

Aircraft

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CABIN

Perfecting the passenger experience

Management



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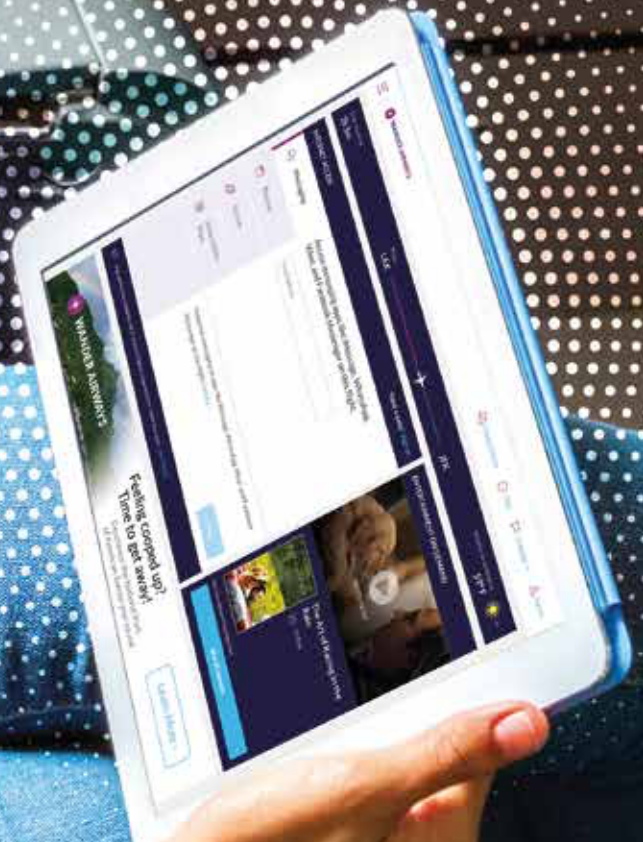
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Management

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Editor's Letter

It wasn't just us in the aviation industry that picked up on the fantastic new tech on display at the Hamburg show this year. Indeed the world's media wrote, blogged and filmed some of the innovations on the stands.

For example, *CNN* wrote about Air New Zealand's cabin bunk beds, and the UK's *Daily Mirror* reported on Collins Aerospace IntelliSense system (under the dramatic headline 'Cabin crew could soon track how much booze you drink and cut you off'), while dozens of outlets reported on the Chaise Lounge double decker seating concept.

While it is good that the general public are taking an interest in these more outlandish concepts, it was the bits that passengers can't (or shouldn't) be able to see that piqued my interest. As I come from an automotive background where components are on the whole engineered to be produced as cheaply and quickly as possible, it was nice to come to a show where (for example) items as mundane as fresh water hoses were made with lightweight alloy billet snap connectors.

The over-engineering of parts isn't done for the sake of it. It is required so that each part can be safely used for thousands of cycles over a period of many years in a stressed environment. When they do fail, they are designed to fail safely.

Alarming, several of the people I spoke to at the event said that they knew of companies who were under pressure to cut costs and



▲ Seating concepts were the talk of the show

were making things a little cheaper and a little worse. It isn't uncommon to meet people at trade shows who will talk down the opposition, and of course all of the components have to be certified for use. With that said, the certification process won't test the longevity of a part, and I don't like to think that short term measures have been taken, irrespective of the medium- or long-term problems.

Greg Whitaker

Greg Whitaker

EDITOR

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P.S. I'm new around here, and I'd love to get to know you better. Please don't be shy in dropping me a note about what you'd like to see more (or less) of in the magazine. You can get me at: greg.whitaker@realresponsemedia.com

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BUSINESS BRIEFING



MANUFACTURING

AJW Group launches new division: AJW Technique Engineering

Aircraft component parts provider AJW Group has launched a new engineering division, AJW Technique Engineering. This division will provide comprehensive support for a range of design, production and maintenance services.

The division is set to commence operations in the fourth quarter of 2023 and aims to leverage the parent company's expertise and experience in the aerospace sector. With headquarters as well as design and production offices in the UK, the firm will operate worldwide.

The envisioned scope of work includes cabin interior design, engineering, modification, repair, and manufacturing for both commercial and VIP sectors,

P2F cargo conversions, composite repair and engine structural repair.

The Part 21J Design services offered will encompass the development and approval of modifications and repairs, ensuring compliance with industry regulations and safety standards. The division's Design Organisation Approval and Production Organisation Approval teams will work closely with customers to provide tailored design solutions that optimise aircraft performance and enhance passenger experience.

AJW Technique Engineering's Part 21G Production services will focus on manufacturing and certifying aircraft parts, adhering to rigorous quality control processes and manufacturing

practices, for example EASA European Part Approval and FAA Parts Manufacturer Approval parts. This capability will further bolster AJW's ability to provide integrated solutions and improve operational efficiency for its customers.

Christopher Whiteside, chairman of AJW Group, expressed his enthusiasm about the launch, stating: "With the establishment of AJW Technique Engineering, we are taking a significant step forward in expanding our capabilities and enhancing our ability to deliver comprehensive engineering solutions to the aerospace industry. This new division will further strengthen our position as a trusted partner and provider of innovative services worldwide."



SEATING

Cabin Solutions and Diehl Aviation's space-saving concept

➤ Cabin Solutions and Diehl Aviation have demonstrated a prototype premium cabin concept for single-aisle aircraft.

Displayed at AIX, the layout promises to grow airline yields by allowing an additional seat per row in the same space as a traditional recliner premium cabin. The makers say the concept will improve passenger comfort and privacy.

The concept consists of an asymmetric cabin configuration with the Eclipse Staggered Seats, a new and innovative premium seat designed to provide

optimal comfort in either a five-abreast or four-abreast configuration. In a five-abreast configuration, passengers do not sit exactly behind each other as usual, but always slightly staggered. For passengers, this means significantly improved comfort.

Due to the staggered seats, passengers' shoulders are not in line with their neighbour. In addition, the seats are enclosed at the rear by a fixed backrest. Reclining is done through a cradling incline motion without any interference for the passenger in the next row.

DEALS

Satair inks multi-year agreement with CTT

➤ Airbus Services-owned Satair has signed a multi-year agreement with CTT Systems. The deal will extend Satair's global exclusive distribution rights for CTT Systems' A350 humidifier pads and the Cabin Active Humidity Control System for commercial and private aircraft.



Under this new agreement, Satair becomes the authorised distributor for the complete range of CTT products across all applicable aircraft programmes. The partnership reinforces Satair's commitment to providing comprehensive support to its global customer base through an extensive distribution network and regional parts availability to meet its customers' needs.

Thomas Lagaille, Head of Product Management, Satair, says "We are pleased to continue our long-term partnership with CTT Systems and expand the product scope to better support our global customers. By offering the complete range of CTT products, we can provide enhanced solutions and deliver exceptional value to the commercial aviation aftermarket."

Satair becomes the authorised distributor for CTT products under the new agreement.

BRIEFS



- De Havilland Canada has struck an agreement with digital passenger service provider Bluebox to provide the latter's platform as an option on the Dash 8-400 aircraft. The announcement was made at the Paris Air Show, and in the same week De Havilland Canada also announced an extension to a maintenance contract with Luxair.

- Elsewhere at the Paris Air Show, Boeing announced a tool designed to monitor and forecast the capacity of sustainable aviation fuel over the next decade. The SAF Dashboard, launched at the show, utilises data collected by BloombergNEF, aggregating announcements of SAF capacity from suppliers and providing filtering options based on production pathway, location and other metrics.

- Acro Aircraft Seating has reached an agreement to supply Deutsche Aircraft with its Series 9 economy class seats for the D328 family of aircraft, which includes the new D328eco and a retrofit option for the D328 turboprop and D328 jet.

- The Green Cabin Alliance trade body has admitted creative agency JPA Design to its ranks. The organisation has a number of high-profile members including Boeing, Muirhead and Thompson Aero Seating; however JPA is the first design agency to join.

AIX UPDATE



IFE

Panasonic Avionics IFE launch with United Airlines

Panasonic Avionics launched its next generation of seat back screens alongside partner United Airlines, which is making the largest investment ever in the IFE technology.

The next-generation Astrova 4K OLEG screens are available in five sizes from 19inch for single aisle business class seats up to 42inch premium class front row monitors.

The hardware and upgraded connectivity and flexibility for airlines to upgrade and manage IFE software promises to herald a new era for onboard engagement and personalisation.

United will fit the new technology throughout its international and domestic fleet. In total, 300,000 screens will be fitted on its aircraft.

Work will start on the carrier's Boeing 787s and Airbus A321XLRs from 2025. It is part of the United Next

programme to enhance passenger experience in narrowbody aircraft.

Unveiling the screens on the first day of Aircraft Interior Expo in Hamburg, Ken Sain, chief executive of Panasonic Avionics Corporation, said the technology is "game changing".

"Our partnership with United Airlines reflects our shared vision to take the passenger engagement to a whole new level," he explained.

"We are confident that Astrova will connect passengers to United more effectively than any other IFE solution, and we will continue to optimise passenger engagement with a cabin experience that keeps pace with innovation in the consumer technology space.

"Panasonic Avionics will perpetually update the passenger experience, introducing new products that bring enormous value and a major competitive advantage to United Airlines."



PROTOTYPE LAUNCH

MIRUS LETS FALCON FLY

Mirus Aircraft Seating has taken the wraps off the prototype for its new long-range economy seat, the Falcon.

The seat features a slimline seatback designed to maximise space and has been developed for ultra-low-cost to premium carriers.

It is made of lightweight hybrid composite materials to ensure passenger comfort, while providing weight-saving benefits for airlines.

Ben McGuire, chief executive of Mirus, said, "In line with our zero-compromise mentality with regards to the maximisation of passenger living space and comfort, the Falcon has a fully integrated industrial design approach and a sleek, modern look."

The Falcon is expected to appeal to long-range economy carriers and is the first Mirus seat to support in-flight entertainment technology, along with a 15-inch recline.

McGuire added, "The Falcon is testament to our mission to enhance the onboard experience of the economy class passenger at the intersection of the demands of commercial airlines."



PREMIUM SEATING

Recaro unveils new premium seat

➤ Recaro Aircraft Seating unveiled its new PL3810 premium class seat among a number of other sustainability and innovation initiatives.

The PL3810 premium seat aims to enhance the passenger journey for premium class travellers.

It features a single-plate table, 4.5-inch centre armrest, a six-way adjustable headrest, a nine-inch recline with articulation, calf-rest and privacy wings.

Weighing 10 per cent less than its predecessor, the PL3810 gives an airline more cabin flexibility and helps save on fuel costs.

Dr Mark Hiller, chief executive of Recaro Aircraft Seating and

Recaro Holdings, said: "With each seat order we receive, from economy to business class, Recaro is tasked with helping airlines build a better passenger experience.

"AIX is an important part of that process, as we greatly value the feedback on our seats that we receive from our partners, customers and suppliers."

In addition to the new PL3810, Recaro also showcased its CL3810 economy class seat and the CL6720 business class seat.

