

Aircraft

aviationbusinessnews.com

VOLUME 12 • ISSUE 2 • APRIL/MAY 2023

CABIN

Perfecting the passenger experience

Management

LIGHT ON THE HORIZON

**EXCLUSIVE CEO survey:
Breaking of a new dawn**

p.40

AN INTERIOR LIFE

Meet prolific
inventor Bill Boyer

p.16

TOP TABLE

Rosen Aviation,
the lone wolf

p.21

GOOD MEDICINE

The post-Covid
content landscape

p.32

Cabin Air Quality Monitored on every flight

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

CRYSTAL
CABIN
AWARD®

Finalist





Cover design: Phil Couzens

EDITORIAL TEAM

EDITORIAL DIRECTOR

Lee Hayhurst

lee.hayhurst@realresponsemedia.com

ART DIRECTOR

Phil Couzens

SUB-EDITOR

Heather Ford

GROUP PRODUCTION MANAGER

Barnaby Moore

barnaby.moore@realresponsemedia.com

COMMERCIAL DIRECTOR

Toby Walton

toby.walton@realresponsemedia.com

ADVERTISING SALES EXECUTIVE

Christian Orros

christian.orros@realresponsemedia.com

CEO

Chris Pitchford

chris.pitchford@realresponsemedia.com

For subscriptions & enquiries:

Barnaby Moore

barnaby.moore@realresponsemedia.com

All enquiries

+44 (0) 20 8444 2554

Printed in the United Kingdom by Micropress.

Reproduction is not permitted without the express written consent of the editor. All efforts are made to ensure that factual accuracy is correct at time of publication.

All rights reserved. No part of this publication may be reproduced, duplicated, stored in any retrieval system or transmitted in any form by any means without prior written permission of the publishers.

Aircraft
CABIN
Management

Published by

Real.
RESPONSE MEDIA

Unit 4D, Cally Yard,
445 Caledonian Road,
London, N7 9BG

Contents

APRIL/MAY 2023



REGULARS

9 IN SITU

Aimee Turner visits Mirus Aircraft Seating

14 INDUSTRY VOICES

gT Labs on Additive Fusion Technology

FEATURES

16 AN INTERIOR LIFE

Bill Boyer Jr aims his inventive spirit towards the often-ignored second aircraft cabin

21 TOP TABLE

Rosen Aviation's Lee Clark explains how the IFE specialist likes to be different

26 ENVIRONMENTAL CONTROL SYSTEMS

Perfecting in-cabin pressure and temperature to maximise customer comfort?

32 IFE

Post-Covid content - wellness is here to stay

37 IFE INSIGHT

The challenges facing an industry that is expanding with more audiences than ever

COVER STORY

40 CEO SURVEY

What industry leaders had to say in our first CEO survey

54 AIX FOCUS

Polly Magraw discusses why accessibility is the next big challenge

56 SEATING

The firms changing the flight experience

63 INDUSTRY VOICES

Imagik chief executive Pablo Vadillo on common device charging adoption

66 LIGHTING

Illuminating the travel experience and promoting brands

70 FOAMS

Has the time come for airlines to embrace green polyurethane?

74 GREEN SKY

AIRA's Tony Seville discusses why the industry must embrace aircraft interior recycling

sustainability is a conscious choice

let's shape the future together

Aircraft **EXPO**[®]
Interiors

Join us at
STAND 5D40

FOUNDING MEMBER



GREEN CABIN ALLIANCE

SEKISUI

KYDEX



Editor's Letter

Reading our exclusive CEO survey in this edition of ACM, conducted in partnership with Tornos Aviation Consulting and AIX, it's heartening to hear that there's such positivity in the sector.

The return to 'normal' after the COVID pandemic is clearly continuing, particularly after the re-opening of China, although some stresses within the industry remain evident.

One of these is the supply chain challenges that were precipitated by the pandemic and have prompted a global recalibration of the just-in-time approach to global supply chains.

A number of the CEOs we surveyed for this edition of ACM tell us that they have reacted to this by taking back more in-house control over the sourcing and warehousing of stock.

However, we hear ongoing issues continue to lead to longer lead-in times, logistical headaches and what one CEO described as 'unjustifiable' price increases.

The other ongoing issue highlighted by the study is people, and while some businesses have taken advantage of access to a more global, flexible and remote workforce, others aren't in such a fortuitous position.

This appears to be the more persistent issue, as we leave COVID behind us, for an aviation industry that is particularly reliant on reliable, well-trained and accredited staff.

After all it is so often true in business that it is people who give you an edge, that something extra which sets you apart from your rivals.

You can read about one such person in this edition of ACM in which we profile inventor Bill Boyer Jr who has seen remarkable success selling his innovations into the aviation sector.



▲ One of Bill Boyer JR's inventions

He puts this down to doing things in a different, maybe somewhat unorthodox, but nevertheless certainly very effective way.

It just goes to show what one man with a mixture of experience, talent and vision is able to achieve and how important human ingenuity still is for any successful business.

Coming at this from a slightly different angle is IFE specialist Rosen Aviation, our focus in Top Table which, like Boyer, puts its achievements down to offering something a little different.

It believes its focus on the end-user, the people who actually experience their products while flying and not necessarily the needs of the corporate customer, is what sets it apart.

Rosen describes itself as a 'lone wolf'. Maybe every industry needs some people and companies prepared to break away from the pack to drive innovation and progress.

These are just a few of the highlights I've picked out from this edition of ACM. I hope you enjoy reading it.

Lee Hayhurst

EDITORIAL DIRECTOR

Lee.hayhurst@realresponsemedia.com

Connect online with Aviation Business News

@avbusinessnews

aviationbusinessnews.com

avbusinessnews

BUSINESS BRIEFING



FINANCIAL

Recaro notches up post-pandemic growth record

Seating business Recaro has posted a record performance of almost 55 per cent in 2022 and has outlined a plan for continued double-digit growth.

In 2022, Recaro generated a revenue of nearly €425 million which included double-digit investment in research and investment. This featured the 2021 €50 million investment in its aircraft seating division's crash facility and flam lab, followed by the €5 million facility expansion at its China seating factory in addition to a €4 million investment at its German site.

"Recaro Aircraft Seating also maintained a global footprint throughout the pandemic and has returned to strong levels of recruiting across its five international sites," it reported.

Employing more than 2,300 personnel, Recaro Aircraft Seating celebrated its 50-year anniversary in 2022, producing nearly 100,000 passenger seats through its distinct hand manufacturing methods. Major customer awards throughout the year included Etihad selecting the bestselling CL3710, IndiGo choosing the lightweight BL3710, and the Lufthansa Group ordering 24,000 of the CL3710 and CL3810 seats.

The business has further expanded into business class with the latest fully-equipped cabins for Iberia and Air China and is now providing passengers with seating in business, premium and economy class. In addition, the company launched its first ever front row monument that was built in-house with composite materials for Iberia.

"Recaro had one clear goal since the beginning of the pandemic crisis: emerge strong. A major part of our success was our unique workforce strategy during pandemic, which continues to ensure job security for Recaro employees in Germany," said Dr Mark Hiller, chief executive of both Recaro Holding and Recaro Aircraft Seating.

€425m

Recaro generated a revenue of nearly €425 million in 2022



NARROWBODY

flydubai unveils the Business Suite, debuts Safran Vue

▶ Dubai-based carrier flydubai has unveiled the Business Suite, a highly customised premium business class seat based on Safran's Vue platform.

flydubai's interpretation of Vue will be introduced into a select number of the carrier's fleet of Boeing 737 aircraft with the new premium business class initially introduced on longer haul flights.

Vue is designed to offer passengers a similar experience to that of the most comfortable widebody aircraft, while maintaining an efficient cabin layout.

Vue's reverse herringbone seat layout offers a window-facing experience and ensures a high degree of privacy, direct aisle access and a long lie-flat bed.

The seat selected by flydubai will be equipped with features such as a door, a wireless charger and customised storage areas. It also features a 17.3" Rave Ultra IFE screen manufactured by Safran.

flydubai said close collaboration with JPA Design had resulted in a unique and best-in-class business class seating product. The first aircraft is expected to enter into service by end of the year.

WIDEBODY

Etihad takes comfort to next level with new 787 seats

▶ Etihad Airways has revealed its new Boeing 787 cabin that will join the fleet in the third quarter.

The Business cabin features a customised version of Collins' Elements seat and is the first airline in the world to introduce the seat on the Boeing 787.



A suite door whose height has been further increased from the A350's debut model will offer added privacy.

Each of the 32 business seats has direct aisle access in a 1-2-1 cabin configuration. The seats recline to a fully lie-flat-bed, 78" in length.

The seat also features a 17.3" 4K TV screen, Bluetooth headphone pairing, multiple charging ports and wireless charging, as well as plenty of storage.

In Economy, the newest 787 will feature 271 seats which are lighter than the current fleet and feature a slimmer profile armrest and an extensive range of entertainment on a 13.3" 4K touch-screen monitor with USB charging port.

"Our new business class takes the guest experience to new heights with the second evolution of the Business Studio which was launched on the Airbus A350-1000 last year," said Antonioaldo Neves, chief executive, Etihad Airways.

BRIEFS



- Swiss is to trial the use of artificial intelligence (AI) to conduct passenger counts during boarding on selected Zurich flights between April and June to enhance security and ease the workload of cabin personnel. A camera will be temporarily installed in the cabin to record the boarding process and determine total numbers. The recordings will be used to train an AI application in the boarding process. It must be able to distinguish whether a passenger is carrying an infant and function faultlessly, even in challenging lighting conditions.

- A new report released by the organisers of Aircraft Interiors Expo (AIX) has found that meetings with 10 suppliers – headquartered in five different countries over the course of three days – could save up to 20 days of travel, not to mention time and expense. AIX returns to the Hamburg Messe from 6-8 June 2023, following the Passenger Experience Conference on 5 June, and will be co-located with World Travel Catering & Onboard Services Expo (WTCE).

- Stefanie Neumann has taken over as one of two CEOs of Lufthansa Systems together with Dr Thomas Wittmann, who has been a CEO since 2019. She will be responsible for the company's digital IT solutions, customers and markets. Neumann joined Lufthansa Group in 2019, where she was VP of IT Infrastructure and was charged with modernising the business's technical IT infrastructure capabilities.

The latest technology in **affordable USB In-Seat Power Systems.**



IKUSBC-450

Type-A **10W** +
Type-C **15W**



IKUSBC-600 PD

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



IKUSBC-450 PD

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



IKUSBC-500 PD

Type-C **60W**

**iPD[®] Intelligent
Power Delivery**

(Patents held in the US, UK,
China, and UAE)

IMAGIK
In-Seat Power Management

www.imagikcorp.com



1

Sitting Pretty

Aimée Turner paid a visit to Mirus Aircraft Seating's Norfolk headquarters in the UK to explore how its £5 million investment could give the business the edge in a highly competitive market segment

In launching the largest commercially available and most technologically advanced crash test facility in the UK, Mirus Aircraft Seating is staking a sustainable claim in the lightweight seat manufacturing landscape of the future.

The purpose-built 407sqm M-TEST facility at its Norfolk-headquarters represents a £5 million investment and has been developed to rival the most advanced facilities in Europe. The showpiece of the centre is a state-of-the-art, 30m-long dynamic test sled, a bespoke device used for destructive and non-destructive crash test replication. Lit by a powerful state-of-the-art lighting system, the LED lamps ensure the comfort for the engineering teams and represents a significant reduction in terms of energy consumption.

Ben McGuire, CEO at Mirus, says the addition of its very own in-house testing facility is a momentous milestone for the company and will serve not only the

aircraft interiors community but will also be made available to the automotive, aerospace, motorsport and rail vehicle industries. Future customers of M-TEST can also be assured of a dedicated and independent team running a facility in a strictly confidential testing environment thanks to a ringfenced IT system that will generate the vital intelligence on their product's performance.

"With the ability to undertake testing accredited by Lloyd's Register and in line with ISO 17025 and ACEA regulations," McGuire says, "M-TEST will enable us to test and certify not only Mirus seating products, but also deliver a solution to the increased demand for sled testing."

Most importantly however, the new facility will allow Mirus itself to develop

1. The centre's showpiece is a state-of-the-art, 30m-long dynamic test sled
2. CEO Ben McGuire says the new facility is a momentous milestone for Mirus



2

new technologies at a much faster pace – enabling greater innovation and speed to market for not only Mirus' flagship product, the Hawk seat, which now numbers more than 120,000 in service but also its new fixed back economy class Kestrel seat.

Adam Challenor, technical director at Mirus Aircraft Seating, tells *Aircraft Cabin Management* that building one of the most technologically advanced crash test facilities to meet the requirements of the broader transportation industry was challenging: "We've had to dig very far down to anchor it so there's a lot of concrete in there."

Having its own test centre on site will save Mirus a significant amount of time and expense, as it will no longer have to send engineers for overnight stays at alternative UK testing sites – where they are also prevented from taking photography. "We can run the sled five days a week," says Challenor. "Normally, we will use it between 40 per cent and 60 per cent of that time, depending on where our programming is so we've got at least 50 per cent capacity that we can go on sale elsewhere."

"THE M-TEST FACILITY HAS BEEN DEVELOPED TO RIVAL THE MOST ADVANCED FACILITIES IN EUROPE"



Crafting a
better future

Sonoma
Enduralite
Alcantara®

AIX BOOTH 5D46
PERRONECO.COM/CBF



“WE CAN PUSH THE BOUNDARIES IN TERMS OF DESIGN AND END UP WITH A BETTER, MORE LIGHTWEIGHT PRODUCT”

“In terms of what it will allow us to do, it means we can actually test and develop much more quickly because we won’t have to go travelling elsewhere. Something that would have taken three days, we can now do in two hours plus we can get all of our engineers here to watch the testing, so our turnaround time will be significantly reduced and our throughput of tests so much higher. That means we can do a better job of developing a product; we can be less scared of failure. We can push the boundaries in terms of the design and therefore end up with a better, more lightweight product.”

Challenor says certification requirements for aircraft seating are in a continual state of flux and are becoming ever more stringent, particularly in terms of how impact to the head is managed. “We’re under continual pressure to reduce development time and a big part of that is testing to optimise the product for weight, for cost and for performance.”

Challenor adds that as the requirements for aircraft seats are

7.5

The lightweight Kestrel weighs in at just 7.5kg (16.5lb) and is destined for operators of short and medium haul routes, enabling airlines to achieve maximum economy cabin densification without compromising passenger comfort

slowly starting to converge with the requirements for automotive in terms of neck injury, by being able to test more, Mirus will be able to develop the products to catch those stringent requirements.

McGuire, explaining more about the reasoning for the investment, says it is not only to take the young seating business’s products to market much more quickly but also to show its long-term commitment to the aircraft seating segment directed at the OEMs Airbus and Boeing, and all its current and potential airline customers.

“We’re a relatively new company. I wouldn’t call Mirus a startup any more, as we started in 2015. We were doing quite well and then along came the pandemic. Our existing customers stayed loyal, so we didn’t lose business. Additionally, our shareholders were very supportive and continue to be so as they’re investing in us for the future. When we came out of the pandemic, we knew more products were needed to capitalise on a market that is going to come roaring back for sure.”

◀ With engineers able to watch on-site, turnaround times are reduced, increasing Mirus’s throughput of tests and designs

“Our job as a seat manufacturer is to ensure that we keep producing seats that give passengers as much space and comfort as possible so, even in higher density configurations, the passenger will have a reasonable amount of living space. Our new test facility allows us to really push this.”

The business launched its new fixed-back economy class Kestrel seat last summer at Aircraft Interiors Expo. The lightweight Kestrel weighs in at just 7.5kg (16.5lb) and is destined for operators of short haul and even medium haul routes, enabling airlines – whether ultra-low cost or premium carriers – to achieve maximum economy cabin densification without compromising passenger comfort – even at a 28in (71cm) seat pitch.

From the outset, the design principles of the seat with all its different trim and finish options, as well as additional features such as USB ports, PED holders and literature pocket choices, were led by a zero-compromise mindset in terms of space, privacy and comfort.

Mirus has multiple patents pending on the Kestrel’s design, focused on its maintainability, extended durability testing, low part-count and reduced layering of components. Another feature is extended warranty, which Mirus reckons will dramatically lower the lifetime cost of ownership and enable airlines to generate a return on investment within a few years.

“We’ve already had feedback that the Kestrel seat is best in class,” says McGuire. “It offers living space at maximum densities because we can make it lighter, we can make it thinner – and that’s all gained by being able to conduct continuous development testing.”



AN INCREDIBLE EXPERIENCE, A DIFFERENT WORLD

INTRODUCING THE E2 CABIN

- Staggered Business seating provides unrivalled space and comfort
- Larger overhead bins accommodate every passenger's carry-on bag
- Wi-Fi connectivity accessible from personal devices
- Exceptionally quiet cabin to work or relax in
- Ambient mood lighting matches time of day

embraercommercialaviation.com



CHALLENGE.
CREATE.
OUTPERFORM.

SUM OF THE PARTS

Jordan Kalman and **Yannick Willemin** of 9T Labs discuss the benefits of using Additive Fusion Technology to enhance aerospace parts manufacturing at scale



“While previously seen as expensive and limited, new advances in additive manufacturing are starting to change the manufacturing landscape”



Jordan Kalman (top) application engineer; **Yannick Willemin** business development director



Visit www.9tlabs.com for more information

Sometimes it is the little pieces or parts that can make the biggest difference. In particular, small things at high volumes such as hinges, brackets, seat spreaders and table tray supports on aircraft contribute substantially to its overall weight, which impacts fuel efficiency and passenger well-being and comfort among other variables.

