# Aircraft interiors INTERNATIONAL

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Onboard social spaces can benefit the passenger experience – and profits

#### I SURVIVED!

How does a plane crash feel? Does crew training kick in? Find out in this special interview with a crash survivor

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#### UNITED POLARIS

Has United really found the ultimate business class seating layout?

# IFE SPECIAL

An in-depth look at the latest IFEC issues, including apps, standards and interfaces

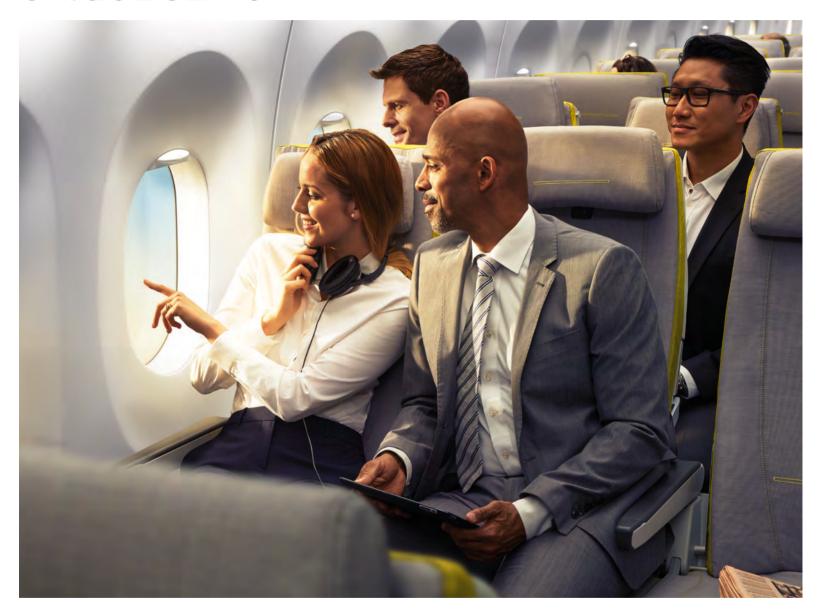
# CABLE RESIDENT

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#### **EMOTIONAL JOURNEY**

have seen a few sights on various airline product launches, from dance troupes to bands, laser shows to opera singers - even an inflight disco. However, the reveal of United's Polaris business class stood out in its relative modesty. Don't get me wrong, the backdrop of New York's Gotham Hall wasn't lacking in pizzazz; it was that the heartfelt presentation by CEO Oscar Munoz - and it was nice to see him looking so well again after his recent health issues - felt almost humble. He acknowledged that the airline had fallen behind competitors in terms of the passenger experience before revealing Polaris, a business class that is the physical manifestation of a new "culture of caring" and "new spirit of United", as he stated.

Worthy words, and the unveiled product looked great, but as the story unfolded it turned out that Polaris is a truly remarkable business class, giving comfort levels that can compete with rivals without any loss in cabin density. As Munoz said, the project has been "defiantly innovative".

While Polaris promises a comfortable flight for passengers, its development has been an emotional journey for its creators, with huge amounts of money, risk and toil involved, but the result will enable United to compete with rivals on an even footing. Emotions ran deep with this project and it was a real pleasure to discuss it with those involved. We bring you the story behind this highly innovative layout on page 72.

Emotions have also been running high following the Emirates Flight 521 crash at Dubai International Airport in August: shock as the news broke, relief as all the passengers escaped alive, sorrow as a firefighter died during the rescue, and disbelief as passengers put lives at risk while they collected their bags before evacuating. My current emotion is hope: hope that a solution can be found to ensure people deplane as fast and as safely as possible. Could stowages that lock automatically during TTL be the answer?

I would like to end with a little more emotion: happiness and jubilation, this is Boeing's centennial year after all. William Boeing's legacy is a remarkable company with a fantastic history of innovation: it really has changed the world. Even Airbus couldn't resist sending Boeing a touching video message (see 'Airbus has something to say to Boeing' in the Videos section of our website). The next step is the B777X, but I hope the B747 will still have a place in Boeing's long-term future. After all, the Queen of the Skies brings out a very special emotion in passengers: a little love.

Adam Gavine, editor





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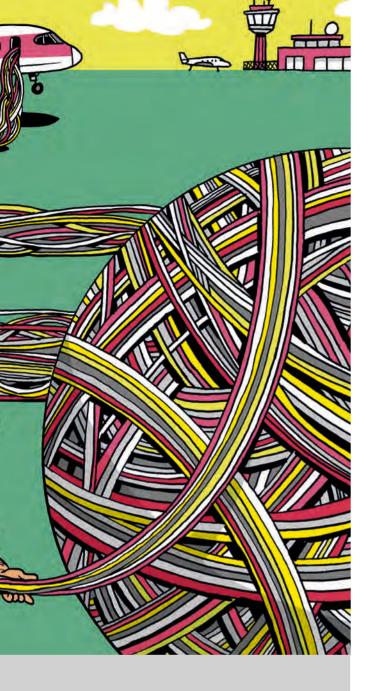
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#### **Upfront**

The latest trends and developments entering the passenger experience airspace. In this issue we have our regular roundup of industry statistics, a British Airways B747 revamp by numbers, the latest news from the Embraer E2 cabin project, an innovative headrest, and more...

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United Airlines' CEO describes the new Polaris business class as "defiantly innovative". We might just agree, and here's why...

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An 1800s nautical theme meets the beautiful B747 upper bubble. Qantas's Captain Cook lounge from 1971 is one of those amazing spaces that people wish could still be flying today.

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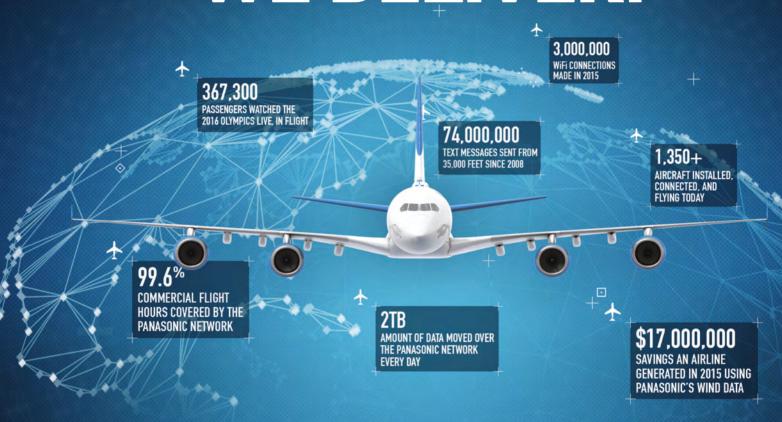
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# 6,12 reloaded 53; 650 pap 233 tool 326 qua drink

#### SERVICE EXCHANGE

6,120kg of service items are unloaded and reloaded before every BA B747 flight. This includes 538 meal trays, 34 teapots, 735 glasses, 650 paper cups, 220 drinks stirrers, 500 coasters, 233 toothpicks, 2,000 ice cubes, 99 full bottles and 326 quarter bottles of wine, 700 small cans of soft drinks, 337 headrest covers, 435 air sickness bags, 58 toilet rolls, 340 safety cards, 1,291 items of china crockery and 1,263 items of metal cutlery

#### SYSTEM UPGRADE

The eX3 IFE system upgrade took nine months to complete and offers a choice of more than 1,300 hours of content, including more than 130 movies and 400 TV programs

#### IFE EXTRA

Since BA's introduction of end-to-end IFE, passengers can enjoy up to an extra hour of entertainment on long-haul flights

#### HIGH WIRE

Fitting the new Panasonic eX3 IFE system across the 18 aircraft involved 61 miles of wiring

#### JUMBO FLEET

With 40 in its fleet, British Airways is the world's largest operator of the B747-400

# JUMBOJOY

British Airways has spent 11 months updating the cabins of 18 of its Boeing 747s to create consistency with the newer A380s and B787s in its long-haul fleet. The numbers involved may surprise you...

#### POWER TO THE PEOPLE

World Traveller (economy class)
customers gain their own personal
in-seat USB socket to power phones
and tablets. That is 243 seats on
the 345-seat variant, and 185
of the 299-seat variant

#### PREMIUM POWER

World Traveller Plus (premium economy) guests now have access to a universal power socket at every seat. That is 30 or 36 seats, depending if the aircraft is a 299or 345-seat configuration

#### LIE-FLAT

16 additional Club World
(business class) lie-flat seats
have been fitted to each aircraft,
bringing the total for each to
86 (only 11 fewer than on
BA's A380s)

#### DREAM WEAVERS

The fabric has been replaced on 4,950 seats during this project, and enough new carpet has been laid to cover 34 tennis courts

#### LIGHT FANTASTIC

Nearly six miles of LED lighting has been fitted across the 18 aircraft, and 4,500 light fittings

#### BODY PARTS

The B747-400 airframe has six million parts (half of which are fasteners) made in 33 different countries

#### FEEL THE SPEED

A B747-400 typically takes off at 180mph, cruises at 565mph and lands at 160mph

PHOTO: BRITISH AIRWAYS

Love details? The Case Studies section of aircraftinteriors international com takes an in-depth look at the latest interiors





W-IFE AVAILABLE FOR TRIALS

Lufthansa Systems has partnered with the NRC to make

its BoardConnect wireless IFE available for use by clients

organizations will also be using the facility to collaborate

"We plan to cooperate closely with the NRC in the

future in terms of features and functionalities," stated

Norbert Müller, SVP for BoardConnect. "Like ourselves,

NRC has many highly capable software developers. This partnership will enable us to benefit from each other's

expertise and experience and has the potential to greatly

enhance the creative development of our BoardConnect

in the cabin simulator. Specialists from both

on the further development of the IFE system.

platform in the future."

# COMFORT ZONE

The pre-flight
gate area simulator
can also be used
to test boarding
techniques

Canada's National Research Council is set to open a cabin comfort R&D center, with the aim of recreating cabin conditions to enhance the passenger experience

For all sorts of reasons, experimenting with the inflight experience is something best done on the ground, which is why the National Research Council of Canada (NRC) is building a facility beside Ottawa's Macdonald-Cartier International Airport scheduled to open in autumn 2017, designed to help airlines, suppliers and airframers develop and advance cabin technologies at low cost, expense and risk, and in a short time.

To make the experience as close to clients' individual needs as possible, the mock-up has options for reconfigurable seats, windows and stowages, which can be used to investigate and demonstrate new interiors, technologies and concepts and how they will be perceived by passengers. Reduced length mock-ups are also available for use in projects such as enhancing thermal comfort and advanced ventilation systems,

developing novel lighting systems and personalized passenger controls, and reducing cabin noise and vibration. A flight simulation laboratory is also available, a two-story space suitable for housing large-scale mock-ups or fuselages for clients.

A particularly interesting technology available at the facility is the sound and light simulator panels, which can be used to accurately reproduce the sound and light levels passengers experience during flight. The panels will be used to evaluate window shades, lighting, and acoustic technologies, and can also be manipulated to function as speakers for passenger announcements and as noise-cancellation devices.

To replicate the distinct and variable lighting environment of a typical cabin during flight, the simulator can mimic the sunlight and glare experienced by passengers during a flight, replicating these conditions by adjusting the angle and intensity of LED lights in the panels.

1. HOW A CLIENT'S SEATING ARRANGEMENT COULD LOOK IN THE FLEXIBLE CABIN LABORATORY IN THE CABIN COMFORT AND ENVIRONMENT RESEARCH (CCER)

BUILDING

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## 100 YEARS YOUNG

With its youthful vigor it's hard to believe that Boeing is 100 this year. Here are a few highlights from a remarkable century of style and innovation from a company that has changed the world



#### THE B707: THE GAME CHANGER

Launched in 1958 with a glamorous marketing campaign, Boeing was selling the smoothness and comfort of this long-range narrowbody as much as its speed. The B707 informed many of today's cabins, with seating aligned to its more than 100 windows to give passengers light and a view that connected them with the flying experience; passenger boarding on the left, which is now standard; and overhead hatrack

stowage that inspired Boeing's future cabin architecture.

The B707 quickly became a popular and even fashionable way to travel. So successful was the B707 that airlines needed something bigger to cope. The answer was the twin-aisle B747.





#### THE 2000S: A DREAM COME TRUE

As the 2001 financial crisis led airlines to prioritize fuel economy over speed, in 2003 Boeing opted to pursue its 7E7 project rather than the Sonic Cruiser. The aircraft – later named the 787 Dreamliner – was to make extensive use of composites to become Boeing's most fuel-efficient airliner, with those composites also enabling passenger benefits such as extra-large windows, an internal cabin pressure equivalent to 6,000ft (1,800m) altitude instead of the typical 8,000ft (2,400m), higher cabin humidity and cleaner cabin air. The B787 also brought in a catalog interiors approach to help ensure stability in a lean production system.

The aircraft is a technological tour de force, but what really impresses flyers is how amazing the cabin looks and how all its features combine to make them feel good. Better still, the swoops and curves of its architecture can also be specified for other models in the Boeing range.





#### A DOUBLE-DECKER IN 1947

A converted C-97 military transport may not sound like the basis for a luxury passenger experience, but when the Boeing 377 Stratocruiser was launched in 1947 it was remarkable. The fuselage, shaped like an inverted figure 8, created 6,600ft<sup>3</sup> (187m<sup>3</sup>) of interior space over the two decks. Boeing offered flexible configurations, including a 114-seat all-economy option and luxury



options with sleeper berths and a lower lobe lounge. Elements of the cabin inspired the B707 and B747, and it also marked Boeing's first project with Teague: a close relationship that endures today.



#### ENTER THE QUEEN OF THE SKIES

Introduced in 1970, the B747 was an instant classic, though having cool customers such as Pan Am and Braniff didn't hurt. As many as 3.5 billion people have flown on the Queen of the Skies – the equivalent of half of the world's population. There is a lot of love

for the venerable Jumbo, but sadly not a lot of orders. Boeing has indicated to the Securities and Exchange Commission that if sufficient orders are not forthcoming, "it is reasonably possible that we could decide to end production of the B747."

A few orders, please! Let's not consign this grande dame to the history books.





#### AND FOR THE NEXT CENTURY?

So what's next for Boeing? Something great by the looks of it – the B777X, which is expected to enter production in 2017. The all-new cabin architecture will include elements from the B777-300ER cabin that have generated positive customer feedback, as well as many of the B787's comfort features, such as the large windows, lower cabin altitude and higher cabin humidity – though with an aluminum fuselage.

Other work confirmed by Boeing includes some unique experiences for the Door 2 entrance area, extra sound insulation, improvements in configurability and advances in LED lighting effects. We can't wait!



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## Life at Aviointeriors is good come share our ideas for the future...



Columbus C4 launched at Hamburg 2016 and being improved





Canova and Sophia have met industry expectations

ADAGIO a new concept in HDBC seating now in development and available to view at the Singapore APEX/AIX show in October 2016



# UPWARDLY MOBILE

The latest industry figures show the interiors industry's continual dramatic growth, the importance of connectivity, and some interesting IFE usage trends





The top 10 airlines generated

### US\$26bn

in ancillary revenue in 2015. For 2008 that figure was US\$8.4bn

IdeaWorksCompany report

**3** 73%

of millennials say that availability of wi-fi affects their choice of flight Honeywell study

#### New crew

Boeing forecasts that between 2016 and 2035, the commercial aviation industry will require approximately 814,000 new cabin crew of passengers place greater importance on onboard connectivity than the inflight meal service Inmarsat In-Flight Connectivity Survey

The aircraft cabin interiors market is expected to grow from **US\$16.87bn** in 2016 to **US\$29.16bn** by 2021

Markets and Markets report Global airline industry profits are expected to increase by almost

**12%** in 2016

IATA 2016 financial outlook

# How people watch IFE

have recently watched a movie on their own device

have watched a movie on the seatback display

10% used the seatback IFE and their own device

65% would be happy to watch

SITA Passenger IT Trends Survey

# Revenues from connectivity are expected to grow from US\$700m in 2015 to nearly

US\$5.4bn

Research and Markets report

#### CART MARKET

The global galley cart market will grow at a **CAGR of 5.6%** from 2016-2021

Research and Markets





Boeing predicts passenger traffic will grow by 4.5% per year over the next 20 years, driving a demand for 39,620 new aircraft, worth US\$5.9tn

**Boeing Current Market Outlook** 

大大大

Airbus says passenger

traffic will grow by 4.5%
per year over the next 20
years, driving a need for
more than 33,000 new
aircraft above 100 seats,
worth US\$5.2tn

Research and A Markets report

The global commercial

aerospace lav market

will grow at 5.5% CAGR

during 2016-2021

Airbus Global Market Forecast

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Cathay Pacific
will launch the
HAECO Vector Y+
economy seat on
the A350-1000

# LEAN MACHINE

Cathay Pacific is introducing innovative coach comfort features on its A350 fleet

1. THIS HEADREST GIVES CATHAY PACIFIC A UNIQUE SELLING POINT IN ECONOMY CLASS

2. THE INNOVATIVE 'BACK PACK' SEATBACK SHELF FREES UP VALUABLE SPACE TO PASSENGERS

3. A USEFUL STOWAGE AREA FOR SMALL ITEMS ADDS FURTHER COMFORT TO THE 18IN-WIDE SEAT, WHICH ALSO BOASTS A 32IN PITCH, GIN RECLINE AND 11IN IFE DISPLAY When 214 of the 280 seats on your A350-900 are economy class, it makes sense to go the extra mile to attract customers into them. Thus Cathay Pacific has showered its coach seats with attention and investment, with a major new feature being an innovative six-way headrest that offers greater lateral support than conventional headrest designs, helping passengers get some much-needed sleep whether upright or reclined – no neck pillows needed here.

This headrest was designed in partnership with Tangerine and is being manufactured by B/E Aerospace as a part of the Pinnacle product, although the design remains proprietary to Cathay Pacific.

The design is a little more comprehensive than a typical folding headrest, as Martin Mo, a designer at Tangerine who was closely involved in the project, explains: "We were looking at ways to bring more passenger benefits and comfort to the economy seat. The idea was to create additional surface space in the headrest, widening it to allow more room for movement in different postures. The traditional way of opening a headrest is to fold it out, which encloses the head rather than opening up more space to lean into. This design creates more opportunity for movement."

The result is a headrest that offers occupants a range of comfort options, with no hard surfaces or gaps, as a soft, hammock-like surface supports the head.

Tangerine, B/E and Cathay tested the headrest design extensively, using physical mock-ups for comfort trials. Over the course of

#### SPACE PROGRAM

The Cathay and Tangerine design teams also looked at how to improve the seatback table arrangement to better suit the needs of today's traveler, with the result being the 'back pack' – a combined shelf and storage area integrated into the seatback.

Vien McArthur, the senior designer at Tangerine who devised the original concept, explains that the idea came from observing passengers watching their IFE and using their devices in new, different ways: "Passengers are flipping between watching their own devices and the airline IFE, so content is more freely flowing. We wanted to come up with something better adapted to their needs and more free."

Unlatch the shelf, situated below the IFE display, and a useful surface is exposed, which includes a cup holder and PED holder so passengers can easily watch secondscreen IFE and put down their drink without having to deploy the larger meal table. Behind the shelf is a useful netted storage area, which can hold cables, cosmetics, wallets, passports, etc – all within sight and easy reach, compared with the lower seat pocket.

"Customers can control their own space. It's all about freeing up space and giving control to economy passengers," adds McArthur.

The feature is especially impressive when you consider that when the concept was first devised several years ago, second-screening wasn't so common and the notion of incorporating a device holder was an interesting new idea.

several design iterations, changes were made to the proportions of the wings, how they opened, and the tension of the hammock material, and a few alterations made following discussions with Cathay on how the dress covers and materials would be used in service, and how they would be cleaned and maintained.

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SEKISUI SPI







With
704 Boeing
737s in its fleet,
737s in its fleet,
Southwest is the
biggest operator
biggest operator
of this aircraft
type

# HEART TO BEAT

Southwest Airlines is using innovation to gain an edge in the US LCC market, with its B737-800s boasting a brand-new seat model, new G7 galleys – and fewer carts

Following on from the launch of its new logo, airport experience, and aircraft livery in 2014, USA-based low-cost carrier Southwest Airlines has revealed the Heart product for its B737-800s, which includes new seat and galley designs to complement the Boeing Sky Interiors.

A major development of the new interior is the seat, a B/E Aerospace model for which Southwest is the launch customer, and which, at 17.8in wide, the airline claims is the widest economy B737 seat in the skies, as well as being lighter than the outgoing model. Passengers also benefit from a 32in standard seat pitch, an adjustable headrest, enhanced back and bottom comfort, and more space to stow personal belongings.

"The new aircraft seats are the widest economy seats available in the single-aisle B737 market, and offer a unique design that gives our customers what they asked for: more space," said Bob Jordan, Southwest's EVP and CCO. "Serving as the launch customer for this seat is just one of several upcoming milestones related to our bold, new look."

The seats are upholstered in E-Leather, a composition leather made of natural leather fibers and dyed in the airline's Bold Blue brand color. E-Leather, which made its debut on Southwest aircraft in 2012, is manufactured using eco-friendly technology.

Southwest expects to have fitted 28 B737-800 aircraft with full Heart interiors by the end of 2016. The airline's ongoing modernization effort also includes cabin interior updates on its B737-700s, the transition of AirTran's B717-200 aircraft out of the fleet, the replacement of Boeing Classic aircraft with Boeing Next-Generation B737 aircraft, and the projected launch of the B737 MAX aircraft in 2017.

#### **GALLEY GOINGS-ON**

The galleys have also received a rethink, with the airline consulting frontline employees about how galley design could allow flight attendants to serve customers more efficiently. In what Southwest claims is a unique feature in the airline industry, the transverse (aft) galley on the new B737-800 aircraft fleet will not have carts (customers are served using trays), which reduces weight and allows passengers to move around the cabin with ease once the seatbelt sign is off – no waiting for carts to clear the aisle.

With the addition of the new G7 galley (located just past the forward-entry door), cabin crew will be able to more quickly accommodate customers in the forward part of the new B737-800s. Additionally, having more space in the forward galley area for emergency equipment means that more overhead bin space is available for passengers.