In addition, an Innovation Station featured a variety of initiatives, including the 'R Horizon' concept – a business class seat with integrated smart cabin technology.



BRIEFS

- Collins Aerospace unveiled its first fully lie-flat Business Class suite for narrow-body aircraft. Aurora offers premium levels of privacy and "exceptional comfort, space and thoughtful amenities" said Cynthia Muklevicz, vice president of business development.

- Schroth Safety Products is to supply seatbelts and restraint systems to Epsilon Aerospace for the Indian market. President Martin Nadol said: "We are looking forward to our partnership... and embarking on journey of aviation growth in India."

- Tapis invited AIX visitors to discuss environmental, thermal, physical and sensory aspects in the Comfort Zone. Jason Estes, vice president global sales and marketing, said it "was important for airlines to begin thinking about comfort beyond the physical realm".

- Fokker Services Group is to partner with Aviation Glass to replace standard inner polycarbonate window lenses with 'RealGlass' technology on the Airbus ACJ330 aircraft. RealGlass is heat-release glass for commercial aircraft with more than 20 passengers.

- IdeaNova Technologies launched Inplay Flow that lets users share content on their smartphone, tablet or laptop devices with their seatback screen when flying. The IFE software specialist believes the technology will end the debate about seatback screens versus personal devices by giving passengers the best of both worlds.

INTERIORS

Soisa expands nearshoring capacity



➤ Interiors supplier Soisa has expanded manufacturing capabilities with an increase in capacity at its Mexico HQ and addition of a Dubai facility.

The expanded facilities are part of the firm's nearshoring strategy aimed at bringing its services closer to clients' hangars.

Airlines such as FlyDubai, Emirates and Etihad will be served from the new Dubai location while North America will use the facility in Chihuahua, Mexico.

Chief executive Jacobo Mesta said: "By nearshoring services for worldwide suppliers and OEMs, we anticipate that, on average, we will be able to offer a 40 per cent cost reduction of their operation compared to outsourcing different elements to additional suppliers."

IMPROVING THE PASSENGER EXPERIENCE

Digitisation of the cabin and sustainability dominated the agenda at the Passenger Experience Conference in Hamburg. **Lee Hayhurst** reports

CABIN CONNECTIVITY

Happy customers are ready for retail

Onboard connectivity is helping airlines with a revenue mindset to turn the aircraft cabin into a profit centre while also providing services that passengers value.

Delegates at the Passenger Experience Conference in Hamburg, held ahead of the Aircraft Interiors Expo, heard how carriers, including budget carriers, are embracing onboard wifi.

Oliver Ranson, editor of *Airline Revenue Economics*, said once the customer is on the aircraft they are more open to retail opportunities than when they are booking the flight.

"The great thing about all of these retail concepts is that they allow people to give airlines their money and feel happy when they are doing it.

"When we buy a ticket to go somewhere we want to spend as little money as possible. We want to minimise the ticket cost.

"By the time we get on the plane we want a good time. Our trip has already started. People are ready to party, ready to splash the cash."

Ranson said 'order at seat' services enabled by onboard connectivity opens the door to additional retail activity, but he warned airlines must have the correct logistics in place.

"You have to make sure you have what people want on the plane. The airline has to use its understanding of the market and data in order to know what to sell."

William Kramer, transformation and continuous improvement lead for inflight retail at easyJet, said airlines must make their onboard offer relevant and manage expectations.



The budget carrier recently announced it has installed portable AirFi technology following a successful trial across its fleet, allowing customers to access content on their own devices.

"We certainly saw some interesting passenger behaviour in terms of how they are interacting with the proposition.

"We have taken our time to launch it properly because there is a big cultural shift with crew and passengers. No one size fits all, and we have a diverse network."

Job Heimerikx, chief executive of AirFi, said: "The consumer experience comes first and driving revenue and profitability comes off the back of that."

John Harwood, vice president retail at dnata Catering, added: "The most important part is to be relevant and make sure that what you offer on board fits the passenger mindset.

"That's the big challenge. We call it the mall in the sky. Everyone has their own idea of how to be entertained and what shops are interesting."



IFE

Travel without compromise

A tiny percentage of Inflight Entertainment Systems (IFE) today are capable of offering the sort of personalised experience consumers are coming to expect in their everyday lives.

A panel of experts that debated how airlines can meet the rapidly evolving expectations of the digital customer said people today want to "travel without compromise".

Andrew Mohr, vice president digital solutions at Panasonic Avionics, said although personalisation has been talked about for many years only 1-2 per cent of IFE is capable of it.





“WE THINK THE BEST THING TO DO IS TO DESIGN A PRODUCT WITHOUT COMPROMISE”

“That makes it an outlier compared to other digital services in the world. You sit down and the seat does not know you at all,” he said.

“To create relevancy in a visual space is to really form a relationship with the customer. Not only is the experience more engaging and interesting, it’s also an opportunity for airlines.”

Arnd Kikker, managing director of AERQ, said: “Digitalisation of the aircraft cabin closes the gap between what people experience in the air and on the ground.

“The airline can use the engagement to push ancillary services to a much larger degree than today. This captured onboard time is something that the airlines really need to push.”

Chris Demange, senior director media and partnerships at Viasat, added: “People expect an intuitive experience that works; they do not expect a fragmented experience.

“They expect to have the services they use on the ground available to them, basically to travel without compromise.”

RECYCLING

Industry must adopt circular design

The airline industry was urged to adopt a more innovative approach to circular design of cabins amid rising concern about the environmental impact of flying.

Caroline Jacob, lead colour, material and finishing strategist at design and innovation consultancy Seymourpowell, said the sector needs to move faster.

She said surveys of travellers are showing that mindsets are shifting as both business and leisure travellers admit to feeling guilty about the impact of their travel.

The answer, she said, is a collaborative and cross-sector approach to adopting principles of circularity, ensuring materials used in construction can be recycled and reused at end of life.

“Circularity and regenerative design goes beyond being sustainable; it’s about giving back to nature,” Jacob said.

“What we need is for the industry to move to the latter part of its [sustainability] journey to become circular in the next five years.

“Cabin is one of the most difficult parts of the aircraft to apply circular principals to. It’s complex, and there’s a lot of jargon that needs to be unpicked.”

Jacob said that as aircraft become more fuel efficient, or even zero emission with the advent of new fuels, operational aspects and the carbon footprint of cabins will grow in importance.

“We need radical innovation to build business cases that have the right impact and to drive innovation to take off. We need to extricate more materials from waste and do it faster.”

SEATING

The promise of plant-based synthetic leather

Could the answer to more sustainable airline seats be delivered by cacti, pineapples, mushrooms or grapes?

These are just some of the raw materials being used by firms pioneering next-generation materials to develop new vegan-friendly, synthetic faux-leather seating covers.

Matthew Nicholls, sales director of Tapis Corporation, which has developed its own sustainable synthetic leather which is certified for use on aircraft, said:

“Are these novel products really genuinely sustainable? A cactus takes one year to grow 10 inches. We think the best thing to do is to build a new product without compromise.”

Nicholls said Tapis is open-minded to alternative ideas and said the company wants to work collaboratively to develop more sustainable products and materials.

“We need to use their innovation to bring them all together to create genuinely more sustainable products. We have to hope that collaboration is the key.”

1. Oliver Ranson, *Airline Revenue Economics*
2. The panel session on designing sustainable cabins gave attendees food for thought
3. Passenger experience is a topic taken seriously
4. Panellists explored the logistics of enhancing digital offerings for passengers



Crystal Clear Winners

In the world of aircraft interiors, the Crystal Cabin Awards is the biggest night of the year. Here's a rundown of the 2023 winners and the best of the shortlist

The annual Crystal Cabin award ceremony took place at the Aircraft Interiors Expo in Hamburg in June, bestowing the prestigious accolade on seven winners.

The international event is organised by the Hamburg Board of Trade and is the only awards event of its type that celebrates both passenger cabin design and innovation. The organisers have strict criteria for choosing the companies that make the shortlist and for selecting

the winners, and just being nominated is considered a major honour.

Winners were chosen by 28 specially selected judges from across the industry who cast their expert eyes on the entries ahead of the ceremony.

CABIN CONCEPTS AWARD

Winner: Air New Zealand 'Skynest'

Economy class and lie-flat beds don't normally go together, but Air New Zealand has introduced exactly that on long-haul routes.

Skynest is a lie-flat 'rest experience' that passengers can buy time on while onboard for up to four hours. A stand-alone monument on the main deck of the aircraft comprises six bunks for economy passengers to stretch out on.

The airline hopes that the offer will improve the flying experience for passengers and help build brand image to boot.

Developing the project wasn't easy – the airline's Head of Aircraft Programmes Kerry Reeves commented that making the idea work was a 'labour of love'.

After receiving the award, he said: "As it's a world first, there are plenty of hoops we need to jump through and problems we need to solve, but the popularity and excitement around it coming to market is what keeps us going".

This isn't Air New Zealand's first win at the Crystal Cabin Awards. It previously won in 2019 for the 'Skycouch', which adds an extra footrest to a standard seat that folds to form a couch.

HEALTH & SAFETY AWARD

Winner: Teledyne Controls 'ACES'

California-based Teledyne Technologies has secured the 2023 award for a product that allows operators to monitor air quality in the cabin more effectively than ever before, with benefits for passenger safety and wellbeing.

ACES monitors several parameters in real-time and relays the data directly to ground stations. It uses laboratory-standard sensors to check airborne particulates, gases such as carbon dioxide, carbon monoxide and ozone, and volatile organic compounds.





3

While the system provides new insights into cabin air quality, the jury also lauded ACES' ability to reduce airline maintenance costs and aircraft downtime by allowing operators to validate repairs on-board with no additional sensor systems required.

PASSENGER COMFORT AWARD

Winner: Collins Aerospace 'Intelisense'

Artificial Intelligence seems to be everywhere these days, and the aircraft cabin is set to be no exception.

Intelisense from Collins Aerospace uses developments in the field – and a lot of sensors in the cabin itself – to predict how passengers are likely to behave in order that the crew can serve their needs, even before the call button is pressed.

For example, the system might be able to tell if a passenger's drink is empty, which would enable the flight attendant to offer (or sell) them a refill.

On a more utilitarian note, the system can also be used for predictive maintenance and can alert ground crews to secure replacement parts, even while the aircraft is flying.

Collins Aerospace is no stranger to the Crystal Cabin Awards. This year alone it won two categories and was shortlisted for three, and it has won a total of thirteen awards since the foundation of the event in 2007.



4

"CONNECTIVITY WAS A TREND IN SUBMISSIONS IN 2023, REFLECTING PASSENGER EXPECTATIONS"

IFEC AND DIGITAL SERVICES AWARD

Winners: AirFi, and Iridium 'LEO Connectivity Solution'

Connectivity was a trend in submissions in 2023, reflecting heightened passenger expectations of internet services in the air and also the will of the industry to offer a new connectivity experience closer to services on the ground.

