Aircraft interiors INTERNATIONAL

SEPTEMBER 2017

In this issue

AIRCRAFT INTERIORS EXPO AMERICAS 2017

SHOW ISSUE

APEX EXPO 2017

Silent killer?

THE ISSUE OF BLEED OIL CONTAMINATION OF CABIN AIR HAS RAISED ITS HEAD AGAIN. IS THE CABIN ENVIRONMENT TRULY SAFE FOR CREW AND FREQUENT FLYERS?

RECARO

EFFICIENT IN THE SKY
WHERE OTHERS JUST FLY

The RECARO CL6710 is the most lightweight seat in the business class. With exceptional ergonomics, highly intelligent functionality and generous storage space, it is an extremely efficient workspace. So sit back, relax and enjoy all the comfort it offers.

EXPERIENCE ADDED VALUE

FRESH APPROACH

In the hierarchy of passenger experience needs, at the very foundation is the expectation of landing at the destination without major incident. If that most fundamental of expectations couldn't be reliably met today, that would be the end of the airline industry – but of course it is met admirably well. However, just one tier above are basic physiological needs such as the need for air that is safe to breathe – and in the opinion of some, even today that basic requirement is not always being met on board.

Some aircrew have been complaining of health problems that they associate with 'fume events' in the cabin, and while some researchers allege that vaporized oils in bleed air are the source of the symptoms, major aerospace organizations disagree, citing "bad science" from the aerotoxic lobby. It's a serious topic, but is it really a serious issue? Rob Coppinger took a deep breath and delved into the fray to try to find out, as he reports on p36.

Continuing the theme of air safety, in this issue we also consider the topic of lithium battery fires. Last year, ICAO deemed the risk of thermal runaway in such batteries sufficient to warrant a ban on their bulk shipment on international passenger flights. Lithium batteries hit the headlines again earlier this year when PEDs larger than phablets were banned from the cabins of some USA- and UK-bound flights from certain countries, with such devices having to be stowed in the hold. There was a perceived risk of explosives being concealed in PED casings and it seems that detonation would require physical proximity to the device, so the logic is clear. However, it also raised the issue of whether the threat of terrorism was being replaced with the more likely threat of a battery fire in the hold. Marisa Garcia spoke to experts to get a clearer picture of the risks (p74).

We also bring news from the most talked about human on the planet: President Trump. Love him or hate him (few seem indifferent), no one can accuse him of being craven. Trump has decreed that US federal agencies should eliminate two existing regulations for every new regulation issued. On the face of it, this 'one-in, two-out' policy seems to have merit in terms of simplifying Byzantine aviation regulations and encouraging housekeeping of archaic regulations.

However, despite its intention to reduce bureaucracy, the order has created something of a paper mountain of its own. The good news is that after delving into this topic and consulting regulators and suppliers (sadly Donald didn't answer our calls), it seems there could be many positives of the initiative (see p46). This issue seems little known in the industry at the moment, so as ever, *Aircraft Interiors International* offers you a chance to get ahead.

Adam Gavine, editor

WORLDWIDE

INTERIORS

SUPPORT

REGENT AEROSPACE

REGENT AEROSPACE

Worldwide Interiors MRO

- Valencia, California
- Dallas, Texas
- Indianapolis, Indiana
- Louisville, Kentucky
- Jacksonville, Florida
- Miami, Florida
- Queretaro, Mexico
- El Salvador
- Jakarta, Indonesia
- Singapore
- Beijing, China
- Tel Aviv, Israel

REFURBISHMENT , MODIFICATION & RETROFIT

- Passenger and Crew Seating
- Galley, Lavatory, Closet
- Sidewalls, Overhead Bins
- Ceiling Panels, PSU's
- In Flight Entertainment (IFE)
- Survival Equipment
- ULD Repair
- Engineering Service Integrator
  (FAA-STC and EASA)

SALES AND MANUFACTURING

- Refurbished Seats
- NEW Life Vests
- Cut & Sew Covers
- Carpet
- PMA/OOP Spares
- Full After Market Support

REGENT
Aerospace Corporation

www.regentaerospace.com
tel: +1 661 257 3000
e-mail: sales@regentaerospace.com

Cabin Wireless Access Points

Cabin Control Panel

All-In-One Server

Passenger Control Units

Aircraft Server

FROM LONG-HAUL AIRCRAFT TO THE REGIONAL & BUSINESS JET ENVIRONMENTS,

TELEFONIX PDT SOLUTIONS ARE ENABLING THE INTERNET OF FLIGHT.™

CABINACE-2™
CWAP

CABINEDGE™
CONTENT LOADER

CABINPINNACLE™
SERVER

THE SUMMIT™ LINE
CERTIFIED IFEC HARDWARE & INSTALLATION KITS

ENCOMPASS™
PORTABLE IFEC ALL-IN-ONE SERVER

www.TelefonixPDT.com | TELEFONIX PDT™

Up front

In this issue:

Expo specials

145

139

151

THE TEAM

published by UKi Media & Events,
a division of UKIP Media & Events Ltd
Aircraft Interiors International
Abinger House, Church Street,
Dorking, Surrey RH4 1DF, UK
Tel: +44 1306 743744
Email: aircraftinteriors@ukimediaevents.com

Annual subscriptions (5 issues)
Worldwide rate: £70/US$108

Airfreight and mailing in the USA by agent Air Business Ltd, c/o Worldnet Shipping USA Inc, 155-11 146th Street, Jamaica, New York 11434. Periodicals postage paid at Jamaica, New York 11431. US Postmaster: Send address changes to *Aircraft Interiors International*, c/o Air Business Ltd, c/o Worldnet Shipping USA Inc, 155-11 146th Street, Jamaica, New York 11434. Subscription records are maintained at UKi Media & Events Ltd, Abinger House, Church Street, Dorking, Surrey, RH4 1DF, UK. Air Business is acting as our mailing agent.

USPS 019-144. ISSN 1463-8932 (print); ISSN 2397-6446 (online)
Aircraft Interiors International September 2017.

Printed by: William Gibbons & Sons Ltd, Willenhall, West Midlands, WV13 3XT, UK

Cover image: Matthew Hollings

Panasonic

Panasonic Avionics Corporation

THE WHOLE IS GREATER THAN THE SUM OF ITS PARTS

Come visit us at APEX EXPO 2017 booth #955 to experience the power of our ecosystem with NEXT.

panasonic.aero/next

NEXT

big success

August saw Emirates celebrate nine years of operating the A380. Let's break down this milestone of the world's largest A380 operator into numbers...

WIDE SPACE

The cabins are 21ft 7in (6.58m)-wide on the main deck, and 19ft 5in (5.92m)-wide on the upper deck

CREW CRAZY

Emirates employs more than 1,500 A380 pilots and more than 23,000 A380 cabin crew

SNACK ATTACK

The Onboard Lounge offers 18 snacks, the most popular being smoked salmon bagels, Arabic pastries and fruit skewers

CABLE MILES

There are more than 320 miles of cables in each A380

IFE AWARDS

The Ice Digital Widescreen IFE system offers passengers more than 2,500 AVOD channels. And 2017 saw the system awarded World's Best Airline Inflight Entertainment by Skytrax for the 13th time in a row

LOUNGE ACCESS

Each Onboard Lounge, accessible to first class and business class passengers, is made by AIM Altitude in the UK, costing more than US$3m

PASSENGER CAPACITY

Three class ultra-long-range:
489

Three class long-range:
517

Two class long-range:
615

COCKTAIL MENU

The 21m² Onboard Lounges can accommodate 26 guests and have 10 lighting options

PAINT COVER

It takes more than 3,600 liters of paint to cover the 3,100m² aircraft

A RANGE OF RANGES

The fleet has flown 1.25 billion kilometers. The shortest route is 851km, the longest is 14,193km

BUYING POWER

Emirates is one of the world's largest buyers of champagne and fine wine, as well as fruit juice, bedding and tissues

FLEET SIZE

A huge fleet of huge aircraft: Emirates has 96 A380s in its fleet, and 46 on order

LOUNGE PARTS

It takes around 1,300 parts to manufacture Emirates' Onboard Lounge

ABOVE: WITH SHOWERS, SUITES AND LOUNGES, EMIRATES HAS EMBRACED THE A380'S POTENTIAL. MORE THAN 80 MILLION PASSENGERS HAVE FLOWN ON THE AIRLINE'S 96-STRONG FLEET OF A380s

Love details? The Case Studies section of aircraftinteriorsinternational.com takes an in-depth look at airline interiors

AIRBUS

CLEVER LOOKING

Airbus is moving toward digitized production, with amazing results reported for its wearable technology trials on A330 cabin assembly operations

THE BENEFITS OF IMPLEMENTING SMARTGLASSES IN ITS PRODUCTION FACILITIES COULD MEAN THAT AIRBUS WOULD EFFECTIVELY EXPAND ITS WORKFORCE AND WORKING HOURS, WITHOUT INCURRING ADDITIONAL EXPENDITURE

Seeking new ways to improve production efficiency and quality, Airbus has introduced 'smartglasses' technology for final assembly line workers at its Clément Ader A330 facility in Toulouse, France. According to Airbus, the glasses introduce augmented reality features that allow operators to mark the position of seats and furnishings to be installed in the cabin more quickly and accurately than the typical system of studying intricate drawings, converting measurements and preparing marking templates, which in turn reduces training requirements.

So how do the smartglasses work? An in-built camera scans the barcode of the item being prepared for installation, the details of the item are then retrieved from the cloud, and a 'marking zone' is displayed on the embedded 1cm² offset screen in the user's eyeline. While the display itself is diminutive, the viewing effect is similar to reading a tablet at arm's length.

Once the marking zone has been traced, to ensure accuracy the system verifies its location before validating the operation for the user. Assembly is a hands-on job, so to keep users' arms free, the glasses can be controlled by voice command.

Following tests, Airbus says the smartglasses can reduce the time spent on marking operations by a factor of six, and completely eliminate positional errors. According to Accenture, a technology company with which Airbus has developed the smartglasses, 60 test runs were conducted during A330ceo aircraft assembly, which showed a 500% improvement in the overall productivity of the cabin seat marking process, while the error rate fell to zero and marking operations "significantly accelerated". This success means that Airbus believes the technology is mature enough to be implemented in A330 cabin furnishing operations, and into other aircraft production lines.

TRIALS HAVE SHOWN MAJOR TIME AND MANPOWER BENEFITS

"Before the arrival of smartglasses for in-cabin applications, we had to decipher complex drawings and convert imperial measurements into metric when marking the position of equipment on the cabin floor," said Cédric Gardon, technical manager for flight test installation at Airbus. "We were surprised at how much time we saved. The operation used to require three people and three days; now it requires one single operator and six hours."

Visit the Videos section of aircraftinteriorsinternational.com to see the smartglasses in action

Let's talk about your future **TODAY**

We know you need connectivity, but let's explore what you want to do in the next 10 years. At Gogo, we make it our business to support your business and design products to fit you and your passengers' needs for today, and tomorrow. And we deliver them on the most powerful global network.

To learn more, go to gogoair.com/aii

DISRUPTIVE INFLUENCES

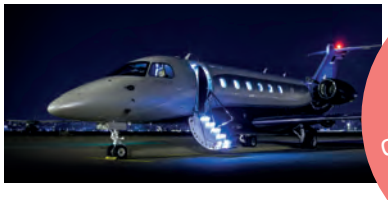
Disruption is usually an unwelcome word for flyers, but giants in the aviation industry are investing in new ways of thinking that could enhance the passenger experience

1

EMBRAER LANDS IN SILICON VALLEY

With almost half of its income today coming from innovations or improvements implemented over the past five years, forward thinking is crucial to Embraer; so much so that it invests nearly 10% of its annual revenues into R&D. In March, the company formed innovation teams in Silicon Valley and in Boston, with the objective of exploring business opportunities and collaborations for the future of air transportation.

"A major transformation is unfolding worldwide, and it has been accelerated by the evolution of AI, robotics, VR and autonomous vehicles, immensely contributing to millions of lives. This is another step that Embraer takes as a player in transforming global air transport," stated Antonio Campello, Embraer's director of corporate innovation.



Visit our website for full details and videos of A³'s Transpose concept

2

DELTA'S INNOVATION ECOSYSTEM

Delta set up The Hangar in May 2016, a team of 20 people working in a 6,500ft² midtown Atlanta space developing innovations, with inspiration drawn from Delta, tech startups, Georgia Tech and the Savannah College of Art and Design (SCAD). You can see some of the results on p24, and earlier this year Delta announced a US$1.5m investment in Engage – an Atlanta-based accelerator supporting tech startup talent in Atlanta.

The airline is also tapping into its own employees for innovation through Innovative Flight Experience (IFX) weekends and regular feedback to generate ideas.

"The Hangar often facilitates ideation and development of solutions based on what teams in the operation have identified as opportunities to make improvements," said Delta COO, Gil West.

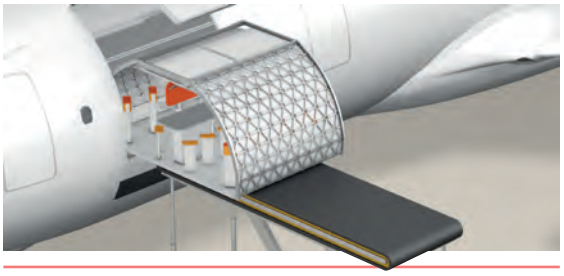
3

AIRBUS GOES WEST

A³ ('A-Cubed') is the Silicon Valley outpost of Airbus, which believes that "the future is created through episodic disruption with intervening periods of incremental innovation". For A³'s team of world-class experts, no goal is too unreasonable (and Airbus Group's US$150m initial commitment to the project helps, too).

Current projects include unmanned passenger aircraft for urban areas, an on-demand helicopter service for Uber, and Transpose, a modular aircraft interior for existing freighters that could bring experiences such as cafés, spas and gyms to commercial airline passengers, with swift reconfigurations possible between routes.

A³ is serious, with a corporate statement reading, "Exploration is unsettling, and only when we disrupt Airbus, its competitors, and the entire industry, will we consider our goals achieved and our mission a success."



4

JETBLUE'S INTELLIGENT THINKING

JetBlue Technology Ventures' (JTV) mission is to 'incubate, invest in and partner with early-stage startups at the intersection of technology, travel and hospitality'. This means developing technologies to power customer and crew member interactions across the entire digital, physical and brand experience of JetBlue. JTV is looking at areas such as AI, machine learning, big data, predictive analytics and the Internet of Things.

JTV is collaborating with fellow disruptor Boeing HorizonX (see below) on Zunum Aero, which would bring a frequent, low cost hybrid-electric aircraft service to small communities, removing the need to travel to large airport hubs.

5

BOEING ACTIVELY SEEKS DISRUPTION

Boeing has set up a disruption group called Boeing HorizonX, which it describes as "an innovation cell". In line with Boeing's plan for investing in future growth, HorizonX will have three focus areas: investing in new ventures and startups; seeking unique aerospace business opportunities; and assessing disruptive innovations and strategies.

Current investments are largely based on augmented reality.

"Our ability to identify, shape and harness game-changing innovations is key to sustaining and growing our leadership in aerospace," said Dennis Muilenburg, Boeing CEO.

Visit the Videos section of aircraftinteriorsinternational.com to find out about Hangar 51, IAG's disruptive division

"Aesthetic design blends to perfection."

EPIANKA

DESIGNED & DEVELOPED BY** TSI **FOR** B737MAX & A320 **NEO

TSI established a platform for a new economy class seat. The Epianka Seat expands the creativity, competitiveness and comfort of economy seating and makes it one of the best solutions for today's leading airlines.

Aircraft EXPO interiors

Visit us at AIX Long Beach California, USA
26-28th September, Stand #2017

TSI AVIATION SEATS

AVIO INTERIORS
Since 1972

#MADE IN ITALY

WWW.AVIOINTERIORS.IT

BIG BUSINESS

Big orders, big numbers, big smiles: the aircraft interiors sector is booming, as is passenger satisfaction

STRONG CONNECTIONS

- More than 17,000 commercial aircraft will offer connectivity to passengers by 2021, up from 6,500 aircraft in 2016
- Airline connectivity supplier revenues from IFC topped US$1bn in 2016 and should reach US$6.5bn by 2026

Euroconsult research

Asked,

"why do you think there is still such a small proportion of female engineers in aviation?"

Aircraft Interiors International readers said it was due to:

Greater male interest in the sector 58%

Women being put off by the high proportion of males 12%

Sexual discrimination 13%

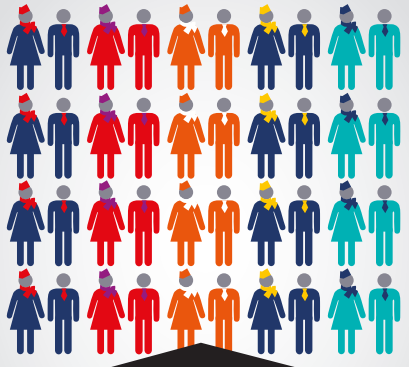
Somewhere in between 17%

AircraftInteriorsInternational.com monthly poll

82%

of air travelers love traveling

Gogo survey of 4,500 respondents



The aviation industry will need

814,000

more cabin crew by 2035

Boeing Current Market Outlook

Delta flight attendants have collected more than 6,500 tons of material for recycling so far this year. That is enough to...

- fill the cargo hold of a B747-400 110 times
- avoid filling nearly 702,000ft³ of landfill
- supply enough aluminum for Airbus to make seven A350-900s
- raise more than US$1m to build Habitat for Humanity homes (which Delta did!)

The aircraft insulation materials market is estimated to grow from

US$7.46bn

in 2017 to US$9.89bn by 2022, at a CAGR of 5.79%

MarketsandMarkets

The global commercial aircraft cabin interior market was valued at **US$17.8bn** in 2016 and is estimated to grow at a CAGR of 10.42% from 2016 to 2022

Research N Reports

Airbus delivers an A320 to EasyJet every 17 days on average

Toy story

97% of cabin crew believe that distributing activity toys to children during flights has a positive effect on their traveling companions

86% also believe that it has a positive effect on other passengers on board

KIDZinflight survey of 100 respondents from 21 airlines

The global aircraft cabin lighting market is expected to grow at a CAGR of

5.87%

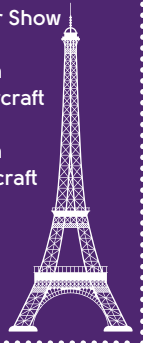
during 2017-2021

Technavio

Orders showdown at Paris Air Show

Airbus:
US$39.7bn
for 326 aircraft

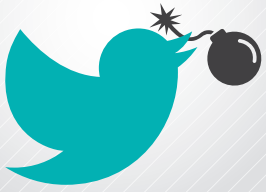
Boeing:
US$74.8bn
for 571 aircraft



Ryanair was awarded

US$284,000

in damages from a man who Tweeted a terror threat to the airline



Visit aircraftinteriorsinternational.com for regular news updates

Visit the Articles section of our website for full details of the Airspace experience

2020's A320

Airbus is adding Airspace family values to its A320 cabin schemes

1. THE WELCOME AREA FEATURES AN ILLUMINATED LED PANEL OFFERING MILLIONS OF POSSIBLE COLOR VARIATIONS

2. THE AIRSPACE CABIN PULLS OFF THE CLEVER TRICK OF LOOKING BETTER THAN THE STANDARD A320, WHILE BEING MORE PRACTICAL

3. WITH THE WHITE CABIN 'PAINTED' WITH A BRAND'S CHOICE OF LIGHT, THE SEAT UPHOLSTERY IS ONE OF THE FEW AREAS WHERE PHYSICAL COLOR CAN BE EXPRESSED

Airbus's Airspace cabin interior scheme for the A330neo and A350 is a compelling option for wide-body operators, but it does raise issues: an inconsistent passenger experience across Airbus fleets; not to mention short-haul A320 operators missing out on the option. This will change come 2020 though, when the Airspace scheme will be introduced on the A320 family, giving airlines the option of a common cabin design language across their fleets, especially since it will be a line-fit and retrofit option.

According to Airbus, highlights of the A320 Airspace experience include new sidewall panels for increased cabin width and an extra inch at shoulder level, and the largest overhead storage compartment in this aircraft class – a claimed 40% more volume, which is sufficient to accommodate eight bags per four-frame bin.

According to Ingo Wuggetzer, VP of cabin marketing at Airbus, airlines have expressed "great interest" in the A320 Airspace's increased overhead storage.

A 'mini wide-body' feel will be created through design features such as door surrounds that match the A350 XWB and A330neo Airspace designs, fully integrated window shades for more window space, and a customizable 'luminary experience' throughout the aircraft, with 16.4 million color options.

The Airspace scheme will even extend to the more private onboard experiences, with the spacious 'Smart-Lavs' to feature colored mood lighting, along with anti-bacterial coatings, automatic aroma dispensers, and optional touchless control options.

Passengers will also appreciate the modular IFE platform with overhead and in-seat display options, as well as provision for in-seat power, wireless flexible connectivity, and GSM mobile telephony to keep increasingly connected travelers happy.

"The A350 XWB cabin has proven extremely popular, with great feedback not only from passengers, but from design professionals," commented Dr Kiran Rao, EVP of product strategy at Airbus Commercial Aircraft. "This was great validation that gave us confidence to apply the design language to the A330neo and now to the A320 family."

The Videos section of aircraftinteriorsinternational.com includes tours of the Airspace wide-body cabins

More clever front-row monument ideas can be found on p66

STAR ATTRACTION

With the arrival of its Dreamliners, El Al is set to launch its biggest-ever interiors project – and they look pretty good, too

1. CREATING THE BEAUTIFUL BRANDING PANEL ON THE FRONT MONUMENT WAS A CHALLENGE AS IT REQUIRED A TWO-TONE FINISH AND HAD TO BE SHAPED TO MATCH THE CURVED DIAMOND PATTERN

2. THE FORWARD SEATS IN BUSINESS CLASS ARE INTEGRATED WITH THE FRONT-ROW MONUMENTS IN TERMS OF FUNCTION AND AESTHETIC

Israeli flag carrier El Al is introducing a new cabin scheme for its fleet of 16 B787-9s, which when launched in September, will mark the largest investment that the airline has made in its aircraft interiors. Highlights include the introduction of a premium economy class, revised brand identities for each class, and the latest in cabin hardware – all wrapped in a cabin scheme that blends Israel's rich history with its high-tech present day.

El Al's Dreamliners will be among the first aircraft to fly with Recaro's CL6710 business class seat (TAP Portugal will soon be launching the seat on its A330neos), which, in its 1-2-1 layout, offers direct aisle access to each of the 32 seats, which also benefit from a 78in fully flat bed, a 21in seat width, 29in of living space and 16in Panasonic IFE monitors. The seat was customized with design partner, PriestmanGoode to increase personal stowage, and to add custom branding, trim and finishing touches.

The living space of the forward seats integrates with the front-row monuments, the design of which provides the footwell ottoman area, sliding tray table and IFE monument attachments. Creating the monuments involved design teams from the airline, Recaro, PriestmanGoode and AIM Altitude, which engineered, certified and manufactured the monuments.

The challenge – apart from the project timescale of just 16 months – was to ensure that the style of the Recaro seats was continued throughout the monument design, to provide a smooth and cohesive appearance. It was not just about making sure the front-row monuments looked good though, as they also have to conceal a range of half carts, standard containers and emergency equipment, all hidden behind the main compartment doors.

For more details about the design thinking behind El Al's Dreamliner cabins, and for further images and video content, visit aircraftinteriorsinternational.com.

MORE RECARO

Recaro is also supplying the seats for the 28-seat premium economy cabin, with a dedicated seat model for this class – the PL3530 – selected. The 19in-wide seat benefits from a 38in pitch, and 13in IFE.

Back in economy the CL3710s – yep, Recaro again – have been customized with technical weaves and metallic stitch details. The seats have a 31in pitch and a 5in recline, as well as 12in IFE.

Visit the Videos section of aircraftinteriorsinternational.com for a tour of the El Al B787 cabins

TALKING HEADS

Aircraft seat pitch is even more of a talking point than usual in the US airline industry, with the Seat Egress in Air Travel (SEAT) Act pushing for the FAA to go beyond its current regulations and mandate a minimum seat width and pitch. Here's what some key players have to say...

"As airlines' profits skyrocket, passengers' seats keep shrinking. The incredible shrinking airline seat is more than just an inconvenience. Raising concerns of deadly blood clots and slowed evacuation, today's cramped cabins threaten the health and safety of passengers. This common-sense bill would establish a minimum seat size and return some much-needed sanity to our skies."
Senator Richard Blumenthal (Connecticut)

"The powerful airline industry will stop at nothing for the almighty dollar. Anyone who has flown recently has noticed the seats getting smaller and the legroom getting tighter, and has wondered if they need to go on a diet. The reality is it's the money-hungry airlines who need to curb their voracious appetite for profit at the expense of the flying public. From charging bag fees and nickel-and-diming passengers for what used to be complimentary inflight services, to shrinking the size of your seat so you're packed in like sardines, the airlines continue to gouge its customers and make air travel uncomfortable and unaffordable."
Senator Bob Menendez (New Jersey)

"Seat pitch and width have been shrinking, while Americans grow taller and wider. These factors pose a safety threat, most notably for emergency evacuations. The FAA has not conducted, or alternatively has not released, any tests, whether computer simulations or rehearsed evacuations, that demonstrate that airplanes with modern seat sizes and modern passenger sizes would pass emergency evacuation criteria."
Paul Hudson, president of FlyersRights.org

"With over 23,000 flights flying every day in the USA, we must ensure standards are in place to provide safe air travel for passengers. The SEAT Act will ensure standards for seat sizes large enough to guarantee effective passageways for emergency evacuation. I'm proud to support this important measure, with bipartisan and bicameral support, to make the frequency of air travel safer for everyone."
Congressman Adam Kinzinger (Illinois)

"From increased fees to shrinking seats, airline passengers are feeling the pinch all over. This bill isn't just about comfort, it's about creating safer conditions for millions of travelers. It protects consumers from being dangerously packed into airplanes, while also giving them the tools necessary to make informed seating choices when booking flights."
Senator Dianne Feinstein (California)

"Sky-high fees, technical meltdowns, along with little legroom and shrinking seats – if airlines aren't squeezing every nickel and dime out their passengers for ridiculous fees or offering *mea culpas* for delays and cancellations caused by technical glitches, they are cramming passengers into small, narrow seats. We should ensure that passengers who've paid their fare are provided sufficient room and safe seats on airplanes."
Senator Edward J Markey (Massachusetts)

"The number-one complaint I hear from travelers is shrinking legroom and cramped seats. Consumers are tired of being packed into airplanes like sardines while the airlines are cruising on record profits thanks to consolidation and super-low fuel prices. It's just plain unfair that a person gets charged for extra legroom inches that were once standard. Congress should pass the bipartisan SEAT Act, which will finally require a standard for seat size and legroom on airlines."
Senator Charles Ellis 'Chuck' Schumer (New York)

"Intense competition throughout the industry is driving positive changes for consumers. Today's travelers have more choices among carriers and amenities - including various seating options - than ever before. The FAA has affirmed that all US carriers meet or exceed federal safety standards and we continue to believe that there is no need for government to interfere with the market-driven solutions that are delivering a better and safer flight experience for everyone who takes to the skies."
Vaughn Jennings, managing director, Airlines for America

"Airline passengers are tired of being squeezed. Shrinking seat sizes in airplanes isn't just a matter of comfort but the safety and health of passengers as well. The safety and health of passengers must come before airline profits."
Congressman Steve Cohen (Tennessee) – a member of the House Transportation and Infrastructure Committee, and proposer of the SEAT Act

Visit aircraftinteriorsinternational.com for regular airline industry news

LONSEAL®
AIRCRAFT FLOORING

WHILE OTHERS MEET THE STANDARD...
...WE FLY ABOVE IT

The Original LONCOIN II FEATHERWEIGHT. Constructed in three layers with excellent slip-resistance and dimensional stability properties. Ideal for galley, entrance/aisle ways, and lavatories. Loncoin II Featherweight is under the AXIS COLLECTION and part of Lonseal's Aircraft Flooring Weight Reduction Program. Lonseal® has made their featherweight technology applicable to all existing aircraft flooring, making Lonseal a leader in aviation flooring.

- 6 ft. (1.8m) and 8 ft. (2.4m) sheet widths ideal for wider-bodied planes and reduces the number of floor seams
- Featherweight technology that makes it more than 30% lighter than standard flooring products
- Three layers with non-porous surface, excellent high-traction and dimensional stability
- Exclusive to Lonseal, **GreenMedic®** anti-microbial formulation increases infection control
- **REACH** compliant formulation
- Meets FAR 25.853a, FAR 25.793, and Boeing D643A504

Visit **www.LONSEALSPECIALTY.com** to see the wide range of aircraft flooring designs and colors.
International: 1+310.830.7111 Toll Free: 800.832.7111

ESSENZA
Essentially: class!

Geven's latest response to the newest quirks of high density comfort seating.
Light and tight - Essenza's little body is all that you need to carry passengers in comfort inspite of the smaller pitches.
Essential in design, but substantial in reliability.
Conceived for the short haul - its life cycle is one you can count on for the long haul.

Geven

Fly beyond expectations

www.geven.com

Most of the interior – excluding seats and IFE – will be built in-house by Greenpoint

SHIP AHOY

The nautical-inspired Crystal Skye B777 adds a whole new meaning to the term 'cruising altitude'

1. FOR A LITTLE AFTER-DINNER ENTERTAINMENT, THE TABLES ARE EQUIPPED WITH EMBEDDED TABLETS THAT CAN BE USED FOR GAMING, USING VIRTUAL CHIPS

2. THE BRAND FAVORS LIGHT AND BRIGHT SCHEMES. THE LIGHT COLOR PALETTE, WITH ACCENTS OF BLUE AND TEAL, IS MODERN AND INVITING

3. THE SEATS ARE A BESPOKE VERSION OF ZODIAC'S AURA MODEL, A DESIGN ORIGINALLY CONCEIVED BY ACUMEN DESIGN ASSOCIATES

4. ACCENT AND WASH LIGHTING SCENES CAN BE TAILORED TO ENHANCE MANY SCENARIOS, FROM FINE DINING TO GAMING

August saw the reveal of one of the most special Boeing 777s in the sky, intended to offer the ultimate luxury travel experience. Named Crystal Skye, the VIP 777-200LR's interior was co-designed by its charter agent – Crystal AirCruises – and the Greenpoint Technologies completions center in Washington.

The idea behind the aircraft and its interior is to offer a cruise experience in the sky, with the cabins becoming an extension of the elegant cabins that the Crystal brand has established with its fleet of luxury cruise ships, yachts and riverboats.

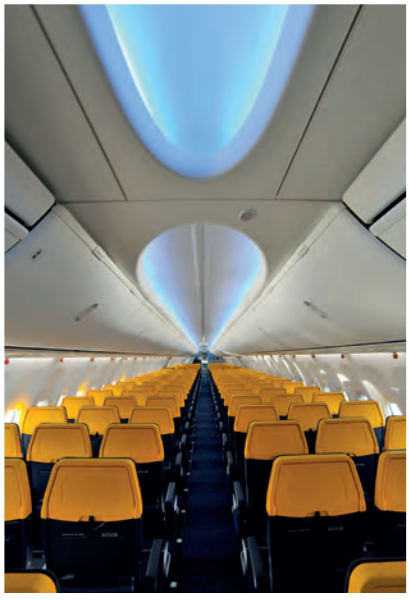
As befits the social nature of a cruise, a key feature of the cabin is a bar and lounge area, an expansive space with custom coved ceilings that accommodates 30 guests comfortably with its 24 seats, three-place divans, dining tables and ample space to stand, stretch, pose or whatever takes one's fancy. The focal point is the full-service bar that features stone veneers, colored LED lighting and a 'wine cellar'. A cellar-like space on the lower deck was considered as a more literal interpretation of the cellar theme, but instead a compartment at the bar filled with crystal glass storage, wine racks and a chiller was decided upon.

"The vision is for guests to feel the comforts of a hotel with a main lounge/lobby area in which to eat, socialize and relax," stated Annika Wicklund, design director at Greenpoint Technologies.

Aft of the social zone is a seating area for up to 84 guests, optimized to accommodate guests traveling in pairs with its staggered 2 x 2 x 2 configuration, which also provides extra-wide aisles. The seats – named Crystal Exclusive Class seats – are a bespoke version of Zodiac Aerospace's Aura model, with 24in between the armrests, adjustable lumbar support and a 70.5in lie-flat bed. Other features include custom privacy surrounds, centerline privacy partitions, four-way adjustable headrests, individual storage ottomans, cocktail tables and 24in HD IFE.

The aircraft needed to be certified for private charter operations, with a challenge being that FAA regulations had stricter requirements for the interior decorative materials than on a typical BBJ project. However, following much testing, the team pushed through many bespoke and luxury materials, including custom quilted leather upholstery for the seating, soft mohair for the divans, and a further mix of reflective, shimmering materials and highly durable and stain-resistant whites to help make the space appear even larger and brighter.

Visit the Videos section of aircraftinteriorsinternational.com to see how the design team developed the cabins



GAME CHANGER

Irish LCC Ryanair really does seem to be living up to its promise of 'always getting better', with the reveal of its B737 MAX configurations for 2019 proving surprisingly generous

THE SLIMLINE SEATS WON'T HAVE SEATBACK POCKETS. THIS MEANS CREW DON'T HAVE TO CHECK AND CLEAN POCKETS, HELPING ACHIEVE 25-MINUTE TURNAROUNDS. THERE IS ALSO A SMALL BUT USEFUL WEIGHT SAVING

Ryanair, the Irish low-cost carrier airline that many people seem to love to hate – or at least love making jokes about – is in the news again. The reason is positive, though, as the airline has launched a further set of customer experience improvements as its enters the fourth year of its 'Always Getting Better' program.

The past three years have seen Ryanair bring in a range of customer service and digital enhancements such as Boeing Sky Interior cabins for its B737s, an increased cabin bag allowance, a new website and app, new uniforms, allocated seating, and tailored business, leisure and family products. These improvements to the customer experience have resulted in profit surges that have given Ryanair CEO Michael O'Leary – famous for his forthright if slightly abrasive approach to customer service – a newfound belief in the power of a positive brand experience. After all, a 66% profits rise in 2015 and 43% in 2016 would put a smile on any airline executive's face.

Naturally O'Leary wants the trend to continue, so a fourth wave of improvements is being introduced in 2017, including Alexa voice recognition functions on the Ryanair.com website. Even better, the airline has revealed new investments in cabin products.

For its Boeing 737 MAX aircraft, which will begin entering the fleet in Spring 2019 – aircraft which Ryanair's chief marketing officer Kenny Jacobs refers to as "game-changers" – the cabins will have more legroom and larger overhead stowage space, enabled by the removal of the rear galley, with two lavs relocated into that space.

The airline has also announced its selection of Zodiac as the supplier of new slimline seats. The reconfigured cabin, combined with these space-efficient seats, is projected to enable an additional eight seats to be fitted per B737 (197 seats compared with today's 189).