1. THE SEAT DESIGNS INCLUDE RAISED INFORMATION POCKETS ON THE SEATBACK TO GIVE MORE SPACE FOR PERSONAL DEVICE USAGE AND STORAGE

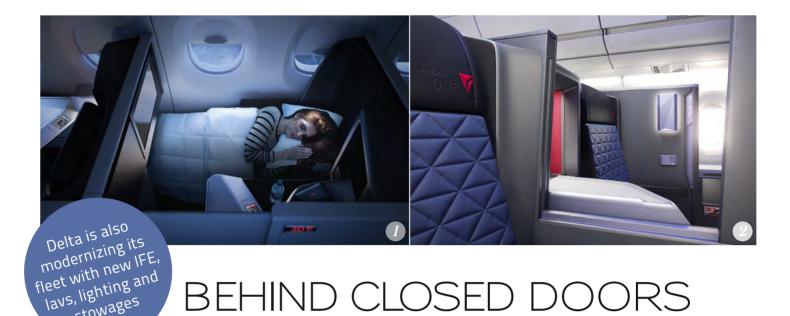
2. NO CARTS HERE: THE NEW AFT GALLEY IS A UNIQUE FEATURE

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# Dreams realised





BEHIND CLOSED DOORS

Delta has finally revealed its top-secret project: a heavily customized business class suite, complete with doors

1 PASSENGERS IN THE WINDOW SEATS WILL BE ABLE TO ENIOY A REALLY PRIVATE EXPERIENCE

stowages

2. WHILE THE SUITES WILL BE PRIVATE, FOR PASSENGERS FLYING TOGETHER, ELECTRIC SLIDING PRIVACY DIVIDERS BETWEEN THE CENTER SUITES WILL ENABLE MORE OPTIONS FOR A SOCIABLE. SHARED EXPERIENCE

Healthy competition between airlines is generally good for flyers, as new passenger-pleasing designs and benefits are rolled out to lure new customers. However, competition among the major US carriers is beginning to look more like warfare, especially in the international business class arena. American Airlines has launched rejuvenated product, United has unveiled its forthcoming Polaris (see p72) and now Delta has revealed its Delta One business class suite.

If the airline is seeking to differentiate its product in the market, it has certainly succeeded, with each of the 32 suites being enclosed, and accessed directly from the aisle via a sliding door. A business class suite with doors is not unprecedented, as JetBlue offers four enclosed suites in the Mint transcon business class on its A321s. However, having an all-suite layout is really upping the stakes and should appeal to the majority of business travelers who fly alone.

The Delta One suite is based on Thompson Aero Seating's Vantage XL platform, with major customization work undertaken by the Factorydesign studio in London. The Vantage XL model is a relative newcomer to the market, having been launched in 2013, but it has been well received by Qantas and SAS, which were the first customers for the seat.

According to Factorydesign's senior designer, Ryan Graham, the door feature was enabled by the A350's generous cabin width. "People like to have some privacy, and the feeling of 'owning their space', and this is exactly what the door provides. It is a major step forward in business class travel. In the creation of the new business class suite, Delta and Factorydesign extracted and interpreted the DNA of the Delta brand to create a unique three-dimensional product."

As well as the doors, the suites also have lieflat beds, 18in HD IFE displays, in-suite ambient lighting, memory-foam enhanced comfort cushions, in-seat USB and power ports, and multiple stowage compartments.

"After setting the standard with the introduction of full flat bed seats with direct aisle access in 2008, Delta is again elevating the international business class experience," said Tim Mapes, Delta's senior vice president. "Added comfort and privacy are important to business travelers, and that drove the design of the allnew Delta One suite."

Delta One will be introduced in the autumn of 2017 on the airline's A350 fleet - Delta is also the first US airline to receive this aircraft type following which the suites will be progressively rolled out on Delta's B777 fleet.

Visit the Recruitment section of aircraftinteriorsinternational.com for the latest career opportunities

# SOCIAL SKILLS

Great social spaces can help airlines differentiate themselves from the competition. These five spaces may be relaxing, but they were What could the future hold rather challenging to create for social spaces?



#### **QATAR GOT CURVES**

There are onboard lounges and then there are amazing onboard lounges; Qatar Airways' A380 has the latter. This truly spacious area on the upper deck may be centered around a bar, but the feel is definitely of a lounge, with the clever use of curves dividing the area into intimate seating areas rather than a large communal space. Business and first class passengers can access the lounge, and Krug, the fizz reserved for first class passengers, is available, in case a top-tier



visitor appears. Visitors can chat to crew and fellow passengers, enjoy snacks and canapés, or simply relax in the space as a change of scenery. PriestmanGoode did an amazing job with this design, with fine European leathers, Arabian-inspired chandeliers and fresh flowers creating a fresh, sophisticated feel.



#### COUNTER ARGUMENT

A380s, Korean Air had a little spare space in which to create something a little special – and it really did. A lounge, you say? Why not make that two, including a cool vodka bar. The thing that really stands out in this fantastic aircraft, however, is the onboard duty-free shop, found at the rear of the main deck at the foot of the stairs. Premium passengers can enjoy a cocktail and then stroll downstairs to do a little shopping, with a range of around 64 items on display on the shelves, including cosmetics, fragrances, alcohol and accessories - all held in place with magnets.

With a mere 407 seats on board its The shop monuments weigh around 130kg, plus 30kg for the display items, with the weight of the stock depending on the route. That weight pays off though, with annual inflight sales of around US\$200m, making Korean Air one the world's most successful airlines in terms of inflight retail.





#### A NEW SPIN ON THE A380

We could focus on the fine leathers, the exquisite marquetry finish on the table, the curved glass stowages or the valuable works of art in the display cases, but one of the most remarkable things about the Lobby in Etihad's A380 upper deck is how it was made possible.

The galley was split into two separate galleys – a front-of-house and back-of-house - enabled by rotating the usual A380 galley orientation by 90°. Moving a 2.5 metric ton galley area around required some major structural work, but the airline and its design partners

> worked with the Airbus structures team to find a solution, which included adding extra carbon-fiber reinforcement to the floor.

Until the final stages of the project, the area was known as Majlis, named after the Arabian spaces where guests are received. However, in keeping with the boutique hotel feel of the aircraft, it became the Lobby.



See p88 to see

What experts

think

#### **GATHER ROUND**

The bars on Emirates' A380s have become an instantly recognizable feature of the airline, especially following a recent TV ad that saw

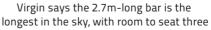


Jennifer Aniston recovering at the horseshoe-shaped bar after having a nightmare about flying with a lesser airline. No showers, no bar inhumane! Aside from the bar unit, nine individual elements make up the Emirates social and refreshment zones – which took creators Pierrejean Design Studio and AIM Altitude four years to develop and bring to production.



#### SFFING RFD

For a glam brand experience, what could be better than a cool cocktail bar, staffed by a mixologist clad in Vivienne Westwood. Step off the dreary airbridge and onto a Virgin Atlantic A330 and you are greeted with a striking bar, dripping with Virgin's trademark candy red.



stool - a snip at US\$40,000 each!

There are different styles of bars on the other aircraft in Virgin's fleet, but for the sheer 'wow' factor on boarding, the A330 has the edge.



Visit the Articles section of aircraftinteriorsinternational.com for the full story about developing the Emirates bar areas



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on our website

2. AN APP CAN CONNECT WITH CONTROLLABLE FEATURES IN CLOSE PROXIMITY, SUCH AS LIGHTING AND CREW CALL FUNCTIONS

PERSONAL EFFECTS

A new development tool at Boeing could connect passengers more closely with their personal environment and enhance crew performance

The way passengers interact with the cabin could be about to change, as Boeing's product development engineers are investigating ways to enhance the flying experience by leveraging the smart technology that so many passengers now bring on board. To further this research, Boeing has created a technology demonstrator called vCabin at its Everett facilities in Washington state. This demonstrator is a cabin mock-up linked to an advanced wireless network through which new technology, such as 'smart cabin' concepts, can be connected and made functional in order to accelerate the technology through the demonstration and development stages.

According to Deborah Regan, a lead engineer at Boeing with responsibility for cabin and product development, as well as cabin technology integration, recent technology tested in the vCabin facility takes connectivity and convenience to the next level, including acting as a means for passengers to control their environment via their smart devices. Some ideas could be implemented tomorrow, such as ordering food and drink, or downloading IFE content via personal devices, but some take the idea of connecting passengers and their devices with their immediate environment a little further. For example, with a finger swipe of their smartphone screens, passengers could adjust and personalize the lighting effects and intensity in their seated environment, or check if the

lavatory is available without having to crane their necks or join a long queue.

Among the prototype technologies being tested in the vCabin are small chips embedded near controllable features such as reading lights, which can be controlled wirelessly via an app. According to Regan, passengers' connections to the chips would be secure and there would be no risk of malicious activity as the chips are not connected to flight-critical aircraft systems or to the embedded IFE systems.

"The vCabin is a great tool to test the inventive ideas we come up with for future cabin improvements," said Regan. "We can get them working, put the ideas through their paces and get a real-world evaluation of the innovations."

A demonstration of the vCabin is available in the Videos section of our website, which also shows some exciting new lighting ideas that are being worked on, including adjustable lighting integrated into the window surrounds, and effects on the overhead bins, such as a starry sky, which can be selected by crew.

The technology is also useful for cabin crew members, who could use it to monitor and control cabin systems during flight. If a problem is detected, the cabin device could automatically inform maintenance personnel on the ground so that it can be booked in for a repair immediately after touchdown. It could also provide cabin crew with information about frequent flyers.

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look at the
cabin design is
available in the
Articles section
of our site

# POWER OF TWO

The Embraer E2 regional jet cabin design is approaching production readiness, with a few interesting recent tweaks

1. THE MAJOR CHANGE IN THE UPDATED STAGGERED SEAT OPTION IS THE SEATBACK DISPLAY, WHICH IS NOW MORE INTEGRATED Over the past two years, the Embraer E2 cabin has undergone some steady revisions following customer feedback sessions. The project is now nearly complete, with prototype flight testing having begun on May 23, and first deliveries of the E175-E2 to launch customer SkyWest Airlines due in the first half of 2018.

According to Embraer, the overall modular cabin concept was validated after the initial engineering mock-up was shown at the 2014 Farnborough show and at subsequent events around the world, with the overhead stowage space, seating and lighting all receiving positive feedback.

However, some changes have been made following those customer trials, the most noticeable of which is the design of the staggered premium seat option. While the original 15in floating IFE monitors looked smart, during trials it was found that some passengers used them to support their weight when exiting their seat, which was clearly a potential maintenance issue — indeed one monitor in the mock-up was damaged during a customer evaluation. Thus the monitors are now integrated into the seatbacks, which Embraer's design consultancy, PriestmanGoode, believes fits the general aesthetic of the interior better and is more consistent with the economy class seat design.

Other than the monitor option, the modular seat concept, which fits on the same tracks as the economy seats, has received minor styling enhancements and there are plans to add a tablet holder function to the tray table. As Christina Carlsson, project manager at PriestmanGoode, stated, "The update of the seats is really good. The previous design had more of an office

#### STRONG RESIDUALS

Another major factor set in stone is the cabin supplier, with Mexico-based EZ Air Interiors, a partnership between Embraer and Zodiac, being the single-source supplier for the entire cabin.

"One of the benefits of having a single supplier is that it makes reconfiguration much easier," stated Saulo Passos, an Embraer spokesman, adding that he has received feedback from airlines that when they try to sell aircraft that have many suppliers, potential buyers say it is difficult to change the interior.

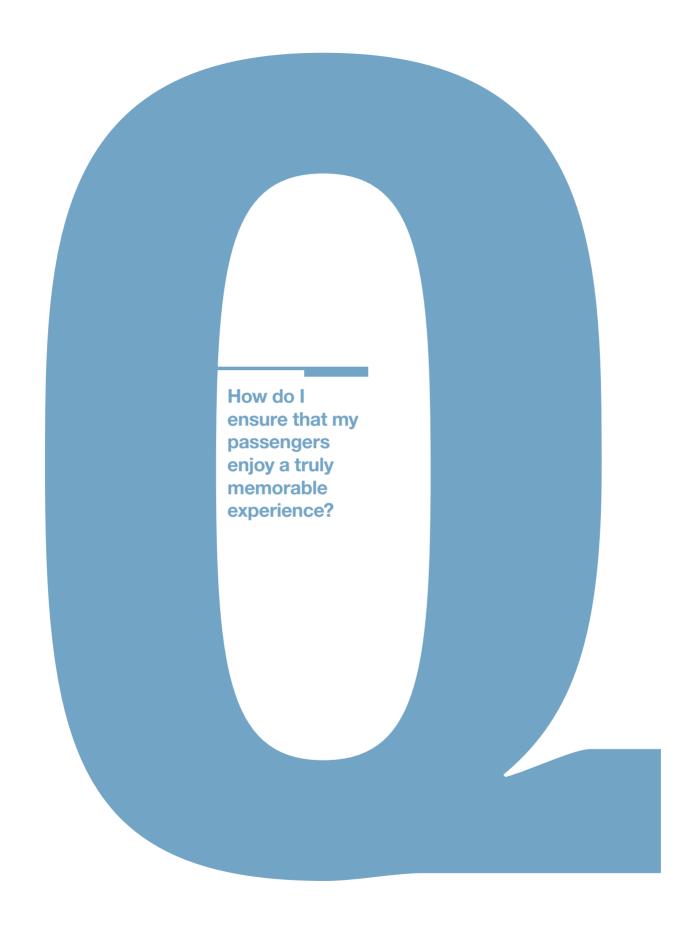
"With the E2 it is very simple. We have developed structural, electrical and hydraulic provisions so that when someone wants to change the interior, it is easy and quick. This is good for leasing companies and it increases the residual value of the aircraft," said Morell.

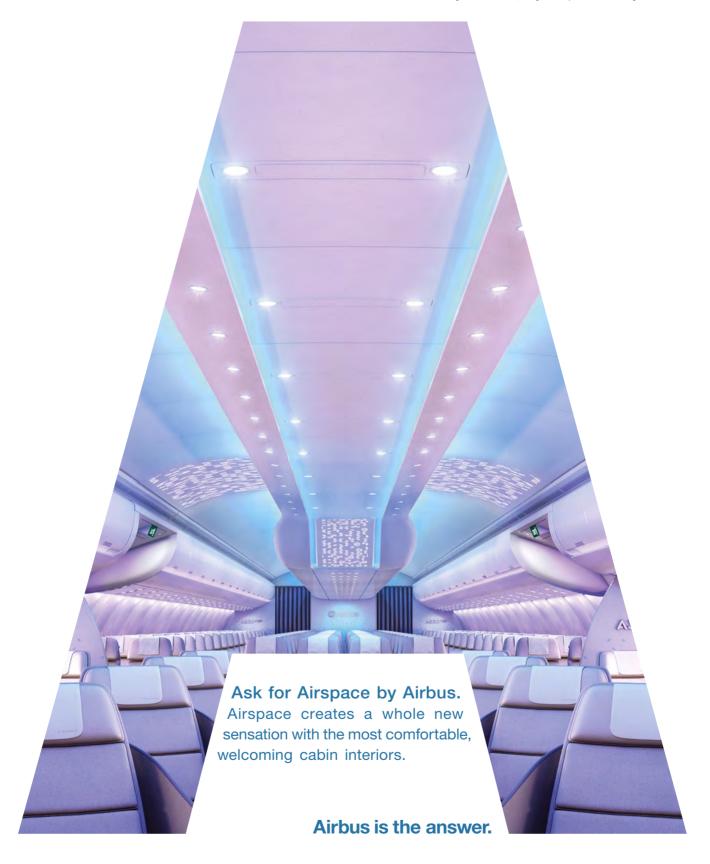
Indeed the E2 is already proving popular with lessors, with International Lease Finance Corporation and Aircastle having already placed orders for the larger E190-E2 and E195-E2 variants.

chair aesthetic, and this is more like home furniture."

Embraer is currently in the process of selecting IFE suppliers and is still developing the unique PSU design, which sees the units mounted on a localized strip to aid swift cabin reconfiguration. A major feature that is complete is the overhead area, with its seamlessly integrated ceiling and stowages.

Visit the Videos section of aircraftinteriorsinternational.com for a flythrough of the E2 cabin







# HIGHER CALLING



#### **BRIFF**

There can be no doubt that today's top-tier first class cabins are astonishing, in terms of their luxury, space and innovation. Indeed passengers in these commercial airline cabins can often enjoy superior inflight comfort to even those flying in private jets. However, as amazing as these spaces are, we would like to see what the VIP/VVIP sector could bring to the top tier of commercial aviation.

#### **DESCRIPTION**

The Airbus Corporate Jet Centre (ACJC), a provider of customized interiors for VIP and VVIP customers, has created a full-height first class suite for the commercial airline A380 cabin market, which it claims goes beyond current commercial aviation standards.

According to ACJC, there have been many technical challenges to overcome in creating the 2.5m² enclosed suite – a version of which is flying in an ACJ319 – especially in ensuring it meets pressure and temperature, airflow and lighting regulations, while still optimizing comfort and luxury.

Within the walls, the suite, which has been designed by ACJC's in-house Creative Design Studio, features a large seat that can be converted into a 33in-wide, 79in-long fully flat bed. This private space has been outfitted with several storage areas, including a redesigned overhead stowage bin, plus a versatile folding table that is equally well suited for dinner or work, and a 32in high-definition IFE display.

While commercial airlines aren't its usual client base, ACJC is confident that it can adapt the suite to airline needs, to suit their branding, culture and operations.







#### **VERDICT**

While the seat itself is unlikely to give the likes of Singapore Airlines or Etihad much pause for thought, those full-height doors are potentially a real gamechanger. As luxurious as today's suites are, they don't offer true privacy as occupants are aware of the open space above, and taller passengers and crew can look over the top as they walk past. The full-height walls of this suite would really create a feeling of security and exclusivity, and offer practical benefits such as being able to change clothes for bed without fear of being viewed. If approved, the design could even encourage the development of full-height concepts such as Seymourpowell's First Spaces and Zodiac's Halo. Putting up walls could really break down barriers...

# AEROLUX THE ART OF CUSTOMISATION



## SIGHT SEER



#### BRIEF

We feature many cabin ideas that can transform the passenger experience, but how about an interior that can transform lives? Orbis, an international non-profit organization that specializes in saving eyesight, is concerned by the levels of preventable blindness and treatable eye disease found in developing countries, with a major issue being that local doctors and nurses are unable to meet the high costs of attending the overseas medical training programs that can be critical to treating eye conditions. In 1994 Orbis took flight with its solution: a DC-10 converted into a mobile teaching hospital so ophthalmologists could share their surgical knowledge and skills with doctors in developing countries. The aircraft was a huge success, as was its DC-10 Series 30 freighter replacement. Now FedEx has kindly donated a newer DC-10-30 to Orbis. Retrofitted with an MD-10-30F upgrade, it needs the latest technologies and teaching tools so this special aircraft can be as effective as possible.

#### **DESCRIPTION**

Sponsors, suppliers and volunteers – including volunteer FedEx pilots – have all rallied to the Orbis cause to create a modular hospital suite for this next-generation Flying Eye Hospital. The project, with expert guidance from Tokyo-based LIFT Strategic Design, is based around nine customized modules that are classified as commercial cargo containers, massively simplifying certification issues.

At the center of the design – literally located over the wing box for stability in bad weather – is a sterile operating theater, where the visiting ophthalmologists can perform procedures, observed through a large window in the neighboring observation room.

As the doctors operate, attendees in the 46-seat classroom at the front of the aircraft can watch the live feed on large monitors, captured in microscopic detail via 3D cameras, with two-way microphones allowing for live commentary from the theater and questions from the classroom.

There is also a laser surgery room, which is a simpler design as it does not need to be sterile, and detailed footage of the activities within can also be broadcast to the classroom as a teaching tool.

There is a care room where patients can be prepared for surgery and recover from their procedures, with the Orbis nurses demonstrating their patient care skills to local nurses.

Further rooms include administrative and IT rooms, and a room where visitors can watch and learn how nurses sterilize the surgical instruments.

Even after the aircraft has departed, the Orbis Cybersight telemedicine platform provides partner doctors with free continuing medical education and mentorship from anywhere in the world, with the availability to consult experts about difficult cases, share real-time diagnoses, and more.







#### **VERDICT**

There is nothing not to love about this remarkable aircraft, from its heartwarming mission, to the impressive and effective execution of its very specific requirements.

More than 285 million people in the world are visually impaired, with four out of five sufferers having preventable conditions. The value of this Orbis mission is really driven home when you consider that 90% of these people live in developing countries. Every time this aircraft touches down in a deprived area, more medical staff learn how to treat eyesight issues, and they, in turn, can train others.

Kudos to Orbis for really striving to radically improve people's lives. This is without doubt one of our all-time favorite aircraft.

# AEROLUX THE ART OF CATERING



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# DINING COMPANION



#### **BRIFF**

While IFE displays are becoming much better integrated with seating in terms of styling, there is often still a feeling of separation between the IFE systems and the cabin hardware. Is there a way that the seat could become more of a part of the IFE experience?

#### **DESCRIPTION**

Four industrial design engineering students from Delft University of Technology in the Netherlands have recognized an opportunity to create something that specifically suits the needs of the economy class traveler, on the basis that every airline offers them a seat and a tray table. Their concept, named Enable, is a seatback tray table that also functions as an interactive IFE platform.

Unfold the tray table and a pico projector mounted on the seatback projects a personalized welcome message onto the table surface. Having been welcomed, the passenger is then presented with a selection of content options, including electronic newspapers and magazines, film, TV and music, all of which can be viewed on the surface.

But what happens when a passenger has to put something on the table – a meal, for example? Wouldn't that make the idea rather redundant? A full tray might, but if, say, a bowl is placed on the table, a scanner (housed with the pico-projector) recognizes the object and moves the content display to a suitable vacant space alongside. Having recognized this bowl of food, the system can even project information about the meal, including nutritional information, sources of ingredients, and suggestions for beverages that might complement the dish.

As users investigate or dismiss content using simple hand swipes recognized by a gesture recognition system, the server-based computer system learns more about the passengers' likes and dislikes, which can be saved for future flights. Landed before you finished a movie? The system will remember and offer to restart it on your next flight at the point you left it.

When the surface is not required to serve as a table, it can be tilted for a more optimal viewing angle when sitting back, as the projector does not require the display surface to be perpendicular.



#### **VERDICT**

There are undoubtedly advantages to the concept, especially with the proposed system concept being lighter and less expensive than embedded seatback systems, as well as being an easy option to retrofit. There is a simplicity and efficiency to the projection-based system, especially since the tables are standard save for the tilt mechanism, meaning they can be easily swapped out if damaged. Airlines can also use the associated computer system to gain a wealth of valuable big data about their customers, to help serve them better – and even optimize food and beverage stocks for individual flights.

However, one can't help but feel that unless eating hunched over the table, the system will be less convenient as an IFE proposition during dining than watching a seatback system.

Overall, though, Enable offers some food for thought and a little intelligence to food service.