The LEO Connectivity Solution developed jointly by AirFi and Iridium proved interesting to the jury of industry experts. Invisible to the passenger, the LEO Connectivity Solution connects to the Iridium Certus system using a pen-sized antenna housed in the window frame that costs substantially less than typical broadband antenna hardware.

The system offers added connectivity for both passengers and crew; travellers can contact those on the ground using WhatsApp and iMessage, while the crew can access ACARS transmissions or validate credit card payments.

SUSTAINABLE CABIN

Winner: Lantal Textiles 'Deep Dyed Carpet'

There's a lot of talk about the importance of reducing environmental impact in the aircraft interiors industry now. Fortunately, some suppliers are turning that talk into action.

This year, the award goes to Deep Dyed Carpet by Lantal Textiles. The winning entry shows potential to improve the ecological footprint of aircraft

cabins in multiple ways, saving not only 60 per cent of water and 80 per cent of waste during production but also aircraft weight and thus CO₂ emissions.

At the same time, the carpet can feature designs bespoke to the customer. To achieve this, Lantal Textiles devised a new digital deep dyeing technology for carpets.

Given the importance of sustainable design, it is perhaps surprising that this award category is relatively new to the award roster, having been presented for the first time in 2022.

UNIVERSITY AWARD

Winner: Technical University of Delft 'Lightweight Aircraft Seating'

Designed to offer students a forum for imaginative clean-sheet designs, the University category is one of the most innovative areas of the Crystal Cabin Awards.

This year, the honour is awarded to a team from the Technical University of Delft for Lightweight Aircraft Seating which has somehow managed to 3D-print a seat cushion.

As this lightweight seat cushion is 3D-printed using sustainable fibres, it



5



6

1. Air New Zealand's Skynest bunk monument
2. Winners' group shot 3. Teledyne Controls ACES air monitoring system 4. LEO system uses small antenna in the window frame 5. Lantal carpet is dyed to order 6. Collins' Intelisense

“EVERYONE IN THE INDUSTRY IS TALKING ABOUT SUSTAINABLE DESIGN”



1

reduces the amount of material needed to produce it while supporting the passenger's body in an optimal way, and at the same time reducing the weight of each seat and the aircraft overall.

CABIN SYSTEMS, MATERIALS AND COMPONENTS

Winner: Collins Aerospace 'Q-tech'

Regular sound deadening usually contains a core of material that resembles a honeycomb.

However, engineers at Collins have devised a new type of noise-proofing that it says can be ten times more effective at reducing noise transmission when compared with a standard double-wall panel.

The product looks physically different, with the honeycomb being replaced by what Collins calls 'bulb arrays'. These are rows of small oblong structures that made us think of those little pods used in coffee machines.

However, these arrays are made from a modern recyclable thermoplastic metamaterial and are designed to be used to mitigate specific problem noises – such as in headrests, sidewalls, seats and galley equipment.

1. A lightweight 3D-printed seat cushion

2. 'Alba' netting seats weigh just 7.5kg

Everyone's a winner

These days, everyone in the industry is talking about sustainable design – and even the Crystal Cabin trophy itself is now made from recycled materials.

The award is manufactured by Fraunhofer IPT and the polymer-based processes and materials used to make it will soon be used for a new generation of sustainable cabin components, helping to reduce emissions from the aircraft cabin industry.

It wasn't just the winners that impressed at the Crystal Cabin Awards. Such was the quality of this year's entries, any one of the products and concepts that made it to the shortlist could have scooped the prize. Here's our pick of our favourites:

CABIN CONCEPTS AWARD

Shortlisted: Diehl Aviation 'Crew Rest Compartment'

For narrow body aircrafts in long range operation, there is a need for the crew members to regenerate, to rest and stretch out.

Diehl has a concept module that uses the space between the first passenger seat row and the door area for a stowage module with integrated foldable elements.

These elements fold down on top of the cabin attendant seats (CAS), using them as static substructure to build up two full flat beds.

For boarding and evacuation, the beds can be folded up and pushed back into the stowage module in seconds.

HEALTH AND SAFETY AWARD

Shortlisted: CTT Systems 'Onboard Pure Air'

A design that reduces fumes in the cabin from ground operations such as fuelling and de-icing as well as aircraft bleed air during flight, the Onboard Pure Air system adds an active carbon filter to the existing humidifier pads in the aircraft,

and so using the same space envelope. This has the advantage of not adding anything to the ECS system, nor to service or logistics requirements.

UNIVERSITY AWARD

Shortlisted: Technical University of Delft 'Alba seating concept'

Another innovative seat design from the University of Delft, the Alba is proof that 'less is more' when it comes to ergonomic concepts.

Constructed from an aviation-certified netting material, it reminded us of one of those modern office chairs that contours itself to the user's form. On a more practical note, each individual seat weighs just 7.5kg and is 17mm thinner than the industry standard design.

IFEC & DIGITAL SERVICES

Shortlisted: Skyted, PriestmanGoode, Airbus Development & European Space Agency's 'noise-cancelling mask'

Having a mask in the shortlist might seem like a sign of the anxious times that we've all lived through, but back in 2018 when Airbus asked "How could cabin noise be muted if 300 passengers all took a phone call at the same time?", French start-up Skyted got together with design agency PriestmanGoode and the European Space Agency to develop a face mask which works like a noise-cancelling headphone, but for the mouth. A bone-conducting microphone enables users to make calls with the mask on and not be heard by their neighbouring passengers.

Currently in a kickstarter funding phase, the device is as likely to be of as much interest to office workers and call centres as it is to aircraft buyers. 📞

2



Cabin Air Quality Monitored on every flight

Teledyne ACES® environment monitoring system is a complete and autonomous solution to efficiently monitor and measure the air quality in the cabin and flight deck. The system provides comprehensive environmental data so aircraft operators can continuously verify the air quality in the airplane, identify potential emerging issues, and ultimately deliver the safe cabin environment that crew and passengers expect.



Weight of Expectations

Family-run Swiss interiors specialist Bucher marked its platinum anniversary at the annual Aircraft Interiors Expo (AIX) in Hamburg. **Lee Hayhurst** caught up with chief executive Beat Burlet



Visit www.bucher-group.com for more information



Swiss aircraft interiors manufacturer Bucher's founding focus was to provide the airline industry with innovative lightweight products to optimise operational efficiency.

Seventy years after the family-run firm was created, that ethos has never been more important as the sector looks to drive sustainability by reducing fuel burn and emissions.

At AIX in Hamburg in June, the third-generation firm showcased its latest developments as well as marking its 70th birthday with existing and new customers.

Beat Burlet, chief executive of Bucher Leichtbau, said sustainability is a topic that OEMs are placing an increasing focus on.

"We have done a lifecycle analysis of our products. The vast majority of emissions our products produce is during the use phase, not during production. That means we need to provide lighter products."

"Internally, we do research and development focusing on new composite materials. The search is on for plastics that can be recycled as opposed to carbon fibre which we know is tricky."

Bucher has begun manufacturing some metallic parts using 3D printing technology that can also be used for more lightweight plastic components. Burlet said, "We can create forms and shapes we cannot do with conventional machines. For me, the benefit of 3D printing is really more in terms of structures we can combine to optimise for weight."

"Our 70th anniversary is a clear testament to our commitment to quality, innovation and sustainability"

Other emerging technology related to the sustainable operation of aircraft is galley power manager systems that allow operators to reduce their energy consumption. Alongside galley inventory management to reduce overcatering, Burlet said the industry will move in this direction in the medium to long term.

Airlines are also looking to provide more customer self-service counters, particularly for long-haul flights, and to introduce special monuments and branding in the cabin.

An example of this is the customised galley Bucher has designed, developed and certified for Condor's A330neo fleet, which was on show at AIX in Hamburg.

The Galley's range of features and details ensure the best working conditions for the crew and optimal service for passengers. The galley door features an illuminated branding panel to welcome passengers on board.

The unit has also been fitted with an ultra-flat AerQ OLED monitor on the rear wall, allowing airlines to display branding and product advertising during the flight.

As Bucher enters its eighth decade, its focus on producing lightweight, reliable products that have a long service life, but are easily replaced, remained undimmed.

Burlet said: "This enables airlines to minimise their ecological footprint and extend the lifespan of their cabin equipment. Bucher's 70th anniversary is a clear testament to our commitment to quality, innovation and sustainability."

"As a family-owned company with a long history of success in the aviation industry, we are well-positioned to continue offering innovative solutions for aircraft cabins worldwide."

From left to right: Beat Burlet, CEO Bucher Leichtbau AG; Günter Müllers, Director Sales & Programs Galley; Sebastian Mueller, Senior Manager Aircraft Cabin Systems Condor Flugdienst GmbH; Alex Schefe, Director Fleet Management Condor Flugdienst GmbH; Daniel Marti, Director Sales Galley; Bucher Leichtbau AG.



2



3

70 years of Bucher Leichtbau

1953

Founded by Heinrich Bucher
in Fällanden, Switzerland

1973

Development of the Bucher
aluminium galley system

1977

Development of catering trolley
and EMS systems for rescue aircraft

1982

Development of an
ultralight aircraft (Canard)

1989

Bucher Aerospace in Washington State
US, founded

1992-1995

Handover to second generation.
Company reorganisation

1996-2002

Twin aisle galleys developed for
Emirates. Galleys developed for A320/
A330/A340 and Boeing 717

2002-2005

Development of modular galley
single aisle. Business class and first-class
tables for seat supplier

2005-2006

Expansion of production and engineering.
Galleys developed for Lufthansa A380

2009-2011

Additional production facility
in Fällanden opened

2012

Founding of Bucher Interiors,
Sinn-Fleisbach, Germany

2013

New facility for Bucher
Aerospace in the US

2014

New H145 HEMS kit AC70 with
modular and flexible STC

2016

New galley system for
Airbus A330neo

2017

Development of 16g partition
wall for Airbus A320

2019

New galley system for
Boeing 777-9X

2020

First fully detachable
HEMS Kit AC67 flex

2021

Enter rail market with new
Bistro for SBB ICN

1. Bucher's unique lightweight
aluminium structures transformed
galley systems 2. Company founder
Heinrich Bucher 3. Crew requirements
were a major part of galley design

BUCHER'S NEW PRODUCTS SHOWCASED AT AIX 2023



1

- A compact, portable SkyBassinet with a patented mechanism that enables it to be folded to the size of a small handbag for 50 per cent space savings

- A sliding class divider is being offered for the first time which can be used to differentiate the flight classes within the aircraft cabin



2

- An enhanced Doghouse – a flexible and customisable storage solution for the cabin and crew, that optimises space utilisation and increases efficiency

- A custom Galley with an ultra-slim AerQ OLED monitor for branding and product advertisements during the flight

- Half-size and full-size FAA TSO certified ARCTICart™ service trollies with thermal insulation to maintain temperatures under 4°C for over 20 hours without the need for expensive dry ice.

1. Bucher's foldable, lightweight baby bassinet makes it extremely flexible
2. The sliding class divider makes it simple to differentiate cabin classes

WEIGHING UP THE OPTIONS

Balancing the demand for lightweight and low price with the need to make seats that are comfortable and safe requires clever design, as **Adam Challenor** discusses



“When it comes to weight-saving, there is no one quick-fix. Each element of the seat is essential!”