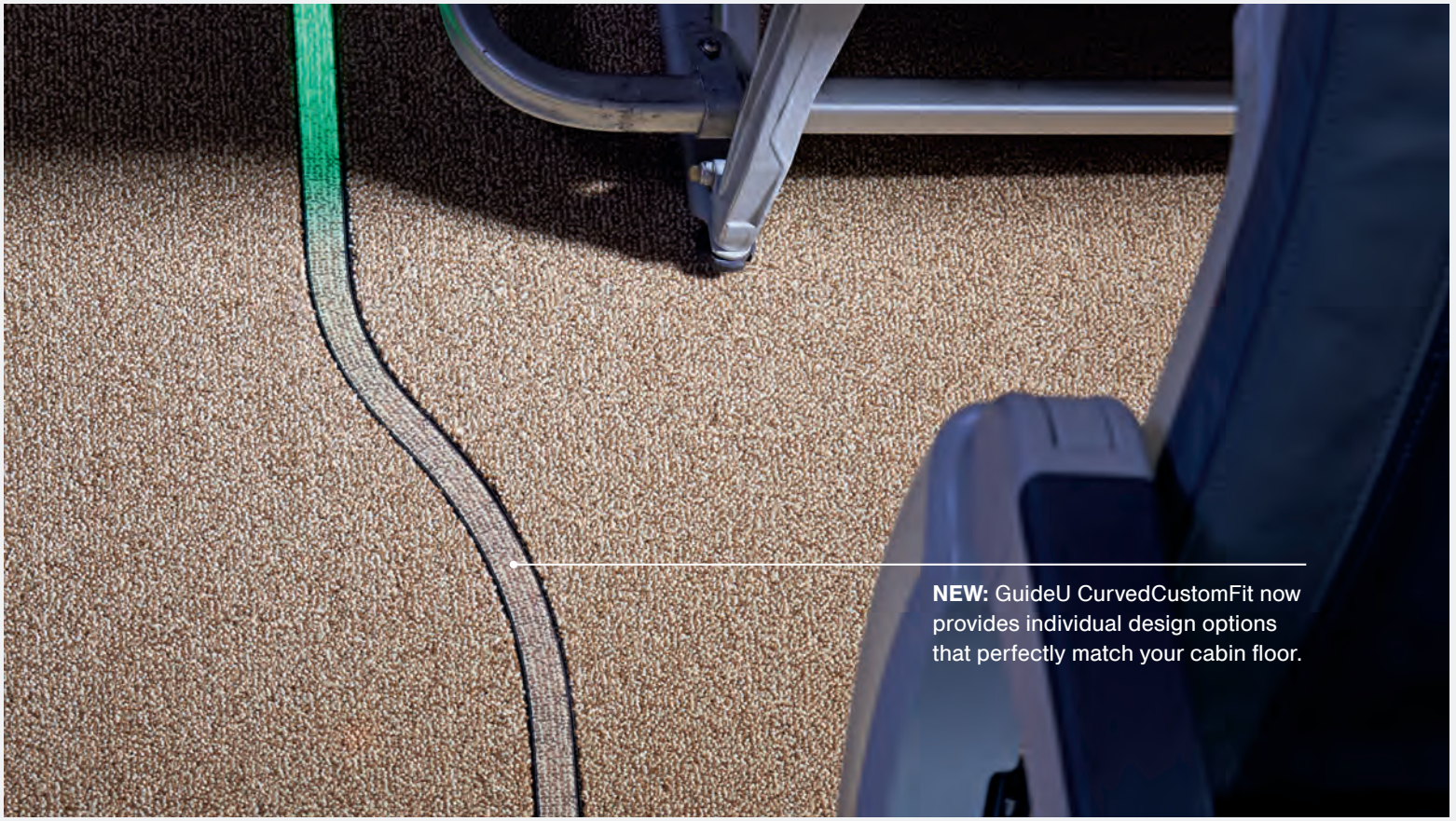
And now for the inevitable 'but'... The surprise is there is no 'but'. Ryanair customers will enjoy an inch more pitch than they do today, adding up to a highly competitive 31in – more than many 'prestige' rivals. This generosity could spell even greater profits for the airline – and the end of Ryanair jokes.

July saw Ryanair celebrate carrying its billionth passenger since its first flight took off in 1985

GuideU

Leading the way in curved style

07.2017



CurvedCustomFit is the next enhancement of the market leading non-electric floor path marking system GuideU 1000-Series. These photoluminescent strips are the perfect synergy between our innovative products CustomFit and ColourCurve. In addition to the vast range of colors, CustomFit can be delivered with surface patterns to match the surrounding carpet, making it virtually disappear in normal lighting conditions. With our curved variant providing lines of any shape imaginable, we follow your cabin contour requirements.

GuideU is a product by Lufthansa Technik Original Equipment Innovation, which is dedicated to delivering trendsetting cabin and IFE solutions.

reddot design award
winner 2017

Lufthansa Technik AG, guideu@lht.dlh.de
Call us: +49-40-5070-2665

Original Equipment Innovation – OEI by

Lufthansa Technik

www.lufthansa-technik.com/guideu

DELTA DISRUPTION

The Hangar, Delta's global innovation center, is collaborating with students at Savannah College of Art and Design in the USA to imagine air travel in 2027. These are some of the items in the final phases of development or testing...

1 PRE-SELECT MEAL BOT

Customers in the airline's soon-to-launch Delta One business class suites will want for little, but a minor gripe has been identified: they can only make their menu selections when on board. Thus a pre-selectable meal solution has been devised, which couples interactive mail with SMS messaging via a chatbot. Meal preference emails would be sent to customers in the run-up to their flight, and if they don't respond to the email, an SMS message would also be sent several days ahead of the flight to try and capture their meal preference. Delta is so taken by the idea that is testing the system for potential implementation.

2 INFLIGHT TOURISM

Explore your destination before you land using a VR system linked to the IFE platform. Customers could write feedback and read suggestions and comments about travel locations from others in their social media network.

3 FLIGHT COMMUNICATION

Boarding can be a source of stress for passengers – and indeed for crews – but improved communications between staff can help to make the process more efficient. The Hangar has collaborated with a cross-divisional team of Delta employees and the airline's operations and customer center, to develop a system of devices that allow for real-time notifications and action items for pilots, flight attendants and gate agents to help expedite their flight. According to Delta, tests have shown that the improved communication between the groups yields a reduction in the amount of time employees spend traversing the jet bridge to communicate with one another, freeing up more time to better serve customers.

4 LOUNGE OCCUPANCY TRACKING

Delta is exploring technologies to measure traffic at its Sky Clubs in an effort to better align staffing and operations during peak days and times. Heat mapping, mobile device identification, real-time video monitoring and infrared distance tracking are all technologies currently being explored.

5 MOBILE GATE INTERFACE

Several ideas have been devised for the gate area. For example, one idea is a security checkpoint that uses biometric scanning and x-ray technology to allow customers to walk through the checkpoint without stopping or unpacking belongings. Another is a furniture system with cubes that could be reconfigured via motion sensor technology to accommodate various and changing seating preferences (napping, reading, working, etc). A mobile application is also being developed that enables lobby and gate agents to perform a number of tasks such as assigning seats and scanning boarding passes without having to be tethered to a PC behind the gate counter.

Delta worked on many innovations for the launch of its B747 in 1970. See p152 to learn more about this amazing aircraft

introducing

ARC™

The Arc™ headrest, designed by HAECO Cabin Solutions, is the next evolution in passenger comfort technology following the Vector™ seating platform. The Arc headrest achieves superior head and neck support compared to current static and articulation headrests on the market.

10° vertical tilt

The vertical tilt mechanism pivots between 0° and 10°, allowing the headrest to cradle the base of the head from underneath.

linear guide system

A linear guide system allows Arc to be positioned up to two inches above or below the standard position.

full 180° curve

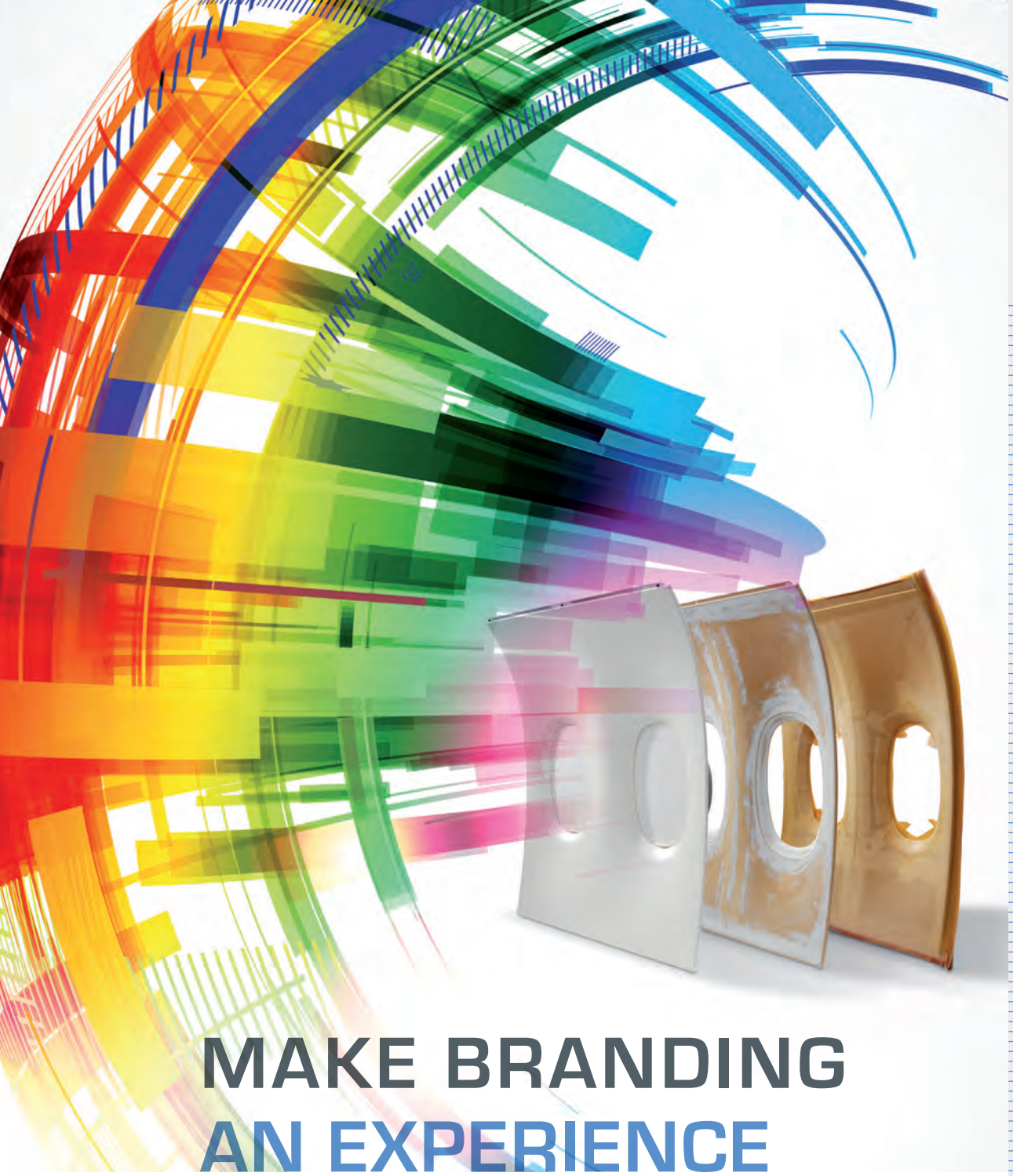
The two pairs of vertically articulating panels, a first in the industry, create up to a full, 180° curve around the passenger's head.

HAECO
Cabin Solutions

SWIRE

seatinfo@haeco.aero | www.haeco.aero

DIEHL
Aerosystems



MAKE BRANDING AN EXPERIENCE

Digital printing turns lining elements into more than just lining. In digital printing, the conventional décor foils on the lining elements are replaced by direct printing. Direct printing is not only lighter and more durable, but also 100% customizable: Unobtrusive patterns, complete panoramic images, realistic renderings or freely scalable vector graphics – there are no limits to flexibility.

www.diehl-aerosystems.com

CABIN FEVER?

Researchers at Arizona State University have discovered that boarding methods and aircraft capacity can influence infection rates in the cabin – and found solutions to aid passenger health and reduce viral outbreaks

"Using smaller airplanes during an outbreak can drastically reduce the probability of infection"

Cramming hundreds of people from around the world into a tube and sending it to a destination across the globe sounds like a great way to spread infection; indeed travel restrictions are often implemented to help prevent disease spread during an epidemic. But what are the actual risks of the spread of infection on board an aircraft? A multi-disciplinary team of experts from Arizona State University has called upon their applied math and computing expertise to find out..

The team began by devising a hybrid model that can evaluate how people move through the cabin and how infectious diseases can be randomly spread through contact with a host. The team didn't mess around with the common cold, they simulated how Ebola might spread through the cabin under various conditions, such as different boarding and deplaning methods, and according to aircraft size. Bad news, germophobes: the commonly used front, middle and rear boarding technique was found to be the worst in terms of the spread of infection, as dwell time in the congested aisles of the plane means that there is more potential exposure to any contagious passengers.

The team projects that during an Ebola epidemic, this boarding strategy would have a 67% chance of infection rates reaching the level of 20 air-travel-related cases per month, whatever the aircraft size.

On a more positive note, the model projected that when the airplane is divided in two lengthwise sections and passengers board randomly within those sections, this generates the lowest number of new infections. This is because bottlenecks are prevented, which keeps passengers from being next to any infected person for very long. The model showed that the chance of that level of infection drops to 40% using this boarding method.

Deplaning was found to be much safer, as it is a faster process, meaning people aren't all crowded together for as long. A good argument for not clogging the aisles as soon as the aircraft lands...

Thus one might imagine that with bigger aircraft, the greater space on board would shrink the odds of being given an infection, but the study found that aircraft with fewer than 150 seats are safer as they have fewer susceptible people on board, fewer people within an infected person's contact radius, and less time is spent moving through the cabin to reach seats.

"Using smaller airplanes during an outbreak, instead of completely banning flights to a specific destination, can drastically reduce the probability of introduction of infection," said Anuj Mubayi, assistant professor at the school of human evolution and social change.

The research team is presenting the findings of its outbreak-reducing strategies to governments and airlines with a view to preventing the rapid spread of disease. The model's parameters, or the settings that it runs on, can be adjusted to test other directly transmitted diseases, such as the flu, and applied to other crowded locations, such as airports. This is an idea worth watching: after all, arriving in good health is a fundamental part of a good passenger experience.

The M3 features a variable-geometry wing design that permits slow and quiet take-off and landing, and enables fuel-efficient cruising at subsonic speeds over land

FAST AND CURIOUS

Based on real-world technologies, the 32-seat Cygnus M3 passenger airliner concept is intended as a credible supersonic alternative to today's wide-body first and business class

The Cygnus M3 has been devised in response to what its designer sees as a lack of ambition to create something genuinely game-changing in aviation. UK-based Tom Johnson Design considers paying twice as much to go 30-40% faster to be a slightly limited vision, believing that something more compelling in terms of speed and range could be built for about the same cost, without the need for heavy and unproven technologies such as low-boom nose extensions. The M3 design – which has been in development for over five years – comprises current technology, with a view to its size, weight, range, speed, safety/airworthiness and cabin arrangements all being as realistic as possible for near-term implementation.

The vision is for M3 to be a small 32-passenger airliner with set scheduled routes, rather than a supersonic bizjet, as the latter requires highly flexible mission parameters, from short hops to transcontinental journeys, making it difficult to design a targeted, optimized aircraft. A bizjet design also limits the number of potential customers because an airliner will always be configurable as a business jet, but the reverse isn't necessarily true.

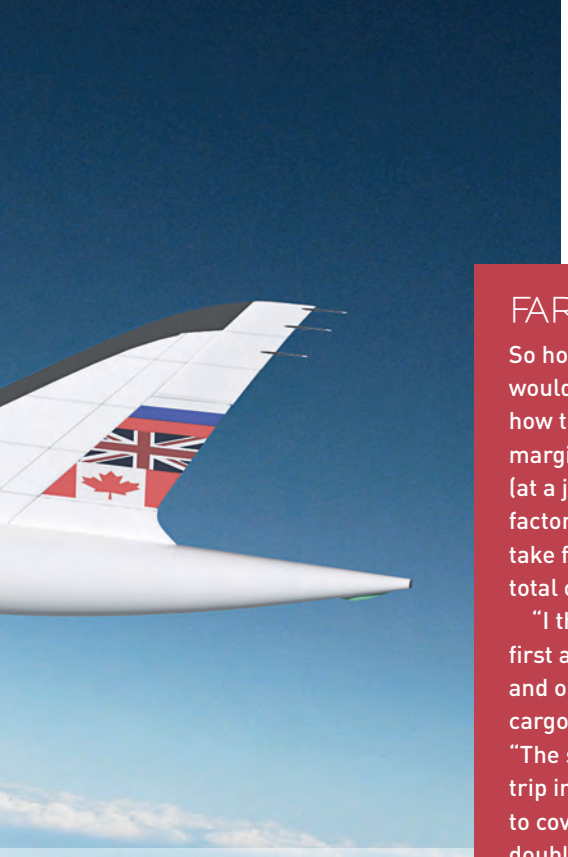
Johnson has paid particular attention to creating a realistic cabin, including factors such as escape doors, window size, and water and services. "These might seem like minutia, but ignoring them early on can lead to huge issues later," said Johnson.

Thus the cabin is designed with FAA airworthiness compliance in mind, in terms of seat and aisle spacing, dimensions, escape doors, etc. The need for high-capacity seating to

WILL IT FLY?

So will we see the M3 fly or will it be consigned to the aviation trivia books? Johnson has had discussions with parties that could potentially offer national-level financial assistance, engineering services and venture funding. However, he states, "To get it to a stage where I'd be comfortable actively seeking third-party investment, there's a huge amount still to do." He adds that the design and engineering of commercial aircraft seating ideas that grew out of the M3 project is another priority.

"Bringing the concept to reality would require as much effort and expertise in technology research as it would in managerial and marketing skill, but cash is king at the end of the day, and developing the Cygnus M3 would require an estimated US$1.5bn."



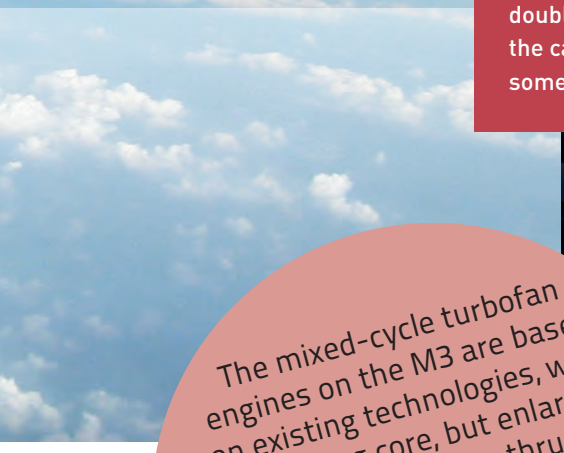
FARE PRICE

So how much would it cost to fly on a Cygnus M3? A lot would depend on the acquisition cost of the airframe, and how the operator funded it, but assuming a 10% profit margin, a maximum range flight from LA to Hong Kong (at a jet fuel price of US$1.43 per gallon) with a 100% load factor of 32 passengers, would cost US$3,600 return and take four hours, with fuel representing about 20% of the total operating costs.

"I think a fleet of these aircraft could quickly cream the first and business class passengers from many airlines and open up many route and usage options – such as fast cargo services or business jet versions," states Johnson. "The speed of the design would permit a return trip in less time than a regular aircraft would take to cover the outbound journey alone, potentially doubling or even tripling aircraft use factors – with the caveat that maintenance requirements would be somewhat higher."

CABIN DATA

Volume: 43.4m³
Length: 13.0m
Width: 2.2m
Height: 1.85m
Crew: Two flight crew, two cabin crew
Passenger capacity: 32
Baggage capacity: 2.6m³ (hold)



The mixed-cycle turbofan engines on the M3 are based on existing technologies, with an existing core, but enlarged to provide the dry thrust required. The variable-cycle technology desired has been tested and flown on one engine design, with several other designs proposed but not yet built

keep ticket prices competitive, combined with the requirement for luxury and comfort, led to the selection of reclining seat designs (proprietary designs that Johnson is currently working on).

Cabin, cargo bay and landing gear bay cooling would be via air/fuel heat exchangers, exploiting the aircraft's relatively small cabin and large fuel load to cope with heat generated by Mach 2.85 flight. This cruising speed was selected because it would generate an average skin temperature of 178°C. Even though the jet's titanium skin can handle more heat without deforming, higher temperatures would create cabin and bay temperatures that are difficult to cool without sapping excessive power from the engines.

However, Mach 3 should be available for short periods, if required.

Clearly noise is an issue, but Johnson decided that even the best low-boom concepts and devices have only a small effect on shockwave intensity, while compromising a design's weight, usable space and efficiency. Thus, Cygnus is optimized for mission profiles on long over-water routes, with as much time spent at maximum speed as possible. However, the relatively small size of the aircraft, coupled with a projected maximum ramp weight of about 70 tons, should minimize sonic boom concerns (the boom signature would be less than half that of Concorde). The variable-geometry wing design also permits slow and quiet take-off and landing, and enables fuel-efficient cruising at subsonic speeds over land.

Visit aircraftinteriorsinternational.com to see a video of the Cygnus M3 concept in action

The B787 doesn't use engine-bleed air. See p36 for insight into cabin air issues

DREAMING DOWN UNDER

Qantas is working to differentiate the already-healthy Dreamliner experience with further passenger well-being benefits of its own

From its spacious cabin architecture with large windows, to its quiet air conditioning and engine noise, to its high cabin pressure and humidity, the Dreamliner experience is as comfortable and healthy as commercial flight gets. However, with over 500 of the aircraft already in service with airlines around the world, the health attributes of the Dreamliner are no longer a point of differentiation. So ahead of the 2018 launch of its B787-9s, Qantas is working to add a few more health benefits of its own.

The 'red roo' is collaborating with cross-disciplinary researchers from the University of Sydney's Charles Perkins Centre who bring well-being expertise in everything from nutrition to physical activity, sleep and complex systems modeling.

A few guinea pigs are also being involved in the project, namely Qantas frequent flyers who have agreed to months of clinical trials that involve flying with wearable technology that will measure their biorhythms, to create baseline data for developing future products.

This is claimed to be the first inflight health collaboration of this scale between an airline and a university to go beyond medical emergency matters, and the data gathered will include sleep patterns, moods and physical states, and food and beverage consumption.

This data will then be applied in research projects which include the perennial favorite of combatting jetlag, menu design and service timing, cabin environment customization including lighting and temperature, as well as ideas that involve a little more passenger participation, such as optimizing and promoting onboard exercise and movement, pre- and post-flight health recommendations, and transit lounge wellness concepts. This holistic approach all comes down to optimizing nourishment and sleep so that passengers will feel refreshed and rejuvenated when they land – and of course feel so good they will want to book Qantas for their next flight.

According to Qantas Group CEO Alan Joyce, the center's research has already influenced what meals and beverages will be serving on board and when, as well as cabin lighting and temperature.

"There is the potential for extraordinary health, science and engineering discoveries and innovations to come out of this research partnership," stated Prof. Steve Simpson, academic director at the Charles Perkins Centre.

AVRO FLYING

Qantas joins several airlines in having an accelerator program (see p12 for others). Named Avro (after the airline's first aircraft in 1920, an Avro 504K), startup program participants receive a 12-week course, led by industry experts and up to A$150,000 (US$118,250) of funding, with an opportunity to gain additional investment. 2017's ideas include a tool for the travel industry to optimize unit revenue and marketing performance, and a tool for crew to view and share rosters with family and friends.

1. COMBINED WITH HIGH-QUALITY SEATING, THE QANTAS DREAMLINER EXPERIENCE SHOULD BE VERY COMFORTABLE INDEED

2. THE LIVERY HAS BEEN UPDATED FOR THE B787 TO CREATE A MORE STREAMLINED LOOK

3. GREAT MINDS IN BUSINESS, SCIENCE AND ACADEMIA CONVERGE TO IMPROVE THE PASSENGER EXPERIENCE

Visit the Videos section of aircraftinteriorsinternational.com to see a range of Qantas content

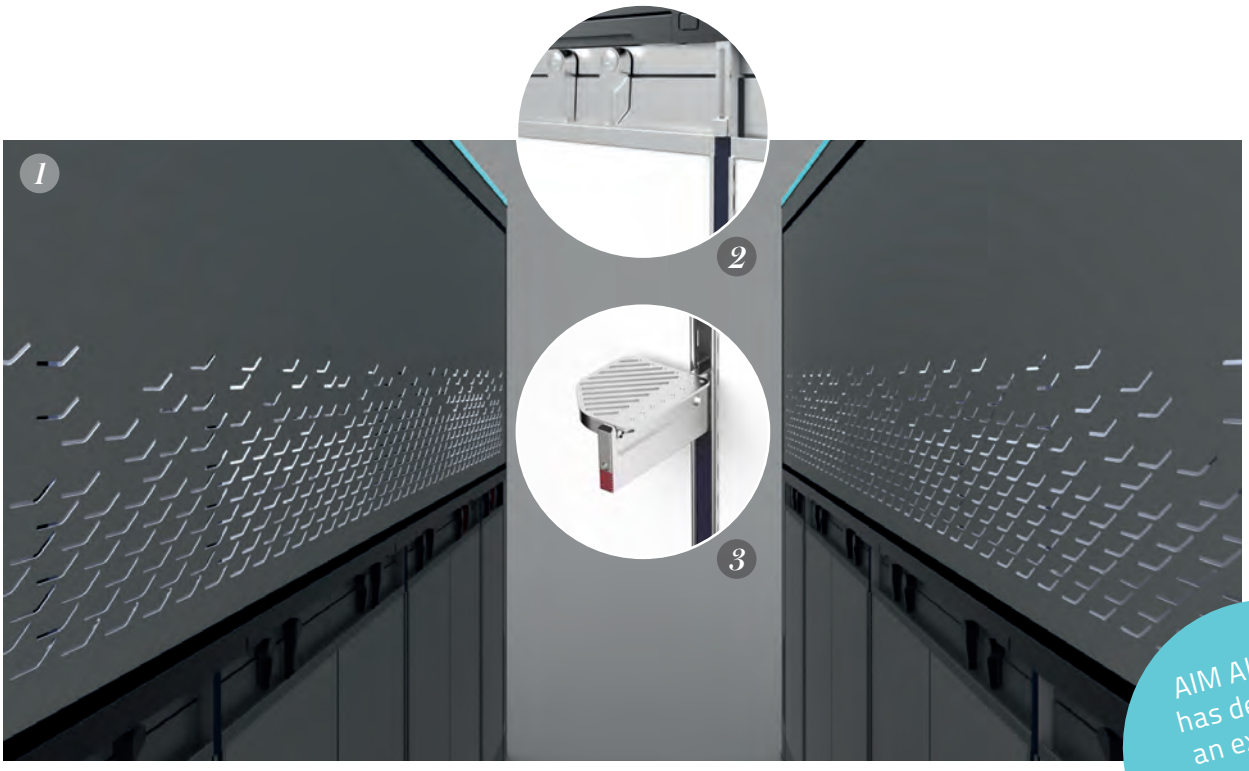
OUR LARGE FRIDGE, OR FREEZER, HOLDS A MASSIVE .17 CUBIC METRES/6.25 CUBIC FEET

CELEBRATING 30 YEARS OF DESIGN AND INNOVATION

A bespoke product
in a mass market world

AEROLUX LTD

AEROLUX LTD, Chorley Road, Blackpool, Lancashire, FY3 7XQ, England
Tel: +44 1253 396670 • Fax: +44 1253 300074 • Email: sales@aerolux.co.uk • www.aerolux.co.uk



AIM Altitude has designed an exclusive monument concept for our feature on p66

AT YOUR SERVICE

A cleverly packaged and optioned galley concept could be taking to the skies soon

1. ROLLER BLINDS CAN BE DEPLOYED TO CREATE A MINIMAL LOOK WHEN THE GALLEY IS NOT BEING USED

2. THE CLIP-ON TRIM SYSTEM IS MAINTENANCE-FRIENDLY

3. EVEN THE CREW STEP HAS BEEN DESIGNED FOR FUNCTION AND AESTHETICS

4. PULL-OUT AND FOLD-OUT FEATURES CREATE AN EFFICIENCY OF SPACE AND AESTHETIC

5. ZOE WENN, AN INDUSTRIAL DESIGNER AT AIM ALTITUDE, IS SEEKING AIRLINE FEEDBACK ON THE DESIGN

An innovative prototype galley design is spiking interest from airline customers, its designer says. This is not just another blue-sky idea, though, as the design is not a concept to revolutionize aircraft food service, but instead is intended as an evolutionary improvement to onboard service.

The next-generation galley features were designed following research carried out by the designer – AIM Altitude in New Zealand – including stakeholder empathy studies; input from cabin crew, maintenance and catering personnel; observation flights; and collaborations with other parties such as suppliers.

The result is clever new features such as a pull-out table that folds flush with the unit when not in use, and a pantry that offers a unique way of storing traditional galley equipment. Full- or half-height units in the pantry can be used for the storage of Atlas drawers or standard units, bringing benefits in terms of crew access and galley capacity.

Other features of the next-generation galley include flush task lighting, flush sinks, configurable shelving, an improved foot step design, and UV water dispenser modules. There are many options, but the idea is that airlines can select as many or as few features as they wish to meet their individual needs.

The galley looks smart too, with a choice of décor panels to meet airlines' branding needs – these can be easily removed or replaced if damaged. The panels are complemented by a clip-on trim system that provides a simple, maintenance-friendly option for replacing damaged trim; again, trim colors can be customized for brand requirements.

Zoe Wenn, an industrial designer at AIM Altitude who worked on the project explained, "The prototype is a first step toward some possible new features for next-generation galleys. We have focused on testing the products and getting first-hand feedback from airlines for us to continue to refine the design. Our intent would be to include some of these features on our baseline standard galleys in the future."

Visit the Image Galleries section of aircraftinteriorsinternational.com to see every aspect of the galley

CELEBRATING
30 YEARS
OF DESIGN AND
INNOVATION

PERFECT RICE
PERFECT CONGEE
PERFECT HAPPINESS

A bespoke product
in a mass market world

AEROLUX LTD

AEROLUX LTD, Chorley Road, Blackpool, Lancashire, FY3 7XQ, England
Tel: +44 1253 396670 • Fax: +44 1253 300074 • Email: sales@aerolux.co.uk • www.aerolux.co.uk

INTO THE BLUE

THE BRIEF

Many brands are seeking the affections and paychecks of millennials. How could a grande dame of airlines appeal to these coveted, youthful customers and secure life-long loyalty?

THE SOLUTION

Air France is hoping to lure 18- to 35-year-olds with Joon, an airline brand with a youthful outlook (the name is a near homophone for *jeaune* – French for 'young' – intended to have international appeal). The brand has been designed as a 'younger sister' of Air France, meeting the aspirations of millennials, with an approach that means something to them and an offer that stands out.

So what has Air France identified as the needs and aspirations of its target audience? "Epicurean and connected, they are opportunistic in a positive sense as they know how to enjoy every moment and are in search of quality experiences that they want to share with others," says Caroline Fontaine, Air France's brand VP.

Some might assume that targeting a young demographic would call for a low-cost carrier approach, but Air France has stated that this is not the Joon way. According to the airline, Joon will "offer original products and services that reflect those of Air France" and be "a lifestyle brand and a state of mind".

Air France has yet to reveal its specific product plans, but its statements to date suggest high-speed connectivity and a strong social media presence, given that it has identified millennial lifestyles as 'revolving around digital technology' (streaming IFE could be a possibility), at least two travel classes, and commonality with the Air France brand and experience as it hopes to inspire Joon customers to travel with its elder sibling in later years.

Air France is working with the Brandimage consultancy in Paris to create 'a lifestyle brand with a positive, optimistic state of mind'. The visual identity is based around an electric blue palette, believed to symbolize a dynamic attitude, as well as sky, space and travel.

Of course, Joon is not just a plan for Air France to recapture its youth and capture new youths: the airline hopes it will boost profitability of the Group, enabling it to reduce costs and ensure the sustainability of its business model. Medium-haul operations will commence this autumn, followed by long-haul in summer 2018.

VERDICT

Joon is a nice idea – but is it needed? On one hand, some research has found that millennials prioritize experiences over material objects, so they may be willing to pay a little more for the Joon experience than an LCC experience. As Dominique Wood, Joon's EVP of brand and communications said, the airline "will offer more than just a flight and a fare; it will offer a global travel experience".

However, are millennials so different to other demographics who select flights based mainly on cost and route? Just look at Norwegian, which appeals to swathes of people and is growing fast based on highly competitive pricing, good routes and a simple but modern product. For millennials wishing to pay a premium for a flight experience, wouldn't they want an experience based on luxury? Something offered by many large airlines, such as... Air France?

Of course, this is speculation. Joon may indeed be the dream experience for its target demographic, and we won't know until full details are revealed later this year (which *Aircraft Interiors International* will of course bring you).

THE CREW'S CASUAL CAPSULE WARDROBES ARE COMPOSED OF BLUES AND WHITES (AIR FRANCE SEEMS TO BE KEEPING ITS SIGNATURE RED FOR ITSELF)

Flyfry: flʌɪɪŋfrʌɪ

verb

To cook (food) in hot fat or oil, typically in a shallow pan, while flying in an aeroplane. A task most easily accomplished using an Aerolux AL-SK15-100 Series Skillet

" the steward easily flyfried an egg for the first class passenger as the galley was equipped with an Aerolux AL-SK15-100 Series Skillet"

CELEBRATING 30 YEARS OF DESIGN AND INNOVATION

A bespoke product

in a mass market world

AEROLUX LTD

AEROLUX LTD, Chorley Road, Blackpool, Lancashire, FY3 7XQ, England
Tel: +44 1253 396670 • Fax: +44 1253 300074 • Email: sales@aerolux.co.uk • www.aerolux.co.uk

the ki

Air inside?

IS CABIN AIR SAFE? WITH LITIGATION UNDERWAY IN NORTH AMERICA AND EUROPE, A NEW STUDY OF BLEED AIR OIL CONTAMINATION IS STIRRING THE DECADES-LONG DEBATE AND TRIGGERING COMPLAINTS FROM THE AEROMEDICAL WORLD

Words by Robert Coppinger
Illustration by Matthew Hollings

LIGHTER BY DESIGN

Voyager Aviation Leather

With the latest development in leather manufacturing technology, our Voyager Leather is up to 30% lighter than standard leather — but remains the same thickness.

The weight saving properties of Voyager leads to lower fuel consumption and its long life cycle leads to less refurbishments whilst still guaranteeing the same trusted physical performance as full weight leather.

+44 (0)1505 691705
marketing@muirhead.co.uk
www.muirhead.co.uk

TANNERY OF THE YEAR FINALIST 2018

Muirhead®
HIGH PERFORMANCE LEATHER

THE NO-BLEED SYSTEMS ARCHITECTURE OF THE B787 IS A GOOD MARKETING FEATURE

For many years, some aircrew have complained of health problems that they associate with fume events in the cabin, and while some researchers allege that vaporized oils in bleed air are the source of the symptoms, major aerospace organizations disagree.

The latest disagreement is between *Public Health Panorama* – a journal of the United Nation's World Health Organization (WHO) – and five aerospace medical organizations that have written a letter complaining about a paper that the journal released in June. The paper, by two scientists and a physician, concludes that there are oil vapor leaks through bleed air systems and that they are of significant quantity and type that they cause harm to cabin occupants, crew and passengers alike. The report also linked symptoms reported by aircrew with inhalation of the oils used by bleed air systems.

AS WELL AS AIR QUALITY BENEFITS, THE NO-BLEED SYSTEM IN THE B787 HAS THRUST AND FUEL CONSUMPTION ADVANTAGES

The paper's corresponding author is Dr Susan Michaelis. She is a medically retired former pilot with a doctorate in the field of contaminated air – and she says she has been affected by aerotoxic syndrome. She also has a master of science degree on how oil leaks from bleed air systems, from Cranfield University in the UK. "I looked at how the oil actually leaks. Seals are not a perfect design and they do leak at a low level," Michaelis told *Aircraft Interiors International*.

The conclusions and the methods of the WHO journal paper have been rejected by aviation medical bodies. The Aerospace Medical Association (AsMA), Civil Aviation Medical Association (CAMA) and the European Society of Aerospace Medicine (ESAM) have jointly sent a letter to the WHO journal.

Another aviation medical organization, the Airline Medical Directors Association (AMDA), which is not a signatory to the letter, told us, "We have serious concerns about the science behind the studies reported. The article

"We have serious concerns about the science behind the studies reported"

THE BAe 146 EXPERIENCED SOME ISSUES WITH ITS BLEED AIR AND CABIN PRESSURIZATION SYSTEMS, LEADING TO SOME FUME EVENTS WHERE IRRITANT FUMES WERE INTRODUCED INTO THE CABIN VIA THE PRESSURIZING SYSTEM (PHOTO: KRISTOFERB)

"No occupational exposure limits were breached"

makes the bold claim that it has established a causative link between cabin air and long-term illness described by a group of individuals. The data presented, in our assessment, does not in any way establish such a link."