## AEROLUX REFRIGERATOR FREEZER

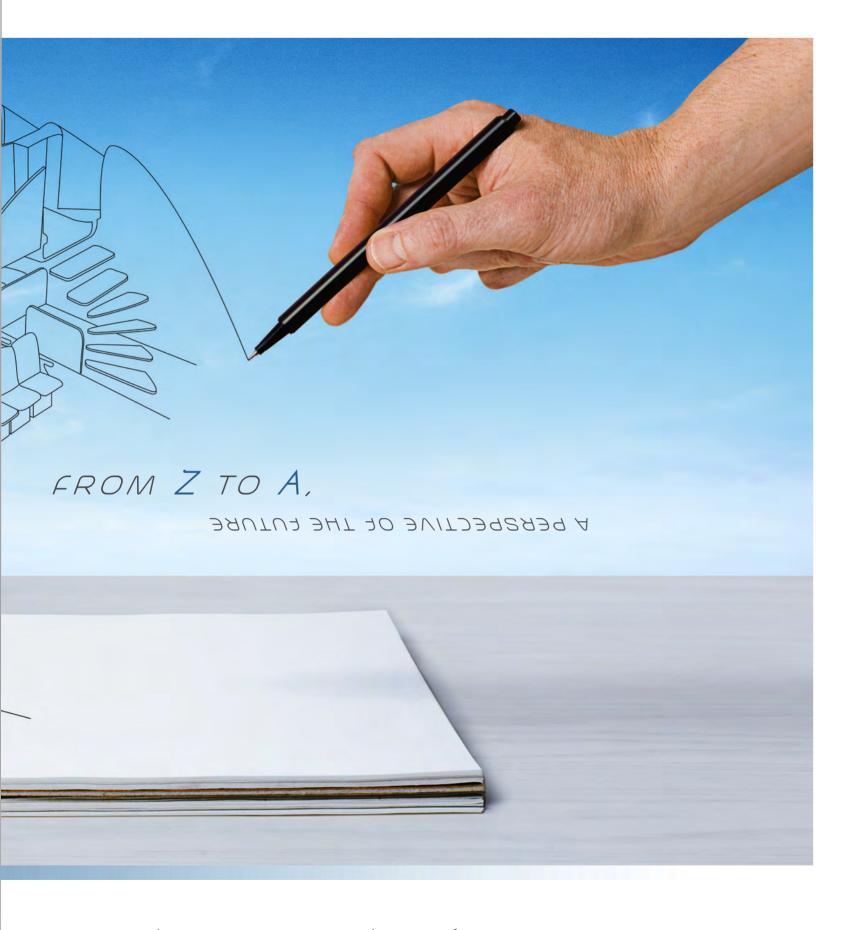


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For Zodiac Seats, innovation has no boundaries. Our holistic approach and expert designer teams worldwide enable us to anticipate customers and passengers needs and go beyond their expectations. This unique vision is what makes us different. By imagining value-added innovations and



conceiving novel sensory experiences, we invent the journey of tomorrow. Our lifestyle concept has received two prestigious awards, CCA & Red Dot, in recognition of our continuous efforts to innovate with a view to an unmatched air travel experience.





# CURRENT AFFAIRS

CABLES AND WIRES ARE THE VEINS THAT KEEP AN AIRCRAFT RUNNING, BUT THE SHEER LENGTHS REQUIRED BRING WEIGHT, COST AND COMPLEXITY ISSUES. COULD CABINS FOLLOW THE IFE TREND OF GOING WIRELESS?

Words by Aubrey Cohen. Illustration by Scott Garrett

djusting cabin and seat lighting, calling for a flight attendant, making announcements, and other functions within an aircraft all rely on miles and miles of wires and cables. A Boeing 747-400, for instance, has 171 miles of wiring (including wiring related to non-cabin functions such as flying the aircraft). Eliminating some or all of those wires and cables would reduce weight, enable new features, offer more flexibility in cabin architecture and potentially increase system robustness. But new wireless systems will have to prove their reliability and win certification before they become part of aircraft cabins.

#### SO WHAT'S POSSIBLE?

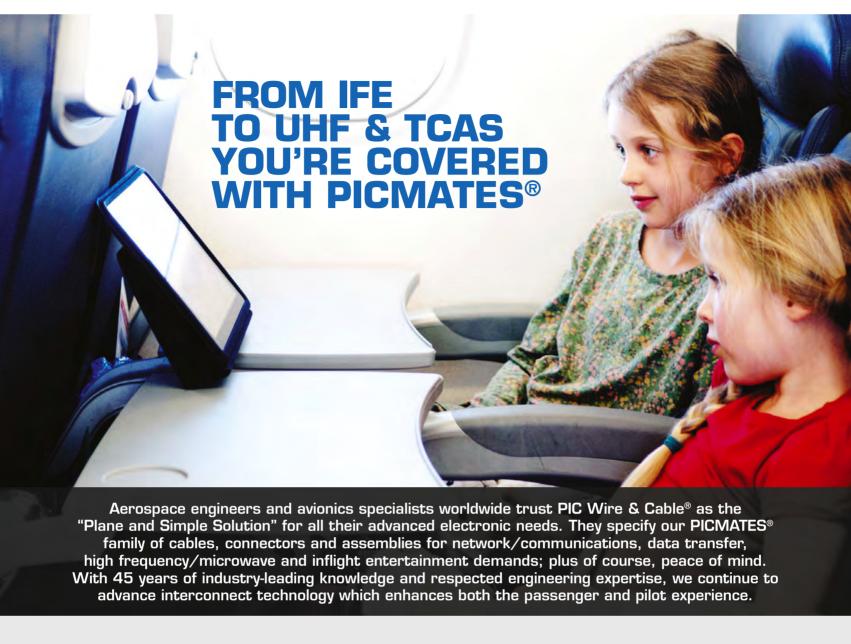
Think of smart homes. They allow occupants to turn lights on and off, adjust the temperature, play music, record a TV program, unlock doors, and more, without touching a switch or even being at home. Aircraft makers are considering something similar.

Boeing, for instance, has created a technology demonstrator interior mock-up called vCabin, featuring 'smart cabin' concepts. In the vCabin, passengers would download an app to their smart devices, and the app would then use wireless transmission to connect to chips embedded near cabin features, allowing the passengers to control personal lighting, order food or drink items, check lavatory availability and download entertainment. The chip connection requires no wi-fi service and is not connected to flight-critical aircraft systems or the traditional IFE system.

Crew members, meanwhile, could use smart devices to control cabin lighting, monitor passenger orders, check lavatory availability, find out the location and preferences of frequent flyers, and monitor the status of cabin systems during flight. Cabin systems could automatically inform maintenance personnel of any problems, so issues could be fixed immediately after landing.

The ultimate goal is to eliminate wiring, according to Boeing spokesman Bret Jensen, who says that it's too soon to speculate about when the technology might actually appear on aircraft.

The Airbus Concept Cabin looks further into the future, proposing an 'integrated neural network', which would be absorbed into the structural materials, making



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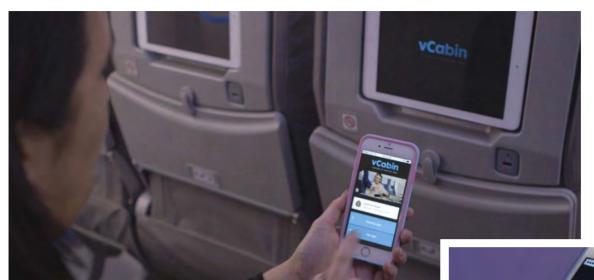
**DataMATES:** Cabin Management Systems &

Ethernet Communications

**MicroMATES:** Satellite Communications &

Onboard Connectivity





LEFT AND BELOW: WITH BOEING'S VCABIN CONCEPT, PASSENGERS CAN CUSTOMIZE THEIR IMMEDIATE ENVIRONMENT VIA AN APP DOWNLOADED TO THEIR PERSONAL FLETTRONIC DEVICE

## "Eliminating wiring allows for more flexibility in cabin configurations"

the hundreds of miles of cables and wires found in today's aircraft a thing of the past. This process would transform regular cabin materials into 'smart' materials capable of performing numerous functions, and connecting the passenger more closely with the aircraft.

#### ACADEMIC INTEREST

The Boeing and Airbus concepts would have clear advantages for airlines, passengers and crew members, including saving millions of dollars in fuel, enhanced service, and not having to look up from your tablet to see if the lavatory is free.

However, for a reality check we spoke to Kevin Gifford, a scholar in residence at the University of Colorado and an expert in wireless communications for aerospace. Outside the cabin, wireless sensors embedded in or attached to the structure and skin of an aircraft could monitor strain, temperature, vibration and pressure, he explains: "Then you could do lots of things, like look for the off-nominal readings that are characteristic of some sort of malady."

With regard to weight savings from eliminating wiring, Gifford notes that wires and cables generally

make up about 5-10% of an aircraft's mass, which adds to the fuel cost or reduces the amount of weight available for other things, like passengers and cargo.

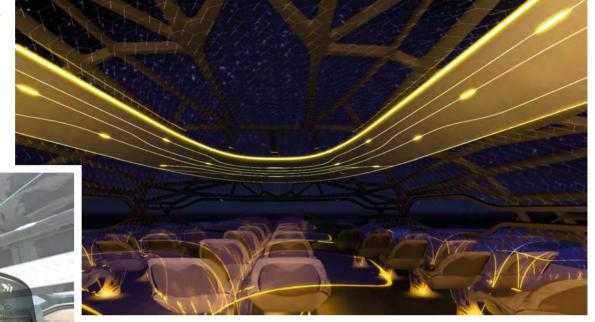
"From a cabin point of view, if an aircraft had complete wireless coverage, then you wouldn't have to run cables to all the seats, etc," Gifford says.

Eliminating wiring also allows for more flexibility in cabin configurations, according to a joint 2013 paper by EADS Innovation Works and the Technical University of Munich in the journal *Telecommunication Systems*.

The paper highlights some problems created by wiring, which include the time required to fit connectors – mainly due to the screws – and the risk of cable pairs being interchanged or incorrectly connected. All these factors make the maintenance and replacement of a device a time-consuming task.

Finally, wireless systems can be more resilient, according to Gifford. In current cabin systems, if a wire breaks, the system fails. "The wireless system would most likely be networked," he says.

"If one of the network nodes goes down, it's very plausible there will be other ways to route that message to its intended destination." RIGHT: BY 2050, AIRBUS ENVISIONS INTEGRATED NEURAL NETWORKS IN THE CABIN, AS WELL AS INTELLIGENT CABIN WALL MEMBRANES



LEFT: IN AIRBUS'S CONCEPT,
PASSENGERS' BODY HEAT CAN BE
HARVESTED THROUGH THE SEATS
TO POWER AIRCRAFT SYSTEMS

CHALLENGES IN STORE

The first difficulty in achieving wireless cabins is that the aerospace industry tends to be risk averse, says Gifford, adding that onboard wi-fi came about only after consumers demanded it. New systems will have to prove their reliability before they can become commonplace.

Many of these components are off-the-shelf items in principle. "It's the same concept, whether you're turning the lights in your house on and off, or you're turning the lights in an airplane on and off," as Gifford puts it. But the components that go on an airliner must meet aircraft certification requirements, and that adds time and cost.

Some common wireless standards won't work well for aircraft cabins. Bluetooth, for instance, has too low a data rate, while wi-fi relies on frequencies that are often used by other systems, so it could easily be disturbed.

The EADS Innovation Works and Technical University of Munich paper focuses on ultra-wideband radio as the most promising technology, although it cautioned that such a system could still be disturbed more easily than wired systems: "This can be due to natural interferences

You can see
the Boeing and
Airbus concepts in
action in the Videos
section of our

from the devices in the environment, blocked frequencies in specific countries, devices with the same technology, or even hostile attacks."

The *Telecommunication Systems* paper said a system will have to be highly redundant, with a second independent interface in place, using a different transmission scheme, to meet the reliability requirements for certification. After all, when crew members need to make an emergency announcement, it's critical that passengers hear them.

The fact that the system would have to serve multiple needs for hundreds of passengers also adds complications. For instance, the 2013 paper reported that a full-featured wireless communications system on a commercial aircraft would require around 1,000 nodes – more for an ultrahigh-capacity aircraft like an Airbus A380 – and the network and the protocols must be capable of dealing with that quantity of nodes.

The system also will have to be able to handle seamless handover to enable wireless use of mobile equipment. This is common in some systems but not others, according to the 2013 paper.

All of this makes it unlikely that airlines would retrofit existing aircraft with such systems. And, since airplanes are designed to stay in service much longer than, say, automobiles, passengers will probably continue to have to reach up and push an actual light switch above their seat for a while yet.

Even when it comes to new aircraft, the advantages of giving up the current, proven way of doing things will have to outweigh the costs and risks of wireless systems. As Gifford says, "It really becomes a business case."

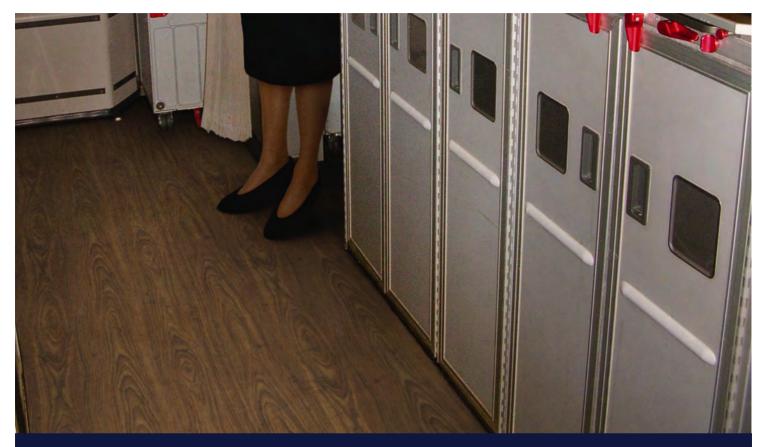






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successful aircraft ditching is a rare maneuver, which many consider nearly impossible to carry out and equally difficult to survive. But, on January 15, 2009, at around 3:30pm, US Airways flight 1549, an A320 aircraft, proved that the impossible sometimes happens and that it can go impossibly well.

After a flock of birds disabled the engines, Captain Chesley Burnett 'Sully' Sullenberger successfully ditched the aircraft on the Hudson River, about 8.5 miles from its point of departure at LaGuardia Airport, New York.

The flight was destined for Charlotte Douglas International Airport in North Carolina, and was only two minutes into the flight when the bird strike occurred. The flight was at full capacity, with 150 passengers on board, including a lap-held child, and five crew members.

One flight attendant and four passengers sustained serious injuries. While the aircraft was considerably damaged, all on board survived.

The National Transportation Safety Board (NTSB) attributes this successful ditching to: "(1) the decision making of the flight crew members and their crew resource management during the accident sequence; (2) the fortuitous use of an airplane that was equipped for an extended overwater flight, including the availability of the forward slide/rafts, even though it was not required to be so equipped; (3) the performance of the cabin crew members while expediting the evacuation of the airplane; and (4) the proximity of the emergency responders to the accident site and their immediate and appropriate response to the accident." But – even with all these factors in its favor – this event could have ended in tragedy.

#### THE BACK SEAT

Doreen Welsh was the rear cabin flight attendant on this miracle flight. She tells us why this accident had every





TOP: THERE WAS A JOINT RESCUE EFFORT BY THE COAST GUARD, NYPD AND NEARBY FERRIES AND BOATS (PHOTO: CHRIS GARDNER, USACE NEW YORK DISTRICT PUBLIC AFFAIRS)

ABOVE: ONE OF THE FIRST RESPONDERS WAS A PASSENGER FERRY (PHOTO: GREG L ON WIKIMEDIA COMMONS) reason to go wrong, and how self-preservation, improvisation and considerable good luck helped ensure everyone on board survived to tell this unbelievable tale: "We had 90 seconds from the impact [to evacuate]. It was so violent in the back that my body was in a slow-motion moment for a while. In your mind you're going through all of your training, all of the procedures of what you need to do," she recalls.

Carrying out a maneuver as complicated as a safe water landing required every ounce of concentration from the flight crew to be focused on flight procedures. Their communication to the cabin, therefore, was limited and very last-minute.

"The first thing we noticed was the silence from losing both engines. We didn't know what happened until the captain said, 'Brace for impact," Welsh says. "In the back of the aircraft there was a lot of damage. About 2.5ft behind my jump-seat was a hole that had ripped right through. That's where all the water came in."

As the NTSB report describes, the damage at the back was significant. "The FR65 vertical beam had punctured through the cabin floor in front of the direct-view jump-seat about 11in forward of the seat pan and 19in left of the lavatory wall. The passenger floor crossbeam web and lower flange in this area were bent in the aft direction. The left-side passenger floor support strut was sheared above the FR65 attachment point and was fractured below the floor crossbeam. The right-side passenger floor support strut was sheared close to the FR65 and

### "About 2.5ft behind my seat, a hole had ripped right through"

Procedures are great in theory, but what happened during the real-life emergency of Flight 1549? The NTSB report on the flight reveals some surprising

figures from the evacuation

**25** passengers (17%)

reported watching most of the preflight safety demonstration

19

passengers (13%)
reported watching some
of the demonstration

12

passengers (8%) reported reading the safety information card before or during the flight





### "There were things I had to make up, to get them to move"

crossbeam attachment points. The center passenger floor support strut was missing at the upper attachment angles on the floor crossbeam. The cargo floor structure was missing in this area. The two floor panels covering the aft galley area from FR66 to FR70 were pushed upward, the fasteners and fastener inserts in the panel were damaged, the fastener heads had pulled through the honeycomb flooring material, and the floor panels were broken. The upward deformation of the panel created a 2-3in gap around the perimeter of the panel, providing visibility directly into the subfloor cargo compartment."

According to the report, the rear Door 2L was also "cracked" open, but it was unclear how.

As Welsh describes the situation in the cabin, there were greater impediments to evacuation in the back than just the water. The impact had dislodged equipment from the galley, including trolleys, coffee pots and trash cans. Welsh feels fortunate that one of the galley carts – the one directly behind her jump-seat – didn't come loose. She believes her injuries could have been more severe, even deadly. Welsh considers this to be just another element of

THE AIRCRAFT WAS TAKEN
TO NEW JERSEY FOR A FULL
INVESTIGATION. IT CAN NOW
BE VIEWED AT THE CAROLINAS
AVIATION MUSEUM IN
CHARLOTTE, NORTH CAROLINA

the good fortune that played a role in her survival during this incident.

But the two trolleys either side of her came loose from their fasteners and interfered with one of the doors at the back. With the water rising, Welsh had to improvise.

"I'm telling people to stand back and get out of the way, and trying to assess everything that I should do with the water rising. I wanted to assess whether I could get one raft out, but the water was too high, and so I had to direct the people to move forward," Welsh says.

Passengers toward the rear of the aircraft had sought the nearest exit, which, in this case, was the wrong one.

"I had to fight quite a few of them to keep them from coming to the back. I had to grab people, shake people, scream commands. There were things I had to make up, which were not part of our training, just to get them to move," Welsh says.

"One of the things that I started yelling – because it didn't seem like they were moving fast enough – was that if people were able to climb over the seats then they should do that and clear the aisle for those who couldn't climb. We needed them to move faster because the water was coming up rapidly," she says.

Despite some passengers being turned around and others becoming confused, Welsh describes a remarkably orderly evacuation.

passengers (53%)
retrieved their flotation
seat cushions during
the evacuation

(31%) retrieved the seat cushion from their own seat

(18%) retrieved a seat cushion from a different seat (3%) found a seat cushion floating in the cabin



#### "NTSB reports the evacuation was not by the book"

"There wasn't any hostility. It was just that everybody knew they had to get out of there now," she says. "The people where I was - at the back - saw the water coming. That gave them reason to move faster. There were some people in shock so I had to shake them to move." In retrospect, Welsh adds, "It didn't seem very quick as the water was rising, but it was. There were four window exits, so people were going through those, and that helped."

The evacuation differed at the other end of the plane. "The people at the front took their coats with them," Welsh tells us. "It was a whole different world at the front."

Both forward doors were clear, although the NTSB report states that door 1R started to close, intruding on the doorway and "impinging on the slide/raft".

One of the FAs at the front assigned a passenger to hold the door, so that others could pass. Both of the slides/rafts deployed - although the slide/raft on 1L had to be deployed manually, causing a 20-second delay.

THE EXTENT OF THE FLOODING IN FIRST CLASS IS EVIDENT WITH THE SLUDGE CONTAMINATION



#### A SFRIFS OF UNFORTUNATE EVENTS

The NTSB report reveals that the evacuation was not "by the book". There was sufficient departure from procedure that - in another set of circumstances - the situation could have resulted in tragedy.

The NTSB also reveals that some passengers, who had left the aircraft, re-entered and then exited again. The map which marks these separate evacuations reveals that the individuals had first exited onto one of the wings and then re-entered to reach one of the two slides at the front of the airplane. That there was any time to exit, re-enter and exit again reveals just how orderly cabin conditions were in most of the aircraft.

The evacuation map also shows the success of Welsh's strategy, encouraging passengers to climb over seats. A number of passengers at the very back made it all the way to the forward door slide/rafts.

Not only did the captain and his first officer carry out an almost impossible landing, they then waited in the cabin to ensure all passengers were evacuated safely. Noting that many had evacuated without life jackets, they collected life jackets from the seats to distribute among the passengers.

It seems impossible to believe, but in what might have been utter chaos and confusion, a fully loaded A320 was evacuated safely on the water with time to spare to wait for rescue boats.

The rescue boats also came quickly. The aircraft made impact on the Hudson River at 3:30pm (+43 seconds), and by 3:54pm (+43 seconds) the last rescue vessel ferried the last rescued passengers away from the site of the crash.

"By the time I got up there and got on the raft it wasn't long until the ferry boats came for us. One of the things we would have had to do, if the wait was longer, was to cut ourselves free from the aircraft. But we didn't have to do that because the rescue was so fast," Welsh recalls.

The weather was fair, the captain was skilled, the crew was experienced, and many passengers were frequent flyers. Things went horribly wrong, but countless other factors, large and small, contributed to a happy ending.

"It was one of those miracles that everything worked out in the end," Welsh says. "So many positive things happened that enabled everybody to get out of there."