Adam Challenor is technical director at Mirus Aircraft Seating



Visit www.mirus-as.com to discover more about the company's products

While AIX 2023 saw more innovation and creativity than ever, airlines continue to seek weight and fuel saving solutions for aircraft – without having to compromise on comfort.

As a seat manufacturer, it is our role to balance the demand between lighter seats and passenger comfort, while also delivering on price and service, particularly in the economy space. Since Mirus' inception, we've strived to meet these demands with seating products, bringing our automotive backgrounds to the aviation space to create sleek, lightweight airline seats that don't compromise on passenger living space.

At AIX in 2022, we previewed our Kestrel seat, an ultra-light weight slimline economy seat, weighing just 7.5kg fully dressed. The reception was exceptional, with numerous airlines expressing an ardent interest in the product.

This interest drove us to work harder than ever to improve the product even further, and we relaunched the Kestrel at AIX 2023 with a 0.5kg weight reduction, shattering the 7.5kg fully dressed barrier and making the seat a clear leader in its class, one of the lightest on the market.

No compromise

The 0.5kg weight saving comes at no compromise to passenger experience, allowing more than 50mm additional

leg room compared to a conventional economy seat and ensuring that even passengers exceeding six foot in height can sit comfortably, achieving both knee and shin clearance.

As the designers, we are conscious that the aircraft seat is the touch point for the passenger throughout the duration of the flight, so it's important that it looks sleek, has a good-quality finish and aptly reflects the airline's brand.

We wanted to offer our customers the lightest seat achievable without the typical price tag that comes with using more exotic materials, so we've created a blend of aluminium, carbon fibre and polymers to develop a seat that's both lightweight and affordable. In economic terms, the 7kg Kestrel is the lightest possible offering that sits within the economy-seat offering,



1



3



2

“Our dynamic test sled, designed for high-impact testing, is the most technologically advanced available”

Testing times

Our dynamic test sled, designed for high-impact testing, is the most technologically advanced available and eradicates the long wait times that come with having to outsource testing. Where previously test failure would delay us by weeks or even months, we can now apply our learnings and get our product back on the sled the next day for re-testing. Now, we see test failure as a chance to learn and improve, which we can do more rapidly and efficiently than ever.

The improvements made to the seat are also thanks to the work of a team of engineers and designers that have worked efficiently and strategically to exceed even our own weight-saving targets. As a result, Kestrel is currently being certified for the Airbus A320 family and Boeing 737 aircraft and will be available for delivery at the end of 2023.

During its concept launch at AIX 2022, the Kestrel piqued the interest of airlines across the board, with many mid-to-long-range carriers seeking a similar product

for their aircrafts. This led us to create the Falcon, intended to plug a gap for lightweight seats in that market. Weighing 11kg per passenger fully dressed and pitched at 29°-32° with a 15 degree recline, it will be available in Q4 2024.

With two new seats and the launch of our in-house testing facility, M-Test, we’ve grown from a start-up to a serious player in the aircraft seating space, with M-Test being a message of intent from us to the OEMs that we are here to stay and will continue to innovate.

Our presence at AIX was larger than ever this year, bringing with it a stellar reception to our products. We are immensely proud of what we have already achieved as a business, but we realise that the work never stops and striving to always improve our offering is paramount. 🍷

1. A good-quality finish is a key part of seat design. 2. The Kestrel has more than 50mm extra leg room. 3. At 7kg, the Kestrel is the lightest economy-seat offering

making it a compelling proposition for lower budget airlines seeking to achieve maximum densification while also reducing their carbon emissions.

When it comes to weight-saving, there is no one quick-fix. Each element of the seat is essential and therefore we’ve had to work diligently to reduce weight in all areas, requiring rigorous and repeated testing. This ability to learn from our failings and then improve upon them has been made a great deal easier by our new testing facility, M-Test, now the UK’s largest commercially available dynamic test facility, situated at our own headquarters in Hingham, Norfolk.

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Type-C **15W**



IKUSBC-600 PD

Type-C **60W** +
Type-C **60W**



IKUSBC-450 PD

Type-A **10W** +
Type-C **60W**



IKUSBC-500 PD

Type-C **60W**

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“Airlines are increasingly choosing lightweight aircraft interiors as a cost-effective solution”



Jeremy Hunter is a director of Jamco America



Visit www.jamco.co.jp/en to discover more about the company's products

The airline industry faces strong headwinds during the next decade as policymakers and the general public raise concerns about the environmental impact of air travel.

The industry has responded with a commitment to reach net zero emissions by 2050, with strategies such as investing in fuel-efficient engines, optimising flight plans, converting to sustainable aviation fuel (SAF), and developing hydrogen and electric power propulsion systems.

These strategies are not without costs and risks, and some remain speculative beyond the foreseeable horizon, with complexities and details to be worked out over the next decade or more.

Lightweight cabin interiors

While airlines pursue an all-of-the-above approach to sustainability, one strategy has proven successful, with few downsides: reducing weight. In particular, airlines are increasingly choosing lightweight aircraft interiors as a cost-effective solution.

In addition to the reduced weight lowering fuel consumption, well-designed aircraft interior systems also produce other savings by requiring less cleaning and fewer spare parts and repairs.

Moreover, airlines are increasingly considering the indirect, non-operational impact on the environment. The cabin interior is replaced four to five times



▲ Sustainability is at the heart of Jamco's Venture seat design

during the life of the airframe, raising the importance of ensuring that its manufacture and end-of-life handling is in line with the airline's sustainability goals.

Environmental impact

A European Parliament study found that aviation accounted for 3.8 per cent of the EU's total greenhouse gas emissions in 2019, and it was the fastest growing source of emissions that contribute to climate change, up by 146 per cent since 1990.

The continuing growth in global airline traffic compounds the challenges. The commercial aviation industry projects annual growth of between 3.1 per cent (ICAO) and 3.6 per cent (ATAG) revenue passenger-kilometres through 2050.

Pressure on the industry to address sustainability is intensified by disparities in who causes, and who is affected by, climate change. The International Energy Agency says, "Around 90 per cent of the global population flies once a year or not at all, around six per cent fly more than twice a year, and just one per cent fly more than five times a year... in some regions, the top decile's emissions from aviation are higher than the bottom decile's entire footprint."



▲ Sustainable interiors can mitigate customer concerns about the environmental impact of premium seating

“Lightweight interior options produce reductions at relatively little cost... with no risks or downsides”

With pressure coming from all directions, airlines are acting to make their operations sustainable, and also conducting marketing and public relations campaigns to address these concerns.

Sustainable aviation fuel

American Airlines recently announced it would purchase 100 million gallons of SAF annually, starting in 2027. United Airlines ‘hired’ Muppets character Oscar the Grouch to lead a multi-media campaign as its Chief Trash Officer, turning plants and waste material into environmentally friendly fuel. United said that, as of the end of 2022, it had invested more in SAF than any other airline.

However, SAF alone cannot solve the challenge. A study from the University of California, Irvine claims meeting aviation industry fuel needs would require as much as three million square kilometres of land for biofuel crops – about one-third of the size of the US. Even if SAF completely replaced petroleum-based fuels, IATA calculates it would contribute only around 65 per cent of the reduction in emissions needed to reach net zero by 2050.

Interiors

That brings us back to airline interiors. Lightweight interiors are effective in reducing fuel consumption and emissions. The reductions may be modest compared to strategies such as investing in new aircraft. However, lightweight interior options produce reductions at relatively little cost – a high return on investment with no risks or downsides.

CBS News reported that “just changing the paper stock on United’s in-flight magazine saved one ounce per copy, saving nearly \$300,000 a year.” Lighter cabins will save much more.

Why is sustainability especially important for cabins?

Pound for pound, lower weight is important for any part of the plane and its contents. But the environmental sustainability of cabins has added value, from a customer point of view.

The Aerospace Technology Institute emphasised this point in 2022: “As public expectations for corporate environmental responsibility rise, the incentive for airlines to demonstrate their sustainability

credentials through the passenger experience design will increase.

“The cabin has a unique value as a marketing asset. It is the only part of the aircraft that is directly engaged with for long periods by the passengers whose ticket revenues fund the industry.”

For a passenger, the cabin is the most significant part of the plane. Marketing and public relations campaigns promoting the sustainability of the aircraft interior resonate with customers.

Sustainable interiors also help to mitigate customer concerns about the environmental impact of premium seating. First class and business class take up more floor area than economy seating, accounting for a larger share of the fuel burn, but premium seating can be highly profitable. The International Council on Clean Transportation estimates that a passenger in first class or business class emits 2.6 to 4.3 times more CO₂ per kilometre than a passenger in economy class. These figures may exaggerate the impact of airlines that fill premium seats with complimentary upgrades for frequent flyers. ©

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A BREATH OF FRESH AIR

Humidifiers and de-humidifiers are not just nice-to-have for passengers, as their health and the condition of the aircraft can depend on the function of these systems

It has been a good month for Nyköping, Sweden-based humidity control system manufacturer CTT. It has signed a new contract with Airbus Corporate Jets (ACJ) and Toulouse-based technical design firm PMV Engineering to supply the ACJ TwoTwenty with onboard humidifiers.

The contract builds on an existing and successful partnership between the three parties to offer humidifiers on the ACJ 319/320 business jets. Essentially, CTT supplies the humidifier, air ducting and related parts such as brackets, while PMV brings the adaptation kit, such as the electric cables, water pipes and connection. Having ACJ as a client is a major win for CTT and a ringing endorsement of its products.

A reasonable question to ask is why fit a humidifier in the first place? Having a humidifier ‘transforms the experience’

▼ ACJ TwoTwenty can be fitted with CTT kit

onboard, according to CTT’s Sales and Marketing VP, Peter Landquist. A 22 per cent relative cabin humidity, he says, is the optimum environment for the cabin.

Stay hydrated

With almost no moisture content at all, the cabin air gradually gets drier as fresh air intake exchanges humid ground air with very dry air. Dry air can feel unpleasant, although it is often difficult to pinpoint why. More seriously, passengers are often dehydrated when they disembark, making them more susceptible to infections when they mix with other people, for example in the airport terminal.

Meanwhile, moisture condensates on the cold fuselage surface, forming ice. This in turn adds weight and drag, increasing fuel use and emissions.

It isn’t fractional, either. Condensation can increase the weight of a medium-

“CONDENSATION CAN INCREASE THE WEIGHT OF A PLANE BY UP TO 300KG”

sized passenger plane by as much as 300kg. Water can also cause corrosion, failure of electronic components and systems and cause unwanted malfunctions. Condensation also destroys the insulation so that it needs to be replaced more often. Calculations from CTT show that if the aircraft weight can be reduced by between 200–300kg, it could reduce carbon dioxide emissions by between 65 to 100 tonnes per year.

When the plane has landed, most of the condensed water flows out via drainage channels, so-called passive dehumidification. However, some condensed water remains in the fuselage, mainly in the insulation. If the aircraft is on the ground long enough, this water dries out, but it rarely happens. Instead, more and more water accumulates in the fuselage, which will refreeze when the aircraft is back in flight.