EUROPEAN UNION

The WHO journal paper follows the March 23, 2017 publication of two European Aviation Safety Agency (EASA) studies. One is called *Preliminary cabin air quality (CAQ) measurement campaign*, and the second is the *Characterization of the toxicity of aviation turbine engine oils after pyrolysis* (AVOIL). The CAQ campaign was carried out by Hannover Medical School and the Fraunhofer Institute for Toxicology and Experimental Medicine.

The EASA March 23 statement said of this study: "The results show that the cabin/cockpit air quality is similar or better than what is observed in normal indoor environments (offices or dwellings). No occupational exposure limits and guidelines were exceeded."

For this campaign, between July 2015 and June 2016, 61 measurement flights were undertaken using seven types of Airbus and Boeing aircraft flying with engine models from Rolls-Royce, General Electric, Pratt & Whitney and CFM International that used bleed air, and eight flights using a Boeing 787, which does not use bleed air.

EASA also said in its statement, "For all flights, measurement equipment was installed in the cockpit and in the cabin. Special attention was paid to organophosphates, in particular tricresyl phosphates (TCP) with the use of high-sensitivity analysis techniques."

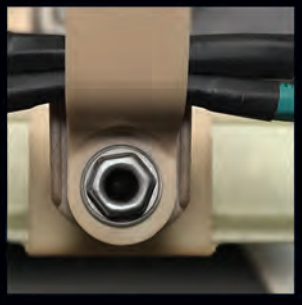
As vapors from engine oils are alleged to be the source of the toxicity, EASA studied what happens to these oils when they're heated. The AVOIL study concluded that neuroactive products

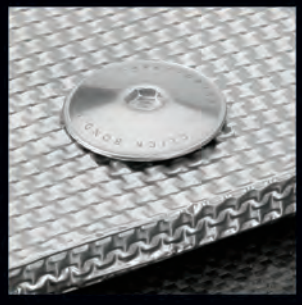
The Videos section of our website features several aerotoxic syndrome shorts

CLICK BOND®

ADHESIVE-BONDED FASTENER TECHNOLOGY

Fasteners that Streamline Manufacturing & Simplify Repairs





- Simplifies Retrofits & Upgrades
- Preserves Structural Integrity
- Eliminates Crack Starting Holes in Metals & Composites
- Avoids Drilling Rework & Repair

The LoMas™ Screw
Up to 50% Weight Savings

For more information visit
www.clickbond.com/INTFALL

30 years OF INNOVATION 1987-2017

PIONEERING > ADVANCED > SOLUTIONS

2151 Lockheed Way Carson City NV 89706 +1-775-885-8000

ZIM
FLUGSITZ

BFE agreement with AIRBUS signed

The perfect seats for all your linefit and retrofit projects

high quality seats

MADE IN GERMANY

www.zim-flugsitz.de

are present in the cabin air, but that their concentration in the presence of an intact lung barrier is too low to be a major concern for neuronal function.

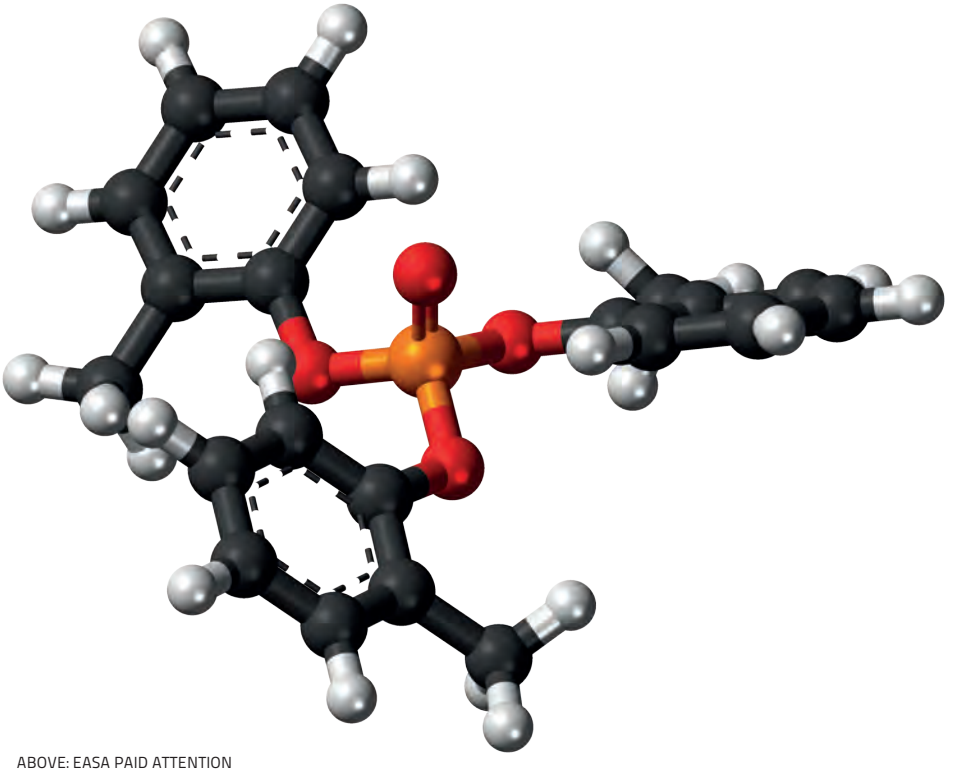
ZERO TOLERANCE

Michaelis's argument is that there is no safe level for these neuroactive products. She told us that she knew of reports that showed that ongoing exposure to low levels meant that aircrew were susceptible to being affected when a high-leakage event occurred.

The EASA study used two brands of oil and "both new and used oil samples were analyzed". EASA said, "Finally, the analysis of the human sensitivity variability factor showed that the complete metabolic pathway and the contribution of inter-individual variability in the metabolic enzymes is still largely unknown for the majority of industrial chemicals, including cabin air contaminants."

The EASA March 23 statement about the two studies finished with these words: "Research and scientific reviews conducted over the past decades have concluded that a causal link between exposure to cabin/cockpit air contaminants and reported health symptoms is unlikely."

The AMDA agrees with EASA's view. A representative said, "Over the past 20 years, a large number of studies have been made into cabin air around the world, and although as an organization we have not directly contributed to them, individuals among our members have had involvement in planning, reviewing and interpreting a number of the studies. None has provided evidence of anything more than transient health effects from exposure to aircraft cabin air."



ABOVE: EASA PAID ATTENTION TO MEASURING TCP DURING AIR QUALITY TEST FLIGHTS

RIGHT: SUSAN MICHAELIS, CRANFIELD UNIVERSITY, UK

Michaelis's response to the March EASA studies was: "The dismissal by EASA [of the threat of bleed air system oil] was extraordinary. As they did in their review between 2008 and 2012, they're saying this is not a safety issue we need to do anything about, but just in case we'll do more studies, and that's the same everywhere."

But this is not the end of the EU's work on the topic. The European Commission is funding further work for which EASA will give technical support. EASA says, "It will take into account the findings and recommendations from the two EASA studies to develop a comprehensive understanding of the cockpit and cabin air quality."

This €1.9m (US$2.1m) project will "enable step-advances in the investigation on the quality of the air on board commercially operated large transport airplanes and its potential adverse consequences on crew/passengers". The Fraunhofer Institute will be involved again, and Airbus will also participate.

HOW THE BLEED AIR SYSTEM WORKS

There can be three different sources of bleed air. The engines have bleed air systems and the APU also provides bleed air, as does the ground power unit on the apron. An engine's bleed air system typically takes air at high pressure and high temperature from ports on the mid-compressor section of the engine.

The conventional bleed air system has high pressure, over-pressure, pressure regulating and shut-off valves to take the air from the engine's compressor section. Seals and lubricating oil form part of this complex assembly. The ingredients of the oil mix used that are suspected of being harmful by aerotoxic syndrome proponents are the organophosphate anti-wear additives and amine antioxidants. They account for less than 5% of the oil. The formulation of oil used is known commercially as tricresyl phosphate or TCP.

Once the bleed air is released by the valves, high-pressure ducting takes it through the engine pylon and wing and into the fuselage, where it is connected to the aircraft's main air-conditioning system. This air coming off the engine is at tens of bar, and its pressure is reduced to closer to 1 bar by passing it through a turbine in the high-pressure duct. The bleed air is monitored by temperature and pressure sensors and is fed through a pre-cooler heat exchanger to cool it before it reaches the main air-conditioning system. The bleed air system also has hot air leak detection devices, along with monitoring and control electronics. The bleed air is routed to the air-conditioning system's central air collection point, and is mixed with existing onboard air. Some of the bleed air is directed to the airframe's anti-icing system, water and hydraulic systems, and the main engine starting system.

THE AMERICAN VIEW

In November 2015, the FAA's Office of Aerospace Medicine published its report, *Aircraft Cabin Bleed Air Contaminants: A Review*. It concluded that the potential health risks from bleed air contaminants is "without broad identification and measurement of the representative hazardous constituents of bleed air", indicating this data does not exist. The report's conclusion also states that the FAA has been mandated to carry out bleed air quality research, but it has not been funded.

According to the FAA, bleed air is not filtered at any stage for gases or vapors. The only filtration occurs when it is mixed with recirculated air, and that is using high-energy particulate air (HEPA) filtration. But, HEPA filters, by definition, are designed to capture particles.

An examination of the toxicity of TCP, which is funded and going ahead, is led by the EU's European Chemicals Agency and the results will be known in 2019; work began last year. The Agency will review the results from these analyses in August next year and publish its findings in 2019. The work that started last year is being undertaken by ExxonMobil, Lanxess Deutschland, and Lanxess Solutions UK. The companies are assessing exposure in different scenarios for crew and pilots, including a calculation of inhalation and dermal exposure. They will also carry out dermal testing and 90-day repeated inhalation dose neurotoxicity tests in rats.

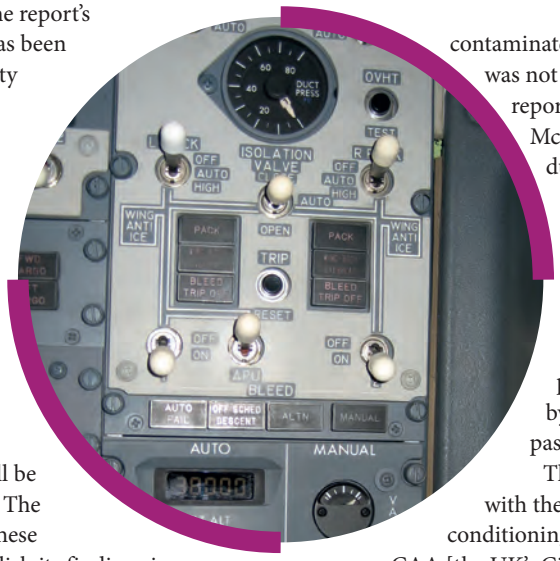
By the time the European Chemicals Agency publishes the outcome, industry may have a solution. Liebherr Aerospace provides air management systems including bleed air systems. In a video on air management systems on its website, dated April 2015, it states that removing the bleed air system from an engine can improve fuel efficiency by 3% and so the company was developing turbomachinery to draw the air directly from outside and pressurize it to cabin levels. The company confirms that work is ongoing for its bleed-less air management system as part of the EU's aerospace research programs.

LITIGATION

John Hoyte is a former BAe 146 pilot, and the founder of the Aerotoxic Association, and he says he has been affected by aerotoxic syndrome. The Aerotoxic Association campaigns for recognition of aerotoxic syndrome. Hoyte told *Aircraft Interiors International* that a lot of legal action by crews goes unreported because the cases are settled out of court.

In January, Alaska Airlines agreed to settle a lawsuit by 26 cabin crew who claimed to have been made sick from contaminated air on board their MD-80 aircraft. Alaska Airlines was not available for comment. According to US media reports, the same crew are suing Boeing as it bought McDonnell-Douglas. Boeing declined to comment due to ongoing unspecified litigation.

> ***"The fact that the A320neo is going to avoid bleed air shows they are testing it"***



ABOVE: THE ENVIRONMENTAL CONTROL SYSTEM REGULATES AIR SUPPLY, THERMAL CONTROL AND CABIN PRESSURIZATION (PHOTO: WSOMBECK)

In Europe, media reported last October that EasyJet was being taken to court by a French pilot, Captain Eric Lundi, over the issue of bleed air contamination. An EasyJet spokesperson told *Aircraft Interiors International*, "EasyJet is aware that a Nice-based pilot has announced his intention to start legal proceedings. EasyJet takes any health concerns raised by its crew seriously as their health, and that of our passengers, is the airline's highest priority."

The airline also said that its aircraft "are fully compliant with the latest standards in terms of air quality and air-conditioning," and that it has, "offered to work with the CAA [the UK's Civil Aviation Authority] on the matter of cabin air quality…We would also be happy to work with other airlines, manufacturers and industry to further study on this issue."

John Hoyte told *Aircraft Interiors International* of his experience: "On the [BAe]146, every time they started the APU [auxiliary power unit] the cabin would be filled with smoke." The BAE Systems BAe 146 is a twin-engine regional jet and it first flew in 1981. He also said that Airbus's new version of its A320, the A320neo (new engine option), does not use bleed air. "The fact that the A320neo is going to avoid the bleed air shows that they are testing it."

Airbus told *Aircraft Interiors International* that the A320neo does use a bleed air system and that the company has no plans to abandon bleed air systems for any of its aircraft. The company also said, "Airbus aircraft – and its cabin air systems – are certified by EASA and FAA and comply with the applicable airworthiness requirements and industry standards."

Proponents of aerotoxic syndrome claim that the issue is the aviation equivalent of the tobacco industry's health denials. The aerospace expert organizations simply say that the aerotoxic lobby has only bad science to support its argument. This debate will continue for many years; however, new technology may bring it to a natural conclusion.

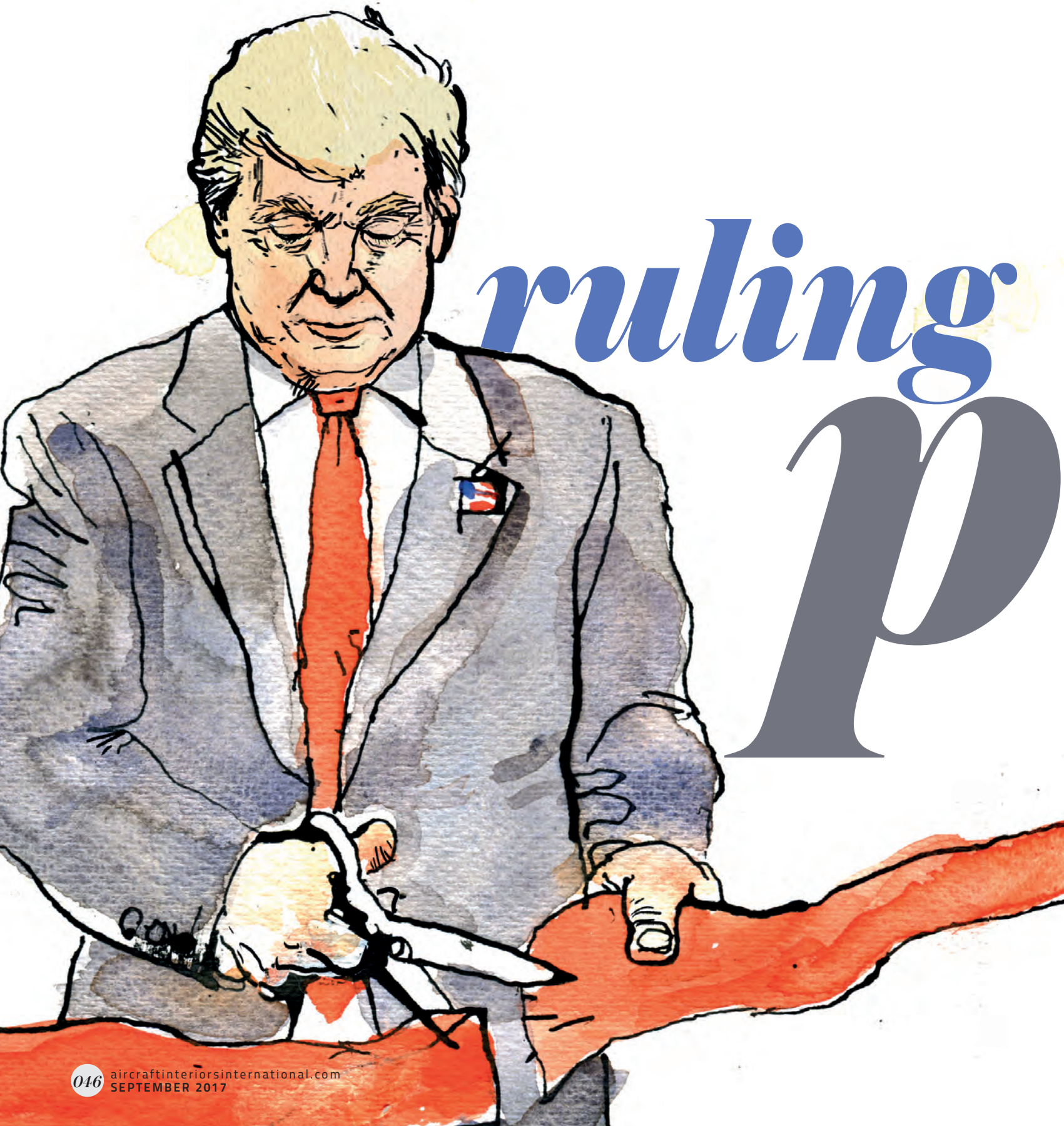
SEE US ON STAND 2230

Aircraft interiors EXPO® LONG BEACH
26-28 SEPTEMBER 2017
CALIFORNIA, USA

Reduced fuel burn, reduced maintenance costs, improved cabin design and branding from a sustainable technology.
To discuss your upholstery and cladding programme requirements call **+44(0)1733 843 939** or email: **aviation@eleathergroup.com**

E-LEATHER®

www.eleathergroup.com



ruling p

over

NEW EXECUTIVE ORDERS BEING INTRODUCED BY PRESIDENT TRUMP COULD HAVE BIG CONSEQUENCES FOR AVIATION REGULATIONS. COULD A NEW 'ONE IN, TWO OUT' APPROACH TO REGULATION FREE UP THE AIRCRAFT INTERIORS INDUSTRY?

Words by Marisa Garcia. Illustration by Alex Hedworth

CLEAR+ COMPLIANT

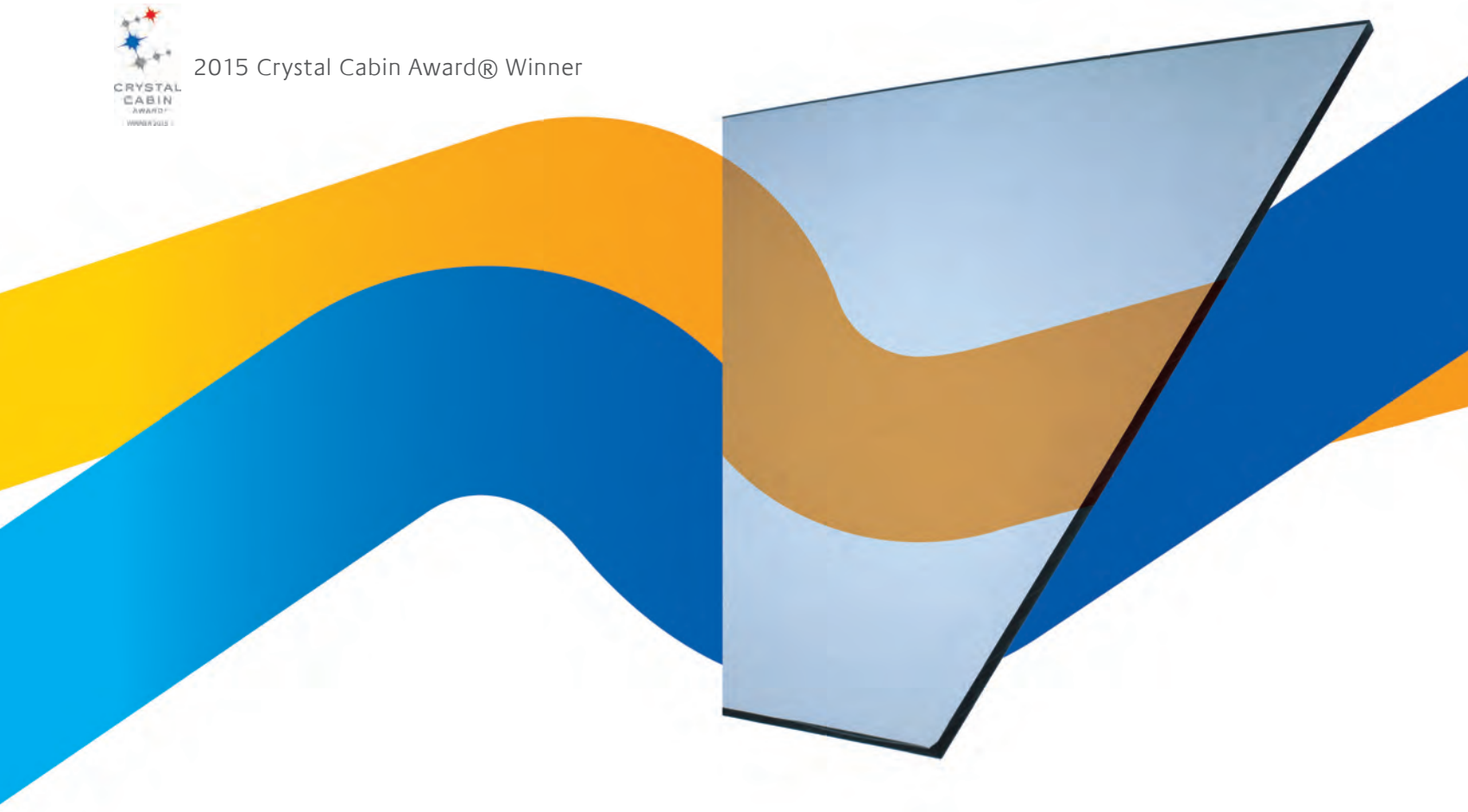
CLEAR LEXAN™ XHR SHEET

The industry's first transparent polycarbonate sheet that meets the aircraft interior FST requirements. It's colorable, texturable, printable, and coatable, meaning your aircraft interior designs are finally free to take new shape.

THE HIGHLY VERSATILE NEW CLEAR LEXAN XHR SHEET MAY BE CONSIDERED FOR:

- Seating applications (dividers, magazine holders, life vest windows)
- Trolley panels and galley equipment panels
- Door systems and window transparencies
- Partitions, divider panels, protective panels and barriers
- IFE system add-ons and mirrors

2015 Crystal Cabin Award® Winner



For decades, aviation safety has benefited from regulations, though at times these regulations have restricted innovation and have made commercial aviation products more expensive to develop and deliver. New US government policy defined by two executive orders (EO) issued by President Donald Trump earlier this year, which aim to reduce the burden of regulations on US companies, are now being applied by the USDOT under the governance of the FAA. The activities surrounding compliance with these policies may result in a dramatic shift in regulations.

Because aviation is a global industry, there is reason to question what impact this new US policy will have around the world. For decades, international civil aviation authorities have worked to harmonize their rules and regulations, ensuring that suppliers and operators around the world are not confused or at a disadvantage. While aviation regulations are often slow to develop and be adopted, and even slower to be repealed and replaced, these policies are pushing the process at a rapid rate.

Let's review the origin of the presidential EOs and how they are being applied by the FAA, and share perspectives from various suppliers around the world on the benefits and challenges of the existing regulations.

RTTF AND ARAC

On January 31, 2017, in one of his first acts in office, President Trump signed one in a series of EOs that would impact the USA – and the world. EO 13771 – Reducing Regulation and Controlling Regulatory Costs – requires that: "Unless prohibited by law, whenever an executive department or agency publicly proposes for notice and comment or otherwise promulgates a new regulation, it shall identify at least two existing regulations to be repealed."

> *"Compliance with these policies may result in a dramatic shift in regulations"*

This EO was followed on February 24 by EO 13777 – Enforcing the Regulatory Reform Agenda. This second EO effectively served to ensure compliance with the first and required each government agency to establish a regulatory reform task force (RRTF), which would evaluate regulations and make recommendations for those that could be repealed, replaced or modified. The USDOT, through the FAA, was directed to garner input from "entities significantly affected by its regulations" to identify regulations requiring review.

To accomplish this task, the FAA turned to the Aviation Rulemaking Advisory Committee (ARAC), a group comprising operators, researchers, manufacturers and advocacy groups, assigning ARAC the duties of the RRTF on April 20, 2017. An FAA notice was published on April 28, explaining the creation of ARAC and its duties.

BELOW: ARAC SUGGESTS A REPEAL OF THE FAA'S REQUIREMENT FOR ASHTRAYS IN CABINS, SINCE SMOKING IS PROHIBITED ANYWAY

THE LONG LIST

By June, ARAC had submitted nearly 150 pages of recommendations for regulations which

SAFETY AND THE SUPPLY CHAIN

The freeze on regulations has also affected rules required for safe operations. For example, the Pipeline and Hazardous Materials Safety Administration's (PHMSA) Hazmat Safety Rule HM-215N, intended to harmonize US hazardous materials regulations (HMRs) with international standards, was put on hold in February, following the EOs. Airlines for America (A4A) and IATA, as well as many suppliers, appealed to USDOT secretary Elaine Chao against this freeze.

According to A4A, "This rule is intended to harmonize the US HMRs with international dangerous goods regulations. Its promulgation will not create any new risks in transport. In fact it will ensure that the US HMRs maintain alignment with international standards, thus assuring safety and avoiding disruptions to supply chains.

"Avoiding disruption is important to manufacturers, retailers, wholesalers, exporters, importers, carriers and industries. Our endorsement of the regulation is also consistent with our endorsement of harmonizing US HMRs with international standards. Harmonization avoids confusion among shippers, carriers and others in the logistics chain, maximizes safety, and reduces costs for US businesses."

The rule was later finalized and published on March 30, 2017.

THE PROCESS OF SIMPLIFYING AVIATION IS GENERATING A LOT OF WORK AT THE FAA'S WASHINGTON DC HEADQUARTERS (PHOTO: MATT BISANZ)

needed to be revised or repealed in keeping with the objectives of the original EO. The complete list can be found in the regulations and policies section of the FAA website in a document named 'ARAC Input to Support Regulatory Reform of Aviation Regulations'.

An FAA spokesperson replied to our queries regarding the reforms with the statement below. The chairman of ARAC, Todd Sigler (whose day job is deputy leader of Boeing's airplane level integration team) requested clarification from the FAA of just how the Administration will evaluate and decide on the regulations included in ARAC's list of regulations to modify or eliminate. In the same letter to the FAA, Sigler expressed concern over balancing objections within the group to the inclusion of certain regulations against the objective of ensuring flight safety, while keeping regulations rational.

From a review of the list submitted – which includes a broad range of regulations, covering everything from operations to small components – it is clear that there are many related to the design of aircraft interiors. A small sample is listed on p53.

An addendum recommendation report, providing supplemental details and data supporting the claims made about the objectionable regulations is due in late August, to be reviewed again for final approval at an ARAC meeting in September.

REGULATIONS TO REVISE

Speaking with suppliers active in the regulatory process, we have heard arguments in favor of a review process for regulations and a more efficient process of establishing new regulations, though those individuals were unaware of the existence of these EOs when asked.

Raki Islam, chairman of the SAE Aircraft Seat Committee – a position he has held since 2010 – explains that the SAE committee works with authorities to create and reconcile standards that weren't previously on the books or may differ by world region.

THE FAA'S FORMAL REPLY

An FAA spokesperson replied to our queries regarding the reforms with a formal statement: "On June 8, ARAC made more than 300 initial suggestions to repeal, replace or modify the FAA's regulatory language. ARAC made the suggestions in response to the January 30, 2017 Presidential executive order on reducing regulation and controlling regulatory costs.

The order requires the FAA to evaluate aviation regulations that could eliminate jobs or inhibit job creation; are outdated, unnecessary or ineffective; impose costs that exceed benefits; or create a serious inconsistency or otherwise interfere with regulatory reform initiatives and policies.

"ARAC will now work to further refine the list of suggestions with cost savings and justification information for the FAA's consideration. The FAA will review this initial list and continue to work with ARAC on its future recommendations."

The list drafted by ARAC was submitted to the FAA's Office of Rulemaking by ARAC chair Todd Sigler of Boeing. In his letter to the FAA accompanying the list, Sigler wrote:

"Each ARAC member was asked to provide their inputs according to the criteria above and with consideration to the EOs referenced in the tasking and related guidance provided by the Office of Management and Budget."

The results of ARAC member input are reflected in the list on p55 (just a small sample of over 300 suggestions to repeal, replace or modify regulatory language). Additionally, ARAC members proposed policy, advisory circulars and orders that could be similarly changed or repealed in support of the EO's stated goals.

"I wish to emphasize the list represents all inputs received from ARAC members. Not all ARAC members provided input, and reaching consensus on each input was not attempted. During the second phase of the tasking, ARAC will strive to reach consensus on what changes the FAA can make to provide near-term relief consistent with the EO's goals and in support of a longer-term regulatory strategy promoting safe and efficient transportation systems. It is likely this effort will result in a smaller list of recommended changes and will contain majority and dissenting positions as required in the tasking.

your space

WITH QUADRA ALL KNEES ARE CREATED EQUAL

*Because **everyone** has the right to recline*

COMFORT AS NEVER BEFORE.

Quadra is specially designed to preserve a sense of personal space during the flight. Our patented articulated system simultaneously moves the seat pan and backrest pivot center to allow 19 extra degrees of recline without intruding on the passengers behind. As our tests demonstrated, people perceive **Quadra** to provide about 35% more space than other recliner seats. **Discover a new way to fly.**

QUADRA. MORE SPACE IN THE SAME SPACE.

WE WOULD RATHER **INVITE YOU**

to find out how we can support you in creating new travel experiences.

AT FTE GLOBAL
LAS VEGAS
SEPTEMBER 6-8, 2017
BOOTH **B2**

AT AIX
LONG BEACH
SEPTEMBER 26-28, 2017
BOOTH **2209**

optimares

optimares.com


WHATEVER
IT IS, WE
TRANSLATE
IT INTO
TEXTILE.
ROHI
Creating Textile Values
rohi.com

Interiors shake-up

ARAC'S LIST OF SUGGESTED REPEALS, REPLACEMENTS AND MODIFICATIONS TO THE FAA'S REGULATORY LANGUAGE THAT COULD AFFECT THE AIRCRAFT CABIN INDUSTRY INCLUDES:

- A modification of FAA Conformity standards under 14 CFR Parts 21 and 39 based on objections a-c that they a) eliminate jobs, or inhibit job creation; b) are outdated, unnecessary or ineffective; c) impose costs that exceed benefits
- A proposed repeal of failure, malfunction and defect reporting requirements under 14 CFR Part 21.3 based on objections b and c
- A modification of HIC protections under 25.562(c)(5) based on objection c
- A modification to the requirements for seats, berths, safety belts and harnesses under 25.785(b) & (d) as well as to the 25.785 (h) (2) Direct View rule, based on objection c
- A repeal of rule 25.856(b) for thermal/acoustic insulation materials based on objection c
- A repeal of general fire protection rule 25.601, "The airplane may not have design features that experience has shown to be hazardous or unreliable. The suitability of each questionable design detail and part must be established by tests"; based on objections b and c
- A repeal of the FAA requirement under 14 CFR 25.253(g) to place ashtrays in multiple locations of cabin compartments, regardless of smoking prohibitions. The argument against this regulation is that the regulation is outdated because smoking is not allowed
- A modification to the rules governing the maximum number of passenger seats (70) allowed for all Type II exits on an airplane under 25.807(g)(7) based on objections b and c; as well as modifications to a number of other regulations that affect egress and evacuation conditions

"From an SAE perspective, if we see a new trend or novel feature becoming a growing customer demand, we have a discussion among the seat suppliers and discuss within the industry how best to test and evaluate that feature. We take the topic up with the SAE and FAA for advice on how we should work it through. The FAA will ultimately recommend a standard, which is adopted."

As one example, Islam points to inconsistencies and impracticalities in the HIC test requirements, included in the ARAC list. As IFE screens become obsolete relatively quickly, repetitive HIC tests become very expensive.

"IFE suppliers came to us two years ago to find if anything could be done to avoid a repetition of the full HIC test, when the only change is the glass used for the screen," Islam says. "We came up with a simplified compression test that compares the performance of the certified glass with the new one. Through that proposed testing we have drafted a recommended practice that is going to be finalized, and we hope to get acceptance from the FAA and EASA for that."

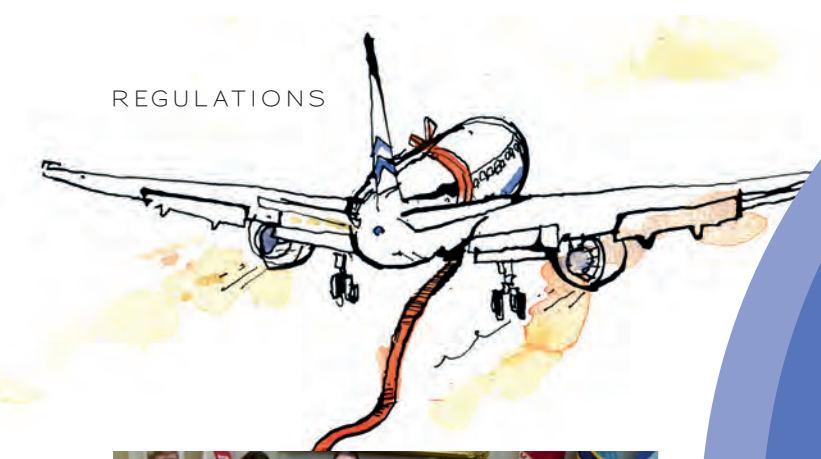
However, there is no official SAE representative on the ARAC committee list the FAA shared with us, and it is unclear whether ARAC was aware of the SAE's recommendation to the FAA and EASA when adding HIC regulations to its list.

A problem with the existing regulatory framework is that the rule change process has to date been time consuming and does not keep pace with changing technology. As a result, some products fall into a vague area of governance by interpretation of related rules.

"We do not want to see a greater burden on regulations based on interpretation"

"What we do not want to see is a greater burden on regulations based on interpretation," Islam says. "For example, the new neck injury criteria in HIC testing has been established verbally and is open to interpretation. From our perspective, it should have been a regulatory change. From the FAA's perspective, it's an interpretation of current regulation. We have met with the FAA and shared documents that might inform regulation. We have challenged the validity of the new requirement and are opening a research project. One thing that would help the industry is if those establishing new requirements conduct cost-benefit analysis in the rule-making process."

RECENT NTSB FINDINGS DETERMINED THAT THERE NEEDED TO BE A TIME LIMIT IMPOSED ON LIFE-VEST RETRIEVAL. THUS TSO 127b WAS ALTERED TO IMPOSE A 10-SECOND LIMIT. BUT THERE WAS NO STANDARD FOR TESTING OF DIFFERENT SIZES OF VEST



While objections to certain regulations are a natural part of the process of interaction between manufacturers and regulatory bodies, Islam says, “Most of the time it works out practically, it makes sense and it's logical."

Dr Mark Hiller, CEO of Recaro Aircraft Seating, who was also unaware of the EO at the time we spoke, says there is definitely room for improvement in the regulatory framework. “There is more added than is removed,” he states. “Once when we started the development of a new product, our engineers said they want to put every requirement into a database, from all OEMs. In the end that list included more that 100,000 line items. Some of them were also conflicting.”

But Hiller believes there is a balance to be struck, which can be achieved through various industry working groups and the regulatory harmonization effort of the world’s regulatory authorities. He also believes that the safety discipline of the industry, encouraged through regulation, is something to be proud of.

“If you look at the history of flight safety and development it gives you confidence that we are on the right track, but we can increase safety without adding complexity,” he says.

Thierry Rouge-Carrassat, chief technical officer of Zodiac Aerospace, adds that while there is room for improvement, there is generally “a good balance” between the need of suppliers and the regulatory process.

“The role of the regulation is to improve safety and we have to work on that,” he says. “In some ways it is a stimulation for innovation because customers expect new functions in the future and we need to find clever ways to satisfy them and get them through certification. The high level of regulation is also a way to protect ourselves from newcomers,” he acknowledges.