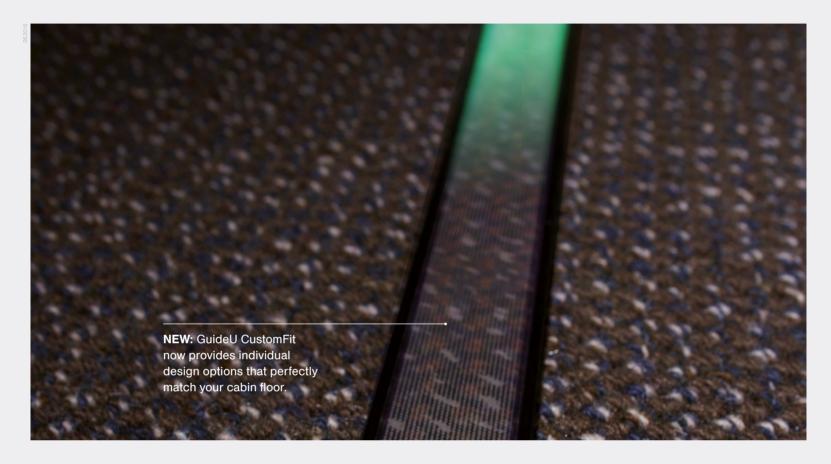


passengers (3%) reported retrieving life vests from under their seats after impact

passengers (3%) reported retrieving a life vest from under a different seat after impact

passengers (14%) reported being given a life vest by someone during or after they had evacuated

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# insatiable

INFLIGHT CONNECTIVITY MAY BE BECOMING MORE POWERFUL, BUT WILL IT BE ABLE TO KEEP PACE WITH THE DEMANDS OF DATA-HUNGRY APPS? LET'S CONSIDER THE FUTURE DEMANDS THAT TECH-SAVVY PASSENGERS WILL BE PLACING ON INFLIGHT WI-FI SYSTEMS, AND HOW PROVIDERS SHOULD REACT

Words by Tomás Romero. Illustration by Russell Brocklehurst









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ome 45% of passengers won't remain loyal to their preferred airline if it doesn't provide the best wi-fi. That is a finding from a recent

Honeywell survey of more than 1,000 Americans who have used inflight wi-fi in the past 12 months. Of those passengers, 68% said they book their flights based on wi-fi availability, and a whopping 84% said it's important for inflight wi-fi to offer an experience "identical to what they have at home or in the office". Any way you look at it, that's a tall order, especially for airlines who have already been struggling to keep up with techsavvy passengers' demand for faster, stronger connection speeds to run their increasingly data-hungry apps, games and AR/VR devices of choice during flights.

Hoping to get a better handle on exactly what sort of mobile apps and/or devices will be taking flight with passengers in the not-too-distant future, and how airlines can best prepare themselves for the data-gobbling, new media onslaught to come, we asked some of the industry's leading tech trend soothsayers to look into their virtual crystal balls and tell us what they see. And the results might just surprise you.

For while boosting wi-fi connection speeds is obviously a given, Emmy award-winning Transmedia



## "New media is new and uncertain. Most airlines are dedicated to mitigating risk"



producer/new media pioneer Jay Bushman says the first thing airlines need to do is take a cue from the old Apple slogan and "think different".

#### NEW MEDIA STATE OF MIND

"The internet, mobile, smartphone and tablet revolutions have utterly changed the way people consume information and entertainment. The industry has been very slow to adapt to this new playing field, and most of their attempts can be lumped together as attempts to jam the old ways of doing things into new platforms," explains Bushman.

"What is required and what is in short supply is an appetite for risk and the ability to back a number of projects and approaches without requiring a guarantee of success. New media is, by definition, new and uncertain. And most of the airlines and big entertainment companies are dedicated to mitigating risk and not rocking the boat."

Bushman says this approach flies directly in the face of what younger, app-happy passengers, and especially millennials, are looking for in a connected aircraft.

Veteran travel industry analyst and Atmosphere Research Group founder Henry Harteveldt seems to Interested
in IFE content
delivery? See p102
delivery? no in-depth
for an in-depth
look at single
deliverable
formats

agree. "The types of apps will likely be similar to what we see now: gaming, entertainment, social media, communication, productivity, retail and travel. However, it will be how those apps work that will be different. This isn't about the connected aircraft, it's about the connected consumer," says Harteveldt. "Video will be increasingly important, as will 'conversational commerce' using natural language processing (think Siri or Amazon Echo), text/SMS and chat. Location-based communication, aided by beacons and other types of technology will also enable greater precision."

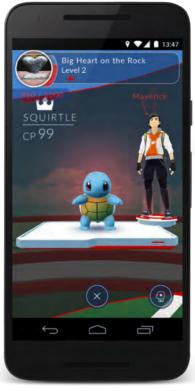
And with insanely popular AR apps like Pokémon GO already revolutionizing the way we think about mobile gaming, Harteveldt says the lines between the virtual world and the real world will continue to blur in flight.

#### THE VIRTUAL CONFERENCE ROOM

"Virtual reality will, in time, become a major factor [for airlines], especially as VR devices become less expensive, smaller, and more aesthetically attractive. But it won't all be fun and games. Business travelers will soon want the ability to participate on video calls with colleagues or clients, listen to webinars, and whatever else is required for them to be productive."

In fact, Patrick Johnson, the director of business development for San Francisco-based AR smartglass firm the Osterhout Design Group (ODG), says the trend to continue to add available bandwidth, both on the ground and in the air, will enable loads of very cool features and apps specifically tailored for business travelers.

"Today's inflight wi-fi systems support email, which is forgiving in terms of unreliable and slow connections.







## "Lines between the virtual world and the real world will continue to blur"

ABOVE: LOVE IT OR HATE IT, PEOPLE ARE ALWAYS FINDING NEW WAYS FOR THEIR SMARTPHONES TO BECOME A PART OF THEIR LIVES. THE POKÉMON GO GAME IS TAKING THE WORLD BY STORM. CARRIERS SUCH AS AMERICAN AIRLINES, SOUTHWEST AND VIRGIN AMERICA ARE NOW USING THE GAMEPLAY IN THEIR SOCIAL MEDIA ACTIVITIES. IMAGES: NINTENDO

For example, the original Gogo system supported about 3Mbps for the entire aircraft, while most of those in service now are closer to 10Mbps per airplane. The next generation of systems will do better, aiming to deliver about 70Mbps per airplane," says Johnson, which could allow for "participation in virtual meetings with material being reviewed in multimedia where the meeting supports collaboration, screen share, 3D model display, and manipulation, etc."

And although Harteveldt says he also has his eye on next-gen mobile innovations such as rollable tech – superthin tablets, laptops and other devices that roll into a cylindrical shape – and Johnson predicts a day will soon come when increased bandwidth will afford passengers and crew wearing AR smartglasses the ability to translate inflight safety manuals, magazines and menus into different languages via object recognition software, even Johnson freely admits that some of these things are more than a few years off.

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LEFT: ATMOSPHERE RESEARCH GROUP FOUNDER HENRY HARTEVELDT IS MONITORING EMERGING TECHNOLOGIES SUCH AS LG'S ROLLABLE DISPLAYS

"With the slim profit margins of airlines, I understand why they are slow to move when it comes to adopting new, disruptive technology," says Johnson. "It is going to be a while before there is any mass adoption of new tech such as smartglasses for airlines, but it won't be too long before smartglasses become the status quo device for consuming media and entertainment." So, ultimately, Johnson says it's going to be passenger demand that gets smartglasses onto the airplane.

See the
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of our website
for a look at future
IFE display
technologies

#### DREAMING BIG

And when it comes to passenger demand, SITA's director of market insight, Nigel Pickford, says the airlines are definitely listening.

"Mobile and the use of apps is without a doubt the biggest focus area for airlines over the next few years," says Pickford. "SITA's Airline IT Trends Survey 2016 indicates that mobile continues to dominate airlines' IT investment agenda for passenger services. Nearly 80% of airlines plan major investments in passenger services via smartphones over the next three years, while 71% of airlines expect to do the same for tablets. Looking more specifically at the services to be delivered, airlines are using mobile to offer duty-free shopping and other commercial offerings that can be managed from the palm of your hand. Providing personalized information on the move through airline apps is also a huge focus for airlines, helping deliver a more intimate passenger experience."

"In their everyday life, passengers are increasingly adopting new technologies such as wearables, artificial intelligence and, to some extent, virtual reality," adds Pickford. "Airlines are following this trend and increasingly investing in new products using these technologies in the cabin. Among the emerging technologies starting to appear in the industry are passenger wearables, such as smartglasses or

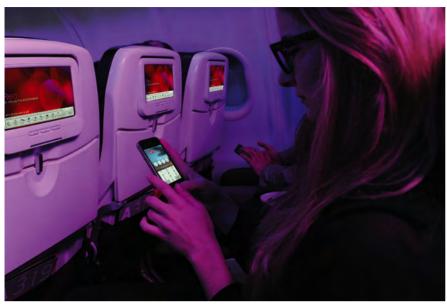
smartwatches – which are seen as having the most potential over the next five years. Currently 11% of airlines are in the process of trialling services for these, with another 28% expecting to over the next five years. And in the next 10 years, just over half of airlines (54%) plan to evaluate wearable technology, while 43% will do the same for artificial intelligence (AI)."

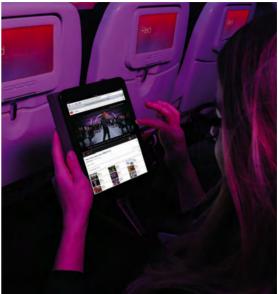
And although AI apps such as the recently launched social media sensation Candid – which filters out hate speech and "enforces civility" through its algorithmic AI – sound very cool, and the idea of being able to use robot assistant apps like Amazon's Alexa and the upcoming Viv (from Siri co-creators Dag Kittlaus and Adam Cheyer) in flight will surely appeal to many passengers, Harteveldt says it is important to remember that all of this mobile app awesomeness is contingent on bandwidth.

#### POWER PLAY

According to travel industry analyst and Atmosphere Research Group founder Henry Harteveldt, the most important factor in the future will be to have reliable, stable and universal access to inflight wi-fi and both AC and USB power outlets at every seat. "Passengers will expect inflight connectivity to be available on almost any aircraft with 70 or more seats. I

think they will accept the reality of some latency, given that airplanes move at hundreds of miles per hour. But passengers won't accept dropped or slow connections. The expectation will be that everyone should be able to simultaneously stream a web video with an experience that is somewhere between 97% and 99% as good as what they enjoy on the ground."





#### THE FUTURE

And according to Gogo's chief commercial officer, Ash ElDifrawi, that's not as far off as some might think. "There's no doubt that there are more and more applications that are being used in flight, and many of them are consuming more and more data. Snapchat is a great example of an application that uses a surprisingly large amount of bandwidth and we are seeing usage increase in flight, especially in the USA," says ElDifrawi.

"For Gogo, the only real answer to this is to bring more bandwidth to the aircraft and create an experience that is comparable to the ground. As an industry, we are fortunately on the cusp of an era of bandwidth abundance. 2Ku in particular gets us there in terms of delivering lots of bandwidth anywhere an airplane flies. We also have a pathway to bring even more bandwidth with this technology to accommodate the data consumption trends we are experiencing on the ground. The other way we are looking at this is to try and build an environment where we are developing applications and services specific for aviation that are not only more compatible with inflight connectivity, but are unique to the travel experience itself," ElDifrawi explains.

"The development of unique connected applications and experiences in flight, whether for consumers or airline operations, has always hinged on a few things – an abundance of lower cost bandwidth that's comparable to what you see on the ground, seamless connectivity anywhere an airplane flies around the world, and a digital platform to allow for application integration with various

ABOVE: VIRGIN AMERICA WAS QUICK TO RECOGNIZE THE IMPORTANCE OF SECOND-SCREEN ENTERTAINMENT TO TODAY'S PASSENGERS

"We're going to see some radical changes in how IFE programming is delivered"

data points on the aircraft," says ElDifrawi. "We now have the technology that brings a lot of bandwidth in 2Ku and we've built the digital ecosystem where these experiences can be developed. Now, the sky is literally the limit."

Many airlines do seem to be rising to the challenge, with more than half of the carriers responding to SITA's Airline IT Trends Survey 2016 reportedly having "major wi-fi projects in the works", with nearly three-quarters (74%) of them on track to offer inflight wi-fi to their passengers by the end of 2019. However, Pickford says

the issue of whether or not the service on offer will be fast enough or come soon enough for some passengers remains to be seen.

In the meantime, Bushman suggests that what airlines should really start thinking about are all the shiny mobile apps and new media gadgetry that

hasn't even been dreamed up yet. "With the proliferation of different devices and screens for consuming entertainment on land and in the air, we're going to see some radical changes in how entertainment programming is delivered, which will require a whole new language and a whole new framework to evaluate, along with some new business models," predicts Bushman. "I think we're about to see an explosion of content of all kinds that will totally rewrite the rules."

In other words, to steal a line from my new Oscar Wilde daily quote app, "Expect the unexpected."



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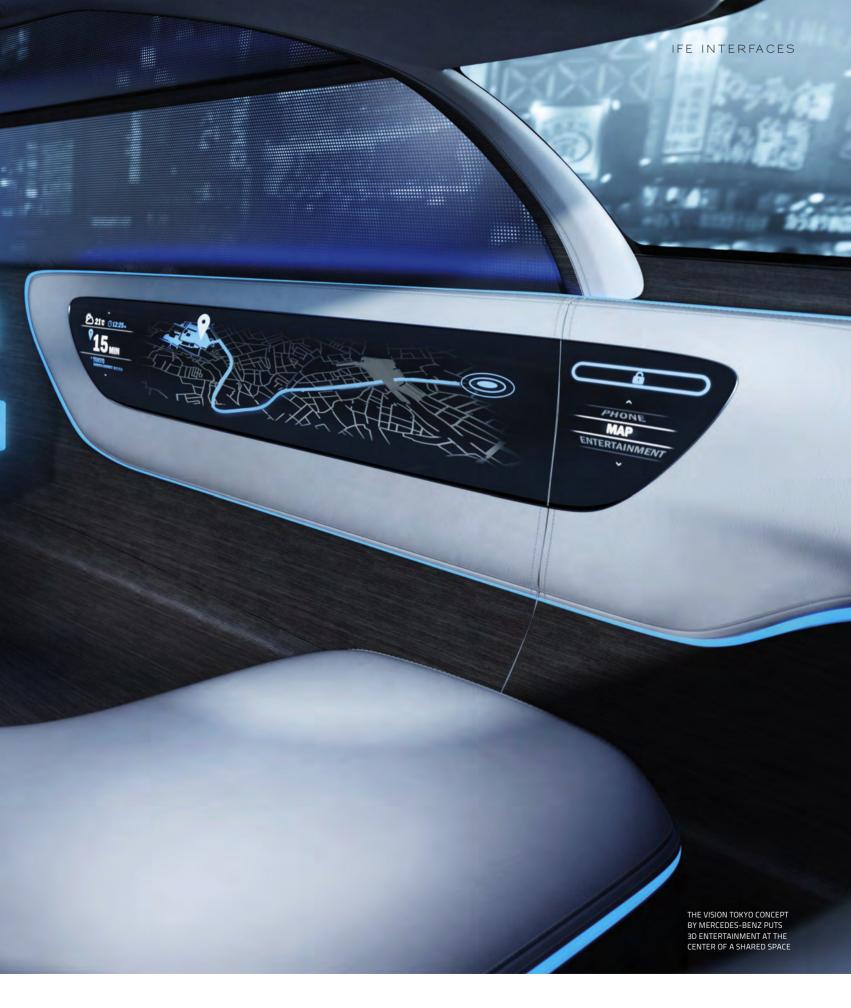


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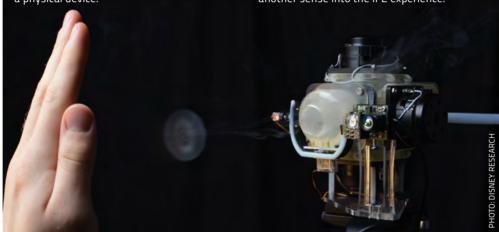




#### DISNEY MAKES ENTERTAINMENT REAL

While Disney is best known for its comic characters, the technology developed by its research labs should be taken very seriously. One of the latest creations by Disney Research is a haptic technology that delivers tactile sensations in mid-air, meaning that users can feel virtual objects, experience textures and receive feedback on body gestures. Just imagine being able to feel what you are seeing on the IFE display or manipulate a virtual controller in mid-air, all without having to wear a physical device.

The concept, named Aireal, is centered around the use of vortexes, rings of air that can travel large distances while maintaining their shape and speed. Actuators mounted around the display enclosure displace air through a nozzle and send vortexes toward the user in a 75° targeting field. When a vortex hits the user's skin, the low-pressure system inside the vortex collapses and imparts a force the user can feel. This technology has the potential to transform the IFE interface, as well as drawing another sense into the IFE experience.



# Looking for the PED holder on a seat or wondering what a button or lever does? Researchers at Carnegie Mellon University and Disney Research have found that most electrical and electromagnetic (EM) noise during operation. When a user touches such an object, this EM signal propagates through the user, due to the conductivity of the human body. The EM-Sense concept uses a modified software-defined radio to detect and classify these signals and display the name of the identified object on a smart device.

## Positive feedback

Operating touchscreens requires some complex hand-eye coordination, with users having to find the desired operating element, select it, and then verify that the intended function has been triggered. Automotive supplier Continental has found that this process can be distracting for drivers, and thus its researchers have developed the Haptic Feedback Display, a monitor that contains an inbuilt haptic actuator system – basically an electromagnetic spool with two windings, fitted behind the construction elements of the touch display.

The haptic actuator creates a mechanical impulse of only around a tenth of a millimeter, but as it happens with very high acceleration, it can be clearly felt through a finger, allowing users to distinguish between several virtual buttons without having to look at the display, and feel that the desired operation has been triggered and understood by the system.

For the aircraft cabin, this system has the potential to help sight-impaired passengers select audio content, and possibly to enhance seat controller applications. The characteristics and intensity of the haptic feedback can even be configured to suit any brand-specific haptic standards.

Continental has been demonstrating the technology to potential customers and expects the Haptic Feedback Display to be ready for series production by 2017.



#### THE GIANTS ARF INVESTING

With Apple, Google and Microsoft sharpening their focus on user interfaces, voice control, gesture control and see-through displays are emerging as hot spots for innovation, according to Lux Research, a research and advisory firm specializing in emerging technologies. However, Lux believes the technology giants have overlooked some opportunities.

"The electronic user interface (EUI) can be the difference between a product's success or failure," says Tony Sun, a Lux Research analyst. "But no single style of interface can fully understand human intention, so a device with truly natural user interfaces will use multiple types of input and output."

Lux Research analysts have also found that since 2014, Apple has acquired seven EUI developers, including natural language processing expert VocalIQ, and augmented reality specialist Metaio, indicating progress in this area.

The team has also observed Google, especially its Advanced Technology and Projects (ATAP) group, and found that it is working on EUI R&D, including speech processing, natural language processing, touch and gesture interpretation, RF-based gesture control, and smart textiles.

Meanwhile, Lux predicts that Microsoft's future is built around four of its user-interface platforms: the HoloLens augmented reality smart glasses; the Kinect full-body motion sensing and voice control device; the Surface Hub interactive display; and natural language processing via its cloud service.

If these technologies become commonplace, you can bet passengers will expect to use similar means of controlling IFE systems.

#### Gather round

Want to impress the tech-hungry post-1995 urban Generation Z with your IFE system? Take a look at Mercedes-Benz, which has targeted this demographic with Vision Tokyo, an autonomous vehicle concept that is more like a hip living space than a car. Being driverless, the conventional in-line seating arrangement is redundant, with passengers instead seated on a large, oval couch. This LOPA is great for social travel, and all passengers can huddle around the entertainment system, which presents apps, maps and displays as 3D holograms within the interior space, which can be manipulated in mid-air. Some of the interior surfaces also act as a graphic interface and source of information. Algorithms enable the vehicle to get to know its owners, with deep machine learning and an intelligent predictive engine meaning that, with each journey, it

becomes more familiar with its occupants and their preferences.

Just imagine the opportunities that holographic technology could create: IFE appearing in mid-air, exciting holographic cabin branding opportunities, communal IFE opportunities for onboard social spaces, and more. Even the styling of the Vision Tokyo cabin offers inspiration for aircraft, such as the back-lit perforated seat covers, which create a hightech ambience that contrasts with the soft finish of the pale leather. Luxury meets technology: isn't that what the airline passenger experience is all about?



#### JUST SAY THE WORD

Remember the TV show Knight Rider, which saw David Hasselhoff talking to his car cum crime-fighting partner, KITT? Later this year, Volvo owners will be able to embrace their inner Hoff as the Swedish car maker has teamed up with Microsoft to develop a wearable-enabled voice-control system.

Volvo owners who specify the system will be able to talk to their car via a Microsoft Band 2 wearable device, allowing them to instruct their car to perform tasks including setting the navigation, starting the heater, locking the doors or flashing the lights.

Voice control could be great in the cabin, especially in the quieter zones of business and economy class. Want a drink? Just ask for it, without having to break off from writing that big sales pitch. Just woken up in bed and you want to return to seat mode for breakfast? Just tell the seat to jump to it - no fumbling for buttons.

This technology is part of Volvo's drive to incorporate innovations from outside the traditional automotive arena. to open up potential partnerships and new business models.

"When innovating, we are not interested in technology for the sake of technology. If a technology does not make a customer's life easier, better, safer or more fun, we don't use it. Let's face it - who hasn't dreamed of talking to their car via a wrist-worn wearable?" states Klas Bendrik, SVP and group chief information officer at Volvo.





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#### VIRTUAL FFFLS NATURAL

Emerging ideas for device control are all very exciting, but is the blending effect of virtual and physical reality going too far? Cade McCall, a psychologist and research team leader in the department of social neurosciences at the Max Planck Institute for Cognitive and Neurosciences in Leipzig, doesn't think so.

"It is initially unimportant to the brain whether it is processing actual or virtual information. If the corresponding conditions are met, we easily perceive virtual environments as real and enter into them," he says.

McCall explains virtuality from the standpoint of psychologists, describing how the human brain reacts to virtual impulses: "The brain is

constantly gathering experiences. Virtuality engages with this process and provides us with elements

of an augmented or alternative world." This means immersive technology fully integrates users into the virtuality of the interior space, with their natural interaction with the surroundings giving rise to a realistic feeling of belonging to an artificially created reality.



#### New points of view

the virtual experience, teaming up with academics to consider how the car of the future can become a virtual space, a 'third place' between home and the workplace. This could equally apply to the inflight experience.

For Anke Kleinschmit, head of research at the automotive giant, "The car of the future will become a

Mercedes-Benz has been researching mobile living space that can connect travelers to their surroundings: social, informative, anecdotal. The surroundings can tell the traveler stories or act as a playing surface. It combines topography with movement to create a game. I can imagine many new applications with virtualization. Virtual and physical reality blend together playfully."