However, Landquist explains that CTT’s technology tackles the root cause of both problems. The humidifiers make passengers comfortable, while the de-humidifiers prevent water from becoming a problem by keeping the fuselage dry. 

ONBOARD PURE AIR

As you’ll see in our Crystal Cabin round-up, CTT were shortlisted for an award in the Health and Safety category for a prototype product that reduces fumes in the cabin from ground operations such as fuelling and de-icing. Called Onboard Pure Air, the system simply adds an active carbon filter to the existing humidifier pads in the aircraft, and so doesn’t take up any more space. This has the advantage of not adding anything to the ECS system, while servicing is not made any more complex as there’s just one filter pack to change.



REDEFINING AIRCRAFT SEATING

Blending **unequalled levels of passenger living space** and comfort in a class leading **ultra low weight 7kg design**, Kestrel incorporates Mirus' signature design philosophy of **simplicity and elegance**, as well as being **5% lighter than its nearest competitor**. Enhancing the appearance and comfort of the cabin, whilst **saving airlines money** through the **lowest cost of ownership** in the market.

Visit www.mirus-as.com for more information.





1

Made for the big screen

Panasonic's latest family of IFE screens launched at the Aircraft Interiors Expo (AIX) in Hamburg in June promises airlines a new era of flexible and manageable onboard connectivity, passenger and customer engagement

It doesn't seem all that long ago that the debate about providing internet connectivity to hotel guests was one of the hottest topics in the hospitality industry.

Today, you would not expect to pay for hotel wifi any more than you would for water in the taps, even for high-speed premium broadband or when opting for a no-frills budget brand.

Aviation has different challenges that make installing and managing onboard connectivity more complex, but the sector is facing the same rising expectations from today's consumer.

Panasonic Avionic's launch of its new range of Astrova OLED 4K screens at June's Aircraft Interiors Expo represents a step change in how airlines will be able to digitise the cabin.

INVESTMENT IN IFE ON A 'PER USE' BASIS LOOKS CHEAP, ESPECIALLY WHEN CONSIDERING REVENUE OPPORTUNITIES

About Astrova

- Astrova screens are available in five sizes, from 19 inch business class single isle, 22 inch standard business class, 27 and 32 inch front row, and 42 inch premium suite

- 4K OLED screens offer the highest definition and image quality in the skies with sharper image quality, cinema-quality colours and perfect black

- The screens offer significant weight saving compared to older technology and will support airlines' efforts to reduce fuel burn and operate more sustainably

- All screens will come with 3D Spatial Audio theatrical surround sound in partnership with HEAR360

- Astrova equipped aircraft offer passengers up to 100 watts of DC power, via USB-C, at their seat, enough to charge most phones and tablets and 90 per cent of laptops

- The seat-back technology comes with programmable LED lighting to enhance the passenger experience and enable airlines to optimise the cabin environment

- Two IFE management apps – the self-service App Manager and Modular Interactive configuration tool – give airlines more control of the seat-back experience

- Panasonic has taken a multi-orbital approach to connectivity to get the benefits of both GeoSat and LeoSat global coverage and latency



2

1. Screens increase engagement rates
2. A mix of BYOD and IFE is popular

The tech giant says its latest hardware and software solutions provide consumer-grade digital services at the very point airlines have the best opportunity to engage customers.

A new digital channel

Panasonic estimates that the fully connected seat back offers as much as 10 to 30 times more passenger engagement opportunity than other channels like web and mobile app.

Andy Masson, vice president of product management, said the modern IFE system provides airlines with a hitherto untapped digital channel right in front of customers' eyes.

"You hear from airlines about how important their web application is," he said. "People may spend 10 minutes on their website booking a ticket before logging off.

"They may then go on their mobile app and spend five minutes checking in before logging off. But how long do they spend on a flight staring at the seat back monitor?"

"On an ultra long-haul flight, it could be up to 20 hours. That engagement is huge when they are sitting there in front of the airline brand on its IFE. The more tech-savvy airlines are realising this."

Different airlines will, of course, adopt onboard connectivity to suit their particular business model, with the ultra-low-cost segment expected to continue with its 'bring-your-own device' approach.

But they are expected to embrace wireless connectivity as a "hygiene factor", as are traditional airlines wanting to offer a consistent experience across their entire wide and narrow-bodied fleets.

Masson said, assessed over the lifetime of an aircraft, the investment in this technology on a "per item basis" starts to look cheap, particularly when you work in revenue opportunities.

Redefining IFE airline ownership

With more modular software and hardware making it easier for systems to be upgraded as new tech and content opportunities emerge, the economics of full cabin IFE will only improve further.

Airlines have been demanding a more flexible approach to IFE management and upgrade for some time and Panasonic says its latest modular operating system answers that call.

An applications manager, effectively a digital services marketplace, will empower airlines to add and take away functionality that either they have developed or acquired from third parties.

Continuous software releases will mean new aircraft types will enter the market with the latest technology onboard rather than the system chosen up to two years before delivery.



1. IFE helps airlines stay 'on brand'
2. Mark Muren, United Airlines

"I GAVE THE TEAM AN IPAD AND SAID, 'GO BEAT THAT'"



Airlines will also be able to keep the systems continually updated, breaking lengthy lead-in times, reducing retrofit downtime for aircraft and onerous certification processes.

For the traveller, the experience then becomes much more like streaming TV at home while the airline has the opportunity to brand, curate and personalise the customer engagement.

An API (Application Programme Interface) for developers opens up the IFE sector to start-ups and third-party software companies to collaborate and innovate.

Uncompromised design

Masson said the Panasonic team was given a brief for the design of its new screens which specifically said not to look at other IFE systems. "I gave the team an iPad and said 'go beat that'," he said.

"We are competing with the fact that the consumer is used to high-end digital products, be it cell phones or tablets."

Panasonic's breadth means it can take inspiration from other sectors that are further ahead in terms of digitising their products, like the electric vehicles which are basically mobile phones on wheels.

"Look at what's happening in automotive," says Masson. "We are part

of a multi-billion dollar business that has an automotive division, so we are able to use those capabilities to help our product development. That gives us a foot up in the market and access to the best capabilities, the best technologies and the best approaches.

"Technology that might seem very futuristic in some respects in automotive is really not, like OLEG screens. These digitised vehicles' life span is around the same as that of an IFE system."

Looking back on the hospitality industry embraced full in-property connectivity, early doubts that it would every become ubiquitous look like they were a denials of the inevitability of progress.

Airlines may be some way further back down the track, and the Covid pandemic certainly did not help adoption of in-flight connectivity, but there's little doubt that passenger demand is already running well ahead of supply so the question now is when, not if.

Masson said: "We are getting inundated with requests. We've doubled the adoption rate for Astrava, which is a sign that this is the right product at the right time. Airlines are interested in this product and we are seeing huge orders from customers. It feels like a very good time to be in aerospace." 

United Airlines has made the largest single investment in Panasonic IFE history with plans to install 300,000 of the new Astrova screens throughout its fleet.

Mark Muren, managing director for identity, product and loyalty said the investment, as part of the carrier's United Next complete refurbishment of its fleet, will turn the airline into a "very big airborne movie theatre".

"We used to think it was all about bring your own device," he explained. "We were right, but the insight we have got from our customers is we can engage with them and delight them in a way we never could before if we also put a great screen right in front of them.

"They want to be entertained and engaged by the screens that we provide them. We are so excited by about the capabilities these screens bring to us. We believe this is going to be the platform we need to bring that engagement to the next level.

"We share the vision [with Panasonic] for the future of inflight entertainment and engagement."

Panasonic



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Panasonic Avionics Corporation



Illustration: phil couzens

CONNECTING THE CLEVER CABIN

The premise of the Internet of Things (IoT) is interconnectedness, so it's no wonder that OEMs and suppliers are figuring out how to boost the capabilities of their IoT services with the help of in-flight wifi. *Stephanie Taylor* finds out more

Pre-pandemic, the commercial aviation industry was awash with talk about the introduction of the Internet of Things (IoT) in the aircraft cabin, with promises of smart aircraft delivering an improved passenger experience alongside increased operational efficiency.

In 2018, Diehl Aviation announced its i+sCabin research project in partnership with Boeing, Etihad Engineering and others, which said it would look at “connecting separate cabin applications such as seating, galleys and lavatories without cabling,” and “designing new, intelligent cabin features enabled by wireless communication between future intelligent cabin equipment.”

The following year, Airbus launched its Connected Experience IoT platform together with Gategroup, Stelia Aerospace and Recaro Aircraft Seating to “link in real-time interconnected core cabin components”.

Fast-forward to 2023 and IoT is firmly back in the spotlight, with both Airbus and Diehl Aviation making further strides to bring a truly smart, sensor-laden, data-emitting aircraft cabin to reality.

Data-driven decisions

The initial findings of Diehl's i+sCabin research project highlighted the need to enable immediate communication of data from the air to the ground.

“The European refunding regulation for a delay of more than three hours [EU261] is a very serious issue for airlines,” explains Lothar Trunk, Diehl Aviation's program manager, innovation and senior expert, cabin systems.

“Currently, cabin defects are assessed when the aircraft is on the ground. This is done via paperwork in the so-called ‘cabin logbook’. We found that in some cases, a single issue is described in many different ways, making it hard for a technician to understand.

“Having determined this, they may have to drive back from the apron to their service base in order to try to fetch a new part. In larger airports, this can easily consume up to two hours, even if the part is in stock.

“The time required for this procedure can be drastically reduced if the maintenance personnel are informed of such a defect whilst the aircraft is still airborne. The technician would then be equipped in a timely manner with the correct part and can start work as soon as the aircraft has reached its parking position.”

With this in mind, the real-time data which is being made available as part of i+sCabin 2.0, the latest iteration of the project that began

de·risk

/dē'risk/

verb

1. To take steps to make something less risky or less likely to involve loss
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“DIEHL AVIATION IS GENERATING A COMMON COMMUNICATION STANDARD IN THE CABIN”

at the outset of 2022, includes “the condition of the oven in the galleys, the use of the entertainment system, and even the filling level of the wastewater tanks.” The project is already analysing around 100 applications and continues to investigate more.

For Diehl, the methods of possible transmission for all of this information are numerous. Trunk explained to *Aircraft Cabin Management*: “The communication is independent of the communication channel.

“This means that we can use in-flight connectivity (IFC), Global System for

Mobile Communications (GSM) or a Wireless Local Area Network (WLAN). The manner of communication depends on the information to be transmitted.

“Essential status messages regarding the cabin are usually short – regarding equipment, part number, serial number and failure, for example – whereas raw data for prognostics and health management elaboration involves considerably greater amounts of data and will be downloaded whilst the aircraft is on ground.”

Diehl Aviation is currently in the process of generating the first release of a common communication standard in the cabin dubbed “Cabin Secure Media Independent Messaging (CSMIM)” within an ARINC group.

Although Trunk admits it is taking considerably longer than was originally anticipated, he notes Diehl Aviation is working to implement the standard on equipment and servers for cabin applications in the meantime.