ABOVE: RECARO CEO DR MARK HILLER IDENTIFIED MORE THAN 100,000 REGULATORY REQUIREMENTS RELEVANT TO AIRCRAFT SEATING ACTIVITIES

UNINTENDED CONSEQUENCES

Rouge-Carrassat’s point that 'regulation is also a way to protect ourselves from newcomers,' raises the question of a perhaps unintended impact of the new EOs: they may make certain products, designed expressly to address more stringent regulations, obsolete. It could open up opportunities for new entrants to produce products at new lower standards, making it difficult for established manufacturers to recover their original costs of product development and testing.

While this may be of economic advantage to airlines, which will ultimately pay less for certain airline parts, it could generate real losses for suppliers.

In some cases, it might prove difficult to say that a change complies with the spirit of the EO because there is a paradox built in. What creates financial gains in one sector of the industry will cause losses in another. What creates jobs for one supplier may cause losses for another. Additionally, the protections of the EO are intended to protect the interests of US companies, while aircraft and their parts are also made and purchased from overseas.

“It could open up opportunities for new entrants to produce products at lower standards”

ARAC MEMBERS

- Aeronautical Repair Station Association (ARSA)
- Aerospace & Defence Industries Association of Europe (ASD)
- Aerospace Industries Association (AIA)
- Aircraft Electronics Association (AEA)
- Aircraft Owners and Pilots Association (AOPA)
- Air Line Pilots Association (ALPA)
- Airline Dispatchers Federation (ADF)
- Airlines For America (A4A)
- Airports Council International (ACI NA)
- Association of Flight Attendants (AFA)
- Boeing Commercial Airplane Group
- Cargo Airline Association (CAA)
- Embry-Riddle University (ERAU)
- Experimental Aircraft Association (EAA)
- FlyersRights.org
- General Aviation Manufacturers Association (GAMA)
- Helicopter Association International (HAI)
- International Association of Machinist and Aerospace Workers (IAMAW)
- National Air Carrier Association (NACA)
- National Air Disaster Alliance/ Foundation (NADA/F)
- National Association of Flight Instructors (NAFI)
- National Business Aviation Association (NBAA)
- National Organization to Insure a Sound-Controlled Environment (N.O.I.S.E)
- Pratt & Whitney (Boeing)
- Regional Airline Association (RAA)

LUXURY TRAVELLER

This luxurious sofa for aircraft was created in cooperation with the internationally renowned designer Jacques Pierrejean. "Luxury Traveller" offers sophisticated air passengers an extraordinary amount of space, incomparable comfort and numerous extravagant features. The finest leather and high-quality materials are processed at BOXMARK with diligent skill and guarantee a stylish atmosphere in the first-class sections as well as in business and private jets.

BOXMARK®
Best in Leather Interior

BOXMARK Leather d.o.o.
Industrijsko naselje 10, SI-2325 Kidricevo
Phone: +386 2 7991-0, Fax: +386 2 7991-641
si.office@boxmark.com | www.boxmark.com

CHOKE POINT

THE 2.4GHz AND 5.8GHz (RF) SPECTRUM MOST COMMONLY USED FOR CABIN WI-FI IS BECOMING TOO CONGESTED. LET'S EXPLORE WHY INFLIGHT WI-FI HAS TROUBLE BEING CONSISTENT, AND HOW TO FREE-UP CAPACITY

Words by Stephanie Taylor

AVIATOR S Series. SMART FLEET™.
Smart business.

COBHAM

The most important thing we build is trust

Next generation satcom solutions for a
more connected and profitable airline.

Scan to see more.

Visit: www.cobham.com/satcom/aviator-s
Contact us: satcom.aviator@cobham.com

MAKE MONEY

More than 4,000 aircraft have W-IFE installed. However, Valour Consultancy estimates that service revenues from these aircraft will only generate US$83m – equivalent to a fairly paltry US$21,000 per connected aircraft per year, shared across multiple stakeholders. In the view of Valour, airlines are underestimating their unique potential to generate additional ancillary revenues.

A known demographic with high levels of disposable income captive for several hours is very attractive to advertisers. More targeted advertising strategies, and fully exploiting the e-commerce capabilities of W-IFE systems (think in-seat food and drink ordering, etc) could see overall service revenues exceed US$4bn by 2024. This equates to almost US$250,000 per aircraft per year.

It's no secret there's a limited radio frequency (RF) spectrum available for unlicensed communications within the 2.4GHz and 5.8GHz bands, which are the ones most commonly used for wi-fi. Now that more and more airlines are introducing wi-fi on board, are the channels becoming too congested in the cabin?

Routehappy's *2017 Wi-Fi Report* highlights that "airline passengers worldwide now have a 39% chance of stepping aboard a wi-fi-equipped flight, an 8% increase from last year", while the latest Gogo study on connectivity suggests that all passengers own at least one personal device. Given such figures, you'd be forgiven for assuming that any industry-wide capacity problem is down to the increasing number of personal electronic devices being connected on board.

However, Jeff Drader, director of business development for VT Miltope, says this isn't really the case: "A typical wireless access point (WAP) can often connect to 250 or more client devices. For example, a narrow-body aircraft often has three dual WAPs (a total of six WAPs spread across the aircraft cabin). Therefore, with a total of 1,500 possible connections, the number of available connections far exceeds the number of passenger client devices."

CHANNEL HOPPING

It's exactly how these WAPs are configured and managed that is critical to improving the capabilities of an airline's inflight wi-fi offering. "Airlines need to add more channels to each WAP," explains Peter Lemme, blogger at Satcom Guru, "but the number of available channels is an issue."

> ***"A typical WAP can often connect to 250 or more client devices"***

TELEFONIX'S CABINACE WAPS FEATURE A TOOL THAT GATHERS SESSION METRICS TO DIRECT EACH CLIENT TO THE IDEAL WAP FOR OPTIMIZED BANDWIDTH AND THROUGHPUT

When Lemme refers to 'channels', he's talking about those that are available within the 2.4GHz and 5.8GHz frequency bands. Initially, WAPs only supported the 2.4GHz band, but then 5.8GHz radio was introduced for dual-band operations, and today, another 5.8GHz radio can be added for tri-band wireless signals from one WAP.

"Access points that support one 2.4GHz and one 5.8GHz channel are better off starting to add more of the 5.8GHz channels – for example, one 2.4GHz and two 5.8GHz channels," Lemme continues.

The reason why multiple 5.8GHz channels are preferable to 2.4GHz channels is outlined by Craig Foster, senior research consultant at Valour Consultancy: "When you have multiple WAPs using the 2.4GHz frequency band, there can be channel overlap and interference, making it almost impossible to achieve 100% coverage. While 2.4GHz has only three channels that don't overlap, by contrast 5.8GHz has 23 non-overlapping channels and offers higher throughput."

According to Drader, there are currently many channels still excluded from use in the 5.8GHz band

due to dynamic frequency selection (DFS), or their potential to interfere with ground-based radar. Nonetheless, he says this could soon change, as there is an effort by the Cabin Systems Subcommittee (CSS) of the ARINC AEEC industry working group (among others) to open the 5GHz DFS channels for cabin use, considerably increasing the available bandwidth in the cabin.

Foster does identify a trade-off when using the 5.8GHz band, and that's the fact the wi-fi signal won't be able to travel as far as at 2.4GHz. However, Lemme says range isn't an issue in an aircraft cabin, which is a relatively compact environment.

MANAGING DEVICES

Yet even with more channels available, Lemme says passengers need their devices to be managed properly using modern software solutions, as not only are they likely to make a poor choice when it comes to which channel to connect to, but they can jam channels with their own WAPs. He also claims that industry-leading software can also "take action to disrupt masquerading rogues".

Foster highlights some of the options already available, such as Telefonix's CABINACe WAPs, which are based on radio technology from Aruba Networks. "At that heart of this technology is an optimization tool that gathers session metrics to direct each client device to the ideal WAP for optimized bandwidth and throughput performance."

Craig Foster from Valour Consultancy shares more thoughts in the Industry Opinion section of our website

ABOVE: VT MILTOPE'S NMAP-2 MULTIFUNCTION WAP OPTIMIZES THE CABIN WIRELESS LAN ACCESS POINT NETWORK

VT Miltope has developed a cognitive hotspot technology (CHT) in cooperation with Spanish networking specialist Aoifes, which allows WAPs to take their environment into account and share information with other WAPs to manage available resources jointly. As Foster explains, "According to Aoifes, testing has revealed that CHT can result in a more than 120% improvement in throughput and could even make it possible to reduce the typical number of WAPs installed on a narrow-body aircraft from three to two."

> *"Industry software can take action to disrupt masquerading rogues"*

VT Miltope's Drader himself notes that CHT performs many functions, including client device load balancing, RF power management, congestion management and interference minimization to get the most out of the available 2.4GHz and 5.8GHz bandwidths.

Foster also offers the perspective that it may not be passengers putting pressure on WAPs in future: "They're beginning to deal with increasing rates of non-passenger data, including cabin crew messages, communications between smart galleys and trolleys, new sensors, etc."

To cope with this evolution, systems such as CHT can embed into the gate link access points usually used for operational data to ensure that non-cabin and cabin use of bandwidth is managed effectively.

INFRASTRUCTURE ISSUES

All these ideas are all very well, but Fun Hu, professor of wireless communications at the University of Bradford's

- Inverters
- Converters
- USB Charging Ports
- Emergency Power Supplies
- Lithium-ion Batteries

TRUE BLUE POWER

A division of Mid-Continent Instrument Co., Inc.

Happy pilots.
Happy passengers.

There's an ongoing power struggle on most aircraft today — not enough power for all the electronic devices pilots and passengers bring on board. The solution is True Blue Power®. The TA102 and TA202 Series USB Charging Ports power consumer products requiring a USB interface. These next-generation in-seat, cabin and cockpit power sources enable nonstop entertainment and business productivity on the fly.

They're all the power you need in a small, economical, easy-to-install package.

NEW!
HIGH POWER USB

TA202 Series
High Power USB Charging Port

Type-A and Type-C configurations

Simultaneously provides
3.0 amps per port

TA102 Series
Dual USB Charging Port

Simultaneously provides 2.1 amps per port

telephone: +1 316 630 0101
toll free: +1 800 821 1212
email: tbp@mcico.com

truebluepowerusa.com

WORLD'S ONLY EN4165 QUALIFIED

SOME SAY ACCORDING TO WE SAY QUALIFIED

EN4165/SIM MONOMODULE SERIES
FITTED WITH 2 MT FERRULES

- Composite SIM series is EN4165 qualified
- Lightweight composite material
- Highly modular connector
- All technologies (signal/power/optical/RJ45...)

YOUR RELIABLE PARTNER
FOR INTERCONNECTS & ATTACHMENT SYSTEMS

Amphenol Air LB
Your Satisfaction. Everyday. Everywhere.

2 rue Clément ADER - ZAC de Wé - 08110 CARIGNAN, France
Tél.: +33 (0)3 24 22 72 09 | Fax: +33 (0)3 24 22 38 72
Email: customer-service@amphenol-airlb.fr
Website: www.amphenol-airlb.fr

Visit the IFEC section of our website for insights into connectivity technology

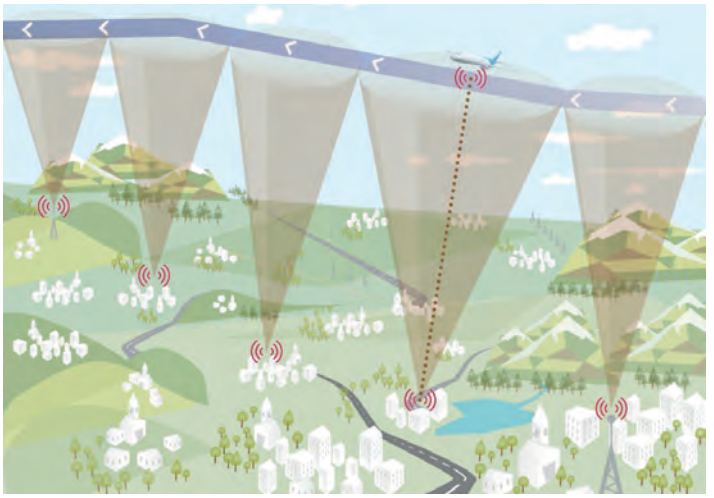
school of electrical engineering and computer science, points out, "We need to bear in mind there are two levels of communication infrastructure: one inside the aircraft cabin – onboard infrastructure – and one connecting the onboard infrastructure to the outside world – air-to-ground [ATG] communication infrastructure.

"It's what is happening to the ATG communication infrastructure that counts most in terms of capacity – there is no point in having a high bandwidth onboard infrastructure but low bandwidth ATG infrastructure that cannot support the high-bandwidth onboard traffic."

While satellite communications have often been considered as being too expensive, capacity doesn't have to equal cost. Hu says that alternatives are being explored: "In recent years, standardization efforts by the European Telecommunication Standards Institute and the CEPT Electronic Communications Committee, for example, have been devoted to developing a set of terrestrial-based broadband direct ATG communications [DA2GC] standards operating at 1.9GHz [1,900MHz-1,920MHz] and 5.8GHz [5,855MHz-5,875MHz] frequency bands, each allocated with a maximum channel bandwidth of 20MHz.

"It is envisaged that this terrestrial-based system will compete directly with satellite-based systems, and that DA2G technology will be the most cost-effective solution for short- to medium-range flights over land masses, whereas satellite-based technology will remain the only option for flights over the oceans," Hu continues.

One company touting its capabilities in this arena is Fluidmesh, which has already deployed its solutions on railways including the metro lines in St Petersburg, Russia, and the Ferrovie del Gargano in Southern Italy. Now turning its attention to the air, Fluidmesh says its DA2GC network can provide passengers with speeds of up to 100Mbps.



ABOVE: FLUIDMESH'S BROADBAND DIRECT ATG COMMUNICATION NETWORK CAN TRANSMIT UP TO 100Mbps OF DATA AT UP TO 45,000FT

"The ATG communication infrastructure counts most in terms of capacity"

Fluidmesh ground stations have a very small form factor compared with a cellular 3G/4G base station and can be easily installed along the major airways and connected to an IP broadband internet connection. One Fluidmesh Ground Station every 50-100km (30-60 miles) provides a broadband coverage in the sky up to 45,000ft.

According to a statement by the company "Fluidmesh ground stations operate at 5.8GHz and are able to cover a very large portion of airways by leveraging beam-forming and beam-switching proprietary technologies that simultaneously employ multiple antennas and fast-roaming fluidity protocols based on multiprotocol label switching [MPLS]".

As the CEO of Fluidmesh, Umberto Malesci, states, "The major advantages over satellites are much lower latency of the connection due to a much shorter round-trip delay, and lower cost-per-bit because the terrestrial network is less expensive to deploy, maintain and upgrade over time."

FUTURE SOLUTIONS

Elsewhere, Hu feels that when it comes to further improving the efficiency of the available spectrum, progress will come from radio resource management schemes being designed. While some research programs have already been carried out in the UK and the EU, Hu says the schemes remain complex as they must cover "beam-forming techniques, which allow easier co-frequency sharing by minimizing interference on different ATG links; multiplexing and multiple access

ABOUT FUN HU

Prof. Fun Hu is well qualified to comment on cabin wi-fi, as a professor of wireless communications engineering (since 2005) and holder of the Yorkshire Forward Chair in Wireless Communications. Since starting her academic career in 1992, Hu has received considerable funding support through participations and contributions to many flagship projects funded by the UK funding councils, the EU, European Space Agency and Technology Strategy Board. Much of her research activities have been conducted in collaboration with industry and other universities and research organizations over the globe. Her major research is in integrated mobile, wireless and satellite communications networks, with particular applications to vehicular communications networks including aircraft and trains. She is the head of the Future Ubiquitous Research Group, and has published over 100 papers in scientific journals and international conferences.

"One major carrier is already testing the potential of li-fi for IFE"

techniques, such as frequency or time division duplexing schemes; and time or frequency or code division multiple access – all while taking into account security and priority aspects".

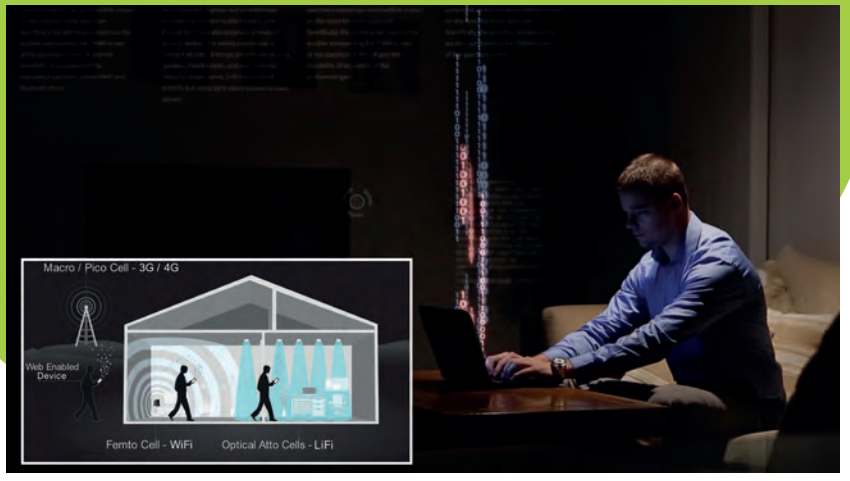
Foster envisages light fidelity (li-fi) as a viable alternative to inflight wi-fi in the mid- to long-term. "Like wi-fi, li-fi is wireless and uses similar 802.11 protocols; but because it is based on visible light communication (instead of radio frequency waves), speeds are estimated to be up to 100 times faster than wi-fi. Tests carried out by researchers at the UK's University of Oxford in February 2015 showed that li-fi achieved bidirectional speeds of 224Gbps.

PROF. HARALD HAAS COULD PROVE TO BE A VERY DISRUPTIVE INFLUENCE IN CABIN CONNECTIVITY

DESIGN FREEDOM

Prof. Harald Haas from the University of Edinburgh predicts li-fi will prove a liberating innovation for aircraft manufacturers, as it largely eliminates the need for copper cabling in the cabin, freeing-up passenger and cargo space.

"I believe that li-fi will herald the arrival of next-generation cabin designs. If cabling is no longer an issue, aircraft interiors have the potential to become more like the Japanese Shinkansen high-speed trains in their look and feel. Li-fi opens the way for manufacturers to install larger windows on planes and bold new seating arrangements, where passengers are at last able to face each other."



"Sending data through visible light could potentially do away with a bulk of the weight associated with wired IFE systems. Although the technology is still three to four years away from practical use for consumers, Prof. Harald Haas from the University of Edinburgh, the man who coined the term li-fi, has claimed that one major carrier is already testing the potential of li-fi for IFE using the overhead bulb already installed in most commercial airlines."

Foster goes on to explain that Haas's university spin-out company, PureLiFi (also based in Edinburgh), has already developed its third generation of products, consisting of USB dongles that allow for li-fi transmissions to any USB 2.0-enabled mobile device. Furthermore, recent versions of iOS code have been found to contain references to li-fi, leading some to speculate whether future Apple devices will be li-fi-enabled.

For any of those skeptical as to whether the industry can overcome this latest challenge, we leave you with a comment from Drader, who says, "Since the start of wi-fi nearly 20 years ago, wi-fi data rates have increased by more than 1,000 times, with multiple generations of wi-fi having benefited the aircraft passenger over the last few years."

Let's see what the next two decades bring.

EMPOWER®

IN-SEAT

POWER

SYSTEMS

BE A SUPERHERO TO YOUR PASSENGERS.

CHOOSE EMPOWER® IN-SEAT POWER SYSTEMS AND YOUR PASSENGERS WILL SEE YOU IN A WHOLE NEW WAY—AS A SUPERHERO! • THEIR FLIGHTS WILL FLY BY AS THEY REMAIN PRODUCTIVE AND ENTERTAINED, SIMULTANEOUSLY POWERING AND CHARGING THEIR LAPTOPS, TABLETS AND OTHER MOBILE DEVICES WHILE IN USE. AND YOU'LL THRILL YOUR MANAGEMENT, CABIN CREW AND MAINTENANCE STAFF WITH THE MOST RELIABLE, MOST REQUESTED IN-SEAT POWER SYSTEM, WITH PATENTED POWER MANAGEMENT; THE LIGHTEST, MOST COMPACT FORM FACTOR; AND THE HIGHEST AVAILABLE POWER FOR 110 VAC AND USB. • CONTACT ASTRONICS, THE INDUSTRY LEADER, AND SEE HOW IT FEELS TO FLY LIKE A SUPERHERO.

ASTRONICS
ADVANCED ELECTRONIC SYSTEMS

ASTRONICS ADVANCED ELECTRONIC SYSTEMS | US Office +1.425.881.1700 | Europe Office +41.61.303.8828

www.astronics.com

front runners

FEW PARTS OF THE CABIN ARE AS VERSATILE AS THE FRONT ROW MONUMENT. OUR PANEL OF EXPERTS SHARE THEIR IDEAS FOR THE NEXT GENERATION…

BE COCOONED

In considering what his take on a new front row monument design would be, Russell Gillott, design director at the Astheimer agency in the UK explored what was possible within the space afforded, drawing on experience in luxury yacht, home, car and hotel design.

"In the future, we imagine a tailored experience with an individual space that's only available to the front row passengers. We envisage a personalized check-in process, where, via your airline phone app, you can pre-select your favorite beers, coffee, deli snacks, magazines and newspapers, for example. These will be supplied to your chilled mini-bar when you embark, and are subsequently accessible to you during the flight, at your convenience.

Dedicated storage for clothing and luggage is also incorporated. Front row passengers would benefit from increased privacy, and as such, we have conceptualized an electronic hood that can be deployed over the space to create a truly personal 'cocoon'.


LOCKED
Welcome
FINANCIAL TIMES
The Daily Telegraph

ST Aerospace
Aircraft Seats
A member of ST Engineering

At Home in the Air

We know how it is to sit for long hours. Feel the difference in our ergonomically contoured seats designed for that pleasant well-rested flight.

Email: mktg.aero@stengg.com | Phone: +65 6287 1111

2 THE THIRD SPACE

"There are many great opportunities for what we call 'third space' monuments, particularly toward the rear of the aircraft," says Hugo Jamson, creative director at New Territory, a London agency that has worked on recent projects such as Airbus A³'s Transpose and Zodiac Aerospace's Lifestyle cabin (details of both can be found on our website).

"Creating spaces that provide new destinations for economy and premium economy passengers – something more than just bathrooms or galleys – as places to break out and spend a moment away from the seat. A third space becomes a place to pick up amenity items, magazines, extra blankets, free drinks and snacks, or it could even be transformed into a pop-up offering the best brands of the destination country or region.

"We think this slim monument type would offer a new differentiator for airlines without adversely affecting seat count, showing an elevated care for passengers in the most densely populated part of the aircraft."

3

NEW POSSIBILITIES OPEN UP

"If VR and IFE merge, the systems become more personal," states Ross Burns, group lead industrial designer at AIM Altitude. It will be possible for visual content to be projected anywhere in the cabin; sounds will become part of the passenger environment. Removing the need for a physical IFE interface unlocks opportunities such as working-desk areas being increased in size, dual-seating and dining areas becoming possible, and the whole seating zone being opened up – potentially allowing the front row area to command a premium for airlines.

"With real vision, holographic crew members could essentially provide each passenger with their own butler. Dining could change, with the front row monument offering molecular food reconstruction technology, creating food out of thin air and reducing the catering workflow."

4

DYNAMIC OPPORTUNITIES

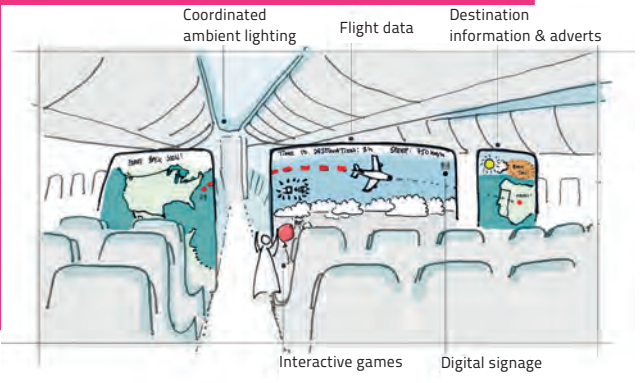
"Monuments are rarely seen as an area for innovation," states Jose Luis Martin-Oar, business strategist at the Mormedi design house in Madrid.

"These elements are mostly used as simple dividers and branding surfaces, and innovation is often limited to finding the lightest and most resistant material.

"We believe that with the development of LED lighting and large modular LED displays, these highly visual elements could be used more efficiently and help airlines to differentiate themselves from competitors, drive sales and enhance passenger experience.

"For full-service carriers, we can see opportunities for brand building by using the displays to create emotional and cultural links to the brand. For low-cost carriers, and the unbundling of services, we see opportunities for dynamic advertising and personalization of services offered by the segmentation of passengers."

Mormedi has also considered passengers, and envisages the displays as being a useful tool for creating different moods by integrating them with other lighting systems, using them as a communication tool to show dynamic information such as flight data and multi-language assistance, and as an interactive entertainment platform for the front row seats.



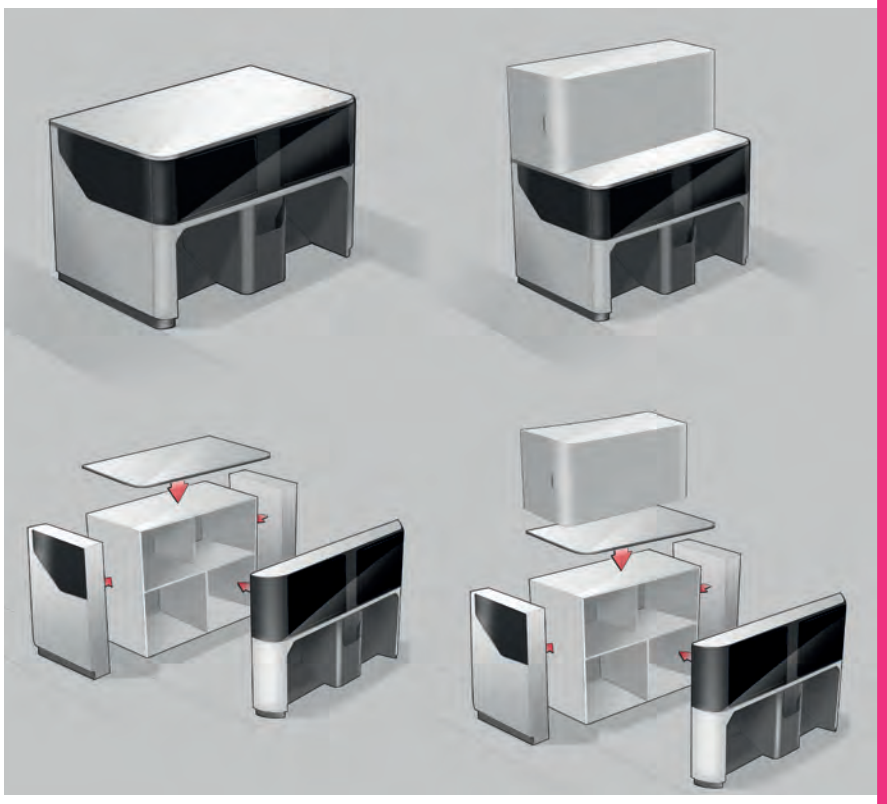
AIM ALTITUDE

LEADING-EDGE SOLUTIONS FOR AIRCRAFT INTERIORS

DESIGN | ENGINEERING | MANUFACTURE

www.aimaltitude.com

An AVIC Company



5

BOLD BRANDING

Because the front-row monument in business class can form a transitional element to the adjoining cabin area in front, this can require close collaboration between the airline, seat manufacturer, IFE supplier, and the architect of the entire cabin.

The real task is to adjust the project to multiple requirements and to remain flexible," states Jakob Versemann, VP of BFE and retrofit sales at Diehl.

An interesting aspect is branding and projection. With full-height monuments, the module itself can serve as a large projection surface, on which information, advertisements and announcements can be displayed, with no heavy monitors required.

"Aircraft can be branded in the blink of an eye, and corporate branding displayed in the cabin without the need of renovation," adds Versemann.

"But such projections can also be interesting for the cabin ambience. For example, the pilots' view from the cockpit can be projected to provide a special travel experience to passengers. Also, the cabin's appearance can be adapted to the flight phase. There are unlimited possibilities."

6

THE SKY'S THE LIMIT

"Storage, open bar units, cabin dividers, foot stools for business class seats: these are just a few of the multiple roles that front row monuments play nowadays in any given airline cabin product and LOPA," states Cristian Sutter, a cabin design specialist at British Airways.

"However, whether a dedicated bespoke BFE design or a humble catalog SFE space filler, front row monuments are still very much a single-function hard product affair."

In Sutter's view, future front row monuments could be designed to deliver flexible are as that can be easily reconverted to support myriad functions, offering new ancillaries and branding touch point possibilities that meet ever-changing passenger needs and route demands.

His ideas include an inflight pop-up duty-free retail space, and a social area for day flights, with extra casual seating. Another idea is a monument able to be converted during flight into a more secluded recreational space that would appeal to families traveling together.

"The sky is the limit in unlocking the true potential of front row monuments as shape-shifting wildcards to meet current and future cabin products flexibility demands," he adds.

Meet us at AIX 2017 in Hamburg – Hall B5, Booth 5D60

For enlightening ideas.

Try Bucher.

www.bucher-group.com

Aircraft Interior Solutions

BUCHER

DACHCOM *

burn notice

WITH MORE LITHIUM BATTERIES GOING INTO THE CARGO HOLD, IS THE RISK OF FIRE IN THE HOLD INCREASING? AND HOW CAN THIS RISK BE MINIMIZED?

Words by Marisa Garcia. Illustration by Rose Lloyd

Although it has now been rolled back, the ban on large electronic devices imposed earlier this year on some airlines flying to the USA raised uncomfortable questions. The ban was imposed in response to intelligence relating to a potential terrorist threat, and no one involved in aviation would make light of such a threat, but the potential risks of packing many more electronic devices in the hold of passenger aircraft was of equal concern.

Objections to this approach by the US Department of Homeland Security came from all corners: airline groups, regulators and other governments.

Resolving the ban, which also inconvenienced passengers, required posing and answering a difficult question: was it more likely that an explosive device would bring down an aircraft, or that a large amount of laptops stored in luggage would?

No one in the airline industry would want to place bets in either direction, but while intelligence agencies were confident of the threat they had identified, regulators were equally confident of the results from tests they've conducted that identify a growing risk posed by lithium batteries.

FIRE PATTERNS

In an accident and incident report published this year, the FAA states that, as of May 22, 2017, there have been 160 air/airport recorded incidents involving lithium batteries carried as cargo or baggage since March 20, 1991. These are only incidents that were brought to the attention of the Administration, and not a comprehensive accounting of lithium battery fires. The study reveals more than just the seriousness of lithium battery fire risk; it also reveals a pattern of acceleration in the number of incidents

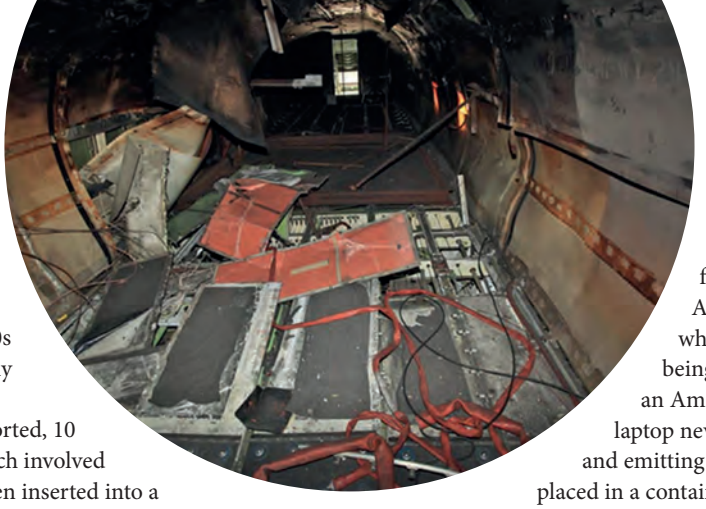

MIA
DFW
ORD
JFK
Aa
QWERTYUIOP
ASDFGHJKL
ZXCVBNM

Travel experience is our world

Global Eagle™

Discover more at globaleagle.com

Ultra-fast internet service
Premium content with global reach
Live & on-demand entertainment



IN THIS 2013 FAA TEST, A SINGLE LITHIUM METAL CELL IN THERMAL RUNAWAY LED TO A FLASH FIRE, AND A HUGE EXPLOSION WHEN MIXED WITH FUMES

involving lithium batteries and lithium battery-powered electronics. Details of incidents that occurred during the 1990s can be found below, and during the early 2000s on p78.

During 2015, 16 incidents were reported, 10 on board passenger aircraft, one of which involved an iPhone 6 Plus cellphone that had been inserted into a GuestLogix XPDA-IP6 point-of-sale credit card reader. The flight attendant was able to put the fire out using a fire extinguisher.

The following year, 2016, brought a sudden surge in reported incidents (31); all but three of these involved passenger flights. Despite the great amount of attention given to the incidents of Samsung device battery fires, these were not the only culprits. There were a number of incidents involving e-cigarettes and various other models of electronic devices.

Two reported incidents in 2016 involved laptops. One caught fire in the cabin on a Delta Airlines flight from Honolulu to Atlanta. It was extinguished by crew, placed in a containment bag and kept in a cooler filled with ice for the duration of the flight.

Another involved an Apple laptop, which went into thermal runaway after being plugged into a seat power outlet on an American Airlines flight. However, the laptop never ignited, only becoming very hot and emitting a smell of burning plastic. It was placed in a container in the galley and returned to the passenger after landing in Mexico City.

This year is already on track to exceed 2016's figures, with 17 incidents though mid-May, 15 of these on passenger airplanes.

Again, all of the incidents were ultimately resolved through various extinguishing methods including fire-safe bags. One of the recorded incidents of cargo, involving laptops, is of concern when considering the risks of carrying large numbers of these devices in the hold of aircraft. A carrier recorded that a shipment of 13 boxes of laptops was inadvertently bumped at a handling facility and one of the boxes fell to the ground. It immediately began to heat up and smoke. Both the box and the laptop were charred and partially melted.

"This year is already on track to exceed 2016's figures, with 17 incidents through mid-May"

CARGO RISKS

To date, there have been no tragic incidents involving lithium fires on passenger flights, but as shown by the FAA's ad-hoc report, the number of passengers traveling with devices in the cabin has increased and with that the number of incidents of lithium fires on board has also increased. Crew intervention in those incidents has helped avoid a deadly event.

Fires (and even explosions caused by lithium fires) in the hold are every bit as real a threat as that of explosive devices manufactured by terrorists and secreted in personal electronic devices (PED).

At the end of March of this year, the International Civil Aviation Organization (ICAO) issued an electronic bulletin, EB2017/23, warning of the risks of overheating for lithium battery powered devices, specifically naming the higher risks of fire when batteries are damaged by impact with other objects or by rough handling during transportation.

QUIET IN THE 1990s

In 1994 and 1996, there were only two PED fire incidents reported, both related to shipments of loose batteries. There were no incidents reported in 1995 or 1997. In May 1998, one incident involved an uninterruptible power supply unit, which exploded while being offloaded from a truck. The second incident that year, however, demonstrates the risks of concentrations of electronic devices. During inspection of the cargo area in flight, the captain and flight engineer reported heat rising from pallets containing a shipment of 336 laptop computers, as well as "a strange odor and lung irritation". The flight was diverted and firefighters sprayed the pallet with flame retardant. However, an investigation found no evidence that the fire had extended.

During 1999, there were only two incidents reported.

"While the *Technical instructions for the safe transport of dangerous goods by air* do not prohibit the carriage of PEDs in checked baggage, they recommend that they be carried in the cabin where an incident can be immediately mitigated. The risk of all PEDs being carried as checked baggage was not taken into account when developing these provisions as most passengers chose to carry them in the cabin," the organization writes.

In the same bulletin, ICAO addresses the ban on large PEDs, warning that it would "significantly increase the number of PEDs powered by lithium batteries in cargo compartments".