#### Knuckle down

Sliders and buttons are common elements of touchscreen interfaces, but US-based tech developer, Qeexo, has created a system that opens new possibilities for the simple press of a finger. Named FingerSense, the system detects the pitch and yaw (basically the angle) of the object pressing a touchscreen, and what that object might be, whether a fingertip, knuckle, nail or stylus. Working in tandem with conventional multitouch finger tracking, the system creates two additional analog degrees of freedom for a single touchpoint. In short, FingerSense enables the touchscreen to distinguish between inputs from various parts of the hand or a stylus and respond accordingly, with unique actions assigned to presses of different angles or parts of the hand. Better still, it is just a software, which can work with existing hardware.

This is no pipe dream, as smartphone manufacturer, Huawei, has licensed FingerSense technology for its flagship P8 and Honor 7 smartphones. Huawei is branding the system as Knuckle Sense, so named as





#### SWEET IDEA

The buttons on a touchscreen can be a little small to read or operate, a little too far to reach sometimes. With Toffee, the touch controls could be accessed on any hard surface within reach – a tray table, sidewall or side Mellon University, is a novel application of acoustic time differences of arrival correlation, which can link a device and gravity for the acoustic coupling.



#### DIALIN

San Francisco-based startup Fingertips Lab has developed the 06, an inexpensive way for people to control their devices one-handed, without even having to hold or look at them. If devices such as this US\$149 gadget catch on, passengers will soon be au fait with new, simple and tactile ways of controlling IFE.

The device can be held, worn or mounted, and its rotary bezel dial features tactile ridges, textured touchpad buttons and motionsensors for device input and control, combining both hardware and software to offer what the company says is a far more accurate and responsive experience than voice commandbased programs. Users can access content and control apps through touch and gestures to remotely open, browse and listen, and respond

to text and e-mail messages, news, social posts, music and more.

The device can also be combined with a dashboard app, which displays a line-up of apps on a user's personal device – although it could also go to an IFE display – including e-mail, podcasts and Twitter as 'channels' and all corresponding content as 'tracks'. If the content includes hyperlinks, the O6 app can automatically fetch and extract the content to audio or convert it to speech.

O6 also includes the use of different voices, audio cues, intonations and sounds to convey structure through audio. Using artificial intelligence, the dashboard app analyzes content to automatically recommend relevant, contextual actions.



free your eyes.

#### Brain power

Why not harness the power of the fine brains of the passengers who had the good sense to fly your airline? Emotiv, a bioinformatics company that is advancing understanding of the brain using electroencephalography could hold the answer.

The company has developed technology that falls under the umbrella of BCI (brain-computer interface) also referred to as MMI (mind-machine interface), DNI (direct-neural interface) and BMI (brain-machine interface) and aims to track cognitive performance, monitor emotions, and control both virtual and physical objects via machine learning of trained mental commands.

Slip on a headset and the IFE system could be controlled using the mind. The system could even monitor your state of mind and recommend something suitable to watch or listen to, such as a soothing soundtrack – and even alert crew if there is a particularly stressed passenger on board who could do with a little extra TLC.

According to Emotiv, applications for its technology and interface span an amazing variety of potential industries and applications – from gaming to interactive television, everyday computer interactions, hands-free control systems, smart adaptive environments and accessibility design – and, of course, IFE control.



#### WILL PASSENGERS ACCEPT THE VIRTUAL WORLD?

According to Erich Schöls, interaction designer at the Steinbeis research center in Germany, there have been recent interesting hardware advances: "Even today, the level of immersion is so high in some applications that an almost natural interaction by humans with the generic, artificial backdrop is possible. In the process, more and more senses are included, and increasingly natural interaction models are implemented. The path from reality to the virtual world is fluid." However, there are some acceptance barriers, adds Schöls: "Although extended reality applications are increasingly establishing themselves in industry, culture and society, many people still feel slightly unsure about immersion into completely artificial environments." However, the professor is sure that these hurdles will be overcome: "This will soon change with increasingly useful applications and further technological improvements. People will come to appreciate cyberspace as a useful and interesting enrichment with enormous potential."

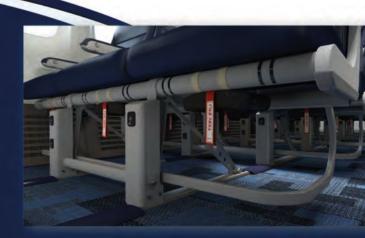


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# ASTAR ISBORN

UNITED AIRLINES WANTED THE SEEMINGLY IMPOSSIBLE FOR ITS NEW BUSINESS CLASS: GREATER SLEEP COMFORT AND DIRECT AISLE ACCESS WITHOUT LOSING SEAT DENSITY. ENTER POLARIS, ONE OF THE BIGGEST BUSINESS CLASS SEATING PROJECTS EVER

Words by Adam Gavine

leep is the new black. So said United Airlines' president and CEO, Oscar Munoz, as he unveiled the new Polaris business class seat in New York. He went on to describe the product as "defiantly innovative", "breaking the mold" and a "reimagining" of its international business class. Bold ambitions and bold claims, but are they marketing puff or truly "the most significant transformation of the product in over a decade"?

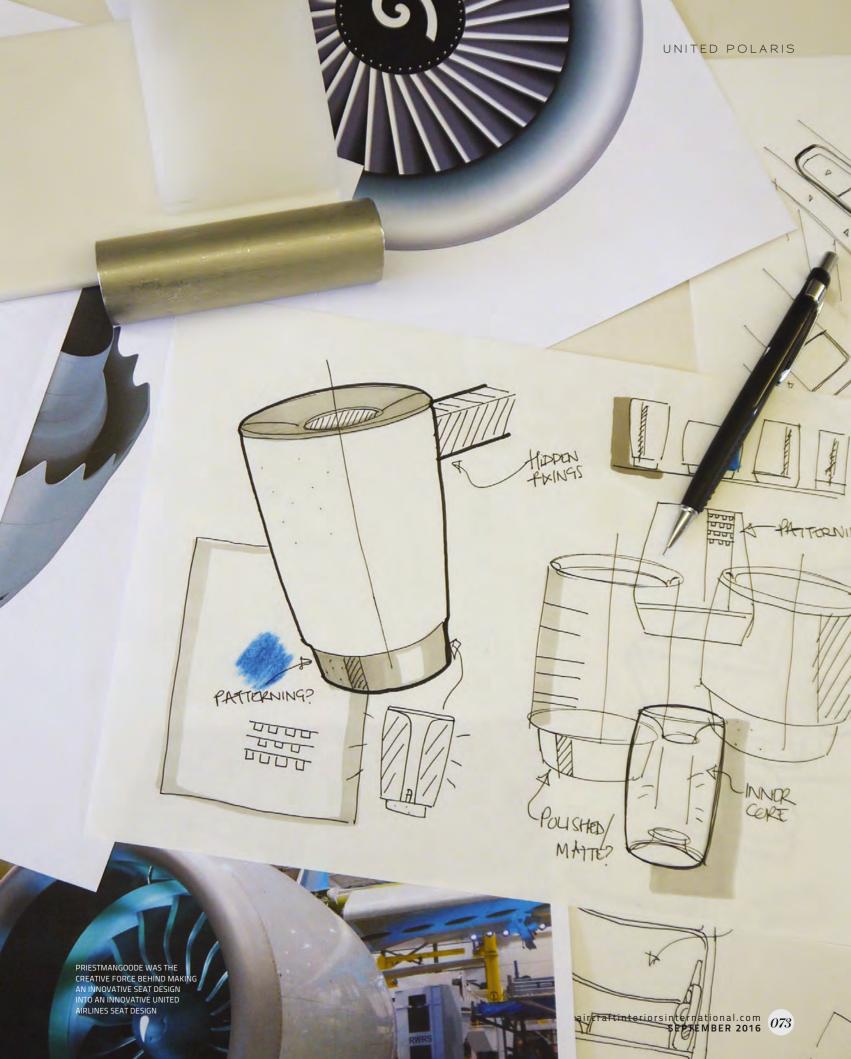
For years, United knew it had a problem: the quality of its business class offer was being surpassed by rivals. Inconsistent seating product – some with fully flat beds, some without – and awkward step-overs for passengers accessing the aisle during the night were becoming a less appealing prospect for customers. Seeking a solution, the airline conducted more than 12,000 hours of interviews with business class customers about what they valued

most in international travel, and the overwhelming response was a good night's sleep – indeed it was deemed almost 2.5-times more valuable than other premium comforts such as dining and VIP accoutrements.

With this in mind, Munoz explains that a seating product that puts sleep at the center was clearly required: "We want to make the weary traveler a thing of the past."

Meanwhile, in a studio in London's Farringdon district, a team of industrial designers at Acumen had been developing something they knew was special: a unique, super-efficient seating layout. So confident was Acumen in the concept that it had invested huge resources into developing an initial sketch in a notebook into a globally patented design.

The design was waiting for the right customer, and who better than an airline with one of the world's largest wide-body fleets? United had been talking to a number





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ABOVE: THE LOPA THAT GOT UNITED SO EXCITED. THE LAYOUT OFFERS DIRECT AISLE ACCESS AND SUPERIOR COMFORT, WITH NO LOSS IN CABIN DENSITY

LEFT: THE MANY SURFACES AND FINISHES REALLY BREAK UP THE AESTHETIC, GIVING POLARIS A LESS BULKY LOOK THAN MANY BUSINESS

of seat manufacturers about new product – a big deal as this is one of the largest orders for business class seating in the history of aviation – but while product existed that would have given United customers that all-important sound night's sleep, they all had too steep a price for the airline: a loss of cabin density.

Acumen's solution, however, was what the team calls "density neutral", giving United all the comfort features it wanted, and that coveted direct aisle access, without any reduction in seat count.

During a meeting with the airline, the layout was checked for every wide-body in United's current and incoming fleet – B747s, B767s, B777s, B787s and A350s – and the figures stacked up for every cabin. The result? A standing ovation from an impressed United team, according to Acumen.

"The result? A standing ovation from an impressed United team"

### SEAT PITCH

So how did Acumen land this monster seating deal? While the seat design was based on inspiration, hard work and investment, there was a little luck involved too. First, the timing of Acumen being ready to pitch its layout coincided with United's search for a new seating product. A United team was in London and visited Acumen to try out a mock-up of the concept. They were impressed, but more so when they found it would offer a flat bed and direct aisle access with the same cabin density as its current product, across every wide-body aircraft in its fleet. The result was a standing ovation. However, serendipity was also a factor: the United team wasn't in London scouting for seats; they were in town for other business and almost had to cancel the meeting with Acumen as they were running out of time.

That wasn't a done deal though. A two-year elimination process followed, with Acumen's design competing against those of the world's biggest seat manufacturers. For a modest-sized studio this was a David and Goliath situation.

However, a final selection process was held at United's headquarters in Chicago's Sears Tower, with the airline's experts, as well as the broadest physical spectrum of staff they could muster, trying out the mock-up. All eyes were on a 6ft 8in IT expert when he settled into the seat, and there were a few quiet sighs of relief when he reported he was comfortable in hed

With the design selected as the seat of preference, those big seat manufacturers had another chance to pitch, this time to quote for manufacturing Acumen's design. The victor was one of the world's largest: Zodiac Aerospace.

#### SO WHAT'S THE SECRET?

"What makes this layout unique is that it combines an in-line seat and angled seat as a pair. All the aisle seats are herringbone-like at an angle, but the center doubles and window seats are all in-line," explains Ali Ersan, an associate at Acumen.

The layout – which the team refers to as "herringline" – is claimed to offer an advantage over staggered layouts in that it eliminates dead cabin space, maximizing use of the world's most valuable real estate.

The layout also offers an advantage for the passenger experience, as the stagger gives the 2-4-2 LOPA the feel of a 1-2-1. Polaris is a high-density cabin, but the layout



# "This project is the perfect storm. It's a heady mixture of influences"

creates a premium feel with real privacy in every seat – unless those in the center pairs wish to lower the electric divider for a shared experience.

"It's the holy grail," enthuses Anthony Harcup, an associate at Acumen who was also lead designer and co-inventor of the Etihad A380 first class cabin.

There's no doubt the layout is great, but the grail? Couldn't the different experiences offered by the in-line and herringbone seats present an issue? Far from it according to the team, who say that research has actually found the differing offer to be an advantage for United.

TOP: THE WINDOW SEATS WILL BE PRIZED BY THOSE WHO VALUE PRIVACY. HOWEVER, SUBTLE DIFFERENCES BETWEEN THE SEAT DESIGNS MEAN THAT EVEN AISLE PASSENGERS WILL FEEL SIMILAR LEVELS OF PRIVACY WHEN RESTING

ABOVE LEFT: WHAT POLARIS IS ALL ABOUT. CEO OSCAR MUNOZ WANTS HIS CUSTOMERS TO ARRIVE RESTED AND READY TO TAKE ON THE DAY. AND OF COURSE TO FLY UNITED NEXT TIME AS WELL

"One seat type isn't better than the other – they both offer distinctly different advantages for different types of passengers. United did research and found the passenger preference for each was split 50:50," states Ersan.

Thus United has embraced the customer choice offered by Polaris, and the design team – together with Zodiac Seats UK, the seat manufacturer for the project – has made sure the in-seat experience is equal, with a little extra bed surface area and larger side furniture for center seats for a greater feeling of space, and a larger backshroud for the aisle seats so that the occupants can enjoy similar

privacy to those in the window seats. But let's not forget the most important leveller: direct aisle access for every passenger.

"It occurred to me this project is the perfect storm. It's the most efficient layout. In terms of airlines, United is probably the best we could have launched this with. In terms of seat manufacturers, Zodiac is the biggest in the world. It's a heady mixture of influences," states Harcup.

### HERRINGLINE BECOMES POI ARIS

While Acumen optimized the layouts and packaging, United brought in another London studio, PriestmanGoode, to lead the creative direction of making the seat a unique United product – as well as to extend the Polaris brand across the passenger experience, from check-in, to

### ASLEEP ON THE JOB

United conducted sleep trials for the seat, using a B787 mock-up cabin at Boeing in which a complete flight can be simulated, including noise. Crew and customers spent the night in the seats, and in the morning were asked about their impressions of the seat and how it compared with the current offering. Feedback was positive, though the impressions inspired a few minor modifications to the design, including refinements to shoulder room and stowage spaces. But though the changes

were minor, the task was major as they had to be applied to each aircraft type.

Further trials to evaluate the design for manufacturing as a new line-fit product saw three rows of seats machined out of polystyrene blocks and used to simulate the installation process. Acumen, PriestmanGoode, Zodiac and Boeing had to demonstrate how the seats would fit into the seat tracks, how they could be split up to fit through the aircraft doors, and then demonstrate a full installation.



BEFORE ACUMEN,
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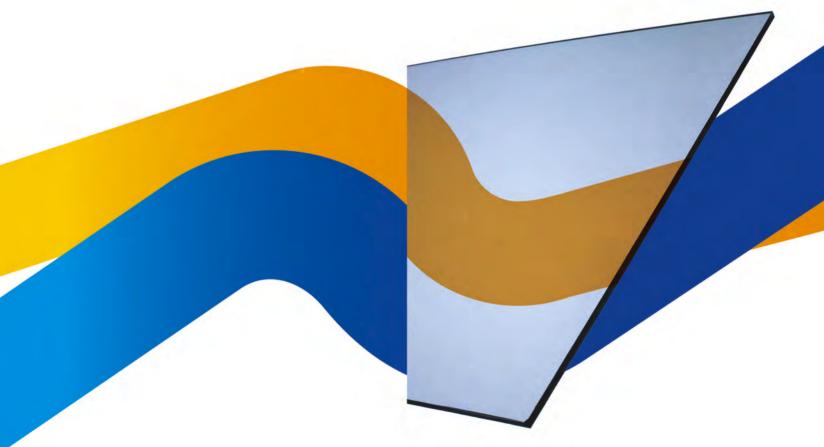
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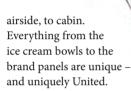
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- IFE system add-ons and mirrors







PriestmanGoode became involved in the project early on, when the layout was fully established but the seat design was still in the mock-up phase. This wasn't just a CMF project for the studio, as it was involved in shaping the seat design and making it fit with its cabin vision, as studio director Nigel Goode explains: "We came up with the vision for the whole cabin interior and the plan of how to implement it." In other words, PriestmanGoode took Acumen's clever seat layout and made it a distinctly United seat.

The PriestmanGoode team was keen to ensure that the interesting configuration didn't become a dull reality, swathed in large expanses of plastic: such a

# PROTECTING THE HERRINGLINE

One of the biggest challenges in the project was securing a global patent for the seating layout, negotiating the complex minefield of intellectual property (IP). Acumen invested heavily in protecting its idea and its patent attorney became integrated with the team. The result is that Acumen owns the IP for the layout, with United granted an exclusive license to use it in North America for five years, and Zodiac a license to manufacture it.

"Funding a global patent is a major investment for a design consultancy," says Acumen's Anthony Harcup. "Normally an airline or manufacturer will ask for an idea and if it produces protectable IP they pay for the patent. This time we put our money where our mouth is."

Other big costs included building mock-ups and flying them around the world for evaluations. However, projects involving the layout will be easier and less costly in future, as having United as launch customer means the layout has been certified across every wide-body aircraft type except the A380, in just one program.

ABOVE: EARLY SKETCHES OF ACUMEN'S INNOVATIVE LOPA. THE TEAM IS SO PROUD THAT ITS DARING IDEA IS SOON TO BE A REAL PRODUCT, FLYING WITH A HUGE AIRLINE major project deserved something special. However, implementing that plan was no small task, given the breadth of the United fleet. Every LOPA required a discreet change in the use of colors, materials and finishes to break up surfaces, and as Maria Kafel-Bentkowska, CMF lead at the studio, explains, "We knew we couldn't implement the whole vision on some

aircraft types, so we created a scheme that means we can do variations on the design

to fit each aircraft. It's not a simple copyand-paste project."

The rather bland outgoing blue cabins will be replaced by a more carefully considered and varied mix of blues and grays, applied in clever ways to maintain visual interest, with a mix of materials and finishes skillfully applied to break up surfaces so that those dense cabins don't look repetitive.

Of course sleep, that key driver of the Polaris project, was given a lot of attention. The PriestmanGoode team strove to make the sleeping environment as private and calming as possible, including a dimmer for the lighting and

### CHALLENGES OF THE PROJECT

Applying a seat design across several aircraft types required every minor modification to be translated across to seats for other aircraft. The A350 presented a particular problem, as the Polaris layout means seats can be fitted further forward in the fuselage taper than usual – and the seat tracks for the front row stop around 3ft short of this point.

The eventual solution was to cantilever the front seat from the other spars.

However, the design partners expect that

Airbus will extend the tracks in time for launch, simplifying the seat construction.

Another issue was the stowage under the ottoman, as in the initial seat designs, bags stowed under the ottoman would have rested directly on the cabin floor. This presented a problem for the certification authorities, with the solution being to add a surface under the ottoman for a bag to rest on, with a partial cover above. It was a lot of work, but having that stowage space is really worthwhile.

# "The differing dimensions of each aircraft type present their own challenges"





ABOVE: PRIESTMANGOODE
WAS KEEN TO HAVE ENCLOSED
STOWAGES FOR CONVENIENCE
DURING TTL. A STANDOUT
FEATURE IS THE STONE-LIKE
RESIN ON THE SIDE FURNITURE,
WHICH FEELS COOL AND SOLID

Want more
polaris? You're in
luck. You can see
the lounges, service
items and more
on our site

soft panels behind the passenger for sound deadening and comfort.

The PriestmanGoode and Acumen teams got to know each other pretty well, with the differing dimensions of each aircraft type presenting their own challenges. For each variant, Acumen would optimize the LOPA, and with that in place, PriestmanGoode would apply the United brand as well as make adjustments to elements such as stowages and lighting. The range of suppliers across the aircraft types also created challenges, requiring Kafel-Bentkowska to work hard to ensure consistency in finish and color.

"This isn't like some seats where there is just a left and right version. There are several slight variants in each aircraft and also changes for each LOPA," says Goode. "It has been one of our biggest challenges and one of the most rewarding jobs because of that."

To ensure Polaris retains its good looks, PriestmanGoode discussed maintenance with the airline. When some business class seats suffer cosmetic damage to the shells they have to be sanded and painted, or in ABOVE: THE WIDE VARIETY OF FINISHES AND MATERIALS IN THE CABIN WILL HELP KEEP PASSENGERS STIMULATED BY THE POI ARIS EXPERIENCE some cases taken off the aircraft for repair. The team tried to make life easier for United's maintenance crews by only using foils in low-impact areas, by incorporating sacrificial panels that can be easily replaced, and by using plastics that can be easily repaired.

A similar philosophy was used for the entrance areas, which take a particular bashing from bags and carts, and have been specified with 3D vacuum-formed Kydex panels that can be replaced during a turnaround.

Polaris isn't just a great business class, it could be a major part of revitalizing the United brand. As an emotional Oscar Munoz said at the unveiling, Polaris is, "The new spirit of United. We have a lot more work to do, but I'm beginning to feel a new energy."

### DOMESTIC BLISS

In September 2015 United also unveiled a custom-designed seat for first class cabins on more than 200 of its narrow-body fleet, which includes A319s, A320s, B737s and B757s.

United invited customers to test seat prototypes, and the feedback was used to refine the design of the custom seat, created with PriestmanGoode.

The 21in-wide seat features an articulating seat bottom, an adjustable

headrest, a patented tray table with tablet holder, and signature navy and champagne leather seat covers. A nice touch is the granite cocktail tables — a touchpoint echoed in the marble-effect tables found with Polaris. And something else it has in common with Polaris: while the seats are wider and more luxurious than their predecessors, each aircraft continues to have the same number of premium-cabin seats.















# "It's a buyer's market so we don't have the luxury of denying requests"

he single-aisle market is a very tight market, a very complicated and congested market, and the aircraft we produce, sell and propose need to be instruments that allow airlines to make money out of them." This is the line that Sukhoi Civil Aircraft is taking with its Superjet 100 (SSJ100) regional jet, according to Evgeny Andrachnikov, SVP of commerce at the company.

Single-aisle competition is fierce, with rivals including the venerable A320 and B737 families, the Bombardier CSeries, the Embraer E-Jet and the Mitsubishi Regional Jet. However, Andrachnikov believes that with capacity for 108 passengers in its densest configuration and a very competitive basic price of US\$35.4m, the SSJ100 is a money-maker for operators, and he wants the aircraft to be the market leader in the 100-seat sector.

