Diehl has created the Sylvia concept to achieve more flexibility and customization in the entrance area. The concept, developed for single-aisle aircraft, combines the lavatory and the galley monument in one module, using systems synergies.

The combination of the lavatory with the 'wet' area of the galley requires only one interface for common water, water waste and electrical systems, which saves weight, cost and installation time. The wet galley area includes

standard functionalities such as sink, waste disposal, beverage makers, ovens, Atlas containers and three half-size trolleys.

The module is fitted on the right-hand side of the cabin, and the free space generated on the left side can be used for various purposes, serving as a great opportunity for airline customization. For example, the free space can be used for additional stowage (of trolleys, for example), a bar module, a welcome desk or a self-service terminal.



Added intelligence

According to Günter Müllers, Bucher's director of galley sales and program management, inspiration comes from close to home – indeed within the home – as he notes that the equipment installed in domestic kitchens is becoming more modern and more intelligent, and serves to make our workload easier.

"We do not expect a revolution in terms of galley design, as the trolleys and containers of the catering industry are pretty much standardized, but we will see next-generation equipment," says Müllers.

"We need to allow communication with the cabin management system, with software in place that supports health monitoring and allows proactive exchange of equipment. Maybe galleys could have intelligent content management systems that tell you where to find items, how many drinks need to be reordered for the next stop, and how many of each meal are left, for example.

"Also the galley is the first thing passengers see when entering the cabin, so it is the perfect place for displaying branding logos and welcoming guests. To maximize this opportunity we will see combi-monuments providing galley space, a self-service bar and display opportunities."



Visit the Features section of our website for more ideas and views on the future of trolleys



Five-year plan

"I strongly believe in innovation in aircraft galleys, and the equipment race is one that everyone must compete in to prevent obsolescence," warns Lucio Iacobucci, chairman and CEO of lacobucci HF Aerospace.

"The next five years should be driven by two main factors: first, environmental sustainability through the optimization of galley waste and recycling processes; and second, improved reliability of galley systems through better water quality for galley inserts."

HELP YOURSELF



Unique service offers differentiation potential for airlines, and Philipp Emmert, an industrial design student from the Methusius Academy of Fine Arts & Design in Kiel, Germany, believes his holistic Food Service Experience concept offers an opportunity.

After checking in online from the comfort of their home, passengers can

select their inflight meals. Once at the airport, after the security check, they receive a personal travel bottle that they can refill on board the plane at one of the service units. When they are ready to eat, they collect their meal at the service unit and heat it themselves with the press of a button. At the destination airport, passengers can refill their travel bottle.





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a system to make meal
service easier and safer.
service easier and safer.
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Quick swap

We asked Jose Pevida, SVP of engineering and product development at HAECO Cabin Solutions for his views on the future of galley design.

"The next generation of galleys will introduce a configurable structure that will allow operators to quickly change inserts to match different seasonal and route needs. This configurability can be achieved by designing into the product a high level of modularity," he states.

"The next generation of galleys will also include health monitoring systems that would allow the operator to predict insert failures, and these systems will be connected to airlines' maintenance operations using global satellite communications. This will ultimately lead to unprecedented levels of insert reliability."

THE CASE OF THE CA

CABIN SERVICE COULD BENEFIT FROM CREW WEARING ALTRAN'S SMARTWATCH, WHICH ENABLES THEM TO CONTROL CABIN SYSTEMS, COMMUNICATE WITH OTHER CREW AND ACCESS FLIGHT INFORMATION. ALL THESE FEATURES CAN BE ACCESSED FROM THE WRIST, SO CREW CAN ASSIST PASSENGERS WITHOUT NEEDING TO RETURN TO THE GALLEY



FUTURE VIEW

Space could be created and weight saved by removing the forward-facing cabin attendant seat. But how can this crew viewpoint be removed without compromising cabin safety? The solution has been found by Lufthansa Technik and Latécoère with the Direct View Camera System, a camera system for the A320 that enables crew sitting at the rear exits to maintain a direct view from the front of the

cabin via a screen. The creators say that the system not only maintains safety while reducing weight and maintenance, but improves safety, as a night vision feature (EASA approved) gives crew a clear view of the cabin in the dark.

The system can provide more functions, such as e-galley content management as well as showing passenger-related information such as food allergies.



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DRAWS FROM WATER EITHER
FILLED ON THE GROUND AFTER
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ONBOARD WATER SUPPLY BY
MEANS OF A FILTRATION SYSTEM

There will be galley and other monument launches at Aircraft launches Expo. See p180 Interiors Expo. see p180

MAXIMIZE SPACE

Many airlines don't use ovens on short-haul flights, meaning the ovens are either carried as dead weight, or removed and the galley slots covered by a panel, wasting the space behind. Diehl Comfort Modules' solution is the newly developed Plug'n Stow Module, which is a drop-in replacement for any standard Atlas oven or fridge.

Items such as emergency equipment can be kept in the module, freeing up overhead bin space. The module is retrofitenabled as no modifications are required. It uses the mechanical attachments of the oven and can also use the power interface, which enables electronic devices to be charged in the module.

DIEHL

Interested in galley concepts?
See p112 to find out how some past designs have progressed

NON-POLITICAL GLOBAL THINKING

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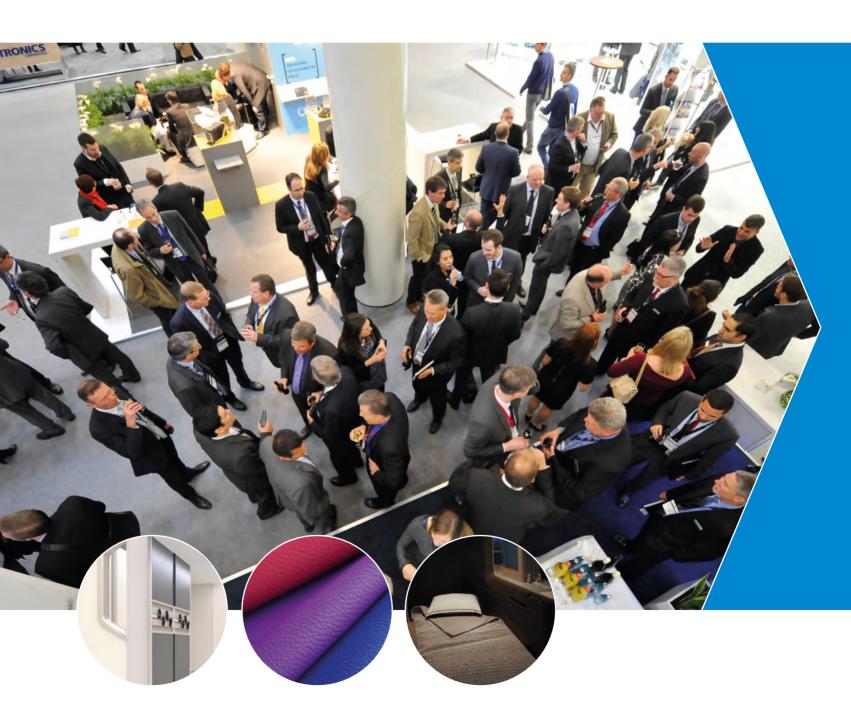






AIRCRAFT INTERIORS

EXPO 2018 The inside track on the launches and reveals taking place at Hamburg Messe on April 10-12 at the world's largest aircraft interiors event





STAND: 2U60 & 2U75

A one-stop shop for interiors design

The UK is the world leader in aircraft interior design, with six of the top 10 design agencies in London alone, including Tangerine, Acumen, Factorydesign and JPA. Match this with an agile supply chain drawing innovation from automotive, transport and maritime, and the UK enables airlines to keep their passenger offer innovative and unique.

This collaboration between manufacturers and UK designers has delivered the world's first lie-flat beds, safety lighting in over 11,000 aircraft, and the horseshoe bar on Emirates' A380s.

At this year's expo, the UK's Department for International Trade (DIT) will be launching a 'one-stop shop' for airline interiors, which will integrate several UK design agencies. For the first time, the DIT can also help with flexible finance through the UK's Export Finance credit agency.

Big reveals in store

At this year's expo. Recaro Aircraft Seating will be showing its latest product developments to meet market demands for creative ideas and customization. With its new short- and medium-haul economy class seat. Recaro claims it will introduce a "benchmark weight" as well as setting standards in terms of modularity in single-aisle aircraft. The lightweight seat with its premium design enables very efficient adaptation to all cabins and applications.

Recaro has also added new features to its long-haul business class seat, and will be demonstrating its design expertise in what it promises will be



PREMIUM SEATING MUST-SEES...

STAND: 7A30

R&T reveals at Stelia

As well as new seat designs, Stelia Aerospace Cabin Interiors has been developing new tools to define its premium seats, which can reduce lead times and simplify the selection process, and aid customization and co-development for new products.

Recent work at Stelia Labs will also be revealed, with the company's research and technology team currently working on new concepts ripe for co-development, and high-tech solutions to improve the passenger experience and operational planning.

Stelia will also display its latest premium seats such as Opal, which will soon be flying with three customers in the Africa and Asia-Pacific regions. Opal will be shown alongside Celeste and Solstys III, which had their flying debut in 2017.

Single-aisle luxury

The increasing range of the latest generation of single-aisle aircraft is driving passenger demand and expectation for a comparable business class experience to airlines' wide-bodied aircraft, including a full lie-flat bed. Visitors can experience one of the latest single-aisle beds for themselves: Thompson Aero Seating's full-lie flat business class seat developed for flydubai – Thompson's first Boeing 737 customer, for the MAX fleet.

The seat is a highly customized version of the Vantage model, with well-considered stowages, "best in class materials" and a 15.6in HD touchscreen. More details can be found on p16.

flydubai is the first commercial airline to install a full lie-flat bed on a B737 MAX and follows in the footsteps of jetBlue, which successfully rolled out narrow-body beds in the 'Mint' cabin on its A321 fleet - another highly customized version of the Vantage seat, including suite doors.





Geven's latest response to the newest quirks of high density comfort seating.
Light and tight - Essenza's little body is all that you need to carry passengers in comfort inspite of the smaller pitches.
Essential in design, but substantial in reliability.

Conceived for the short haul - its life cycle is one you can count on for the long haul.



Fly beyond expectations

www.geven.com



Economy seats with a premium feel...



EXCITING TIMES AT MIRUS

Mirus will be showcasing new developments of the Hawk economy seating platform, further demonstrating, as Mirus says, that the young seating company is "here to stay". The design of Hawk draws on Formula 1-derived engineering and automotive technologies for industrial reliability. The result is a seat that balances performance, value and durability, while maintaining a premium feel and high-end design.

The modular platform can be configured to fit any economy class seating requirement, and at the expo Mirus will present a range of new options (including various IFE and power systems as well as storage and comfort options) alongside examples of seats for multiple aircraft types (A320, A330 and B737).

STAND: 6B30

STAND: 1UB30



STAND: 6C110

A HOLISTIC CABIN EXPERIENCE

This year, EnCore will be showcasing products from its seating company LIFT, and also EnCore Interiors: the first time both companies' products will be presented side by side, highlighting EnCore's ability to tie cabin elements together.

LIFT's Tourist Class Seating, coupled with EnCore
Interiors' products, creates a full cabin experience that
includes seats, galleys, branding elements, class dividers
and overhead bins, for both narrow- and wide-body aircraft.
Having recently delivered to its launch customer, LIFT will
have a production version of 737 Tourist Class Seating on
display, along with the latest iteration of its B787 Dreamliner
Tourist Class Seating, which garnered much attention at last
year's show. Both seat designs have matured since previous
years' prototypes, and LIFT is excited to show off its first
narrow-body product in-flight, along with an
enhanced wide-body seat, available

STAND: 5C20

SERIES 6 GETS UPGRADES

Acro will be exhibiting the latest developments in the 'Series 6' range of economy class seats, which is available in fixed back and reclining versions, as well as new refinements to its 'Series 7' single-aisle premium seat. Acro is saving the details for the big event, but states that the developments will follow the company's ethos of 'simplicity through design' for passenger comfort, a sophisticated appearance, generous legroom, light weight and durability.

Visitors can also visit Acro's specially designated innovation area, where experts will offer a glimpse of how to perfect comfort for both economy and premium class in the future.



ESSENCE-IAL VIEWING

Visitors to Geven's stand can try out the Essenza seat, to get a feel for the future Flynas narrow-body experience: this Saudi Arabian low-cost carrier is the first airline in the world to fit the Essenza seat on the A320. The Essenza economy seat will be fitted on Flynas' new fleet of 60 A320NEOs between Q3 2018 and 2026, in a 174-seat

configuration, with 'convertible' seats in the first four rows as premium seats with a vacant center seat and custom cocktail table.

Essenza (Italian for 'essence') is available in two variants: pre-reclined for high-density configurations and reclinable (up to 6in), with a width of 18.3in between the armrests. Features include a primary structure designed to maximize shin and knee clearance and to optimize weight; lightweight cushioning and an ergonomic seat design for comfort; and an ultra-slim backrest design to increase knee clearance at short pitches.



to new customers for both

line-fit or retrofit.





Triple reveal

Remember the headline-hitting Skyrider seat by Aviointeriors? Don't miss this opportunity to try out Skyrider 2.0, an evolution of the original 'saddle' seat first revealed in 2010. The semi-standing nature of the seat enables a very high-density cabin configuration, which Aviointeriors believes represents the potential answer to markets where the fifth percentile of population is the majority and where low fares are demanded. The seat can accommodate fifth percentile passengers at a 23in pitch to create what Aviointeriors calls 'SuperEco class', suitable for low-cost carriers flying short-haul routes.

The company is also expanding its premium economy range, with a new seat joining the Columbus Four model. Aviointeriors says the levels of comfort, personal space and storage in this seat put it at the top rank of premium economy seats.

A new long-haul economy seat will also be unveiled, designed in accordance with ergonomic studies. You may note the premium and economy seats have not been named: their names will be revealed at the expo, and will be inspired by famous Italian people.

SANTO Seat

Every passenger should have a great flying experience, and to help ensure the youngest and larger passengers are cared for, the SANTO seat is worth a look. Standing for 'Special accommodation needs for toddlers and oversized'. this Crystal Cabin Award-winning seat concept has been developed by SII Deutschland, the German subsidiary of the international engineering and IT corporation, SII Group.

SANTO is based on the concept of maximum space usage in the aft of an aircraft cabin, taking advantage of the unused space often found between the last seat row and the aisle in the tapered section at the rear of the cabin. The concept introduces a 'one-and-a-half' sized seat, including a fully retractable armrest, which offers enough seating space for two grown-ups and a child seat, or for travelers in need of more seat width.

Operators and travelers alike can benefit from the concept, as for a moderate surcharge, the safety of traveling infants can be considerably increased and the comfort of travelers with special requirements can be drastically improved. According to SII Deutschland, the seat is attracting a great deal of interest, particularly as it fits the layout of any airliner.

STAND: 1UB50

Sideways thinking

Molon Labe has hit the headlines in recent years with its Side-Slip Seat, with the aisle seat sliding over the middle seat to enable faster boarding. The team has been busy developing a further two economy seat models, which are also innovative.

The fully tested and market-ready S1: Space Seat will be unveiled, a slimline seat that is a non-sliding, lighter version of the Side-Slip Seat that targets the short-range market and offers several unique features derived from the staggered design. These features include a 3in wider middle seat, extra lateral space for all three passengers in a triple, staggered/delineated armrests that solve the dreaded 'elbow wars', four USB outlets per triple, and a latchless trav-table.

A mock-up of the S2, Stagger Seat will also be displayed. This long-range economy seat is suitable for both wide-body and narrow-body aircraft. The increased lateral space offered by the patented design offers greater cabin density with comfort to airlines operating wide-body aircraft, such as an 18.4in-wide seat on a nine-abreast B787, or a 10-abreast A350 that maintains a seat width in excess of 17in.



STAND: 5A30

Sii Deutschland won a 2015 Crystal Cabin Award with its SANTO concept



Codename S:4

Building on the Crystal Cabin Award-winning success of the S:two seat, Rebel.Aero will this year again be launching a revolutionary new economy class seat. The company says that its latest model, currently codenamed S:4, is an ultra-lightweight, low cost, easy-to-maintain economy class seat that will bring new levels of passenger comfort by means of a unique, previously unseen flexible seating configuration.

The design of the S:4 is based on previous show feedback from Aircraft Interiors Expo and it has been developed to meet all the requirements that airlines and OEMs have requested of future seating from Rebel.Aero.

STAND: 7A45

ROYALUX

ROYALUX A NEW INNOVATION FROM TSI AIRCRAFT SEATS

COMFORT & STYLE IN BUSINESS CLASS









STAND: 1020

LINEAR MOTION

Faulhaber is expanding its range of linear DC-servomotors for small and micro linear motion applications. These motors combine the dynamic motion performance and robust design typical of a pneumatic system with the high reliability and silence of a brushless motor.

The new LM 1483, with a continuous force of 6.2N and a peak force up to 18.4N, combines highly dynamic motion (acceleration up to 220m/s²) with high precision and repeatability (down to 120µm and 40µm, respectively).

GEVEN TO OPEN WEB PORTAL C

Since the 1990s, aftersales service has been one of the key factors in Geven's success. The company believes in listening to customers and in the importance of a close relationship with the customer base – a base that is considerably wider than it was in the 1990s.

To maintain a personal relationship with its growing customer base, Geven has adopted a web-based platform to improve the post-delivery customer service experience: the Web Portal. This dedicated portal supports the customer service team, enabling them to provide a personalized service. Customers can also use the platform to check spare-parts inventory and delivery status, to have easy access to engineering support, to manage warranty claims, and much more.

The Web Portal also helps the aftersales team to monitor customers' status, quickly managing requests or issues.





Seating innovation behind the scenes...

GRP GUIDES

Motion plastics specialist Igus has expanded its Drylin W modular system, with the option of linear guides with rails made of glass-fiber-reinforced plastic (GRP). This metal-free alternative helps save costs and weight in the overall construction.

As well as having lower weight than metallic alternatives, GRP also has a very high media resistance, and is non-magnetic and cost-effective. In order to expand its Drylin W modular system for linear technology, Igus has developed a GRP rail on which a plastic carriage is used.

The Drylin W profile made of glass fiber is 20% lighter than aluminum and 70% lighter than steel," says Stefan Niermann, head of the Drylin linear and drive technology division at Igus. "At the same time, it is also 50% cheaper than carbon, which means that our GRP linear guide system is an alternative for use in vehicle and aircraft

STAND: 6A71

SECOND LIFE FOR SEATS

Affectionately nicknamed the 'eBay of aircraft seats', aviationgate says it enjoyed a successful 2017, and expects an even better 2018.

As Marcel Jansen, partner at the company, says, "2017 was a successful year for us, with sales nearly double the year before. That was thanks to completing 25 projects, such as buying, importing and refurbishing eight shipsets of A330 seats in Asia and reselling six of them, as well as introducing new activities, such as end-of-life projects and spare-part sales."

In addition, the company sold shipsets of B777 economy class seats, B737NG shipsets in a 189-seat configuration, and several Recaro 3510s for A320s.

Plans for 2018 include enlarging the hangar floor at its base in Germany to accommodate three full economy class wide-body refurbishment projects, increasing storage capacity, opening storage locations

in Latin America and Asia, and adding more part-145 partners by year end.



EUROPEAN AVIATION

Flying Further

Founded in 1989 European Aviation currently owns a number of aircraft and has previously operated and modified interiors on Boeing and Airbus aircraft.

The organisation has operated a Formula 1 team, a charter airline and has bases in Ledbury, Bournemouth and Indianapolis in the USA.



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STAND: 5D60

INNOVATION GALLE'

Visitors to Bucher's stand can experience a new space-saving galley and front-row monument combination, which combines passenger comfort with the functionality required for catering. The lightweight galley has been optimized for maximum storage space.

A newly designed 'innovation galley' will also be on show, which includes modular and exchangeable branding panels and storage options. In combination with the SkyDrinx coffee and beverage dispenser, the galley can become a self-service bar unit. This galley will also feature a new way of storing and handling refrigerated food, an energy- and space-efficient solution claimed to substantially reduce the costs of the airline catering.

As in previous years, Bucher will also present a variety of sleek IFE and tray table deployment systems with improved reliability, simplicity and feel. These proven mechanisms have found application in premium aircraft seating such as first and business class, and in private jets.

Bucher's lightweight, bionic partition wall is also worth seeing. The

Deliciously good galley ideas...