To help operators comply with the ban while mitigating risks, ICAO recommends that passengers ensure their devices are completely switched off and packed in protective packaging, described as "strong, rigid packaging and cushioning material". The aim of this is to prevent accidental activation of the electronics and to mitigate the risks of damage to the batteries which might cause a fire. Additionally, ICAO recommends that airlines consider the risks of "higher concentrations of lithium battery devices packed in close proximity to each other and to other dangerous goods".

On June 30, a SriLankan Airlines flight had to divert when a Li-ion battery inside a carry-on bag began smoking

Airlines were encouraged to disperse the electronic devices among various cargo containers, pack them in such a way that they would not move freely in the container, and also to advise code-share and alliance partners to ensure appropriate measures were taken to stow this equipment safety on transfer.

In April of this year, EASA issued a Safety Information Bulletin, SIB No. 2017-04, *Safety precautions regarding the transport by air passengers of portable electronic devices containing lithium batteries*, which recommended that these devices such as tablets and laptops "should preferably be carried in the passenger cabin, on the person, or in carry-on baggage".

THREAT WARMING IN THE 2000s

No PED fire incidents were reported in 2000 or 2001, two in 2002, one in 2003, and three in both 2004 and 2005. However, in 2006, 10 incidents were reported.

It was also the year that a laptop first ignited on a commercial passenger aircraft. The incident took place in the first class cabin of a Lufthansa flight scheduled to fly from Chicago to Munich. A burning smell was detected coming from the luggage bin above seat 2A shortly before departure. Crew evacuated the passengers from first class and from the first two rows of economy class, and used fire extinguishers to attempt to quell what appeared to be the beginnings of a fire. Maintenance personnel removed the bag from the aircraft onto the ramp, where it caught fire and the fire was eventually put out, but not before re-igniting. The culprit was determined to be a spare battery packed with the laptop.

That September, a laptop caught fire prior to the departure of a United Airlines flight bound from LA to Heathrow. In this incident, again ground crew and the fire department had difficulties putting out the fire.

In December, a passenger using a 'Fresh Air Buddy' personal air filter on a Houston-Portland flight was burned when the device ignited. He removed the device quickly and it fell between two seats, where it burned holes in the cushions. Passengers evacuated from the aircraft complained of smoke inhalation.

By 2007, the number of incidents reported had risen to 13, two of these involving laptops. The first incident involved a laptop plugged into an aircraft power port via a power converter, and it was the converter that reportedly heated up. The incident caused a flight diversion. The second incident involved a laptop fire in the gate area, which proved difficult to extinguish.

The reason stated is that cabin crew would be able to respond more quickly to any fire incidents. Additionally, the agency warned against banning carriage of PEDs in the cabin, saying this would only lead to a "significant increase" of the number of PEDs carried as cargo in checked luggage.

"This should be taken into account as part of the operator's safety risk assessment process, and appropriate precautions should be applied to mitigate the associated risks, such as fire in the hold," EASA writes.

DANGER LURKS BENEATH

Other than to warn of proper device handling and dispersal, there are no ready cargo bay solutions to contain any fires should they occur. ICAO is actively

Let digEcor cabin technology delight your passengers

The only fully integrated system from a single source

- Affordable
- Light Weight
- Quick & Easy to Install
- Reliable

digEcor

INTEGRATED FLIGHT EXPERIENCE

EMBEDDED - PORTABLES - POWER - CABIN LIGHTS
ENGAGE - PASSENGER SERVICES - CONTENT
CABIN MANAGEMENT - TAPE REPLACEMENT - WI-FI

Visit us at APEX Expo Stand 931

Contact us today
sales@digecor.com


ANKER
PROFESSIONAL CARPET
flooro
FLOOR FABRICS
the new less
Carpeting can be made using more or less. More weight, more material, more resources, more energy, more waste. We've opted for less: flooro. The new floor fabric.
More information: anker.eu
Agree your personal presentation: contact@flooro.eu

working with regulators to find adequate fire suppression and containment solutions. This process is complicated because of the threat caused by the gas emissions from those fires.

During a series of tests conducted in 2013, the FAA reported that unburned hydrocarbons in the cargo compartment of the test aircraft produced an explosion strong enough to dislodge the floorboards below the flight deck – indeed strong enough to blow the door off its hinges and into the flight deck. In this case, the explosion was caused by a single lithium-metal cell that continued to burn in thermal runaway, leading to a flash fire that forced open the blow-out panel into the mix bay and ignited the fumes that had accumulated there.

Lithium-ion batteries present similar risks. They can generate temperatures exceeding 1,100°F (593°C), while releasing flammable electrolytes.

In a SAFO (Safety Alert for Operators) published in 2015, the FAA Tech Center revealed results of further testing, which showed that "the ignition of the unburned flammable gases associated with a lithium battery fire could lead to a catastrophic explosion".

DURING AN FAA TEST, A SINGLE LITHIUM CELL IN THE HOLD HELPED CREATED A BLAST STRONG ENOUGH TO BLOW THE COCKPIT DOOR OFF ITS HINGES

The Articles section of our website has insight into fires, from thermal runaway to materials testing

"Lithium-ion batteries can generate temperatures exceeding 1,100°F"

The Administration warned, "The current design of the Halon 1301 fire suppression system (concentration 5%) in a Class C cargo compartment in passenger airplanes is incapable of preventing such an explosion. In addition, tests also revealed that the ignition of a mixture of flammable gases could produce an over-pressure, dislodging pressure relief panels, and thereby allowing leakage from the associated cargo compartment. This could lead to the spread of smoke and gases from the fire into occupied areas of the airplane. The number of cells necessary to produce this condition is small and can occur with just a few packages."

In a presentation for the industry that was prepared following these tests, the FAA added, "The ignition of flammable gases produced by a small number of lithium-ion batteries in thermal runaway (less than 10, depending on state-of-charge) can cause an over-pressure in a cargo compartment with a 70% load factor, that will dislodge pressure release panels designed to activate between 0.5-1.0psi, which would compromise the fire protection capabilities."

The FAA also found that a bulk shipment of lithium-ion batteries in thermal runaway could cause an explosion in a fire-hardened container, which might otherwise be capable of extinguishing or suppressing cargo fires not caused by lithium.

PILOTS SPEAK OUT

Steve Landells, Flight Safety Specialist at BALPA (the British Airline Pilots' Association) shares his – and the association's – fears of carrying large amounts of lithium-ion in the hold: "Pilots have been calling for greater awareness of the potential dangers of lithium batteries for some time now. While we appreciate these batteries power a majority of the devices we use to stay connected, the recent issues with some mobile phones highlight how dangerous these devices can be. However, the problems are not confined to a specific device.

"When a lithium battery fails it will get extremely hot and may end up in a condition known as 'thermal runaway' which in essence means that it is creating its own fuel and it will burn at extreme temperatures until it has completely destroyed itself.

"In this condition it is almost impossible to extinguish with conventional firefighting equipment, and that is a major concern on board an aircraft. During this process it will also produce a large amount of explosive gases and that is why it is so important for airlines and their passengers to ensure that batteries are not carried in the hold where an uncontained fire could prove disastrous; lithium battery fires have been cited in the accident reports of at least two fatal crashes.

"This is a recognized problem and the UN safety regulator has now banned the carriage of lithium batteries in bulk on all passenger aircraft. BALPA would like to see more research into the safest way to carry lithium batteries and more resources put into reducing the flow of poorly made and counterfeit versions of all types of lithium battery."

KEEP PEDs WITHIN REACH

At the same time that the DHS announced the lift of the ban of carriage of large personal electronic devices this July 17th, the FAA published InFO notice 17008 for airlines revealing the dangers of packing these large electronic devices in the hold.

The wording of the InFO was particularly alarming. The FAA recommended a change in procedures for airlines ensuring that passengers only carry these devices in the cabin where cabin crew can react quickly to put out any fires and monitor potential reignition.

"PEDs that are in checked baggage or consolidated by the airline operator and loaded into the cargo compartment may create conditions beyond what the airplane was designed to manage," the FAA warned.

The tests which led to the publication of this InFO were conducted by the FAA as part of an investigation of the concerns airlines raised about complying to the DHS ban on laptops and large electronics, and included tests of personal electronics in passenger baggage as well as consolidated in the types of safety packaging supplied by airlines affected by the ban to their customers.

After trials of various combinations of devices in airline packaging and in standard luggage, the FAA found that fire in one faulty device could spread to tragedy. The FAA found that Halon 1301 fire suppression systems in the hold alone may be inadequate to address the most intense fires which could lead to explosions, because they may not penetrate items in the hold sufficiently to impact the fire source.

A REAL THREAT

Details of the precise reason for the laptop ban are still under wraps, but John Kelly, secretary of Homeland Security revealed some details behind the thinking at the Aspen Security Forum in July (just before his appointment as White House Chief of Staff). He said that the threat was "not only sophisticated, but it was real and it was targeted at certain airports" – airports that he didn't feel had security measures that could detect the suspected devices.

According to Kelly, the TSA worked with the US intelligence community and the FBI to build two example explosive devices that fit within the casing of large PEDs. Kelly was initially dubious that this amount of explosive would be sufficient to destroy an aircraft in flight.

However, testing changed his outlook. "We tested it on a real airplane on the ground, pressurized, and it destroyed the airplane.

"We didn't feel at the time that overseas airports had the kind of security initially that could give me a comfort that they could detect this device."

BAD FOR BUSINESS

During the US laptop ban, there were concerns about how it could affect ticket sales in business class. As Mark Jenkinson, director of bespoke air charter firm, Hunt and Palmer, stated, "This could have a deeply negative impact on the international business community. A broadening of the laptop ban away from select high-threat countries has the potential to both hinder business and hit the airlines' bottom lines, as execs decide they cannot afford a day of time flying to the US without such a crucial business tool.

"For businesspeople who fly regularly, not being able to have a laptop or tablet on board when traveling to the USA could wipe out an entire billable day. It's a big cost and a cost that the major commercial airlines could ultimately be set to pay.

"The airborne office is second nature to C-suite executives; they use these hours in the sky to prepare for meetings and presentations. Without being able to use laptops or tablets, top business execs are hostages to the in-flight entertainment.

"If implemented, this policy broadening could have a profound effect on the mainstream airline industry as it disincentives businesses to travel."

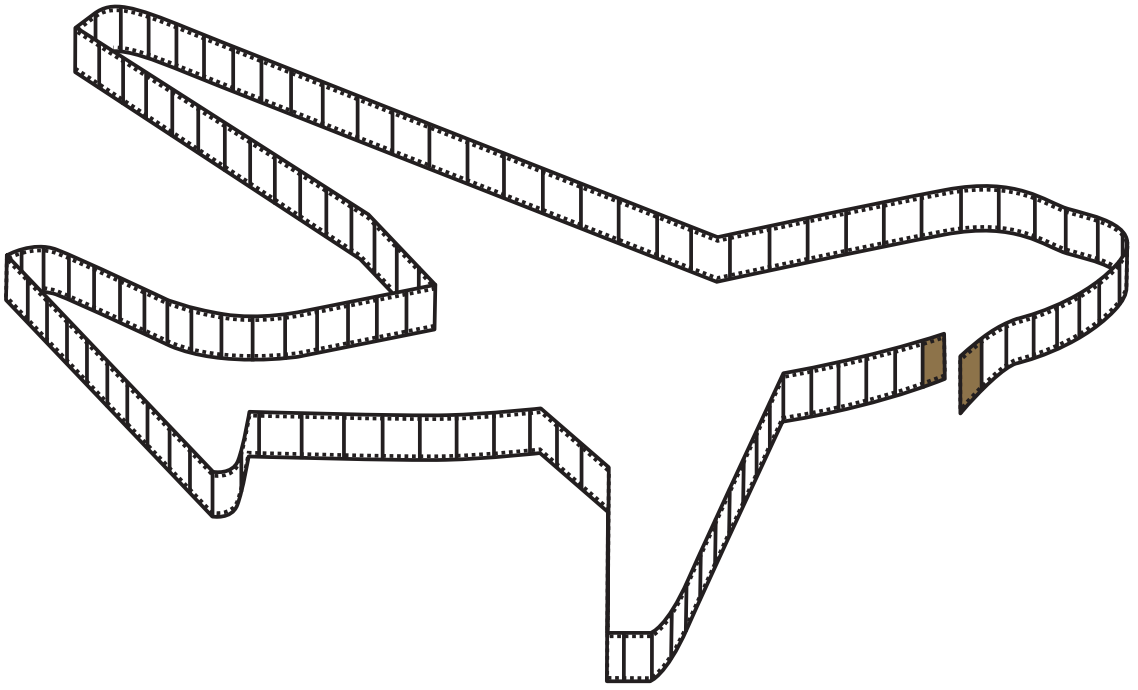
In the case of packaging similar to that supplied by airlines during the laptop ban, the FAA found that some specialised suppression packaging, including America's Laptop Containment units and AVSAFE Overpacks for laptop boxes were capable of containing fires.

The FAA found the greatest threat stems from laptops or other large electronic devices packed in passenger luggage – either soft-sided or hard-shelled. In various tests, they were unsuccessful in containing fires caused by thermal runaway, with some of the fires emitted by test samples described as "vigorous."

The FAA found that packing luggage closely together, leaving little air between bags, might have some positive effect, but warned that fire would spread with a source of air, such as from a small hole in luggage.

The combination of permitted hazardous materials in luggage – such as aerosol hair spray cans – and a thermal runaway fire from a PED could result in a dangerous explosion.

"The results of this test condition yielded the most troubling results," the FAA writes. "As a result of this, it was concluded that if a PED is packed in a suitcase with permitted hazardous materials and a thermal runaway event occurs, there is the potential for the resulting event to exceed the capabilities of the airplane to cope with it."



Tailor Made Seat Covers

DESIGNED AND MANUFACTURED IN CALIFORNIA

Aerofoam Industries, 31855 Corydon Road, Lake Elsinore, CA 92530, USA

www.aerofoams.com

suite heart

WITH MASSIVE IFEC INVESTMENTS, A NEW TRAVEL CLASS, BUSINESS SUITES AND AN A350 INCOMING, THESE ARE EXCITING TIMES AT DELTA. CHRIS BUCKNER, DIRECTOR OF ONBOARD PRODUCTS, SHARES HIS VIEWS

Interviewed by Adam Gavine

On a long flight, it's not just where you sit, it's **what you sit on** that matters.

Demand Italian ~ Specify Cortina

121 West 27th Street, Suite 1001 New York, NY 10001
Tel. 800·338·6229 info@CortinaLeathers.com

On a long flight, it's not just where you sit, it's what you sit on that matters.

Demand Italian ~ Specify Cortina

121 West 27th Street, Suite 1001 New York, NY 10001
Tel. 800·338·6229 info@CortinaLeathers.com

Buckner on... PAIN POINTS

"There are areas we continue to focus on improving, but I don't think we have a true pain point. However, I know we have the bandwidth to improve some areas. Boarding is one example of an area we're constantly trying to improve, and we do a lot of studies and evaluations to make sure we've got the best options out there."

The US airline market is blossoming, with the schemes and investments of the major carriers emerging to great acclaim. The latest US carrier to create excitement is Delta, which hit the headlines with news of its 500th aircraft's seatback IFE installation and the announcement that its Delta One suite had won a Crystal Cabin Award before it had even launched. Many of Delta's innovations are driven by Chris Buckner, director of onboard products, who explains that this passenger experience renaissance is not due to a recent initiative or a reaction to competitor products, but rather to seeing investments made over the last 10 years become market-ready and installed on a broad scale.

While the airline is the last of the US 'big three' carriers to unveil a new business class, it has been well worth the wait, holding its own against American Airlines' impressive passenger experience investments and United's clever Polaris. Named Delta One, the scheme brings enclosed suites to the airline's long-haul business class passengers (see p91 for details of the suite).

Delta One is a bold statement, and a strong point of differentiation from the competition, and Buckner is convinced of its merits. "We are of course better!" he (half) jokes when asked how the suite compares with the latest international business class reveals from American and United. "For us it's not about thinking what the competition is doing – for us it's about listening to customers and trying to figure out how to equip them to get from point A to point B the best way they can and to hit all their expectations – and then some."

ABOVE: THE DELTA ONE SUITES ARE MORE LUXURIOUS THAN MANY PREVIOUS-GENERATION FIRST CLASS OFFERS

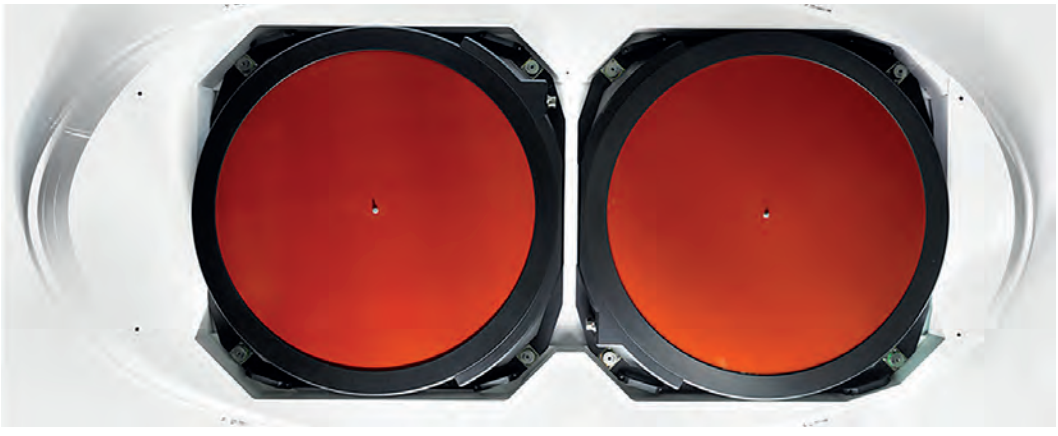
BELOW: DELTA'S CHRIS BUCKNER

BOTTOM: 2KU TECHNOLOGY CAN BE FOUND ON MORE THAN 1,000 OF DELTA'S AIRCRAFT FLEET

"Delta has put a lot of investment, time and energy into not just providing customers with what they expect, but exceeding those expectations. What you see on our Delta One product and what you're going to see in the future is a culmination of that thought process," he adds. "We're really trying to push the envelope. I want people to feel refreshed when they land and a lot of the innovations we're putting into the Delta One cabins reflect that."

With sliding doors creating enclosed suites, 18in IFE displays and other premium benefits, Delta One is firmly in super business class territory, making first class a fairly redundant proposition for the airline. Buckner explains that while first class makes sense in some markets, for Delta, investing in business class product has been a better option.

"We're really trying to push the envelope"



PLUGGING EXPERIENCE GAPS

The only downside of this high standard of business class is that it has further widened the experience gap with economy class… however, this gap presented an opportunity to introduce premium economy. Again, Delta is not the first major US carrier to launch premium economy (American took that honor last year), but when it launches in October – on the A350, with Delta One – it will be a highly competitive proposition, which will also be rolled out across the B777 fleet and then possibly to other aircraft types.

Named Delta Premium Select, it is a dedicated class with seats similar to a regional business class offer, a 38in pitch, and upgraded service and amenities.

In addition to filling a service gap, the decision to introduce premium economy was also partly inspired by the success that Delta's partners Virgin Atlantic and Air France have enjoyed with their products – which will also help ensure consistency between codeshare flights.

"There is a huge benefit in having consistency between codeshares, but it's really about giving customers choice," says Buckner. "Customers have different demands for different products, so it's a continuation of creating segmentation and providing choice."

Indeed the quality of the premium economy cabin still leaves a fairly large gap to economy, so for customers looking to spend just a little more for an enhanced experience, there is also Delta Comfort+, which adds to the standard economy experience with up to 4in extra legroom, dedicated overhead bin space and priority boarding.

ECONOMY CLASS?

So what will the majority of Delta flyers experience? While lacking the dramatic advances seen in the

ABOVE: THE CUSTOMIZATION OF THE THOMPSON VANTAGE XL PLATFORM WAS CARRIED OUT WITH LONDON-BASED FACTORYDESIGN

Buckner on... FRIENDS & RIVALS

As Delta's relationships with Virgin Atlantic, Air France-KLM and Alitalia becoming ever-closer, is its passenger experience being influenced? "We have conversations within the confines of our joint ventures, and where we are able to collaborate, we do. We're always learning.

"However, product is one of those areas where you don't need to have conversations with your partners – you just see the developments in the product they deliver. There are things we do within the confines of our joint ventures, but it's less about learning from our partners and more about going out and experiencing product. We fly other airlines' products and learn from them."

Buckner on... INFLUENCES

Buckner may not be overly influenced by other airlines, but he does take inspiration from outside the airline sphere. "When we talk of competitors and markets, we're not just thinking about airlines. With connectivity we often reference the hotel model – many now have wi-fi in every room and it's high-speed, which gives an at-home experience. For us it's about looking at how they achieved that, and learning from it.

"We're constantly looking outside the airline industry to try and find new ways to innovate and provide customers with a better experience. We also look at the automotive industry, as they're obviously good at making seats. So we look at what they're doing in terms of seat design and ergonomics."

BELOW: A MILESTONE MOMENT IN DELTA'S HISTORY AS IT BECOMES THE FIRST US AIRLINE TO RECEIVE THE A350-900

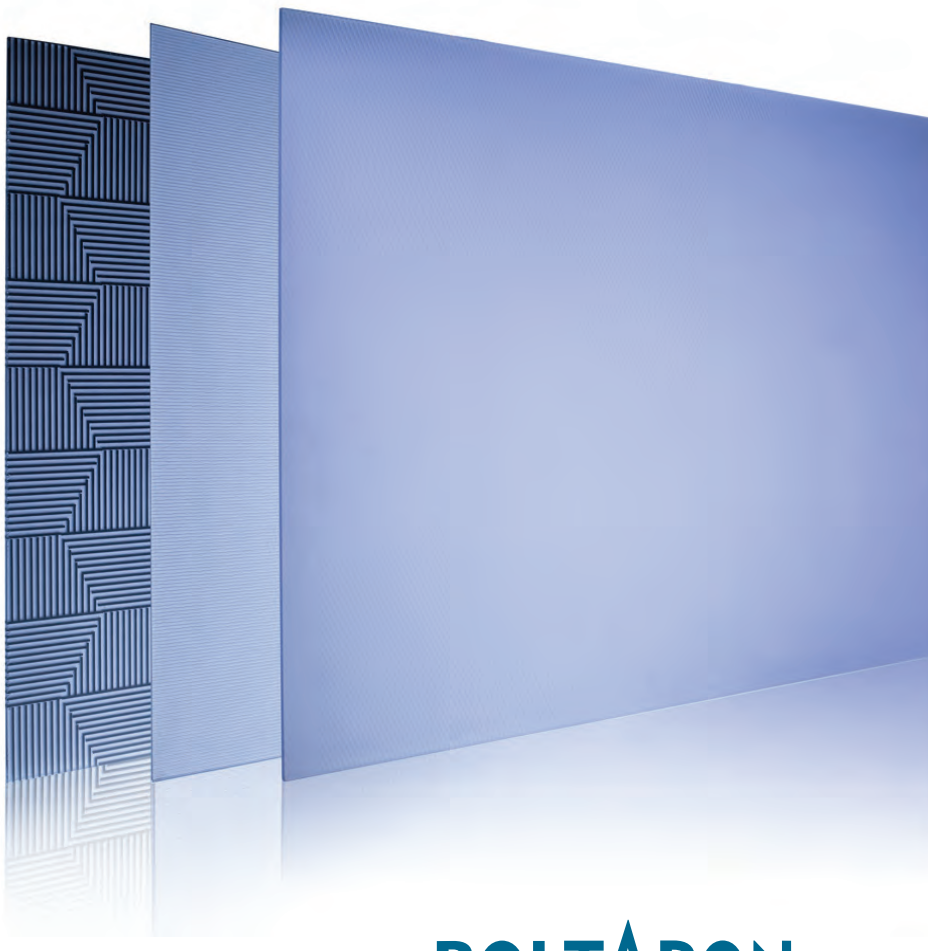
Make a clear impact.

Boltaron's translucent decorative sheet technology transforms FAA compliant materials into a means of incorporating light, visibility, and style into the cabin interior.

Customize high impact design areas with distinctive forms, unique patterns, and dramatic textures that make your interior vision clearly stand out.

Custom-routed translucent panels for aircraft interior components Boltaron® 9916 and 4350 meet FAR regulations for flammability, heat release and smoke density, in additon to low toxicity specifications for class dividers, partitions and other decorative trim and finish features.

Discover more design possibilities at the Aircraft Interiors Expo in Long Beach, **stand 2320.**



CRYSTAL CABIN AWARD®

2017 Crystal Cabin Award Shortlistee

BOLTARON
A SIMONA Company

INSIDE DELTA ONE

The Delta One suite is a collaborative effort between the airline, the Factorydesign industrial design consultancy in London, and Northern Ireland-based seat manufacturer Thompson Aero Seating.

The notion of fitting sliding doors to business class seats was not new to Factorydesign and Thompson, as they collaborated with JetBlue for its Mint suites, launched in 2014. However, there are big differences between the two products, with Mint being a narrow-body product based on the Vantage seat model, and only four out of the 12 business seats on JetBlue's A321s are suites.

For Delta One, the larger Vantage XL seating platform has been used, and the seating configuration chosen for the airline's A350s has enabled each of the 32 business class seats to be a suite.

"Everything on the seat was customized," says Ryan Graham, Factorydesign's senior designer, including a bespoke reading light design, mood lighting on the dividers between the center pairs – and of course the sliding doors.

forward cabins, Buckner says there has been a lot of quiet innovation in economy class.

"Cushion comfort has come a really long way, both in terms of providing more space back to customers within the same pitch, and also in terms of seat comfort improvements. And that's something we see reflected in our customer satisfaction ratings – they are dramatically different to 10 years ago."

Buckner and his team constantly evaluate new economy class features, but he says that many require space compromises and sometimes, "just don't provide the benefit that the vendors think they do".

"It's a matter of us evaluating things and seeing what's right for the customer and what's right for Delta," he adds.

EMBEDDED INNOVATION

July was a milestone month for Delta, with its 500th aircraft installed with seatback IFE – and the 600th due by late 2018. At a time when some airlines are considering switching from embedded to streaming IFE, what was the thinking behind this – especially when Gogo's super-fast 2Ku connectivity is on board most of the fleet?

"Delta is 100% committed to seatback IFE," states Buckner. "Our customers love it and they tell us that, which is fantastic. It's definitely a benefit we will continue to offer. It's amazing how much customers love seatback entertainment, as many don't want to have to take out a laptop or tablet or watch something on a little phone. They want to have a proper screen in front of them that allows them to relax and disengage from their PEDs."

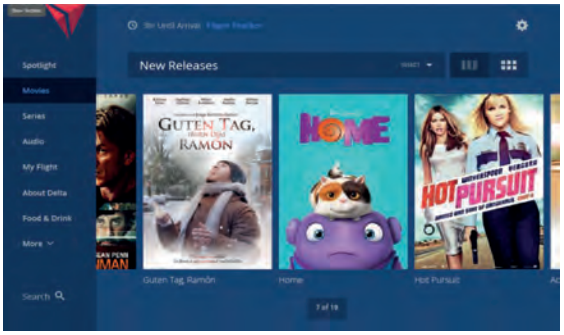
"Delta is 100% committed to seatback IFE"

There is plenty to choose from on the Panasonic systems, as the Delta Studio content platform offers multilanguage content, with up to 300 movies, 750 TV shows, 2,000 songs, up to 18 channels of live satellite TV, and games.

However, some passengers will still want to watch their own favorite IFE content, or use their devices as second-screen entertainment, and the capacity of 2Ku allows them to supplement their IFE diet with streamed content.

ABOVE: DIVIDERS CAN MAKE THE CENTRAL SUITES SOCIAL OR PRIVATE

BELOW: A FAMILIAR SIGN TO DELTA FLYERS, DUE TO THE AIRLINE'S HUGE INVESTMENTS IN CONNECTIVITY



"Every single Delta aircraft except our 50-seat regionals has the capability for IFE streaming. Even where there are gaps on some of our short-haul aircraft that do not have seatback IFE, they do have streaming."

WELL CONNECTED

Indeed Delta operates the world's largest wi-fi-equipped fleet (more than 1,000 aircraft), including its entire fleet of 660 domestic aircraft, almost all Delta Connection two-class regional jets and all of its long-haul fleet.

This level of connectivity represents a lot of investment, commitment and faith. Does Buckner view it as an essential piece of today's passenger experience? "I would say connectivity is incredibly important. It has become a table stakes feature, and for us it's a matter of continuing to improve the technology with our vendors to get speeds toward an at-home experience for customers."

Buckner on... THE A350

We asked Buckner what will make Delta's A350 cabins a uniquely Delta experience, and the Delta One business class suites are key. He acknowledges that in the international long-haul market, Qatar Airways has launched a business class suite, but adds that Delta One "is uniquely Delta, especially in the North America market. It is a very different product than United's Polaris, and that uniqueness is a big feature of the A350. You'll walk on board and it will look and feel exactly Delta, with the cultural feel and customer experience you're used to on other Delta aircraft, but with a lot of great improvements too.

"These improvements are not just in terms of product, but also how you'll feel when you fly as this is Delta's first next-generation widebody, and it has a lot of innovation in itself for a better experience."

Buckner on... GALLEYS & SOCIAL SPACE

"We look at galley space innovations, and we have a couple of projects underway in that area, but it is too early in the process to share that work. We evaluate galleys regularly to see if we can provide innovations that would supplement the customer experience in a particular cabin."

So would Buckner consider creating social spaces within aircraft? "I can see the pros and cons. Obviously it takes up some space, but if you think about it in terms of supplementing service and providing a place for customers to get up and their stretch legs then I like that idea.

"It's a matter of looking at the financials and balancing if it will provide customers with the improvement in experience they are looking for. It's something we look at a lot."

TOP LEFT: THE IFE GUI IS INTENDED TO BE SIMILAR TO USING A SMARTPHONE

TOP: THE PREMIUM ECONOMY CABIN TIES IN VISUALLY WITH DELTA ONE

ABOVE: THE DELTA IFE EXPERIENCE HAS BEEN FURTHER ENHANCED BY NOISE-CANCELING HEADPHONES FROM TRENDY LA COMPANY LSTN

More than 370,000 Delta customers per day have access to the inflight connectivity, and their experience is set to improve further, with Gogo's next-generation modems (being installed in the second half of 2017) expected to raise streaming video quality performance from 15Mbps to the seat to 20Mbps, aided by the launch of new high-throughput satellites.

Exciting times, but what's on the horizon for Delta's connectivity technology? "It's tough to speculate. I think the space will continue to evolve, and there are a lot of questions about how it will evolve and how people will utilize connectivity and entertainment," says Buckner. "Internally at Delta we have some of our own ideas that we're trying to figure out and work towards, but beyond that it's really tough to speculate as we're too far back in the process.

"I think we will get more answers in the next couple of years, especially as vendors continue to think about how to innovate connectivity with the inflight experience."

+44 1993 868866 www.beadlight.com contact@beadlight.com

STELLAR

focused on the detail.

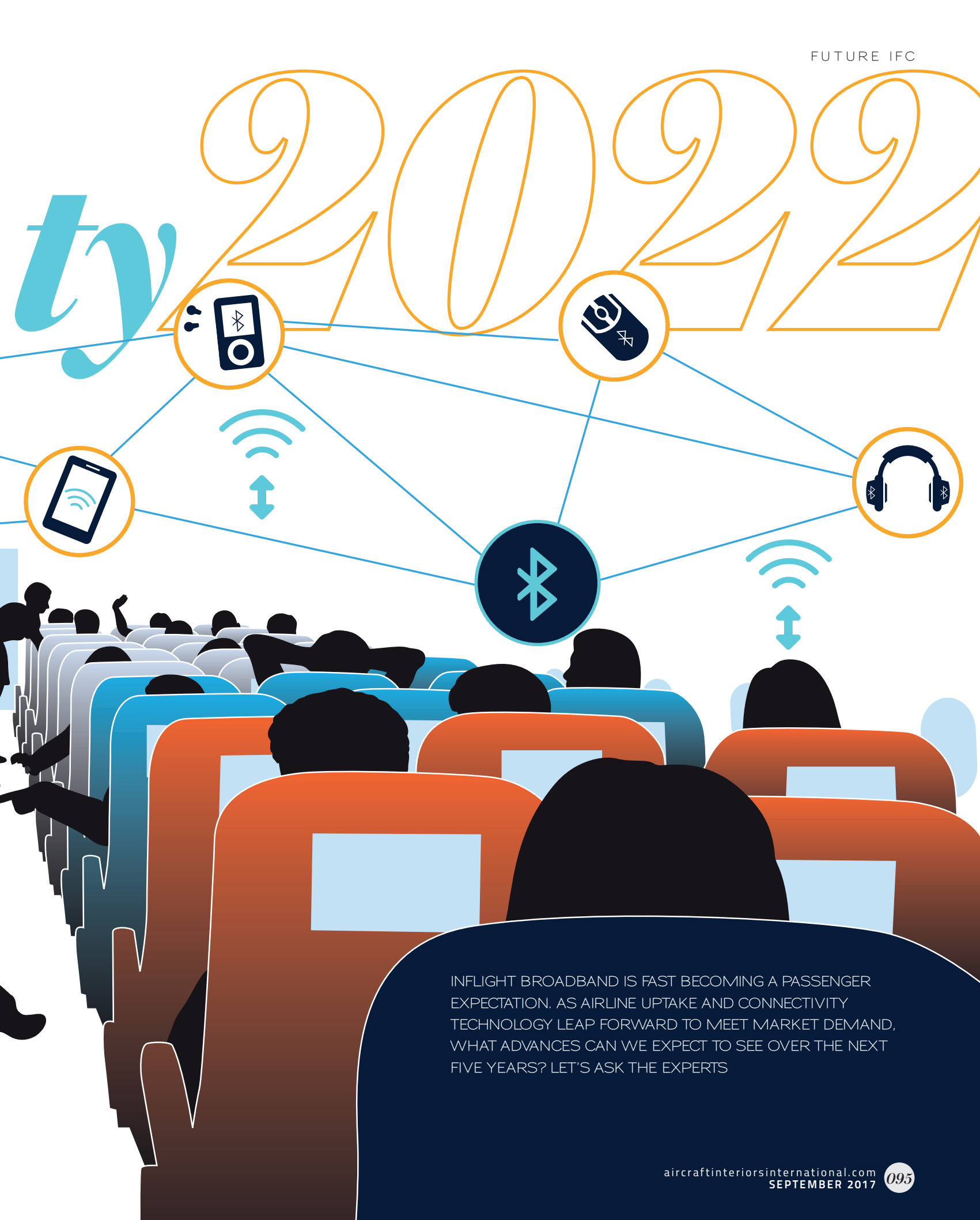
MADE IN BRITAIN

WE DESIGN, ENGINEER AND MANUFACTURE
THE ULTIMATE AEROSPACE READING LIGHTS.

Beadlight®
AEROSPACE

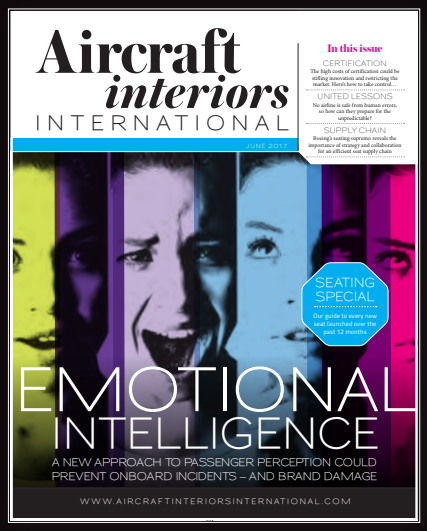
Connectivi

ty 2022



INFLIGHT BROADBAND IS FAST BECOMING A PASSENGER EXPECTATION. AS AIRLINE UPTAKE AND CONNECTIVITY TECHNOLOGY LEAP FORWARD TO MEET MARKET DEMAND, WHAT ADVANCES CAN WE EXPECT TO SEE OVER THE NEXT FIVE YEARS? LET'S ASK THE EXPERTS

www.aircraftinteriorsinternational.com



Request or renew your subscription **NOW!**

NEVER MISS AN ISSUE!

Aircraft interiors INTERNATIONAL

WWW.UKIMEDIAEVENTS.COM/RECARDS/FORMS/1425

What speeds can we expect?