ABOVE: A BIG MOMENT AS MAY 2016 SAW IRISH EUROPEAN REGIONAL AIRLINE CITYJET BECOME THE FIRST EUROPEAN CARRIER TO OPERATE THE SUPERJET. CITYJET IS LEASING 15 AIRCRAFT WITH AN OPTION FOR AN ADDITIONAL 16. THE DEAL IS WORTH OVER USSIBN

RIGHT: PININFARINA EXTRA WAS ENLISTED AS THE CABIN DESIGNER FOR THE SSJ100 PROGRAM



Sukhoi is hungry for customers, so when it comes to interiors options, for Andrachnikov, the customer comes first. "We are still a new kid on the block, so we follow our clients' wishes. It's a buyer's market so we don't have the luxury of denying requests – we deliver whatever a customer wants. We will stick with this strategy as we want customers to be very satisfied and happy with the product they get. So we always listen to their wish lists and try to meet them."

For example, the standard SSJ100 has two galleys and two larger kitchens, but when launch customer Aeroflot requested an additional galley, Sukhoi was happy to meet their requirements.

Beyond economics, operators – which also include Mexican LCC, Interjet; Irish regional airline, CityJet; Red Wings, a Russian carrier; and several leasing companies – also appreciate the cabin comfort of the aircraft.

The 127.4in-wide cabin allows a 3-2 seat configuration in economy, with a 20.8in-wide aisle, 83.46in-high ceiling, and 18.31in-wide seats (16.23in for the middles). A fourabreast business class cabin is also an option, with 20in-wide seats and a 24in-wide aisle. Whatever the seating configuration, the overhead stowage is generous – indeed it is claimed to be the largest capacity available on aircraft of this class – and can accommodate the largest IATA-approved bags.

### BUSINESS SMARTS

Born in 1968, Evgeny Andrachnikov graduated from Moscow Civil Engineering Institute in 1989 and later received a bachelor's degree in business administration from the Wharton School at the University of Pennsylvania, USA.

From 1996 until 2002 Andrachnikov worked for international mutual funds

consulting companies and investment banks including Vanguard Group, PricewaterhouseCoopers and Morgan Stanley.

He also served as the managing director of Dexter, the first Russian air-taxi project, until 2013, and has managed the business aviation assets of one of the largest Russian familyowned funds.

In 2014, he was appointed as the senior vice president of commerce at Sukhoi Civil Aircraft.



The cabin was designed by Italian design house, Pininfarina Extra. Asked why Sukhoi didn't opt to create the design in-house or through a Russian consultancy, Andrachnikov responds, "Everybody should do what they do best. Like Germany is good at making beer and cars, historically Russia has been a leading power with making airframes. That's where we are on top of the game, globally. We are good at engineering and testing, and Russian scientific institutions are employed by the industry leaders to do that for them. We are also very strong in software.

"For other work, we believe others may do it in a more effective way. The SSJ100 is a high-tech product that is the pure result of international cooperation. You can do it all yourself, but Boeing and Airbus both have thousands of suppliers around the globe, and so do we."

Indeed Sukhoi's partner in the Superjet program is Leonardo of Italy, and Boeing has been brought in as a consultant in the field of marketing, design and manufacturing, certification and quality systems, supplier management, and aftersales support.



### "The SSJ100 is a high-tech product that is the result of international cooperation"

ABOVE LEFT: AN EARLY SSI100 CABIN DESIGN RENDERING BY PININFARINA EXTRA

ABOVE AND BELOW: THE BUSINESS JET VARIANT OF THE SSJ100 IS BEING HEAVILY MARKETED ON THE POSSIBILITIES OF ITS FUSELAGE WIDTH, CLAIMED TO BE THE BIGGEST IN ITS MARKET SEGMENT

The main interior components are supplied by B/E Aerospace, whose Advanced Design Studio is a recommended design house for Superjet clients, along with Pininfarina Extra. "We are well positioned to meet customer needs," says Andrachnikov. The interiors are installed at Superjet's facilities in Venice, Italy.

Target markets include carriers with regional routes in China, India, Iran, Africa, South East Asia and Europe, although the long-range version can effectively operate on a number of mainline routes. Development is also well

> underway on a 120-seat variant, due out in 2020, which is quite involved, as it requires a new wing design, rather than an insertion within the central part of the fuselage.

So who is a Superjet best suited to? "Not every airline operates in a market suitable for the SSJ100. Not every single airline operating in a suitable market has a suitable business model for employing the aircraft. It's a combination of having the right market for a 100-seater and the right business model. It's not as widely spread as general narrow-body aircraft demand. We're talking about 100-120 aircraft sold per year in terms of new and replaced aircraft, versus thousands of narrowbodies. It's a specific market with suitable business models, but customers are out there and we are after them."









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of the current onboard social space offer. "The time has come to question the delivery of typical airline services and seek truly unmatched leisure experiences. Many airlines have expertise and cultures centered on only delivering operational and engineering expertise, but few have truly mastered the art of hospitality. An opportunity is emerging for air carriers to redefine their business models and import the skills that are either lacking or badly imitated by many."



### On-brand, not bland

For Knapp, airlines could learn from – or even collaborate with – leaders in the hospitality industry to create an outstanding social experience, not just in social spaces, but across all classes.

"What if YO! Sushi had its own designated block of seats in economy for those who wanted a different flying experience that is more aligned to their day-today food and beverage habits and choices? We may not be able to import the table-top conveyor belt, but the brand could still be reinvented and delivered in a new way for a chosen few at 40,000ft.

"And so to business class: for the youthful and achingly cool business 'hipsters', aka the new millennials, maybe we could import the Ace Hotel vibe? Cool and social at the same time, food, beds and music all align for a limited number of business seats to break the

expected and stereotypical delivery of bland Gordon Gekko corporate-ness.

"And for first class? What about offering the Aston Martin suite, with chic and timeless elegance, a real sense of rarity and craft that others can only envy from afar; partnered with Johnnie Walker Blue Label for a perfect pour in a perfectly fitted seat.

"Mixing up brands in this way could help to reimagine the typically tired and predictable experiences that passengers have become accustomed to as they are processed and packaged from global airport to global airport.

"So, let's mix it up a bit, start drawing upon the best of the best for our entertainment needs, and focus on what we're actually good at. After all, would you rather have coffee from Starbucks or 'Globo Airlines'? We all know the answer. now where's the solution?"



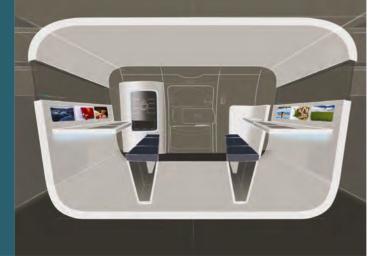
A technology-driven space would be impressive, but also a quite passive experience, says Ross Burns from AIM Altitude. Burns has an exciting idea for passengers who would like to be a little more active during flight.

"A fitness suite with exercise bikes and running machines would be great in terms of new experiences for business and first class customers. A health spa experience with treatments, a shower and massage chairs would be likely to prove popular," states Burns. "Sitting in robes afterwards, enjoying afternoon tea, could be the perfect luxury treat to start a holiday."

Further ideas include a casino, complete with card games, slot machines and roulette tables, etc, and a private office space with telephone booths that could appeal for both business and social requirements.

"For all passengers, I think an internet café would be very successful, providing both an internet access point and a communal area to drink hot beverages and sit in small groups. Vending machines could supply food and drink to paying customers, perhaps with interactive media via large-screen monitors," he adds.

However, he adds that the space need not be dedicated to one activity: "I would be keen to see adaptive monuments that could change their purpose during the flight. This would make the space very flexible. It may even make it possible to have a live performance area, for music, comedy, theater or dancers."



### SUPPLIER INSIGHT: AIM ALTITUDE

Ross Burns, group lead industrial designer at AIM Altitude, explains the technologies that could inform future aircraft social spaces: "Interactive touchscreens will be widespread. Larger video screens and seamless integration of video walls that wrap around curves are likely to become commonplace, along with high-resolution projection systems, perhaps projecting night scenes and moving clouds."

In his vision, scanning systems may also be put in place, to identify passengers and classify their threat level, or review passenger stress levels, heart rate and well-being, while adaptive advertising linked to the projection systems could react to personal tastes.



### CHALLENGE THE BEAN COUNTERS

We asked Daniel Baron, founder of LIFT Strategic Design, for his view. "The airlines who "get it" will embrace the notion of social spaces and will keep pushing the envelope. The challenge is the other 200... It can be difficult for airline marketing or product teams, and designers, to get past road blocks set by bean counters who counter curvaceous counters with 'how the hell will giving up seats or spending a fortune on a bespoke galley improve my bottom line?' We need airframers and suppliers to join our chorus at the early stages of new-build or retrofit programs and help support the case for extra 'wow' from the get go.

Let's also focus on economy class. In an age of

increasingly shrinking living space, airlines need new ways to communicate added value through enhanced wellness. But how to translate that into tangible improvements? For example, seats located directly across from a lavatory door are guaranteed to be the most complained about spot on an aircraft. Instead of just saying, 'we need the revenue so we will accept lower customer scores', airlines could fill that space with a self-service counter or stretch zone. Even an empty space with funky lighting to stand and chat, without encroaching on crew space or other passengers, could help fuel greater loyalty negating the loss of revenue from removing two or



### Casual quality

DCA's vision for an onboard bar/restaurant area has a shape and layout inspired by sushi bars, which provide a high-quality but informal dining experience. The space is intended to allow for interaction between passengers in a relaxed, unforced manner, while for those seeking to dine alone but away from their own seat, smaller seating areas separate from the main bar area give passengers freedom to dine as socially or privately as they choose.

### Indulge the senses

Stress is often associated with the travel experience, be it getting to and through the airport, the flight itself, the onward journey, or the prospect of the crucial meetings looming at the destination. A high-quality spa area, including showering facilities, would enable an airline to stand out from the competition by providing a facility in which passengers could be pampered, unwind and relax.

"In this scenario, we envisaged that traditional spa services such as massage, aromatherapy, manicures and pedicures could be provided via a preflight booking system. Aromas and music could be used to further engage with the passenger at a sensory level," explains DCA's Kruizinga.

The inflight treatments could be integrated with lounge-

based facilities to provide a joined-up service throughout the entire journey.

### DESIGNER INSIGHT: DCA

"Social spaces are an important part of the traveler's experience, both at the airport and in flight. They also offer a great opportunity for an airline to set itself apart from the competition and reinforce its brand," explains RP Kruizinga, senior industrial designer at DCA Design International, a product design and development consultancy.

The studio has created exploratory concepts with the aim of moving away from the traditional alcohol-based value paradigm and exploring other environments that they feel could bring an increased level of differentiation and sophistication to the inflight experience.

"Much of the focus was on the idea of 'relaxed socializing'. We wanted to offer passengers activity-focused spaces in which social interaction would be natural and stress-free," explains

Kruizinga. "At the same time, we wanted to give them control over the degree to which they chose to socialize

— it must feel equally normal to use these same facilities and spaces in a quiet and private



### GO FOR THE BURN

way if that is your preference."

One of the most common problems with long-haul travel is that passengers' movement is restricted for a prolonged period of time. Current onboard social spaces often assume that all customers want to sit and relax for the entire journey.

Not so with DCA's space-efficient gym concept, which would offer passengers an opportunity for active relaxation and informal social interaction, or simply to focus on their own private exercise routine. Time in the facilities could be booked preflight to prevent queuing and disappointment.



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### DESIGNER INSIGHT: TANGERINE

"Increasingly, airlines are seeing the value in creating exclusive bar and lounge areas on aircraft for their premium class travelers. These social spaces offer an opportunity for airlines to differentiate their services and build brand value with their customers," states Martin Darbyshire, CEO of Tangerine.

"As the airline industry catches up with the rapid pace of technological change being driven by the advent of the IOT and connectivity, we will see these spaces being used for more engaging and diverse activities."

However, in Darbyshire's view, social spaces will continue to be defined by the small footprint of available space on an aircraft that can't be used more effectively. Few airlines are prepared to compromise seat density for social areas.

This conflict was evident when Tangerine designed Virgin Australia's new B777 business class bar. "In order to create a spacious bar with lounge seating and provide a desirable service, the LOPA integrates business seating with the bar area to increase the available

floor space. This maintains critical seat count, while allowing the airline to offer exceptional services that empower the brand," he explains.

"The shape, form and use of social spaces will continue to be determined by the revenue that they bring. We can see an opportunity for the creation of larger social spaces if these areas can bring additional revenue that counteracts the loss of seat count. For instance, perhaps airlines could offer more interactive retail and shopping experiences, or even an inflight tax-free casino?"

# Top table

Martin Tatchell, a designer at Tangerine, has created a concept interactive lounge area intended for a standard wide-body aircraft, which would be positioned between seating areas or between the business and first class cabins. The sealed, sound-proofed space would offer premium passengers an engaging and interactive social space away from the solitude of their seat.

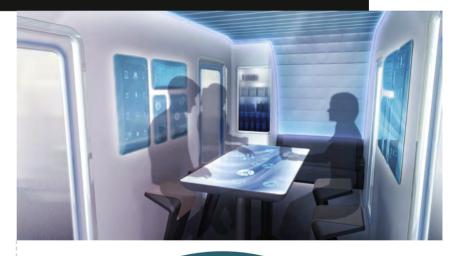
A 65in interactive table acts as the focal point, encouraging people to gather around a shared activity. The table features an interactive touch surface that could be used for activities such as ordering food and beverages, shopping, gambling, gaming or surfing the web. The walls and flooring respond to the central activity on the table, with the lighting and mood adapting to create a more immersive experience.

Bulkhead and overhead storage features are removed from the social area to create a continuous wall-to-ceiling display with light and acoustic panels.

"This creates a perception of more space and transforms the feel of the environment, so that there is a clear disjuncture between a seated experience and the passenger's time in the social area," explains Tatchell.

So where is the bar? E-service replaces a dedicated bar counter with a host, which allows the social area to be passenger-focused and frees up additional space.

Tatchell envisages that the space could be adaptable depending on the airline, or route. Airlines could even offer private group bookings to use the space.



### CHILD'S PLAY

Juliane Barbara Trummer, director of insights & strategy at Mormedi, has identified a way that airlines could use social space to differentiate themselves in the market, and increase passenger satisfaction and loyalty through the personalization of services.

The idea is simple: "A kindergarten in the sky!", says Trummer.
"What could be more relieving for parents and fellow passengers,
and of course the children themselves, than a space that
allows little ones to enjoy the flight in a space that corresponds
to their natural need for movement and under the loving care
of a professional?

"The idea is not new, but as far as I know, no airline has offered it yet. Maybe it is time to reconsider."



# YOGA'S NOT TOO MUCH OF A STRETCH

John Tighe, design director at JPA Design, has noticed that many onboard social spaces such as bars or retail areas are static and have a single function. He sees opportunity in creating transformable spaces that can change in function throughout the duration of the flight to add more value to passengers.

Tighe proposes a yoga space, reflecting the popularity of an industry that has been estimated to be worth US\$80bn globally. Providing for an activity that just needs some space for mats is refreshingly simple (well, as simple as allocating space in the world's most expensive real estate ever is), and time in the yoga zone could be rented as a source of ancillary revenue, or offered free as a nice value-adding service. The space could also be used at other times for other functions, such as a welcome or breakfast area.

"It's something we're excited about and it's believable," says Tighe. "We would love to put running machines in, but a yoga space is believable while still being exciting. There's a need for it, it's not just a gimmick. For super long-haul flights, the ability to move around is more than just a nice thing to have."

Tighe predicts that airlines will get better at selling the value of such spaces as booking systems become more intelligent and fleet consistency worries are removed. A great social space can become a brand promise rather than a halo branding exercise.

Even better, if the space was flexible, its size could be adjusted according to seasonal demand. This could also enable airlines to feel less bound by their choices for such spaces, making them feel more confident to experiment and update.

### Pub-lic enemy

In 2013, at the reveal of British Airways' new A380 and B787 cabins. Aircraft Interiors International asked the airline's then managing director of brands and customer experience, Frank van der Post, if he had considered fitting a bar to the new fleet.

He was robust in his response: "No, I hate bars. If you want to go to a bar you should go somewhere in town and go to a pub or a hotel bar, not go on an aircraft. For 50% of the time an aircraft is flying, people want to sleep and a bar is very disruptive. I don't believe in bars. We did some research, and not many passengers want a bar – certainly not the most frequent business travelers, who just want peace and quiet so they can sleep. They don't want people making noise in a bar.'

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David Caon, founder of the Caon Studio in Australia. One of Caon's previous airline projects was the design of an onboard social space, and he has taken the opportunity to study how the space has worked in practice on many occasions. The L-shaped space offers a self-service bar and a long sofa, and while it isn't serviced as a bar per se, Caon has found that the space is often quite busy on long-haul flights as people look to either meet up with companions seated elsewhere in the aircraft, or to escape the

> "It has proved to me that the provisioning of social spaces on board aircraft is welcomed by flyers," states Caon.

monotony of their seat.

#### seats cantilevered to the sidewall to maximize space, with a fixed assembly of seat and table further inboard," he adds.

The floor is key to the concept, establishing the seating areas as mini-zones, as well as enabling seats to pivot to allow access. An aircraft bistro could also reduce the noise and activity in the main cabin, as well as stimulating thinking about what needs to be provisioned in the passenger seats in terms of dining.

"Seats could be contemplated as lounging and sleeping spaces only, thus possibly opening the door to new ideas and configurations," adds Caon.

### INNER PEACE

Extensive long-haul travel takes its toll on the body, and Caon Studio has been exploring ways to minimize stress on the body during flight, with key themes being exercise, stretching and healthy eating.

"Given a blue-sky brief, we would certainly explore a communal area to promote these values to passengers. Rather than providing a massage room or spa or similar, I fundamentally believe the passenger should be active in their well-being, and as such, I imagine a flying yoga studio of sorts. With the big windows or digital walls of

future aircraft providing an amazing skyscape to set the scene, we imagine a space where a small group could assemble and be led in a guided yoga or meditation session by a trained cabin crew member," states Caon.

Advanced technologies such as augmented reality and virtual reality could assist in multilingual instruction, in creating the right aural ambiance, and in compensating for the limited available real estate.

"Control over the atmosphere of the space or the oxygen content lends powerfully to the concept," he adds.

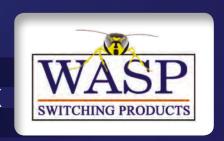
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### High society

How about a viewing area where passengers could really experience what it is like to travel across the world at 500mph at 34,000ft, but not take away any cabin space? This is the vision of Acumen, which has designed a 'Bar in the Clouds', located below the main deck in the aft cargo area.

"The huge panoramic windows and natural incline would give passengers unparalleled views across the landscape - truly feeling like they're on the edge of space," says Anthony Harcup, an associate at Acumen. "To keep the area crowdfree and relaxing, passengers could book a slot during the flight to experience the space."



#### **DESIGNER INSIGHT:** ACUMEN

"Social spaces usually consist of small bars and lounges nestled among the premium seats. Airlines seem reluctant to embrace such spaces, as they take away cabin real estate - which could be given back as more pitch or bed length," states Acumen's Harcup.

"However, some areas, such as the Virgin Upper Class bar, are part of the experience, suggesting that these spaces can be effectively used to build brand loyalty."

## DESIGNER INSIGHT: CRISTIAN SUTTER

"Designing flexible social spaces that deliver a relevant customer experience addressing myriad passenger requirements, while keeping sight of airlines' routes and operational flexibility, is key to justifying their cabin footprint over installing additional seats," states Cristian Sutter, a cabin design specialist working for British Airways.

Sutter believes that technologies such as virtual reality, floor-to-ceiling image projection, flexible seating and augmented reality can enable and influence the design of customizable cabin flexible spaces. The flexible aspect means that such zones could be easily transformed from a

social area for families, to businessoriented networking spaces, or even pop-up food and drinks experiences themed to match with seasonal menus and destinations.

"Customizable cabin social flexzones will enable airlines to target passenger groups and to accurately deliver a relevant experience to them throughout flight phases, destinations and even seasons. The possibilities for creating new themed experiences (and ancillary revenue) are almost endless, changing the current rigid cabin social space paradigm to a flex zone that will act like a white canvas for delivering new and exciting passenger experiences."

#### DESIGNER INSIGHT: PRIESTMANGOODE

According to Nigel Goode, director at PriestmanGoode, there are a number of key things to consider when you're thinking about creating social areas on board aircraft.

"Firstly, the reality is that commercial imperatives remain the drivers in



aviation, so if you're talking about dedicating space to social areas, this will be for first and business class passengers. Interestingly, as the seat environment gets increasingly luxurious, it also becomes harder to draw passengers out of the seats and into social spaces.

"The biggest opportunities if you want to maximize seat-count, but still have social spaces, lie in using nonrevenue areas, spaces that cannot be used for passenger seats for various reasons (height restrictions or no windows, for instance), such as parts of the luggage hold.

"Being able to turn these spaces into social areas or experience spaces - a VR cinema or sleep pods, for instance - not only presents an opportunity to create amazing experiences that could be made available to all passengers, but will also enable airlines to create additional revenue."



# COMMON SENSE

APEX IS EMBRACING THE DIGITAL CONTENT ECOSYSTEM AS IT ADOPTS DECE'S COMMON FORMAT AS 'THE SINGLE DELIVERABLE FORMAT FOR ALL IFEC USES'

Words by Michael Childers. Illustration by RUDE www.thisisrude.com

he IFE industry is about to become part of the digital content ecosystem through the adoption of Digital Entertainment Content Ecosystem's (DECE) Common Format (CF) as its "single deliverable format" (the designation as stated in the proposed APEX specification 0415). The move is part of a new outreach initiative by the Airline Passenger Experience Association's (APEX) Technology Committee and represents a paradigm shift in the IFE content delivery supply chain.

In addition to it's new relationship with DECE, APEX has also established relationships with the Interoperable Master Format (IMF) Working Group of the Society of Motion Picture and Television Engineers (SMPTE), the Entertainment Technology Center (ETC) think-tank at the University of Southern California (USC) and MovieLabs, an independent non-profit research and development organization founded by the six major movie studios.

APEX is integrating the needs and requirements of IFE into the broader ecosystem, in part by including the establishment of IFE profiles in both CF and IMF. APEX has worked with the SMPTE IMF Working Group for several years and its chair, Annie Chang, has spoken at numerous technology forums.

With CF at the top of the supply chain, APEX looks to use IMF as its specification for mezzanine files – the source for most IFE encoding. The next component is MovieLabs' Media Manifest specification, which facilitates the delivery of assets from distributors to post-production, supports conversion from IMF to CF using an IMF output profile list (OPL), and enables increased automation and integration of workflows for purposes of metadata distribution and file delivery.