Welcomes you at

PROTOTYPE GALLEY

A new galley project will be revealed by AIM Altitude, which it says will bring together innovation, functionality and form. Heeding the requirements of airlines, crew and passengers, the company's designers and engineers have created a prototype galley with creative and resourceful features that will improve the flight experience for all.

Richard Bower, CEO of AIM Altitude, explains, "The galley is often the first

impression passengers receive of the airline when they board. As such, we are finding greater demand for galleys that are practical but also elegant and, of course, well made. We have applied some imaginative thinking and clever engineering to craft a galley that works on all levels. There are some inventive touches and displays of craftsmanship that should create interest in the industry."

AMALTITUDE

AIM Altitude is

STAND: 7BO1





CLEVER IDEAS FOR THE CABIN...

STAND: 2UO4

Transparent mirror

Attracting the attention of passengers during a flight can sometimes prove challenging – so how about a mirror-come-screen, that conceals flight information until needed? This is the thinking behind AviationGlass & Technology's (AGT) transparent glass mirror.

Signs, lighting and LCD displays are integrated behind the ultra-thin mirror so that the surface remains translucent when switched off.



A capacitive button enables lights to be switched on and off.

When it is time to show communications such as passenger announcements or even advertising, the mirror suddenly becomes a display screen, attracting the attention of passengers.

"Meaningful innovation is our mantra when it comes to the creation of technical features, says Jaap Wiersema, COO at AGT. "Possible applications are integrated screens in bulkheads or in lavatories for advertising and passenger communications including 'close the door' and 'return to seat' signs. The possibilities are endless."

STAND: 6A79

Brand panel benefits

Cabin branding specialist, ABC International has secured new airline contracts with Jazz Airlines for branding elements to be installed on its Bombardier fleet, and with Air Canada for a panel bearing its iconic maple leaf logo to be installed on its B737 Max fleet in line-fit collaboration with EnCore. Other new partnerships for ABC include satin anodized aluminum brand panels for TAP Air Portugal's narrow-body Airbus fleet, and decorative panels for Pegasus Airlines' A320 NEO aircraft. See p263 for more details.







STAND: 6F60

A helping hand with baggage

In response to increasing demand from passengers for carry-on luggage, airframers and interiors manufacturers have developed larger overhead stowage bins capable of carrying more luggage. Unfortunately, in some cases this has resulted in bins that are difficult to close when full.

To address this problem, ITT Enidine has developed a fully mechanical weight-sensing lift-assist mechanism, which engages automatically when the weight of bin luggage requires extra force to be closed. The mechanism does not require passenger interaction to engage the lift-assist, relying solely on the weight of the contents of the bin to activate the mechanism. The lift-assist also automatically disengages when the weight in the bin is reduced. This enables the bin to open fully when only a light bin load exists. The mechanism can be engineered to suit specific aircraft overhead bin applications.

"This product is what the industry has been asking for, and we're proud to bring it to the market," says Ryan Evans, aerospace product manager for ITT Enidine.





Program Research

Our engineers will define system requirments, scope of work; as well as, provide pricing and recommendations.

Program Management

Global will manage all program vendors, reduce program schedule and risk with program metrics.

Integration Engineering

An experienced engineering team with airline industry experience will take system maintenance into consideration during program design. Furthermore, the best design practices will be utilized in order to provide the most efficient and safest system installation.

Certification Management

Global will manage the certifiction hurdles by using experienced DERs and our close working relationship with the local ACO. Our DERs possess special approvals allowing for quicker solutions.



Installation Support

We will have on-site engineering and DERs to manage system installation and testing.

Ongoing Support

Global will provide continued support of systems once the aircraft returns to revenue service: as well as, ongoing management to ensure customer satisfaction.

Global Aerospace Design Corp www.gadc.aero

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STAND: 6A60

LEKI SECURES NEW DISTRIBUTION DEALS

Leki Aviation has announced an exclusive distributorship with Rhine Air for its fuel tank ventilation and respiratory protection equipment. These ventilating systems and protection equipment are ideal for both fixed-base and AOG operations.

The company is also offering a new emergency locator transmitter (ELT) from Elta, which includes some of Leki Aviation's performance-boosting ELT accessories.



Company news to keep you in the loop...

BRINGING TALENT TOGETHER

For 2018, the Department of Automotive and Aeronautical Engineering at the Hamburg University of Applied Sciences (HAW Hamburg) has changed its strategy for exhibitions. The university has, in previous years, focused on attracting potential students, but this year is also looking to attract more companies who are interested in current students and graduates.

Interested companies will be shown the content of the syllabus and how students learn to apply it. HAW Hamburg wants to work as an interface between students and possible employers. On the one hand, students have to pass their internships as well as student research projects, while graduates are seeking businesses where they can apply their knowledge. On the other hand, companies can

benefit from promoting themselves and their products to creative young people for possible cooperation.

FOKKER EMBRACES STARTUPS

To help ensure innovation as a service provider, Fokker Services enjoys cooperations with startups. The company will be hosting three new startups at the show that have been working on a wide range of interior innovations, such as cabin scenting and lightweight seating.

The cooperations enable
Fokker Services to use the
innovative power and agility the
startups have to offer, while the
startups benefit from
the company's
experience
as an

aircraft designer and system integrator, which is invaluable for startups in getting their product to a higher maturity level.

For example, Fokker Services can help startups with certification of their product, provide advice on regulations, and of course act as launch customer or distributor of the products. Furthermore, startups can benefit from the Fokker Services network, which can help validate important assumptions, and refine the product to match market needs.

STAND: 5B03

SMOOTH LOGISTICS

To address the demanding needs of the cabin interior industry, Kuehne + Nagel will launch a solution for cabin equipment logistics. This integrated end-to-end solution, which is part of the group's 'Supply the Sky' global aerospace portfolio, covers all elements of the material lifespan, to enable customers to focus on the creation, production and maintenance of cabin equipment.

Visitors to Kuehne + Nagel's information container (found outside, between Halls 5 and 7) will have the opportunity to learn about the solution and its configuration possibilities, which enable a smooth integration into the value chains of manufacturers, MROs, airlines, leasing companies and distributors.



ITALIAN AVIATION LEATHER SUPPLIER DELIVERING THE FINEST QUALITY





CORPORATE UPDATES...

Visit Vartan
Visit

STAND: 7A80

Starling invests in technology

Starling Aerospace has invested in new technologies to support the design and manufacture of its Track and Swivel seat, including major improvements to its facilities to shorten lead times and enhance quality.

New equipment includes a large 4 x 11ft tank with a robotic arm and automated film layer and activation system for aqua transfer printing, which will enable Starling to print full-sized side ledges, bulkheads and sliding doors in a also invested in a five-axis CNC router for 3D and large-scale composite production and a four-axis machining center for aluminum seating components.

To further complement its in-house seat manufacturing capability, Starling has installed a Gerber automated CNC leather and fabric cutter, which enables automatic cutting of leather hides for aircraft seat covers. To produce first article concepts quickly, the company has also invested in new software to 3D print prototypes to demonstrate proof of concepts for designs and customer approval prior to production.

China support for Boeing 737

The Vartan Aviation Group is set to commence on-site support operations for the new Boeing 737 Completion and Delivery Center in Zhoushan, China, just as soon as the joint venture between Boeing and COMAC starts operations (the opening is planned for late 2018). Several major aviation suppliers have already signed contracts with the Vartan Aviation Group for the B737 in Zhoushan, and work packages at the Boeing-COMAC joint venture will include support for cabin interiors and aerostructures.

With the new support office, Vartan will strengthen its presence in the Chinese market and offer customers full-scale support in the world's largest single-aisle market on both Airbus and Boeing aircraft programs.







Stand No: 4E80



We produce

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Galley Equipment

interview in the state of the s



Big time

ROCKWELL COLLINS IS A GIANT IN THE INTERIORS
SECTOR, AND A MAJOR INDUSTRY INFLUENCER. LET'S
SEE WHAT WERNER LIEBERHERR, EXECUTIVE VICE
PRESIDENT AND CHIEF OPERATING OFFICER OF
ROCKWELL COLLINS, HAS TO SAY ABOUT THE INDUSTRY

ROCKWELL COLLINS COULD HAVE INVESTED IN MANY SECTORS
OF AEROSPACE, BUT CHOSE
CABIN INTERIORS WITH THE B/E
ACQUISITION. DOES THIS DECISION INDICATE INSIGHT INTO A STRONG FUTURE FOR INTERIORS?

Interiors are highly complementary to the commercial and information management segments of Rockwell Collins. In addition to providing a more geographically diverse backlog and customer base, the interiors segment has a unique understanding of airlines, their business models, and the needs of users in the ecosystem. The future for interiors remains strong with the growth of air traffic, the new aircraft required to meet demand, and the retrofit of aircraft interiors that takes place every six to eight years.

WHAT ARE THE MAIN BENEFITS OF WORKING WITH A COMPANY OF THE SCALE OF ROCKWELL COLLINS?

Firstly, our cultures are highly compatible. The brand values of integrity, trusted relationships and continuous innovation are hallmarks for Rockwell Collins and the former B/E Aerospace. The integration and transition last April was near textbook. It was a tremendous compliment to both entities that we simultaneously integrated and met our customer and shareholder commitments. In our annual cost-saving synergy targets, the team is well ahead of schedule for this goal, and the additional

monies have enabled an escalated focus on integrated innovation in each segment and across the enterprise.

WHICH AREA OF THE INTERIORS SECTOR DO YOU FEEL IS PERFORMING THE STRONGEST?

Each business unit in the interiors segment is an innovation leader in the market. Whether it be seating, food and beverage equipment, A350 galleys, lighting or lavatories, all units are at the highest market levels of customer satisfaction and product innovation.

DOES ROCKWELL PLAN TO GROW FURTHER IN THE IFE AND CONNECTIVITY SECTORS?

For the better part of a century, Rockwell Collins has set the standard for aviation connectivity. By introducing ACARS, we were the first to connect disparate information systems in aviation, and put the first satellite communication into service for data and voice. We continue to break through seemingly insurmountable barriers between disparate systems and codes. Today we are setting a new standard for connected aviation with the introduction of a singular operational environment integrating new IP and legacy networks. We do so because we are inspired by breakthroughs, by the unlimited potential for progress when people, systems and technology connect.

WHAT IS YOUR GOAL IN INTERIORS? TO BE THE NUMBER-ONE NOSE-TO-TAIL SUPPLIER?

Simply, we will continue to develop product platforms and deliver services that maximize the user experience, increase the profitability and operational efficiency of our customers, and use our agility to adapt in a very fast-changing market and expand our value proposition in aviation.

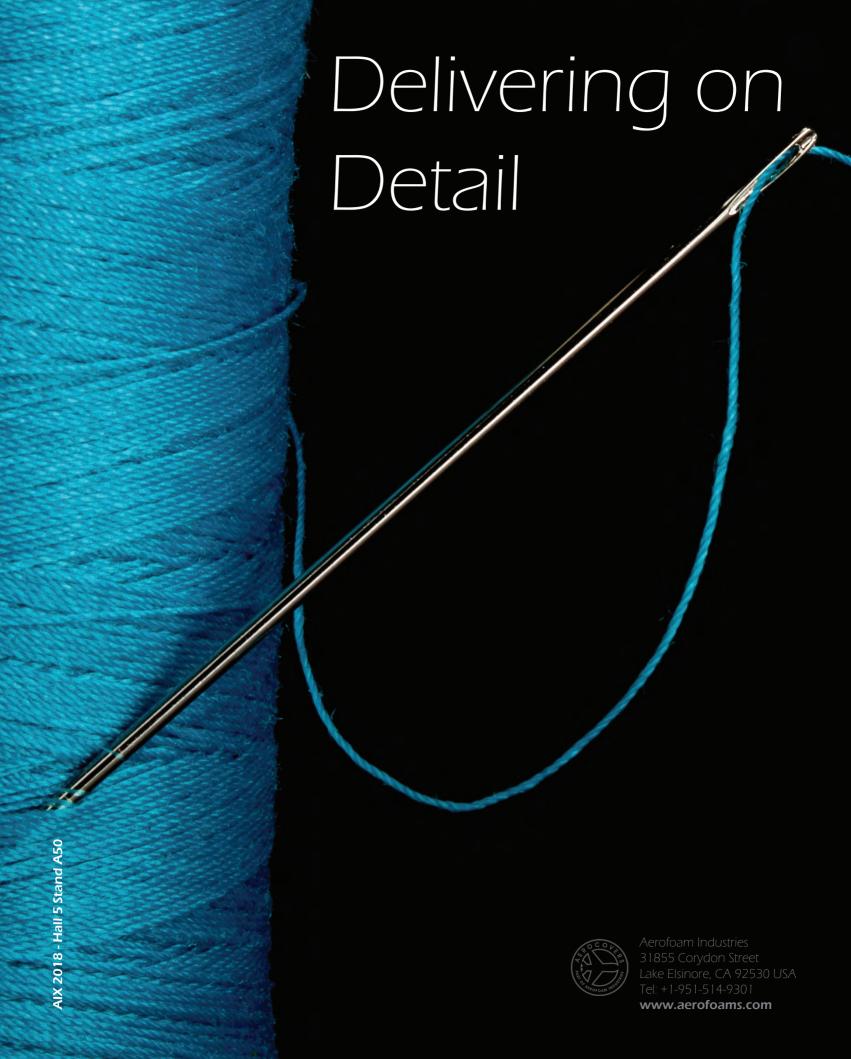
AS A MAJOR INDUSTRY
INFLUENCER, CAN YOU SHARE
WHAT THE FUTURE HOLDS
FOR INTERIORS?

The future of aircraft interiors will be dramatically different from today, across user requirements, market shape and competitive structure.

AS THE ASIA MARKET GROWS, DO YOU HAVE ANY PLANS TO INVEST FURTHER IN THE REGION?

Rockwell Collins is one of the most progressive entities in aviation with our Asian footprint and robust supply chain, especially in China. A large number of our employees are based in Asia. We have multiple engineering centers of excellence in India, and a manufacturing and distribution center of excellence in the Philippines, in addition to repair centers across the region.

The future of aircraft interiors will be dramatically different from today





ANO.

SIMPLY ELEMENTAL

Inspired by the elements, Schneller's 2018 design collection, named Simply Elemental, takes its cue from the natural world and the five elements of fire, earth, air, metal and water. This collection represents transformation and change by incorporating a mixture of graphic elements, rich color and pigment effects to create a range of effects, from soft subtle stone finishes to luxurious metallic gradients and vivid jewel tones.

The collection was inspired by studies of various processes, functions and phenomena of nature. Schneller's new collection reflects nature by using earth tones, simplified symmetrical patterns, rich metallic effects and combined geometric structures with natural wood and stone patterns. The result is a rich spectrum of decorative laminates and flooring.

HOOK'NFLY TAKES OFF

This year Tarkett, which has built a solid reputation in aviation with its high-end Wilton woven Desso aviation carpets, is launching Hook'nFly, a hook-and-a-loop carpet installation system for the aerospace industry. This FAR-certified system has been developed in cooperation with Velcro and the self-adhesive Velcro Hook Tape, together with a specially developed Desso aviation carpet, makes it easier and faster to replace carpets in the aircraft. The tape stays firmly in place on the aircraft floor panels for several years and there is no need for time-consuming removal of self-adhesive tape and glue residues.

Flooring launches worth the walk...

STAND: 6C30

ONE-STOP INTERIOR FURNISHINGS

Following successful collaborations in recent years, Tarkett and Aunde will again present their jointly designed one-stop-shop collection for cabin flooring, seating and curtain textiles. New this year will be a collection of various designs of Tarkett non-textile flooring, suitable for galleys and restrooms. Visitors can also view matching Desso aviation carpets, Tarkett non-textile flooring and Aunde seat textiles, all based on four interior color trends: Being Creative, Doing Good, Customize and Shades of Blue.

CARPET INNOVATION

Looking for a guarantee that a modular aircraft carpet will keep looking good? SkyPaxxx is offering just such a thing: a guarantee of appearance retention and in-service life for its Sky-Tiles carpet. And not just against manufacturer defects and raw materials, but on the final, installed product.

The company boldly says that Sky-Tiles will last two to three times longer than any other aircraft carpet, with no serging/binding, no fraying, no shrinking or stretching, selective replacement of individual tiles, and when it does reach the end of its life, is 100% recyclable. Better still, SkyPaxxx has now reduced the weight of Sky-Tiles by more than 10%.









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MATERIALS THAT ARE ON-TREND RIGHT NOW...

STAND: 5CO4

Perforate to luxuriate

Perforated leather is eminently suited to enhancing aircraft interiors. At least, this is what Emma Rickards, designer at West 6, believes (see page 94 of the November issue of Aircraft Interiors International). According to the textile specialist, perforations provide the leather with enhanced functional properties, structures, patterns and individuality in equal measure.

"Perforations improve the breathability of leather and ensure a greater level of comfort, particularly during long-haul flights," explains Christian Schober, key account manager with Austrian leather manufacturer, Boxmark. He adds that perforated seat covers also convey a sense of luxury to passengers.

Designers at Boxmark anticipated this trend toward perforation and have developed an exclusive perforated seat design for this year's Aircraft Interiors Expo.

"Of course, here we benefit from our experience and expertise in the automotive industry, for which we have been manufacturing perforated seat covers for many years," says Schober.

It is not just seat covers that can be visually enhanced with perforations: they also work well with wall panels. "In our in-house design department, we are constantly looking for new possibilities to add an even greater touch of class and functionality to the material of leather," explains Schober.



STAND: 6B21

[†] A brand-new approach

Visitors should expect the unexpected at E-Leather's stand, with the materials company saying it will unveil "a number of surprises" at the expo, from exhibits to the design of the stand itself.

E-Leather's operations director
Nico Den Ouden comments: "We are
well known at Hamburg for our striking
stand design and our minimalist
approach to exhibiting. Following the
launch of the E-Leather rebranding, we
want to take a completely new approach
to the stand this year. I think people will
be excited and surprised by the
difference they see."

The company is working in collaboration with industry-recognized designers to develop interesting exhibits that will broaden people's horizons in terms of the potential that E-Leather offers as a technologically advanced material, and to demonstrate its versatility in using it in more applications than just aircraft seating.



VIP guests are invited to an 'inspiration room' where they can get early insights into the product developments and innovation projects, as well as being first to see the E-leather trend collection.

The E-leather team is also working on two additional aviation products that they hope to reveal during the show.

STAND: 5D02

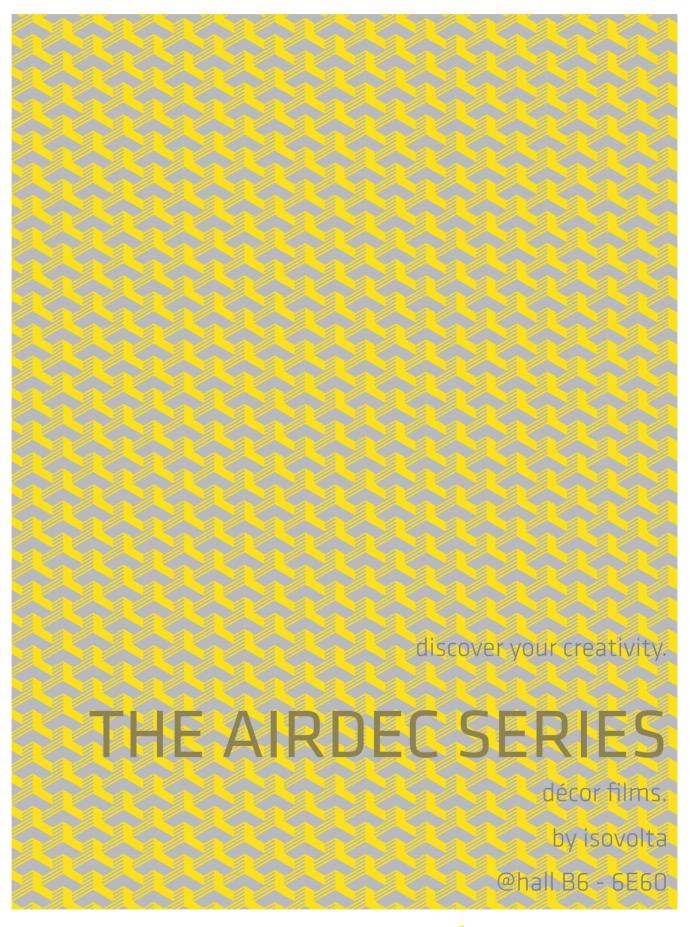
All blue this year

As it does every year, Tisca will unveil an inspirational trend collection of carefully harmonized seat cover fabrics, carpets and curtains. Without wishing to spoil the surprise, the theme will be 'blue' this year. This holistic collection reflects the latest global trends in terms of patterns, textures, materials and color combinations – all of which Tisca can design, develop and manufacture in-house.