Furthermore, the company expects to present the results of its i+sCabin 2.0 research, which is specifically looking to “enable sharing of data obtained from the cabin with ground stations during the flight for automated processing and evaluation using artificial intelligence,” to become available in November 2025.

The lead-time for these projects demonstrates that while the relevant technology to create a smart cabin is available, there’s lots of work to be done before it can become part of a holistic, seamlessly operating aircraft ecosystem.

Linking up

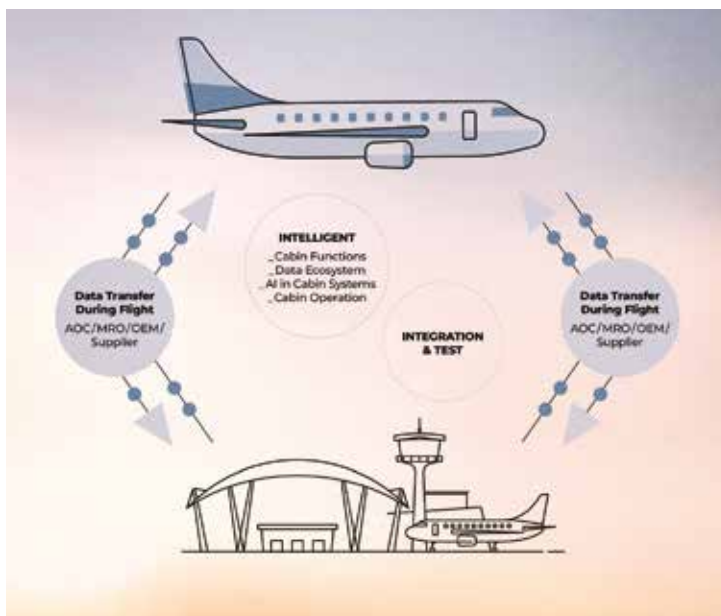
Airbus’ tangible IoT offering, a direct result of its aforementioned “Connected Experience” cabin mock-up, now comes under the Airspace Link umbrella.

Unveiled at the Aircraft Interiors Expo (AIX) in Hamburg in 2022, Airspace Link is a flexible and open ecosystem consisting of four layers: the Intelligent Core Management Platform (ICMP); IoT services; an app store including passenger- and airline-related apps; and HBCplus, Airbus’ new agnostic connectivity platform.

Together with its cabin systems subsidiary, KID-Systeme, Airbus also offers a solution called GeniusLink, which provides the same services as Airspace Link but for non-Airbus aircraft.

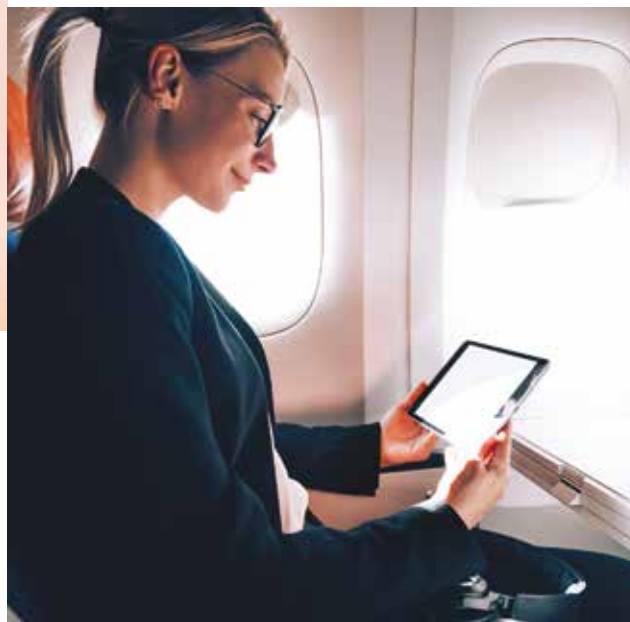
1. Airbus is innovating in every area of cabin connectivity
2. Ethiopian Airlines will equip four A350-1000s with HBCplus





1

“IT’S BROADLY ACCEPTED IFC IS INCREASINGLY UBIQUITOUS IN THE AIRCRAFT CABIN”



2

The OEM sees HBCplus as an integral component of the connected cabin. Ingo Wuggetzer, Airbus vice president for cabin marketing, says:

“Associated with the other Airspace Link layers, HBCplus connectivity will broaden the scope of opportunities for the airlines to enhance their cabin and cargo operations, which includes end-to-end real time data flow and IoT. This will result in more personalised services for the passengers and increased operational performance for the airlines.”

The industry is one step closer to being able to see the HBCplus system in action, thanks to an order from Emirates, which will be the first to install the solution onboard 50 new A350-900 aircraft.

Ethiopian Airlines will also equip four A350-1000s with HBCplus, with deliveries slated to begin in the third quarter of next year. Both orders were announced at the most recent AIX event.

New concepts

Elsewhere, Collins Aerospace has also expanded its presence in the IoT arena with its IntelliSense “integrated intelligence system,” which was a recipient of the 2023 Crystal Cabin Award for Passenger Comfort at AIX. The company’s current objective with the concept is to obtain user insight and customer feedback.

Jeff McKee, the company’s director of customer experience and design, explains how the system, which is based on “emerging technology building blocks,” works: “Existing seat sensor data and

1. Diehl’s i+sCabin 2.0 relays information constantly

2. IFC can generate more targeted digital services

a new optical sensor is used to collect information about objects, seat status and equipment health. Deep Learning AI is at the core of the IntelliSense intelligent cabin.

“When integrated with new advanced reasoning techniques, the system is able to infer a passenger’s service needs automatically, for a faster and more personalised service and an improved overall experience.”

According to another news outlet covering the initial IntelliSense announcement, the information provided to cabin crew will help them proactively offer drinks refills, for example, or convert beds into the lie-flat position.

Like Airbus and Diehl Aviation, McKee agrees that in-flight connectivity and the real-time communication of information will have a positive impact on these kinds of IoT services.

“We already see this transformation occurring in our daily lives. The combination of real-time embedded AI with enhanced in-flight connectivity will bring the best of both worlds together, improving not just cabin service, but also enabling more personalised and targeted digital services as well.”

IFC + IoT = ?

It’s now broadly accepted that IFC is becoming increasingly ubiquitous in the aircraft cabin. According to Valour Consultancy’s quarterly IFC tracker service, over 10,000 commercial aircraft were equipped with connectivity as of the fourth quarter of 2022.

Industry players have long argued about its commercial viability, but perhaps the simultaneous growth of IoT, which benefits from a real-time connection with the ground in terms of coming good on its potential to minimise unscheduled maintenance and maximise passenger satisfaction and engagement, will help persuade decision-makers that installing in-flight wifi is a sound business decision.

However, as the number of potential data points appears to be growing exponentially, it will likely be necessary to establish a clear hierarchy for the information, so that an airline never has to worry about compromising on capacity and, more importantly, isn’t overwhelmed with intelligence. After all, there is the old adage, “the more you learn, the less you know...” ©

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Loom with a view

Illustration: phil couzens

Cabin electronics have never been so advanced, yet wiring looms have never been shorter, lighter or more reliable. **Greg Whitaker** looks at how this contradiction is possible

Here's an interesting fact: did you know that the Boeing 787 has around 100km less copper wiring than the B767? That's kilometres, not metres, and the statistic is even more astonishing when you consider the increase in passenger entertainment systems and ambient lighting on the newer craft.

The aerospace industry has always been at the forefront of technological advancements, and in recent years significant progress has been made in enhancing the efficiency, safety and

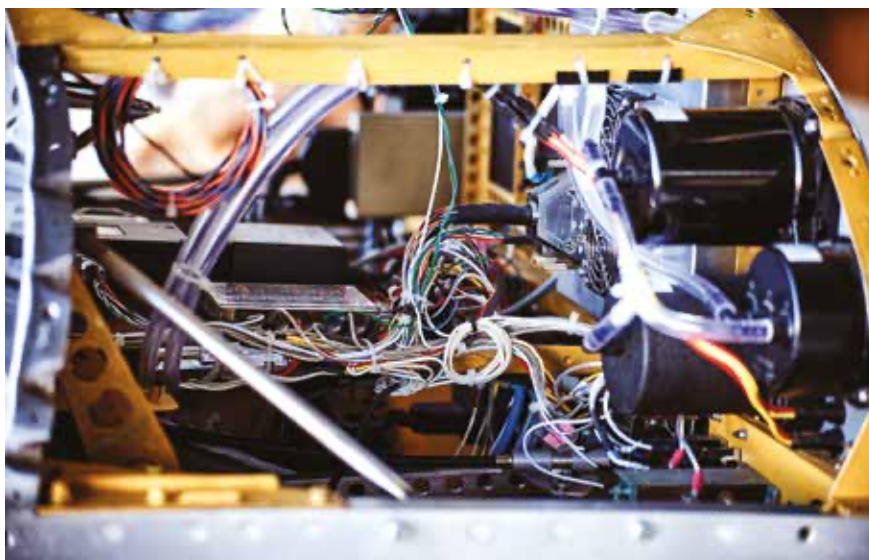
overall performance of aircraft. One critical area that has seen remarkable development is cabin wiring as the intricate network of wires that connects various systems and components within the cabin has undergone a real transformation, which has revolutionised the industry.

Aircraft manufacturers have long been striving to reduce weight to enhance fuel efficiency and increased payload capacity, and wiring systems are no exception. Traditional copper-based wiring is being replaced with lighter alternatives such as fibre optics and carbon nanotube wiring.

Fibre optics offer numerous advantages including higher data transmission rates and immunity to electromagnetic interference, while carbon nanotube wiring combines better conductivity with a lighter weight promising a substantial weight reduction and greater flexibility in routing.

Lighter wiring

Apart from fibre optics and nanotubes, technology has also made it possible to make the remaining wires physically lighter. For example, the new Base-T ethernet cable from Carlisle Interconnect Technologies features aluminium rather



“DATA BUS ARCHITECTURE COMBINES POWER AND DATA TRANSMISSION INTO A SINGLE, HIGH-SPEED NETWORK”

than copper-based shielding which allows for substantial weight savings without sacrificing temperature rating or electrical performance.

“With the ever-present challenge of reducing aircraft weights, demand is rising for lighter constructions that still offer the same performance,” says product manager Allen Schaefer.

“From Commercial OEMs to AAM development projects, there is a need in the aerospace marketplace for reduced weight to save fuel and power, as well as a need to support the increasing amounts of data being transferred. We are offering some of the lightest constructions on the market without sacrificing any features.”

Integrated data bus architecture

While this explains how the cabling is lighter, how is the length of the wiring run so drastically reduced? The answer is that aircraft manufacturers ditched the traditional method, where each item is wired back to a switched relay, and instead have adopted an integrated data bus, where there is a controller network for the whole cabin and modules for each area become ‘plug and play’.

Apart from a drastic reduction in the length and weight of cable needed, modular wiring systems enable easier installation, maintenance and upgrades, significantly reducing the time and effort

required for an initial build or a re-fit.