This standard Media Manifest specification unifies multiple supply chain automation efforts into one integrated structure and set of definitions at a time when the IFE content delivery supply chain is on the cusp of





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### ENTER THE DIGITAL ENTERTAINMENT CONTENT ECOSYSTEM

DECE is a consortium of major Hollywood studios, consumer electronics manufacturers and retailers, network hardware vendors, systems integrators and digital rights management (DRM) vendors.

DECE was launched in September 2008, led by Mitch Singer, CTO of Sony Pictures Entertainment. The company was chartered to develop a set of standards to enable new models for the digital distribution of premium Hollywood content, initially focusing on the development of a set of rules and a back-end system to give consumers a new value proposition to respond to the decline in home video revenues and avoid fragmentation and incompatibilities in the digital video ownership market.

DECE's 'digital locker', which stores the keys to consumer media rights, is called UltraViolet. By creating an UltraViolet Library and linking it to participating retailers, users and their families are able to purchase movies and TV shows from multiple retailers for download or streaming on set-top boxes, computers, web-connected home video devices such as Blu-ray players and internet TVs, and mobile apps for smartphones and tablets. Most DVD and Blu-ray Discs come with UltraViolet redemption codes, allowing users to extend their physical purchase into the cloud.

While DECE's original goal was the creation of an ecosystem to support this home entertainment business



IFE MAY HAVE PROGRESSED FROM FILM, TO CASSETTE, TO DIGITAL, BUT IT IS STILL MOSTLY DEPENDENT ON PHYSICAL DELIVERY MEDIA

model, it turns out that it is ideal for the entire media industry, from digital cinema all the way to specialized markets such as IFE. DECE developed a set of CF specifications to enable all aspects of digital video delivery, tying together many standards such as AVC and HEVC video encoding, multichannel audio formats, subtitles, MPEG common encryption, DASH streaming and more. In 2012 DECE separated the CF specs from the UltraViolet ecosystem and made the specifications available for public use.

#### JOINT FORUM WITH APEX

In May 2016, DECE held a users' forum at the Sheraton Universal Hotel in Hollywood, California. The second day of the event was held jointly with APEX to review how the IFE industry will benefit from CF.

An immediate benefit is APEX's adoption of the Internet Media Subtitles and Captions (IMSC) format, which provides a single deliverable for closed captions in IFE that can be used to convert to bitmap captions for MPEG-1/2 and some MPEG-4 IFE systems, as well as Timed Text, to newer MPEG-4 and HEVC systems. IMSC grew out of the CF, and the author of the IMSC candidate recommendation from the W3C Timed Text Working Group, Pierre-Anthony Lemieux, spoke at the DECE/APEX forum on its use. Lemieux has served on APEX's Closed Caption Working Group.

In June 2016, APEX's Encryption and Encoding Technologies Working Group (EETWG), chaired by Thales InFlyt Experience's systems engineering manager Pierre Schuberth and APEX's technical director Bryan Rusenko, revealed details of pending APEX Specification 0415, the media and device IFE ecosystem specification, at APEX Tech, the Technology Committee's summit, held at the Loews Hollywood Hotel. This pending specification describes an ecosystem for delivery and distribution of next-generation IFE content to passengers.

As with the previous APEX 0403 Specification, 0415 describes minimum security requirements, format



### WHAT'S NEXT FOR APEX AND DECE?

Common Format-related work is being carried out in MPEG to standardize the Common Media Application Format (CMAF). Apple, Microsoft and others began standardizing CMAF in MPEG in February 2016.

The initial specification was proposed by several companies and written over the past two years by Apple and Microsoft, based on the work involved in DECE, DASH, MPEG Common Encryption, ISOBMFF and MPEG-4 Part 30.

MPEG calls this type of specification a Media Application Framework (MAF). The primary purpose is to combine and apply MPEG standards. Microsoft and Apple recognized the growing opportunity for industry convergence on a single media format for internet video driven by the growth of adaptive streaming, where an opportunity to unify and codify industry practice is already converging.

According to Kilroy Hughes, digital media architect at Microsoft and Albert Koval, VP at DECE, speaking at the DECE/APEX Users Forum in May 2016, a single format would be more efficient for content providers, streaming services, player implementers, browsers, apps, devices and testing.



insight into IFEC standards, visit the IFE and Connectivity section of our website

constraints, workflow recommendations, and a single unifying file format. But the key to this specification is that it uses DECE's CF for media as the single deliverable format for all IFEC uses.

The CF uses a standardized container and format restraints that are well documented and commonly produced. This format supports embedded IFEC systems as well as airline-owned and passenger-owned portable electronic devices (PEDs), and is an appropriate foundation for new designs of dedicated IFE hardware.

CF also supports interoperable DRM, which enables files to be secured with any compatible DRM, including Marlin DRM, CMLA-OMA v2, Microsoft PlayReady, Adobe Primetime DRM and DivX DRM. All can be decrypted using MPEG Common Encryption.

#### LOOSFLY CONNECTED MARKETS

For years, the business of content was that of a series of markets loosely connected by a release cycle called 'windows of availability'. Each market had its own sales department and fulfillment function.

In the early 1990s a concept called media asset management (MAM) was introduced, initially as an accounting principle that maintained that digital technology was opening new opportunities to earn money from media assets. The idea originated - or was at least first publicly promoted - by accounting firm Arthur Andersen and its Accenture division.

The theory behind MAM - which became digital asset management (DAM), since it was digital technology that enabled it - was that digital technology made it possible to centralize the architecture of the media asset delivery supply chain. Under the principles of DAM, content is digitized, stored in a data center or digital archive for easy and secure access, repurposed to fulfill orders in the form needed by each market, licensed via a secure business system, and delivered via a trusted electronic system.

In a DAM environment, the business process for content creation and distribution changes to enable predistribution processing of value-adding elements such as multiple languages, subtitles, closed captions, edited versions and other elements adding value in each market. By being created in pre-distribution, these value-adding elements would be available at the time of first market availability - a consummation devoutly to be wished (to borrow the words of Hamlet).

#### WHERE IT BEGAN

Getting entertainment content on board aircraft for IFE was never an easy task. The first IFE system, using David Flexer's million-dollar customization of a Pageant 16mm projector, ran a long loop of celluloid throughout the aircraft cabin, passing through up to three separate projection units.

In one of the earliest inflight exhibitions, a 16mm print of the John Wayne movie Stagecoach was delivered to the aircraft by an actual stagecoach pulled by horses! While that was a publicity stunt, it might be argued that IFE's content delivery supply chain has not progressed all that much since, substituting the 'sneaker-net' - where at least you don't have to clean up after the horses - for the stagecoach.

### THINK-TANK ESTABLISH

The Entertainment Technology Center at the University of Southern California (ETC@ USC) is a think-tank and research center. It brings together senior executives, innovators, thought leaders and catalysts from the entertainment, consumer electronics, technology and services industries, along with the academic resources of USC, to explore and act on topics and issues related to the creation, distribution and consumption of entertainment content.

As an organization within the USC School of Cinematic Arts, ETC helps drive collaborative projects among its member companies and engages with nextgeneration consumers to understand the impact of emerging technology on all aspects of the entertainment industry, especially technology development and implementation, the creative process, business models and future trends. ETC acts as a convener and accelerator for entertainment technology and commerce through research, publications, events, collaborative projects, shared exploratory labs and demonstrations.

APEX is establishing a relationship with ETC@USC. At its June tech forum, APEX hosted Phil Lelyveld, virtual reality augmented reality (VR/AR) initiative program manager at ETC@USC, who offered insights into VR in IFE, painting a picture of an virtual world where passengers can experience destinations and encounters with just a click.

Accompanying Lelyveld, Yves Bergquist, program director, data and analytics, ETC@USC, described how the capture and analysis of passenger data could be used to improve the passenger experience.

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### "The streamlined values of asset management systems are readily apparent"

The IFE market migrated over time from 16mm to 8mm film, then to VHS and Betamax cassettes, and then to digital files, but content was still distributed to aircraft on physical delivery media via the sneaker-net. And much of the post-production work for IFE continues to this day to be done in three principal post-production facilities and a number of secondary facilities – decentralizing rather than centralizing post-production in an asset management environment.

#### **COST-EFFECTIVENESS**

DAM was accepted in principle long before it became cost-effective to implement. At the SMPTE Annual Conference in 2000 in Pasadena, California, Wendy Aylsworth, vice president of technology for Warner Bros – and who spent 15 years in the aerospace industry designing and developing computing systems for operational aircraft, flight simulators and training devices – discussed the state of asset management at that time: "Once a movie is created and transferred to video, there are still numerous versions to be created, all involving various video/audio formats, various compression rates, and various edited versions... Airlines require a version

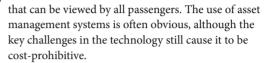
### ULTRA VIOLET

### ABOUT THE AUTHOR



Michael Childers is a long-time industry content management consultant. He is in his third year as a member of the APEX

Board of Directors and chair of its Technology Committee. He has chaired its Digital Content Management Working Group since 2000, and chairs the Closed Caption Working Group. He was appointed by the US Secretary of Transportation to serve on the Department of Transportation's ACCESS Advisory Committee and co-chairs its IFE Working Group. He is a member of the Society of Motion Picture and Television Engineers, has collaborated with its IMF Working Group for 10 years, and has worked with DECE for two years. Bringing IFE into the digital content ecosystem is a principal objective of his tenure with the Technology Committee.



"The streamlined results of asset management systems are readily apparent in many venues of a production company," Aylsworth continued. "At Warner Bros we have started to think of asset management systems in three distinct categories: production, distribution and asset archiving. As opposed to trying to conceive of a system that solves all problems, smaller independent systems that can interrelate ultimately provide better functionality."

But Aylsworth acknowledged that a downside of a number of small systems "is the interoperability of multiple asset systems".

Interoperability, not just of the asset management systems, but of the assets themselves, became the focus of attention for the Entertainment Technology Center think-tank at the University of Southern California as digital cinema adoption accelerated. The Digital Cinema Laboratory (DCL) opened in 2000 to perform research regarding standards for digital cinema, and in November 2006, after digital cinema theaters began rolling out in earnest, ETC moved the lab to the USC campus.

Following DECE's launch in 2008, ETC announced its intention in 2010 to develop "a voluntary specification for an interoperable set of master files (and associated metadata) to enable standard interchange and automated creation of downstream distribution packages". ETC planned to hand off its standard to SMPTE in 2010.

"When there is no effort to define guidelines for the underlying framework of an emerging technology," notes Ken Williams, ETC executive director and CEO, "multiple formats evolve and battle for supremacy – like Blu-ray versus HD-DVD, Betamax versus VHS – bring uncertainty, inefficiency and confusion to the marketplace, and slow product adoption and business growth for all players."

It was the battle between Blu-ray and HD-DVD that caused consumers to substantially slow their purchases of home video content, and was the impetus for the UltraViolet value proposition. Finally all the industry's asset systems are being integrated around CF.

The infrastructure developed by DECE has become far more important than its original charter and has brought together years of work by many entities into an ecosystem for all media, including IFE.



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Words by Adam Gavine

STRATEGY TO BOOST SALES OF THE SUPERJET 100 REGIONAL AIRCRAFT, AND IT IS READY FOR TEAM ORDERS







hink the notion of an aircraft dedicated to flying sports teams sounds whimsical? Think again. Economists at Sukhoi Civil Aircraft have calculated that the sports air transportation market is worth in excess of US\$600m per year, and they want to corner that market. Their proposition is a unique aircraft cabin that can boost athlete performance and recovery to improve team performance.

As Evgeny Andrachnikov, senior vice president of commerce at Sukhoi, explains, "The SportJet is purely market driven. The global sports industry has grown aggressively over the last decades in terms of size and millions invested, and people who invest hundreds of millions in sports teams as a business require the best possible performance from their athletes."

The rigors of the playing arena, whether a football field, ice rink or basketball court, take their toll on the athletes' bodies, as do the rigors of the intensive travel involved between fixtures in terms of physiological and psychological effects – and of course good old jetlag.

According to Sukhoi's findings, almost every major league or national sports team charters aircraft, mostly narrow-bodies with reclining business class seating. Very convenient and comfortable – but not optimal.

Thus Sukhoi has consulted with sports physicians, experts and managers to create an aircraft that offers medical and IT solutions that address sports injuries sustained during the game, as well as flight-related issues such as jet lag, hypoxia and dehydration.

"Statistically, teams that fly to a game perform worse than the home team. The idea is to create a home field advantage," Andrachnikov explains.

The SportJet, which is based on the Superjet 100 regional jet, will have four functional zones: the flight zone, the recovery zone, the coaching zone and an



### "The idea is to create a home field advantage"

ABOVE: WHILE THE ATHLETE'S
SEATS ARE FITTED WITH SEVERAL
HEALTH-MONITORING DEVICES,
THE FEEL IS OF COMFORT AND
LUXURY, RATHER THAN
A CLINICAL ENVIRONMENT

BELOW: IN THIS ZONE THE TEAM COACHES CAN HUDDLE TO WATCH GAME FOOTAGE AND PLAN TACTICS FOR THE NEXT FIXTURE administrative area. The concept has 45 seats, although there is capacity for more, and it has a range of 2,800 miles (4,500km), which can be extended to 3,700 miles (6,000km) if additional fuel tanks are certified.

"It's not an expensive toy – teams are thinking about making money," asserts Andrachnikov.

#### SEATS FOR ATHLETES

Athletes like a little special treatment, so when boarding they will find their seats sport their player number and a personal greeting on the IFE screen. The seats recline almost flat – although fully flat beds would be a logical development – and also feature biomedical technology



#### WHY SPORTJET?

"As a regional aircraft manufacturer, we don't have the luxury of being able to sit idle and wait for customers," states Andrachnikov, when asked why the company is investing in such a niche product as SportJet.

"We have to be aggressive in grabbing the market, or as in the case of SportJet, setting it out. We are looking for market niches and creating ideas for them, to sell more units. The 100-seater market is 100-120 units per year globally – new and replacement – while sales of narrow-bodies are 10 times more. We need to look for alternate ideas."



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including bioimpedance sensors and pulse oximeters integrated into the armrests, backrest and seat pad, which can monitor physiological and psychological parameters during a flight. A wearable diagnostic device - the Sportband – also monitors each athlete's functional state and displays an individual air adaptation index.

A bespoke software system processes the data gained from the sensors and generates recommendations for each athlete's flight program, which is displayed on the IFE monitor. The team coach and physiotherapists can also access this information via the IFE in their seating zone, or wirelessly via their own personal electronic devices to make sure players' needs are met - and that they are obeying Dr SportJet's orders. The SportJet software systems store data from each athlete on each flight, to monitor how effective its recommendations are proving and to make any necessary adjustments.

ABOVE: FOR IN-DEPTH HEALTH DIAGNOSIS, ATHLETES CAN BE HOOKED UP TO THE AEROSCAN DIAGNOSTIC CAPSULE, WHICH INCLUDES MANY PHYSICAL ASSESSMENT TECHNOLOGIES

The IFE displays are not just for medical information, though: athletes can also use the Be Ready To Win multimedia system that contains motivational programs, video analysis of matches and theoretical training programs -

or even just watch a movie during downtime. A nice touch is the special customized media content for celebrating victories - this may be a little less cheerful if a match has not gone well.

#### RECOVERY ZONE

While the seats can monitor players' health, the recovery zone is a little more involved, being the onboard sports and medical center. Athletes can be invited to sit in the AeroScan diagnostic capsule, where they are hooked up to various sensors, which give the medical staff comprehensive information and assessment of physiological indicators.

The capsule includes a bioimpedance sensor, an ECG recorder, a spirometer to measure lung performance, a hypoxic generator to regulate oxygen, a blood pressure monitor, and a pulse oximeter to measure oxygen saturation in the blood.

Injured players can be treated on a multifunctional lie-flat biomedical table, which can be used for physical

### "Bespoke software processes data gained from the sensors"

### THE SPORTJET MARKET

Among the projected customers for the SportJet are national sports federations, clubs, and even individuals. Some top-flight sportspeople might be interested in having their own personal SportJet, although this is a limited market populated by only the biggest names such as golfer Tiger Woods, NFL quarterback Tom Brady and Yankees hitter Alex Rodriguez, all of whom have bought their own aircraft. Similarly, some team owners could be interested, although several such as Dallas Mavericks boss Tom Cuban, while they have their own jets, seek luxurious rather than medical appointments inflight.

The big potential lies in the national and professional teams. "It's not just fantasy," says Sukhoi's Evgeny Andrachnikov, pointing

to Delta's charter deal with the US National Basketball Association as an example, with the airline's 11 all-business B757-200s (complete with oversize lavs) carrying 11 of the 16 participating teams. United has similar arrangements to carry NFL teams and even US college football teams, the latter of which Andrachnikov sees as a big market with hundreds of teams.

"America is a developed sports power. But there is also aggressive growth in the Russian leisure market, with the Kontinental Hockey League (KHL), which has 29 clubs from seven countries that cover eight time zones," he explains. "If we are fortunate enough and aggressive enough, then SportJet will be a sweet piece of our sales strategy."

"Most aircraft engaged with sports teams are narrow-bodies, and in scheduled services cost-per-seat matters, but sports work on a cost-per-trip basis, and in this regard we outperform everyone because Superjet is lighter, more comfortable and the right size."

And, most importantly, its medical technologies make SportJet unique. "We won't take market share as there isn't one. We are creating a market to take over," states Andrachnikov.

He believes that the first deals will be with the KHL, not only due to their requirements, but as a matter of national pride, international image, and low cost. He expects to sign deals with all 29 teams in the hockey league.



### EVEN AN LCC IS GETTING IN ON THE GAME

Irish low-cost carrier Ryanair is getting of up to six hours, complete with in on the sports transport market. In March this year, the airline began a corporate jet charter service, with a customized B737-700 offering 60 reclining business class seats (19.5in wide) at a 48in pitch capable of flights

flight and cabin crew and fine-dining options. The airline has identified sports teams as a target customer group, but for a really targeted offer, perhaps they would consider a SportJet in the future.

therapy, including cryotherapy (extreme cold treatments), electrical muscle stimulation therapy, press and lymphatic drainage, and massage - or simply as a flat surface for badly injured athletes to lie on during flight.

"This feature is helpful for athletes to overcome issues relating to the 45,000ft flying altitude when flying to 70-80 games per season," says Andrachnikov.

With most teams traveling relatively short routes

between games, having an onboard massage table might seem a little decadent, but Andrachnikov - a keen sports fan himself - is convinced of its value: "For a two- to three-hour flight we're not talking about a Thai massage session in a salon, we are talking about medical procedures to relieve congested muscles. It's not about pleasure, it's about health, and athletes need to be well prepared to be on the ice, field or track when they leave the aircraft."

BELOW: FOLLOWING DIAGNOSIS, THE VARIABLE LIGHTING IN EACH SEAT CAN BE SET TO SUIT THE OCCUPANT'S NEEDS, WHETHER REST OR STIMULATION. THE ADAPTIVE LIGHTING SYSTEM IN THE CABIN CAN ALSO REDUCE THE EFFECTS OF JET LAG, AND CAN OF COURSE BE SET TO A TEAM'S OFFICIAL COLORS



Athletes can also use the dynamometer isokinetic exercise machine and optional ergometer in the recovery zone for inflight training and warm-up sessions - all fully monitored by the SportJet systems.

Of course, the athletes' needs are the main focus of the aircraft, so the remaining zones are simple: a zone for coaching staff, with fore and aft club seating, desks and touchscreens to help them analyze player performance and plan strategy for the next fixture; and simple economy-style seating for the administrative staff that accompany the team during the sporting season.

Sukhoi was demonstrating a 15m-long mock-up of the SportJet cabin to potential clients at the Rio 2016 Olympics, and intends to have the aircraft certified and transporting teams in 2018. That timescale could work well for Sukhoi marketing, with 2018 also being the year the FIFA World Cup is hosted by Russia.

"We are sure that flights for professional sports teams on SportJets will eventually become an integral part of the air transportation market," says Andrachnikov.

### ATHLETIC COMPETITION

The notion of a cabin dedicated to athletes' needs is not entirely new, as in 2014 Nike collaborated with Teague to create the Athlete's Plane concept, intended as a complete training room in the sky. The concept centers on recovery, circulation, sleeping and thinking, which were identified as areas of performance innovation that are not addressed by commercial charters.

To aid recovery, the athletes' seats include 'plug into plane' compression sleeves to ice sore muscles, as well as inflight biometric testing and analysis.

For injured players, the concept offers biometrics and analysis equipment to accelerate diagnosis and treatment, complemented by massage tables.

Particular attention was paid to creating the ideal sleeping

conditions, with a zoned cabin configuration separating noise. Finally, a big screen in the lower lobe lounge can be used for analyzing game footage.

Asked his opinion of the concept, Sukhoi's Andrachnikov responds, "I can only comment on what exists, and that is a virtual concept. We have invested in R&D and a mock-up to present SportJet as a real case."



Industrial Neotex is a company founded in 1987 that offers equipment for aircraft, trains and ships.



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STAND: G10



VERSATILE BUSINESS SEAT TO BE REVEAL

Aviointeriors will launch a new high-density business class seat at the show, designed for Aviointeriors by Tangerine to offer a wide range of seating density options for both wide-body and narrow-body aircraft, ranging from eightabreast for a B777, to five-abreast for an A321. The forward-facing layout gives 100% direct aisle access and a fully flat bed, 76.5in long and 26in wide.

The seat can also be offered at the same density in a wide-body premium economy seating configuration with a reduced pitch and seat width.

Jeffrey Forsbrey, SVP of sales and marketing at Aviointeriors, says the seat is intended to address the complex issue of ensuring cabin density in business class, with a seating platform that is easy to certify and offers premium styling. "We wanted a seat design that is adaptable across aircraft types, where we can add seat numbers or reduce seat count and offer a premium business class seat. The developing and we will have a mock-up available in Singapore, where we expect it to raise quite a stir."



Our June issue (available on our . website) has an in-depth review of all the latest

premium economy version is an added bonus for us as we reviewed the design with airlines and it was suggested that the seat could offer adaptability based around pitch, seat width and seat recline angles. We are very pleased with how the seat is

seat models

STAND: F10

### A whole new seating range

Italian seat supplier Geven is gearing up to showcase a whole range of new products to the Pacific Rim audience at the show.

The Far Eastern aircraft cabin market is especially dear to Geven: it was after all at the first Aircraft Interiors Expo in Hong Kong in 2007 that Geven signed a seating deal with its first line-fit launch customer.

The new family of seating products includes the highdensity Essenza seat, designed to optimize form, weight, luxury, living space and comfort, and minimize maintenance requirements.

The long-haul Elemento seat has been conceived to cater to high-density long-haul cabins, with a wide range of options and increased comfort.

The Comoda AQ completes the range as a compact premium economy/business class longhaul product.