Traditionally, many of the structural interior components have been made of metal and manufactured by subtractive manufacturing processes. Today, new developments in additive manufacturing and its pace of innovation for new applications are growing this technology and expanding it into new industries, like aerospace, to solve both old and new problems.

In today's market, traditional and established subtractive manufacturing approaches are hampered by issues related to weight and sustainability while being cost competitive. The price of fuel and aluminum is increasing and environmental sustainability is a growing concern for all industries.

While additive manufacturing was previously seen as expensive and limited in terms of both part performances and production scaling, new advances are starting to change the landscape of manufacturing. Additive Fusion Technology (AFT) is a new design and manufacturing standard that leverages new developments in software and hardware to solve previously identified problems with composites manufacturing, making it truly competitive with traditional subtractive manufacturing on cost, performance and sustainability.



9T Labs, who have defined AFT technology, have made it their mission to help mobility OEMs reach climate-neutral products by introducing this new design and manufacturing standard. The Switzerland-based company continues to bring innovation through the development of new applications for AFT across multiple industries, including aerospace.

The value of AFT in aerospace applications

AFT is a multi-step process that combines integrated software with automated, precision additive manufacturing processes and advanced post-processing. AFT brings together design and simulation software, build modules for manufacturing preforms, and fusion modules for fusing and



2

“Parts made with AFT offer a low buy-to-fly ratio along with excellent corrosion resistance”

compression preforms and, optionally, other materials together.

By automating the process of composite manufacturing, AFT allows for metal substitution of high-strength parts that are lighter, cost less and offer a zero-waste proposition over traditional metal parts. Through this innovative technology, critical applications such as brackets and seat structures traditionally made with metal can now be mass produced with composite materials.

Because AFT is fast and uniquely suited for production volumes between 1,000 and 100,000 parts per year, it is a viable alternative to metal and conventionally manufactured composite parts, especially those with small and complex geometries.

Compared to aluminum, the AFT process reduces the weight of parts by about half and cuts production time and costs, while maintaining mechanical performance, including dimensional stability. Parts made with AFT also offer a low buy-to-fly ratio along with excellent corrosion resistance. Therefore, AFT is an ideal choice for components used in the aerospace industry.

CASE STUDY

The overhead bin pin bracket

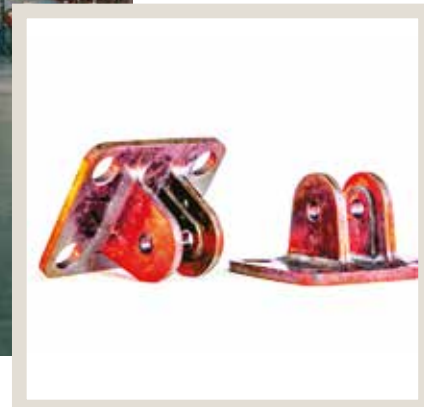
Working with composite manufacturing research leaders at Purdue University, 9T Labs embarked on a collaboration to explore AFT-produced aerospace applications at Purdue's Composites & Manufacturing Simulation Center in West Lafayette in the United States.

A three-dimensional overhead bin bracket for aircraft was chosen as the test case since its geometry is relatively complex, which would showcase the advanced capabilities of AFT. Purdue had also previously benchmarked this part with composite materials.

The team developed a strategy to use 9T Labs' AFT solution to print a continuous fibre preform (20 per cent of the final part weight) of the bracket and co-mould it with carbon fibre platelets (80 per cent of the final part weight) in the fusion process.

The efficient design and manufacture of these high-performance parts using thermoplastic discontinuous fibre bulk moulding compound (BMC) platelets and continuous fibre preforms using AFT cut weight by 45 per cent and

1. Small items at high volumes contribute substantially to an aircraft's overall weight
2. 9T Labs' Blueprint workshop
3. Composite overhead compartment pin brackets



3

reduced production costs by 50 per cent compared to its machined aluminum counterpart. The AFT-produced bin pin brackets also have higher strength, lower variation and last longer than their aluminum counterparts.

In terms of recyclability, while aluminum is well-established in the aerospace industry, recycling it is more energy-intensive compared to the AFT and carbon fibre process. Due to the rapid recyclability of thermoplastic-based versus thermoset-based composites, this represents a more sustainable manufacturing approach.

9T Labs has successfully demonstrated the upcycling of thermoplastic fibre composite scrap material by leveraging software engineered and additively manufactured continuous fibre preforms (< 20 per cent of entire structure) to obtain a > 85 per cent performance compared to the virgin baseline parts described above. This opens a real opportunity of even more sustainable and more cost-competitive high-performance parts.

The overhead bin pin bracket may just be one small part on a large aircraft, but there are hundreds of brackets, hinges and fittings on an aircraft that, if made with AFT, could contribute to significant cost and weight reductions. ©



People often forget that there are two cabins on an aircraft and most don't stop to think about the one below. But that's where one entrepreneur has focused much of his effort during a starred career in product development

Bill Boyer Jr has his own Wikipedia entry. One significant highlight of his industry career reads thus: "Boyer, who dropped out of college, was an entrepreneurial-minded baggage handler at Seattle-based Alaska Airlines when, in response to information posted about inflight entertainment challenges on the Alaska Airlines employee website, he conceived of a portable hard-disk based video on demand media player that he later named the 'digEplayer'."

It goes on to explain that after securing US \$2.5 million in financing, Boyer contracted with the San Diego-based e.Digital Corporation to develop and produce the device. He then convinced 20th Century Fox to provide first-run movies on the device for his employer Alaska Airlines before going on to sign up over a dozen more airlines that wanted to offer the digEplayer to customers.

In 2003, Boyer sold the company to Wencor which rebranded it as the 'digEcor' and it is that success which has provided the tried-and-tested credentials that have supported a lengthy career as a prolific inventor and entrepreneur.

Indeed, the money that the sale of the digEplayer generated allowed Boyer to develop a whole series of innovations, many of which have centred on the cargo hold of the aircraft, something for which his baggage-handling experience made him well suited.

Boyer explains that during his time at Alaska Airlines, the hours spent working in the cargo hold allowed him to muse about the causes of damage to the aircraft. Combined with his college engineering education that helped him master technical drawing, he saw the potential of making a career out of designing products for airlines. "And then I did," he laughs.



1



2

“FOR YEARS, WE KNEW THAT THERE WAS LOAD SHIFT HAPPENING IN CARGO HOLDS”

His experience of developing the digEplayer meant he already had invaluable experience dealing with manufacturing engineering companies plus the associated marketing and intellectual property aspects of product development. “I just took the same approach to the ideas I came up with. I replicated it every time and it worked,” he calls.

Boyer’s most successful product to date has been the Cargo Door Shield which has paid back its cost many times over for both Alaska Airlines and Southwest Airlines. It is basically a protective shield that goes on top of the Boeing 737 cargo door which, due to opening inwards, receives a lot of damage. Both airlines are understood to have virtually eliminated all door damage due to loading thanks to the shield.

And then there’s Boyer’s Cargo Stop Block that has been flying since 2012. It is positioned in the forward cargo pit of the 737 to stop load shift on landing and prevents the cargo doors from being blocked.

\$30
MILLION

An airline can potentially save \$30-\$60 million a year by solving load shift, reducing fuel burn

“For years, we knew that there was load shift happening in the cargo hold of Boeing 737s. So, we hired a third-party engineering analytics firm to conduct a study on the -800, -900, Max 10, 9 and 8 which just completed. We did that because a legacy carrier reached out to us last summer and said they had had several hundred load shift incidents on their 737s in five months.

Study results

The results of the study left everyone shocked. Admittedly, Boeing recommends carriers secure loads with straps and a crushable bag or object, although Boyer believes that few airlines are actually doing that.

The problem is this: when the cargo load shifts, it moves to block the inward-opening door. “In a less serious case,” Boyer explains, “it’s a slight delay because the ramp agents can kind of finagle their way in there, but oftentimes it’s so blocked that what they have to do is remove a row of seats and go in

from the passenger cabin and to physically get a guy through the blowout panel. That means time and money.”

“There’s also a fuel savings aspect to load shift and if you can save \$30-\$60 million a year on fuel that’s a lot of money,” says Boyer. He adds, “What load shift does is it causes the flight crew to trim the plane in such a way, and that causes significant fuel burn.”

Again, Alaska Airlines has confirmed that they no longer have any load shift issues through using the product in the forward pit.

Both the Cargo Door Shield and Cargo Stop Block are now long-tested products although they are routinely improved. For example, the Cargo Stop Block was launched weighing 25 pounds. Once Boyer redesigned it, he got that down to 8 pounds. Despite their success, the market exposure of both products

1. A Shoring Tray carrying a motorised wheelchair

2. Bill Boyer with his innovative new Shoring Tray invention



1. Shoring Tray on an Embraer 175
2. Cargo Door Shield and Cargo Door Sill Guard

“RENDERINGS LOOK SO REAL THAT THE AIRLINES THINK IT’S AN EXISTING PRODUCT”

has been relatively limited to date. “We never really advertised at all,” explains Boyer, “even though we have long-term customers who have seen so many great results.”

A tentative marketing push has led to several airlines around the world contacting Boyer’s company AMAI which now, encouraged by the level of interest, is preparing to partner with a Texas manufacturer in a bid to extend the geographical reach of these products.

Boyer will be heading to this year’s Aircraft Interiors Expo (AIX) with upwards of 15 products for the cargo interiors equipment market. This will include a Cargo Door Sill Guard that attaches to the lower corners of a Boeing 737’s cargo doors – although it can be easily adapted for other aircraft types.

Boyer invented this door sill protector – in which three major airlines are very interested and two are testing right now – after airlines flagged a problem with heavy extendable baggage loading systems which, if they’re not installed perfectly in the door, can damage the sill of that door to the point where it has to be removed and replaced.

The main excitement however this year will be reserved for his latest product, a Shoring Tray, which is already flying with Alaska Airlines-owned Horizon Air. The floor panel product, which allows airlines to transport heavy wheelchairs, actually went from concept to purchase order in a matter of 40 days. Horizon Air has equipped its entire Embraer fleet with this new product, enabling them to end their embargo on mechanised wheelchairs. Boyer has several other airlines pursuing the same program.

Embraer

Boyer explains that the Embraer 175 and 190 aircraft type has a cargo hold that is only rated to 100 pounds per square foot, whereas heavy motorised electric wheelchairs can weigh anything up to 450 pounds. “So, for a regional airline such as Horizon, its only option is to either ship that wheelchair via FedEx or allow the passenger to rent a different wheelchair so it’s very, very expensive,” he says.

So how does Boyer come up with so many inventions that lessen or eliminate damage and delays and market them so successfully within weeks when most people who sell to airlines take years?

“When I come up with an idea, I sketch it out then I have a guy that can render my product and make it look real,” Boyer says. “Then, if I get any takes on it from the airlines, I have an engineer do the drawings for it and we make a prototype. Here, I reach out to companies that can do 3D printing. Later, I’ll reach out to companies that have machine shops. If they can do it, then I give them a contract to make me samples.”

“I have to admit,” he adds, “that renderings look so real that the airlines think it’s an existing product. You can save so much money by doing renderings versus going and making a product right off the bat. I try to present three or four different views of the product; that is enough to get airlines get super interested. Then I have to make it,” he says.

Greg Latimer, who headed Alaska Airlines’ branding and marketing activities and today collaborates with the entrepreneur as president of Skycast Solutions, says Boyer is uniquely talented: “I’ve seen this up close because I’ve worked with him now since 2012. He has a unique way of looking at a problem and very quickly synthesising a solution. He also has the ability to apply his engineering skills to make it happen and, thanks to his past successes, he has enough funding resources to throw some money at it and get it done.” ©



Movable Class Divider

for A320 aircraft family

Light, Flexible and Easy to install



- **Easy to install in any type of cabin**
- **Ready to install**
(no additional hardware needed)
- **No installation training required**
- **No PSU units relocation needed**
- **Fully customizable**

The MCD kit includes:

- Central, LH and RH pelmets
- Overhead bins rails
- PSU installation brackets
- Safety placards
- Curtains

Delivered with EASA approved Service Bulletin, CMM, ICA and Form One with a highly competitive **Lead Time**.



Your next preferred
“one stop” design organization

www.abc-int.it

marketing@abc-int.it

(+39) 081-842.43.21

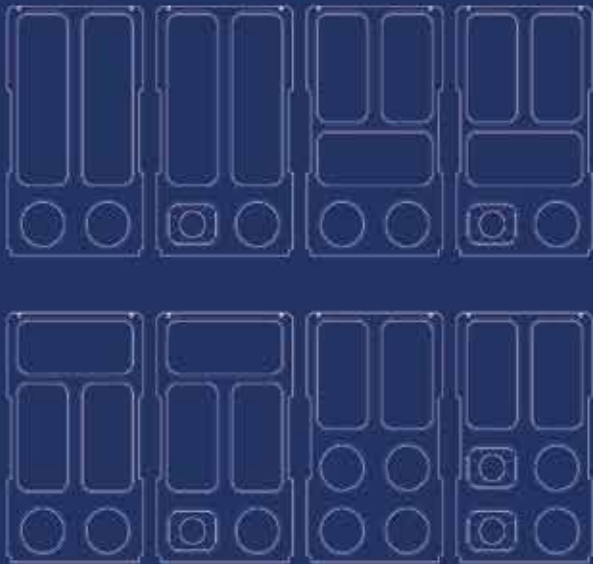


Via Napoli 155, 80013, Casalnuovo di Napoli (NA), Italy



A New Era in Waste Management.

The **ReTrolley** is the ideal solution for managing waste disposal on board, a cabin service trolley for onboard recycling developed, certified and distributed by Iacobucci HF Aerospace to meet the fast growing needs for 'green' solutions in flight. ReTrolley is the final product of a unique vision, **an authentic game changer** that combines a reduced environmental impact with **revolutionary and decisive innovations** which will provide passengers with the most engaging and pleasant experience possible.



www.iacobucci.aero

RETROLLEY

SUSTAINABILITY • RECYCLING • WASTE & LIQUID MANAGEMENT



IACOBUCCI **HF**
AEROSPACE



Lee Clark is senior vice president, strategy, Rosen Aviation

Rosen Aviation

Perfect Partner

Rosen Aviation prides itself in being a lone wolf in a competitive industry. It does things differently. It goes against the tide in pursuit of one thing: building a better mousetrap. **Aimée Turner** met senior VP of strategy Lee Clark to find out more



Visit www.rosenaviation.com for more information



ACM Rosen is known for its unique services, capabilities and custom design solutions that help create advanced cabin technology and entertainment systems, but what makes it different?

LC Rosen is the gold standard in inflight entertainment. That is our forte and has been for well over 40 years now. We work with the entire industry but we're only a small organisation, although we compete globally with the very big players and bring an agility that most lack.

One of the critical areas where we are successful is in the depth of our technological understanding. Within our area of expertise of IFE, we very firmly believe in doing things a little differently.

We are categorically not simply a supplier. We work extremely hard to advocate for our customers and to be a true partner and that means getting involved in programmes at the very earliest stage of ideation.

ACM How do you rate current procurement process?

LC Rosen is a little bit of a lone wolf in the industry. We do things differently. We go against the tide. It's very difficult, changing established paradigms and we're having to do that in many, different ways. We're trying to turn the procurement paradigm around, where people put out RFPs to suppliers.

It's dysfunctional. It doesn't work. It's slow, it's bureaucratic and expensive. It has burdens left, right and centre. Yes, do your due diligence and find good partners, but once you've found them, trust them, share with them and work with them at the very earliest phase of ideation.

ACM What are the risks in not being involved right from the start of a programme?

LC Often, we see OEMs coming up with statements of work, RFPs in isolation, and we spend a lot of time trying to fix those issues afterwards. Our goal is to know our customers better than they know themselves, what problems are they going to run into and whether their vision meets the practical.

As much as we are technology experts, we are experts in 'aviating' technology. Aviation is very conservative, risk adverse and somewhat inward-looking and we are at pains to look outside of aviation to use the best technology. We know what it takes to pass certification requirements that allow us to get the best technology on board the aircraft.

The piece that underpins that most importantly is that we're not simply a technology company. We assess the passenger experience, the brand of the organisation, look at the experience of the passenger within that brand and apply the most appropriate technology to create that experience.

▲ Rosen Aviation works hard to advocate for its customers



“We’ve seen research that the very existence of technology can elevate brand perception, whether used or not”

ACM How do you go about ‘aviating’ novel technology?

LC It’s driven by designing for intent. Five, ten years ago, we designed for zero defects to make a very reliable, high-quality, high-performance product. But if it doesn’t serve the intent, what is the purpose? What’s the use case? How are you improving passenger experience?

We’ve worked very hard across the entire organisation, especially with our engineering development team, to get the engineers to step away from looking at the statement of work and the specifications to ask the question “What is the purpose we’re trying to actually do here?” and “How is this mousetrap a better mousetrap?”

One example would be the significant improvements in various sensing technologies that allow us to turn any surface into a sensing switching surface. That could be the wall. It could be the table. It could be a bezel.

We have seen many OEMs coming to us asking us to basically reinvent a mechanical switch in the form of a solid-state electronic switch. But we push back to ask, “Fundamentally, what’s the experience you’re trying to change to make a better experience?”

ACM How is that challenging approach received by the airline and aircraft operators?

LC Airlines have become very good at understanding their passenger. It is our role to work with them to bring them technologies that meet their desire for an enhanced passenger experience. We don’t expect the airline to be an IFE expert, but that’s a world we know exceptionally well and we work in partnership with them to understand what the problem truly is.

Technology becomes a significant differentiator if it’s applied correctly. We’ve seen research that the very existence of technology can elevate a

brand’s perception among the travelling public, whether they use it or not. Just the fact that the airline has a beautiful OLED large display with touch control and Bluetooth for headphones elevates the brand perception.

ACM So what are what are you seeing in the marketplace in terms of emerging trends?