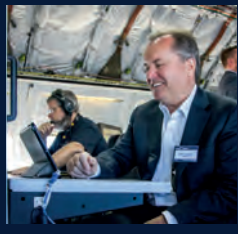
ONBOARD WI-FI THAT DISAPPOINTS CAN BE MORE DETRIMENTAL TO THE PASSENGER EXPERIENCE THAN NOT PROVIDING THE SERVICE AT ALL. WITH INTERNET SPEEDS ON THE GROUND SETTING THE BENCHMARK FOR EXPECTATIONS, HOW WILL ONBOARD WI-FI SPEEDS COMPARE IN THE COMING YEARS?

100Mbps IS HERE TODAY

We approached Intelsat, a communications satellite services provider with a global network, for its views.

Mark Rasmussen, VP and GM for mobility, says, "Just a few years ago, passengers were limited to emails or simple web surfing, but aero connectivity today is closer to matching connectivity on the ground. High-throughput satellites (HTSs), combined with advances in antenna and modem technologies, are enabling the delivery of the higher throughput that enables more inflight uses, such as video.

"Recently Intelsat and Gogo demonstrated the latest in onboard connectivity during a two-hour flight on a test aircraft. Using the Intelsat Epic^{NG} platform, passengers connected 53 devices and consumed 29GB of data at speeds as high as 100Mbps."



3G AND 4G TO GROW

Let's hear what a developer of technology, applications and services that enable connected aircraft solutions has to say.

Dominique El Bez, VP of product and strategy at SITAOnAir states, "Everyone is working toward achieving a similar connected experience to that on the ground. I anticipate demand for achieving inflight 3G/4G connectivity will continue to grow – and ultimately inflight connectivity will become just as accessible as ground-based mobile or wi-fi."

AT LEAST ONE TECHNOLOGY GENERATION BEHIND

Let's get a view from an IT service provider – Jan-Peter Gaense, director of projects and certification at Lufthansa Systems.

"We have seen an increase in speeds with satellite and ATG solutions, and given the lead times for building such an infrastructure this is a great achievement. New technologies such as LEO satellites also promise higher speeds with lower latency. This is all good, but it is no match to what is happening on the ground.

"My reference point is iPhone speeds. The first iPhone, launched in 2007, had 2G (EDGE, up to 0.5Mbps), while today's iPhone 7 with LTE support is more than 400Mbps. Streaming services in HD (even 4k) such as Netflix has become the norm, and FaceTime and IP-based communication have almost replaced traditional telephony."

VERY HTS ON THE HORIZON

Eutelsat operates a fleet of satellites serving users across Europe, Africa, Asia and the Americas. Here's what Jags Burhm, SVP for aero global mobility at Eutelsat, has to say.

"Airlines are increasingly leveraging connectivity to provide a seamless online experience, from home to airport, boarding and inflight, and to the destination. Passengers now want more than simple connectivity. They want high-speed internet on flights, especially for streaming video.

"With the current development of HTS and the emergence of 'very HTS' satellites within the next decade, combined with the prospect of cheaper capacity for airlines, streaming Netflix movies at 36,000ft has already become a reality for passengers."

A GAME OF CATCH-UP

For market analysis of the connectivity sector, we asked Craig Foster, senior consultant and co-founder of Valour Consultancy, a UK-based provider of market intelligence services.

Foster states, "I don't think it is realistic for airlines to be able to match the on-ground experience. The time it takes for solutions to be certified and installed, and the pace at which consumer technology evolves, means they will always be playing catch-up. Even so, inflight connectivity is improving quickly and more carriers will be able to support streaming of web-based content, although not necessarily always on a 'freemium' model."

AIRSPEED MUST MATCH GROUND SPEED

Someone familiar with fast connections is Frederik van Essen, SVP of strategy at connectivity giant, Inmarsat Aviation.

"A major milestone has already been reached with the launch of GX Aviation, the world's first inflight connectivity solution with seamless, reliable high-speed global coverage provided through a single operator. It is the only service in the market that guarantees minimum data rates, ensuring that passengers have an onboard connectivity experience comparable to the mobile broadband services they may receive on the ground.

"However, to maintain customer satisfaction and passenger experience standards, breadth of coverage and speed must continue to match terrestrial broadband in the future."

Costs

WITH MARGINS TIGHT, SOME AIRLINES ARE CAREFULLY MONITORING COSTS BEFORE TAKING THE PLUNGE INTO CONNECTIVITY. HOW WILL THE COSTS OF CONNECTIVITY CHANGE?

A SPONSORSHIP OPPORTUNITY?

Mark Rasmussen, Intelsat: "The introduction of HTS technology is delivering enhanced performance for airlines at a time when broadband connectivity is becoming a key requirement for passengers. Let there be no doubt: our goal is to reduce the cost of bits delivered. And when paired with improved installation costs for more powerful hardware, and reduced operational costs, this will support the development of a more cost-efficient mainstream inflight connectivity service.

"Airlines and service providers need to think through all the business models: what should be free to customers, what should be for a fee, and whether there are aspects that could be sponsored."

POTENTIAL SHORT-TERM INCREASE

Dominique El Bez, SITAOnAir: "With satellite providers continuing to launch new satellites and competing for market share, we certainly expect the price per megabyte for airlines to decrease. However, as satellite providers focus on delivering the increased bandwidth demanded by connected airline passengers, this will require ongoing investment by providers.

"So while unit cost is expected to continue to drop with more high-throughput capacity being deployed, satellite providers are seeking to increase their average revenue per aircraft [ARPAC], initially by increasing bandwidth. So costs are likely to rise for airlines in the initial phases of migration of HTS."

44% of flyers would switch from their preferred airline within a year if it did not offer reliable wi-fi
Inmarsat survey

BEWARE MARKET CONSOLIDATION

Jan-Peter Gaense, Lufthansa Systems: "As speed and throughput increase, the price per megabyte will continue to drop. Looking at the investment needed for satellite and ATG infrastructures, there is a limit to what is possible. But the trend is clear: costs for airlines will go down.

"Connectivity providers have announced additional satellites, which will increase available bandwidths; there will not be a shortage, even with more than 14,000 connected aircraft due to be flying by 2020.

"Prices for connectivity equipment will also continue to go down, although new technologies [e.g. flat panel antennas] will be more expensive in the beginning.

"I predict prices increasing only if a massive supplier consolidation takes place, which would reduce overall capacity and the number of players in the market."

IFC GIVES A GOOD RETURN ON INVESTMENT

Jags Burhm, Eutelsat: "When considering equipping their fleets with IFC, airlines have serious concerns about its implementation, with regard to the installation of the antennas, terminals and internal connectivity; the fuel burn; the operational expenditure associated with the management of the connectivity service [billing, quality of service, site management]; and the cost of capacity. In fact most of these questions have very simple answers, revealing that IFC systems can easily produce a favorable return on investment."

CATALOG IFC WILL REDUCE COSTS

Craig Foster, Valour Consultancy: "The up-front capital costs and the ongoing operating costs associated with inflight connectivity will undoubtedly fall. The launch of more HTSs will continue to put downward pressure on capacity pricing, while by 2022 a number of IFC solutions are likely to be in the catalogs for a variety of airframes, meaning airlines will take less of a financial hit from STCs and aircraft downtime.

"Antenna drag and its impact on fuel burn will also be much less of an issue, as flat-panel antennas currently in development will have made their way to market."

WORLD CLASS ENGINEERING SOLUTIONS

WASP design, manufacture and qualify seat/suite control units and cabin lighting systems to the highest quality.

AS 9100 Rev C accredited

www.waspswitches.co.uk

WASP
SWITCHING PRODUCTS

Data rates and bandwidths

WHAT DO THE NEXT FIVE YEARS HAVE IN STORE FOR DATA RATES AND BANDWIDTHS?

RESELLERS TO BECOME OBSOLETE

Frederik van Essen, Inmarsat Aviation: "We are likely to see a real difference in terms of data rates and bandwidths by 2022, which will evolve in line with the inevitable increase in inflight connectivity use and support the demands of high-data applications.

"Capacity will be one of the main challenges and increasing bandwidth should also markedly improve the consistency of connectivity in the air. Technologies that can support airlines' capacity needs as connectivity becomes increasingly popular and redirect bandwidth quickly on short notice are likely to thrive. This is only feasible with a network ownership model and, as such, we expect satellite owners not just to overtake resellers in the coming years, but to render them obsolete.

"Equally, the solutions offering the greatest flexibility will prevail. Thus our offer includes reserved bandwidth in our network so that airlines can have the freedom to increase or decrease their capacity as the market shifts."

MANAGING BANDWIDTH CONSUMPTION IS KEY

Jags Burhm, Eutelsat: "Demand for capacity continues to grow and exceed projections. Managing bandwidth consumption of mobile devices is becoming a key part of service management for airlines.

"Broadcast content may become a mobility value-add area in the future as satellite providers build solutions that deliver enriched media direct to user devices. The emergence of these services should increase opportunities for mobility across all sectors.

"Operational data is expected to be one of the largest growth areas for IFEC services, with the market projected to be worth US$1bn for aircraft health monitoring and flight operations planning in the next 20 years. Major airlines are expecting an explosion of information, reaching half a terabyte of data per flight, generated from a growing number of sources – from employees and customers, to cargo containers and components."

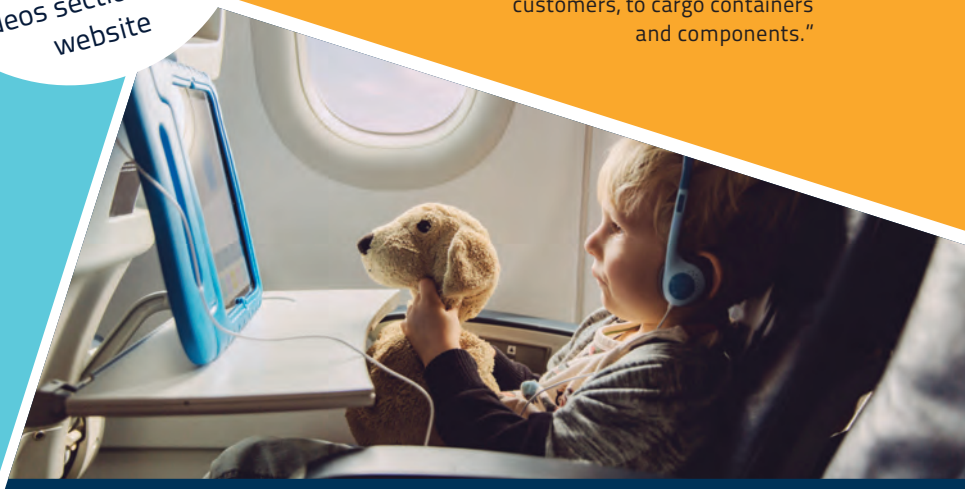
We conducted three exclusive video interviews with Inmarsat. You can watch them in the Videos section of our website

EXPERIENCE TRUMPS SPEED AND BANDWIDTH

Dominique El Bez, SITAOnAir: "As higher bandwidth becomes the norm, the conversation will naturally turn to the quality of the unique connected service for passengers, and how airlines can enlist this greater capacity to deliver a truly brand-defining, connected inflight experience.

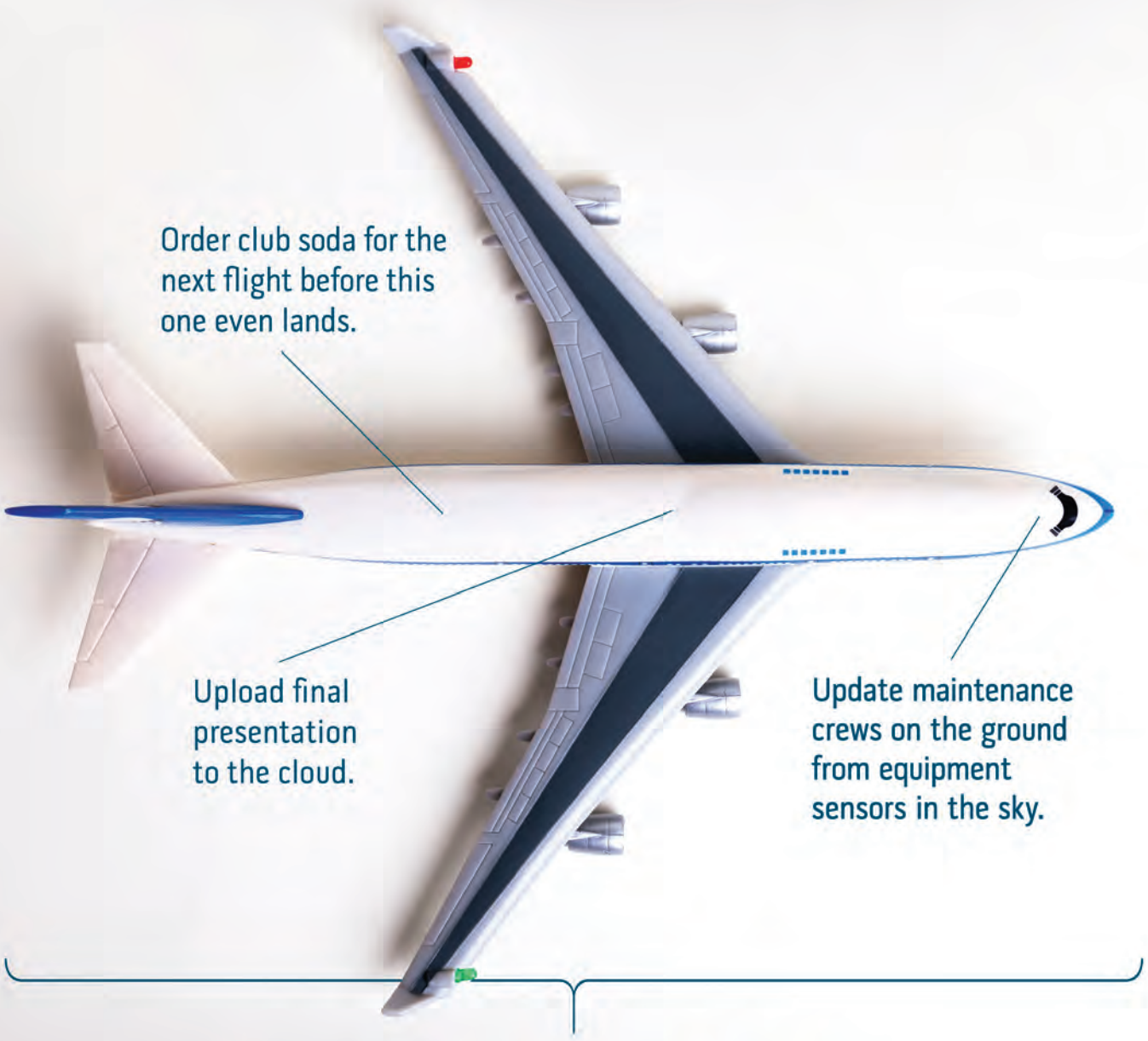
"Speed and bandwidth will become immaterial – what you do with it and the experience you're able to give your passengers will be the big question. For airlines this means being able to integrate inflight connectivity within their specific brands and digital experience. It won't matter whether an airline delivers 100Mbps over Ku or 800Kbps over SwiftBroadband – it will be about providing a unique connected experience for airlines and passengers.

"A number of airlines already understand this and are focusing on delivering a unified digital passenger experience across multiple satellite technologies and across their fleet."



HEALTHY COMPETITION

Jan-Peter Gaense, Lufthansa Systems: "Passengers' hunger for more data and bandwidth will continue to grow. Providers will do everything they can to keep a competitive advantage."



Now that's productive.

TRUE 4G LTE IS HERE.

And it's going to completely transform every aspect of how the aviation industry operates. SmartSky's proprietary beamforming technology enables nose-to-tail connectivity for unparalleled use of inflight apps and services that's 10x faster and has 20x the capacity of current industry standards—all at a cost that's lower than what you're paying now. **The future of IFC is here. And we'd like to bring you onboard.**

SMARTSKY NETWORKS®

VISIT SMARTSKYNETWORKS.COM OR CALL 800.660.9982

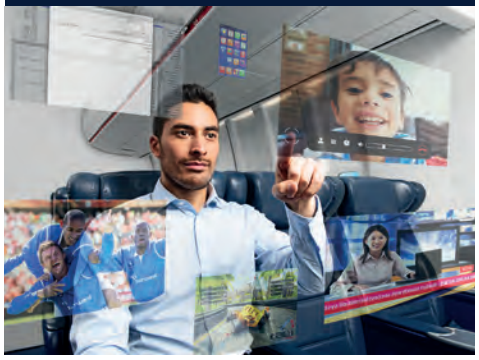
hardware

WHAT HARDWARE DEVELOPMENTS CAN WE EXPECT TO SEE IN THE SKIES – AND IN ORBIT – BY 2022?

330% IMPROVEMENT IN THROUGHPUT

Mark Rasmussen, Intelsat: "The introduction of powerful HTS satellites is being matched by the development of new flat-panel antenna technologies that, together with new modems, enable much more efficient and flexible use of the satellite spectrum without impacting an aircraft's aerodynamics.

"Tests with Intelsat EpicNG customers and ecosystem partners showed a 165% increase in spectral efficiency with traditional ground platforms and modem technologies and up to a 330% improvement in throughput when using next-generation antenna technology."



NEW WI-FI STANDARDS

Jan-Peter Gaense, Lufthansa Systems: "This is a very interesting topic. I predict the following trends: smaller antennas (flat panels), servers with more capacity and computing power to provide more services on board, the introduction of new wi-fi standards in the cabin, and more support for IoT devices and use cases."

LEGACY MODEMS ON THE WAY OUT

Craig Foster, Valour Consultancy: "While much of the talk in the IFC world has understandably focused on available bandwidth, there is now a growing appreciation of the need to remove so-called 'choke points' in the cabin. As an example, many legacy modems installed in the early days of this market are coming to the point where they cannot support the increased bandwidth that is now available and therefore need to be replaced.

"As a result, we are seeing the introduction of new modems that are being built to handle not only data delivered from today's satellite networks, but also from next-generation HTS systems and beyond. The same is true of next-generation antennas, server units and WAPs, all of which will enable airlines to make the very best of available bandwidth."

QUICK AND SMALL TO INSTALL

Frederik van Essen, Inmarsat Aviation: "Airlines look for ways to reduce costs and improve efficiency. Developing hardware to make it lighter and more powerful, while remaining easy to install to avoid aircraft being out of use for any substantial periods of time, will be key. We are already focusing on this, with hardware that enables airlines to use the European Aviation Network, comprising connectivity terminals that are quick to install, with low-drag antennas so small they can fit in a pocket.

"Equally, some of the other emerging antenna technology, particularly radomes incorporating multiple antennas, could play a major role in the future."

AIRLINES LOOKING AT OPTIONS

Jags Burhm, Eutelsat: "Some airlines have been flying with connectivity for almost 10 years now. Emirates, for example, started GSM in 2007. Airlines are typically in contracts on a five-to-seven year cycle. There are airlines that have all the hardware installed and may want to procure certain service components directly.

"Between 2017 and 2021, some airlines that are already connected may be looking at their options. They may continue with their installed hardware, or they could explore alternative procurement options to reduce their operational expenditure."

MOBILE GSM IS KEY

Dominique El Bez, SITAOnAir: "The inflight connectivity market needs to move toward an open platform approach with standardized hardware. IFC services should be provided consistently on all frequency bands across an open digital architecture. This will enable airlines to integrate any digital system and deliver consistent connectivity across satellite links and technology platforms, irrespective of fleet diversity and location.

"We envisage flat-panel combined Ku/Ka-band antennas becoming widely available by 2022, and more open ways to combine antennas with satellite airtime.

"Pure wi-fi will not be the single aircraft connectivity truth for the future – we are also convinced that mobile GSM connectivity on board is a differentiator. As the world of mobile 3/4/5G converges with wi-fi, operators who maintain strong capability in mobile services may well keep a competitive edge in the future."

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

50 years
1966 - 2016

POSITRONIC. THE SCIENCE OF CERTAINTY. / *www.connectpositronic.com/aii*

Positronic®

Aircraft interiors EXPO®
LONG BEACH
26-28 SEPTEMBER 2017
CALIFORNIA, USA

THE AIRLINE INDUSTRY'S LARGEST FALL EVENT FOR PASSENGER EXPERIENCE

Aircraft Interiors Expo, Long Beach is the only fall event dedicated to the cabin interiors industry. Showcasing a wide range of cabin interior products such as seating, galleys, lighting, lavatories, cabin management systems and passenger services, it is the perfect opportunity to conduct business and network with key industry decision makers from around the world.

REGISTER NOW!

26-28 SEPTEMBER 2017

Co-located with:

apex EXPO
APEX EXPO CONFERENCE
LONG BEACH, CA USA 25–28 SEPTEMBER 2017
Covering the Entire Passenger Experience

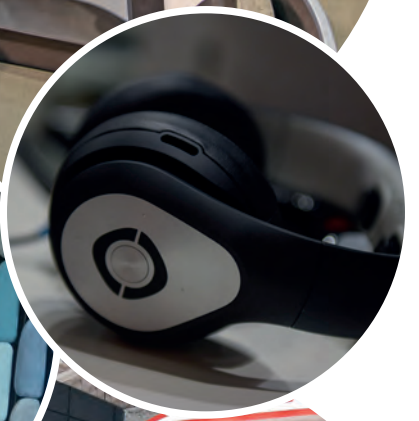
IFSA LONG BEACH
SEPTEMBER 25 - 27, 2017
CONFERENCE&EXPO

Organised by:

Reed Exhibitions®

WHY ATTEND?

- Connect, reconnect and network with airlines, key suppliers and industry experts from around the globe
- Keep up with trends within the market and discover new innovated products including: seating, galleys, lighting, cabin management systems and passenger services
- Co-located with APEX Expo and IFSA Conference and Expo enabling the entire supply chain and international airlines to experience the full spectrum of aircraft interiors products and passenger services on one level, in one location
- The 2nd largest global meeting point for the interiors industry



AIRLINES ALREADY REGISTERED TO ATTEND

AirAsia · AirPanama · Alitalia · American Airlines · DELTA · HAWAIIAN AIRLINES

JAL JAPAN AIRLINES · QANTAS · السعودية SAUDIA · THAI · UNITED · Virgin america

FREE to attend, register today!

www.aircraftinteriorsexpo-us.com/Aircraftinteriorsinternational

Aircraft interiors EXPO® LONG BEACH
26-28 SEPTEMBER 2017
CALIFORNIA, USA

AIRCRAFT INTERIORS EXPO *Americas 2017*

The American version of the world-renowned Aircraft Interiors Expo will bring together all aspects of the cabin. Here's a taste of what to expect at the event...

RIGHT: THE B737 VERSION OF ENCORE'S TOURIST CLASS SEAT

FAR RIGHT: OPTIMARES' MAXIMA MODEL, CUSTOMIZED FOR HAWAIIAN AIRLINES

STAND: 2023

More in store for EnCore

It has been an exciting year for LIFT by EnCore, which was recently awarded a seat program from SpiceJet, an LCC headquartered in India. This marks the third customer for LIFT's 737 Tourist Class Seat model, which is the first seat to be spatially, structurally, and aesthetically designed to complement the B737 Boeing Sky Interior, a result of LIFT's industry-first collaboration with Boeing.

At the Expo, LIFT will be displaying the production-ready Tourist Class Seat, which is available to be viewed by appointment only. Representatives from LIFT will also be available for discussions and a virtual reality demonstration of its newest product, the B787 Dreamliner Tourist Class Seat, which was debuted to much acclaim at this year's Hamburg expo, and is currently in development for Q1 2019.

STAND: 2209

TWO EXPERIENCES TO MAKE YOU FLY

Optimares will be presenting its two latest seating developments: the brand-new premium lay-flat Maxima model, based on Hawaiian Airlines' specific needs; and Quadra, a next-generation economy class seat with a highly effective recline system.

The company's exhibition stand has been conceived to enable visitors to see the products close-up and get a 360° virtual reality experience of Hawaiian Airlines' futuristic and distinctive, yet recognizable cabin.

STAND: 2001

Aviointeriors has created another model for its range of business class seating: Galileo, a high-density seat that offers a high level of passenger comfort. According to Aviointeriors, this seat represents the evolution of two previous projects (Giotto and Relax).

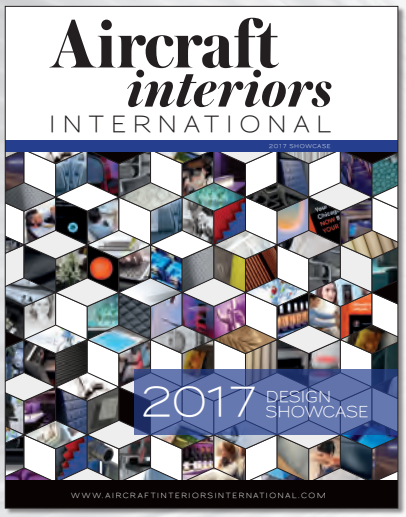
The fully flat, staggered seat has a minimum pitch of 48in, and is equipped with 18in IFE, generous space for amenities and generous bed dimensions.

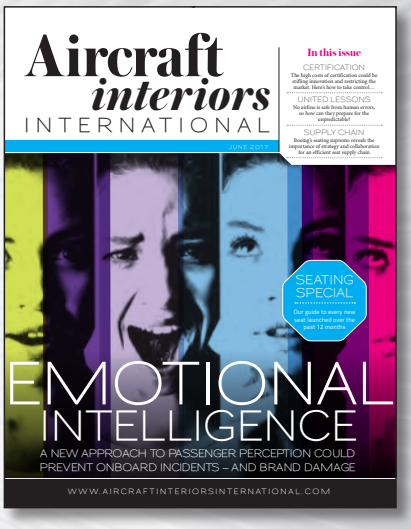
In other Aviointeriors news, the company is still working on Adagio, the business class seat it presented at April's Aircraft Interiors Expo in Hamburg, and is also working on the Adagio premium economy seat, which is intended to offer comparable comfort to business class.

GALILEO BUSINESS CLASS SEAT SET FOR LAUNCH

Aircraft interiors INTERNATIONAL

› All the latest news ‹
› Expert opinion ‹
› Exclusive features ‹
› Video gallery ‹
› Industry interviews ‹
› Recruitment section ‹
› Digital edition and magazine archive ‹





www.aircraftinteriorsinternational.com

STAND: 2017

BIG IDEAS FOR NARROW-BODIES

Turkish seat supplier TSI Aircraft Seats is expanding its product profile with Epinaka, a new narrow-body seat application, which will be certified on the A320 Neo and B737Max families of aircraft in the first quarter of 2018.

The seat has been developed to ensure the company is among the very best seat suppliers in the demanding narrow-body market, and most of the design work was completed in-house in TSI's new R&D center.

Can Sasmaz, general manager at TSI Aircraft Seats, says that being given permission by the Turkish government to open the R&D center is a big step forward for the company, which is looking to expand its portfolio of in-house developed products.

All the latest seat models are online in our June 2017 issue

STAND: 2215

SIMPLY RELAX

Usually positioned on the armrest almost alongside the body, the economy class seat recline mechanism can be difficult to find. Thus Acro Aircraft Seating wanted to create a more natural, easy- to-reach operation for its Series 6 seat and came up with the idea of positioning the recline mechanism at seat cushion level on the front of the seat frame.

The occupant need only push a slider forward at the same time as leaning back to achieve a comfortable recline. The location of the switch provides a maintenance advantage because it reduces the length of the cable running to the recline mechanism.

STAND: 2131

HAWK'S USA DEBUT

A first-time exhibitor at AIX Long Beach, Mirus will be showcasing the Hawk seating platform, a modular, next-generation economy class product. The Hawk can be configured for a range of purposes, from short-haul LCC through to long-haul FSC applications. The company will be exhibiting two examples of the Hawk seat: an entry-level fixed-recline variant and a plush, USB-equipped reclining seat.

Mirus' Formula 1 heritage (many of its staff are from this motorsport background) means that there is a focus on structural optimization and material technology in the seat designs, while its automotive experience ensures controlled high-volume, lean manufacturing.

cabin hardware

STAND: 2049

HIGH-DENSITY CABIN MOCK-UP

Diehl Aerosystems will have a particular focus on cabin interiors solutions for the Airbus A320 family of aircraft at the show, including the North American debut of a cabin mock-up. Dubbed the 'High-Density Solution', the mock-up will demonstrate a layout for the rear of the cabin, which has been jointly developed by Diehl Aerosystems and Lufthansa Technik.

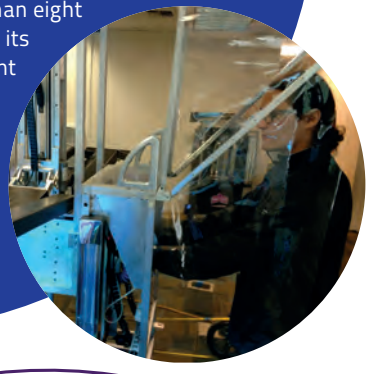
The design gains extra cabin space through the installation of double lavatories alongside the aft galley. This helps operators to maximize operating profit and fleet flexibility by enlarging their seat capacity, while reducing maintenance costs and weight, too.

STAND: 2132

Sanitize the cabin

GermFalcon will be demonstrating its turnkey solution for disinfecting aircraft interiors. Invented by a surgeon in Long Beach, GermFalcon is around the size of a galley cart and can be easily navigated through an airplane cabin, where it uses ultraviolet-C (UVC) light to instantly kill disease-causing pathogens on surfaces and in the surrounding air.

The GermFalcon is a fast, safe and convenient way to routinely disinfect commercial and private aircraft cabins, and is able to treat the surfaces of a B737 – including galleys and lavatories – in less than eight minutes. The company believes its product will also play an important role on the ground at airports in an outbreak of, for example, Ebola, SARS, or MERS.



Interested in cabin health? See our feature on air quality on p36

STAND: 2357

Ozone converter

BASF's Deoxo technology is claimed to be able to reduce both harmful ozone and volatile organic compounds (VOC) in aircraft cabin air. This technology improves air quality and enhances the passenger experience by removing certain hydrocarbon compounds responsible for unpleasant odors, such as jet fuel smells. The sources of these odors include lubricant leaks and on-ground maintenance activities. With more Deoxo ozone converters in the air today than any other brand, BASF is a proven OEM and MRO service provider.

STAND: 2353

DIAB AMERICAS EXPANDS FOAM-CORE CAPACITY

OEMs are under pressure to reduce costs and increase throughput in the production of new aircraft. Composites offer a great overall solution, but traditional honeycomb cores have drawbacks in terms of layup time and surface finishing. Selecting the right core material and using ready-made kits can save substantial time in production. With Diab's structural foam-core and kits, made from a combination of thermoforming and five-axis CNC machining, the company says that customers have made 10-30% savings in total costs, and also achieved weight savings.

According to Diab, foam-core offers greater design freedom than honeycomb, as machining and thermoforming complex shapes are possible. Foam-core also offers good thermal insulation, sound damping and no water absorption, ensuring that no edge filling is necessary.

Diab says that due to these properties, many business class seat producers have switched to foam-core, and to meet increasing demand, Diab Americas has recently installed new five- axis and three-axis CNC routers, and a new oven for thermoforming at its facilities in Texas.

Perfect comfort for passengers

Aircraft Seating

It's about the person not the seat

Need more space?

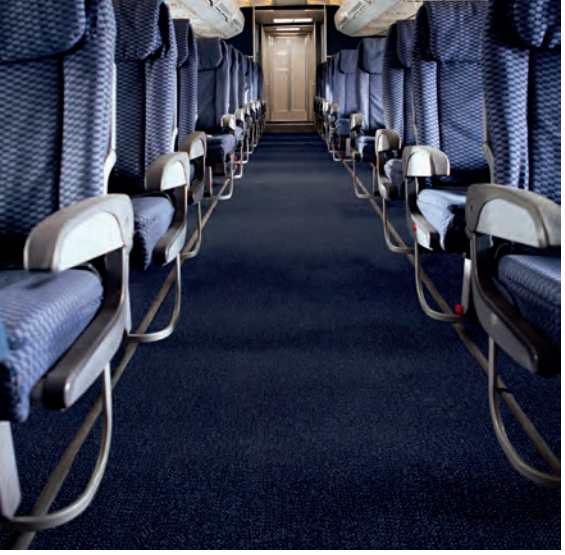
Come and see us on stand 2215

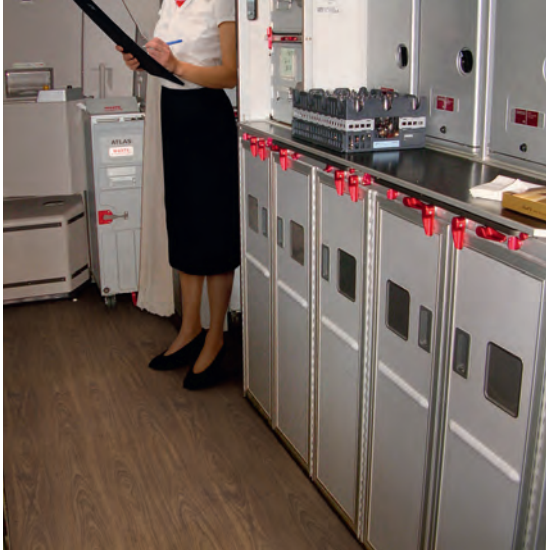
ACRO

Aircraft interiors EXPO® LONG BEACH
26-28 SEPTEMBER 2017
CALIFORNIA, USA

Come and see us on stand 2215

info@acro.aero www.acro.aero
T +44 1737 304700





Innovative
non textile
floor coverings

CHOOSE BATIFLEX

batiflexbygerflor.com - batiflex@gerflor.com

Gerflor®
theflooringgroup

INNOVATIVE CABIN MATERIALS…

STAND: 2319

Aircraft flooring collection

Lonseal has been providing the aviation industry with resilient vinyl flooring for more than 45 years, and visitors at Long Beach will be able to view the company's latest aircraft flooring collection, an assembly of its most popular products specifically geared for aircraft use.

Features of the collection include additional new colors, 6ft- and 8ft-wide roll availability, low VOCs and REACH compliance. All product lines in the collections meet FAR 25.853a and FAR 25.793, while the Loncoin II Featherweight line meets Boeing D643A504.

The Featherweight formulation is claimed to be more than 30% lighter than standard NTF aircraft products, which, combined with a high strength-to-weight ratio, means it is often specified by aircraft designers and OEMs. Lonseal's distinctive selection of embossed and smooth designs comes in four collections: Axis, Cirrus, Halo and Mirage.

STAND: 2010

Recyclable, modular carpet

Order a roll of carpet, cut it, serge it, deal with shrinking, fraying, stains and poorly fit pieces, and then replace it constantly. For decades, airlines have been handling their carpet programs the same way, with the same results. Everything in the aircraft cabin has experienced exponential innovation except the carpet – until now.

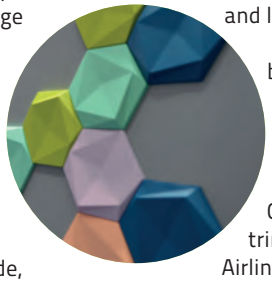
SkyPaxxx's modular Sky-Tiles need no serging, are delivered cut and ready to install, allow for selective replacement, guarantee against fraying and shrinking, are 100% recyclable, and last a claimed two-to-three times longer than any other carpet.

STAND: 2320

Innovative thermoplastics

Boltaron will be promoting the use of aircraft-rated thermoplastic sheet products not only to meet FAR performance requirements, but also as a design element for components.

On display will be a range of color, pattern, metallic, and translucent sheet samples guests can see, touch and keep for creative inspiration. Boltaron's new standard and custom textures, including leather, haircell, carbon fiber, felt and suede, bring versatility and dimension to typical aerospace components such as seatbacks, tray tables and class dividers.



Visitors to the Boltaron stand can also stop and watch a visual demonstration of how Boltaron products meet a wide range of performance and cost requirements while exceeding fire standards for impact resistances, low smoke and low heat release.

Additionally on display will be Boltaron's FAR-rated Translucent Decorative Material Collection, shortlisted along with PriestmanGoode in the 2017 Crystal Cabin Awards for its trim and finish features on United Airlines' Polaris. New developments utilizing Boltaron's press-laminating capabilities offer unique possibilities for designers to enhance their clients' branding throughout the aircraft interior's aesthetic design.