Moreover the company will introduce six stock range upholstery fabric collections. These wool-blend fabrics feature small patterns, intriguing 3D effects and technical finishes. The fabrics are available from stock with no minimum order quantity, ready for immediate shipment.

Also on display will be a novel, advanced engineered polyamide carpet named T-PAC Eco Premium, with many fresh and trendy patterns and color combinations on show. This premium, high-end polyamide carpet is available in three weight classes and offers unlimited freedom for customization.







Try the latest seat coverings for size...

Soisa is

competing in

the Crystal

Cabin Awards

2018

TRUE IN-SEAT LIGHTING

An interesting lighting exhibit can be found on Soisa's stand: the Glowing Experience. This technology redefines in-seat lighting by integrating ambient lighting effects into the seat cover, where they can serve as safety compliance indicators and as a styling differentiatior.

> For example, the lighting can function as a visual indicator

that passengers are complying with aircraft safety procedures, help crew members with their duties and help prevent injuries, as well as assisting passengers to access their seats more easily during night flights.

STAND: 6C41

SFAT COVFR INNOVATION

STAND: 6E70

A new polymer construction has been developed by Lantal Textiles that looks like leather, but has greater elasticity and a lower price. The material, named TEC-Leather, is stain repellant and low maintenance, requiring just occasional cleaning with soapy water and a soft cloth. The elasticity of the product means it is suited for complex seat shapes and does not sag, even after long periods of use. According to Lantal, other advantages are its light weight and excellent flame-retardant properties, which eliminate the need for an additional fireblocker. You can explore the soft touch of TEC-Leather and the countless color options. Also, as it does every year, Lantal will showcase a Conceptual Forecast collection featuring seat cover fabrics, carpets, leathers and curtains, all within a balanced overall design concept.

STAND: 4UF50

DIGITAL SEWING

Juki will be exhibiting the first digital sewing system for heavy-duty seating - the LU-2822V-7. This model allows the digital entry of machine parameters instead of the manual adjustments normally required for traditional sewing machines. This digitization means that sewing specifications can be exactly replicated across a production line.

For high-end aircraft seating this means that designers have control over all sewing parameters, from prototype all the way through to final production. Parameters such as thread tension, movement of the feed-dog and more can be saved internally in the machine or digitally via USB or the Juki Smart App for Android.

STAND: 7C20

TOUCH THE INNOVATION

maintain fabric launched with Lift by EnCore - the product is now in service with launch airline LOT Polish.

The Promessa product line is manufactured by Ultrafabrics at its state-of-the-art production line or bonding agents, creating an extremely durable

According to Tapis, Promessa weighs less on a single-aisle aircraft, even at today's





JUKI







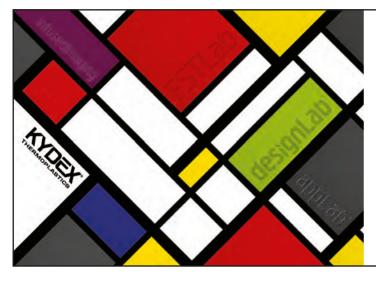
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MORE MATERIALS INNOVATION...



What if...?

STAND: 5D40

Thermoplastics giant Sekisui SPI invites attendees to pose their 'what ifs?' to its aviation teams, so they can explore pushing boundaries, revolutionizing designs, and answering 'what if?' questions. Answers may be found in its innovative materials, people, technologies and processes, and visitors will experience these innovations through pop-up installations featuring the company's capabilities.

Guests will also get the first glimpse of the newest addition to Sekisui SPI's innovation centers. Opening in 2018, appLab is a dedicated 745m² (8,000ft²) innovation space with resources focused on exploration and product ideation.

The appLab joins the company's designLab, where art and science combine in a collaboration space for color and design, and the FSTLab, where teams collaborate on new fire-resistant technologies and materials while shortening the product development cycle.

STAND: 7E40

Automated coating

Standard interior topcoats, unique design effects and smart coatings with special functions are increasingly being used in modern cabins. For instance, coatings with anti-bacterial properties are in high demand by airlines.

Besides the creation of new design effects and smart coatings, the ramp up and the ever-increasing demand for uniform surfaces in the cabin interior is one of the hottest topics for 2018 and 2019, according to Mankiewicz. The company is presenting automated paint solutions that help producers to speed-up their processes, boost capacity and increase the quality of surfaces in terms of uniformity. The automation, whether water- or solvent-based, topcoat or filler solutions, ranges from automated mixing to fully automated robot application.



STANID: 21 131

Rapid repair systems

To help keep cabins looking pristine, Satto is launching Sollux, a system for repairing composite components. Sollux joins other rapid repair systems in the Satto range, so now damaged plastics as well as composite components can be given a strong, flawless and permanent repair – repairs that could bring a reduction in cabin maintenance expenditure of up to 60%

The systems are EASA and FAA approved and are tailored for use both in the workshop and on-wing, and most repairs take less than 30 minutes to cure, with no heat required. Damaged overhead bins, galleys, seat plastics, delaminated composite panels or even completely sheared parts can be repaired quickly, rather than replaced.

STAND: 2U60

Process expertise

Thormac, one of Ireland's leading injection molders, will present its capabilities in complex technical molding, including insert and hybrid molding, and work with Organo sheet materials.

Wittmann Battenfeld technology has been playing its part in producing the latest Thormac Organo-based products. A MacroPower 350 molding machine is at the heart of the latest Organo-based production, which, according to Sean Ryan, director of Thormac, offers many advantages over conventional thermoset or thermoplastic production.

"Shorter cycle times, weight reduction and reduced wall thickness are some of the many benefits of fiber-based molding that Thormac will be showing," adds Ryan.







STAND: 5A50

ULTIMATE COMFORT

The take-up and acceptance of memory foams in the aerospace market has been slow, while in our daily lives, from bedding to seating, the use of these materials to relieve pressure points is commonplace. This is the view of Aerofoam Industries, which believes the main reason these materials have not been used more is primarily due to their weight and cost and/or the lack of understanding about how they should be used.

The company is aiming to address this issue with the release of two grades of memory foams designed for aerospace.

The physical properties of these graphite-filled

foams are claimed to be identical to mattress foams, but with less than half their weight, compliant for use with or without fire-block, and costing no more than standard high-resilience foams.



Even more materials innovation...



STAND: 2U73

DISRUPTIVE DIGITAL TECHNOLOGY FOR PREFORMS

Senior Aerospace is looking to shake up the composites market by targeting cost and weight reductions using near net-shape dry fiber textiles, incorporating complex 3D design features. 3D pre-forms can deliver efficiencies in the structural design and fabrication of composites, giving bespoke, near net-shape preforms with specific fiber placement, to provide reinforcement where required.

Senior has signed a licensing agreement with RT2i in France for what it calls "a revolutionary process" to manufacture low-pressure composite ducting. The partners say the technology

has solved many of the issues of knitting different fabrics and resins at high speed without the need for costly setups. Put simply, it offers the flexibility of 3D printing for fiber pre-forms.

The manufacturing process comprises two key operations: the automated manufacture of 3D dry textile reinforcements in Kevlar, glass, carbon or other types of fiber; and the impregnation of these reinforcements with either thermoplastic or thermoset matrices.

Senior is using the RT2i process to manufacture air distribution systems for aerospace at its facility in the UK.

THERMOPLASTIC DUCTING

Flexfab is introducing a line of reinforced thermoplastic foam panel (RFP) ducting for use in the aerospace industry. The construction of the RFP ducting is ideal for weight-sensitive applications requiring rigidity within the ECS system. Ducting solutions range from small custom part geometries to large runs up to several meters in length. The duct construction complies with FAR 25.853 (a) App. F Part I vertical burn, FAR25.853 (d) App. F Part IV OSU Heat Release and Part V smoke density, and toxicity limits for commercial aircraft.

Benefits of RFP ducting include minimal tooling investment and rapid development cycles, with materials and designs customizable to meet specific product requirements.



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STAND: AUD77

NEW ADHESIVES RANGE

Chemique Adhesives will be launching Aerotak, a range of adhesives designed specifically for the aircraft interiors industry. The range consists of sprayable, solvent- and water-based adhesives used in the manufacture of aircraft seat covers.

Using a hot press stamping method, the adhesives can bond combinations of fabric, leather, foam, e-leather and scrim materials into style pads. Once completed, the style pad will pass the required test method for flammability requirement CS-25.853 APP F Part 1a 1(ii).

NEW NAME, SAME PFRFORMANCE

July 2017 saw Biolink acquired by Saint-Gobain, bringing a new name for the company: Saint-Gobain Performance Plastics Biolink. The name is new, but customers can still benefit from the company's range of UV-cured tapes, including flooring tapes, which are certified for and used by industry leaders such as Airbus.

STAND: 6B90



Innovative attachment ideas...

GROMMET EDGING

A new lifecycle cost (LCC) research study from Device Technologies, Inc. (DTi), a manufacturer of wire protection, seals and trims, highlights that switching from the traditional nylon grommet MS21266 to the M22529/2 grommet edging can save time and money over an aircraft's 30-year life.

> The study shows that the MS21266 nylon grommet is 206% more expensive than M22529/2 when the 30-year are assessed. This means the cost of M22529/2 is only 48.5% that of the nylon grommet cost.

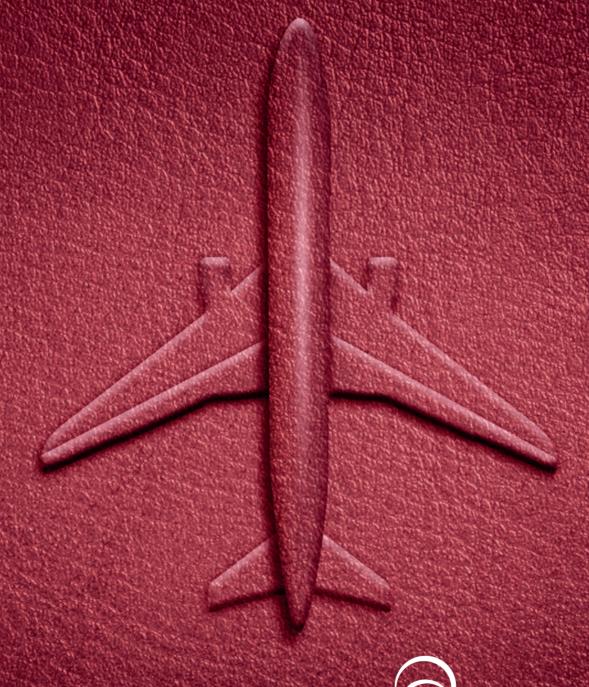
The MS21266 grommet is molded as a straight, stiff element that is cut to length and bonded around penetrations and along edges using MEK solvent-based adhesives. By comparison, DTi's M22529/2 Spring-Fast aero grommet is much simpler, its edging snapping onto material installation cost per grommet

INNOVATIVE **FASTENINGS**

Driven by the trend for lightweight automotive construction, fastening technology specialist Ejot has developed solutions for sandwich materials with honeycomb and foam core structures and various cover layers. One such solution is TSSD, with which components can be securely fastened to lightweight construction materials. It is also suitable for aircraft interiors.

In the aviation industry, fixing points in these demanding materials and structures are largely achieved with potted in inserts, which have a time-consuming and lengthy installation process. With the TSSD thermal adhesive bonding boss, multiple processes can be reduced to just one step, taking less than 30 seconds per insert. The plastic bosses can either be used as a screw boss (dimensioned for an Ejot Delta PT screw) or as a direct fastening element. New for 2018 is a TSSD with a 1in metallic thread insert or a version with a ball head for snap-in connections.





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Sticky subject

ALEXIS GABILLON, PRESIDENT OF ADHETEC,
DISCUSSES THE VISUAL AND ECONOMIC BENEFITS
OF ADHESIVE FOILS, PLACARDS AND TAPES
IN AEROSPACE

HOW IMPORTANT IS THE PLACARD BUSINESS TO ADHETEC?

Placards are a complement to our aircraft customization capability: we can create permanent exterior and interior adhesive products, from complete liveries through to elements such as mandatory markings and placards. Adhetec has gained a great reputation with its OEM-qualified solutions. For example, Adhecal has been developed for liveries and decorative elements, and Adhemark for markings and placards. These are our main flying product families, and together they represent around 30% of our turnover.

DO INTERIOR PLACARDS HAVE APPLICATION BEYOND ADVERTISING?

Interior decorative elements are the best way to convey an airline's brand image and create a unique atmosphere on board. Therefore yes, some interior solutions, if they meet all FAR specifications, will have applications beyond advertising. Therefore we have engineered a self-adhesive decor foil that meets all FST and heat release requirements in the cabin and which will allow airlines to customize the cabin.

YOU ALSO WORK IN SPECIALTY TAPES. WHAT ARE YOUR LATEST ADVANCES IN THAT AREA?

Our most recently developed products are protective foils that are suitable

for permanent use in the aircraft cabin as they meet burn test requirements, and temporary protective foams with different thicknesses for use on aircraft interiors or exteriors, for which we can provide customers with an M1 industrial fire resistance test certificate.

CAN YOUR EXTERIOR PRODUCTS
HELP ENABLE QUICK LIVERY
CHANGES – FOR EXAMPLE, FOR
A SPECIAL AIRCRAFT PROMOTING A
MOVIE, EVENT OR BRAND TIE-IN?

Our patented and OEM-qualified products can enable quick livery conversion: our 13880 adhesive foil is easy to apply and remove without chemicals, and it will not damage paint or leave residues. Our engineering team can adjust the livery to the aircraft using even, curved zones to make any design look great.

PLEASE CAN YOU NAME SOME OF YOUR MAIN AVIATION CLIENTS?

We work with all commercial and business aviation customers, ranging from major OEMs, to MROs, to airlines. Our client list includes Airbus, Boeing, ATR, Bombardier, Embraer, Etihad, Emirates, Qatar Airways, Air France, Iberia, Cathay Pacific and Qantas, to name a few.



Interior decorative
Interior decorative
elements are one of
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Skycast offers a wide range of TabCaddyTM PED holders, including the "Clip" product line that accommodates coach and premium class seats with folding meal trays.



- · Lowest cost fixed tablet holder available.
- Fast and easy installation.
- Customized for specific tray tables.
- Supports phones and tablets of all sizes securely.
- New branding and advertising platform.



- Lowest Cost folding meal tray holder option.
- Fast and easy 'stick on' installation.
- Frees entire meal tray for use.
- Supports phones and tablets of all sizes securely.





STAND: 4B11

SAFE PORTABLE STREAMING

Another highlight of Lufthansa Systems and Lufthansa Technik's joint work is the new Power & Safe solution for BoardConnect Portable. At the Expo both companies will show, for the first time, how the BoardConnect Portable Mobile Streaming Unit (MSU) can be stowed in a safe inside the overhead storage compartment. Placing an additional power supply inside the baggage compartment eliminates the need for battery replacement. The first customer to use this solution is Air Europa.

How secure is cabin wi-fi for passengers? Find out about the latest risks on p82

More IFE highlights...

PROFITABLE SOLUTIONS

In addition to its Electronically Dimmable Window (p216), Vision Systems is showing an IFE system that offers passenger satisfaction and ancillary revenues through varied content, including

movies, music, games, daily press, extensive tourist information, ticketing and

advertising. The system comes with a cost-effective business model created for each airline customer, based on tailor-made content and targeted advertisements.

Vision Systems is the single contact for installation, maintenance and content update, although airlines can choose to change the interface and the content themselves, in a few clicks.

STAND: PERS

POWER PLAY

Portable W-IFE system provider AirFi will be demonstrating a new 'stay onboard' power supply system option for its AirFi Venus Boxes. Until now these wi-fi boxes have run off battery power, but following a development project with AirFi's avionics engineering partner, the boxes can also be run off aircraft power. Whichever power source the customer opts for, the boxes have the same

The power supply system is provided as a complete kit of parts, installation instructions and documentation, with minor modification approval typically obtained within five weeks, according to the company. The system can be installed in a single-aisle aircraft in four to six hours (during an overnight check, for example), and once fitted, can simplify airline operations as there will no longer be the need for daily on-/ off-boarding routines for charging, making it a true zero-touch operation.

STAND: 3D60

PROGRAMMATIC VIDEO ADVERTISING

Immfly claims it has has become the first W-IFE provider to serve programmatically traded advertising in the cabin without relying on an off-board connection. The company is using a platform developed by Inadvia to provide campaigns to its Immfly W-IFE portal, which is first being used on Iberia Express, for a campaign featuring 30-second advertisement spots, which are being ran ahead of music videos streamed to passengers' devices.

For this campaign, Inadvia created a marketplace that allowed Immfly to expose its inventory to multiple advertisers in the programmatic ecosystem.

"The inflight advertising industry is growing at three-digit speed and we believe that programmatic advertising will be key to sustain this growth over the next five years. Instead of offering our advertising inventory in bulk, the programmatic ecosystem allows us to segment it, which provides a customized user experience and higher added value for our advertisers," says Samuel Gombervaux, chief revenue officer at Immfly.







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ENHANCE YOUR ENTERTAINMENT...

REVEAL

STAND: 4B11

Customized shopping services

Most passengers want personalized services on board an aircraft, and they want them to be easy to use and with relevant content. With this in mind, Lufthansa Systems and Retail inMotion have been working together to integrate the BoardConnect digital platform with the Retail in Motion e-commerce solution. They will show the results - for the first time - at the Expo.

Highlights include a new recommendation engine that suggests content based on a personal profile; the longer the profile is used, the better the algorithm learns and the more relevant the content shown.

Within the Retail in Motion e-commerce shop, users can choose their preferred payment method, from credit cards to online providers. Once the payment data is entered, the user can buy safely and quickly via one-click payment. The selection of payment methods is route-based, so the shop only shows the items for sale, payment methods and credit cards relevant to the

region involved.

STAND: 4A08

Dynamic subtitles

Following months of hard work and dedication, Global One Media has become the first and only lab to produce dynamic subtitles for IFE content. The company's in-house labs have developed cost-effective and high-quality cinema dynamic closed captions and dynamic subtitles for major languages, to support international passengers and those with hearing disabilities.

Global One Media now produces dynamic subtitles for TV content, local and international movies. Among the IFE suppliers using its technology today are Panasonic, Thales, Zodiac Inflight Innovations and Rockwell Collins.

STAND: 4UC41

Increased IFE content

How much video content is enough? In our Amazon and Netflix world, we have instant access to almost everything, at home and on the move. The exception, currently, is when we're flying. IFE systems can be upgraded to increase video storage and transmission capacity, but at a cost, in terms of money and aircraft downtime.

Cadami believes this is changing, however, and will be demonstrating a system that enables airlines to provide a huge onboard video library. The solution uses a unique combination of the latest coded caching and transmission standards to make efficient use of the existing server, Ethernet network and seatback screens. The full potential of coded caching is exploited with XOR logic and multicasting.

The result, says Cadami, is bandwidth savings of 50-80%, enabling an airline to provide 500 passengers with 2,000 movies, without loss of quality. In fact, it can easily handle HD and 4K content.

The company adds that using hardware that could achieve this would involve the installation of an extra six servers. seatback screens with much more storage, or a new Ethernet network with 10 times the power of the current network.







ZODIAC AEROSYSTEMSConnected Cabin Division





Tap in to the newest connectivity technology...

ANTENNA INSTALLATION

Aircraft modification and cabin upgrade specialist AKKA Technologies Group has a DOA team specializing in STC development for system integration and certification. The latest news from the company is that, with a focus on connectivity solutions, its subsidiary Aeroconseil has been awarded the first European STC for large antenna installation on single-aisle aircraft. This means that Aeroconseil can cover engineering, certification, installation kits and support during working party and T-PED testing.

This expertise has been used to support several major players in the connectivity market, among them Aeromobile, Onair and GEE, for major airlines such as Singapore Airlines, Emirates, Lufthansa, Avianca Brazil and Air France.



DONICA

compact, line-replaceable unit. The CWAP, meanwhile, provides the onboard wireless access service, supports IEEE802.11ac WAV2 protocol and offers high-performance wi-fi and streaming. The load between CWAPs can be balanced by managing the quantity of passenger terminal links and dynamically controlling bandwidth.