LC Many of the current tier one and top tier suppliers are hampered by their scale and the bureaucracy involved in being a multi-billion-dollar organisation. That stops them being agile, being responsive. It stops them listening, so they ultimately end up selling what they want to sell. We find that the customers are wanting to take back control.

▲ Rosen Aviation’s Maverick project, a reimagined business jet cabin

Find Your Comfort Zone

Comfort is more than just a cozy seat. Our seating materials, like Promessa AV, are expertly designed to regulate body temperature, providing long-lasting comfort and peace of mind flight after flight.



 **TAPIS**



Global Aviation Partners

Experience Comfort at AIX Stand #7C20

For samples:
914-273-2737 or info@tapiscorp.com



“We build perfect products every single time. Technological innovation has to be there, but you can’t do it at the cost of reliability”

We’re not looking to own that piece of it, however. In fact, that’s where we want to work in partnership. We’re a boutique, we’re a Savile Row tailor. We listen to exactly what the customer wants but we also advocate for them, and we will say “I’m sorry, you are not having bright yellow wide lapels because that is not an appropriate image for what you’re trying to do. Let us show you how you can have the experience you want to have with the right technology.”

ACM Does Rosen have any additional value propositions?

LC Our value proposition is not only our insight but also our precise execution. We have a 100 per cent on-time delivery record. We have metrics and measurements on just about every single thing, month-on-month rolling metrics on delivery, on production, on repair

stations and on internal phase gates for the development process.

And reliability comes almost first. We have zero manufacturing workmanship issues. We simply build perfect products every single time. Technological innovation has to be there, but you can’t do it at the cost of reliability. We’re a very process-driven organisation, sometimes to our detriment. It’s a knife edge to walk between zero defects on one side and being fast and agile on the other. But somehow, we manage to do it a lot better than anybody else.

ACM Where do you see the market headed in terms of advanced and innovative IFE propositions?

LC Rosen is bringing three critical areas to the market: a significantly enhanced viewing experience and game-changing audio experience, as those two go hand in

hand, in addition to a radically different architecture to support that. You have connectivity between the aircraft and ground, between servers and displays, but how are you moving that content around all those devices?

What we find is that people are wanting to have the same experience that they have at home. They already have almost the same experience in their car. They have smart apps on their phone or smart TVs with apps at home so they want that continuity. The passengers also want to take back control. They don’t want to sit there and watch the 100 movies that you selected for them. They want to watch whatever they want to watch from an almost infinite list. 

▲ Rosen Aviation foresees a radically different IFE architecture

Make aerospace parts strong, lightweight and sustainable like never before

Experience the new composite design & manufacturing standard for aerospace interior parts



From idea to production in no time

Get the needed tools to start your production in small batches and scale it up in no time. With our end-to-end process, you will be able to massively reduce your time-to-market, while limiting the financial risk you take.



Zero waste and cost efficient

Reduce your carbon footprint with environmentally friendly materials & processes that eliminate waste and minimize use of resources.



Strong as metal but at least 50% lighter

Replace heavy metal parts with the most lightweight fiber composites while not giving up on strength.



Creating the comfortable cabin environment

Having the appropriate pressure and temperature in the aircraft cabin is vital for passenger comfort and wellbeing. *Bernie Baldwin* learns how that can be achieved from some leading players

When you've nicely settled into your seat, the door is closed and pushback has started, it can

be really irritating if the air in the cabin just does not feel quite right. It might be the wrong temperature or a feeling of stuffiness, but the overall effect can prevent a passenger from thoroughly enjoying a comfortable flight.

The technology to ensure that scenario does not arise is the environmental control system (ECS), which is designed to regulate the cabin pressure and temperature. That includes the individual air vents above each passenger. The result should be a cabin environment which meets all the necessary hygiene factors.



◀ Careful control of heating, ventilation and air conditioning is a complex task in the cabin

“AIRLINES, OEMS AND THE PUBLIC ARE JUST STARTING TO REALISE HOW IMPORTANT CABIN AIR QUALITY IS”

David Yokota, senior director, air management systems, Honeywell, assesses the elements of the system which provide required balance, especially when some passengers keep their individual vents open and others don't. “The vents, which are also known as ‘gaspsers’, can let in cooler air, but not hot air. The aircraft cabin can be subdivided into zones where a separate temperature controller can be used to monitor and adjust the bulk average temperature within the zone,” he remarks.

“The passenger vents affect only the very local temperature near the air stream, but the temperature controller for that zone of the cabin works from the average temperature sensed in an area that is remote from any specific vent. The number of zones will be specified by the aircraft manufacturer,” Yokota comments.

Within an ECS are a number of elements – diffusers, coolers, HVACs (heating, ventilation and air conditioning). Yokota notes that the key design principles behind these vary due to the nature of the equipment. “The overarching principle for ECS design though, has been to minimise size, weight and power usage,” he adds.

Collins Aerospace is another of the big manufacturers of such systems for a wide range of commercial and military platforms. “Specifically, on the commercial side, we support business, regional, single aisle and twin aisle aircraft, most notably on the Boeing 787 and 777 and Airbus A380,” states Paul D’Orlando, the company’s director of business development, environmental & airframe control systems.

The key design principles at Collins are in a similar vein to those at Honeywell. “We are always working to reduce the weight, complexity and part count of our

systems. We already have systems in service that include composite parts, and we’ve integrated various assemblies to reduce part count,” D’Orlando confirms. “In addition, we are actively developing additively manufactured parts for future systems that open a range of benefits including reduced weight and part count and improved thermal performance.”

The benefits of Collins being part of an industrial giant are also being put to good use in collaborative efforts. “Working with our sister Raytheon Technologies business Pratt & Whitney and the Raytheon Technologies Research Center, we are developing new power thermal management solutions to enable the aircraft of tomorrow, while also supporting upgrades to today’s fleet. We want to find the most efficient way to integrate between propulsion, electric power generation and thermal management. By designing more efficient air management systems which use less engine bleed air, we can help improve engine performance and optimise fuel burn,” D’Orlando explains, highlighting the integrated nature of the ECS and other systems.

Bleed air

Although not an outright ECS supplier, PTI Technologies does provide cabin air filtration technology and is also exploring bleed air filtration, according to David Conrad, the company’s vice-president of business development.

“Bleed air is used on commercial aircraft today for many applications including fuel tank inerting systems (FTIS) and the environmental control systems (ECS). However, bleed air contains many contaminants including carbon monoxide (CO), carbon dioxide (CO₂), ozone (O₃), hydraulic fluids, engine

oils, pyrolysis products, volatile and semi-volatile organic compounds (VOC/SVOC) and particulates,” he notes.

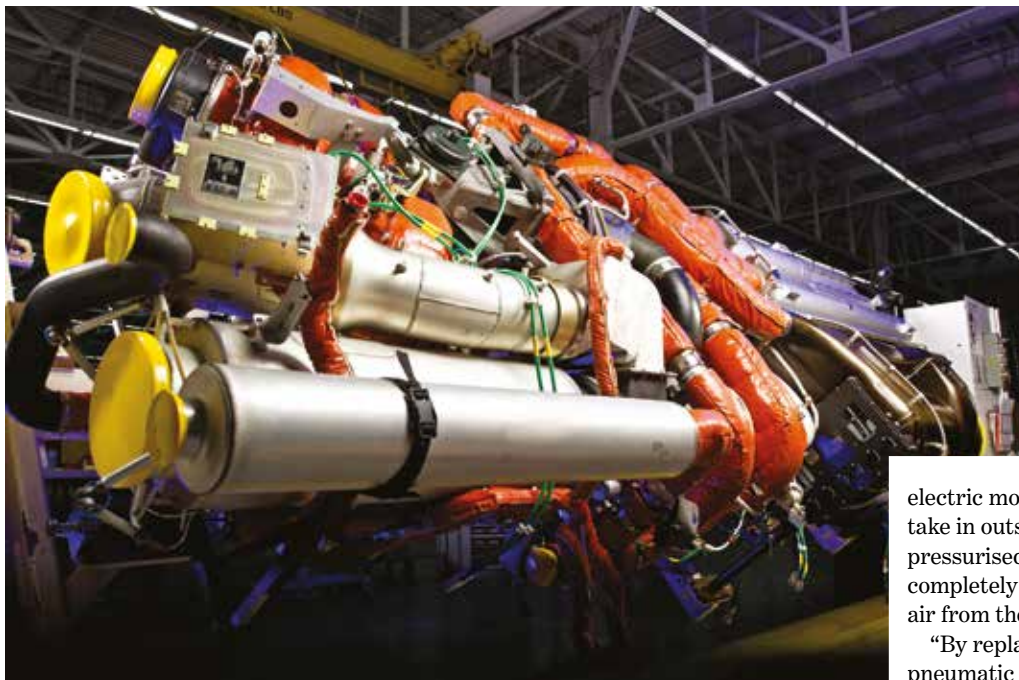
“In the ECS, removal of contaminants is essential to improve cabin air quality for the safety and well-being of crews and passengers. Commercial aircraft have HEPA filter systems for the recirculated air, but there is no filtration of the bleed air used in cabin air,” Conrad notes.

“As we start to think of air quality based on safety, instead of just comfort, decision making by airlines dramatically changes regarding how we attain clean air in the cabin. This is more important today as we work to provide a safe cabin environment to remove bacteria and viruses. Airlines, OEMs and the travelling public are just now starting to realise how important cabin air quality is to the aviation industry,” Conrad stresses.

PTI Technologies has a long history in this field, its first application of cabin air filtration technology being in military aviation in the 1980s for the Northrop Grumman B-2 programme. This paved the way for continued work on a variety of other military and manned space programmes right through to today.

This continued investment enabled PTI Technologies to move into commercial programmes too, developing patented integrated filter technology to capture bleed air contaminants. “We applied this technology to FTIS filtration applications with flows of 0.07 ft³/min (33 cm³/s) and temperatures up to 71°C to provide significant weight and envelope savings for FTIS, as well as extending the life of the air separation module,” Conrad elaborates.

“Now we are applying this technology to design bleed air filtration for the ECS where the filter must handle high



◀ Collins Aerospace offers the only 100 per cent fresh air ECS for large commercial aircraft

“PTI IS DEVELOPING THE NEXT GENERATION OF FILTERS TO REMOVE PARTICLES, GASES AND VAPOURS”

flows up to 1,200 ft³/min (566,337 cm³/s) and high temperatures up to 250°C. We are currently testing at ambient temperatures (21°C) and challenging the filter with various contaminants including toluene, engine oils, carbon monoxide, ozone and propylene glycol. Our initial test results are very positive and given our 60+ years of experience in filtration design, we are confident that PTI's integrated filter design for bleed air application will provide clean bleed air to the ECS for our OEM customers.”

PTI is also investing in developing filter systems for recirculated cabin air. “Standard HEPA filters clean recirculated cabin air impurities that originate from a confined space with lots of people. HEPA filters only capture particles (dust, fibres, bacteria, fungal spores and pollen), not gases and vapours,” Conrad explains.

“PTI is therefore developing the next generation of cabin air filters combining HEPA with activated charcoal imbedded into the weave to remove particles, gases and vapours from recirculated cabin air with encouraging filtration performance results exceeding current options in the market,” the VP declares. “We're committed to developing the filtration

technology necessary to provide aircraft manufacturers and airlines with the best possible cabin air quality.”

Smoke detection

Alongside delivering clean air into the cabin, some ECSs perform smoke detection too. Should airlines want that attribute, there are a number of ways to acquire them. “Aircraft use smoke detection systems in the aircraft cabin and are typically procured separately by the airframe manufacturer, although they can be supplied by the ECS manufacturer,” says Honeywell's Yokota.

“If smoke is detected, the cabin pressure control system is typically commanded to dump the cabin pressure – depressurising it to a predetermined safe level – to purge the smoke, and the ECS directs more fresh air flow into the cabin,” Yokota adds in explanation.

If cabin air filtration technology is considered PTI's key product, then the equivalent at Collins Aerospace is a particular ECS. “Our most advanced environmental control system is the one we provide for the Boeing 787 – the only 100 per cent fresh air ECS for a large commercial aircraft application,” declares D'Orlando. “The system's

electric motor-driven compressors take in outside ambient air and provide pressurised air for the cabin, thus completely decoupling the engine bleed air from the cabin air.

“By replacing the traditional pneumatic engine bleed air control system with electric motor-driven compressors, the ‘more electric’ system also enables a significant engine fuel burn improvement. This architecture continues to be an area of focus for our future research and development,” he adds, emphasising the ‘sustainable’ credentials of the system. “We believe our 787 ECS represents the future of cabin air conditioning – the technologies may not be employed in exactly the same way, but they will likely become more widely adopted going forward.

“The advantages for fuel efficiency are significant. Rather than constantly drawing bleed air from the engine, the 787 ECS compresses its own air and only compresses as much as it needs. The ECS is the largest energy user on the aircraft besides propulsion,” D'Orlando elucidates. “More than 3 per cent of fuel on any given flight is used for air conditioning and cabin pressurisation alone, so any reduction in bleed air consumption for the ECS can have a meaningful impact on fuel usage and, in turn, carbon emissions.”

The more efficient and ‘greener’ operations of the aircraft resulting from such a system is unlikely to enter a passenger's thoughts as they enjoy a flight with just the right cabin temperature and air that feels fresh. But with their immediate environment under control, most travellers are likely to approve of a system that not only provides a comfortable flight, but which reduces the flight's impact on the wider environment outside the cabin. ©

WHAT IF...

(PASS)

We could make life easier for each passenger?
(especially those with disabilities)

With Our Passenger Accessibility &
Services System (PASS) ...WE CAN !



With our (PASS) System, you can now enjoy ultimate comfort
with control of vents and air pressure at your fingertips with Braille.

PASS has been designed and built upon the foundation of our highly successful PES/PSS+P system, operational since 2014, that provides individual passenger control of reading/call lights/chimes, audio volume/channel selection and USB power all rolled into one PCU unit. Like the PES/PSS+P system PASS is fully compliant with all DO-160 airworthiness requirements.



Patent Pending

4650, Côte Vertu, St.Laurent • Québec, Canada H4S 1C7
514 331.9771 • inflightcanada.com



SEE HOW
WE DO IT !





WOULD YOU COMPROMISE ON YOUR IMMUNE SYSTEM?

Better protected from virus and colds.
Better wellbeing. Better comfort.

Cabin air dehydrates people. A long distance aircraft requires active humidification in order not to be more dehydrating than any place on earth. Discomfort with dry cabin air include fatigue, jet lag, red eyes, dry skin, more susceptible to virus diseases, etc.

www.ctt.se

HUMIDIFIER ONBOARD TRANSFORMS THE EXPERIENCE.

CTT:
SYSTEMS

THE GOLDBLOCKS SYNDROME

Professor Peter Vink discusses the challenge of finding the correct cabin temperature

Sixty-eight per cent of passengers report a poor experience related to the temperature on an aircraft, according to a survey of 900 flyers conducted by Tapis in 2023.

Sometimes, it is experienced as too cold by passengers, sometimes as too warm. While mostly experienced in mid-flight, entering an aircraft with no air conditioning can also lead to discomfort. When it is hot outside, the aircraft is often even warmer; when it is freezing, the aircraft can be very cold.

Differences

Research shows that humans are not capable of defining the absolute value of temperature. Human sensors are good at noticing differences but not absolute values. A draught is immediately felt, but a slow change is not.

A 2008 study by Kolarik showed that if you increase the temperature 0.6 degrees Celsius every hour in an office

“ONE OF THE DIFFICULTIES IS THAT PASSENGERS ARE PASSIVE”

for four hours, people do not feel it. At a certain point, people get too warm or too hot and they start noticing it although there is a range where humans do not complain about the temperature.

Individual

When humans are active, a lower environmental temperature is preferred. When they are passive, they need a higher temperature to feel comfortable. That means that in an aircraft, the temperature can be relatively high, between 21-25 degrees Celsius.

Of course, it also depends on clothing and if you have a blanket or not. Some airlines even turn the temperature down to sell more blankets. Preference over temperature differs therefore

not only according to activity but also between people.

This means that personalisation of temperature is a way to achieve improved comfort ratings. A blanket, a shawl or a passenger service unit (PSU) making a cooling breeze can allow the passenger to have some influence over temperature. This is important as it gives a feeling of control, independent of what other passengers prefer.

One of the difficulties in a cabin is that passengers are passive, thus requiring a higher temperature, while flight attendants are active and so requiring a lower temperature. The flight attendant's perception might be that it is too hot and they might adapt the temperature according to their perception or ask the pilot to change the temperature, which could make it too cold for the passenger.

Head/feet

Research has shown that for good sleep, humans need warm feet and a cool head. In an aircraft, it is mostly cold at feet level and warm at head height. Solving this is not easy as warm air usually rises. In some aircraft there are heated floors in the galleys, which are appreciated by flight attendants.

It is however not easy to implement heated floors throughout the whole cabin as airflow is needed to let air pass through HEPA filters. These are needed to clean the air and have become especially important in Covid times. Modern aircraft like the Boeing 787 and A350 have better temperature regulation, which should lead to less passenger complaints so, in the future, complaints about temperature might be reduced.

However, there is always the human factor. The fact that busy cabin crew control the temperature could lead to too high or too low temperatures. 



Professor Peter Vink, TU Delft's faculty of industrial design engineering



GOOD MEDICINE

Stephanie Taylor surveys the post-Covid content landscape and discerns several significant trends

The pandemic accelerated changes across the aviation industry, including the in-flight entertainment sector. Airlines suddenly pivoted away from a heavy reliance on Hollywood blockbusters and are now throwing more weight behind other formats.