These systems employ connector plugs, allowing for the swift replacement of components, thereby minimising downtime and improving overall operational efficiency.

The adoption of integrated data bus architecture has greatly changed the way data is transmitted within aircraft cabins. This wiring approach combines power and data transmission into a single, high-speed network.

By integrating multiple systems onto a common backbone, such as the avionics control, lighting, entertainment and environmental systems, aircraft cabin wiring can be simplified, reducing weight, improving reliability and streamlining maintenance processes.

Grommets and washers

So, what are the problems? One of the main issues is wires can chafe and break which can obviously cause problems in the cabin, and not just for the passenger.

Safety is paramount in the aviation industry, and the wiring systems within aircraft cabins are no exception. After all, it stands to reason that having a broken wire, or worse a bare one arcing on the airframe, is a less than ideal situation.

Fortunately, chafing is easily prevented by using grommets, and there’s more choice in this area that you might think. John G Kelly from Southborough-

1. Cabin wiring is now lighter and reduced
2. Carlisle Interconnect RF components

based Device Technologies explains that his company’s core product is the ‘Spring-Fast’, an unassuming-looking nylon strip which, as the name suggests, uses spring pressure rather than glue to cling to the metal frame of the aircraft.

“By eliminating glue, the process is much faster; there’s no mess, plus the product can be removed and re-installed in seconds with just finger pressure,” Kelly adds, noting that workshop floor admin just requires a simple logbook entry for minor repairs or alterations. With these facts in mind, he estimates that installers could save up to 49 per cent compared with using traditional glued rubber grommets.

Future outlook

There are more changes to come. As you’ll see in our coverage of this year’s Crystal Cabin awards, as technology continues to evolve, we can expect further integration of wireless connectivity and power transfer within the cabin. The advent of 5G and the Internet of Things will enable a new generation of smart cabin features, such as real-time passenger data monitoring and even more advanced in-flight entertainment systems – all of which will have to be wired in.

Nonetheless, the advances in aircraft cabin wiring have ushered in a new era of efficiency, safety and connectivity in aviation, which will elevate the passenger to new heights, making air travel even more enjoyable, secure and efficient. 🍷





Furnishing material matters

1

The materials used in aircraft cabins, from seats to sidewalls, must meet the requirements of more than one constituency, as *Bernie Baldwin* reports

One of the great challenges for an airline industry supplier is that, no matter who pays for their product, a company is nearly always having to satisfy two customers at once – the operator and the passenger. And they don't always want exactly the same thing.

In the aircraft cabin, the use of effective materials is a good example of that challenge. Passengers want comfort and refinement and, while an airline wants to deliver that, it also desires durability, lightness and the ability to meet all necessary regulatory standards.

Take a seat

The most-used material in this area, namely on the seats, directly affects every passenger. Each one has his or her own response to it as they settle down for a comfortable flight. In recent years, economy class seats have become much slimmer and taken weight out of the aircraft. But both airlines and suppliers continue to seek ways in which changes in material and smarter design could help to get more weight removed.

Sohaib Ahmed, interiors programme manager at AJW Group, believes there are numerous ways in which modifications in materials and intelligent design can contribute this area. One of the company's developments – its

partnership with the largest seat cover manufacturing facility in Europe, Autostop Aviation – offers a strong starting point.

“An example of a smarter material choice is SkyLeather, manufactured using 100 per cent water-based polyurethane and known for its exceptional lightweight properties,” notes Ahmed. “Compared with natural leather, SkyLeather offers a weight saving of 25 per cent, resulting in approximately 0.96kg saved per passenger. Based on the A320 and 737 aircraft families, implementing SkyLeather can help airlines save approximately 16,000kg of fuel per year, per aircraft, and reduce carbon emissions by 50,000kg annually, per aircraft. This

1. JetBlue's Mint Studio features high-tech comfort fabrics from Ultrafabrics and Tapis
2. Lantal's innovative Digital Deep Dyeing Technology is fast and also more sustainable

“SEAT COVERINGS MATERIALS HAVE SEEN ADVANCES IN COMFORT, EASE OF CLEANING AND DURABILITY”

25%

SkyLeather offers a weight saving of 25 per cent, resulting in about 0.96kg saved per passenger

makes it one of the lightest material options available for seats.”

Tapis and Ultrafabrics also bring lightweight seating materials to the market successfully, the proof being the ongoing nature of their partnership, which is still going strong after more than 40 years. The collaboration sees Ultrafabrics make the products in their mill in Japan. After that, the products are shipped to Tapis in Dallas, Texas, where they are finished to make them flameproof and airworthy. Tapis then distributes them into the global aerospace industry.

Fire blocking

As with AJW's Ahmed, Barry Silverman, vice-president, marketing and branding at Ultrafabrics, also identifies one of his company's products as a tool to help to get more weight out of interiors. “The use of new modern materials such as Ultrafabrics Atago is a good example,” he confirms. “The Atago product utilises a base layer that is an integral fireblocking material. This allows for the fireblock material – typically used in a seat cushion build-up – to be removed and allows the use of non-graphite foams for the seat cushions.

“Removing the graphite and fireblock takes weight out of the product and can reduce the overall weight of the passenger place by 1lb per passenger

with synthetic leather and 2lb per passenger when converting from genuine leather,” Silverman adds.

The economy class seat weight reduction conundrum is also being met by Lantal Textiles, according to Luzius Rickenbacher, the company's executive vice-president, aviation interiors. “Lantal developed a seat fabric which has a different design on both sides and has the same performance independent of whether used on its front side or back side.

“This product, called ‘double-sided fabric’, allows the airline to reduce complexity by having only one part number, reducing weight as the customisation element is done with one seat fabric, and using the ‘other’ side for the head rest, compared to leather for example. Furthermore, we see lots of potential in the seat cover design application in order to continuously check whether lamination is being used or not.”

Advances in technology

Of course, seat coverings in all cabin sections have also been seeing advances in materials with reference to comfort, ease of cleaning and durability. “We mainly see more demand for sustainable materials. Lantal has developed a 100 per cent biodegradable wet-green leather as well as other seat fabrics,” Rickenbacher reports.

AJW's Ahmed concurs that there have been significant advancements in seat covering materials across all cabin sections in the past few years. “Our SkyLeather material exemplifies these improvements by providing exceptional comfort with a soft and supple feel akin to natural leather. Moreover, SkyLeather boasts effortless maintainability, as stains and marks can be easily wiped away using a cloth and soapy water,” he comments.

“In terms of durability, this revolutionary material surpasses expectations,” Ahmed claims. “Wyzenbeek testing involves rubbing along the warp



2

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2



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“THE SYNTHETIC LEATHER TREND BEGAN IN THE US AND IS SPREADING TO THE REST OF THE WORLD”

and weft of the test fabric to predict wearability. Having exceeded 400,000 double-rub Wyzenbeek cycles, with testing ongoing, SkyLeather instils confidence that this number will continue to rise significantly. Comparative testing has shown that SkyLeather outperforms similar materials currently available on the market in terms of durability and longevity.”

The company has recently received endorsement of its faith in this material with Azerbaijan Airlines’ decision – announced at the 2023 iteration of Aircraft Interiors Expo (AIX) – to install SkyLeather on three of its A319 and six of its A320 aircraft.

Regarding the materials covering seats in all cabin sections, Ultrafabrics’

Silverman has observed a few trends from airlines in their choices, in particular alternatives to natural leather. “The trend towards synthetic leather began in the US around ten years ago and is now spreading to the rest of the world,” he explains. “Using a leather or synthetic leather finish enables a wipe-clean finish. Our high performance topcoats are engineered to be resistant to a much wider array of cleaning chemicals (alcohol, quaternary ammonium and so on) than genuine leather.

“Ultraleather is the only product with an integral foam layer in between the back cloth and the topcoat,” he notes. “The foam layer provides heat dissipating effects for better thermal comfort and increased surface area contact from the conforming nature of the foam, leading to less pressure and more physical comfort.”

Touchy-feely

Alongside the sense of touch, Tapis-Ultrafabrics has been working on innovations in materials for the sense of sight, by bringing vibrant colours to

Ultrafabrics products. Its launch colour, stemming from a partnership with Pantone, the famous colour matching company, is called Vivid Punch. This is based on Pantone’s own ‘colour of the year’, dubbed Viva magenta, which gives an idea of the vibrant hue that is being promoted.

“We wanted to examine colour in interior aviation design,” Silverman declares. “Typically, that is driven by the brand. Our hope is that we can introduce something a little bolder to the discussion, and follow some other industries like, for example, automotive and even furniture design. There’s no reason why the airline industry can’t begin to experiment with bigger, bolder colours that communicate an idea that creates excitement, creates a new feeling. Our hope is to get them to think more about that.”

1. Tapis-Ultrafabrics want to inject more colour into interior aviation design

2. Newer materials are soft touch, easy to wipe clean, durable and lightweight



1

“PRODUCTS SUCH AS CARPETING, PANELLING AND MONUMENTS ALSO HAVE NEW DEVELOPMENTS”

It is not just in seating materials that progress has been made in weight and durability. Interior products such as carpeting, panelling and monuments also have new developments being introduced regularly.

“The use of lightweight foams (such as Zotefoam) in combination with products like our Ultraleather 9 Series allow for soft touch panels and front row monuments,” Silverman reports. “Combining the two materials typically weighs around 450gsm [grammes per square metre] in total, which is significantly lighter than honeycombs and thermoplastics.

“The combination of attributes such as soft touch, wipe clean, durability and light weight is a huge step forward in materials innovation,” the Ultrafabrics VP contends.

Lantal, meanwhile, has developed a new dyeing process for cabin carpets. The Digital Deep Dyeing Technology has already been something of a hit by winning the 2023 Crystal Cabin Award in the “Sustainable Cabin” category at the awards ceremony which took place in Hamburg alongside AIX 2023.

“Conventional aviation carpets use a yarn dyeing process, but this is slow and

energy intensive,” notes Rickenbacher. “Complex and colourful patterns end up increasing carpet weight and costs, and risk not meeting all airworthiness requirements. With our new carpet technology, Lantal is firstly going digital to ensure customised solutions are available within days. We are also going ultra-lightweight while maximising design freedom and customisation. Finally, we’re going green through major water and CO₂ reduction and low waste production processes.

Deep dye

“All stakeholders are benefitting from the Digital Deep Dyeing Technology – something the judging panel realised,” the EVP elaborates. “Passengers enjoy a more appealing cabin environment, airlines and OEMs will achieve weight reduction targets and experience shortened lead times and, most importantly, nature benefits from a tremendous environmental footprint reduction.”

This final theme resonates with the view of AJW’s Ahmed about the development of materials beyond those for seats. “In response to the threat of climate change, the aviation industry is committed to taking active measures

1. Tapis-Ultrafabrics’ bold new Ultraleather shade, ‘Vivid Punch’
2. Lantal’s Digital Deep Dyeing Technology maximises design freedom and customisation

toward the reduction of global greenhouse gas emissions. Businesses across the globe are working to reduce their carbon footprint and are investing in technology to design and develop more sustainable products to achieve this,” he remarks.