WLAN INNOVATION

Donica will be demonstrating its WIFI6000 WLAN

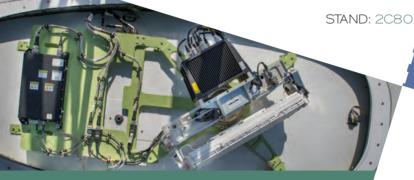
system, which consists of just two components:

the Cabin Network Service Unit (CNSU) and Cabin





STAND: 2D80



STAND: 4B40

CONNECTED EXPERIENCE

Passengers have come to expect that high-speed inflight wi-fi will be available from gate to gate during their travel experience. Airlines are also looking at connectivity to help streamline operations and increase the safety of their fleets. That's why Honeywell and Inmarsat have been working to create a faster, more consistent, and global inflight internet experience with Honeywell's JetWave and Inmarsat's Global Xpress Ka-band service.

JetWave allows passengers to connect to Inmarsat's GX Aviation broadband service, which, as well as cabin connectivity, creates indirect passenger benefits. The airline data analytics allow for predictive maintenance, which translates into fewer delays and increased safety, and more intuitive runway navigation guides so that take-offs and landings are smoother. Nervous flyers need only worry about which song to listen to.

STAND: 2A10, 2C30

CONNECTIVITY SURGING

Airlines are predicted to make an additional US\$30bn through inflight connectivity by 2035, according to Frederik van Essen, SVP at Inmarsat Aviation. The communications giant is maximizing this potential with its GX Aviation high-speed global connectivity solution, in commercial service since last year.

GX Aviation is now available on more than 100 Lufthansa and Austrian Airlines aircraft, and with airlines including Qatar Airways, Air New Zealand, Norwegian Air, Singapore Airlines and Air Asia opting for the service, Inmarsat has more than 1,300 installations in backlog.

Meanwhile, the tide is turning for the millions of European travelers without access to fast, consistent inflight wi-fi, as the European Aviation Network (EAN) will launch in 2018. A unique integrated satellite and air-to-ground network developed in partnership with Deutsche Telekom, EAN has been designed for Europe's busy skies. This multinational initiative is a big step forward for the region.

Van Essen says of the surge of inflight connectivity: "We're driving this revolution by bringing tailored inflight wi-fi services to airlines, helping them realize the value of connecting passengers in the skies."

SKYHIGH RESOLUTION





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MORE CONNECTIVITY TECHNOLOGY...

STAND: 2C55

Connecting crews

Connecting commercial tablets and crew devices in flight with an aircraft's existing onboard data system would deliver improved operational efficiency, performance and safety, with information exchanged between the aircraft, flight crew and the ground.

This is possible with the new GroundLink AID+ from Teledyne Controls, which enables airlines to connect tablets to the GroundLink Comm+ unit, either wired or wirelessly via the AID+ Wireless Access Point (WAP), for all flight phases.

The unit, which is typically used as a wireless quick access recorder (WQAR), can now provide onground 3G/4G IP connectivity for updating electronic flight bags (EFBs) and crew devices, while also providing interfaces to aircraft data and communication systems such as the FMS and ACARS.

The ACARS proxy in particular allows multiple EFBs to send and receive ACARS messages, supporting pilots with ground and flight operations communications, the distribution of flight documents, and load sheets

This technology also provides aircraft interface device (AID) functionality without having to install a separate AID unit. And with more than 10,000 GroundLink units already flying, it is an easy transition for those with the technology already installed, enabling them to protect their legacy investment.

Connected experience

Connected aircraft service expert SITAOnAir will showcase how its bespoke high-speed broadband services are providing an enhanced and consistent connected experience for passengers and cabin crews, empowered by global, reliable and seamless inflight connectivity solutions. The company will reveal its latest Link OnAir high-speed broadband project news (the company is a key GX Aviation partner and distributor), as well as discussing its major products - Link OnAir, Mobile OnAir and Internet OnAir.

The Internet OnAir inflight wi-fi portal is designed to help major airlines deliver an evermore personalized, contextualized service to passengers, and to support their brand-defining strategies, while boosting ancillary revenues. This is achieved through intelligent digital integration and customization capabilities – both in terms of the user experience, and with airlines' existing CRM systems.

SITAOnAir will also be discussing its newest Mobile OnAir innovation, the industry's first inflight 3.5G mobile network services over GX Aviation, as well as latest inflight mobile trends, such as the convergence of wi-fi and cellular technologies that meet future passenger expectations with a hybrid experience offering that can leverage the advantages of both wi-fi and cellular technology.



STAND: 4UB31

Satcom network

WiFi Technologies will use the Expo to officially release its Aviator WiFi private Satcom network for crew. Aviator WiFi enables cockpit and cabin crew to use their own tablets as full mobile satcom terminals during flight, for voice calls, SMS, email and data. The unit costs under €30,000 (US\$37,000). including STC and installation kit, and installation takes less than a day. For business jet users, access can also be opened to passengers.

With its Part 21 partners, WiFi Technologies has STCs and modification approvals for all types of Boeing and Airbus airliners, plus most regional aircraft. A network of Part 145 partners means that the system can be installed at a customer's base, anywhere in the world.





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STAND: 4B20

Enhance your entertainment...

ON AIR IN THE AIR

Software development company Axinom will be introducing its Live TV to Aircraft solution, a technology that provides high-quality live-streamed broadcasting on board aircraft. Of course such a service can demand a lot of satellite bandwidth. so the company has developed a smart traffic management technology to optimize the bandwidth consumption of the system. The system will enable airlines to offer their customers the same entertainment they might enjoy at home, including live-streamed sports tournaments and their favorite TV channels. Axinom's technology allows handling of multiple live channels at the same time and allows content protection using DRM.

STAND: 3D50

PRACTICAL POWER

In response to many new consumer devices adopting USB-C as standard, IFEC interface specialist IFPL will be demonstrating how airlines can easily transition from USB Type-A to USB Type-C, either with or without USB-Power Delivery (USB-PD). The solution is the Reversible USB Type-A and Type-C combination outlet, designed to allow airlines to support their passengers through the transition period from USB Type-A to USB Type-C.

IFPL has developed two combination variants. The first is a variant that uses the existing high-power reversible USB Type-A, combined with a USB Type-C designed to work with the existing onboard power architecture, providing airlines with a simple and low-cost upgrade path. The second is a reversible USB Type-A and Type-C

combination outlet that supports USB Type-C, with USB power delivery supporting Power Delivery Rules 1-4 and providing up to 60W of power to charge laptops, as well as the regular PED power.



Going forward.

MARK PEABODY, EXECUTIVE VICE PRESIDENT OF ASTRONICS CORPORATION, LOOKS TO THE FUTURE

ASTRONICS HAS BEEN SHOWING STRONG GROWTH IN THE AEROSPACE SECTOR. DO YOUR PROJECTIONS INDICATE MAJOR SECTOR GROWTH IN THE FUTURE?

> Our projections anticipate four areas where airlines will continue to invest in the commercial aerospace sector: newer and more efficient aircraft, connectivity, more effective aircraft information systems, and the newest consumer technologies for passenger power.

CREATING THE NEW ASTRONICS CONNECTIVITY SYSTEMS AND CERTIFICATION GROUP (ASTRONICS CSC) IS AN EXCITING MOVE, WHAT WILL BE THE MAIN ADVANTAGES FOR CLIENTS?

The new group will serve the needs of aerospace connectivity providers with a complete set of hardware, integration engineering, installation design and certification services to enable aircraft IFEC.

Astronics CSC has been selected by Air Esurfing to supply connectivity to several Chinese airlines

WHAT WILL BE THE NEXT BIG THING IN IFEC?

We believe that the high-throughput satellites (HTS) will relieve the bottleneck of inflight connectivity by providing a more home/ office-like experience, including streaming video-

on-demand, and services such as Netflix and Amazon.



Function Elevated by Design

Lightweight, flexible and innovative, our Passenger Control Unit (PCU) will seamlessly integrate into your application and enhance your passenger experience.

















STAND: 2F90

BOX CLEVER

Data Device Corporation (DDC) is introducing a compact 280W converter to supply 28V power for IFEC electronics and USB charging ports for PEDs, which can power up to 18 aircraft seats. The 1-14683-R converter's space-efficient design eliminates the need for under-seat boxes, brackets or shrouds, as the unit can be mounted within the cabin wall or ceiling. Power efficiency is >92% (power factor >0.95) at 115VAC 400Hz and maximum load, with safety and reliability ensured through over-current protection, thermal shutdown and short-circuit protection features. A complete seat MRO package is available, including sidewall mountings, seat looms and USB sockets.

"The power solution affords aircraft integrators a cost-effective means to shorten installation time, while freeing up valuable cabin space for passenger comfort and safety," states Graham Jefferies, DDC's managing director.



STAND: 1C58



NEW product

NOSE-TO-TAIL POWER

The growing demand for power outlets on commercial aircraft means airlines need reliable USB and wall-outlet power. True Blue Power believes it has the answer with its range of AC-DC converters that can power electronic equipment throughout the aircraft, including in-seat, cabin and cockpit power applications. The converters are small and lightweight and can be mounted in the floor or cabin wall. All True Blue Power converters are FAA/EASA TSO certified and RTCA DO-160G qualified.

True Blue Power's newest AC-DC converter is the high-power TC2000, which supplies 2,000W of 28V power to electronic equipment. The TC2000 has Power Factor Correction (PFC) and is capable of simultaneously powering more than 100 single-port USB chargers.

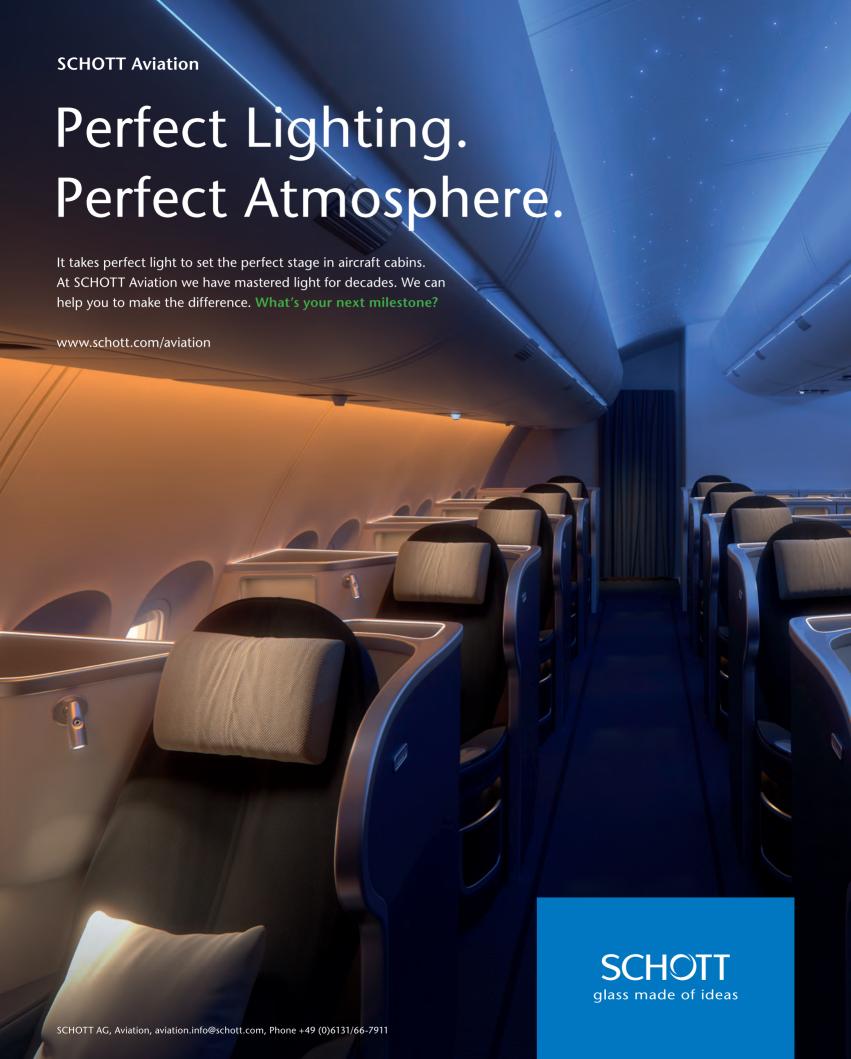
STAND: 4E41

TRULY FAST USB POWER

Fancy a sneak peek at British Airways' new USB power system, being installed in its A319/A320/A320 fleet from April 2018? BA is the latest airline to select Inflight Canada's (IFC) FAST USB power system, which will be shown on Stand 4E41.

IFC says the system is the first in the industry to offer a combination of the latest technology, a unique system architecture to reduce weight (by as much as 50%), a dramatically reduced installation time (by as much as 80%), and elimination of the high costs and long lead times associated with seat modifications and certification.

The power system also has BITE functionality without the requirement for head-end units, and LRUs can be replaced within minutes. It also features dynamic load balancing and is available with high-power USB Type-C. Better still, by locating certain components 'off-seat', passenger space is not reduced.





STAND: 2D60

SECOND-GENERATION DIMMABLE WINDOW

Vision Systems is presenting a dimmable shading system based on a new industrial process for enhanced optical quality and lower cost.

The second-generation Electronically Dimmable Window (EDW) eliminates the need for shades and using an SPD film, provides variable shading, from fully clear to up to 99.9% light blockage, and an instant response time. The reduction in cabin heat gain offered by the EDW contributes to a considerable reduction of airconditioning energy consumption and greater comfort for passengers. EDWs have no moving parts as the electronics are fully integrated, reducing maintenance costs and downtime, and installation is often limited to a simple mechanical operation, which is advantageous for the aftermarket.



More intelligent electronics...



STAND: 1C64

BYPASS

A PMA-certified, direct replacement self-ballasted 115 VAC LED lighting system will be introduced by Aircraft Lighting International. This system allows users to bypass the AL-2115 and AL-2116 ballasts and operate directly from the shipside 115 VAC power bus, while still using all the existing controllers. Further benefits include long life, few parts to maintain, virtually no heat, low current draw, no new assemblies, no rewiring, no mercury, no radiation, no UV and a three-year warranty.

Aircraft Lighting International will also display other PMA-certified LED light systems including the Mood LED lighting system, LED reading lights, plug-and-play LED systems, and 28 VDC direct replacement self-ballasted LED systems.







Watch this...

WHAT DO THE COMING YEARS HOLD IN STORE FOR THE IFEC SECTOR? JON NORRIS, SENIOR DIRECTOR OF MARKETING AT PANASONIC AVIONICS CORPORATION, SHARES HIS THOUGHTS

PANASONIC HAS BEEN MAKING BIG ADVANCES WITH SATELLITE OPERATORS RECENTLY. CAN WE EXPECT ANY MORE SATELLITE ANNOUNCEMENTS IN 2018?

In 2018/2019 high-throughput satellite (HTS) Ku-band satellites are coming into service. Looking forward, Panasonic is working with multiple satellite operators that are planning new high-capacity Ku-band HTS satellites designed for the aviation and mobility markets, which will enter service between 2020 and 2022.

LATE LAST YEAR, PANASONIC ANNOUNCED A BIOMETRICS DEAL WITH TASCENT. HAS THERE BEEN MUCH INTEREST IN THE TECHNOLOGY YET?

Panasonic has been working closely with our technology partner, Tascent, to see how biometrics technology could be integrated into the passenger experience throughout the travel thread: preflight, inflight and also post-flight. There is a lot of interest around using biometrics for the pairing of personal passenger information with the IFE seatback screen, payment verification, and also to improve the flow and efficiency of immigration upon arrival.

WHAT'S THE NEXT BIG THING IN IFE?

There are a number of trends and influences, including technology, businesses and society that are driving innovation in passenger experience.

These are the trends that we expect to see take off in 2018 and beyond: Contextual relevance, with passenger and destination-focused content and shopping; Internet of Me, with hyperpersonalized content and experience enabled through single sign-on access; Natural interaction, with interface options that accommodate different user abilities and needs; Smartphone-centric growth, with personal devices providing power, identity, payments and content; 'Everything is a brand', with branded exclusive and shareable interface experiences: and Accessibility and wellness, with proactive guided and quantified

HOW DO YOU VIEW THE FUTURE OF EMBEDDED SEATBACK IFE?

passenger care.

There has been talk in the media lately that with the growth of BYOD, seatback IFE screens will become extinct, but we do not believe that to be the case. Airlines have different and varying requirements for what they want to provide to passengers to improve their flight experience. Relevant factors can include region, length of flight, and also whether it's a narrow-body or wide-body aircraft flying that route.

With wide-body aircraft, Panasonic is still seeing predominantly seatback embedded systems. A lot of airlines,

particularly those with narrow-bodies, that are taking streaming solutions, are those that in the past would not have selected an IFE system at all. As a result, we actually look at BYOD and streaming services as a positive for Panasonic, as it

has increased our addressable market.
Still, in most cases, embedded

systems are not being taken off to install streaming solutions.

Another factor is that we live in an 'and' society.
People don't want embedded or streaming. They want both. The trend in homes and offices is about second screens. You watch the big HD 4K TV in front of you and browse the tablet in your lap at the same time. We are seeing this trend

A lot of airlines are asking for seatback IFE systems with streaming, which supports that second-screen trend.

increasingly move onto the aircraft.

IS EX4 IN THE PIPELINE?

Panasonic launched the NEXT IFEC platform at Aircraft Interiors Expo (AIX) 2017. What you're going to see during AIX 2018 is how that NEXT platform and NEXT operating system provide a digital cabin featuring cloud-based data sciences (analytics and business intelligence); fast-paced innovation (agile methodologies on a single, unified platform); services on-demand; and improved quality through architecture and process improvements.

HAWK FLYING HIGH

A PROVEN, IN-SERVICE SEATING PLATFORM OVER 100,000 SEATS SOLD TO DATE









catering

The World Travel Catering & Onboard Services Expo (WTCE) is designed for airline buyers seeking catering, onboard retail and passenger comfort innovations. The 2018 event will offer sourcing and networking opportunities for its predicted 3,700 attendees, with more than 350 suppliers covering categories including food and beverages, hygiene, logistics, packaging, retail, comfort, toys and games. Here are eight good reasons to attend the event on April 10-12.

reasons to visit



The popular New Exhibitor Villages will be revamped and expanded, with four zones dedicated to first-time exhibitors across Halls A1-A4. These dedicated areas will introduce airline, rail, cruise and coach operators to companies never before showcased at the event. A host of new products and services will be unveiled by a wide range of businesses, from olive oils to gourmet snacks, nut mixes and cheeses, to wines and cava.

Where: HAMBURG MESSE

APRIL 10-12

2 WORLD TRAVEL RETAIL

Following on from a successful launch in 2017, the Focus on World Travel Retail will return this year. This dedicated showcase for the onboard travel retail industry will unveil the products and services available for inflight purchases. A networking bar, sponsored by Heinemann Gebr, will also offer exhibitors and visitors a chance to catch up and sample the future of travel retail onboard through a series of branded networking sessions. A full schedule will be announced soon.



WTCE IS FREE TO ATTEND!

EXPO PREVIEW

catering (O

See the latest travel

trends at the What's

New Onboard area,

located at the front of the VIP Buyers Lounge in Hall A3

Cioccolato

Ciocc

5 BUSINESS MEETING HUB

Nocciola

As ever, relationship building is a key focus for WTCE, and the 2018 event will see the introduction of new and improved networking facilities.

The WTCE Business Meeting Hub is one such addition, providing a dedicated place for attendees to hold meetings with clients. VIP airline and rail attendees will have priority booking for the hub, which is located in Hall A2.

The VIP Buyers Lounge is a dedicated area for professional meetings, with this exclusive area set aside for VIP guests to relax and enjoy time out from the busy show floor, and unwind while taking advantage of the complimentary facilities available, including breakfast, lunch and refreshments throughout the day.

Taste of Travel



TASTE OF TRAVEL THEATRE

The Taste of Travel Theatre will inspire debate, with cutting-edge presentations, live chef demonstrations and new product launches. The theater is free to attend and a full program will be announced in due course.





$\boldsymbol{6}$ what's new onboard

WTCE's What's New Onboard showcase will highlight the latest industry offerings, bringing innovations and products launched to the market in the past 12 months to the Hamburg Messe.

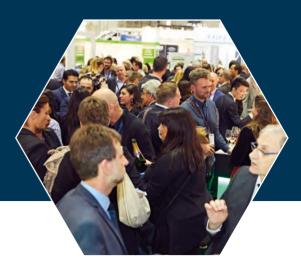
7 PASSENGER EXPERIENCE CONFERENCE

Arrive at Hamburg Messe on April 9, the day before WTCE begins, and you can attend the Passenger Experience Conference, which is an opportunity to gain key industry knowledge and expand your network of contacts in a relaxed environment. The conference brings together experts and visionaries from airlines, airframers, OEMs, suppliers and design organizations with key responsibility for the passenger experience.