Wellness content here to stay

Those that flew during Covid-19 were subject to much additional stress on the day of travel. As well as any general anxiety around an evolving virus, and travel rules that changed quickly along with it, they were inevitably faced with long queues as a result of short-staffed

airports and the need to present increased paperwork.

Thus, it was broadly accepted that airlines should provide health and wellness-related in-flight entertainment (IFE) content that comforted passengers and helped them to feel more in control. Etihad's Asif Khan, head of inflight entertainment and publications, says, "The emphasis on wellness was a trend we saw post-pandemic, so we worked with the makers of the Calm app to bring mindfulness and meditation onboard."

The interest in such content hasn't faded now travel has returned to normal. According to the Global Wellness Institute, "The world wellness economy is worth \$4.4 trillion and forecast to

reach \$7 trillion by 2025." The increase in airline interest in this type of content reflects the wellness boom on the ground, with multiple alliances between carriers and health and wellness companies continuing to be announced this year.

In January, Spanish airline Level and content service provider (CSP) QuiverTree Media engineered a partnership with Caravan Wellness to bring yoga videos and mindfulness sessions onboard. In March, Virgin Atlantic teamed up with Pancea Health on in-flight videos to relieve neck, shoulder and lower-back discomfort.

But wellness content also stretches beyond just physical and mental exercises. Estibaliz Asiain, SVP media & content at Anuvu, identifies 'wellness/environment' as

1. Etihad's offering now includes big brands such as HBO Max and TED Talks
2. Air Canada's WhereWeFly shows route maps to facilitate future trip planning
3. Panasonic's Arc moving map has a host of innovative new features and data

one of the key areas in which the company is "diversifying its entertainment library."

It recently confirmed partnerships with personal growth platform Mindvalley and self-proclaimed "media powerhouse of positivity" TheSoul Publishing, which creates original short-form content.

Asiain explains: "With the proliferation of content from growing streaming services, and the reduction in theatrical windows, many people have already seen the major newest titles at home. We know that travellers want content that is different to what they can view at home."

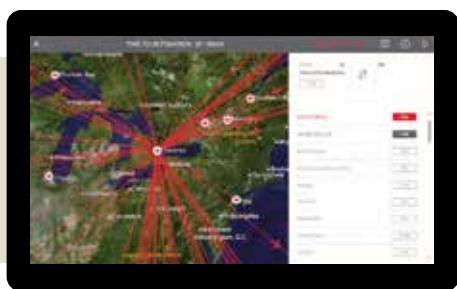
Streamers rival Hollywood studios

Not long ago, management consultant firm Kearney released the results of a survey it conducted of over 3,000 people across eight countries regarding inflight entertainment and connectivity (IFEC). They showed that although over 80 per cent of respondents considered IFEC an important or very



1

AIRLINES FACE GROWING DEMAND FOR WELLNESS-BASED IFE AND MORE VARIETY IN ONBOARD CONTENT



2



3

important factor when selecting a long-haul flight, only 35 per cent felt access to the latest Hollywood movies was important when choosing who to fly with.

Kearney believes this conveys a shift in preference away from movies to other content, including TV series, audiobooks and games. Supply and demand seem to be in step here, with Kearney noting that "in 2015, there were 706 Hollywood movie releases and 420 US scripted series, but in 2020, 493 series outnumbered just 329 movie releases."

As with wellness, airlines have increasingly been responding to this new paradigm since the pandemic. For example, in December British Airways announced

a collaboration with Paramount+ in the form of a branded channel on its Highlife entertainment platform featuring a selection of Paramount+ series.

These kinds of deals are a win-win for both parties. The tie-up between the two companies swiftly follows the launch of Paramount+ in the UK, which took place in June 2022. In the official news release, Anna Priest, chief marketing officer for Paramount UK, stated, "This partnership is a fantastic platform for our continued growth in the UK."

Etihad has also recently "introduced big brands like HBO Max and TED Talks to [its] content mix, keeping in-line with viewing trends on the ground," says Khan.

Such strategies very much demonstrate Asiain's view that "streaming services, from Apple to Hulu to Peacock and others, are all keen to access the inflight market." She explains, "They see the potential of attracting new home subscribers, while the airlines enjoy having new sources of high-quality entertainment."

And CSPs also benefit from relationships with streaming platforms. Asiain continues on to say that partnerships with streamers is one of Anuvu's key offerings. It recently entered a strategic partnership with MUBI, wherein it represents MUBI's content through its global aviation and maritime market distribution network.

Sotiris Damianos, VP business and market development at QuiverTree Media, echoes the importance of such tie-ins. "From apps on smartphones to subscription services on smart TVs, digital platforms are the new content distribution vehicles. Access to OTTs and branded channels give airlines a wider variety of content and a greater flexibility in models to cover the cost of content. With relentless margin pressure in the industry, airlines have recognised



◀ Anuvu has partnered with the global streaming service, production company and film distributor MUBI to offer its content

“THE MOVING MAP CONTINUES TO BE AN ENDURING STAPLE IN AN AIRLINE’S IFE OFFERING”

the financial advantages of a highly innovative CSP which focuses on OTT collaborations and revenue generation.”

Big brands will stick to household names

While there are certainly many positives to the increased visibility of streaming content onboard and the diversification away from predominantly Hollywood film content, there are also some interesting consequences.

Damianos feels that as a result of “the globalisation of entertainment”, certain content is harder to come by. “Straight comedy content, namely hit films purely based on the comedy genre, is harder to acquire from traditional sources as it depends on local or cultural appeal.”

He explains that this fact, in addition to Hollywood Studios falling prey to high interest rates, means “it is a safer bet [for them] to invest in action films with brands and build humour into those titles. These already draw the public because of internationally recognised heroes.”

“Distribution models are generally unstable, and studios are quickly realising a good show is sufficient to sustain streaming platform performance,” Damianos goes on. “IFE

ultimately will see the available volume of new blockbuster releases shrink at least in the short term. Studios will be more conservative rehashing existing brands which in turn implies big IFE movie releases will feature more familiar characters.”

Damianos believes this is where social media and local content can fill the gaps, with the latter being a key differentiator for airlines. For Etihad, this is an especially important feature on its short-haul flights. “Our short-haul aircraft largely operate a regional network, so the programming on these aircraft is skewed towards a regional demographic,” states Khan. On the former point, Estibaliz agrees that “social media video content such as TikTok, Instagram, YouTube and gaming [are] huge areas of growth for inflight entertainment”.

Reimagining the moving map

While it seems like there’s been a sea change in the way the entertainment world operates over the past couple of years, the prospect of some familiarity doesn’t seem like a bad thing. Perhaps that’s why the moving map continues to be an enduring staple in an airline’s IFE offering, albeit revamped for the 21st century.

Jace Hieda, product marketing manager, digital solutions at Panasonic Avionics Corporation (PAC), says: “Maps are one of the most popular forms of IFE content and there are many reasons why. For some, it’s simply nice to see live updates of their trip, as well as the time of arrival. For others, it’s a shameless opportunity to geek-out: to explore the different unheard-of locations, compare different altitudes and changing temperatures, track time zones and even airspeed. The live map can also act as anxiety-reducing content for some passengers, as it gives reassurance during their flight.” And so we’ve gone full circle – was the moving map an original form of wellness content?

PAC is making sure passengers have a lot to geek out about with the latest upgrades to its Arc moving map product, unveiled at last year’s APEX/IFSA EXPO. New features, such as the ability to track live weather at the flight’s destination as well as other locations of the passenger’s choice, are enabled by live data gathered via inflight connectivity. Arc Flight Simulator, which will become available this year, allows passengers to take simulated control of their flight, navigate the world and play flight-related games.

PAC aren’t the only ones innovating in this space. FlightPath3D has launched two exciting new additions to its moving map product. Where WeFly entered service with Air Canada across both its in-seat and wireless IFE offerings in September 2022. The premise is that by visualising Air Canada’s route map and giving passengers information on flight dates and times alongside aircraft details, they can use their flight to plan their next trip with the carrier. This announcement followed the news that Southwest Airlines’ moving map, powered by FlightPath3D, incorporates Destination Reels: mobile-friendly, short-form videos for all Southwest destinations.

Whether passengers choose to spend their flight meditating, mapping their route or devouring movies, it’s clear that airlines and passengers alike will continue to benefit from a diversification of media content. 🍿

Sustainable lightweight construction with a long tradition



Meet us at AIX in Hamburg
from June 6–8, 2023
Hall B5, Booth 5D60

bucher-group.com

BUCHER  **70** Year Anniversary
Effective Solutions
since 1953

Lighter on the inside so versatile...

Complex window
 housings combining
 different grades

ZOTEK® F

high-performance
 foam for
 aircraft interiors

Flexible ECS ducting
 for weaving through
 airframe

*Weight
 savings of
 up to **70%**

*versus traditional materials

Trough and gutter system
 channels condensation

Compatible with a wide
 range of conversion
 techniques for complex
 component production

Products courtesy of Technifab Inc.

Aircraft Interiors | **EXPO®**
6 - 8 JUNE 2023
HAMBURG, GERMANY

visit us
on Booth
7A57



ZOTEFOAMS

www.zotefoams.com



General Release

Sotiris Damianos, VP of business and market development at QuiverTree Media, outlines the challenges facing an industry that is expanding with more audiences than ever before

ACM During COVID-19, airlines and CSPs talked about focusing on light-hearted, uplifting content and wellness-related content for IFE. Now we've 'returned to normal', can QTM talk about any content trends it is seeing coming down the pipe?

SD Without going into the technical implications of connectivity, if we look at the content trends from an entertainment industry perspective alone there are two key trends we are seeing.

On one hand you have entertainment industry pressures. Studios are cutting back after excess investment, given economic and market forces. Streaming was the staple during the pandemic and has thinner margins in comparison to cable. We have seen some of the biggest theatre chains enter bankruptcy or become plagued with significant debt.

"IFE ultimately will see the available volume of new blockbuster releases shrink, at least in the short term"

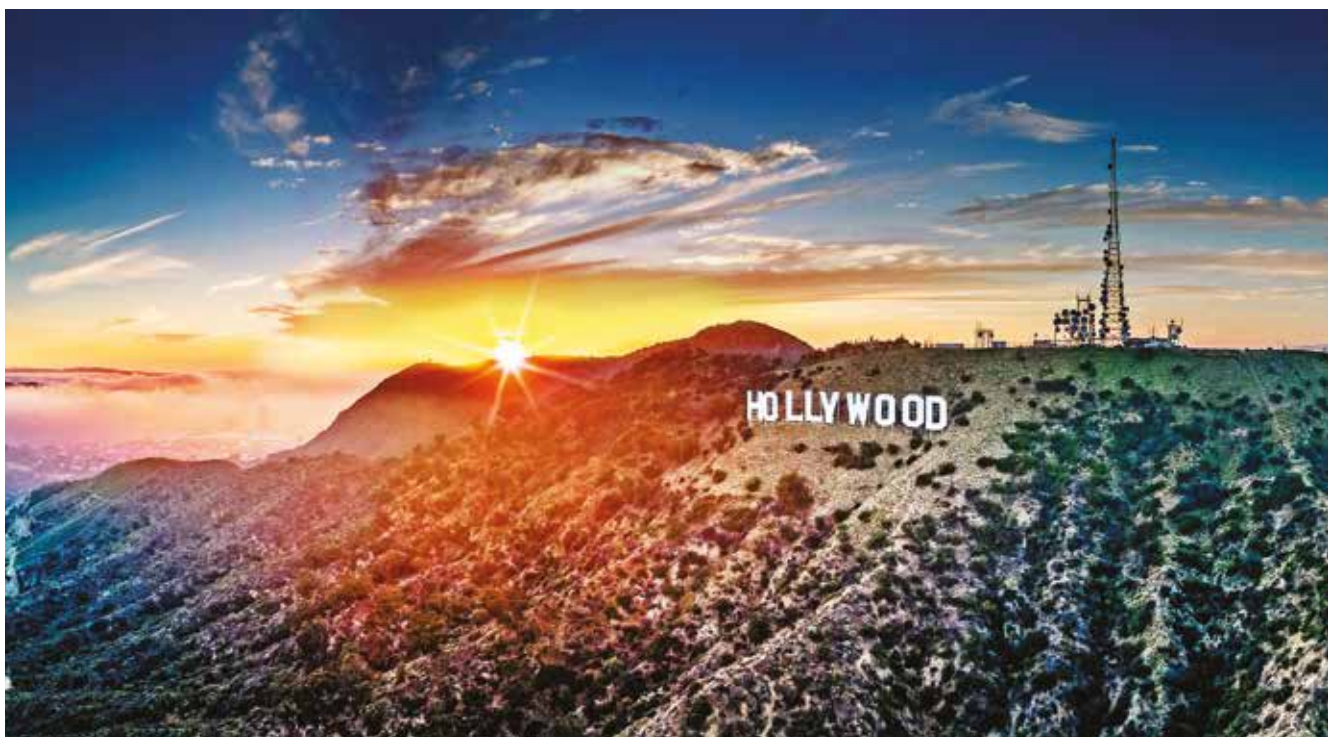
Theatrical performance directly influences the marketing opportunity for big draw titles. This coincided with an excess in independent content during the pandemic which majors are now moving away from. Distribution models are generally unstable, and studios are quickly realising a good show is sufficient to sustain streaming platform performance.

IFE ultimately will see the available volume of new blockbuster releases shrink, at least in the short term. And with higher interest rates, money becomes more expensive. Studios will be more conservative, rehashing

existing brands, which in turn implies big IFE movie releases will feature more familiar characters. Finally with ongoing convergence of tech and entertainment, cash rich players like Amazon and Apple may spur on further industry consolidation and add inflationary pressure on premium content.

At the same time, the industry is expanding with more audiences than ever before. Hollywood studios are scrapping Covid safety measures, saving them

▼ Hollywood studios are scrapping Covid safety measures, helping to reduce financial pressures





TAKE BACK CONTROL

At Rosen, our one-word mission is simple: *ADVOCACY*.

By designing for intent rather than focusing solely on the technical specification, choosing Rosen means choosing a partner that understands your brand vision. A partner that helps you take control in delivering an unmatched experience.

VISIONARY INSIGHT | PRECISE EXECUTION

ROSEN
AVIATION



“Access to OTTs and branded channels give airlines a wider variety of content and a greater flexibility in models to cover the cost”

money, and most majors (other than Netflix) will support theatrical release strategies of a few weeks before home streaming to give them a marketing edge.

This means the blockbuster lustre will coexist within a broader context of content, and this will also be reflected in IFE propositions. Fresh material and formats will continue to emerge and become mainstream. We've seen, for example, straight comedy content become more challenging from traditional sources as entertainment becomes more globalised and, in turn, IFE tapping into social media and local sources to fill in such gaps.

ACM QTM mentions local content as part of its IFE content offering for airlines. Can you explain how you go about sourcing this content and why it's an important part of an airline's IFE?

SD Local and regional sourcing is key to a differentiated IFE proposition. This is how QuiverTree Media helps airlines differentiate their proposition and align their offering more closely with their customer and brand. We do this by

allocating resources that work on all levels of the proposition, from specialist audio management for cabin music products to specialist content modules featured in the IFE offering on board.

ACM You also talk about partnerships with OTT channels and branded channels as one of your differentiators. What are the benefits of these partnerships for airlines and will this continue to be a growing part of an airlines' IFE content offering?

SD From apps on smartphones to subscription services on smartTVs, digital platforms are the new content distribution vehicles. Access to OTTs and branded channels give airlines a wider variety of content and a greater flexibility in models to cover the cost of content. Uniquely, QuiverTree Media started as a digital CSP from day one and, within a relatively short timeframe, we've come to serve content to millions of passengers on board hundreds of aircraft worldwide.

This is not a coincidence – with relentless margin pressure in the industry, airlines have recognised the financial

advantages a highly innovative CSP which focuses on OTT collaborations and revenue generation with an in-house advertising team can offer. Additionally, by enabling airlines to tap into content from Hollywood majors and international local studios while also unlocking access to OTTs, we deliver real content differentiators that boost satisfaction and valuable NPS scores.

ACM What do you mean by 'straight' comedy content? What are the traditional sources?

SD Popular hit films which are purely based on the comedy genre are less common. This appears to be a trend which is the result of competition reaching a global scale. It is tougher to succeed with comedy content without local or cultural appeal. It is a safer bet to invest in action films with brands and build humour into those titles. These already draw the public because of internationally recognised heroes. C

▲ With digital platforms driving content, IFE must adapt to provide a wide range of sources

HORIZON WATCH

This year's Aircraft Interiors Expo will see a distinct return of confidence. In our first CEO Survey in association with Tronos Aviation Consulting and AIX, **Gary Weissel** and **Jeff Luedeke** forecast business opportunities to meet burgeoning near-term demand

June will be the second 'post-pandemic shutdown' Aircraft Interiors Expo (AIX) held in Hamburg, Germany, and there is a lot of anticipation in the marketplace on where the market is in its recovery cycle.

There have been a lot of improvements in the market since the last AIX with China opening back up for international travel and some airlines returning to profitability. With the return to near term profitability for some of the world's airlines and regions – particularly North America – and improved cash flows and balances, will this represent a resurgence of interior and product investments in the industry?

Passenger volumes at a glance

IATA recently reported that February 2023 international traffic as measured by revenue passenger kilometres (RPK) was up almost 90 per cent from 2022 levels. The smallest recovery was in Asia Pacific where year-over-year percentage change is still over 40 per cent below pre-pandemic levels in 2019. Worldwide RPKs year-over-year in February were up over 55 per cent from 2022. This puts February RPKs about 15 per cent below their pre-pandemic levels.

IATA's Quarterly Chartbook Q4 2022 reported global RPKs for calendar year 2022 were at 68.5 per cent of pre-pandemic levels in 2019. This is up

from 2021 only having 41.7 per cent of 2019's RPKs. The upward trend in traffic is now in its third year of continued growth from the effective global shutdown.