The November issue of Aircraft Interiors International will include a focus on trim and finish

cabin hardware

MORE HIGHLIGHTS AT LONG BEACH…

Meet the Aircraft Interiors International team at Stand 2347

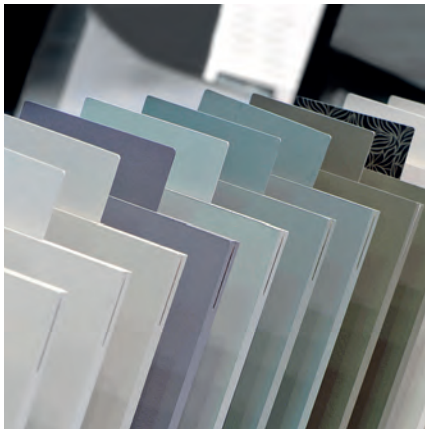
STAND: 2007

It all starts with color

Sekisui Polymer Innovations, manufacturer of Kydex Thermoplastics, invites attendees to experience what a master supplier can deliver: world-class design balanced with an ability to create high-performance materials.

The stand will highlight how small color shifts within the same hue can influence passengers' perception of space. Texture will also be featured to inspire reflection: for example, 'How is the experience of the same material different if it's in the same color, with a different texture?' and, 'How might this be used in design to create personalized passenger experiences?'

Also on exhibit will be the company's proprietary Infused Imaging Technology, which won a 2016 Crystal Cabin Award. With Infused Imaging, design becomes integral to Kydex thermoplastic sheet, while maintaining regulatory compliance – all without the compromise of capped solutions.



STAND: 2005

VIP comfort for all classes

Economy class passengers on board Swiss's B777 fleet have been enjoying the comfort of Supracor's Stimulite honeycomb cushions since the aircraft began flying in 2016. Coming soon with the airline's A340 retrofits, more of the airline's passengers will be able to experience Stimulite comfort, as it has been selected for cushions in economy, economy plus and first class.

Comprised of a lightweight cellular matrix that contours to body shape, Stimulite cushions are ventilated to control heat and moisture. The flexing of honeycomb cells stimulates blood flow and promotes relaxation. Unlike traditional foam cushions, Stimulite cushions are washable, so if a passenger's coffee spills, the cushion can be removed, washed and put back into service. Made from highly resilient thermoplastics produced by partner BASF, Stimulite cushions are durable and completely recyclable, giving some VIP comfort to our planet.

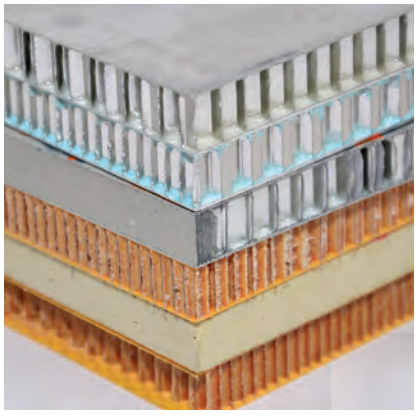
STAND: 2016

New-generation low-density edge fills

Aerospace edge-fills are low-density syntactic foams that can be used to fill gaps between panels in aircraft interiors. To achieve low-density, foam products tend to have the consistency of mud or dough, which has made mixing and applying two-part systems a manual and difficult process.

However, Ellsworth has developed composite materials that can be used as edge-fills. The composite is a 'syntactic' foam, whereby a polymer matrix is filled with hollow particles. The polymer matrix is composed of a high-performance adhesive or sealant, with microbubbles to reduce density of the composite.

"Aerospace designs require low-density, high-strength, performance materials. Aircraft interiors are often made from a combination of low-density honeycomb, foam and composite materials," explains Bonnie J Ludwig, ResinLab product development manager at Ellsworth. "Honeycomb materials are used for cabin walls and other large structures. Foams are used for seating and soundproofing. Composite materials are used as adhesives and sealants."



Touch the Future™

Come by and visit Tapis booth #2022 at AIX Long Beach.

TAPIS
IN EVERYTHING THAT FLIES

www.tapiscorp.com

Uf
Ultrafabrics®

www.ultrafabricsllc.com

The latest and next-generation railcar and mass-transit design, materials and technology showcase!

BOOK YOUR EXHIBITION SPACE NOW!

damien.deroche@ukimediaevents.com

COULD YOUR PRODUCT BE THE **NEXT BIG THING** IN THE RAIL INDUSTRY?

CZECH REPUBLIC

PRAGUE

Railway interiors EXPO 2017

14-15 NOVEMBER 2017

PRAGUE, CZECH REPUBLIC

www.railwayinteriors-expo.com

STAND: 2037

Your virtual business card for Long Beach

First-time exhibitor Avipeo will be introducing visitors to what it claims is the first social network for the aviation community. Users can download a free app and then create their own profile and present their skills and expertise to the Avipeo community – currently more than 2,000 users.

In addition to a news stream of aviation stories, the app offers user groups on various topic areas. The user-optimized search function enables users to find the right business contacts, companies or detailed information. Download the app ahead of the Expo, and using the GPS-based 'Nearby' function, users can easily connect with other users at the show.

STAND: 2036

EXPEDITED FLAMMABILITY TESTING

Aerospace manufacturers can run hundreds of quality control tests per month, which in addition to becoming expensive, adds pressure to lead times when products are waiting to ship. Current industry lead times for flammability testing typically range from three to five days, which includes the mandatory 24-hour conditioning prior to testing. Factoring in the transport time of shipping samples, results may take over a week to arrive.

Independent testing lab Aeroblaze Laboratory hopes to expedite this process with a new flammability testing service that provides expedited testing for quality control, offering turnarounds of less than two days, and reduced rates.

STAND: 2229

Aeromexico adds a little Italian style

Aeromexico has become the first airline to carry amenities by Boggi, the famous Italian fashion brand. The kits have been introduced on board through an exclusive deal with Formia, and feature iconic pinstripe fabrics, reminiscent of Boggi's stylish and refined suits.

As well as a selection of comfort items, the bags contain cosmetics from the luxury Parisian Institut Karité skincare brand.

STAND: 2128

VARTAN EXPANDS AIRCRAFT SUPPORT

The Vartan Aviation Group is set to open its first American repair, modification and overhaul station in Seattle, with a planned open date of October 2017. The facility will be certified according to part 145 FAA and offer support for overhaul and modifications of aircraft interior components and equipment such as galleys, lavatories, seats, panels and linings. A test bench and other repair capabilities for galley inserts, for instance ovens and coffee makers, will also be available at the station.

Vartan now offers on-site support for Bombardier aircraft in Toronto, Canada. The new location has enabled it to expand availability and flexibility for North America customers.

cabin materials

STAND: 2022

Engineered upholstery

The Expo runs alongside APEX Expo: see p130 for a preview

Forty years since establishing their collaboration, Tapis and Ultrafabrics are still striving to lead the aviation industry in the innovation, design and customization of engineered upholstery materials. In-house design expertise and customization capabilities create a unique opportunity to work with airlines and seat manufacturers worldwide to develop solutions that address all aircraft seating needs.

For example, the Ultraleather Promessa upholstery by Ultrafabrics offers durability and performance while delivering a comfortable seating experience. Promessa has been selected by airlines and seat manufacturers worldwide and was recently selected for the new Boeing 737 tourist class seat by LIFT (which you can try out for yourself on Stand 2023).

Another innovative upholstery technology, Ultratech, takes customization to new heights as it features a proprietary molecular structure and exclusive pigment systems that combine to deliver uniquely refined matte finishes. Airline passengers will get a futuristic level of tactile appeal and softness.

RIGHT: E-LEATHER'S NICO DEN OUDEN STRESSES THAT THE COMPANY'S PRODUCT IS UNIQUE IN THE MARKET

STAND: 2230

10 years of flying high

E-Leather will be celebrating 10 years of working in aviation at Aircraft Interiors Long Beach. Since shipping its first order to Thomas Cook in 2007, the business has succeeding in becoming a market leader in supplying high-performance leather fiber composites to some of the world's largest airlines.

Nico den Ouden, sales and marketing director at E-Leather, states, "We are extremely proud of what we have achieved over the past 10 years, creating an entirely new category in the seating material market, which has been widely adopted by a large number of airlines globally."

Many of the leading North American airlines are among the list of E-leather adopters, which den Ouden believes comes down to three key things: "Building strong partnerships with the industry's leading seating and cut-and-sew suppliers, together with our product's proven performance in service and the passion of our growing team."

Aircraft Interiors International

FREE APP

now available!

Available on the App Store

ANDROID APP ON Google play

DOWNLOAD NOW!

> Read anywhere, **without wi-fi!**

> Receive the latest issue weeks before the hard copy is available

PLUS

The latest news & Free Magazine archive

Disruptive thinking will change how air passengers travel

AS APEX CELEBRATES ITS 40TH ANNIVERSARY, CEO JOE LEADER SHARES HIS THOUGHTS ON THE DIRECTION OF THE ORGANIZATION – AND THE PASSENGER EXPERIENCE

Interviewed by Adam Gavine

The best in-flight sound ...just got better

Increase headphone performance by combining with Phitek connectors.

Magnetic connectors will also significantly increase the life of the jack and eliminate pin breakage.

Certified System
SAI GLOBAL
AS9100
Aerospace

EASA
European Aviation Safety Agency
EASA.2IG.0053 approved

To discover more, visit us at **APEX Expo Stand 941,** or email **info@phitek.com**
phitek.com

PHITEK™

"Airlines need to be bolder with their economy class aircraft interiors innovations"

Some 40 years ago, APEX (the Airline Passenger EXperience Association) was established as a non-profit global organization with the goal of improving the air travel experience. The initial focus was on in-flight entertainment (IFE), but over the years, the scope of APEX's work has expanded to cover all portions of the passenger experience, all the way from making the first flight search online, to arriving at the destination. With such a wide remit in a fast-paced and dynamic industry, let's see what APEX CEO Joe Leader thinks of the airline world…

WHICH ASPECTS OF THE INFLIGHT EXPERIENCE DO YOU FEEL ARE THE WEAKEST?

Airlines need to be bolder with their economy class interiors innovations. There are genius designs available for airlines that want to think outside the box, providing economy passengers with alternative configurations, two-level armrests, and spacial innovations.

WHICH PARTS OF THE EXPERIENCE DO YOU FEEL ARE DEVELOPING MOST STRONGLY?

International business class has advanced faster in the past few years than I thought possible. We have moved beyond lie-flat seats, to a new era of business class privacy

ABOUT JOE

Joe Leader was appointed as CEO of APEX in September 2015, following a four-month search process involving more than 600 high-profile applicants, who were screened and interviewed via the Marlborough aviation executive search group.

Prior to joining APEX, Leader served in executive roles at aviation and technology companies for more than two decades. He worked as the president of an international aviation association, led the advancement of aviation booking technology expansion at a multibillion-dollar GDS company, and served in the international leadership of advanced technology companies. With a passion for education, Leader's business PhD dissertation research focused upon accelerating the passenger adoption of new aviation technology.

"I came forward to the board with a plan to advance APEX as a beacon to the industry working in partnership with others," Leader explains. "Commercial airline experience triggered me to jump from high-tech to aviation nearly a decade ago. I advised the CEO and head of marketing of one of the major airlines in the US on passenger experience and loyalty, and that interaction inspired me to affect a much broader world, as afforded by APEX's incredible community."

After two years in the role, what does Leader see as his achievements at APEX so far – and what does he still hope to achieve?

"APEX has grown to be known as the global airline association for passenger experience, with our partnerships providing a much broader stage for our incredible airline and supplier membership base. Now that we are known, we are growing from having every major airline in the world as members, to having *every* airline in the world as members."

So what does Leader like to do in his spare time? "My favorite hobbies are travel with my family, adventure and photography. I went on a five-day African safari with my wife and nine-year-old daughter this summer and that checked all the boxes."

And as a well-traveled character, what is Leader's favorite travel destination? "Sydney, Australia is my favorite travel destination in the world and where I spent Christmas and New Year's with my family last year. Being even-handed, I am proud to say our journey included Delta, JetStar, Qantas and Virgin Australia flights. I work hard to make certain that I sample every airline possible, even in personal travel, to get the fullest taste of the airline passenger experience."

FREE SERVICE!

LEARN MORE ABOUT OUR ADVERTISERS **NOW!**

Visit **www.ukimediaevents.com/info/aim** to request exclusive and rapid information about the latest technologies and services featured in this issue

Aircraft interiors INTERNATIONAL

www.ukimediaevents.com/info/aim

in a world of luxury. Advancements like these give high-end travelers a sense of enjoying a private jet experience.

WHAT ASPECTS ARE MOST LIKELY TO BE AFFECTED BY DISRUPTIVE THINKING?

Disruptive thinking will change how air passengers travel. First, forget the electronic boarding pass and ID check as you know it. The biometric algorithm of your face will become the boarding pass of the future. The Internet of Things will track your preferences and items so that the world revolves more individualistically around you.

WHAT WILL BE THE NEXT BIG PASSENGER EXPERIENCE STORIES?

Over the next five years, the stories will revolve around connected technology driving greater personalization. Advances will continue around aircraft interiors, but some of the most exciting steps forward will come from the amount of connected technology that may improve the air travel experience at every step of the journey.

LEADER ADMIRES DELTA'S COMMITMENT TO THE PASSENGER EXPERIENCE IN EVERY CLASS. HOWEVER, FOR BUSINESS CLASS, THE AIRLINE HAS REALLY GONE A STEP BEYOND WITH ITS DELTA ONE SUITES

APART FROM IFEC, IS THE PASSENGER EXPERIENCE IMPROVING IN ECONOMY CLASS?

The economy class passenger has more choices and perks than ever, at lower prices. For the most part, major carriers have kept seat distance constant for the past 20 years, and are using better seating materials. A round-trip 14-day advance ticket purchase, from the East Coast USA to Florida, was US$198 20 years ago, or US$301 in today's money. That same 14-day advance round-trip costs US$100 today on an ultra-low-cost carrier with less legroom, US$168 on major carriers for the same legroom as the past, and US$208 in premium economy with more legroom and more amenities. Yes, we are charged for checked bags now, but that still costs in total less than the inflation-adjusted cost for a coach airline ticket.

TOO CONNECTED?

There is a lot of talk of passengers' individual tastes being monitored and anticipated, an idea being further enabled by Internet of Things applications. But do passengers really want so much connectivity? For many, a flight is a rare opportunity to unplug from the world for a few hours.

"For passengers that want to unplug, that will always be possible. Those are the same people that bring a book to the beach rather than their smartphone. The Internet of Things and personalized experiences will enable passengers that want to engage with the digital world to find it intermingled with their physical world.

"The phrase that I would use instead of 'augmented reality' would be 'connected reality', where your digitally connected world finds a place in the passenger experience touches around you."

LEADER FINDS INSPIRATION IN EVERYTHING FROM TWO-LEVEL ARMRESTS SUCH AS THIS CONCEPT BY PAPERCLIP DESIGN, SOUTHWEST'S HEARTFELT APPROACH, AND DELTA'S NEWEST PASSENGER EXPERIENCE TECHNOLOGIES

WHAT FEATURE WOULD YOU MOST LIKE TO SEE ENTER THE ONBOARD PASSENGER ENVIRONMENT?

I would like to see passenger messaging systems widely integrated into inflight interactions. For example, most passengers do not like pressing the flight attendant call button. It's so much nicer to text that you would like a drink or a blanket. In that way, when the flight crew has the opportunity, they can take care of passengers in a single action. Airlines need to think about how they integrate seamlessly with the way that passengers do things.

WHAT'S NEXT FOR THE IFEC SECTOR?

As storage and connectivity become less expensive, the selection of entertainment will grow exponentially for passengers. Combining this wide array of content with stored passenger preferences will enable a feature whereby movies that match passengers' individual tastes are suggested.

"Airlines need to think about how they integrate seamlessly with the way that passengers do things"

WHICH AIRLINES DO YOU MOST ADMIRE?

I point to Delta and JetBlue as US airlines that relentlessly provide great passenger experience touches in every class of service. I admire Emirates, Etihad, Qatar, Singapore and Turkish for raising the bar for the passenger experience worldwide. I find inspiration from airlines such as Finnair and Air New Zealand for showing that size does not mean compromising the passenger experience. I smile upon Aer Lingus and Air Canada for demonstrating that an airline may concurrently defend against low-cost carriers while building its business class brand and routes. Finally, I admire airlines like Southwest that prove that the passenger experience starts with simple heart and values of front-line employees in delivering a consistent passenger experience.

WHICH AIRLINES STILL HAVE WORK TO DO?

I believe that American and United are both going through a metamorphosis to raise the bar in terms of consistency in their passenger experiences. British Airways, with its cost cutbacks in the passenger experience, must clearly define the global airline that it wishes to become as it transforms.

Wireless

Bluebox Wow

Portable wireless streaming – lightweight, scalable, battery-powered, no mandatory STC.

Bluebox wIFE

Fitted wireless streaming – 1,000's of hours of IFE content to passenger devices.

bluebox

Bluebox Ai

Standalone portable IFE – optimised & approved for delivering pre-loaded EWC on iPads.

Bluebox Hybrid

Connected portable IFE – provides secure EWC in a wireless cabin, minimises wireless network traffic.

Portable

Looking for an IFE solution that is fast and cost effective to deploy?

Portable IFE solutions – Bluebox Ai and Bluebox Hybrid – provide airlines all the benefits of IFE on the latest off-the-shelf technology. Approved for pre-loaded early window content, they also deliver a range of other video, audio, reading and gaming content to passengers. Bluebox Hybrid connects to additional content and services available on wireless streaming systems.

Wireless IFE systems – Bluebox wIFE and Bluebox Wow – offer fitted and portable wireless options for streaming IFE content to both passenger and airline-owned devices.

If you're looking for options – for delivering IFE, replacing obsolete IFE systems, providing service recovery, delivering accessibility services, generating ancillary revenue – contact us to discuss how a Bluebox solution can work for you.

bluebox

Contact us to discuss your portable & wireless IFE requirements.
blueboxaviation.com info@blueboxaviation.com

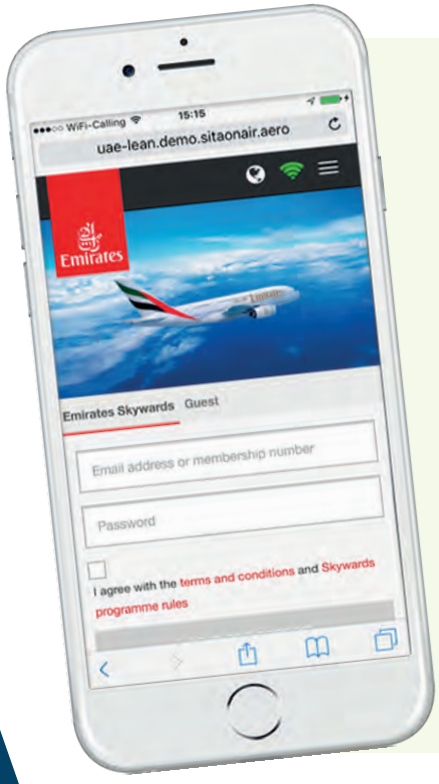
Visit us at Booth #1133
apex EXPO
LONG BEACH, CALIFORNIA
25-28 SEPTEMBER 2017

apex EXPO

LONG BEACH, CA, USA
SEPTEMBER 25-28, 2017

APEX EXPO 2017

More than 3,000 aviation professionals, including nearly 100 airlines and 300 suppliers are preparing to head to Long Beach, California. Here's why...



STAND: 429

E-COMMERCE FOR EMIRATES

When Emirates wanted to create an exclusive inflight e-commerce passenger experience, it decided to call upon SITAOnAir's digital aviation harmonization expertise.

SITAOnAir's digital specialists have designed and deployed Emirates' inflight Internet OnAir connectivity portal, an onboard technology harmonized with Skywards, the airline's frequent-flier program.

The result is that passengers can now log into their unique portal as they fly, enabling Emirates to further personalize the passenger experience. SITAOnAir has worked in close partnership with Emirates every step of the way to deploying this digital capability across its entire fleet. By enabling passengers to connect in real time to their personal portal, those passengers will benefit from a seamless digital experience throughout their journey, while enabling the airline to advance its customer relationship management capabilities to build and reward passenger loyalty.

STAND: 1228

INTERACTIVE BIRDVIEW

As usual, PXCom's team will come to the exhibition with its luggage full of innovations – as well as the APEX Cool Award it won in 2016 for its inflight advertising technologies.

Perhaps it will win another with PXVision, the company's latest idea, which is the first ever 360° interactive video player dedicated to IFE, aimed at streaming either a live external view or pre-loaded touristic 360° videos. PXVision is designed to elevate the passenger experience, as well as to generate ancillary revenues.

PXCom will also be showing its XPlore digital content management system, which has been extended to include editorial content, enabling full dynamic management of the digital inflight experience.

AirSAS, which PXCom says is the only inflight digital ad-serving solution that does not require any connectivity, has also been improved with new features designed to better meet digital marketers' expectations. Co-developed with inflight media sales agency, IMM Digital, AirSAS is now live with its first airline customers.

STAND: 327

Next-generation CWAP

According to Telefonix PDT, wireless access points (WAP) set the overall speed and reliability for inflight connectivity systems. The company's CabinACe-2 cabin WAP (CWAP) is said to be the only certified CWAP that is ARINC 628 compliant and features 802.11ac Wave 2 wi-fi technology. By being the first to certify a Wave 2 multigig wi-fi CWAP, Telefonix PDT says it is free of connectivity bottlenecks.

The Wave 2 CWAP enables fast uploads and downloads and smart load balancing to optimize streaming, and supports devices utilizing multiuser, multi-input, multi-output (MU-MIMO) technology. The CWAP offers good bandwidth delivery to the cabin, while maintaining a small form factor and low power consumption. Initial trials of Wave 2 CWAP are underway, with installations planned for later this year.

STAND: 553, 757

Broadband boom

Inmarsat has been on a roll since announcing the launch of GX Aviation, its next-generation inflight broadband solution, at APEX Expo 2016. GX Aviation entered commercial service in May with launch customer Lufthansa Group, and has also been selected by leading airlines including Qatar Airways, Avianca and AirAsia Group.

Inmarsat is investing in developing the network to meet future demand, with recent developments including the launch of a fourth satellite in May and signing a US$130m contract in June for an additional satellite scheduled for launch in 2019.

Leo Mondale, president of Inmarsat Aviation said, "APEX Expo 2016 marked a significant milestone for Inmarsat Aviation with the GX Aviation launch. The momentum has continued ever since, with positive feedback from Lufthansa Group passengers and staff, and a growing number of market-leading airlines choosing the service. "At APEX Expo 2017, we look forward to showcasing GX Aviation alongside our other next-generation services: the European Aviation Network, Jet ConneX and SwiftBroadband-Safety."

STAND: 453

CONNECTIVITY LIGHT

Passengers increasingly expect ground-like experiences on board aircraft. Above all, they want to stay connected. With Connectivity Light, Lufthansa Systems has created a new connectivity feature for its BoardConnect Portable system, which enables text and email messaging, and other use cases such as online payment or personalization.

Connectivity Light utilizes existing connectivity solutions and makes those available for passenger use. It is perfect for airlines that lack a business case for broadband satellite connectivity, such as regional airlines or LCCs.

BoardConnect Portable with Connectvity Light does not require an STC and is suitable for use on leased aircraft that have to be returned unmodified.

As part of the BoardConnect product suite, BoardConnect Portable – with or without Connectivity Light – can be updated at any time to the fixed installed wireless IFE or IFEC solution.

The BoardConnect digital platform can support the digitization of the entire aircraft. With the possibility of application hosting and a set of APIs and interfaces, BoardConnect enables airlines to include any service they like in their digital platform, enabling them to provide individual services for their passengers, and to increase ancillary revenues.

APEX CEO Joe Leader shares his views on p120

STAND: 1215

Natural feeling

Mills Textiles has developed a sensory comfort range of products intended to help promote a sense of relaxation and refreshment. These products can be filled with natural grain such as wheat, or cherry stones, and infused with an aromatherapy scent, which is tailored to help sleep or waking up. The products can also be branded or themed, depending on airline requirements.

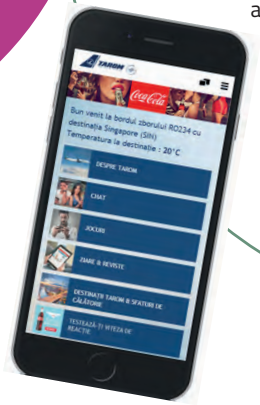
STAND: 420

CAPTIVE AD AUDIENCES

Long Beach visitors can see the launch of what is said to be the first onboard ad server. The technology – named AirSAS and developed by IMM Digital – can be paired with any wi-fi boxes or portable wireless IFE solutions. Coca-Cola and Le Moulin Rouge are the first advertisers to sign up to AirSAS in order to reach target audiences.

The click-through rate (CTR) is very high at 3.76%, and the technology and ad server enable advertisers to communicate on wi-fi portals and offline mobile apps in the aircraft cabin on passengers' personal devices, while targeting the passengers' nationality, age, gender and routes. By doing so, advertisers are able to reach the right audience at their most receptive moments, as aircraft cabins provide a captive environment.

The AirSAS ad server also provides real-time statistic with volumes of banners impressions and CTR, updated with every take-off and landing.



Live | Highlights | Programming

Exclusive coverage

For more information, please contact
oliver.huson@img.com or kate.garden@img.com

IMG

MORE HIGHLIGHTS AT LONG BEACH…

STAND: 948

Power play

A rapid increase in wireless IFE systems and the growing demand to power PEDs, point-of-service credit card readers and other electronics, has left airlines in need of reliable USB and wall-outlet power.

True Blue Power's line of FAA- and EASA-certified inverters, converters and USB charging ports delivers all of the needed power in small, economical, easy-to-install packages. Typically installed as a minor alteration, the True Blue Power range already provides uninterrupted power to the passengers and crew of more than 50 airlines worldwide.

The TI250 Series DC-to-AC Inverter is ideal for electronic flight bags and the power-hungry electronics found in the cockpit, and one TC280 AC-to-DC converter delivers enough energy to power 18 single-port or nine dual-port USB chargers. The sealed USB units offer water-resistant protection against spills and surface-cleaning solutions.

What will the next generation of connectivity technology bring? Find out on p94

STAND: 846

A virtual trip to Tokyo

If you are interested in Japan, '#Tokyo' is a must-see program. The program – created by NHK G-media – brings the latest sightseeing information from Tokyo by utilizing social media posts and review websites. This unique approach, which reflects the web generation, depicts first-hand information from tourists.

Viewers can see Tokyo's city views from observation decks, cherry blossoms, great ways to enjoy green tea, and more. A segment featuring Haneda Airport, which was rated as the world's cleanest airport by Skytrax, gained almost 800,000 views on Facebook in just one month! The program reveals the secrets of the airport's success.

#Tokyo is mainly composed of photos shot from a tourist's point of view, helping people considering a visit to Japan to research their trip in advance – including sightseeing and practical information – using a virtual tour. With the Tokyo 2020 Summer Olympics coming up, NHK G-media also carries a large selection of NHK news and documentary programs that are perfect for foreign visitors.

STAND: 1229

Smart apps for a smart sky

At last year's event, SmartSky unveiled its Select program, and challenged the industry to develop new apps and services optimized for its bidirectional high performance, low-latency network.

However, SmartSky realized there was still something missing and has worked to develop that missing piece: the Skytelligence technology framework.

Skytelligence gathers feeds from an array of real-time sources including air traffic, weather and airspace status, and then simple API hooks allow them to be used to power the applications the IFE industry is developing for the aviation world of tomorrow.

Simply put, Skytelligence empowers app development for aviation by consolidating multiple data sources. It enables access to patented methods and systems for airspace modeling, flight path trajectory management, proprietary data libraries, and more. Skytelligence is an open framework that uses APIs to allow innovations to be applied to any aviation communications network.

ZODIAC INFLIGHT INNOVATIONS

ZODIAC AEROSYSTEMS
Connected Cabin Division

ZODIAC AEROSPACE

STAND: 1041

Collaborate to innovate

Visit Latecoere's stand to help them celebrate 100 years of activities, as well as to see the company's new approach to onboard video systems, which is based on addressing end-to-end user expectations for video systems services.

Current airborne video systems, as installed on board many civilian aircraft, are very much segmented per end-user destination and have difficulty in catching up with the latest technologies.

Nowadays, digital technologies enrich the end-user expectation for added value services. They are already available on the consumer market and are included in Latecoere's three main offers for vision systems, comprising entertainment, safety and assistance to aircraft operations.

This trend is to incorporate those technologies within most of the usual operations and practices. This is considered as the most intense field of innovation and exploration for Latecoere in developing its Latvision system.

Thanks to partnerships with expert startup companies, the company aims to boost the time-to-market of these innovations for the aerospace industry. Evidence of the benefits of this approach will be presented at APEX Expo, including interactive software applications for HD landscapes, a new 360° camera concept and applications, broadcast capabilities and responsiveness, and situational awareness advance solutions.

Visit Stand 2347 at the neighboring AIX to meet the Aircraft Interiors International team

STAND: 157

Try Saudia's earbuds

Linstol, a provider of headsets and earbuds for the airline industry, will be displaying its enhanced PE-95 premium earbuds, customized for Saudia's economy class. Designed as a special gift for Saudia's guests, the earbuds offer sound quality and performance that matches earbuds available in the retail market, yet designed specifically for an airline cabin environment. A bespoke logo print and color scheme completes this unique offering.

Linstol's design team and audio engineers designed the PE-95 model to surpass standard earbuds with precise angles that allow sound to be transmitted deep into the external auditory canal. The resulting benefits are a clear sound and reduction of engine noise. To enhance comfort, Linstol introduced softer silicon earpieces and a flat speaker housing. Passengers can wear the earbud for extended periods, even while sleeping.

Saudia's earbuds are gifted to passengers in sleek multicolor foil pouches designed to complement Saudia's marketing materials, with packaging artwork that is updated regularly.

A bespoke H-Type adaptor is included with the earbuds. This adaptor, made only for Saudia, facilitates ease of use with single- and dual-pin IFE systems and enables passengers to enjoy the earbuds post-flight.

ASTRONICS
ARMSTRONG AEROSPACE

1437 Harmony CT
Itasca, IL 60143 USA
Email : Armstronginfo@astronics.com
Phone : +1.630.285.0200

*"Installing **Passenger Power Systems** has never been easier."*

OFF SEAT
POWER SOLUTIONS

POWER BAR®

No Seat Modification

Is completely separate from the seat and meets all FAA requirements.
Installs directly to the seat tracks with no contact with the seat leg.

Low Weight

Has dynamic load requirements of only 9G, not 16G.
Has no conflict with the dynamic deformations/deflections of the seats.
Weighs less than five pounds per seat group.

Universal Solution

Is Airbus and Boeing compatible.
Takes typically less than 12 hours for a narrow body installation.
Reduce Product time to Market.

Visit us at the 2017 Apex Expo, booth 441.

CELEBRATING
30 YEARS
OF DESIGN AND
INNOVATION

PERFECT RICE
PERFECT CONGEE
PERFECT HAPPINESS

A bespoke product
in a mass market world

AEROLUX LTD

AEROLUX LTD, Chorley Road, Blackpool, Lancashire, FY3 7XQ, England
Tel: +44 1253 396670 • Fax: +44 1253 300074 • Email: sales@aerolux.co.uk • www.aerolux.co.uk

PERFECT RICE

If rice or congee is on your first class menu, you need to ensure it is easy to prepare freshly and perfectly. The answer is an Aerolux rice cooker

The rice cooker has always been one of Aerolux's most popular items. Ever since it first became available some 20 years ago, it has been delivering perfectly cooked rice and congee to first class passengers, and providing Aerolux with a constant stream of happy airline customers, including Cathay Pacific, China Airlines, China East and Lufthansa, as well as Gulfstream.

The rice cooker was another Aerolux 'first' when Cathay Pacific asked the company's founder, Ken Metcalfe, to design a rice cooker that would be a part of something exceptional: a shipset of rice cooker, skillet, toaster and blender for the airline's first class galleys. Metcalfe got together with his design team and produced the rice cooker for the airline market in early 1998. It was quickly accepted by the industry and acknowledged as a first class product.

Cathay Pacific took the shipset, except the blender – they wanted to use it as an ice crusher, but solving the noise issues of crushing ice was never resolved to everyone's satisfaction, so Cathay Pacific and Metcalfe agreed to shelve the idea.

The rice cooker has been an outstanding success for Cathay Pacific, one that has stood the test of time, and the test of reliability and durability too. It has deservedly been one of Aerolux's best-selling items of galley equipment, and although most of the units the company has produced and delivered are still in operation, the order book for the unit is still full. Aerolux has recently agreed a new contract with Hainan Airlines to deliver 20 units during Q2 2017, with an option for 60 more.

The rice cooker has remained largely unchanged during its 20 years of production, with only minimal updates that include a new lock-down lid to satisfy new safety regulations, and upgraded circuitry and software as improvements became available. All these modifications are backward-compatible, so every unit in commission can stay in commission.

Clever functions of the unit include fully automatic operation for cooking rice, with the unit switching off when the rice is ready, so there is no risk of overcooking. When preparing congee, the unit again offers easy operation, with constant temperature control to ensure no spills and perfect preparation of the rice.

The unit is fully self-contained, with an aluminum body that is powder coated, offering strength as well as utility. The cooker comes with an insulated, lockable lid for safety, and a Teflon coated, replaceable internal bowl.

Aerolux production manager, Peter Robinson, relates the story about a recent trip to Beijing. When the steward asked him if he wanted coffee, Robinson explained who he was and asked if he could see inside the galley. The coffee maker was an Aerolux unit, and when he asked about the rice cooker, the steward became quite enthusiastic, saying it was faultless, always producing perfect rice and very easy to operate.

If rice or congee are on your first class menu, your galley should have an Aerolux AL-RC25-100 Series rice cooker to make it fresh on board.

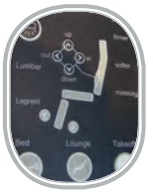
Aerolux will be displaying its range of products at MEBAA in Dubai on December 6-8

AEROLUX HAS PUT A GREAT DEAL OF ENGINEERING, TESTING AND TECHNOLOGY INTO ENSURING PERFECT RICE ON BOARD

FREE READER INQUIRY SERVICE

To request more details from Aerolux, visit www.ukimediaevents.com/info//aim




"The only comprehensive survey of the aircraft cabin environment from the 1970s to the present day."

Airliner World






JETLINER CABINS: Evolution & Innovation

E-BOOK APP

Available on Amazon, Apple iTunes®, and Google Play™

More information available on www.jetlinercabins.com

AIRCRAFT LIGHTING INT'L

TEL: (631) 474-2254 | FAX: (631) 474-0355 | WWW.AIRCRAFTLIGHTING.COM

COME SEE US AT MRO EUROPE I OCT. 3-5 I BOOTH 647

CLEAN LIVING

Wollsdorf Leather has invested in methods and processes to ensure that its products are environmentally friendly

Wollsdorf's CO_2 emissions are 50% below the leather industry average

Founded in 1936, Wollsdorf Leather is a fully integrated tannery that processes every stage of production, from the raw to the finished leather hide, at its facility in Wollsdorf, Austria.

In 1997 Wollsdorf Leather became the first tannery to receive ISO 14001, an environmental certificate that is reissued annually. In recent years, the company has also received many other awards for its environmental commitment, including an 'environment Oscar' from Austrian magazine *Umweltschutz*, the Austrian waste avoidance award, the Waterland Styria 2012 certificate for water protection, the Blue Angel award for low-emission upholstery leather, and the ECO_2L Energy Controlled Leather label.

Examples of its approach to environmental responsibility include safe disposal of unavoidable waste using the latest technologies, burning accumulated sewage sludge while recovering energy, and an in-house sewage treatment plant. Wastewater values are checked daily to ensure standards are met.

Wollsdorf Leather fulfils the highest standards within the leather-manufacturing industry and also adheres to ecological criteria in its selection of suppliers. In 2012, it became the first industrial company in Austrian Styria to win the Water Protection category in the Waterland Styria awards. Since 2009, it has spent more than €10m on environmental projects aimed at ensuring clean wastewater, reducing waste and improving eco-safety.