Amenity kits are a popular product at WTCE. See p146 for the latest kits and to find out how to create a kit that passengers will love

S INDUSTRY NETWORKING PARTY

The popular Industry
Networking Party will take
place after the Passenger
Experience Conference on
Monday April 9, providing an
opportunity for professionals
in the industry to meet new
people and build new
business connections.



LSGgroup



Creating holistic concepts that make a real impact with your passengers means bringing together many companies, experts and competencies. At the LSG Group, we smoothly connect all of these elements in a collaborative approach, creating an efficient working process for you as well as a seamless experience for your customers.

Meet us at the **WTCE 2018**, Hall A1, Booth 1E20 10–12 April, Hamburg, Germany wtce2018.lsg-group.com





SERIOUS SNACKING

Feedback received by the organizers of WTCE shows that savory, sweet and healthy snacks are three of the top five food products searched for by VIP visitors at the expo. The data, which garners feedback from more than 800 VIP attendees, saw that at last year's show 41% were interested in savory snacks, 40% in sweet snacks and 38% in healthy snacks.

The interest in snacks for onboard consumption comes as the growth of buy-onboard presents new challenges and opportunities for travel operators to drive ancillary revenue and cater for a wide array of consumer preferences.

STAND: 1A41

READY, STEADY, BAKE!

A team of chefs at Crantock brand The Bake Factory has created Taco Sliders, a box containing two Mexican-style tacos with slow-cooked fillings. One is Sloppy José, a minced beef with Mexican spices and chocolate, the second is a Chicken Taco with honey, lime and jalapeños topped with pink pickled onions.

Crantock will also be showcasing its portfolio of flight-ready products in partnership with brands such as Old El Paso, Fry's and Levi Roots. The company's executive development chef, James Strawbridge, will be running a demonstration at the Taste of Travel Theatre on superfoods and how he designs buy-onboard products that deliver on flavor and appeal to vegans and vegetarians.



THIS TARALLI'S A CRACKER

Are you tired of the snacks you usually find on board? Are you coeliac and still struggling to find something suitable for your diet during flights?

Fiore di Puglia is announcing a brand-new item available for airlines: the 35g Gluten-Free Taralli with extra virgin olive oil, suitable for gluten free, lactose free and even vegan diets.

The Gluten Free Taralli is free of palm oil, wine and yeast, is not fried and is low in salt. Crunchier and crumblier than many other gluten-free products on the market, it is also healthier.

The Taralli is available in three savory flavors (classic, pizza and multigrain) and two sweet flavors (chocolate and lemon).

A small sample from the WTCE menu...

STAND: 1E20

BOX CLEVER

he Oakfield Farms Solutions Europe has developed a unique meal for the travel industry for Schär, a European brand of gluten-free products. Named 'Schär's Gluten Free concept', the product bridges the gap between special meal requirements and catering complexity. Because it is delivered as a ready-assembled solution, it assures safety and quality, for consumers as well as operators.

The boxes contain a hot Italian meal, a bread roll, a portion of butter and a chocolate-covered wafer snack. The meal is available in vegetarian and non-vegetarian options. The hot meal element is placed in a separate compartment, which enables crew to remove it easily for heating and reinsert it for service. The packaging is clever. By unfolding the compartments, passengers can create their own trays. All components come readily assembled in one box, which makes this concept easy to handle.



STAND: 4E51

NATURAL TALENT

Hessing will be showing products from its Just brand, which takes raw ingredients and processes them into healthy ready-to-cook vegetables, fresh cut fruit, fresh juices and salad meals. The company's latest creation is soup in a cup, made with pure and natural ingredients. "Every single product we offer must fit our mission to be delicious, convenient, healthy and fresh. No... superfresh!" says Frank Hessing, managing director of Hessing.

The My Event tool
(available on the WTCE
website) allows
attendees to plan ahead of
the show by flagging key
exhibitors to visit, or Taste of
Travel sessions to attend.
Visitors and exhibitors can
explore the list of participating
companies and attendees, to
establish contact and
arrange meetings to
maximize time spent at
the show.





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EXPO 10 – 12 April 2018 Hamburg Messe, Germany



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Making travel easier

Air New Zealand further enhances the Economy Skycouch™

Air New Zealand has further developed its award-winning Economy Skycouch™, introducing a new infant harness and belt allowing infants to remain lying down throughout the cruise phase of flight and a new infant pod for the airline's youngest customers.

The Air New Zealand designed Skycouch is a row of three Economy seats that easily convert into a flat, flexible surface for rest, relaxation and play, was first introduced in 2011 and has revolutionised long haul travel in the Economy cabin.

These new enhancements give families even more freedom to choose how they fly.

The airline will be displaying the updated Skycouch at the Aircraft Interiors Expo in Hamburg from 10-12 April 2018, at the SWS Certification Services stand, 5E16 in Hall B5. Contact Kerry Reeves to organise a time for viewing. Kerry Reeves, Head of Aircraft Programmes, Kerry.Reeves@airnz.co.nz.



FLEXIBLE THINKING

Air New Zealand has enhanced the innovative design of the Economy Skycouch

ir New Zealand has taken customer feedback on board and further developed its award-winning Economy Skycouch, giving families even more freedom to choose how they fly.

The Air New Zealand-designed Skycouch, a row of three economy seats that easily convert into a flat, flexible surface for rest, relaxation and play, was introduced in 2011 and remains one of the most innovative long-haul economy seat designs.

In addition to the normal seatbelts fitted to economy seats, customers seated in a Skycouch are also issued with a Skycouch seatbelt pack by the crew after takeoff. This pack contains unique seatbelts that allow customers to sit or lie in a variety of positions during flight, even if the fasten seatbelt sign is switched on.

The airline has now further developed the product, offering even greater flexibility for those traveling with young children.

The Skycouch seatbelt restraint system has been updated to include an infant harness and belt, allowing infants to remain lying down throughout the cruise phase of flight. Previously they were required to be seated on a guardian's lap when the seatbelt sign was illuminated. A new infant pod also provides additional comfort and protection for the airline's youngest Skycouch customers.

The Skycouch Cuddle Belt, which was previously only certified to allow two adults or an adult and child to lie down side-by-side on the Skycouch, has also been updated to allow two children to use it, giving parents and guardians more flexibility around how the family travels.

Air New Zealand's head of aircraft programs, Kerry Reeves, says a significant amount of work has gone into the development of the Skycouch design, and the airline expects the changes to be popular with flying

"The Skycouch has proved to be a real game changer in the economy cabin. While we initially marketed it to couples, we quickly found the product suited parents with young families especially well. Parents can relax while their children are able to have their own space and play area without interrupting other passengers.

family groups.

"Through this process, we've spoken to many customers who have traveled on the Skycouch and their feedback has helped to inform the updates and refinements we're introducing this year," adds Reeves.

Pending approvals, the airline is aiming to have the modified Skycouch product on board its Boeing long-haul fleets later this year.

The Skycouch has also been licensed by a number of other airlines, and these new improvements will also be made available to those airlines.

The airline will be displaying the updated Skycouch at Aircraft Interiors Expo in Hamburg from April 10-12, 2018 at the SWS Certification Services stand.

FREE READER INQUIRY SERVICE

To request more details from Air New Zealand, visit www.ukimediaevents.com/info/aim



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LATCHING ON

The small details make all the difference to the overall impression of a cabin, and Actron's latest designs and web experience can help airlines get the details right

precision interior hardware used in commercial and business aviation applications Actron Manufacturing has unveiled its new website. The idea behind the remodeling project was to modernize the site to deliver a better user experience, with a highlight of the new website being the product selector feature, which gives engineers access to product categories, high-resolution renderings and 3D models.

SA-based manufacturer of

During the initial phases of a project, engineering teams can use the product selector to identify application solutions and review dimensional and mechanical features; 3D models can also be imported from the website to assist in the design function. While many of the company's projects are a collaborative effort between customer design and engineering teams and Actron, the website is intended to streamline the process by enabling design professionals to shortlist potential solutions, saving time and money. You can visit the site at www.actronmfginc.com.

HEADPHONE HOOK (A2040)

Actron has introduced a new headphone hook, designed to fit flush with the surface when not in use. It can be extended up to 2in and can be delivered with a round or square bezel. Driving the idea behind the headphone hook is the speed with which IFE applications are being introduced to commercial flight.

For business jet completions, a much higher level of integration and finish is expected. Actron meets this expectation in many ways. Parts can be delivered in custom finishes or unfinished. When delivered unfinished, the completion center manages the finish of these and other findings to ensure design



continuity. Factory assembly ensures Actron's standard of quality and maintains the integrity of the warranty. The A2040 is delivered hard anodized (clear), and can be finished to customer specified colors, or delivered unfinished, in kit form.

NEW LATCH PRODUCTS

Actron is also introducing a range of latches, including the round and oval shaped lines popular on business jets. A departure from the usual rectangular design shapes, these new designs incorporate a modern look and feature new architectural finishes. They can also be delivered unfinished as a kit, which can be consolidated with other elements to ensure continuity in cabin design. Once finished, Actron offers the

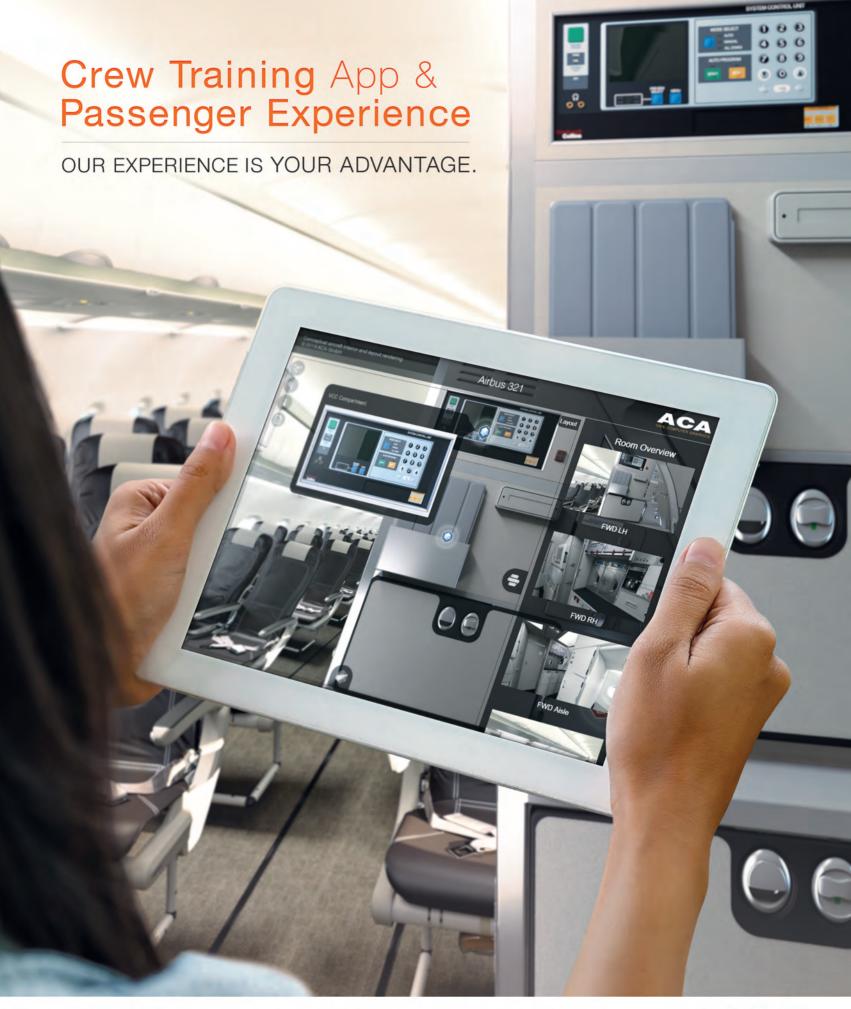
option of factory assembly, which ensures the company's standards of quality and integrity of warranty are maintained.

MADE IN THE USA

California-based Actron Manufacturing makes aluminum drawer slides, latches, door bolting systems, handles and pulls, coat hooks, and other interior components found on most commercial and business jets around the world. Actron is AS9100, Rev. D certified and has been designing and manufacturing solutions since 1971.

FREE READER INQUIRY SERVICE

To request more details from Actron, visit www.ukimediaevents.com/info/aim



A NEW STEP FOR AIRLINES

ACA is introducing a new database system for virtual content that can help airlines design better and more efficiently

irlines and airline alliances are very large companies with many departments, several of which will require and work with different virtual products. This range of virtual products makes it challenging for the various departments to communicate with one another, and to easily establish which content each department has already created. This often means that there is a lack of information about which designs are complete and available to use immediately, or which can be used as the basis for a design.

ACA, a visualization company with over 30 years of experience in aviation, has created a new product named Virtual Fleet. This product is the result of ACA's experience of organizing a huge database, having built up files for aircraft exteriors and interiors over three decades; the company has realized the savings in time and money that can be gained from having a well-organized library.

Within ACA's virtual fleet workflow, the combination of the advantages of several design products helps users to reduce the costs and timeframes of projects by providing an overview of all relevant designs already created through an archive function. The system also offers the ability to re-order renderings in different resolutions or other output formats, to order an animation of any existing still images, or to choose between multipresentation tools for different output devices such as iPad or VR headsets.

ACA's virtual fleet database offers many possibilities, such as gaining an overview of already ordered products, a fast re-order function, and an extended ability to order more products directly.

For example, the process could start with ACA's aircraft configuration tool, and the next step would be to use this virtual

A well-organized virtual design library can yield library can yield time and money savings

THE 3D ENVIRONMENT ALLOWS CABIN DESIGNS AND LIVERY SCHEMES TO BE VERIFIED QUICKLY AND SIMPLY

cabin design for internal and external design reviews of any components within the cabin. After the final design has been established, the virtual cabin can be used as the basis for creating visual content for external presentations, crew training or passenger experience applications.

Finally, the virtual library gives all authorized members of an airline permanent access to all existing designs throughout every department.

FOUR KEYS TO SUCCESS

ACA's virtual fleet system combines four main products.

The first is Virtual Cabin, which combines design support tools with a variety of presentation products such as stills animations and apps. Once a cabin is built up, it can be used for analyses and to demonstrate the passenger experience.

Next, the Crew Training app combines the Virtual Cabin product with an interactive user interface that enables crew to explore the aircraft ahead of its entry into service. This capability reduces downtime of aircraft and makes it much easier for crew members to become familiar with the different aircraft types.

The LiveryPro design support tool gives designers the possibility to create their own liveries within a 3D environment. The easy-to-use tool can run on PC or Mac and allows users to verify the livery design in real time and create quick previews. Being able to check the fit of liveries in 3D helps users avoid common map distortion issues.

Finally, the Virtual Library offers access to the airline's existing products within a private homepage that can be accessed by selected team members of the airline for further usage.

FREE READER INQUIRY SERVICE

To request more details from ACA, visit www.ukimediaevents.com/info/aim

WE ARE **SCIENTISTS**.



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FOR TEXTILES.

WE MAKE FLYING...





FRESH & RELAXING





COMFORTABLE



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ENHANCE WELL-BEING

R·VITAL

CLEAN AND GREEN

Devan CEO Sven Ghyselinck looks into the future of aircraft interiors and explains how textiles can play a vital role

or Devan Chemicals, an R&Ddriven manufacturer of finishing technologies for textiles, the sky is not the limit: it's only the beginning. Inspired by its activities in other textile market segments, such as clothing and bedding, the company is now looking to tackle various causes of discomfort on board aircraft, by offering an extensive range of textile treatments.

"We like to hold future-forward brainstorms with global textile companies, looking into trends and provoking new ideas and concepts by sharing our experiences in other market segments," says Sven Ghyselinck, CEO of Devan Chemicals.

Frequent long-haul flyers have many complaints in common, such as sore legs, not being able to sleep, and having dehydrated skin from the dry air.

"We have developed a comprehensive health and wellness product range, which can be applied to textiles to help address these long-haul flight issues," Ghyselinck explains. "For example, facemasks, pyjamas and compression socks that can offer skincare benefits; blankets with a pleasant fragrance; pillows that help you fall asleep more easily. This is no longer a thing of the future. It's here."

Devan recently teamed up with the Japanese pharmaceutical company Kaneka, and added Ubiquinol, a more advanced and 100% natural form of Q10, to its R-Vital range of active ingredients for skincare and well-being in general.

"Textiles enhanced with Ubiquinol deliver their optimal effect when in direct contact with skin for a minimum of three hours," Ghyselinck adds.

A FRESH AND CLEAN ENVIRONMENT

Devan has been talking to many suppliers of cabin textiles and has learned about



TREATED TEXTILES CAN COMPLEMENT LIE-FLAT BEDS TO HELP ACHIEVE RESTFUL SLEEP

the challenges of keeping cabins fresh and clean for a long period of time. Unwanted odors and stains from food or drink spills are just a few of the concerns of both passengers and airline personnel.

"Our long history of developing technologies for all kinds of textiles and market segments enables us to understand the headaches that airlines face and allows us to offer solutions," says Ghyselinck. "Permanently fixed antimicrobial solutions for biological odors, or odor breakdown technology for chemical smells coming from foam materials or other components in the cabin, could provide an answer to these concerns."

The company even offers a probioticbased allergen control solution for seats and carpets, a technology that was created 10 years ago for the bedding market to prevent household allergies.

THE FUTURE IS GREEN, AND SO ARE DEVAN'S FLAME RFTARDANTS

For obvious reasons, airline textiles have to meet strict flame retardancy (FR) regulations. Besides the FAR norm (burning behavior), some airlines also choose to upgrade their FR performance in compliance with (the Airbus) ABD norms for smoke density and toxicity.

"We notice more and more that global consumers seek out more environmentally friendly textiles for their beds, personal clothing and home furnishings. So why not offer them the same level of comfort and peace of mind inside an aircraft?" the CEO asks.

Devan has what it takes to help reach these standards in an environmentally friendly way, with its product range being free of halogens, antimony and heavy metals. The company also has technology that locks the flame retardancy properties inside the yarn, so less topical chemical treatment is needed.

ARE YOU READY?

"Why wait until others have the future?" Ghyselinck asks airlines. "We regularly hold future-forward brainstorms with global textile companies, looking into trends and provoking new ideas and concepts by sharing our experiences in other market segments. Some of these interactions result in our 'Future Lab' projects - collaborative and tailor-made

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GET SMART

Airlines need to embrace the digital world in their passenger experience or they will become marginal, says Altran

You can visit Altran at Aircraft Interiors Expo 2018, Stand 6A80

he long-term outlook for the global airline industry is bright, with many projections indicating that passenger figures will double by 2035. Reflecting this positive outlook, the aircraft industry has full order books. Does this mean the route ahead for aviation will be smooth, with a strong tailwind of surging demand?

The answer is most likely not. The fundamental challenges of the airline industry will remain: operational efficiency must be ensured at all levels, and a unique experience must be provided throughout the passenger journey, to successfully differentiate airlines' brands. In addition, passengers have entered the digital age, and airlines that embrace the move toward digitization on an operational level as well as on a customer-facing level are the most likely to make strong profits.

Many airlines have created customer portals where passengers can plan trips, book flights and execute most pre-flight transactions on a self-service basis. However, the closer the customer gets to the actual flight, the bumpier the seamless digital experience gets.

For the onboard experience itself, airlines need to master the challenges of clients wanting to use their own smart devices on board, with access to fast and reliable connectivity during the flight, as well as access to useful and attractive services during their time on board.

All those 'wants' are an opportunity for airlines to further their strategies to open up new revenue streams, and the existing ecosystem of supplier partners needs to react to that. A cohesive client platform available on various devices is needed, and should be developed by specialists able to implement a complete digital passenger journey and integrate various IT systems (CRM, booking,

entertainment, shopping) within the IFE system. The development partner should be particularly knowledgeable about safety and security, given that the systems will use cloud-based and networked platforms.

Airlines need to tackle the subject of efficient cabin management from multiple angles. One aspect is reconsidering cabin layouts in terms

Airlines need to tackle the subject of efficient cabin management from multiple angles. One aspect is reconsidering cabin layouts in terms of space and weight optimization, passenger comfort and maintenance costs. As new layouts are devised, for example moving galleys below deck, new requirements for intra-crew communication arise.

It is also important to gain cabin efficiencies through paperless processes and by making hardware 'smarter'. One possibility is the introduction of wearable devices, such as smartwatches. Initial

LEFT: THE AUTONOMOUS CABIN TROLLEY, A SMART AND AUTOMATED DEVICE TO TRANSFORM CABIN SERVICES

FAR LEFT: WEARABLES CAN BOOST THE EFFICIENCY OF CABIN MANAGEMENT SYSTEMS

demonstrations have shown that such devices can be successfully integrated into existing cabin management systems and deliver value by offering crew control of cabin systems and passenger data. Such technology also provides an opportunity for personalized service.