Anyone who has travelled in the past three to four months will have experienced the crowded airports and certainly the increased load factors on aircraft. IATA's analysis shows that industry-wide load factors for 2022 were up almost 10 per cent from 2021.

All this recovery, increased traffic and increased flying is putting pressure and wear on aircraft interiors where replacements and upgrades were shut down and remained dormant for several years.

“SUPPLIERS ARE REPORTING A SIGNIFICANT UP-TICK IN PROPOSAL ACTIVITY”

Financial performance at a glance

IATA reported that 2022 ended with only North American airlines generating net profit for the year. However, the trajectory and IATA's forecast anticipates European and the Middle East airlines will return to profitability in 2023, albeit by a slim margin. Overall industry airline revenues in 2022 were 87 per cent of 2019 revenues and, bolstered by the large North American airlines, the industry overall had an estimated net loss of only US \$7billion.

In the United States

Delta Air Lines reported their Fiscal Year (FY) 2022 adjusted net income of US \$2.05 billion with an adjusted operating margin of 7.8 per cent. This is still less than half of the adjusted net income for FY 2019, but it's moving in the right direction. Delta's 1Q2023 quarterly earnings reports an adjusted net income of US \$163 million versus a US \$784 million deficit in 1Q2022. In mid-2022, Delta announced an order for 100 Boeing 737MAX 10 aircraft and more recently committed to 12 additional A220s.

American Airlines reported their FY2022 net income of US \$127 million with an operating margin of 3.3 per cent. As of the time of writing, American hadn't yet released their 1Q2023 earnings report.

United Airlines reported their FY2022 adjusted net income of US \$831 million with an adjusted operating margin of 5.5 per cent. Their 1Q2023 quarterly earnings report a net loss of US \$194 million. However, they are forecasting a FY 2023 profit.

All three majors are reporting strong bookings and demand for 2Q and 3Q, and hope to bolster their financial positions.

In Europe and the Rest of the World

Lufthansa recorded a FY2022 net income of €791 million and British Airways recorded a FY2022 operating profit of £322 million. However, many other airlines reported losses; overall operating margins for Europe were negative. easyJet reported a £208 million loss before tax.

Asia Pacific, Middle East, Latin America and Africa regions all posted negative operating margins and the forecast is for some of them to still be in the red by the end of 2023.

There is continued light on the horizon with IATA forecasting significant recoveries for 2023 in the regions that were losing money in 2022 – albeit still in the red but with much smaller losses.

The OEMs are winning orders and airlines and lessors are spending money on fleet growth and renewal. In 1Q2023, Airbus booked 142 aircraft orders and Boeing booked 120.

2023 Commercial aircraft interior market at a glance

TAC and *Aircraft Cabin Management* independently performed surveys with a handful of interior product supplier boardroom-level executives to get an understanding of business recovery,

supply chain issues and staffing levels with a focus on inflight entertainment, connectivity and in-seat power suppliers as this is an area seeing the most near-term growth.

The suppliers are reporting a significant up-tick in proposal activity with several suppliers reporting proposal activity is three times what it was last year.

Supply chain issues continue to be relevant, mainly related to raw materials and microprocessors, with added pressures from rising energy costs and logistics. Suppliers have tried to manage these challenges with restructuring, investing in stock-based forecasting and investments in tooling/capabilities allowing sourced items to be made in-house. While there have been successes in some cases, new issues arise as inventory is depleted at the sub-supplier levels and production is not able to keep up. Lack of forecasting and liquidity to invest in inventory are some of the factors.

Staffing levels continue to be a challenge and, in most cases, fall short of 2019 levels. Every supplier we contacted is looking for new staff members.

▼ Airframers are winning orders and airlines and lessors are spending money on fleet growth





◀ Some major interiors suppliers have signalled that there is more work than they can possibly handle

“A RESURGENCE IN REGIONAL TRAVEL KEEPS PRESSURE ON NARROWBODY PRODUCTION”

“Can’t get people fast enough” has been a repeated term. The greatest challenge was stated in degree-level technical positions, such as engineering. However, difficulties in fulfilling entry level manufacturing positions continue as well. Several suppliers are reporting a high turnover rate and extended training required for new employees causing additional stresses on their operations.

The combination of unknown risks in the supply chain, and depleted staff levels to support orders that are already placed, is creating significant stresses. Airlines are looking to place orders and finding no available capacity, longer lead times and higher costs. Some major interior suppliers have indicated there is more work to go around than they can possibly handle, so they are able to decide which programs to chase and which to outright no-bid.

Aircraft interiors market outlook

The Aircraft Interior Market Outlook is driven by overall market financial health, fleet sizes, cabin age, new product trends and new product introductions. TAC, in partnership with Aerodynamic Advisory, annually produces a 10-year interiors market forecast. TAC is now finalising its updated 2023 forecast, which should be ready for release by the Aircraft Interiors

Expo. However, recent research can still provide some initial insight into what we are seeing compared to last year.

Our 2022 forecast projected a total 10-year interiors production forecast spend in major product categories of US \$121 billion covering both new line fit and aftermarket production needs. This includes 6.2 million new passenger places for new line fit production (-17,600 new aircraft deliveries) and retrofit requirements. An estimated US \$80 billion in 10-year spend on aftermarket is forecast, including repair, overhaul and cabin replacements and upgrades.

With the continued recovery and preliminary data developed so far for our 2023 forecast, we do expect to show some increases in these numbers, bolstering the view of continued market recovery.

Aircraft interiors market trends

While a large percentage of the current business in the interior supplier market consists of restarting programs that were in the works pre-pandemic, there are limited areas of innovation evident. Demand for Personal Electronic Device (PED) connectivity while airborne remains steady.

Leisure travel is still driving the desire to maintain connectivity while in the air to

stay in touch with family, friends, social media and breaking news.

Over the past year the active fleet grew from ~21,000 to ~23,000 aircraft adding over 300,000 new passenger seats to the fleet. We’ve also seen up-gauging in the number of seats per aircraft from an average of 179.3 pax/aircraft in 2021 to 180 pax/aircraft in 2022. For the aircraft that entered the fleet over the past year – either from new deliveries or reactivation from storage – the average passenger count was 188.6 pax driving up fleet-wide averages.

We’ve also seen a trend in slightly larger premium cabins. For those aircraft with international first and business class cabins, the seat counts by cabin increased by 4.7 per cent in F and 9.1 per cent in J. This supports traffic recovery data recently reported by IATA whose analysis shows February 2023 premium traffic was 86 per cent of February 2019 traffic. This compared with total passenger traffic only recovering to 81 per cent of 2019 levels.

This goes against speculation that reductions may be needed as virtual meetings became the norm during the lockdowns. While late last year several airlines announced the impending halt of international first-class cabins, early this year saw some airlines resurrect international first class.

The resurgence and continued growth in domestic and regional travel keeps the pressure on narrowbody production volumes. Both Airbus and Boeing are still struggling with supply chain issues in their attempts to meet their own robust and growing forecast production rates.

The airlines’ recovery is well underway with growing travel demand. As a consequence, we anticipate continued new business opportunities for suppliers and required growth to meet the market near-term demand. 🟡

Gary Weissel is managing officer and Jeff Luedeke, managing director, Tronos Aviation Consulting (TAC)



Cobalt Spectrum

THE ORIGINAL PLUG 'N' PLAY MOOD LIGHTING SYSTEM

BRIGHT

BEAUTIFUL

BESPOKE

**Award-winning drop-in
LED mood lighting, now
with wireless control.)))**

- ✓ Unlimited light settings
- ✓ Install in just one shift
- ✓ Light weight, high reliability
- ✓ Promotes passenger wellbeing
- ✓ Improves the in-flight experience

COBALT
AEROSPACE

PART OF
IFPL
GROUP



Rodolfo Baldascino

Chief commercial officer
ABC International

Has there been a significant increase in proposal activity over the past year? If so, can you quantify it in terms of percentage of uptick from what you were seeing last year?

Actually yes, the feeling is that the aviation industry in terms of activity and overall volume is now fully back, and we have seen an increase of roughly 50 per cent in proposal activity. Unfortunately, the quality and level of concreteness of each business has decreased and the market is very demanding – sometimes unreasonably so – in its requests and definitely more unstable compared to the pre-Covid era.

Has there been a significant increase in orders and production over the past year? Can you quantify it in terms of percentage increase?

More proposals are being prepared for sure and we have registered an increase of approximately 10-15 per cent.

Are you still seeing any supply chain stresses such as in raw materials, manufactured sub-components, design services, etc?

Absolutely, yes.

In any particular area or category?

We are especially seeing them in longer lead times and continuous and unjustified prices increases.

What are you doing in order to try and address those stresses?

Despite the fact that we are a DOA, we manage our own warehouse of soft furnishing raw materials and we are trying to increase our stock of most common materials to limit the number of purchases, increase the quantity purchased for any purchase order we issue and obtain better terms and conditions whenever possible.

Given increases in orders and proposals and the short staffing and struggles to rehire highly skilled engineering

post-pandemic, has engineering capacity and availability proved a bottleneck over the past year?

This is a fact. However, specifically at ABC we have been developing for several years a new generation of engineers who are now sufficiently skilled to cover our medium-term engineering needs. We are also expanding our engineering capacity at our Shannon office although we are struggling to find good candidates due to high demand locally.

Also, next year, it will be more difficult to find the 'right people' at our Italian headquarters. We prefer to talk to universities, hire and train young and newly graduated talent. Typically, in approximately 12 months they start to contribute in terms of adding value.

What areas of product development do you see the most focus on over the next five years for your business?

All products and services are aimed at effectively supporting the aircraft transition's process and all cabin revamp projects such as small and customised monuments (windcreens, partitions, doghouses, stowages, MCD), soft furnishing (carpet and curtains) and associated engineering and approval services.

Here at ABC we have the capacity to implement this successfully as we are already doing this with our lessor and airlines customer base which is continuously expanding.



1

1. The market can be demanding in its requests
2. ABC has registered a 10-15% rise in proposals



2

“We are increasing our stock of common materials to limit the number of purchases”

Skycast Solutions, AMAI and **Jana Inc** have developed proven products for the passenger cabin and cargo hold that improve the passenger experience and eliminate costly repairs and delays.

EZView Cradle

- Provides a secure way to hold phones and tablets for streaming entertainment.
- Can be fully customized for different seat types and airline branding.
- Can provide a new and significant ancillary revenue source or product giveaway.



Cargo Door Armor

- Protects the 737 Cargo Door from impact damage.
- Installs and is removed in seconds.
- Used on major airlines since 2012 and has eliminated cargo door damage.



Cargo Door Sill Guard

- Protects cargo door sill from damage from belt loaders and other loading devices.
- Installs and is removed in seconds and glows at night.
- Eliminates costly repairs and maintenance delays.

Cargo Stop Block

- Prevents load shift of bags and cargo.
- Less than 10 pounds and installs and is removed in seconds.
- Has been used on major airlines since 2014 and has eliminated cargo shift and delays due to cargo door blockage.
- Saves fuel burn caused by weight/balance changes after takeoff.



Mobility Aid and Commodities Support Panel

- Provides a secure method to carry and support mobility devices.
- Clears imposed weight limits on regional jet cargo floors.
- Can be used to support numerous type of specialized cargo.



skycast
SOLUTIONS™

amai
AEROSPACE MACHINING & ASSEMBLY, INC.

jana

- ▶ Visit us at Aircraft Interiors EXPO Hamburg - **Booth 1C78.**
- ▶ For more information email greg.latimer@skycastsolutions.com or bboyer.amai@gmail.com.



Pablo Vadillo

Chief executive, IMAGIK
International Corporation

Has there been a significant increase in proposal activity over the last year? If so, can you quantify it in terms of percentage of uptick from what you were seeing last year?

We had a substantial increase during 2022 and the trend continues in 2023. Our full line of in-seat power supply and patented iPD power management system has also brought enormous interest and requests from potential customers who realise PD power will be the go-to product in coming years.

Has there been a significant increase in orders and production over the last year? If so, can you quantify it in percentage increase?

We are very excited to see both orders and production are growing. We see that reflected in the increase in proposals since 2022.

Given increases in orders and proposals and the short staffing and struggles to rehire highly skilled engineering post-pandemic, has engineering capacity and availability proved a bottleneck over the past year?

IMAGIK maintained its entire core team intact through the pandemic and beyond. We have had no critical staffing issues on normal replacement or additions required due to increased production.

What areas of product development do you see the most focus on over the next five years?

Our core business remains in-seat power systems. We see a need for the entire narrowbody fleet to be fitted with charging capacity. USB charging and PD 60W in particular is the way to go and will in a very short term become ubiquitous in the airline industry, regardless of aircraft type and configuration.

Type C PD will in a short time replace most other charging options. The amount of power required in the entire cabin will only be possible through power management, and IMAGIK offers a unique patented system to achieve this.



Kevin Clark

Chief executive, Bluebox
Aviation Systems

Has there been a significant increase in proposal activity over the last year? If so, can you quantify it in terms of percentage of uptick from what you were seeing last year?

Yes, the market is definitely more active than it was a year ago. Overall, I would say that activity is up by 30 per cent.

Are you still seeing any supply chain stresses – in raw materials, manufactured sub-components, design services, etc?

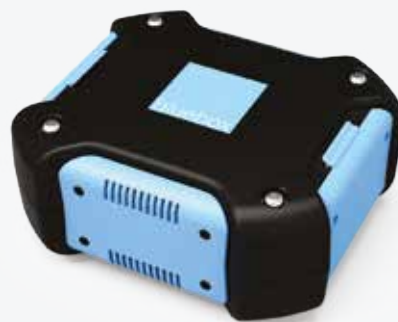
It depends on the components but yes, there are definitely stresses in some areas. This manifests itself as component/material price increases and extended lead times.

In any particular area or category?

In some electronic components, although we generally have dual/multiple supply sources to protect us. We also see impacts on the components used in aircraft installation rather than our actual Bluebox units. For example, plastics used in cabin partitions have increased 20 per cent in price.

What are you doing in order to try and address those stresses?

Our Bluebox Wow portable streaming units utilise off the shelf components which are commercially available – the bulk of the value-add comes from the software capabilities. We protect key components by dual/multiple sourcing but



▲ Bluebox Wow
portable streaming units



SAFETY THROUGH TECHNOLOGY

SCHROTH AirPRO®

Forget what you think you know about commercial aircraft passenger lap belt airbags.

SCHROTH is proud to offer the new SCHROTH AirPRO® (Airbag Protective Restraint for Occupants):

- The ideal occupant safety solution for critical front and exit row positions.
- Meets the latest FAA and EASA rules on head impact, neck injury, head rotation, rebound, and chest acceleration.
- Standard airbag shape fits most applications (no need for costly design and test iterations).
- Soft, super-comfortable package.
- Suitable for seats in all commercial passenger classes.
- Tested according to ETSO and TSO requirements.
- EASA approved in 2022. FAA approval expected Summer 2023.

Come and see us at the Aircraft Interiors EXPO to find out more about the revolution in aircraft passenger airbag technology.

Aircraft Interiors EXPO®
6 - 8 JUNE 2023
HAMBURG, GERMANY

**Hall B6
Booth 6A30**



www.schroth.com

also by pre-purchasing for stock where in previous times we would have relied more on supply chain stocks. We have desensitised this by bringing stock in-house.

Given increases in orders and proposals and the short staffing and struggles to rehire highly skilled engineering post-pandemic, has engineering capacity and availability proved a bottleneck over the past year?

Not specifically for Bluebox. Our prime technical skills are in software development and a positive impact of the pandemic has been the extension of remote working which means we can just as effectively operate with team members located beyond our normal geographical recruitment boundaries.

We have experienced the effects of engineering constraints in some of our customers and partners so there are definitely pressures, but not in terms of recruiting Bluebox staff. We also retained all staff throughout the pandemic, a costly commitment that served us and our customers well.

What areas of product development do you predict the most focus will be on over the next five years for your business?

We are focused on advancing the digital passenger experience by increasing the breadth of digital services and richness in the capabilities offered by our Blueview software suite such as further ancillary revenue related services in addition to the existing retail, advertising and entertainment, and leveraging the benefits of connectivity for the provision of even more advanced and real-time digital services.

It is important to note that Bluebox is a software company, though we do produce a portable wireless streaming hardware platform called Bluebox Wow from which we host and stream our software. Here, we have experienced the impact of the supply chain issues this survey addresses.

It is important to make this distinction, because when discussing overall proposal activity, for example, we do have some projects that have been primarily software driven. The last question addresses that software focus so otherwise might seem incongruous unless it's clear that we are a software company.



Henrik Höjer

Chief executive
CTT Systems

Has there been a significant increase in proposal activity in the last year? If so, can you quantify it in terms of percentage of uptick?

There has been a significant increase in our proposal activity, especially in late 2022. Due to the pandemic's severe impact on the airlines revenues, and thereby their possibilities to invest in new systems, the proposal activity was on a record low level in 2021. Therefore, it's hard to quantify in percentage terms.

Has there been a significant increase in orders and production over the last year? If so, can you quantify it in terms of percentage increase?

CTT production has ramped up significantly with an increase of 36 per cent from 2021 to 2022.

Are you still seeing any supply chain stresses – in raw materials, manufactured sub-components, design services, etc?

Our supply chain is still under stress due to increased prices and longer lead times.

In any particular area or category?

No particular area, but the risk to any category is avoided with CTT's active way of handling its supply chain.

What are you doing in order to try and address those stresses?

CTT spends time managing its supply chain, ordering earlier to handle longer lead times, increasing stock levels etc. to make sure that we can deliver on time to our customers.

Given increases in orders and proposals and the short staffing and struggles to rehire highly skilled engineering post-pandemic, has engineering capacity and availability proved a bottleneck in the past year?