“Like the innovative SkyLeather material, lightweight carpeting materials that are also durable can reduce aircraft weight significantly, thereby reducing the carbon footprint of the airlines using them,” Ahmed continues. “Manufacturers have been implementing advanced weaving techniques when producing aviation carpeting. Using innovative fibres allows for thinner and lighter carpets, while still maintaining an aesthetically pleasing appearance.”

Ahmed also points to new compounds – made from honeycomb structures or carbon fibre-reinforced polymers – being used to create panels. “These lightweight, earth-friendly products are ideal for aircraft interiors and can be used in the manufacture of galley storage units and lavatories, further helping to reduce onboard weight while still maintaining functionality,” he states.

Alongside, the materials themselves, considerable progress has been made in production techniques which add to weight savings and durability. Suppliers are therefore managing to meet the demands of those two customer factions, helping airlines maintain the appearance and comfort of their cabins while delivering reduced weight and increased longevity of the products. ©

2



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Buckle up

A technical and complex product, airline seatbelts are a crucial part of onboard safety. *Alex Preston* talks to two manufacturers about what's making the safety restraint market click

**“Fasten your
seatbelts; it’s going
to be a bumpy night”**

It’s a now famous line, spoken by Margo Channing, played by Bette Davis, in the 1950 movie *All About Eve*. But her warning is not referring to airline turbulence.

Aircraft seat belts would have been an all-too-familiar sight to cinema-going audiences at that time, after all, they had been introduced to passenger aircraft in the 1920s.

However, while seat belts had become mandatory in all types of aircraft in the US by 1928, passengers were not required to wear them. Controversy surrounding the dangers of seat belts dogged their use until the 1970s, despite studies showing the importance of seatbelts in aircraft accidents.

The danger of non-compliance was highlighted by the US National Transportation Safety Board report into the crash of Asiana Airlines flight 214 in 2013, at San Francisco airport. As the 777-200ER crashed on landing, two passengers were ejected and killed. The subsequent investigation concluded that their ejection was attributed entirely to the fact they were not wearing seatbelts, and that they would otherwise have remained in the cabin and survived.

Safe from harm

As the Federal Aviation Administration (FAA) acknowledges, the purpose of those early seatbelts was mainly to prevent passengers from being tossed around or thrown out of the cockpit during turbulence or other manoeuvres.

During the 1940s, research shifted from measuring passenger restraint to crashworthiness – how effectively they could prevent injury and accidents.

Today, seat belts and safety restraints are manufactured and certified according to US Technical Standard Order (TSO) and European Technical Standard Order (ETSO) standards.

For seat belts and extensions these are TSO/ETSO C22g and TSO/ETSO C114 (Torso Restraint Systems), which are set against the minimal performance standards of SAE (Society of Automotive Engineers) AS8043 and AS0849.

There are only a handful of manufacturers responsible for producing the huge volumes of seat belts shipped each year. One is Schroth, which works as part of the SAE seat committee to develop these standards.

While legislation has pretty much stayed constant for several years, there is a piece of



1. Anjou cockpit harness
2. Schroth airbag belt
3. Correct belt fit is essential

3

“SEAT BELT PRODUCTION IS A NICHE ACTIVITY WHICH REQUIRES A SPECIFIC AND RARE KNOW-HOW THAT WE ARE PROUD TO TRANSFER FROM GENERATION TO GENERATION”

forthcoming regulation whose effects will be felt widely by all stakeholders in passenger safety restraints.

This is coming in the form of the FAA Advisory Circular AC25.562-1b Change 2 – “Dynamic Evaluation of Seat Restraint Systems and Occupant Protection on Transport Airplanes”.

As Schroth explains, this is a topic the SAE committee are tracking as it will have a big impact on front row seat restraint selections, requiring airlines to upgrade to either 3-point restraints, similar to automobiles, or lapbelt airbag solutions.

The Advisory Circular (AC) comment period for the proposed changes is closed, and everyone is awaiting a final release of the AC to understand the language

and maximum period until mandatory implementation of restraint solutions on aircraft to address the AC.

Another seat belt specialist is Anjou Interiors, which over the past 10 years has invested in new and modern machinery for its own testing laboratory to oversee crash tests, webbing elongation and abrasion testing, salt spray tests, FAR 25.853 flammability tests and much more.

As general manager Alexandra Curca says: “Seat belt production is a niche activity which requires a specific and rare know-how that we are proud to transfer from generation to generation.” The company has been doing this since 1948.

Anjou provides seat belts, adult and baby extensions for passenger seats (including the Y belts for the front row) as well as 3/4/5-points torso restraint systems with inertia reels for the attendant and cockpit seats.

The firm is celebrating 25 years since it certified its seat belt type 349, and 10 years since launching its rotary buckle type 358 originally destined for Airbus helicopters but currently seen in various types of helicopters and planes.

Curca says the company closely collaborates with its customers who contribute to development programs through their constant feedback. “This is how our new, more ergonomic

and lighter rotary buckle type 368 came to life,” she reveals. The product was showcased at this year’s Aircraft Interiors Expo in Hamburg.

Three-point turns

Seat belt performance is dependent on proper use and fit. Ten years ago, Curca says, the trend was to lighten the products and as a response to this request Anjou developed and certified its light buckle type 353.

Nowadays, she says, the major change is related to Business and First-Class seats on which the standard seat belts (with or without airbag) are replaced with 3-points torso restraint systems with inertia reel on the shoulder strap.

Anjou has successfully installed this product in Airbus helicopters, Daher Socata, Cessna planes and others for more than 20 years.

“The recent market evolution [has] had a positive impact on our sales,” reveals Curca. “We saw 30 per cent more 3-points torso restraint systems delivered in 2022 compared to 2021.”

For Schroth, Business Class presents a different issue. As the company identifies, herringbone seat configurations with large oblique angles are becoming a popular design trend to maximise occupants in this cabin space.

The technical challenge, says the company, is during a forward dynamic

2



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crash event, where there are high side loads on the passenger neck and hard surfaces to the side of the head that can lead to head impact. This requires more complex restraint solutions than a standard lapbelt or 3-point restraint.

Another challenge is posed by Premium Economy, where new seat designs featuring external hardshells are emerging. The technical challenge here, according to Schroth, is that standard seats fold forward during a crash event, providing additional distance between the passenger head and impacting the seat.

With a rigid shell, that impact distance is reduced as the shell doesn't move during impact. With airlines wanting to maximise the number of rows in the Economy/Premium Economy sections, this makes it difficult to find solutions to the reduced distance, requiring more expensive concepts such as lapbelt airbags.



2

Intelligent seat belts

At the 2018 AIX in Hamburg, Aircraft Cabin Modification (ACM) launched its proprietary seat belt, "Smart Belt".

Using sensor technology connected to an app, crew can check whether passengers have fastened their belts at any time and without disturbing them.

If a passenger is injured during turbulence, it can be proven whether the seat belt was fastened or not. In the case of possible compensation claims, this fact can prove to be a significant advantage.

According to ACM, the integrated technology does not add additional weight to the belt.

Commenting at the time, Roger Hohl, managing director of ACM said: "We are certain that this product will make a significant contribution and provide added value to worldwide safety in aviation."

"In turn, this will have a direct influence on the reduction of incidents and injured persons due to passengers with incorrectly fastened seat belts — at all stages of a flight."

Schroth says it has begun to receive inquiries into "connected cabin" concepts. Monitored buckles for seat belts have been developed for more advanced restraint concepts like lapbelt airbags, but these require their own power source in the form of an underseat battery unit.

As the company warns, unless every seat integrates into the aircraft power system, which can drive up costs, a monitored buckle solution will not be feasible. "We expect more demand for monitored seat restraints in the eVTOL (electric vertical take-off and landing) market, especially for autonomous piloted passenger carrying vehicles," the company says.

While its customers have yet to show a real interest in seat belts with sensors, Anjou says what is noticeable is its customers' interest in customised seat belts and tailor-made solutions.

"We propose a large variety of webbing colours (even though blue and grey shades continue to be the favourite choice for many airlines) and have also invested in laser engraving machines," says Curca.

"While the technical characteristics stay the same, the seat belt, as a part of the cabin interiors, can of course be customised to match the airline's colours and global brand image," she adds.

"The seat belt must be safe and stylish while, technically, standardised but still customisable; this is the real challenge and what makes our work so interesting." ☺

1. 3-point belts proposed for front row
2. Custom belts are now an option
3. Changing seat designs is impacting safety
4. The Schroth team at AIX



1



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Paul Hutton, chief executive at Cranfield Aerospace Solutions

THE HYDROGEN REVOLUTION

Paul Hutton, chief executive at Cranfield Aerospace Solutions, explains H2 technology is closer than you think

The introduction of zero-emission aircraft will enable us to re-think our approach to regional connectivity and the way we currently fly. As we outlined with many others in our recently published NAPKIN report, zero-carbon emission flight is entirely possible from the middle of this decade on sub regional routes, on aircraft that range in size from seven to 19 seats. The report also projected that it could be cost-effective to replace the entire UK regional fleet with safe, certified, zero-carbon emission larger aircraft by 2040, comprising 50-90 seats.

As the ATI's FlyZero study pointed out, and as Airbus revealed at the company's 2022 technology summit, significant progress can – and is – being made within R&D for larger aircraft powered by hydrogen, with larger aircraft potentially using hydrogen combustion from the mid-2030s.

But from now until then we do not have wait. Hydrogen technology in aviation is closer than you think and it will start small. We are working to convert the propulsion system of a Britten-Norman Islander nine-seat aircraft to that of gaseous hydrogen via a fuel cell system, with the goal of bringing it into commercial service by 2026, flying routes of up to 200km.

There is an immediate role for hydrogen, and we are encouraged that greater consideration to the so-called sub-regional element of air travel is occurring. Targets are essential to maintain focus and to help sustain the momentum that is required to reach our environmental goals. It is encouraging that in aviation stringent targets are not only being agreed upon, but some nations are choosing to set even more challenging ones.

The road to zero will be complex, with different technologies co-existing

Many countries are taking the global 'aspirational' goal of net zero emissions by 2050 seriously. Take, for example, the US states of California and Hawaii, both of which require net zero to be reached by 2045 and not 2050. In terms of aviation, Norway has a target of zero-emissions internal flights by 2040; closer to home, the UK government will consult next year on a target for domestic flights to reach net zero by 2040.

The road to true zero emission aircraft will be complex. Different technologies

will co-exist for a certain period until a complete switch towards zero-carbon and zero-emissions aviation can be achieved. But whatever the technology, there must be no let-up in pace. As an industry, we must not be complacent; we must assume that eventually governments will intervene in response to public pressure and curtail air traffic volumes if the aviation sector does not meet its environmental goals.

Countries like the UK can flatten the research and development curves of the technologies, drive down costs and make adoption easier on a global scale. And we must all play our part – on the small scale and on the large, collaborating at home and with our compatriots on the other side of the globe. 🌍

▼ An Islander aircraft will be equipped with a fuel cell to run on gaseous hydrogen





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