Together with smart trolleys, the contents of which can be identified via RFID and monitoring systems, as well as service innovations like automated cabin trolleys, smart solutions can drive savings and create new service concepts. It is vital for airlines to choose a digital partner that combines agility with know-how across all the relevant domains, and this is where Altran comes in.

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"ALL LED" CABIN LIGHTING INTEGRATIONS

Defining a brand and creating the optimum customer experience is a common goal of airline marketing departments and industrial design firms. LED cabin lighting is a key element in those airline marketing efforts.

Bruce Aerospace LED Lighting Systems are offered in all-white, bi-color or full color spectrum, and are certified on many Boeing and Airbus platforms and flying today on leading airlines. The Full Color Mood Lighting is a vibrant, customer-programmable "plug and play" system providing rich colors and illumination levels tailored to suit each airline's distinctive brand. The Bruce design is easy to install and provides long-term cost-of-ownership savings as the LED systems weigh less than the original fluorescent systems and produce less heat in the cabin. Also, since the LED systems require less power draw than fluorescent systems, this frees-up power for other uses such as IFE, Wi-Fi, and in-seat power.

Please visit us at the Aircraft Interiors Expo in Hamburg, April 10-12, 2018 in HALL B5 STAND 5B20.



Company Contact Details:

101 Evans Avenue, Dayton, NV 89403 **Tel:** +1 775 246 0101

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LED LIGHTING INTEGRATION

LED cabin lighting from Bruce Aerospace offers a major benefit to cabin aesthetics

efining a brand and creating the optimum customer experience are common goals of airline marketing departments and industrial design companies the world over. These teams make careful selections of seat cover materials, IFE, flooring, decorative laminates and other individual elements, which all combine in the cabin to create the 'look' and the passenger experience that each airline is targeting.

However, one design element that is not always considered in a cabin upgrade program also happens to have one of the most noticeable effects on the overall design: cabin lighting. Lighting is a truly integrating element, which brings together all the colors, textures and features in a cabin.

As a supplier of the All-LED brand of plug-and-play cabin lighting systems, Bruce Aerospace has worked with airlines and industrial designers around the world to add the lighting element that adds the final touch to cabin integration. The positive impact of the systems on the passenger experience, and the relative economy of the lighting, means that LED lighting gives a good 'bang for the buck'.

As the founder and CEO of an airline (name withheld) that has installed Bruce Aerospace's full-color spectrum mood lighting explains, "I spent a lot of money on new seats and IFE, yet the positive comments I get from passengers are always about the great lighting."

The LED lighting systems from Bruce Aerospace are offered in all-white, bi-color or full-color spectrum, and are already certified on many Boeing and Airbus platforms and flying today with leading airlines. The full-color mood lighting is a vibrant, customer-programmable plug-and-play system providing rich colors and



MYRIAD LIGHTING EFFECTS CAN BE ACHIEVED USING THE SYSTEMS, WHICH ALSO SAVE WEIGHT

illumination levels tailored to suit each airline's distinctive brand.

The Bruce design is easy to install in aircraft, and also provides long-term cost-of-ownership savings as the LED systems weigh less than the original fluorescent systems and produce less heat in the cabin. Also, since the LED systems require less power draw than fluorescent systems, this frees up power for other uses such as IFE, wi-fi and in-seat power.

With more than 60 years of experience in the aerospace lighting industry, Bruce Aerospace continues to create new solutions for cabin lighting. Its 'Gen 3' LED lighting system is an example of how to bring together the latest in high-resolution LED technology into a highly reliable, lightweight, low power consumption, airline-programmable

lighting system that is easy and quick to install.

The Gen 3 system complements the other All LED cabin products offered by Bruce, such as work lights, passenger reading lights, emergency lights, signage, lavatory lights, entry and galley lights, branding panel lighting, and accessory lighting.

The fully user-programmable LED lighting systems offer industrial designers and airline marketing departments a low-cost tool to bring all the cabin design elements together. By varying the illumination level, the colors, and the transition timing from one lighting scenario to the next, the customer experience is elevated to an entirely new level.

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Virtual and augmented reality technologies are rapidly transforming our business. Pacelab AVR-enabled aircraft configurators combine high-end 3D visualization with real-time compliance checks to give you a head start on creating dynamic and personalized customer experiences that inspire buyer confidence and deliver sales.

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A NEW REALITY

A dynamic virtual environment is ushering in a new reality for cabin configuration, improving the design process and experience

s virtual reality (VR) progresses from hype to practical application, VR simulations have become a staple of the cabin design process. These simulations enable designers and airline customers to freely explore the 3D space of the cabin to get a clear idea of how it will look and feel. While the visuals are unarguably spectacular, VR simulations all too often limit themselves to presenting a static snapshot of the aircraft configuration, without leveraging the additional value offered by simulation technology.

The most widely used commercial aircraft and cabin configurator, Pacelab Cabin, explores a more holistic approach by providing a fully dynamic virtual environment, which enables users to interact directly and in real time with the visual representation of the cabin. The visual depiction is closely coupled with the underlying configuration model to ensure that all business, technical and regulatory constraints are complied with as selections are made. This process reduces the number of design iterations required, while providing a unique buyer experience that matches the high-tech character of the product.

PACE, the company behind the software, has a long tradition of adopting emerging technologies such as 3D imaging and cloud-based services to make cabin definition faster, less cumbersome and more transparent for everyone involved. When PACE became part of simulation software provider TXT. technological synergies sparked instant product development activity. Drawing on two decades' worth of experience in developing simulation software for crew training and on-the-job support, PACE set out to merge full-on configuration capability with the immersive power of virtual and augmented reality (AR).



The first development milestones are highly interactive AR and VR solutions, which support a visual configuration of the whole cabin and of individual cabin items such as galleys and lavatories. PACE is also working on augmented and mixed-reality applications for training, in which the real world is enhanced by virtual details but remains central to the experience. These applications promise to deliver a less synthetic user experience and open up additional use cases. While AR hardware such as the Microsoft HoloLens has not hit the mainstream yet, the intertwining of the real and the virtual is clearly destined to be a transformative force in cabin mock-up and retrofit centers.

PACE's long-term vision is to equip marketing and customer engineering teams scattered around the world or working on different cabin aspects in customer definition centers with light AR- and VR-enhanced applications that enable them to collaboratively create a master configuration that is essentially a digital twin of the aircraft at the contract configuration level, tightly integrating the cabin definition phase into the wider product lifecycle management context.

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DESIGN THINKING

Creativity and innovation lead the way at Sekisui SPI, especially with the help of a new design strategist

n her role as design strategist at Sekisui SPI, Karyn McAlphin's strengths are not only her design background and vast aviation industry knowledge, but also her ability to think like the customer.

"To create meaningful innovation, understanding your audience and truly caring about their experience is essential. Having insight into their wants and needs and how they interact within their environment provides an opportunity for great design.

"You have to put on your customer hat and consider their point of view," McAlphin explains. She believes in close interaction with Sekisui SPI clients as projects get underway. She draws upon years of overseeing airline research, including focus groups and online surveys, which have contributed to her awareness of the customer's viewpoint.

INNOVATION BASED ON INSIGHT

McAlphin has 25 years of airline experience, with 18 of those years spent focusing specifically on aircraft interiors. With degrees in fine arts and photographic illustration, coupled with a sharp eye for design and color, she has developed award-winning aircraft products and interiors, and branding and communication materials.

McAlphin specialized in cabin design and branding for new aircraft specifications and retrofits and was instrumental in developing the industry-leading Envoy Suite for US Airways, and indeed for the rebranding of USAir to US Airways. Now she is collaborating on behalf of Sekisui SPI, helping customers explore products and possibilities while approaching design with vision and imagination.

In her evolving role as design strategist, McAlphin is off to an enthusiastic start, bringing together client stakeholder alignment on design innovations. "I speak their language and understand their challenges," she explains. "I will work with airline staff, seat manufacturers. in-house industrial designers, and outside design houses. Ultimately, I will serve as a liaison to a variety of groups."

EARLY INTERVENTION

McAlphin meets with engineering, procurement, marketing and branding teams, and designers to educate them about the capabilities of thermoplastics, in terms

of what can and can't be done, visually and practically. According to McAlphin, "Aircraft interiors have to be lightweight to save fuel, yet durable enough to stand up to the rigors of travel and cleaning."

With her airline background, McAlphin sees opportunities along with possible difficulties. Her goal is to get involved in the planning process early to help steer clear of potential problems.

"Clients don't always know what they don't know, so it's critical to get out in front of them and address design challenges early in the process. They can turn to me as an empathic resource

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Expo 2018,
It,
It,

who can empower them to discover the best solutions."

According to McAlphin, the customer is not only the airline, but also the passenger – the latter being the ultimate end user: "When we, as an industry, focus on the passenger, we all win."

McAlphin will be at Sekisui SPI's stand (5D40) at Aircraft Interiors Expo 2018. Please stop by to discuss how design thinking can shape your next project.

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MEMORY MAKERS

Formia is putting brand purpose first at WTCE 2018, showing how to create kits that please and impress passengers

ccording to TrendWatching.com, 86% of business leaders agree that a good customer experience is vital for success.

Consumers already expect competitive pricing and quality customer service, and now they want something more: a great brand experience. Changing technology, apps and online purchasing methods are in turn changing customer tastes and requirements, and how the overall B2C environment is evolving. Time is a precious commodity and customers are increasingly looking for purpose-driven brands that deliver a good experience.

What this means for businesses is that in order to tempt customers into their particular experience, they have to consider the psychology of creating an experience that creates devoted customers. The companies that are best at this create experiences that customers feel are personal, while also connecting them to the company's story. Even if the storyline is not directly related to the customer, it should feel familiar to the customer and be something they can relate to, turning them into purchasers and social brand ambassadors.

As a market leader in inflight service amenities and comfort items, Formia has made the customer experience a top priority, ensuring that each innovative product offering is more than just an inflight complimentary gift. With its amenities, Formia helps welcome passengers into the onboard experience, offering products that go beyond traditional amenities, and become treasured functional keepsakes with multiple post-flight uses, embracing airlines' mission to indulge passengers.

At this year's World Travel Catering & Onboard Services Expo in Hamburg, Germany (April 10-12), Formia will share stories of how it can redefine the





AT WTCE 2017, FORMIA SHOWCASED ITS AMENITY KITS CREATED FOR AIRLINES AROUND THE WORLD

customer experience through its extensive brand portfolio and strategically creative tailor-made designs.

For each new amenity innovation, Formia takes the airline's distinct story and injects a little passenger desire, through design, style and functionality. The result is kits that give a feeling of value and being valued, which passengers will want to keep and reuse. Designing memorable experiences is a business art that Formia embraces.

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ALL CHANGE

This is a big year for TSI Seats, with seat launches, new airline deals, deepening relationships with airframers, and a new general manager

he start of 2018 heralds a very exciting year for TSI Seats as the company will be delivering its new Epianka seat model for Turkish Airlines' B737MAX and A320Neo aircraft programs. This deal marks a significant development for the airline, and also for TSI Seats as it starts to develop its relationships with Airbus and Boeing.

This year also will see TSI Seats' first foray into narrow-body business class seating, with the launch of Royal Lux, a design featuring innovations in comfort and styling. The seat will be offered with electrical or mechanical drive options as part of the seat customization choices available to suit individual airlines' needs.

In addition, TSI Seats will showcase its new Milligram narrow-body lightweight seat at Aircraft Interiors Expo 2018.

Milligram has been designed with a weight goal of less than 9.5kg and will be available in several versions, ranging from an LCC seat with no recline, to a fully featured economy seat with IFE, recline and footrest options, depending on aircraft configuration.

Suat Sağiroğlu, the new general manager of TSI Seats, was appointed in January 2018 to lead and further develop the company. Sağiroğlu has a senior degree in engineering and has held several senior positions at Turkish Airlines in fleet development, aircraft leasing returns and coordinating engineering project teams.

Sağiroğlu comments, "I have been given the opportunity to grow and develop TSI Seats into one of the world's leading seat manufacturers, and I relish the challenge of growing TSI's brand recognition in the exciting world of aircraft interiors.

"We will be continuing our seat development programs as we grow

LEFT: ROYAL LUX IS A
LANDMARK PRODUCT FOR
TSI SEATS, BEING THE
TSI SEATS, BEING THE MILLIGRAM
ECONOMY SPIRST NARROWBODY BUSINESS CLASS SEAT
BELOW: SUAT SAĞIROĞLU,
GENERAL MANAGER

RIGHT: THE MILLIGRAM
ECONOMY CLASS SEAT WILL
BE REVEALED AT AIRCRAFT
INTERIORS EXPO 2018

and develop our capabilities, and we will be seeking industry opinion and knowledge in how we move forward in seating design and the implementation of the newest technologies into our seats to offer the best in class for customers in terms of weight, comfort, safety and reliability.

"This year is my first Aircraft Interiors Expo, and I am very excited to attend and lead TSI Seats in its new direction," adds Sağiroğlu.

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SUPERSONIC CABINS

The second generation of supersonic commercial flights is coming, and the cabin designs look set to build on those of the legendary Concorde, finds Jennifer Coutts Clay

econd-generation supersonic aircraft development (as reported in previous issues of Aircraft Interiors International) has given cabin designers unprecedented opportunities to showcase advanced materials and innovative methods, manufacturing and installation processes that were unavailable during the early days of Concorde.

Examples include regular-size, instantly dimmable windows (instead of Concorde's basic window panes measuring just 6.5in by 4.5in); ease of accessibility (Concorde's 16in aisle width posed problems for mobility-impaired passengers); LED mood lighting (instead of warm white/cool white fluorescent tubes running along the ceiling panels in Concorde's cabins); and almost limitless, multiscreen in-flight entertainment options and virtual reality headsets (instead of Concorde's purely audio-channel content).

This new generation of supersonic aircraft cabins can also benefit from advances such as cabin coatings that are resistant to dents, marks and scratches; recyclable carpets, modular floor tiles and non-textile 'hard' floor coverings; seats with microclimate features, massage facilities and lightweight seat-foams,

you can you download Jennifer's download Jennifer's e-book on Amazon, e-book on Amazon, e-book on Amazon apple i Tunes and Apple i Tunes and Google Play Google Play contourable to any shape; sustainably sourced, stain-resistant seat cover fabrics

contourable to any shape; sustainably sourced, stain-resistant seat cover fabrics that adjust automatically to balance body temperature needs; and wi-fi enablement, PED connectivity and stress-reducing noise-cancellation systems.

Further advantages include anti-microbial surface treatments and UV lights to sanitize heavy-use areas; stylish bathrooms with touchless water-supply and garbage-disposal units; upgraded galleys with induction stove tops for onboard chefs to cook fresh meals; and bio-degradable catering accessories and easily maneuverable galley trolleys.

Those flyers lucky enough to have experienced supersonic flight before will hope for cabin pressure to be maintained at Concorde's extremely comfortable level of about 5,500ft, and they will certainly welcome technological and green developments in the cabin environment.

However, there might be a revolt if airlines ventured to serve next-generation superfoods, as lauded by health gurus (e.g. fungus adaptogen compounds and fermented-seed crisps with antioxidant powders). The *crème* de la *crème* clientele would never want to relinquish the superlative menus and dining standards pioneered for Concorde by chefs such as Alain Ducasse, the Roux brothers and Anton Mosimann. From the passenger perspective these star chefs are the enduring guardians of the legacy of the glory days of Concorde.

JENNIFER COUTTS CLAY

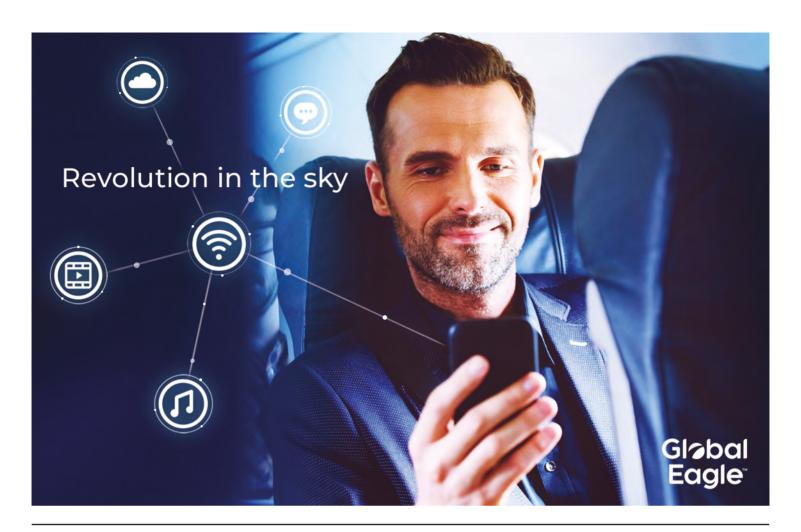


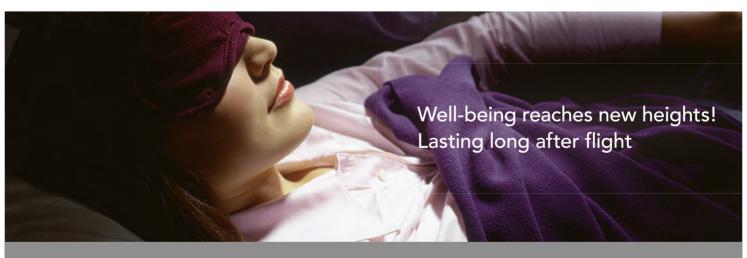
Jennifer Coutts Clay is the author of Jetliner Cabins: Evolution & Innovation, available on Amazon, Apple iTunes and Google Play. This e-book app provides details of hundreds of aircraft cabins.

As controller of corporate identity at British Airways, Jennifer was responsible for the cabin refurbishment and upgrade of the airline's supersonic fleet, as well as its subsonic fleets.

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INFLIGHT CABIN HUMIDIFICATION IMPROVES SLEEP AND FURTHER REDUCES JET LAG

Cabin air is far more dry than any place on earth. The dry cabin air is together with cabin pressure, noise, vibrations and lightning a key factor behind jet lag.

How dry air affects the passengers varies but the negative impact adds up with the number of flight hours as well as the selected cabin class. Ironically, the more spacious you travel, the more comfort and luxury being offered, the more dry is the air due to lower passenger density. But that is about to change...

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TOUCH THE INNOVATION

Superb aesthetics, light weight, and comfort for super long-haul routes: Ultraleather Promessa promises it all

aving raised customer expectations through smart, compelling and consistent marketing techniques, the world's leading airlines are embracing the technological revolution that is gaining speed around us. As technology evolves, so do the challenges presented to the world's airlines. The operator of the world's longest flight route frequently changes, with current holder Qatar Airways' Doha to Auckland flight being challenged by Cathay Pacific's Hong Kong to Washington DC

One solution in the quest for greater cabin density and longer range is Ultraleather Promessa by Ultrafabrics. Promessa is a comfortable, lightweight, and easy to clean material for seat covers, and it has proven durability. Launched at Aircraft Interiors Expo 2017 in conjunction with Lift by EnCore's Skyseat, Promessa is now in service with launch customer LOT Polish Airlines.

route. Meanwhile, interiors are

becoming denser in terms of seating,

with more than one airline actively pursuing 10-abreast seating in a Boeing

777 economy class configuration.

Since 1977, Tapis and Ultrafabrics have collaborated to provide luxurious performance fabrics to the aviation industry. The Promessa product line is manufactured by Ultrafabrics at the company's state-of-the-art production line in Japan using proprietary Takumi Technology in a four-layer process.

Tapis' vice president of technical services and operations, Kevin O'Brien, states, "We've pushed the boundaries of comfort in our Promessa product line and now we can provide virtually all seating manufacturers and airlines with an instant comfort upgrade through their

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yourself at Aircraft
Interiors Expo,
Stand 7C20



material selection. The process does not use adhesives or bonding agents, creating an extremely durable product with zero risk of delamination."

The first layer is a protective surface providing resistance to liquids, stains, and the harmful effects of harsh cleaners. This layer gives the product an easy-to-clean surface, and can even be enhanced to resist ink and denim.

The next layer is the top skin, made with unique polycarbonate resins engineered for maximum hydrolysis resistance. This layer adds enduring strength to provide long-lasting vibrancy and consistent grain retention. It has a wide range of leather and non-leather textures and limitless color selections.