CTT has managed to hire highly skilled engineers, but the hiring process takes longer and requires more support from external partners to be successful than pre-pandemic. CTT has so far managed to avoid bottlenecks affecting our customers but, in some cases, we have had to put a lower priority on our own R&D projects aimed at the future.

“CTT spends time managing the supply chain, ordering earlier, increasing stock”

What areas of product development do you see the most focus on over the next five years for your business?

The aviation industry is focusing on sustainability and product development must support that focus. CTT will focus on improving its products even further to enhance well-being by increasing humidity and reducing condensation for better reliability and lowered environmental impact. Our R&D will focus on lower weight and increasing the capacity of our products to help our customers reduce their CO₂ emissions even further.



▲ CTT products focus on reducing condensation, increasing humidity



The Choice is Yours

Astronics AES EmPOWER® In-Seat Power Systems

Power all your passenger and crew devices with the expanding menu of innovative options from Astronics. Wireless, USB, and zonal charging systems are ready to future-proof your cabin, built from the reliable technology of the industry's most proven power solutions.

We invite you to see why all major airline manufacturers plus over 285 airlines rely on certified cabin, flight deck, and galley power solutions from Astronics.

www.astronics.com/EmPower





René Lang

Executive managing director
Mankiewicz Coatings

Has there been a significant increase in proposal activity over the last year? If so, can you quantify it in terms of percentage of uptick from what you were seeing last year?

Mankiewicz Coatings is a global coatings manufacturer active in many industries; one of them is aviation, where they develop, produce and supply coatings for cabin interiors, exteriors and structural parts. Last year, we saw increased enquiries and orders that reached pre-pandemic levels.

Has there been a significant increase in orders and production over the last year? If so, can you quantify it in terms of percentage increase?

There were differences in the timing of this comeback which started in the US, followed directly by Europe and Asia. Due to the tight Covid rules in China, those were the biggest hold-ups, but the Chinese aviation industry is also experiencing strong growth.

Given increases in orders and proposals and the short staffing and struggles to rehire highly skilled engineering post-pandemic, has engineering capacity and availability proved a bottleneck over the past year?

The aviation supply chain, which has been severely cut back, is facing challenges in meeting this sudden spike in growth. Mankiewicz has always been convinced that the crisis is temporary

and that highly qualified personnel are crucial. Through many measures, we have been able to retain vital staff in all areas and so we are in the fortunate position of being ready for growth.

But we are also affected by the fact that logistics is a bottleneck and some raw material suppliers cannot keep up the new pace. In addition, the business has become more global due to increased demand.

Free maintenance slots are being used no matter which end of the world they are available. Considering that we make individual bespoke suites in paint for our customers, it's a big challenge to switch quickly and schedule US planned paint jobs for China.

It can happen to any supplier that a raw material becomes unavailable or difficult to obtain, despite having set up Plan Bs and Cs. When you consider how exacting and specialised the industry's requirements are and how few companies are approved as manufacturers themselves to supply the industry, it is in the nature of things that you cannot randomly choose between hundreds of offers.

For us, openness and a constant and timely exchange with all customers to meet their urgent needs are key to success. In this way, we have already been able to overcome raw material crises and the supply chain has been able to continue working. In such cases, we set up interdisciplinary task force teams to take care of these shortages in a centralised manner. Not disrupting the supply chain and keeping customers informed is our highest priority.

What areas of product development do you see the most focus on over the next five years for your business?

Regarding product development, we see the most significant trend in sustainability. The most crucial factor here continues to be weight. For example, modern and lightweight rigid foams are only made possible in the interiors sector by coatings or production processes such as 3D printing.

We have developed a filler, especially for this purpose, Alexit PrimeFill, which creates a perfectly even surface for a decor of an airline's choice and delivers the lowest possible weight. In addition, our customers appreciate that our products are primarily water-based and do not require oven drying.



▲ Customers appreciate products that are primarily water-based

“Not disrupting the supply chain and keeping customers informed is our highest priority”

DIEHL
Aviation

 **IMAGINE**

What do you imagine?

We master the elements. We develop designs.
But only when imagination has fully spread its wings
have we achieved the cruising altitude of our minds.
If you can IMAGINE it, we can make it real.

Visit us at AIX 2023 Hall B7 / Booth 7D20

**YOU INSPIRE
WE CREATE**





Mike Pigott

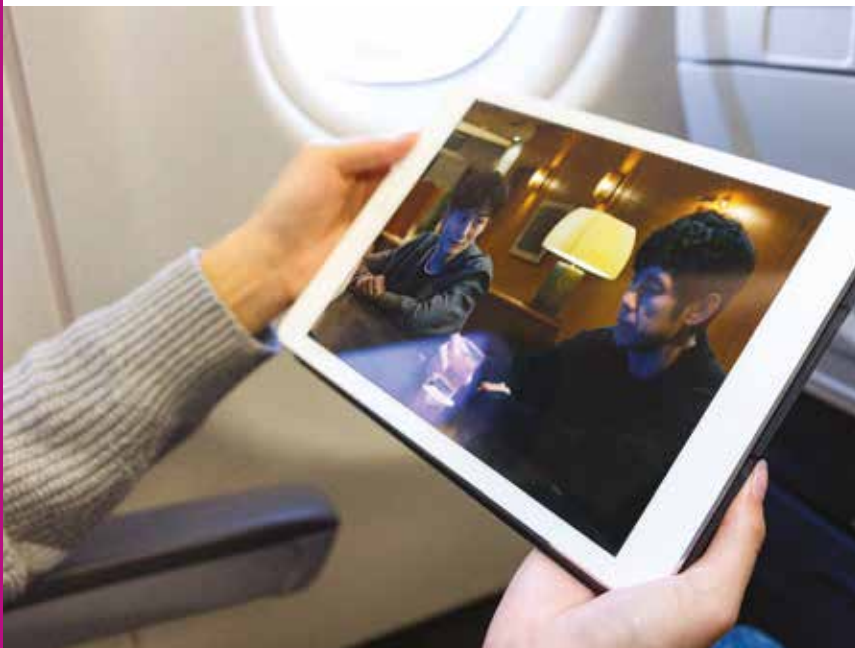
Executive vice president,
connectivity, Anuvu

Has there been a significant increase in proposal activity over the last year? If so, can you quantify it in terms of percentage of uptick from what you were seeing last year?

We have seen a marked increase in requests for proposals and requests for information from customers throughout the world, but in particular in North America, Europe and the Middle East. From a percentage standpoint, we have seen our connectivity proposal activity increase 300 per cent since early 2022.

Are you still seeing any supply chain stresses – in raw materials, manufactured sub-components, design services, etc?

We are still experiencing supply chain stress throughout the business, including in both raw materials availability and sub-components. Overall, the stress level continues to decline from the crisis level during the Covid-19 pandemic, but still remains a key focus requiring significantly more attention than normal.



2

“We continue to make great strides in delivering on our Hybrid Network plans”

Given increases in orders and proposals and the short staffing and struggles to rehire highly skilled engineering post-pandemic, has engineering capacity and availability proved a bottleneck over the past year?

Anuvu maintained and even expanded its full engineering team during the pandemic and were therefore able to quickly address the return to market without significant bottlenecks. Access to third-party engineering services has been disrupted, but not significantly given how much work we handle in-house.

What areas of product development do you see the most focus on over the next five years for your business?

We continue to make great strides in delivering on our Hybrid Network plans, including our Anuvu Constellation and Network Resource Management services, and will continue to develop those items as key focus areas.

1. MUBI's partnership with Anuvu

2. Anuvu's collaboration with TheSoul and WaterBear

ADHETEC

adhesive solutions

NEW CABIN DECOFOILS *ADHESKIN FB*

STRONGER, LARGER, OPAQUE

No MOQ • Unlimited designs • Cut to shape • Short leadtime

ADHESKIN®

DECOFOILS





1

Access all areas?

Polly Magraw, event director, Aircraft Interiors Expo discusses the next challenge for the industry: accessibility in aviation

There is little doubt that air travel can be a stressful and daunting experience for those with disabilities. According to a survey by the Civil Aviation Authority (CAA), more than half (56 per cent) of passengers with a disability find flying and using airports difficult.

In 2019, following the introduction of new federal requirements in the US, airlines were, for the first time, required to report how often they gate-checked wheelchairs and scooters, as well as how often passengers reported those devices as damaged, lost, delayed or stolen. It

revealed that airlines had mishandled more than 800 wheelchairs, the equivalent of 1.5 damaged chairs for every 100 flown over the course of one month.

In the UK, there have been numerous incidents that have caused emotional damage to wheelchair users. While passengers with disabilities are expected to plan ahead and request assistance, Paralympian Anne Wafula Strike was left stranded at Stansted airport on her return from the world para athletics European championships in Berlin. Elsewhere, a passenger was asked by airline staff to walk up the stairs 'for easiness' sake, before eventually being unable to board the flight.

Several of the issues faced by wheelchair users stem from the fact that air travel is one of the only methods of transport that does not allow passengers to travel in their own wheelchairs. In some cases, passengers must bring an array of additional products such as gel cushions, car seats and memory foam, at a significant emotional and financial cost.

Dignified, accessible

Fortunately, the industry is making progress on these issues. Recently, there has been investment in loading devices, eliminating the need for people to lift expensive wheelchairs onto the plane. What's more, according to Michele Erwin,



2

56%

According to a survey by the Civil Aviation Authority, more than half (56 per cent) of passengers with a disability find flying and using airports difficult



3

Founder of All Wheels Up, a not-for-profit which aims to increase awareness for safer and more dignified accessible air travel, there has been a big change in the past 12-24 months regarding the industry's commitment to access, "specifically, the recognition for, and real interest in, a wheelchair spot for planes".

This is in part thanks to the development of an innovative solution that addresses this very need – The Fly Your Wheels Suite. This is a design that would allow WC19-certified manual and power wheelchairs to be used as a seat on board commercial airlines, creating a free space where passengers with their own wheelchairs can choose their seating orientation, both forward and rear-facing.

Of course, accessibility in aviation is a broad spectrum, and it's been great to see the wide-ranging innovations that

have developed to facilitate an agreeable experience for everybody. For example, Air Canada's twin-aisle aircraft includes fittings designed to be operable with one hand, including handles, locks, soap dispensers and flush control.

Meanwhile, airlines have sought to lessen the impact of flying to make it easier for passengers with neurodivergent conditions such as autism and ADHD, who can often be made uncomfortable by the lack of structure, unknown surroundings and unfamiliar sights that all come with flying. One such initiative comes from British Airways, which announced on World Autism Awareness Day that it would become the first airline to launch a visual guide to flying, taking passengers through the different parts of the journey, including the sights, sounds and smells to expect.



4

Accommodating needs

Furthermore, with the proliferation of inflight entertainment (IFE), we are seeing efforts to ensure that the technology is accessible for all. For instance, in 2019, United Airlines rolled out a range of accessibility features on its seatback IFE systems, accommodating any level of vision and providing support for customers with hearing and mobility issues.

It includes text-to-speech mode, captions and subtitles, audio descriptions and closed captions, as well as a variety of other visual settings and features from magnification, high-contrast text and paging arrows that allow passengers to navigate the system with simple touch gestures or a mouth stylus. We are confident that airlines will continue to follow the path of United to ensure in one, five, and ten years' time the passenger experience is improved for those who most need it.

Aircraft Interiors Expo (AIX) returns to the Hamburg Messe from 6-8 June, and will continue its focus on accessibility in the cabin across both the show floor and through talks at Passenger Experience Conference (PEC). In the first theme of the PEC programme, 'Delivering for the new generation passenger', Christopher Wood MBE, founder of Flying Disabled, will host 'Revolutionising air travel for passengers with reduced mobility'. 

1. The industry is looking into ways to create a wheelchair spot for planes
2. AIX will focus on accessibility in the cabin across the show floor and through talks
3. Seatback IFE systems should ensure the technology is available to everyone
4. Polly Magraw is event director at Aircraft Interiors Expo

ACCESSIBILITY NEEDS RANGE FROM MOBILITY ISSUES TO NEURODIVERGENT CONDITIONS

We look forward to seeing you there.
To register your interest to attend,
visit aircraftinteriorsexpo.com



Breaking the mould

Alexander Preston talks to businesses that are looking to change the flight experience for passengers while offering new disruptive seating solutions to airlines

◀ The Butterfly Single-Aisle option offers the choice of staggered recliners for two passengers or a business-class flatbed suite for one



In 2021, Recaro entered the regional jet market with its first Embraer installation on behalf of KLM Cityhopper, the regional arm of KLM Royal Dutch Airlines. Speaking at the time of the announcement, which saw Recaro's BL3710 and SL3710 seating fitted out on KLM Cityhopper's fleet of E190 and E195-E2 aircraft, Dr Mark Hiller, CEO of Recaro Aircraft Seating, said: "Expanding into the regional jet market is a tremendous opportunity to grow our capabilities and strengthen our customer base," adding that he had great confidence in the company's ability to rise to a new challenge. In recent years, a number of start-ups have similarly sought to meet these challenges and disrupt the dominance of more established names.

Double decker

One such newcomer is the Chaise Longue Economy Seat, from the company of the same name, which optimises the vertical space in the cabin by elevating one row of seats and then placing the next row lower again, creating more space. The top row is accessed by going up two steps; when accessing the bottom row, the seat pan can be moved out of the way to allow easier egress and ingress to the seats.

Alejandro Nuñez Vicente, CEO and founder, explains the extra space used is created by removing the central overhead storage compartments. In return, luggage is stored inside the module itself and underneath each passenger's seat. "Not only will this allow passengers to have much easier access to their belongings without having to stand up, but it will also hold the same capacity as the overhead bins we use nowadays," he says.

Chaise Longue takes its name from the main feature found on the bottom row of the module. Because the row in front of these seats is elevated, passengers on the bottom row can slide forwards when reclining using

a cushioned platform to support their feet and calves. By achieving this almost lie-flat position, Vicente says passengers will have more comfort and be able to rest more on long flights. The seat also reclines 15 degrees more than those used currently.

The higher recline angle can also be found on the upper row. "Even though passengers won't be able to fully stretch out in this row, they will have more leg room than they would at present and wouldn't have any passengers reclining into their personal space," claims Vicente. "This makes the top row ideal for working and using your laptop."

Hybrid business class

Regional business class by day, flatbed suites by night. Ten seconds and one hand are all it takes to transform Butterfly between high-density recliners for two and all-aisle-access business class flatbed suites for one. So says the marketing literature for the Butterfly Single-Aisle, the first product in the Butterfly family of seats to be developed for aviation.

Each Butterfly unit is made up of two staggered recliner seats that can be sold as premium economy (on wide-body aircraft) or regional business class - on single-aisle aircraft. Folding down the inboard seat creates a private business class suite for one passenger, complete with a seat and a multi-purpose side couch, while folding down the outboard seat creates a spacious bed that can lie flat diagonally.

This means that aircraft are no longer restricted to a single cabin configuration, allowing for greater utilisation, more efficient operations and lower ticket prices. The versatility of the seat allows airlines to offer competitive flatbeds on long flights without sacrificing density on short flights. As Lars Rinne, CEO and co-founder of Butterfly Seating says, "Butterfly itself is a tool for airlines to generate more money because of its convertibility."



“BOTH COMPANIES HAVE ALREADY RECEIVED VARIOUS INDUSTRY ACCOLADES AND RECOGNITION”

According to revenue management expert Oliver Ranson, the Butterfly seat is the best he's ever sat in. A ringing endorsement to be sure, but he warns, 'airlines are not start-up friendly'.

Barriers to entry

The problem, believes Ranson, begins at board level. CEOs are not your typical passenger and, as such, often view seats simply as assets rather than an experience. This then feeds into the tender process, which Ranson bluntly calls a farce. “The specifications can be too complex and detailed,” he says, arguing that the process should instead be tailored towards a seating company.

This means the current approach puts companies like Butterfly and Chaise Lounge at an immediate disadvantage. So how can such companies compete

with the larger, more established seating manufacturers? The answer is simple – don't. Both companies, which have already received various industry accolades and recognition, don't consider themselves as seat manufacturers.

Their shared aims are to work alongside manufacturers and airlines to bring their respective seats to the market and create the best version possible for passengers.

“It didn't take long for me to notice that the aircraft industry is hard to get into,” admits Vicente, who began developing the Chaise Longue concept while a student at TU Delft in the Netherlands where he became part of the “airplane of the future” project.

“However, I work hard on attending as many events as I can to keep relevant and in touch with what my potential clients would like to see.

“I have had to achieve big things to prove my talent and the worthiness of Chaise Longue. However, I have also found incredible professionals that have wanted to help me and mentor me to make this design become a reality. Without their advice and knowledge, I would've struggled much more.

“The same can be said for those on my team who have joined me in this journey. Working on Chaise Longue is hard and requires motivation to keep on pushing the limits without much security in return. Together, we are managing to continue growing and developing the project.”

It's an approach familiar to Rinne. “We need people with expertise in their fields, who know how to manufacture something innovatively, who understands finishing and so on. But that is an expertise that is better for us to get from partners, whereas our focus will always be on the design and engineering and certification of those products.”

Ultimately Rinne sees Butterfly serving those small- to medium-size airlines that want to have a simple product with some level of customisation. “We want to make a beautiful product. The customer will know that we put a lot of heart and effort into our engineering and manufacturing of the seats,” he says.

The current Butterfly seat is the result of numerous iterations over many years. Pointing to the different versions of the demonstrators, Lars highlights the efforts of his team.