Optimal usage of resources such as water, energy and other raw materials, as well as environmental compatibility of processes, is of the utmost importance to Wollsdorf Leather, and many projects have been realized in recent years to make its facilities more sustainable.

THE TANNING PROCESS MAY BE GREEN, BUT YOU CAN ORDER WOLLSDORF LEATHER IN ANY COLOR YOU LIKE

For instance, various production optimization methods have helped reduce water consumption, which is now significantly below benchmark levels for the leather industry.

Energy consumption has also been cut, resulting in an annual saving of nearly 1GWh of electricity. The company's CO_2 emissions are 50% below the leather industry average, thanks to using only renewable energies.

The remaining emissions are neutralized through the purchase of climate certificates, which benefit climate protection projects in the rainforest. Thus, Wollsdorf Leather is CO_2 neutral.

ALTERNATIVE TANNING

Traditional tanning processes use chromium, but Wollsdorf Leather uses more environmentally friendly synthetic vegetable tanning agents instead. Chrome-free leathers meet the same specifications and exhibit the same flame- and fire-retardant behavior as chrome-tanned leathers.

As a result of the use of synthetic or vegetable tanning agents and plant-based fat liquoring agents (palm, rapeseed and beet oils), the leather is free from heavy metals and thus poses no hazard to people allergic to chromium or metals in general. Seat manufacturers are also able to guarantee take back of used seats, as it is possible to incinerate alternatively tanned leathers without releasing toxic hexavalent chromium.

Many tanneries are unable to offer alternatively tanned leather due to the complicated production methods. Chrome-free aircraft leather produced by Wollsdorf Leather has been fitted to more than 150,000 aircraft seats since production began in 2010. It is available in standard form, or as a lightweight version weighing less than 650g.

INTERIOR PRODUCTION

THIS IS LIGHTNESS

LOVE CONNECTION

Astronics' new aircraft connectivity solutions keep passengers and flight crews connected and informed

Connectivity to avionics data provides airlines with valuable insight

While passengers enjoy rich seat upholstery, personal lighting, and the other comfortable appointments of an aircraft's interior, behind-the-scenes technologies support a safe and pleasurable journey. Among them is connectivity. Whether passenger or crew, staying connected is critical in today's competitive airline industry.

Astronics is working to enhance both passenger and crew connectivity with a fresh look at new technologies, and has recently rolled out two new products. According to Pete Gundermann, Astronics Corporation's CEO, "Over the years we've developed several technologies for our customers to incorporate in aircraft connectivity solutions. We continue to invest strategically in connectivity product development to provide value to this growing market and customer base."

IMPROVING CONNECTIVITY FOR THE AIRCRAFT

Next-generation Ku-band high-throughput satellite (HTS) networks will rely on spot-beam technology for connectivity, providing faster, more seamless connections than those offered by conventional wide-beam technology. To help aircraft take advantage of these advancements, Astronics AeroSat – the connectivity subsidiary of Astronics – recently introduced the new FliteStream F-310 fuselage-mount satellite antenna.

The antenna provides Ku-band HTS connectivity with new technology that minimizes service interruptions when switching from beam to beam during flight. Coupled with Rexolite lens technology, this sensitive and spectrum-efficient antenna excels at maintaining low-angle satellite coverage while flying at higher latitudes. It is also compliant with RTCA/DO-160 and RTCA/DO-178.

Matthew Harrah, president of Astronics AeroSat, explains, "The evolution of our fuselage-mounted antennae for commercial and VVIP aircraft illustrates Astronics' focus on providing industry-leading airborne connectivity solutions. We are offering an improved user experience for inflight connectivity that bridges the gap to match the wi-fi performance that passengers experience at home and work."

CONNECTIVITY MATTERS

Meanwhile, connectivity to avionics data provides airlines with valuable insight into the performance of their fleets. Gaining access to existing aircraft data empowers flight crews to improve situational awareness, gives passengers an optimal flight experience, and reduces operational costs.

Astronics Ballard Technology – the company's avionics division – recently introduced a unique device, the webFB, to enable connectivity to avionics data simply, safely and securely. The ultra-compact webFB fits in the palm of the hand yet incorporates the capabilities of both an aircraft interface device (AID) and a wireless server. Using a wireless connection to portable electronic flight bag (EFB) tablets, the webFB delivers important data to the crew's fingertips.

Along with FAA approval, Astronics recently received EASA, Transport Canada and DGAC Mexico approval for the use of webFB on Boeing 737s.

Jon Neal, VP and general manager of Astronics Ballard Technology, adds, "This approval is exciting because the webFB is a game changer in terms of size, cost and ease of installation. With the webFB, a fleet-wide upgrade can be completed in days rather than years, enabling airlines to realize benefits immediately."

IFPL

CONNECTING YOUR PASSENGERS

SEE THE LATEST FROM IFPL

At Apex 2017 STAND #134

INNOVATE

USB A & C

- Allows passengers to use USB-A & C devices
- Supports PED and tablet charging
- Upgrade to USB-C using existing on-board IFEC or power system

INSPIRE

REDEFINE SEAT INTEGRATION

- Complements the seat design language
- Ergonomic positioning of peripheral
- Removes complexity and cost
- Fewer components delivering lighter seats

DELIVER

HIGH VALUE CONTACTLESS PAYMENT

- Maximises on-board revenues
- Simple contactless PCI compliant payments
- Optional high value pin on screen variant available
- Enables passenger personalisation via NFC data
- Allows passenger to shop and pay at a time convenient to them

T:+44 (0)1983 555900 IFPL.COM E:innovate@ifpl.com

The Best Fit for Your IFE Needs.

TEAC

Recording Tomorrow

TEAC CORPORATION

Phone : +1-323-215-5559

http://teac-in-flight.com/

GOOD FORM

Boltaron explains the basic differences between three classes of sheets for thermoformed components

Virtually every thermoplastic sheet product used for the thermoforming and fabricating of cabin components is made using one of three methods. Each offers distinct advantages and limitations that designers should know, in order to specify sheets with optimum appearance and performance.

Extrusion is a continuous process in which plastic compound is melted, mixed and conveyed through a heated barrel by a screw. The compound's ingredients are converted into a molten plastic mass that is forced through a lip die, which flattens the mass into a sheet of a specified width and thickness. The sheet then passes through heated embossing rolls, which impart a predetermined surface finish prior to trimming to the final sheet dimension or (less commonly) winding it onto embossing rolls.

Advantages of extruded sheet include the availability of medium- and heavy-gauge sheets suitable for most thermoforming, fabricating and machining applications; lower minimums than calendering; and custom colors and gauges. The drawbacks include having a monolithic sheet with limited appearance options and properties, limited standard textures, higher minimums than press laminating, and a smaller range of standard textures.

With calendering, compound ingredients are fed into a two-roll mill that mixes and heats the material. A continuous strip of homogenized, molten compound cut from the mill is then fed into calender rolls that compress it to form a wide, thin film. Embossing rollers then impart a smooth or textured surface and begin cooling the film, which is wound onto rolls or cut into sheets.

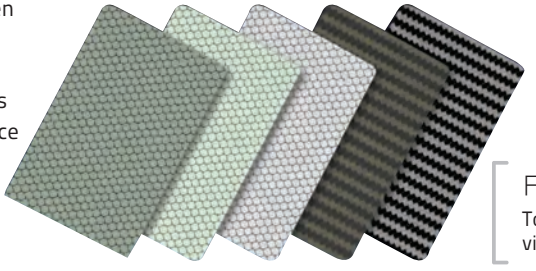
The advantages of calendered film and sheets include the availability of thin-gauge films for capping of heavier-gauge (extruded) sheet in-line or off-line (with low minimums); thin-gauge films for creating composites with exceptional aesthetic and performance qualities; the ability to produce medium gauges more economically by calendering than by extrusion; greater production efficiency and lower cost than extrusion (depending on volume); and the availability of custom gauges and colors.

CALENDERING CAN HAVE LOWER PRODUCTION COSTS THAN EXTRUSION

Visit Boltaron at Aircraft Interiors Expo Americas, on Stand 2320

Limitations of calendered film and sheet include having only a limited number of standard surface textures; having relatively high minimums; and no availability of heavy gauges.

Finally, press laminating combines layers of calendered or extruded sheet off-line, and fuses them using heat and pressure over relatively long cycle times to form composite sheets in gauges from medium to heavy.



Advantages of press-laminated sheet include having combinations of aesthetics and economy that are impossible to achieve with extrusion or calendering alone; minimum gauges equivalent to extruded sheet, with maximum gauges of over 3in; unlimited textures with low minimums; unlimited patterns with thin (calendered) clear protective films permanently fused to substrates of any color to achieve unlimited visual effects with low minimums; custom thicknesses and colors with low minimums; and a sheet that is generally of higher quality than extruded sheet.

Limitations of press-laminated sheet include the higher cost of production of conventional (monolithic) sheet in longer runs; and the necessity for extruded or calendered feedstock.

FREE READER INQUIRY SERVICE

To request more details from Boltaron, visit www.ukimediaevents.com/info/aim

WHAT IS COMFORT?

Comfort means different things to different people, but using a comfort mapping system, AeroFoams believes it can get the balance just right

You can visit AeroFoams at Aircraft Interiors Expo Americas, Stand 2125

Comfort is defined by the *Oxford English Dictionary* as "a state of physical ease and freedom from pain or constraint", "the easing or alleviation of a person's feelings of grief or distress", and in US dialect, "a warm quilt".

But in the world of aerospace, how do we measure comfort? Do we use a special comfort ruler? Do we have a defined comfort scale? Is there a special calibrated gauge? If asked "Are you comfortable?", would all people measure comfort in the same way or answer the question comparatively?

Culture has an impact in this measurement. For example, in North America, comfort is often perceived as being quite soft and accommodating, similar to a couch or sofa. In Western Europe, comfort is seen as being more supportive and firm, similar to a sports car. In Asia, firmer means more comfortable, but by western standards this firmness would be judged to be quite hard. In South America, passengers tend to associate comfort with super softness, almost like a water bed or bean bag.

Can all of these factors be figured into an equation that could then be weighted based on demographics?

Fortunately the human body is wonderfully proportional in its ratios; the human head, for example, weighs 11 lb (5kg) with a high degree of statistical accuracy. When the body is in the sitting or TTL position, these ratios allow us to calculate that there is an approximate downward force of 400Nm acting downward into the seat cushion.

We also know that the force is borne predominantly by the ischial tuberosities, otherwise known as the sit bones at the base of the human pelvis. Thanks to the ratios of the human body, we can also calculate with relative accuracy the surface area of the sit bones and the muscle mass surrounding them.

But we must also consider rebound or load deflection. Calculating the pressure may tell us where the high pressure spot is, but it won't tell us how to reduce the discomfort felt by the passenger on a fixed seat reference point. By using highly resilient seat foam and suspending the load, we can dissipate the force more effectively, while maximizing surface area and increasing comfort.

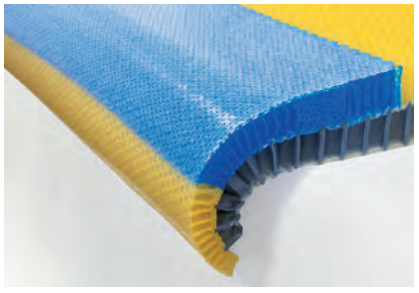
AeroFoams' comfort mapping technology combines elements of pressure mapping with support and load deflection metrics to help define a comfort code. By utilizing interchangeable components of the seat cushion in variable densities, the comfort mapping system can be used to adjust the comfort level until the passenger perceives it to be comfortable. The formulated system is verified by pressure mapping and allows AeroFoams to create a unique comfort code specific to an airline. The airline can of course define multiple codes for multiple demographics, but importantly it can also use a unique code to ensure comfort continuity across multiple seat platforms and classes.

Book your comfort seat mapping session at Stand 2125 at Aircraft Interiors Expo Americas 2017 in Long Beach, California on September 26-28. At the show, AeroFoams' sales director, Matthew Nicholls, will be able to assist with any comfort queries.

COMFORT AND WELLNESS

Cushions should be so comfortable that passengers don't even notice them, says Supracor

While seat manufacturers design seats with the latest comfort features, often forgotten is the role the cushion plays in providing comfort. The cushion should remain comfortable for the duration of the flight without becoming hard or too warm over time. In the best case scenario, the cushion should provide a sense of wellbeing without being noticed by the passenger.



Supracor's Stimulite honeycomb cushions feature wellness benefits that work to ensure long-term sitting comfort. They are comprised of a lightweight and flexible cellular matrix that contours to the body and is more than 90% open space. As the honeycomb cells flex, they help to stimulate blood flow, which boosts oxygen and promotes relaxation. The cells are perforated to allow air to circulate, keeping the seat temperature at a comfortable level.

Passengers flying on Swiss International Airlines B777s in economy class are enjoying the wellness benefits of Stimulite cushions, and the airline has also chosen Stimulite for its A340 retrofit in economy, economy plus and first class. Supracor is currently working on programs to integrate Stimulite cushions with several airlines so more passengers will soon be able to experience comfort and wellness benefits when they fly.

LEFT: THE CELLULAR MATRIX CONTOURS TO FORMS

ABOVE: A CLOSE-UP OF THE STIMULITE HONEYCOMB STRUCTURE

FREE READER INQUIRY SERVICE

To request more details from Supracor, visit www.ukimediaevents.com/info/aim

ARMREST COMFORT

How do you find the best material for armrests? It's a question of comfort and economics, says Ebco

As a result of its experience as a supplier of armrests for aircraft seating, Ebco has decided to use its own special polyurethane foam. From Ebco's point of view, PUR is certainly the best material for armcaps. But what are the pros and cons of PUR?

Ebco's PUR meets aviation standards ABD0031 and FAR 25.853b, offers a high resistance to abrasion, an unlimited choice of colors, low tooling costs, low minimum order quantities, and is also available with an antimicrobial surface.

There are some other materials for armrests on the market, such as thermoplastic polyurethane (TPU), injection molding or silicone. Low-priced injection-molded armrests are hard, feel unpleasantly cold and lack any comfort for passengers. Where TPU and silicone are concerned, both tooling costs and production runs are higher. In addition, not all colors requested by the customer can be produced.

PUR and silicone offer good comfort, damping features and good haptics for a long time. However, with silicone a surface coating for a better abrasion resistance must be applied, an additional process that is not required for PUR, because of the in-mold coating process during the foaming procedure.

Materials for inserts such as aluminum or plastic, which are temperature-resistant, can be used in PUR armrests and fixed to the seat structure. The design and surface can be optimized for adhesion.

There are many good reasons for using armcaps made of PUR. Ebco's PUR armrests are also available with an antimicrobial surface, which makes 99% of the bacteria disappear within three hours. This health-oriented innovation for enhanced hygiene also reduces the risk of infectious disease transmission.

Ebco always works with customers to work out and develop the best solution for their armrests.

FREE READER INQUIRY SERVICE

To request more details from Ebco, visit www.ukimediaevents.com/info/aim

FLOORING TAPE

High-performance carpet tape can bring benefits in terms of installation, performance and removal

Biolink Tape Solutions, a trusted adhesive tape partner for Airbus, and for leading carpet producers and airlines around the world, will present its aero flooring tape solutions at Aircraft Interiors Expo Americas on September 26-28.

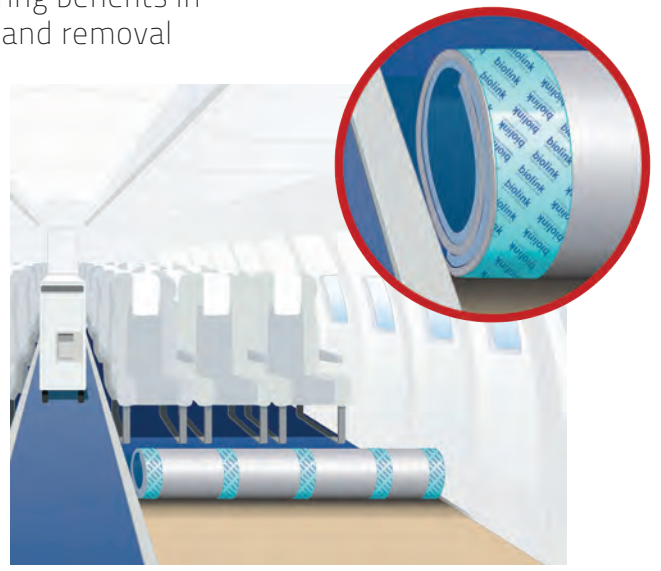
In other company news, on June 30, 2017, Saint-Gobain successfully completed the strategic acquisition of Biolink. The future for the company, which will trade under the new name Saint-Gobain Performance Plastics Biolink GmbH, looks extremely bright.

Saint-Gobain is one of the world's top 100 industrial groups and a world leader in transportation. The company's considerable investment in Biolink acknowledges the important role that high-performance tapes play in delivering technical PSA solutions to the transportation segment generally, and to aerospace more specifically.

Biolink's unique solvent-free adhesive technology is used to produce a variety of high-performance adhesive tape solutions for many industries and critical applications, such as aircraft flooring.

With Relink 2318, Biolink sets the benchmark in aero flooring tapes. It is a high-performance carpet tape that provides benefits including quick installation, secure lift-free fixation across all carpet backing types, and rapid removal in one piece, without leaving residue or damage. These benefits translate into quantifiable cost savings.

Airbus approved and specified (ABS5648B), Relink 2318 continues to add value to major airlines and MRO companies around the world.



FREE READER INQUIRY SERVICE

To request more details from Biolink Tape Solutions, visit www.ukimediaevents.com/info/aim

COMPOSITE PICTURE

When composite structures are required, there are advantages in working with a highly experienced partner

Passenger seating for business and first class cabins has evolved tremendously over the past decade. These premium seats have essentially grown from being larger versions of standard seats into comfortable places to work, sleep and live during the time spent flying. Today, amenities such as bars, showers and suites are all plausible elements of the customer experience.

When British Airways first introduced beds into its B777 fleet at the turn of the millennium, a marriage of composite furniture and seating technology emerged. AIM Aerospace in Seattle was – and continues to be – the largest independent partner in delivering composite structures exclusive to high-end seating platforms.

Tracing its beginnings to the mid-1970s, AIM has produced virtually every composite structure that can be found inside a commercial airline cabin. From closets to crew rests, AIM is experienced in stepping up to the demands of first class cabins and the customers who fly in them. Today, the company is a leader in providing solutions for many seating manufacturers. It can deliver a range of products from composite privacy dividers, seatbacks, shells, consoles and compartment doors, up to complex full-height monuments in support of the seating 'living space'.

This capability starts with the visualization of design, and continues through to the testing, certification and manufacture of the associated furniture. AIM's products are often delivered straight to the airline or OEM without passing through a seating facility. The company produces thousands of composite seat shells and hundreds of monuments annually.

With 1,000 employees in the greater Seattle area, AIM also supplies more than 20,000 OEM composite parts per month. From a simple contracted item, to a fully integrated monument, see what AIM Aerospace can do for you.

FREE READER INQUIRY SERVICE

To request more details from AIM Aerospace, visit www.ukimediaevents.com/info/aim

"WE SHOOT" PHOTOGRAPHY, INDUSTRIAL DESIGN: JCE DESIGN

CASTELLO
MONTE VIBIANO
VECCHIO

SURROUNDED BY THE BEAUTIFUL HILLS OF UMBRIA (THE GREEN HEART OF ITALY), MONTE VIBIANO GROUP HAS EXPANDED ITS ACTIVITIES FROM THE PRODUCTION OF EXTRA VIRGIN OLIVE OIL, TO WINES, FOOD AND BEAUTY PRODUCTS.

The first awards of excellence of many, for the extra virgin olive oil and the wines, arrived in 1926 and since then the quality of the homegrown products was paramount for the Fasola family.

In 2009 Castello Monte Vibiano Vecchio has become the first "zero CO2 emissions" farm in the world, resulting in a net zero impact on the environment. DNV, world's leading certification bodies, handed over certificate #00001-2009 to Monte Vibiano. This is the first ISO 14064 certificate released by DNV which relates to 0 greenhouse emissions achieved exclusively by a company through an ecological strategy and restructuring.

The two sister companies, Castello Monte Vibiano Vecchio and MV Food & Services, are inspired to the same philosophy.

MV company was created in 2008 with the aim of serving the transportation industry with top quality food products. The initial experience of its sister company, in supplying the airline and hotel industry with the world's best extra virgin olive oil, opened the market for MV Food & services.

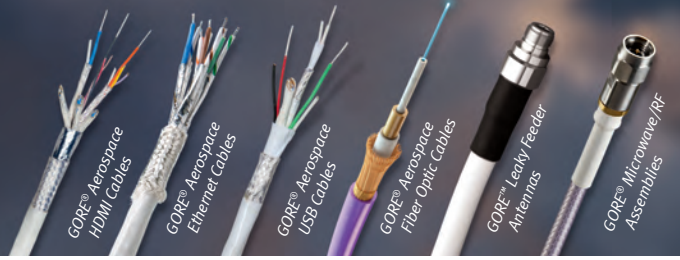
The central region of Umbria being its natural home, MV aims to transmit the Mediterranean lifestyle through its products. Simple ingredients, enhanced by spices, herbs and the Italian professional and traditional cooking are paramount. The collaboration with Michelin star Chefs adds a defined touch of class to the products.

WWW.MONTEVIBIANO.IT
email: info@montevibiano.it **tel:** +390758783001

Take off and stay connected

Connectivity and In-Flight-Entertainment

GORE® Aerospace High Speed Data Cables keep passengers connected anytime, anywhere while traveling. Ensure they get the ultimate in-flight experience on their laptop, tablet or mobile phone no matter where they sit on a plane.



GORE
Creative Technologies Worldwide

A TASTE OF ITALY

Naturally good Italian produce comes from all-natural production processes, such as Monte Vibiano Group's zero-emissions farms

Surrounded by the beautiful hills of Umbria in the green heart of Italy, Monte Vibiano Group has expanded its activities from the production of extra virgin olive oil, to wines, food and beauty products.

The company earned the first of many awards for excellence in the production of extra virgin olive oil and wines in 1926, and since then the quality of its homegrown products has been paramount for the Fasola family.

In 2009, Castello Monte Vibiano Vecchio became the first 'zero CO_2 emissions' farm in the world, and it now creates a net zero impact on the environment. DNV, a leading certification bodies, issued certificate #00001-2009 to Monte Vibiano. This is the first ISO 14064 certificate released by DNV; it relates to zero greenhouse emissions achieved exclusively through ecological strategy.

Furthermore, sister companies Castello Monte Vibiano Vecchio and MV Food & Services are inspired by the same ecological philosophy.

MV Food & Services was created in 2008 with the aim of serving the transport industry with top-quality

food products. The experience of its sister company in supplying airlines and hotels with extra virgin olive oil opened the market for MV Food & Services.

With the central region of Umbria as its home, MV aims to convey the Mediterranean lifestyle through its products. Simple ingredients, enhanced by spices, herbs and professional and traditional Italian cooking are paramount. Collaborations with Michelin-starred chefs adds a refined touch of class to the company's products.

FREE READER INQUIRY SERVICE

To request more details from Monte Vibiano Group , visit **www.ukimediaevents.com/info/aim**

INDEX TO ADVERTISERS

You can request more details about advertisers in this issue, including the companies and products listed in the Products & Services section, by visiting: **www.ukimediaevents.com/info/aim**

Delta's Penthouse

One can imagine the clinking of glasses at a Madison Avenue ad agency as they came up with "A few steps above first class," the perfect tagline for Delta's Penthouse, a luxury lounge space due to launch on the upper deck of the airline's new B747s.

All passengers booked on the first Delta B747 flight on October 25, 1970, had much to look forward to, with the Georgia Belle boasting the widest seats in the skies, the first overhead stowages, and audio IFE, but of course those in first class had something really special in store.

The spacious 58-seat zone at the front of the main deck had an intriguing feature: a spiral staircase. Ascending those 'few steps above first class' (14 to be precise) must have been so exciting, and at the top they were greeted with a six-seat first class lounge, and to the right something even more special: the Penthouse.

The Penthouse was only available as an exclusive booking, charged at five one-way fares to reserve the space for one to five people, and six fares for the maximum capacity of six. The four deluxe reclining swivel seats and the two-place sofa were all certified for TTL, so guests did not need to leave the Penthouse, creating a truly intimate and special experience that was perfect for anything from family trips, to three couples going on vacation, to a Hollywood star seeking privacy, to a secret board meeting, especially with its soundproofed walls. 'Like a private jet,' as Delta described the space.

Penthouse guests had their every whim catered to by a dedicated member of the cabin crew (specifically a "smiling stewardess" in advertising material), who could deliver cocktails and refreshments from the upper-deck bar. Upstairs also boasted a state-of-the-art galley, claimed to maintain the succulence of hot foods and keep cold foods well chilled, with options including continental dinners, exotic dishes, midnight snacks, leisurely luncheons and even a hunt breakfast.

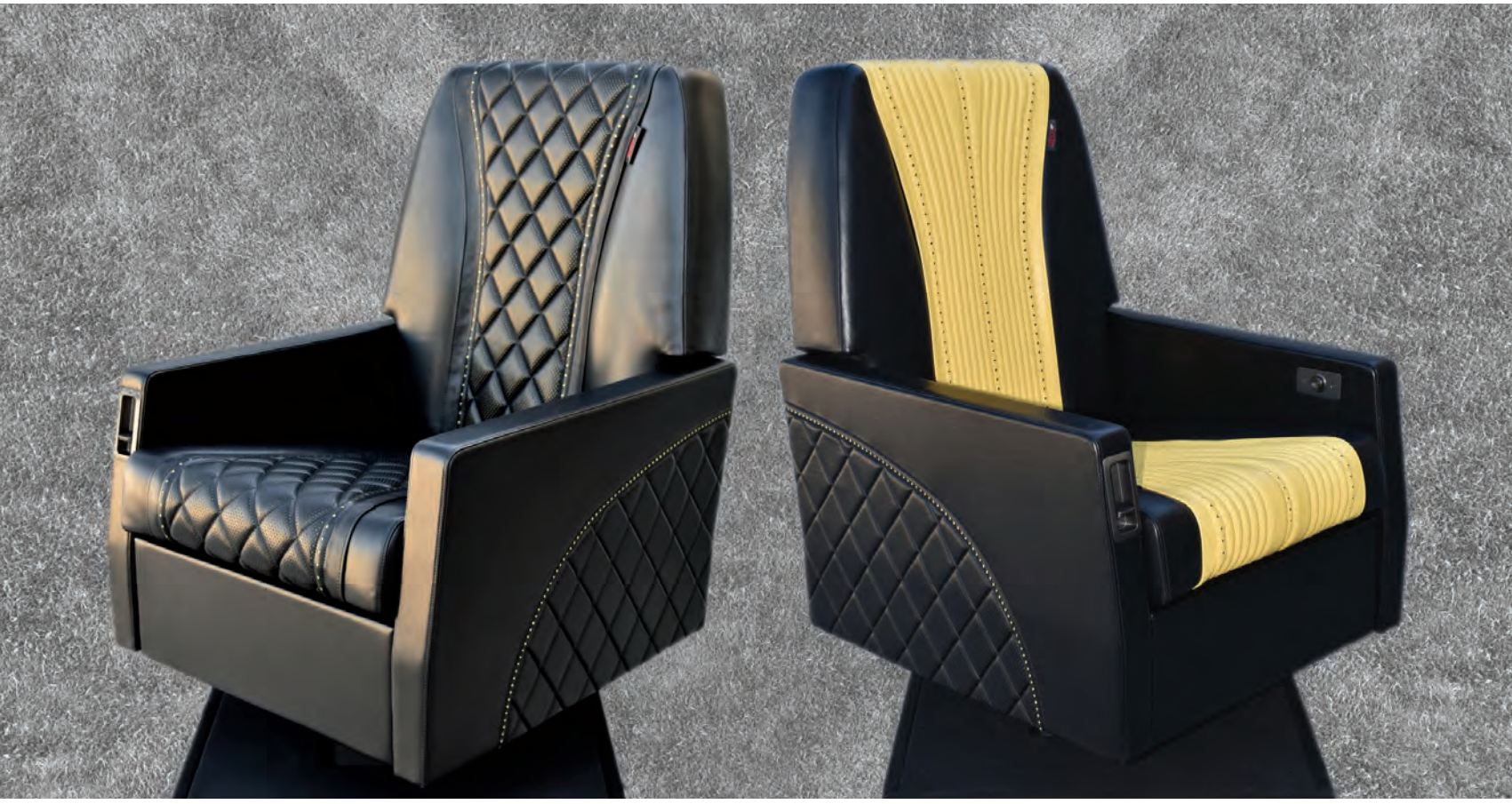
MANY THANKS TO MARIE FORCE AT DELTA FLIGHT MUSEUM IN ATLANTA, GEORGIA, USA, FOR HER HELP, EXPERTISE AND ENTHUSIASM. THE MUSEUM NOW HAS A 1998 B747-400 AS AN EXHIBIT, WHICH DELTA RETIRED IN 2015

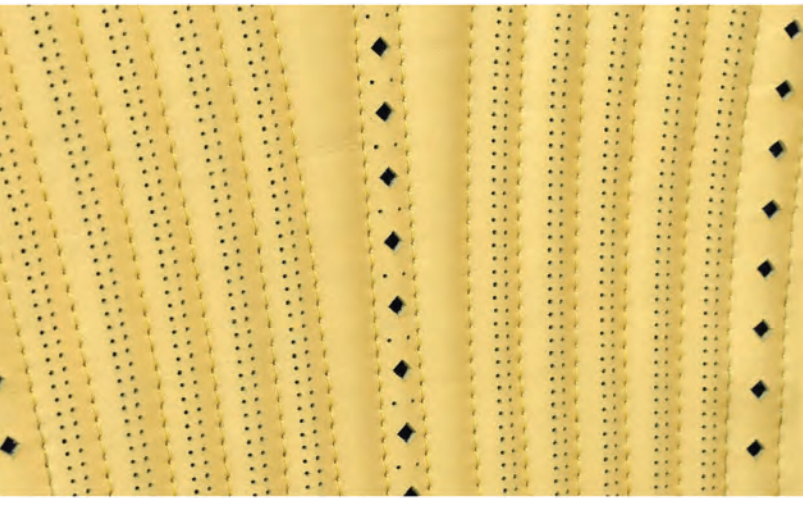
While the color palette was more restrained than some other lounge designs of the 1970s, its application wasn't, with the seats finished in a mottled 'combo' design in blue/olive and blue/yellow, placed in a seemingly random arrangement, with 'bronze green' armrests and aqua and gold deep-pile carpeting. The bulkheads, centerline complexes and window panels were finished in an original pattern named 'trees', inspired by a photograph taken upward from a forest floor. The tree patterns were varied, with dark gold on the bulkheads and pale silver on the window panels.

Unfortunately Delta's jumbos arrived at a time of instability in the US economy, which reduced demand for luxurious travel, especially on the airline's predominantly short- and medium-haul route network. Disappointing demand meant the Penthouse was a short-lived affair, and by 1973 the partition between the Penthouse and the lounge was removed to create a single, larger lounge.

Sadly Delta was also finding the B747 too large for its routes. Combined with soaring oil prices, it meant the airline had little option but to trade its five aircraft back to Boeing between 1974 and 1977. A merger with Northwest in 2008 brought B747s back into Delta's fleet – but alas the upper deck was a duller place.

two of a kind





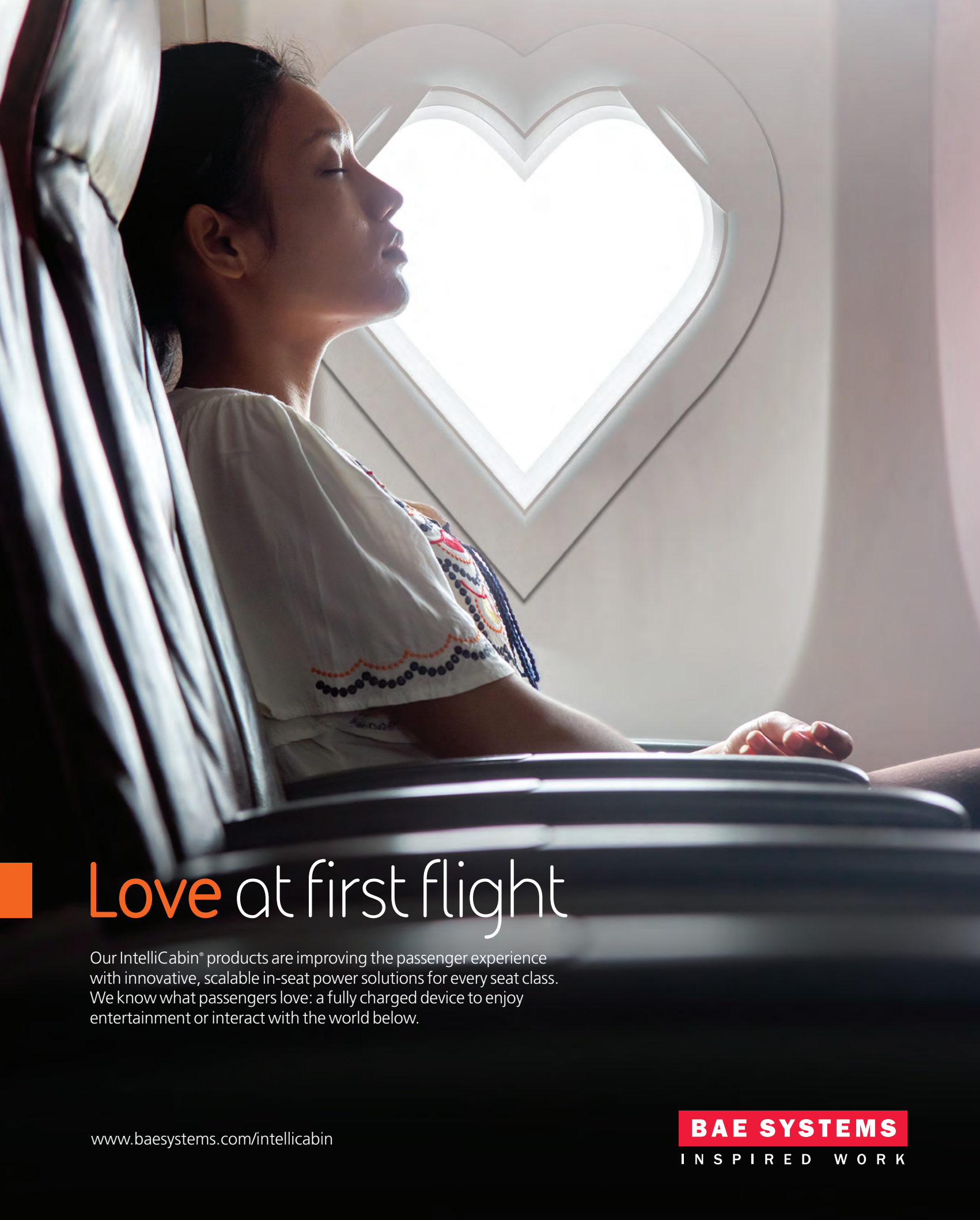
Bespoke leather crafting applications. Hundreds of patterns to chose from or submit your own design ideas.

- Proprietary manufacturing equipment operated by state of the art CAD technology renders custom perforation in over a dozen different hole sizes to be mixed and matched plus pattern drawing, leather splitting, skiving, cutting and notching.
- Our team of highly skilled crafts personnel adds the finishing touches with precision stitching, sewing and quilting using a wide variety of high tech substrates for the ultimate 3D look, seating comfort, cabin ambience and durability.
- Creating uniquely crafted leather inserts for seats, panels and more.

by one of a kind

AERISTOCRAFT

AERISTOCRAFT™ – Division of AERISTO®
2550 N. Great Southwest Parkway
Grand Prairie, Texas 75050, USA
Phone: 001 (817) 624 8400
Telefax: 001 (817) 624 9520
info@aeristo.com www.aeristo.com



Love at first flight

Our IntelliCabin® products are improving the passenger experience with innovative, scalable in-seat power solutions for every seat class. We know what passengers love: a fully charged device to enjoy entertainment or interact with the world below.

www.baesystems.com/intellicabin

BAE SYSTEMS

INSPIRED WORK