The third layer is a polycarbonate foam layer for added comfort, cushioning and a sublime touch. This layer has been designed to transfer body heat and moisture away from the passenger, creating a comfortable seating experience for ultra-long-haul flights.

The last layer is a premium reinforced woven backcloth for dimensional

stability. This layer forms the foundation of the structure and is responsible for the fabric's class-leading physical properties, ensuring the seat retains a fantastic aesthetic quality throughout its life.

Promessa weighs less than genuine leather – in some cases more than 75% less – which considerably reduces cabin weight and fuel consumption. At 460g/m², this can provide fuel savings upward of US\$50,000 annually on a single-aisle aircraft, even at today's low oil prices.

"After a strong launch with Lift by EnCore in 2017, we have refined the Promessa product line in line with airline and seating manufacturers' expectations for comfort combined with durability and fast service, and we're very proud to be flying with great airlines such as LOT Polish Airlines and United Airlines," comments Jason Estes, vice president of global sales and marketing at Tapis.

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show growth of smartphone and tablet ownership, with fast, and accelerating adoption of USB-C power in new portable devices. USB-C is already integrated in cell phones and tablets, and is now being applied in larger devices. Additionally, as domestic wall sockets increasingly also support the USB-C power outlet standard, this will further drive the ability for personal devices to be supplied without AC cable bricks. This drive will make the USB-C and subsequently PD standard ubiquitous for personal devices, including even power-hungry large laptops, within the next few years.

arket review data continues to

As it stands, there remains more than one wireless charging standard, and indeed there are a number of other smaller groups and businesses looking to promote their own unique technologies as well. This battle has a while to run yet before there is a stable approach for long-life platforms such as aircraft cabin seats.

An interesting 'wrap up' on this comes from publication Android Authority: "Clearly there's a lot of promising wireless technology, but there's still one big question: why should consumers choose it over the convenience of a USB cable? Honestly, it's a tough one to answer, but ease of use and ubiquitous gadget support and charging stations will probably be required..."

It sounds as if until the market infrastructure settles and wireless charging is accepted into the domestic market, USB-C PD will remain the charging technology standard for the foreseeable future.

In order to offer seat USB power to passengers, airlines will need a complete MRO package, including converter mounting, zone power distribution, seat



should be aware of all potential solutions available for a seat power upgrade and ensure they select a provider with the right-sized offering for their needs.

In response to the demand for every economy seat to feature USB power outlets, Data Device Corporation (DDC) recently introduced the first of a family of robust power supply units for converting 115V AC to 28V DC. The unit can be used to power IFEC electronics in seats and elsewhere in the cabin, and for bulk-power conversion upstream of USB charging ports for portable devices.

This cost-effective, compact and high-output (280W) solution delivers excellent power efficiency performance. The converter's space-saving design can help system designers eliminate the need for under-seat boxes, brackets and shrouds, as the bulk-power converter can be conveniently mounted within the cabin wall or ceiling spaces. Cooling is passive, with no internal fans needed in operation.

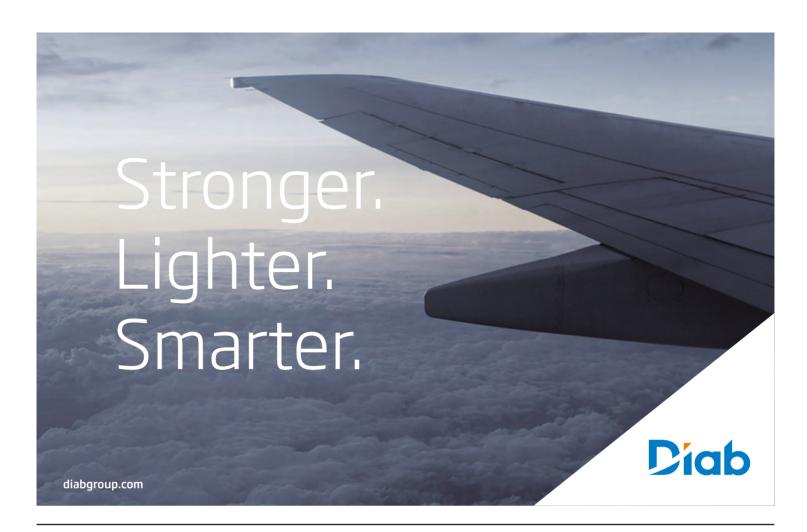
DDC'S 280W CONVERTER SUPPLIES 28V POWER IN THE CABIN FOR IEEC ELECTRONICS AND LISB CHARGING PORTS

The robust design topology offers power efficiency of greater than 92% with a power factor over 0.95 at 115VAC 400Hz and maximum load, optimizing power utilization and generating little heat. Safety and reliability for this power solution is achieved through over-current and short-circuit protection, backed up with thermal shut-down.

DDC is a world leader in the design and manufacture of high-reliability data networking, power control and motion control solutions for aerospace, defense and industrial applications.

FREE READER INQUIRY SERVICE

To request more details from Data Device Corporation, visit www.ukimediaevents.com/info/aim





SMARTER, FASTER, LIGHTER

Aviointeriors has been making significant enhancements to its seating range, ahead of the reveal at Aircraft Interiors Expo

he ambitious motto of Aviointeriors is 'smarter, faster, lighter'. And in the context of the upcoming Aircraft Interiors Expo in Hamburg, the company is ready to exceed itself in these goals.

Aviointeriors has always been focused on increasing its research and development activities while still responding quickly to market demands. Following its philosophy of innovation, the Italian company is now renovating its product lines in interesting ways.

It has been more than 20 years since Aviointeriors started business and became the world's first seat supplier to develop an electrical business class seat, and this drive for innovation never stops. The company, in line with customer needs, demonstrates a great ability to create highly customizable products so that each airline can fly with its own tailor-made seat.

For example, the new Adagio business class seat, which has already created great airline interest, has been further developed over the past 12 months. Adagio provides an eight-abreast configuration for B777 and B787 operators, complete with 100% direct aisle access and a fully flat bed.

The Adagio platform has been expanded with a premium economy variant, the Adagio PE. The seat is based on the same concept and design as Adagio, but with a reduced pitch and a Z-bed position. Aviointeriors says the Adagio PE could be a game changer in the premium economy seat market.

Adagio PE is also suitable for narrowbody applications, and is available in a five-abreast (3-2) staggered layout that gives airlines more configuration options.

Aviointeriors is also launching a mechanical premium economy seat, which offers a deep recline position, a



good level of privacy, a large console, and the ability to install a widescreen IFE monitor. The power, audio and USB ports are integrated into the center console, making them easily accessible without restricting the passenger living space.

Thanks to the integrated work of Aviointeriors' engineers and designers, together with customer feedback, the company is launching a product billed as having the perfect combination of comfort and reliability.

After the success of the Columbus family of seating, recently installed in a B737 MAX fleet, Aviointeriors is taking a first step toward renewing its economy class range, starting with long-haul products.

For example, a new seat design has been created that offers elegant and practical stowage areas, a generous recline, a fully articulated seat pan, a

footrest, a bi-fold meal table and three backrest options.

Further options include a large 13.3in IFE system, additional stowage spaces for personal belongings, and an innovative headrest concept. The seat has been already dynamically tested and a very short lead time is expected for this product. Further benefits of the model include light weight, achieved with advanced technologies along with partcount minimization.

Flexibility is the key with the new products, which have higher levels of comfort, even more innovative designs and further weight optimization compared with previous Aviointeriors seat models.

FREE READER INQUIRY SERVICE

To request more details from Aviointeriors, visit www.ukimediaevents.com/info/aim







GO WITH THE GRAIN

Immedio Contract combines tradition and technology to offer high-quality, customized leathers

or several generations, Immedio Contract has been supplying the finest leathers in many textures and colors. This Italian company has been working with commercial, business and VIP aircraft upholstery leather customers, as well as yachting, naval, automotive and luxury residence clients, in compliance with all their various certification requirements.

Immedio Contract's experience in the leather industry springs from the Martirani family tradition, with the Martirani cousins being the founders of the company.

One of the Martirani cousins explains their passion for the leather trade: "As kids we learned the processes that a hide goes through to become a finished product. We laugh about it, saying that we grew up in the tanneries."

Immedio Contract's leathers are exclusively selected for each customer, drawing exclusively from European sources of high-end materials, which are then processed in Italian tanneries using highly advanced technology.

The materials are top quality in terms of quality and sustainability, and the company can offer leathers in many colors, styles and customized sizes, according to the needs of each customer.

The tanneries are constantly monitored by the Martirani cousins, to offer the best service to their customers. Their goal is to create synergies with customers to provide customized textures that can satisfy all needs, and to get the best performance from the products.

The company, which is ISO EN 9001 certified, combines traditional methods with the most modern technologies to deliver the highest level of quality, improving the quality and lifespan of leather.

Immedio
Contract has been
Contract has been
the early
20th century

IMMEDIO CONTRACT HAS WORKED WITH
BIG NAMES IN AVIATION, SUCH AS AIRLINES,
SEAT MANUFACTURERS AND DESIGNERS

The quality of Immedio Contract's leathers is the result of careful hide selections, tanned in modern and well-established tanneries in the northeast of Italy, which benefit from more than 100 years of experience in the leather tanning industry.

The company's goal is to offer global solutions in these markets, and the team is very flexible when it comes to customizing for different needs, and proposing functional and elegant solutions. All options are based on carefully chosen materials, with consideration given to compliance with the required technical specifications, as well as to meeting cleaning and maintenance schedules.

In 2013 the company expanded its international network through the acquisition of the WTC aviation leather

company. This acquisition opened up a market that would soon become strategically significant for the company, and the collective know-how of both companies enables Immedio Contract to offer global solutions in the aviation interiors market. The company has also cooperated with seating manufacturer Geven, and has successfully worked with several airlines and design studios.

Immedio Contract's strength is in providing customers with a flexible and tailor-made service. Particular attention is paid to innovation and creativity, and to optimizing delivery times and fulfilling strict aviation regulations.

FREE READER INQUIRY SERVICE

To request more details from Immedio Contract, visit www.ukimediaevents.com/info/aim









- Allows passengers to use USB-A & C devices
- Powers passengers PEDs and laptops
- Upgrade to USB-C using existing on-board IFEC or power system



- Complements the seat design language
- Ergonomic positioning of peripheral
- · Removes complexity and cost
- Fewer components delivering lighter seats



- · Rapid on-wing replacement
- Minimises support costs
- · Low cost replacement cassettes
- · Robust and reliable unit

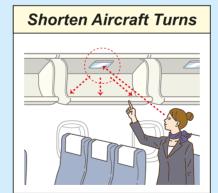
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BOX CLEVER

Portable boxes for wireless IFE, with options for battery or cabin power, are growing in popularity and creating new airline opportunities, says AirFi

he portable wireless IFE market recorded its biggest ever year of growth in 2017, and AirFi is reporting that its order book for the first quarter of 2018 is already bigger than the whole of last year. Such strong growth sets an exciting scene as we head toward Aircraft Interiors Expo this April in Hamburg, the sector's most important trade show of the year.

AirFi has been at the very center of the portable wireless IFE sector of the market since inventing the industry's first battery-powered, carry-on 'hotspot in a box' in 2013.

Although initially seen as a stop-gap alternative to mainstay IFE options, the combination of very low cost, yet highly reliable hardware with absolutely no aircraft installation requirements or certification hurdles has underpinned the explosive growth of the system and convinced several airline executives that the product has a long-term place in their companies' onboard digital transformation strategies.

Indeed carry-on systems are becoming evermore sophisticated, especially since they can be adapted quickly to harness new technologies from the fast-moving consumer electronics – much more quickly than their installed-system counterparts.

In response to increasing levels of interest from the larger fleet operators around the world, AirFi has also launched a universal aircraft power kit that allows the boxes to be powered by the aircraft system, removing the need for batteries to be recharged as part of catering operations, without compromising the carry-on characteristics of the hardware.

This year has also seen AirFi's secondgeneration Venus box enter revenue service. This carry-on wi-fi box boasts a range of smart technologies to enable



fully autonomous operation, without need for crew input. With faster processors than its predecessor, a 24-hour battery life and 1TB of storage, Venus can support new user experiences such as gamifying the classic moving map, which can now be re-imagined as a 'glass-bottomed plane' 360° augmented reality experience.

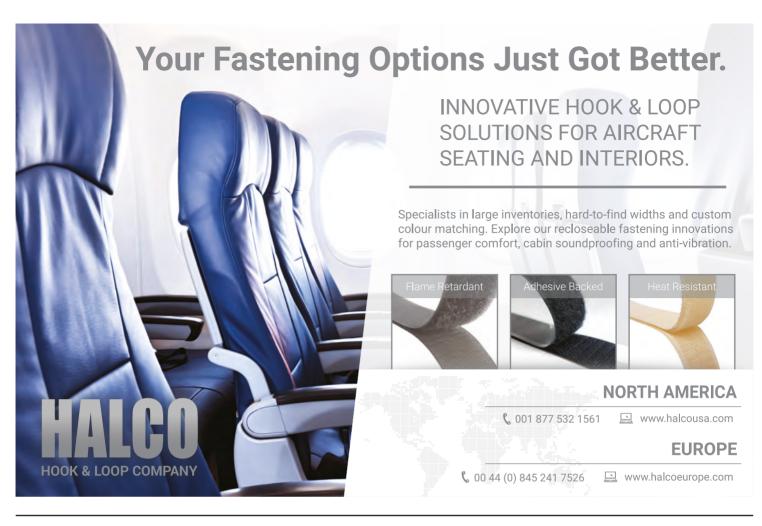
Since content is king in the IFE marketplace, other new developments are taking shape to bring the best digital content to passengers' own devices. Chief among these advances is a browser-based app-free DRM technology. AirFi is making major strides to enable Hollywood movies and TV programming from the big six studios, so passengers can securely stream their content without needing to pre-load apps before their flight. As well as a huge cost and

development savings, in comparative tests, app-based systems have been found to be used by only around 5% of passengers, whereas browser-based systems are typically accessed by upward of one-third of the cabin.

As more airlines are tempted to offer IFE due to fast deployment technologies such as AirFi's boxes, this creates more opportunities to monetize this valuable traveling captive audience. As we fly further into 2018, expect new ways for onboard retailing and digital advertising and promotions to further increase passenger choice and generate digital ancillary revenues.

FREE READER INQUIRY SERVICE

To request more details from AirFi, visit www.ukimediaevents.com/info/aim





Expo 2018,

Stand 5B20

SIMPLY ELEMENTAL

Schneller has harnessed the strength and beauty of nature in its new Simply Elemental collection of aircraft cabin finishes

nspired by the elements, Schneller's 2018 design collection, Simply Elemental, takes its cue from the natural world and the five elements: fire, earth, air, metal and water. This collection represents transformation and change, incorporating a mixture of graphic elements, rich color and pigment effects to create a range of finishes, from soft subtle stone effects, to luxurious metallic gradients and vivid jewel tones.

The elemental theory evolved from the study of various processes, functions and the phenomena of nature. Schneller illustrates the power of the elements by using earth tones, simplified symmetric patterns, rich metallic effects and geometric structures combined with natural wood and stone patterns. The result is a rich spectrum of decorative laminates and flooring that will enhance the aesthetic harmony of any cabin environment.



For Aircraft Interiors Expo 2018, Schneller is introducing Simply Elemental, as well as the Laminates and Light experience, on Stand 5B20. Partnering with Bruce Aerospace, Schneller has taken its decorative laminates, thermoplastics and non-textile flooring and paired them with Bruce Aerospace's

cabin lighting and mood lighting to create experiences and showcase the Simply Elemental designs. Schneller invites you to stop by at the expo for a tour.

FREE READER INQUIRY SERVICE

To request more details from Schneller, visit www.ukimediaevents.com/info/aim

The latest amenity kits from Anaik can take you on a trip to many of the world's major cities

As a creative customer experienceoriented company, Anaik has made enhancing airline passengers' onboard experience a major focus of its business.

At this year's World Travel Catering & Onboard Services Expo (WTCE) in Hamburg on April 10-12, Anaik will be presenting a fresh, cutting-edge and stylish range of products to indulge passengers' comfort during their journey.

As an eco-conscious organization, Anaik's offering includes items that have been specifically developed for the expo with a particular focus on being kind to the environment.



Following the current popularity of tin boxes, Anaik has created an eye-catching, vivid and unconventional 'art collection' themed range of such boxes for airline amenity kits.

These kits will be showcased at Booth 4A68 at WTCE, where visitors can get a glimpse of life as a green globetrotter.

FREE READER INQUIRY SERVICE

To request more details from Anaik, visit www.ukimediaevents.com/info/aim



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PURSUIT OF BEAUTY

Cabin branding panels can add a little extra beauty to an aircraft, and enhance passengers' perception of an airline

The fast exchange of information and data over media today means that everything can be widely viewed and is subjected to judgments on appearance.

This is why airlines are investing more in designing pleasant and unforgettable cabin interiors in order to create a deep connection between the passenger experience and airlines' brand identities.

Cabin branding specialist ABC
International is widening its customer
base, taking on more airline clients and
types of aircraft. For example, Jazz
Airlines (Air Canada's sister airline) has
selected ABC International's branding
elements for installation on its
Bombardier fleet. Meanwhile, the iconic
maple leaf logo has been installed on Air
Canada's B737 Max as part of a line-fit
program in collaboration with Encore.



Another important cabin branding partnership has been set with TAP Air Portugal. ABC International has delivered the latest satin anodized aluminum brand panel, featuring a special resin layer that showcases the airline's green and red color palette and the airline's brand name. These panels are being installed on TAP Air Portugal's A319, A320 and A321 aircraft.

The Italian company's latest cabin element project is the decorative panel manufactured for Turkish low-cost carrier Pegasus Airlines. The panel is made of painted honeycomb with varnished aluminum lettering, in accordance with the corporate colors, and has been installed on the front-row partitions of its A320neos.

ABC International plays its role in achieving beauty in cabins, and like an 'aviation artist', the company creates tailor-made solutions for airlines that wish to showcase their influence and iconic status all over the world.

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To request more details from ABC International, visit www.ukimediaevents.com/info/aim

EVERYTHING FROM ONE SOURCE

How can manufacturers of premium economy seats source high-quality leather armrests economically?

As an experienced supplier of tray tables, PUR armcaps and leather-covered armrests for aircraft seating, Ebco offers armrest assemblies according to customer specifications, using its own special flame-retardant foams.

Ebco supports many manufacturers of aircraft seating with their planning requirements, by providing all components from a single source.

The company has manufactured leather armrests since 2006. Ebco is responsible for everything from the armrest structure and specially developed flame-retardant PUR foam, right up to the high-quality leather processing.

Workmanship quality with perfect seams and an eye for even the smallest detail means Ebco can supply even low batch sizes economically.

With its armrest production carried out in line with customers'

individual wishes, Ebco is able to offer passenger armrests with good damping features and comfortable haptics. The perfect combination of foam with the excellently processed leather guarantees a long operating life for

airline operators.

To avoid leather defects during the production process, Ebco places a focus on the incoming inspection of leather by means of a specially developed test device. This approach means that

defects will be detected prior to production – defects that otherwise would be visible only after completion of the production process.

The PUR foam used for the armcaps is manufactured in-house, which enables Ebco to adapt and optimize the design of the armcap for being covered with leather during the development process. Ebco's PUR meets aviation standards ABD0031 and FAR 25.853b.

Customers benefit from well-trained Ebco specialists with many years of expertise, who provide substantial support, from the planning phase until the serial delivery.

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To request more details from Ebco, visit www.ukimediaevents.com/info/aim





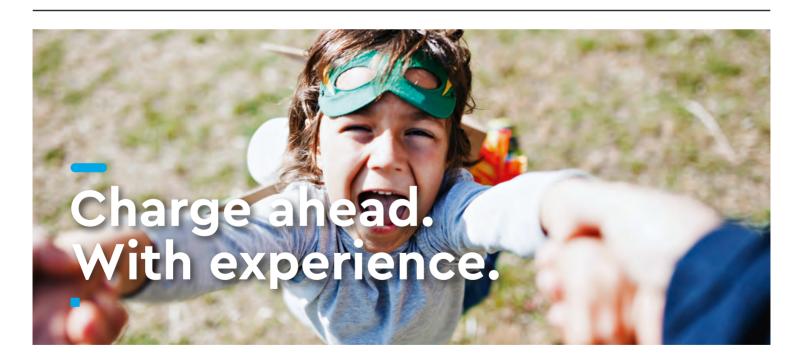
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DURABLE FLOORING

The new Luxury Woven Vinyl flooring range from Infinity Woven Products offers sustainable style

Infinity Woven Products' latest floor covering will shatter expectations. Luxury Woven Vinyl (LWV) flooring combines style and practicality, and with a wide variety of styles to choose from, it is sure to catch passengers' eyes.