▲ The Butterfly seat's clever design means it can become a spacious diagonal bed area

REDEFINING AIRCRAFT SEATING

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

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



T - +44 (0) 1953 853200
E - sales@mirus-as.com

Aircraft Interiors | EXPO®



HALL B6
STAND NO: 6A70
HAMBURG MESSE



1

LESSORS ARE IDEAL TO OFFER SEATING PRODUCTS, ESPECIALLY AS REVENUE GENERATORS

"It is really learning – learning about the industry, learning about seats, learning about airlines, learning what the customer needs."

Support network

Such efforts are also the result of the enduring support from both suppliers and sponsors.

Chaise Longue for example, is working with Rollon on mechanisms, and how to optimise the different seat movements. Style&Design is developing the next designs as well as building prototypes for the company. 3DSeatMap by Renacen have worked with Vicente and his team to produce their website, while AIRE helped make the seats for the previous prototype out of aviation grade leather.

They also host Chaise Lounge on their stand at AIX each year, as well as allowing them to use their headquarters in Madrid as a showroom for their prototypes. SWS Certification Services are working to complete the certification of Chaise Longue.

"We are halfway through the feasibility study with SWS and aim to complete the whole process over the next couple of years," reveals Vicente.

"We are also finishing the next optimised design of the Chaise Longue module and these improvements will be exhibited at this year's AIX."

Rinne also "cherishes" his sponsors, which are proudly listed on the Butterfly demonstrator in Belfast, and who were happy to support a company wanting to try 'something new'. These include Kydex, Tapis and Thales among others.

Such support overcomes one of the main hurdles faced by start-ups. According to Rinne, it is all too common to hear potential suppliers say, "Why don't you come back when you have a launch customer?" And for airlines to say, "Why don't you come back when you have a final product, which is certified and industrialised that I can buy?"

Coach approach

For Ranson, selling to airlines is a fool's game. "Forget it," he says, "sell to lessors instead." Ranson believes that lessors are best placed to offer seating products, especially as revenue generators.

Butterfly has adopted another approach. Butterfly Motorcoach is modelled after its airline-style long-haul business class seating but at a much

1. Alex Preston (left) gets the full lowdown on the Butterfly seat with CEO and co-founder Lars Rinne

2. Passengers on the bottom row of the Chaise Longue can stretch out with their feet and calves on a cushioned platform

lower price point, yet keeping all the essentials to give passengers space, comfort and privacy. "A bus passenger is the same as a train passenger, is the same as an airline passenger. A body is a body," says Rinne. "They need to relax, stretch, feel positive."

Butterfly Motorcoach entered service in June 2022 with US-based launch customer Napaway Coach. Napaway offers overnight premium sleeper coach services between Washington DC and Nashville.

"Now Butterfly Motorcoach has become a tool to sell Butterfly. With Butterfly Motorcoach, and later on Butterfly Rail, the airline world will realise people are satisfied with that product – sitting, lounging and sleeping. If they are satisfied with those transportation means, there's a high likelihood that they're also satisfied on an aircraft."

As Warren Bennis, a pioneer of leadership studies noted, "Innovation by definition will not be accepted at first. It takes repeated attempts, endless demonstrations, monotonous rehearsals before innovation can be accepted and internalised by an organisation. This requires courageous patience." Attributes and processes these start-ups know only too well. 🍷



2



DEDICATED TO YOUR SAFETY SINCE 1948.

We provide a complete pack of products (textiles, composite products, seat belts, extensions and restraint systems) and services (design and engineering, certification, maintenance and repairs) for the cabin interiors. Moreover, we have established a global reputation for being a valued business partner thanks to our short lead time, fair price and very high degree of flexibility in our collaboration with the world wide clients. At Anjou Aero you will encounter a distinctive tailor-made service for the cabin's refurbishment and customization.





AJW®

AJW® TECHNIQUE Interiors

Looking for sustainable
interiors that deliver
lower fuel burn?

We provide tailored solutions
for design, development and
manufacture of your aircraft
seat covers and cabin needs



AJW Group is the world-leading, independent, parts, repair, lease, engine, flight hour programme and supply chain solution integrator, transforming efficiency in commercial, business and defence aviation.

With hubs and offices on every continent - including AJW Technique,
a state-of-the-art component MRO facility in Montreal
- nose to tail, we have you covered.

ajw-group.com

LEFT TO ONE'S OWN DEVICES

Imagik is celebrating 30 years supplying highly reliable, well-designed and affordable cabin electronics. Chief executive **Pablo Vadillo** discusses the trends in aircraft passenger device power supplies and USB Type-C power delivery in particular



“The adoption of USB-C PD as the common charging port is a positive development for the electronics industry”



Pablo Vadillo is chief executive, Imagik International Corporation



Visit www.imagikcorp.com to discover more about the company's products

One of the most significant trends in aircraft passenger device power supply is the move towards USB charging ports. In the past, airlines primarily used in-seat power supplies that required proprietary charging cables. However, with the growing prevalence of USB devices, airlines are increasingly switching to USB charging ports that are compatible with a wide range of devices.

The adoption of USB-C PD as the common charging port is gaining momentum not just in Europe, due to the EU Common Charger Directive (2022/2380) for small and medium-sized portable electronic devices, but also globally. In fact, even Apple, which has long been known for its proprietary Lightning connector, is starting to make the switch to USB-C PD.

Moreover, Apple's move towards USB-C PD may also encourage other manufacturers to follow suit. As one of the leading players in the electronics industry, Apple's adoption of the standard is likely to have a significant impact on the market.

Overall, the adoption of USB-C PD as the common charging port is a positive development for the electronics industry as it is likely that we will see a reduction in electronic waste, and improved convenience and cost savings for consumers.

USB Type-C PD chargers can deliver up to 100 watts of power, although on aircraft, due to the limited power available, we limit this through design to 60W – still significantly more than the 10-15W that USB A ports typically provide. This increased power capacity means that USB C PD chargers can charge laptops, tablets and smartphones much faster than traditional USB A chargers while in flight.

Wireless charging

Another trend in aircraft passenger device power supply is the integration of wireless charging technology, allowing passengers to simply place their device on a charging pad. While wireless charging is not yet as widespread as USB charging, we can expect to see more airlines adopt this technology in the coming years.



▲ The new USB unit that will be on show at AIX



2

Finally, airlines are also focusing on improving the reliability and consistency of their power supplies. Many airlines struggled to provide consistent power to all their passengers, leading to anxiety, frustration and inconvenience for those with dead or low batteries. Today, airlines are investing in more powerful and reliable power supplies that can ensure all passengers have access to the power they need throughout the duration of the flight.

In conclusion, the trends in aircraft passenger device power supply and USB C power delivery are clear. Airlines are increasingly adopting USB charging

“Our design methodology means that the wiring harnesses are lower gauge and lighter”

ports, with a focus on USB C PD technology that delivers fast and efficient charging. Wireless charging is also gaining popularity in premium seating products, and airlines are investing in more reliable and consistent power supplies to ensure that all passengers have access to the power they need. With these trends in mind, passengers can expect a more convenient and efficient charging experience while in-flight.

Game-changing tech

Imagik International Corporation has been refining its product range ahead of the market trends. Our multi-patented iPD (Intelligent Power Delivery) technology is a power management system. This makes us the only company to have the ability to offer real power management in the aircraft cabin.

It manages the power supplied to each connected device, negotiating the amount of power available and distributing it to guest devices to ensure everyone has power. The technology can also be used

to generate ancillary revenue by offering the higher power choices via a paywall.

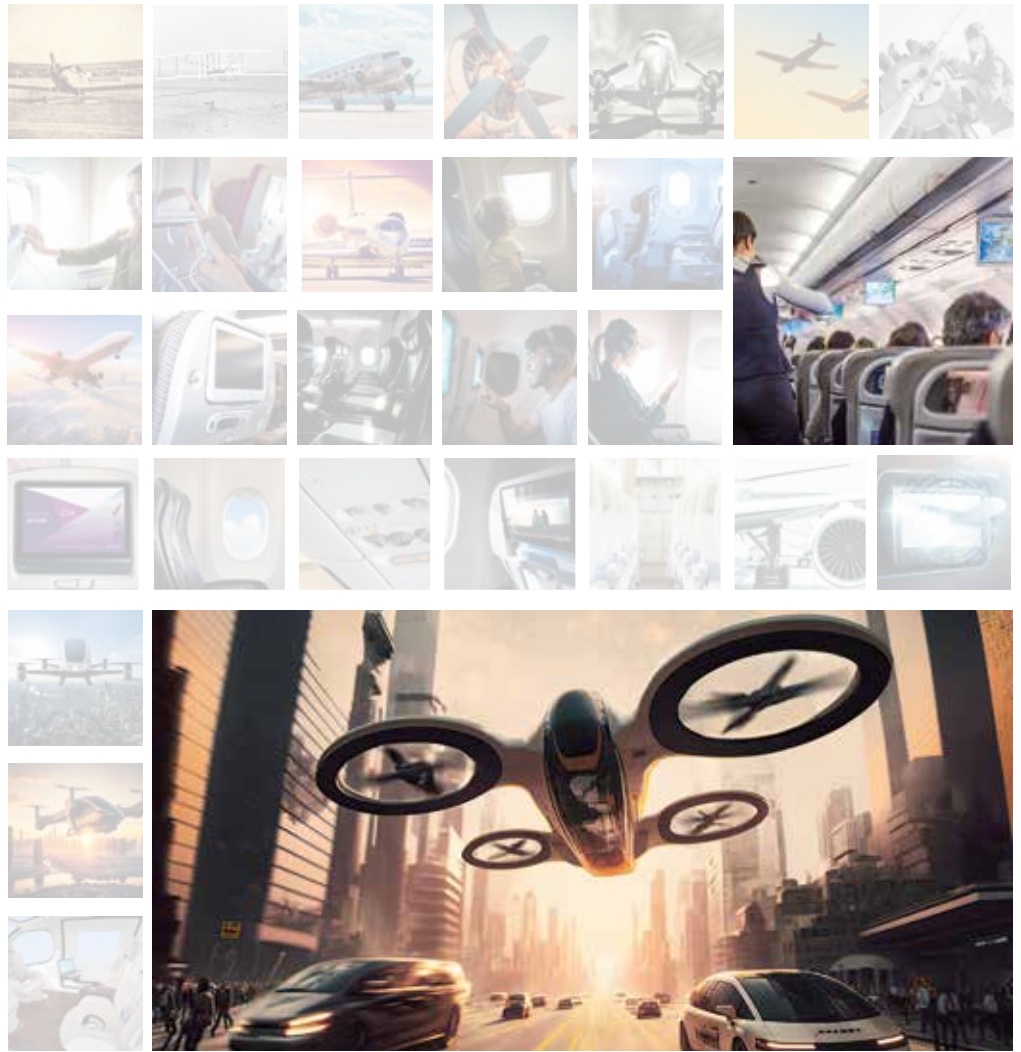
A major difference in the way we design our power system is that the power conversion and control are accomplished at the PSU level. This means our outlets are much smaller and do not need the added heat dissipation design that some of our competitors must build in. It also reduces the costs of the USB outlet, helping our customers with the total cost of ownership. Our USB outlet LRUs are typically half the unit price of competing products.

That can save a lot of money given the life of a system across a fleet of aircraft. Our design methodology also means that the wiring harnesses are lower gauge and lighter which saves a lot of weight across an aircraft shipset, reducing fuel consumption and carbon footprint. 🌱

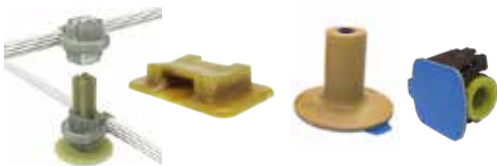
1. The USB unit currently manufactured
2. With the growing prevalence of USB devices, airlines are increasingly switching to USB charging ports that are compatible



1



FLYING INTO THE FUTURE



ADHESIVE SOLUTIONS *STRONG, STICKY, EFFORTLESS*

Lightweight, fastener free designs with compact profiles for minimal footprint in tight spaces.

Offering Standoffs, Snap 'N Posts, U-Snaps and Tie-down Supports. Adhesive Solutions come ready to support two robust bonding options in liquid or tape forms.

Need the bond but not the mess? Try our tape today!



CABLE CLAMPS *CC5516LIGHT & CC1339LIGHT*

Impressive weight savings vs. metal clamps.

Protection from vibration by over-molded elastomer, with multiple sizes available.

Pre-Installation Feature (CC1339Light) & Pre-Locking & Stacking (CC5516Light).



AUDIO STREAMING VIA *BLUETOOTH 5.0*

Directional Bluetooth Jack provides a Bluetooth® connectivity to add or extend the wireless connectivity of Inflight Entertainment and media systems.

The Bluetooth Jack is small, lightweight, and can be installed in the seatback, seat pan, and above passenger.



RISE & SHINE

1

From promoting an airline's brand to enhancing the travel experience, cabin lighting can be a valuable tool. *Aimée Turner* examines the latest lighting systems

Beyond the fundamental requirement of illuminating the cabin, aircraft interior lighting solutions are capable of fulfilling a variety of different needs and desires for operators, crew and passengers.

Developments in cabin lighting have given rise to products which are worlds away from traditional fluorescent lighting systems. Gone are the days of flickering fluorescent bulbs casting harsh, yellowing light into the cabin. Instead, many of today's systems use lighter, brighter and more efficient LED bulbs to provide uniformly effective interior illumination.

IFPL Group's Cobalt Spectrum has perfected this technology, combining LED mood lighting with the science of colour to facilitate a relaxed cabin atmosphere which improves passenger well-being during travel.

Using light in this way is particularly effective when it comes to long haul journeys which disrupt a passenger's routine and natural biorhythms, leading to tiredness, discomfort and potentially even ill health.

Saving the day

Jet lag is indeed one of the biggest issues affecting passengers, particularly during long haul travel as light is a major influence on human rest and wakefulness.

IFPL commercial director Gary Girard explains that Cobalt Spectrum incorporates a 'sunrise' mode which has proven enduringly popular with its customers as it not only makes the cabin look beautiful, but also positively impacts passenger wellbeing.

"Inspired by nature, this mode uses soft peach and orange tones to gradually lighten the cabin, gently easing passengers awake," says Girard. "Instead of flicking the lights from 'off' to 'on' and plunging guests into a suddenly bright, fully lit cabin, we use this technology to gradually transition passengers to a more alert state, mimicking the optimal natural conditions for wakefulness that occur each morning."

1. Lighting displays and projection technology may merge to form a combined technology
2. Cobalt Spectrum now comes with a wireless controller

“IT IS NOT JUST DISRUPTION TO SLEEP THAT CAN IMPACT PASSENGER WELLBEING”

System is a proprietary full cabin lighting system that reduces jet lag, intelligently syncing with real-time flight data to optimise performance.

Hypergamut has increased the number of coloured LEDs used in traditional cabin lighting systems, tapping into specific wavelengths that have a significant influence on the human body's biological clock – or circadian rhythm.

“These additional wavelengths can be seamlessly and invisibly added to a cabin light mixture, harmonising with circadian rhythms and positively influencing cycles of rest,” says Herring. “This enriched light spectrum aids in the travel process, helping passengers arrive at destinations more refreshed, attentive and better suited to deal with the demands that time changes put on the body.”

Hypergamut is an advanced and intelligent system in that data gleaned from aircraft activity, global positioning, flightpath, time at the destination, weather and more is collected and interpreted by the advanced connectivity system to enable both predictive

functionality and autonomous operation. This also has major benefits in reducing cabin crew workload.

Recently launched on Starlux Airlines' A350 fleet, Herring adds that Collins' Secant Luminous Panel which uses highly efficient micro-LED lights to create a fully scalable and customisable lighting system can transform any aircraft cabin surface into an illuminated, dynamic display.

Secant can seamlessly integrate with systems such as Collins' Hypergamut, expanding the array of features focused on passenger comfort. A sunrise or sunset scene displayed by Secant could for example be combined with Hypergamut wavelengths to match what's visually being seen, enveloping passengers in a truly immersive experience.

Routine setting

According to IFPL's Girard, it is not just disruption to sleep that can impact passenger wellbeing; any deviation from routine can be stressful, and travel is no different. “Luckily, mood lighting can help in that area too,” he says, and points

The same is useful in reverse – a ‘sunset’ lighting mode which mimics the sun going down and lulls passengers into a restful sleep. These modes can be deployed by crew at the touch of a button, coordinating with the travel schedule of each individual aircraft. Cobalt Spectrum also now comes with a wireless controller, making it even easier for crew to use their cabin mood lighting system.

Jan Petersohn, business development, cabin systems at Diehl Aviation agrees that lighting options in aircraft cabins should not only be designed to provide necessary illumination but also to offer passengers a sense of comfort during their journey.

In the Airspace cabin for the Airbus A320 Family, for example, Diehl Aerospace has developed an innovative lighting concept that uses the latest LED technology to make the cabin appear significantly larger, more modern and brighter. The entrance area, the entire cabin and the lavatories all feature impressive main lighting and flexible light strips along the contour of the overhead compartments.

“Additionally,” says Petersohn, “the so-called Hero Light that runs in the middle of the cabin ceiling can be customised with a dedicated pattern for each airline, with comfort colours and dimmable lighting to ensure maximum passenger experience.”

Real time data

Richard Herring, value stream leader, interior lighting, Collins Aerospace, says the business's Hypergamut Lighting





◀ Digital surfaces in the cabin may eventually replace conventional lighting systems

MOOD LIGHTING CAN HELP TO IMPROVE WELLBEING AND CREATE A MEMORABLE EXPERIENCE

to Cobalt Spectrum's various modes that can promote a relaxing atmosphere in the cabin.

"We tend to favour cooler tones for these settings, like pale lavender and gauzy blue shades," he says. "Research has shown that colour has a physical effect on the human body, for example red is responsible for raising heart rate while blue provides a soothing effect which calms the nervous system. We've certainly found this to be true, even when exploring different colour options with customers at one of our 'colour clinics'. There is an immediate sense of relaxation and often an audible sigh of contentment when we switch the system to this mode."