Heavy traffic rating, light weight and its easy-to-clean nature are among the compelling reasons for choosing LWV. In addition to these benefits, LWV features a one-of-a-kind vinyl backing that provides a unique cushion, setting the flooring apart from many other floor coverings.

LWV also has the ability to resist dirt and remain clean-looking week after week, while it sheds water quickly and offers impressive antimicrobial properties. Infinity Woven Products controls the entire manufacturing



process, from raw materials to the finished flooring, with an emphasis on quality and customer service.

In corporate news, Infinity Woven Products has recently added new equipment to expedite service and personalize offerings to the aviation industry. Computer numerical controlled (CNC) machines automate the capturing and routing of fabrics to predetermined

sizes. Automating these processes increases capacity while making final products more precise. Given the specific measurement demands of fuselage compartments and seating areas, Infinity saw this as an opportunity to better meet each designer's specifications.

The CNC has 10 x 22in cutting capability and optional pre-placed snap locations. Various binding colors are offered to complement the chosen flooring. With the help of digitizing software, Infinity can use a paper or plastic template, or customers can supply digital files to create a custom floor kit.

FREE READER INQUIRY SERVICE

To request more details from Infinity Woven Products, visit www.ukimediaevents.com/info/aim



WHAT IS THE BIGGEST CHALLENGE FOR THE AVIATION MARKET TODAY?

The aviation industry, both general and commercial, is facing the digital age and digital transformation. This shows the magnitude of this technological development, as the industry is known to be rather conservative when it comes to innovation. From my experience in the aviation industry I am convinced that companies have to capture the spirit of digitization and embrace innovation if they want to stay relevant. Thinking ahead has to become part of the DNA of any company.

RETHINKING THE MARKET

Patrick Schrot, general manager at TQ-Aviation, talks about how the aviation industry must embrace digitization and how TQ is preparing for the future

WHAT IS THE ROLE OF TQ?

For TQ-Systems and its TQ-Aviation subsidiary, innovation has always been part of our strategy. As a German electronics engineering manufacturing and services (E²MS) company, TQ has been a supplier to the aerospace industry for over 15 years. We expanded our portfolio in 2016 by acquiring Dittel Avionics, which enabled us to enter the avionics segment of the market.

WHAT MAKES TQ'S STRATEGY UNIQUE?

TQ has taken the next step into the future. We are the first E²MS company to be examined and certified by the German Luftfahrt-Bundesamt (Federal Aviation

Office) with both Design Organization Approval (DOA) and Production Organization Approval (POA), and we are currently working on Maintenance Organization Approval (MOA) as well.

With this unique combination of certificates and a decade of experience in the industry, TQ will now begin to manufacture its own aviation products and become a technology trendsetter for the industry. We will also provide our customers with faster speed to market, as there will be no need to recertify or reapprove solutions.

FREE READER INQUIRY SERVICE

To request more details from TQ-Systems, visit www.ukimediaevents.com/info/aim





Motivated by customer demand for comfort and the need for more efficient use of space and materials to cut costs, aircraft interiors are undergoing extensive redesign.

Technically superior fastening solutions that can offer quality and longevity while optimizing weight and cost reduction are needed for seats, overhead lockers and electronics cabinets etc.



Improve Design

Improve passenger experience through interior design



Improve Efficiency

Improve aircraft fuel efficiency and reduce environmental impact



Reduce Costs

Reduce maintenance and repair costs



Streamline

Reduce production costs by streamlining the supply chain

stanleyengineeredfastening.com/aerospace





AS GOOD AS THE ORIGINAL

Lantal's new TEC-Leather is billed as an ingenious alternative to other leather and artificial leather products

Leather is a popular material for aircraft cabins because of its many benefits. Natural leather stands out, adding a touch of class, but the material also comes with some disadvantages, such as a high price and slackening after long periods of use. To avoid these problems and maintain the desired look of leather, Lantal developed TEC-Leather.

This product is highly cleanable, and most stains can be removed with a dry cloth. In addition, it has high resistance to stains and dirt, which reduces the need for cleaning. TEC-Leather causes no skin irritation, has excellent thermal properties, and is resistant to fungal growth. It is a bio-compatible product, and improves passenger well-being.

The material has a highly elastic polymer construction, and thanks to its flexibility, the cover can be formed to fit



any kind of seat. It stays in the exact same shape – without sagging – and retains its good appearance over years in service. This innovative Lantal product is lightweight and requires no additional fireblocker, resulting in cost and weight savings for airline customers.

BRIGHT IDEA: TEC-LEATHER IS INTENDED TO LOOK GOOD, AND TO KEEP LOOKING GOOD FOR YEARS

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To request more details from Lantal, visit www.ukimediaevents.com/info/aim

MACHINE LEARNING

Machine learning and the passenger experience have more in common than you might think

Machine learning enables systems to learn from data without being explicitly programmed, and to get smarter through exposure to more data. This means that systems can discover patterns not easily seen, and improve at predicting future results. The digital world of machine learning and the personal customer experience have more in common than you might think.

Aircraft part demand forecasting is a crucial process for both OEMs and distributors in order to have the right parts available throughout the life of any aircraft. There are millions of aircraft parts on the market, and MROs and airlines have different maintenance intervals and part needs. Successful demand forecasting results in all aviation supply chain processes running seamlessly, which in turn will improve



the passenger experience. Flight delays because of missing parts in an AOG situation will become fewer.

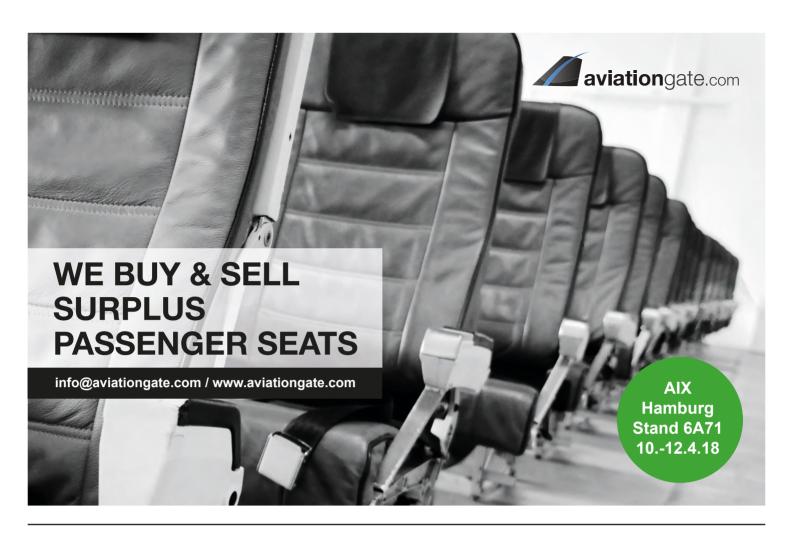
As Ben Nieuwland, director of marketing intelligence at Proponent (Kapco Global and Avio-Diepen) explains, "Most part demand forecasting in our industry is accomplished using historical data, which has proved to be tricky for interior parts in particular, as these parts

have different lifecycles than the parts used for regular maintenance and have a high number of customized parts.

"These are very exciting times as the new data analytics techniques mean more opportunities to use proactive data. Machine learning can analyze huge amounts of data efficiently and accurately. As the machine does that, we can focus on building qualitative and enduring personal relationships with our customers. At the end of the day, that is our greatest goal. There is still a lot of uncovered data that can potentially improve the passenger experience, and machine learning is another tool which will help us to analyze it."

FREE READER INQUIRY SERVICE

To request more details from Avio-Diepen, visit www.ukimediaevents.com/info/aim





ONE-STOP SEAT SHOP

Used seating can be purchased through Aviationscouts, which takes care of all refurbishment and logistics

Many people know aviationgate.com as a place to buy and sell used passenger seats online. However, not so many people know that the company behind the website also buys and sells aircraft seats itself.

"Some of our clients think we only work in the background, helping to build the relationship between buyer and seller," says Marcel Jansen, partner and head of sales at parent organization, Aviationscouts.

"In fact, we are also a large player in the market, buying and selling seats ourselves. We don't just wait for people to come to us. We actively go out and buy seats from around the world, storing them in Germany or with our partners in Asia or the USA."

Aviationscouts facilitates the sale of seats between buyers and sellers,

handling any required refurbishment, storage and transfer between the parties. The company owns many of these seats itself, which it then goes on to sell directly. In a time-sensitive industry, airlines, lessors and teardown companies demand quick actions for their used seat stock.

The German company currently has more than 100 different models online at its aviationgate.com website, and 450 shipsets of seats, including a recent batch of Recaro 3510s for the A320.

"Obviously we want to help people buy and sell their seats," says Jansen, "but we are really keen to buy more used seats ourselves. By having them in stock, and by taking care of the refurbishment and logistics, we can offer a more seamless sales and delivery process, creating a real one-stop shop."



FREE READER INQUIRY SERVICE

To request more details from Aviationscouts, visit www.ukimediaevents.com/info/aim

TURNKEY IFE

Imagik is finding wide airline interest in and acceptance of its range of in-house designed and manufactured IFE products

Over the span of 20 years in the airline IFE business, Imagik has used its experience to become one of the world's leading suppliers of in-seat USB power supplies and flat-panel monitors. The company's technology is on board some of the world's most prestigious airlines, and its technologically advanced products, proven track record, and ability to work well with customers have enabled it to win a number of significant orders for IFE retrofits and replacements.

The design of electronic components (hardware, software and firmware) as well as the external hardware is done in-house at Imagik, affording the company complete control over the product, in terms of obsolescence issues, efficient power usage and weight.

The company's USB Quatro USB charging system has now been expanded with the UBS Quatro + AC, which continues the company's philosophy of using only the latest technology, with low weight and low cost.

The Quatro Line is proving to be a successful product, and has achieved great acceptance from a number of airlines that have selected it for their fleets.

Imagik also holds parts manufacturing authority (PMA) on the products that it offers and runs a complete turnkey operation, including carrying out its own engineering.



expanded with the signing of commercial and strategic agreements with several top companies, adding visibility and reach to its product line.

Imagik will be showing its full product line at Aircraft Interiors Expo 2018 in Hamburg, Germany, booth 3C20.

FREE READER INQUIRY SERVICE

To request more details from Imagik, visit www.ukimediaevents.com/info/aim

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UHD MONITORS

ACS's low-profile 4K modular monitors give superior UHD picture quality, as well as complete control over the input combination

Aircraft Cabin Systems (ACS) is gaining a lot of market attention with its new 4K UHD modular monitors.

The modular design concept is unique and allows customers to integrate their existing HD IFE systems with the monitors for a UHD viewing experience



that offers customized, modular video inputs and control ports.

The design also supports upscaling, from the 1080P full HD to 4K UHD. Sizes range from 27in to 75in. Input selections include HDMI, SDI (6G) or composite/component and the possibility of specifying custom inputs.

Depending on the monitor size, each monitor can support two or three internal modules. Both the HDMI and the SDI (6G) modules include two inputs and one output each. The composite/component module includes one composite input and one component input.

This modular approach will allow ACS to assemble a qualified monitor that meets customer requirements, no matter the unique inputs. All monitors will be provided with qualification test

documentation that meets the testing standards DO-160G and DO-313.

ACS specializes in the design and manufacture of high-quality flat-panel displays to meet the market demand for larger, custom displays as used in today's cabin environment. But customers need more than just a display, and ACS provides that. ACS exceeds industry expectations with quieter and lower emission power supplies, safer front surfaces, 16g survivable mounting attachments and special sweep circuits, making its LCD monitors the ideal addition to an IFE system.

FREE READER INQUIRY SERVICE

To request more details from Aircraft Cabin Systems (ACS), visit www.ukimediaevents.com/info/aim

TRACK AND TRACE

Brady has developed a new ultra-thin RFID label for non-metal surfaces

Brady's new RFID Air Label for aircraft and the general aerospace industry is ultra-thin and has an industry-leading read range of up to 8m. By attaching the RFID label to non-metal components, and safety and medical equipment, any non-metal aircraft item or component can be easily tracked and traced during assembly or before take-off.

Easy tracking

Non-metal components or items can be tracked quickly and easily if they are equipped with the RFID Air Label. Where in the supply line are the composite parts we need? How many life vests are on board? Do any oxygen masks need to be replaced? To check, simply use a mounted or handheld scanner to pick up the 'birth records' of every labeled item. The scan will tell you where items are and how many there are, keeping you compliant with a number of EASA requirements.

Ultra-lightweight RFID labels

The RFID Air Label weighs less than 2g and is available in three sizes. The label is able to withstand extreme environmental conditions without the use of an overlaminate and is ATA2000 and AS7578 certified. The RFID Air Label is part of Brady's RFID label range, which also includes an RFID Alloy Label for metal surfaces and components, an RFID Flag Label to apply to wires and cables, and RFID Rigid Tags for indoor and outdoor applications on both metal and nonmetal aircraft components.

Print and program on-site

Brady's on-site RFID print and program solution enables users to simultaneously



program the RFID chip and print information on the labels at 600dpi. The intuitive printer software is fully compliant with ATA Spec 2000, and allows manual or fully automated data entry and an integrated validation process.

The on-site RFID setup should enable aerospace manufacturers and airline maintenance crews to print and program an RFID label in less than 10 seconds.

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Aerotak

Aircraft Adhesives

- Chemique Adhesives will be officially launching Aerotak at the Aircraft Interiors Expo in Hamburg
- Aerotak is a new range of adhesives designed specifically for the aircraft interiors industry
- The range consists of a variety of solvent based and water based adhesives used in the manufacture of aircraft seat covers and cushions
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TEXTURED SURFACES

The new generation of SelfTex paint systems by Mankiewicz offers performance that matches its looks

Painted surfaces don't always have to be glossy. Quite the opposite in fact: a certain degree of structure and texture can be a genuine plus, not only in terms of look, but also feel, and it brings diversity to the surface properties of aircraft interiors. Textured surfaces appear softer and are satisfying to touch.

Mankiewicz has developed the Alexit SelfTex coating, which produces a textured, homogenous surface directly from the spray gun. If you are looking for easy and efficient application of a very robust surface, then Alexit SelfTex should be considered. The coating creates an evenly textured surface that always looks consistent, regardless of the spraying equipment used and the operator's personal style of application. It even makes the parts produced by different



manufacturers appear as if they came from the same mold. Alexit SelfTex is available in a wide range of colors.

The second generation of Alexit SelfTex systems is now even more powerful, with the paints having especially high scratch-resistance characteristics – indeed they are almost indestructible. In addition, their repairability has been optimized, so that should a repair be necessary, a simple correction makes for an almost invisible repair. A further advantage of SelfTex paints is that only one coat is needed, making application particularly easy and efficient.

With almost 40 years of experience in developing aircraft interior coatings, Mankiewicz products offer resistance and strength with regard to durability and cleanability.

At Aircraft Interiors Expo 2018, Mankiewicz will be presenting the new generation of SelfTex coatings at Stand 7E40. [™]

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COLLECTIVE THINKING

Poltrona Frau and Optimares are set to reveal a seating design collaboration which blends cabin density with the finest luxury

Poltrona Frau and Optimares have collaborated to create a new aircraft seating concept, with the aim of offering business class passengers optimal relaxation during every phase of a flight, especially when it is converted into an extremely comfortable bed.

The design philosophy behind the seat is to merge technology, aesthetic innovation, comfort and craftsmanship. These qualities combine to help the traveler completely relax, while the airline will enjoy the best seating density: two achievements that seemed incompatible until now.

Through partnering on this project, Optimares' knowledge of ergonomics was blended with Poltrona Frau's attention to stylistic and material details, creating a



feel similar to luxury furniture. The seat shells feature high-performance technical materials, and are upholstered with soft leathers and distinctive finishes, all intended to recreate the feeling of relaxing at home in luxurious surroundings.

Thus, as well as the seats being upholstered with Poltrona Frau Leather, the table surfaces have quality finishes,

and the cushions boast hand-stitching with an attention to detail that reflects the Poltrona Frau luxury brand.

As with all its products, Optimares searched for a seating solution that offers the potential for a new vision of the cabin, a system that can strengthen the relationship between passenger and airline.

With this new product design,
Optimares offers a cutting-edge travel
experience that meets airlines' specific
needs and raises the passenger
experience above the competition.

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POCKET SCIENCE

Lantal has created a modular system for customized literature pockets

As a supplier to the aircraft interiors industry, Lantal's goals are to manufacture and refine premium textiles, and to provide customers with useful services and cost-effective solutions. The newest addition to Lantal's broad spectrum of services and ready-to-install parts is a modular system for customized literature pockets.

The system allows customers to choose from a wide range of materials and colors in six easy steps to create perfectly coordinated and individual literature pockets for aircraft seats. Lantal's literature pockets can be made of fabric, genuine leather or artificial leather, and the matching net and frame types are also available in different shapes and colors.

Further design options include various seam styles, embroidery of customer logos, and embossing or debossing (only

for leather). The modular system theoretically offers more than 1.3 billion combinations.

More than 10 years of experience in the development and

production of literature pockets for the aircraft industry make Lantal the right partner for future literature pocket projects.

By working with Lantal, customers benefit from a single point of contact as well as a shorter development time and resource savings. In close collaboration with customers, prototypes are developed and analyzed before the product enters production. Lantal's team of experienced project managers and designers guide customers from the very first idea to the ready product. The finished literature pockets, which are

crafted to high quality standards and fulfill all airworthiness requirements, are then shipped to the seat manufacturer ready to install.

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United Friend Ship

November 7, 2017 was a bittersweet day for United Airlines, signifying the end of its Boeing 747 operations. It was marked with a special retro-themed celebratory flight on which lucky staff and aviation enthusiasts were flown from San Francisco to Honolulu, the same route that United's first-ever B747 flew back in 1970. Crew uniforms, catering and even IFE options all recalled that first flight, but the modern-day cabins were a world apart from those on the airline's first B747, christened the William M Allen, after the then-CEO of Boeing.

If United's 1970 cabin configurations were proposed today, a riot would ensue in the accounting department – the main reason being the extravagant first class section. There were only two classes then – first and coach – the seat count of the former being 48. First class occupied three zones at the front of the plane: a 26-seat zone at the nose, a further 22-seat zone just aft of the spiral stairs leading to the 'hump' (both of which boasted a large movie screen), and the hump itself, which served as a lounge area.

The 1970 space was impressive, but the seats on that

2017 farewell flight were a marked improvement. The original models boasted an articulating seat pan, and a service panel on the seats so that passengers did not need to reach up to press the lighting or attendant call buttons. The seats were certainly comfortable, but no match for the current models with their flat beds, personal IFE monitors and that reassuring 16g-tested structure.

ABOVE LEFT: THE UPSTAIRS LOUNGE WOULD KEEP CUSTOMERS COMING BACK TO UNITED'S B747 EXPERIENCE

ABOVE RIGHT: UNITED ROLLED OUT THE RED CARPET (AND SEAT COVERS AND UNIFORMS) FOR FIRST CLASS PASSENGERS

BELOW: THE FABULOUS B747 INTERIORS WERE A MARKETING DEPARTMENT'S DREAM AND WERE PROMOTED HEAVILY BY UNITED But then, the modern experience wasn't quite such a visual feast. In the 1970s, United's first class passengers luxuriated in a cabin filled with lavish red fabrics, deeppile carpeting, and glittering wall coverings of 'galaxy gold' and ivory on the near-vertical sidewalls.

Every passenger on board enjoyed a little extra space to stretch out, as the galleys were located below the passenger decks, which also reduced noise, aromas and bustle. As the airline said: "We took the kitchen out of the living room, so we could have more 'living room'." The two large galleys were each staffed by one crew member, which United said made for a more consistent culinary experience. That experience was also consistently rather busy for below-deck crew, but their task was made a little easier by the latest convection ovens, with the food then delivered in 'keep it hot' carts to the main deck via elevators.

The real treat in first class, however, was the upstairs lounge, a unique part of the B747 experience. A walk up the spiral stairs brought guests into a purely social space – no movie screen up here – with a curved sofa that could comfortably accommodate eight guests, and a selection of swivel chairs. There was of course also

a selection of groovy finishes, and, naturally, a touch more shag pile carpeting. Add in the food serving area serviced by another elevator, and guests could really spend some time in t his unique space. A space that, while a little extravagant, would keep people coming back for more. As the whole experience encouraged passengers to socialize, it is fitting that United marketed these aircraft as the 'Friend Ships'.



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