Regulating a passenger's appetite is another method of helping them to maintain a routine whilst travelling, which improves wellbeing and impacts on a passenger's enjoyment of the flight.

Girard says airlines are advised to use bright and clean hues like a well-balanced white to illuminate the cabin during meal services. "Simple light modes have the

dual effect of simulating natural daylight to increase passenger alertness, whilst enhancing the appearance of food and making it seem more appetising," he says.

Brand identity

Airlines are looking for solutions, features and amenities that delight and excite passengers while differentiating themselves from their competitors and lighting system have their role to play here.

"While mood lighting can help to improve passenger wellbeing, it is also an excellent way to provide an entertaining and memorable travel experience," says IFPL's Girard. "For example, one of our most requested Cobalt Spectrum modes splashes a captivating Northern Lights-inspired light scene across the ceiling of the aircraft."

He says the value of cinematic lighting like this cannot be underestimated in ensuring a flight is memorable for the passenger for all the right reasons. Collins' Herring concurs and points to

Hypergamut's small segment control that allows for dynamic scenes to be created with infinite light patterns being possible such as full motion Borealis Lighting effects on ceilings and side walls. The Secant Luminous Panel can also provide seemingly infinite possibilities to create bespoke experiences that stimulate visual interest, enhance brand messaging and add to passenger comfort.

Scaleable for any aircraft surface area, airlines are given complete control in what to display and can create their own unique designs that best fit their brands. "Marketing and branding functions could also be addressed by Secant with airlines using its capabilities to display everything from brand messages, passenger seat information and egress patterns, to destination information, items available for purchase or premium services," says Herring.

Diehl's Petersohn says he sees a trend towards digital surfaces in the cabin that may even eventually replace conventional lighting systems. "A surface light with a customisable printed pattern is an excellent example of an intermediate step for this technological journey. In the end, lighting, displays and projection technologies will merge to form a combined technology capable of providing all benefits at once."

In conclusion, the latest LED lighting technology has enabled airlines to create comfortable and modern cabins that enhance the overall passenger experience. The integration of advanced LED lighting systems and digital surfaces will further enhance the airline passenger experience, providing a unique and personalised journey. ©



AVIATION

Business News

Exclusive features, industry interviews, expert opinion
and all the latest news from the cabin, cargo, MRO
and low cost & regional airline industry

aviationbusinessnews.com



BIO-BASED COMFORT

The use of bio-based materials in aircraft seat foams is yet to be adopted despite copious research into its application. *Alex Preston* asks whether the time has come for green polyurethane foams

The aviation industry is constantly looking for ways to use more sustainable resources in their products as well as to develop aircraft that leave a smaller environmental footprint over their lifespan and use.

For example, between 2016-2019, an international collaboration of Chinese and European partners in the EU-funded Eco-Compass project assessed the viability of different eco-materials and technologies for their potential application in aircraft interior and secondary composite structures.

Initial results showed that bio-based composites from flax and ramie plant fibres could potentially be used in natural-fibre-reinforced plastics for aviation. Other investigations have taken place into the use of bio-based materials and associated bio-based foams for aircraft seating.

As the US Federal Aviation Administration (FAA) notes in its Aircraft Materials Fire Test Handbook, many different foams of various densities are used in aircraft seats based on a number of requirements such as wear, comfort, flotation, flammability and others.

The foam in the cushions is either moulded to the final shape or cut from existing foam stock and bonded together

with adhesives. Open cell urethane foams are most used with densities as low as 1.98lbs/ft³. A foam with such a density will typically last for around 5-7 years.

If the cushion is to serve as a flotation device in emergency situations, the foam must be closed cell; polyethylene foams are often used for this.

Flexible approach

Since its breakthrough in the late 1930s, and later widespread commercial availability in the 1950s, flexible polyurethane foam (FPF) has become a preferred material in aircraft seating, such as fillers in seats or head restraints, giving seat manufacturers and designers more flexibility in design,

1



2

efficiency and safety. FPF is the result of a chemical process involving a reaction of two primary ingredients: an isocyanate and a polyol. Originally, these raw materials were derived from petrochemical feedstocks.

Neoprene, silicone and modified urethane foams can be used for cushions to meet FAR 25.853(c) (pertaining to seat cushion flammability) without a fire-blocking textile. They may also be used as fire blockers over conventional foams. The densities of these foams have a range of 3 to 4 lbs/ft³.

Outside of academic and industrial research, the EU has spearheaded studies into alternatives to currently used flexible foams for seat cushions, which comply with aircraft fire resistance requirements under the same weight specifications while meeting the comfort and durability needs of passengers.

The use of bio-polyols, such as those derived from vegetable oils, as an alternative to standard polyols began in the early 2000s in response to the rising costs of petroleum feedstocks and a growing concern for the environment.

However, these bio-polyols can only replace a portion of the polyol part in the chemical formulation of FPFs and need to be blended with petroleum-based polyols to maintain the foam physical and mechanical properties.

PUR-fecting performance

Back in 2012, the EU-funded Fibioseat (fire-resistant biobased polyurethane foam for aircraft cushions) project attempted to develop seat cushions using petroleum-based and natural oil polyols



3

and non-halogenated flame retardants that provide comfort and durability.

During the 25-month time frame, working with PMV Industrie, France's Axyal, a specialist in the transformation of plastics and composites, developed a green polyurethane foam with a 30 per cent bio-based polyol.

Using computer-aided design software, the project teams manufactured two foams: Foam CSI Green PUR (with expandable graphite as a fire-retardant additive) and Foam CSI Green PUR-2 (without graphite).

According to the teams, this polyurethane system is easily recyclable through mechanical recycling (grinding) or chemical processes (glycolyse).

PMV, which assembled the seating cushions, reported that their comfort performance was 'good', claiming that test showed "the properties of resistance to compression, resistance to fatigue is comparable to well-known foams used for airliners seats and also VIP seats."

It was hoped that Fibioseat would pave the way for the qualification of a green polyurethane foam for producing

"THE USE OF BIO-POLYOILS AS AN ALTERNATIVE TO STANDARD POLYOILS BEGAN IN THE EARLY 2000s"

sustainable aircraft seating cushions. The project concluded: "Successful production of innovative and green foams from petroleum and renewable resources and treating them with increased concentrations of non-toxic fire retardants should provide the polyurethane foam processing sector in Europe with a clear competitive edge." However, no further details of the project have been made available since its conclusion in 2014.

GREASE is the word

The Department of Environmental Engineering of the Fraunhofer Institute for Chemical Technology has also looked into the development of polyurethane components from renewable source and recycled materials, especially alternatives that do not compete with food production.

In 2015, the Department was a participant in the Grease project, which aimed to develop new chemical and biotechnological processes for the upgrading of low-cost wood-based fatty acids such as tall oil and birch bark, obtained from industrial streams, to value-added oleochemicals for use in applications including partly bio-based (up to 70 per cent) polyurethane products (rigid foams and elastomers).

Led by the Technical Research Centre of Finland, with partners including the University of Helsinki, RAMPF Ecosystems and Akzo Nobel Industrial Coatings, the project members developed a formulation for flexible PU foam which passes the FAR 25.853 appendix F fire regulation test without the use of any additional flame retardant. The formulation consists of about 22 wt% (weight per cent) renewable material. This decreases the carbon footprint of the foam

1. Flexible polyurethane foam is a preferred material for aircraft seating

2. Any seat foam alternative must meet passengers' expectations of comfort

3. Researchers are exploring new materials alongside different seat constructions



◀ Leitat's aircraft seat is easy to dismantle and recycle

“A MONO-MATERIAL CUSHION WAS PROPOSED TO IMPROVE THE EASE OF RECYCLABILITY AND THE COST OF PRODUCTION”

and facilitates its recycling via glycolysis.

The project went on to evaluate recycling, long-term stability testing and Use of Life Cycle Assessment (LCA), while the foam formulation influenced the EU-funded Haird (Hybrid Aircraft Seating Design) project.

The Haird project sought to deliver a new design for a next generation aircraft seating which is comfortable, lightweight, fast to disassemble, easy to dismantle, cost-efficient to produce, highly recyclable and reliable in structural integrity. Within the Haird project a new mono-material cushion was proposed to be developed to improve the ease of recyclability and the cost of production.

As Dr Pere Badalló, project coordinator pointed out at the time, “By employing new materials that are easier to recycle, such as a new polyurethane-based cushion, we can reduce the seating's environmental impacts.”

Composite manufacturing techniques like sheet moulding compounds (SMCs), wet compression moulding (WCM) and prepreg compression moulding (PCM) with co-moulding of SMC were used to design and build the aircraft seat – a

new economy class aircraft seat for the Airbus A320, weighing 8.56 kg and 10 kg for economy class and economy class plus respectively. An amazing 95 per cent of the weight of the seat is recyclable.

Based on the results of the Haird project, Hairmate, a five-year project led by Leitat Technological Center, has designed and manufactured molds to produce the next generation of aircraft seats. In January, the project received the JEC Composites Innovation Award 2023 in Paris in the Aerospace-Parts category.

The consortium is now seeking funding at the European level to continue development of the technology and to be able to make the prototype available soon.

Automotive aspirations

With aircraft seating manufacturers sharing many synergies with the automotive industry, and taking inspiration and influence from the sector, could aviation take a leaf from the automotive industry, where bio-based foams have already been developed for many vehicle types?

Faurecia Seating is currently working on its ‘Seat for the Planet’, an initiative

aiming to advance sustainability through a holistic approach which includes the frame, foam, covers and accessories.

Anne-Sophie Cabouillet, Covers & Foam Innovation project manager, is working on developing seat foams that use recycled, recyclable and bio-sourced materials: “Easier to separate for recycling, bio-composites use non-food agricultural materials such as hemp stems. Using bio-sourced materials lets us reduce the use of non-renewable materials by up to 50 per cent.”

Benoit Scheer, Cover & Foam Solutions innovating manager who is working on low-carbon textiles for seat covers and alternatives to leather, added: “Integrating recycled and recyclable materials in our covers will not only help reduce emissions related to our products but also support the development of a robust circular economy for seating which will include all components.”

Returning to the aviation industry, an ever-increasing awareness of the environmental impact of traditional-based polyols in flexible polyurethane foams is leading to greater interest in bio-based polyols.

However, new materials and technology may make it necessary to modify the various test methods from time to time in order to address newly identified testing anomalies. In these cases, authorities like FAA and EASA require assurance that such changes do not affect the intended pass/fail criteria of the test (that is, the level of safety provided), but do provide an increase in repeatability, reproducibility or ease of test conduct.

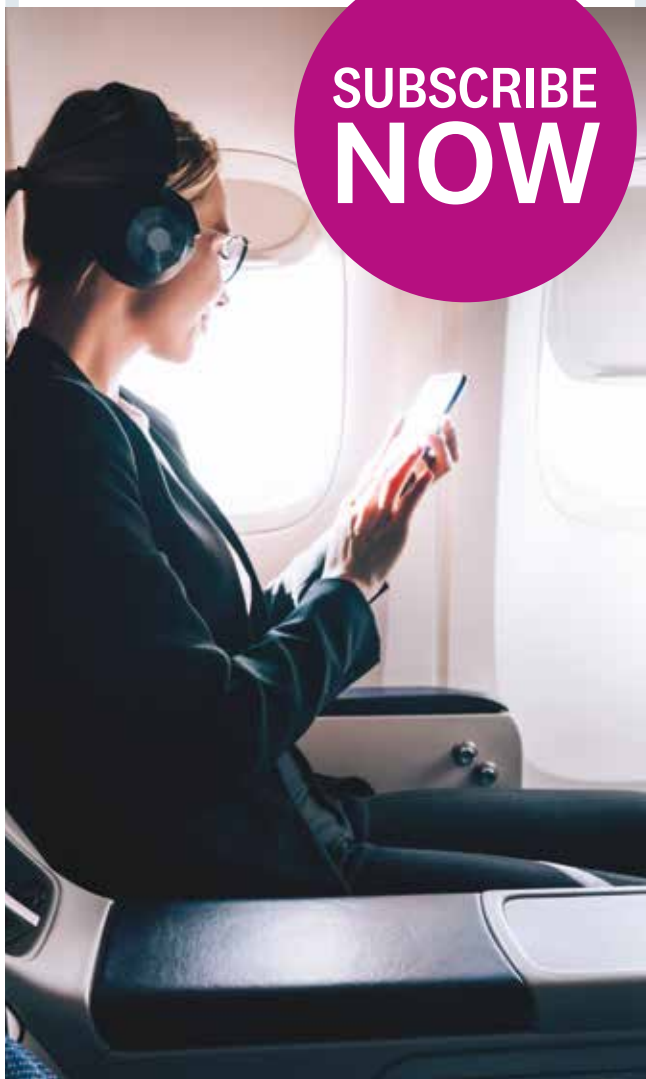
Such projects as those described above have provided an assessment of different eco-materials and technologies for their potential application in FPF. Although these projects have demonstrated the apparent successful combination of bio-based polyols for the manufacture of FPFs for aircraft seating, more work is needed to optimise the properties of these material systems and to understand the fundamental issues that affect their performance. 🍷

Aircraft

CABIN

Management

SUBSCRIBE
NOW



Aircraft Cabin Management is the magazine informing airlines of key design concepts, the manufacture and operation of modern airline cabins – helping airlines to address the balance between passenger appeal and operational efficiency.

Reaching an audience of over 32,000 professionals, we aim to keep you fully informed of the latest news and developments from the sector.

aviationbusinessnews.com/subscribe



Transtel

A world of
quality
content for
acquisition



2022
Inflight Catalog
for Licensing
Partners

Contact: christian.kuehne@dw.com



Tony Seville, director, Aircraft Interior Recycling Association – AIRA

SECOND LIFE

AIRA's **Tony Seville** discusses why the industry must embrace aircraft interior recycling

At AIRA (Aircraft Interior Recycling Association), we are long-term researchers of recycling and sustainability of aircraft interiors and its materials.

We all really need to take the responsible approach to this and deal with them properly.

Over the years we have worked out a number of different ways that really stand out to find the highest material recovery rate. We continue to look at getting as much recyclable material out of the interiors as possible. This is really important for our clients to know what materials we can take out of the aircraft interiors that can be recycled, getting the maximum use out of AIRA as a specialised dedicated company to recycle aircraft interiors from the manufacturing process through its lifecycle and through to the end of life.

Here are some startling facts and figures for you to think about, and how we are helping aircraft interior manufacturing and airlines reduce their carbon footprint.

In the past 18 months, AIRA has recycled over 130,000kg and saved almost 300,000kg CO₂ from the manufacturing process in the UK. One company, one sort of material, and this is low due to just coming out of the pandemic and supply chain problems. It would normally be double that figure. The CO₂ saved is a benefit to the manufacturing company in various ways which will be included in their ESG reports.

After many years of our research and the introduction of our new software system, Q Intelligent Systems, we can now very accurately identify and calculate an airline's carbon footprint reduction per aircraft, which can amount to many thousands of kilogrammes of materials recycled and also millions of tonnes of CO₂ to be offset from their own

"It became clear our industry is possibly unaware of the negative impact it has"

emissions should the airline implement a simple strategy with us. And it's not only the airline and its passengers that benefit – it's the OEM that supplies the interior components and the whole supply chain behind it, if done correctly.

Material analysis

We recently carried out a material analysis for an airline customer that wanted to look at the waste they were producing and landfilling from different cabin interior components over a period of seven years and then multiply that by the number of aircraft in their fleet.

After going through the analysis and imputing all the data, it became very clear that our industry is possibly unaware of the negative impact they have with the materials currently used but also how quickly we can turn this into a positive for airline clients and their passengers without them having to be sustainability specialists and trying to re-invent the wheel with materials that have a higher carbon footprint than the materials we already have, and that cannot be recycled from either the manufacturing process or end of life.

An airline with 100 narrowbodied aircraft could recycle over 475,888kg of materials over the life span of the aircraft, saving in the region of 2,518,600kg CO₂ which is the equivalent of 5,672,522.52 passenger airmiles. It's also the equivalent of 533,881kWh which would power 62,882 homes for a whole day, and the equivalent of planting 119,928 trees. Again, the CO₂ saved is a benefit to the airline in various ways which will be included in their ESG reports.

It has become a more significant issue since the world's aircraft fleet size is expected to increase from 25,900 to 49,405 aircraft between 2019 and 2039. While the more established markets of Europe and North America are predicted to increase by around 76 and 42 per cent respectively, the Asia Pacific fleet is expected to increase by about 139 per cent to 18,770 aircraft in 2040. 🌱



Aircraft|EXPO®
Interiors
6 - 8 JUNE 2023
HAMBURG, GERMANY

WHERE CABIN CONCEPTS TAKE OFF

**Join us in Hamburg
from June 6 - 8, 2023.**

Aircraft Interiors Expo is the definitive marketplace where everyone involved in developing cabin interiors needs to be.



Co-located with:

World Travel Catering
& Onboard Services
EXPO 6 - 8 JUNE 2023
HAMBURG, GERMANY

Passenger
Experience
CONFERENCE 6 JUNE 2023

Organised by:

RX In the business of
building businesses

In co-operation with:

Hamburg
Messe + Congress

Visit us at: <https://www.aircraftinteriorsexpo.com/ACM>

Panasonic



ALL THE COLORS OF THE RAINBOW

With addressable LED lighting, the Astrova peripheral bar produces millions of colors for customized notifications, lighting sequences, and syncing with the rest of your cabin lighting.

Plus, with Astrova you lower your total cost of ownership and keep current with passenger demand. The peripheral bar is upgradeable, repairable, and replaceable without having to remove the monitor itself, for easy on-wing servicing.



www.panasonic.aero

Panasonic Avionics Corporation