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STAND: D60

### Full composites, full comfort

A new seat manufacturer will be debuting an innovative seat at the Expo. The idea to set up AirGo Design came when material scientist and designer Alireza Yaghoubi took a flight from Iran on an aircraft that was 30 years old and then transferred to a state-of-the-art aircraft in the Middle East. He wondered why the seats in decadesold aircraft were more comfortable.

Yaghoubi believes that seat comfort has taken steps backward over the past decades, and established AirGo with the aim of creating a comfort-focused seat. After four years of R&D using the latest technologies, design work, building supply chains, and getting feedback from leading long-haul carriers, AirGo is now ready to

launch its long-haul economy class seats at the Expo.

Named Orion, the seat will have a full-composite structure, which AirGo claims will make it the lightest ever long-haul seat. Features such as a braided composite structure, self-cleaning nanocoatings on the seat cover, and a multidensity cushion are all firsts in the industry, according to the company. Airlines will benefit from lower operating costs and less maintenance, while economy class passengers will enjoy an ergonomic design based on 3D body scanning. A smart redesign combined with innovative subcomponent integration creates up to 4in more legroom and a 2in wider middle seat compared with rival products, the company claims.



STAND: B10

Meet
the Aircraft
Interiors
International
team at Stand
A41

### MIRUS PROMISES "REVOLUTIONARY" TECHNOLOGY

Since it launched the Hawk short-range economy seat at Aircraft Interiors Expo in Hamburg this April, Mirus Aircraft Seating has been making further refinements to the design, and in Singapore will be showing a few design tweaks and enhancements. The seat will be fitted to over 400 of AirAsia's A320 family of aircraft currently on order with Airbus.

Mirus will also be launching some new technology, which the company is remaining tight-lipped about prior to the show, but promises is "revolutionary" and will provide benefits to potential customers and deliver extra 'wow' factor at the show.

The Asia region is proving to be a major launch pad for this new British company, which announced at Farnborough International Airshow in July that the first of its overseas hubs is being established in Malaysia.

Mirus Aircraft Seating Malaysia SDN BHD will initially act as an aftersales service center, providing technical support to AirAsia as well as other customers in the region. In due course, this gateway to Asia may become a duplicate production facility and center of excellence for all projects in SE Asia, further improving lead times and lowering costs.



5

STAND: C30

### Try a little Italian style for size

Comfort and weight were the two main criteria considered by the ComFly team during the development of its new seat. The slim design, created in accordance with Aeronautical Authority specifications and OEM requirements, draws on Italian style, with simple and minimal lines.

Seat ingress has been eased through considered design of the seat legs and the short, movable armrests, while head clearance has been increased by reducing the thickness of the backrest in the upper zone, knee clearance increased by the curved backrest shape in the armrest zone, and shin clearance increased by using a short STS dimension and a very small endbay.

In collaboration with leading designers including



STAND: G40

### COMPACT LIGHTING

To complement the premium seating on show, Beadlight will be exhibiting its aerospace reading lights for the first time in Asia, including a range of new products. The new lights – named Stellar, Mono and Sirocco M – have been designed to respond to market demand for thinner lighting fixtures. A reduction in depth means the lights can be fitted within a panel, thus offering reduced panel depths.

The Stellar is a touch-sensitive light designed to complement any seat design, and with a depth of 20.5mm, it is versatile enough to fit in small

spaces and panels. The Sirocco M is the company's smallest light fitting, and its 35mm diameter front face can be adjusted ±25% right to left.

The Mono model has a pop-open mechanism that fits into a reduced depth case. This light, despite its size, is offered as a 12-28V variable solution.



### What's Important to You?







Elemento: Geven's new
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Where all the elements of comfort,
luxurious living space, fresh and trendy
Italian appeal and high optionality play
together as one natural element.



Fly beyond expectations

There is a fantastic article about materials flammability on our website

STAND: D38

### Six magic touches

DON'T RISK PICKING COLORS, MATERIALS AND FINISHES FROM A CATALOG WHEN YOU CAN SEE AND FEEL THE REAL THING AT THE EXPO. WE RECOMMEND YOU GET YOUR HANDS ON THESE SIX PRODUCTS



At Aircraft Interiors Expo in Hamburg this year, Sekisui SPI won the prestigious Crystal Cabin Award for Materials and Components for its Infused Imaging technology.

Traditionally, design or pattern in thermoplastic sheet is achieved by adding material to its surface or by printing on the surface. Infused Imaging integrates design into any Kydex thermoplastic sheet product. Because design becomes part of the sheet, it doesn't have the challenges of capped and printed materials, and

retains the chemical and flammability properties of the polymer. The global manufacturer invites visitors to its stand to see new inflight examples of Infused Imaging and a preview of the first edition of the Infused Imaging design library.

The company will be showing parts that demonstrate the possibilities that occur when combining the fit, finish, and buildability of Kydex materials with pressure-forming technology, including the offer of personalized textures.

STAND: C29

3D

EEEECTC

To make air passengers feel at home, Fuchi Aviation Technology is presenting its latest designs for a textile that combines embossing and blends to create 3D and streamlined effects. This textile brings passengers a feeling of nestling, coziness and security, just like they feel on the couch at home. It adds warmth to the cabin, and transforms flying into a refreshing and home-like experience.

Fuchi Aviation can supply lightweight and custom-made textiles and leather, all of which comply with airworthiness regulations. The company can design and manufacture dress cover and interior items, helping give customers one-stop shop convenience.

STAND: C51

CRYSTAL

CABIN

AWARD

WINNER 2016

### Testing for quality

The big news at Tapis is that its in-house lab has been accepted as a certified FAA testing facility for smoke density, OSU heat release and Bunsen burner testing, allowing for quick turnaround for its seat covers and the ability to conduct tests as needed.

Faced with increasing pressure to cut operational costs, airlines are being challenged to find lightweight seating materials that are both durable and comfortable. Constructing seat covers using lightweight Ultraleather materials allows for a consistent cut and sew process with great yields,

color retention and overall quality. Ultraleather's Takumi Technology provides a balance of comfort, durability, weight and ease of maintenance. The customization possibilities are extensive, including features such as antimicrobial protection, solar endurance abilities, and technology that protects against tough stains, including ink and denim transfer.

BRAZILIAN LCC AZUL AIRLINES SELECTED ULTRALEATHER





### Sheets you'll want to stroke

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

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

PRESS LAMINATING CREATES NEW OPPORTUNITIES FOR DESIGNERS

STAND: D35

Visitors to the Boltaron stand can watch the new *Design Possibilities* for Aircraft Interior Components video for a visual demonstration of how Boltaron products meet a wide range of performance and cost requirements, while exceeding aircraft fire standards for impact resistance, low smoke and low heat release.

New developments utilizing Boltaron's press laminating capabilities offer exciting possibilities for designers to enhance their clients' branding throughout the aircraft interior's aesthetic design in products such as custom seat class dividers.

STAND: C39

### FANTASTIC FLOORING

Gerflor will present its new expanded range of refined colors and timber decors for its non-textile floor coverings for galleys, entrance/exit areas and lavatories. The Batiflex AV 155 is Gerflor's latest engineered non-textile floor an all-in-one assembly. Its unique multilayer product construction creates outstanding durability and reliability, with a very high resistance to compression, and an excellent weldability.

GERFLOR WILL SHOW ITS BATIFLEX AV 155M, FEATURING ALL-IN-ONE ASSEMBLY

covering with

### A COCKTAIL OF IDEAS

At this year's Expo, Rohi and Anker, two leading manufacturers of premium aircraft textiles, launched the Create Spirit design study – inspired by a range of their favorite drinks, and the result of an in-house project to test their ability to interpret any idea into a concept of fabrics and carpets.

Create Spirit will also take pride of place on Rohi and Anker's combined stand at the Asia event. "This project underlines our belief in creating unique solutions for customers," says Philipp Dahm, managing director of Rohi. "It is a great way to showcase our design talents and ability to translate any source of inspiration, however disparate, into a meaningful textile concept."

"Our goal is to inspire the industry. We wanted to test and demonstrate again our ability to work with a daring brief but still deliver a coordinated and considered response," adds Alexander von Fuchs-Nordhoff, sales director at Anker. "The project set out to challenge Rohi and Anker to think creatively and to deliver a smooth package of solutions relevant to our airline customers. Whatever the brief – we can translate it into







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he prolonged debate over whether wireless IFE will one day replace seatback screens is resolved, if you ask Patrick Brannelly, divisional vice president, customer experience, in-flight entertainment and connectivity at Emirates.

"There is a future for handheld IFE, but the premium option is to always have the embedded screen with content provided," he says. "I'm not saying that handheld is superfluous. There is a very good use case for handheld streaming in the aircraft. But when you watch a movie, would you rather watch that movie on your laptop or on a big screen?"

#### BYE-BYE TABLET

Brannelly also believes that IFE on a handheld PED (personal electronic device) becomes cumbersome to watch on longer flights.

"If you give someone a tablet device to watch content, after a while their hands get tired and they need to find somewhere to put it. Some people are actually making tablet holders to put on the seatback, and soon we're back where we started," he says.

Statistics from passengers onboard Emirates using the airlines's wi-fi connection reveal that many passengers are moving away from tablet devices and using their smartphones or phablets instead.

"The amount of people carrying tablets on a plane was three- to four-times higher three years ago than it is today," Brannelly says. "It's about 85% smartphones now."

As Brannelly sees the consumer trends in PEDs evolve, he believes that there is a strong case for using such devices as second screen options on connected aircraft. That's because inflight connectivity adds value beyond content viewing on the seatback screen, and enriches the entertainment experience of both handheld and seatback screens.

ABOVE: EMIRATES' ICE (INFORMATION, COMMUNICATION, ENTERTAINMENT) SYSTEM HAS MORE THAN 2,500 CHANNELS

ABOVE RIGHT: CONTROLLERS CAN BE USED AS SECOND SCREENS OR EVEN GAMING HANDSETS

BELOW: THE FIRST CLASS IFE DISPLAYS ON EMIRATES' NEW-DELIVERY A380 AND B777-300ER FLEET ARE NOW 32IN, RATHER THAN THE PREVIOUS 27IN The airline has found a high passenger adoption rate for its wi-fi offering, with more than half of passengers connecting at some point on flights over 12 hours.

"It helps that Emirates has made it

free to connect," Brannelly acknowledges.

But the second screen utility – being able to check reviews of a movie online, or keeping up with friends while watching a film – is attractive to flyers.

"With connectivity, we're merely scraping the surface at the moment," Brannelly says. "It will be absolutely a basic requirement. That's why Emirates has invested hundreds of millions of dollars getting connectivity onto our fleet. We will carry on, expecting to improve the quality of connectivity going into the future."

### "With connectivity, we're merely scraping the surface at the moment"





For dynamic streaming content delivery – programming sent to the passenger seat on demand from the cloud – connectivity is still too expensive, though Brannelly believes there will be some usage cases for it in future.

"In the future we will be remotely loading aircraft with new content. It doesn't make a huge amount of sense sending up *Gone with the Wind*, but the latest episode of *Game of Thrones* might be essential," he says.

For now, live television is a more effective way to offer something fresh and timely which passengers appreciate. "We have live television on about 95 aircraft today across the fleet, and we're adding three or four more aircraft. Primarily, it is used for live sporting events," Brannelly tells us. "But whether we load content at the gate or via satellite, the ability to have fresh IFE content on board is definitely the future. There will be massive investment in that over the next two to three years."

EMIRATES IS INCREASING THE SIZE OF ITS SEATBACK DISPLAYS IN ECONOMY FROM THE PREVIOUS 12.1IN (ABOVE LEFT) TO 13.3IN (ABOVE RIGHT)



#### HIGH RESOLUTIONS

Second screening aside, the main seatback screen has to be high quality, Brannelly says. Customers expect the more comfortable viewing experience of an airlinesupplied large screen displaying a large catalog of content.

Brannelly believes that future improvements to IFE displays will rely more on viewing quality than screen size. Emirates offers its customers screens up to 13.8in in the economy cabin, and Brannelly believes that's about the limit for a comfortable viewing experience. In the future, he believes, IFE suppliers should focus on making improvements to picture and sound quality, as well as on the user experience (UX) of the IFE menu.

"It has to be very usable. We're constantly trying to simplify it, without it being too simple. It needs to be intuitive," he says. "People are getting used to working these systems on the ground. When they get onto planes or they get to hotels, they expect similar methodologies.

### "The ability to have fresh IFE content on board is definitely the future"



around the world as the airline with the best IFE. This is the 12th year running that the airline has won the world's Best Airline Inflight Entertainment category at the Skytrax World Airline Awards, which recognizes airlines that deliver the best choice and quality of IFE.

July saw Emirates voted by passengers

From the choice and freshness of the movies, TV programs, music and games on offer, through to the availability and functionality of onboard wi-fi, this Skytrax award is about honoring those airlines that seek to deliver a fantastic

experience to their passengers. The results are based on a total of 19.2 million completed surveys covering 280 airlines, with flyers hailing from more than 100 countries. A proud Patrick Brannelly collected the award at the UK's Farnborough International Airshow.

The top 10 airlines in terms of IFE, in descending order, are: Emirates, Singapore Airlines, Qatar Airways, Turkish Airlines, Qantas Airways, Thai Airways, Etihad Airways, Lufthansa, Cathay Pacific, and Delta Air Lines.





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[The focus should be on] trying to get everything to a more standard way of organizing content, accessing content, playing content, etc."

#### ALL THE CONTENT

Airline UX could also benefit from improvements, according to Brannelly. Specifically, the way content is added to the system could be simplified.

"If you look at very mature systems, such as the Apple iTunes store or Spotify, record companies are able to push content into those systems quickly and populate them instantly. It can still take two months to update content on a plane. That's got to change. I think it will certainly change. It's just going to take another few years," he says.

Brannelly says that Emirates gets ahead of the content loading process by featuring a lot more content than passengers can consume, even on a series of flights.

"This is core to our product proposition in terms of IFE. You get an immense choice of content, more content than you could watch. The days of someone saying, 'I've watched everything, really have gone," he says.

Besides the Hollywood blockbusters people have grown to expect from airlines, Emirates also features a large selection of international content from more than 25 countries, in 27 languages, much of it subtitled in the most common languages for its customers.

#### UNIVERSAL ACCESSIBILITY

Another area for improvement is content dubbing and universal accessibility. Emirates, which early on identified the need for closed captioning for the deaf and hard of hearing, and audio-descriptive services for the visually impaired, has leapt ahead of the industry by finding its own solutions.



### "Standards were being talked about, but we couldn't wait so we did it our own way"

ABOVE: BY OFFERING MORE THAN 4,000 HOURS OF CONTENT, EMIRATES CAN COMPENSATE FOR SLOW CONTENT LOAD TIMES

BELOW: EMIRATES PROMOTES ITS IFE IN ITS MARKETING CAMPAIGNS



But Brannelly believes the industry must improve on content dubbing for the disabled, ensuring universal accessibility of IFE.

"Emirates was the first airline to have movies with closed captioning. That was around 2008. At the time, the standards were being talked about, but we couldn't wait so we did it our own way to get it on board. If you rely on closed captions because you're hard of hearing - and a lot of people do - you'll find 41 Hollywood movies with closed captioning on Emirates. We added audio description over a year ago. There are 26 movies with audio description," Brannelly says.

For all you need

to know about

closed captioning,

visit the IFEC

section of our

website

The airline has found that Hollywood can supply the assets Emirates needs to deliver universal content to customers, but television content is more complicated because the encoding standards differ.

"The reason for that is technical restrictions of the equipment on board the aircraft. They have to change,"

### "With better integration of connectivity, interactive IFE could be realized"

he says. "We need to be able to buy content and almost assume that it has closed captions and audio descriptions, to be more accessible. This is something that Emirates is pushing to do whatever is necessary to achieve, but it isn't easy because of the technology on board."

Brannelly acknowledges that systems have advanced considerably. "It is fantastic, when you think of it, to have a server on board an aircraft serving content to over 600 people at the same time from the same server," he says. But building systems which can readily address content accessibility needs to be a priority. "We have to have that. I think the industry is just going to get better and better."

Acquiring the right content requires Brannelly's team to keep a close watch on entertainment trends, keep close contact with content providers, and actively take part in content festivals, like the BBC Showcase. But customer feedback is also essential to that process.

"We read e-mail that comes to us from customers to make requests. It can be anyone. It could be a mother who writes to us, 'I'm flying in October with my two-year-old and I really need suitable programming,' and it's good to write back and say, 'Don't worry, we have about 10 or 15 channels with recent entertainment," Brannelly says. "You listen to your customers. If a customer writes to Emirates, we have systems in place that mean it will usually be read, if not within minutes, within half a day."

The latest IFEC

Systems will be on systems in Singapore in October.

See pages 118 and 138

BELOW: A PROUD PATRICK BRANNELLY ACCEPTING MULTIPLE SKYTRAX AWARDS AT FARNBOROUGH INTERNATIONAL AIRSHOW, INCLUDING WORLD'S INFLIGHT ENTERTAINMENT

#### INTERACTIVE ENTERTAINMENT

With better integration of connectivity, handheld and seatback systems, Brannelly believes the promise of interactive IFE, which could offer other airline services beyond entertainment, could be realized. But he says this is still a work in progress.

"It's complicated when you start integrating seatback systems into airline systems. That's not been done very well anywhere in the world yet. It has been done, but it's very difficult and clumsy," he says. "There is potential there, though, and I think the connected traveler, truly connected to the airline ecosystem, is the future."

#### A MORE GOLDEN AGE

Brannelly believes that in-flight entertainment is essential. It is something passengers look forward to, he states, which delivers brand loyalty.

"My job, at the end of the day, is to generate repeat business. To get people to fly on Emirates and say, 'That was fun, I want to do it again.' I need to drive loyalty and drive repeat business. You do that through delivering a great experience," he says.

Brannelly takes comfort in the feedback he gets from passengers, which point his team in the right direction.

He shares one letter he received from a parent recalling what their child most remembered from his journey from Boston to South Africa for a safari.

"When he got home he said the best two features of the holiday were the lions and ICE on Emirates [ICE – Information, Communication, Entertainment – is the name if its IFE system]. He sent me a message, and I thought that was wonderful. That goes to show, from a child's perspective, traveling is fun," Brannelly says.

Brannelly believes that this memorable inflight experience is the best way to revive the Golden Age of aviation. As he says, "For a child flying in 1955 it would have been an absolute adventure and something to look forward to. That's what we're trying to recreate."

#### **BUILDING ON SUCCESS**

Since winning the Best Airline Inflight Entertainment category at last years's Skytrax awards, Emirates has enhanced its ICE system with:

- 35% more TV channels
- 20% more TV box sets
- 35% more audio channels
- An enhanced selection of content for hearing and visually impaired customers with audio description and closed captions
- Content offered in 37 languages
- The expansion of live TV across its fleet, including live sports channels featuring high-profile sporting events, including this year's Rio Olympics



### Skycast Solutions Fuels the Tablet Revolution with the Latest in Portable IFE.

The most capable low cost portable IFE device is powered by Windows and flying high on Alaska Airlines.

Alaska needed a portable IFE solution that met the quickly changing demands of their customers and one that would integrate seamlessly with their connected cabin. They looked to Skycast, together with Microsoft, to develop a cutting edge device that packed robust capabilities along with a stunning entertainment experience.





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- Seamless Wi-Fi integration with onboard server or internet connection.
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- Complete program management available.



"The user experience is awesome and so easy and intuitive. This is truly the best inflight entertainment system we have ever used."

~ John Lisicich, Long Time Alaska Frequent Flyer

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### APEX EXPO 2016

THOUSANDS OF AVIATION PROFESSIONALS ARE DUE TO CONVERGE AT THE MARINA BAY SANDS IN SINGAPORE FOR APEX EXPO ON OCTOBER 24-27. MORE THAN 100 AIRLINES AND OVER 150 VENDORS ARE EXPECTED AT THE EVENT, ALL COMMITTED TO IMPROVING THE AIRLINE PASSENGER EXPERIENCE, HERE'S A TASTE OF SOME OF THE LATEST DEVELOPMENTS AND UPCOMING LAUNCHES THAT VISITORS CAN EXPECT TO SEE...



### Link up with these eight connectivity technologies

INFLIGHT CONNECTIVITY IS ONE OF THE - IF NOT THE - STRONGEST TREND IN COMMERCIAL AVIATION TODAY. CONNECT WITH THESE EIGHT TECHNOLOGIES AND YOU CAN HAVE SATISFIED PASSENGERS

STAND: 515

### 2KU THROUGHPUT DOUBLED

The 2Ku era is officially here. Gogo has launched 2Ku, its next-generation satellite-based technology, and it is now up and running with three commercial airlines.

Gogo's engineers are working to find ways to further optimize the technology to provide even more bandwidth to aircraft, including a recently introduced software upgrade that more than doubles throughput to more than 50Mbps to the seat using the current modem. As a new modem is introduced into the market next year and more HTS satellites come online, the performance will improve further still.

One of the key attributes of 2Ku technology is that it can be

upgraded remotely with little or no work required on board the aircraft. This operationally graceful technology path is the key to 2Ku's open architecture. Gogo expects to introduce many more enhancements as it continues to evolve the 2Ku product, which will help its airline partners stay ahead of the curve from a technology perspective.

Keep
checking our
website during
website for news
the Expo for news
updates

STAND: 525

### Aviation's information age

The aviation industry is in the midst of a new information age. By 2030, the number of active air transport and business aircraft is expected to grow to nearly 85,000 - with 80% of those equipped with new information-enabled systems. Faster and more secure air and ground networks, and more streamlined airline and airport operations, are also being created. These developments are making a seamless and integrated aviation ecosphere a reality.

Rockwell Collins is investing in a portfolio of systems and services, from informationenabled avionics and cabin systems, to global communications networks and services and airport information solutions.

The company is developing applications and services that leverage that global portfolio to bring new value to aviation customers by improving safety, maintenance, flight operations, the passenger experience and more.

STAND: 525 & 1634

### Jet ConneX validated

According to Rockwell Collins, in a series of recent network tests, the company validated the performance of Inmarsat's Jet ConneX high-speed broadband service for the business aviation market, as well as a number of its own value-added services.

Rockwell Collins is a valueadded reseller of the Jet ConneX service as part of its ARINCDirect offering. Jet ConneX, which is



being launched this year, will be powered by Inmarsat's next generation of Ka-band satellites.

"Jet ConneX is poised to provide business jet passengers with the highest inflight connectivity speeds available," says David Stanley, VP of ARINCDirect Cabin Services for Rockwell Collins.

New value-added applications and services available include an app that enables passengers to call and text on their cell phones, using their own number, anywhere in the world, using broadband service connections from the aircraft. Another feature is firewall security, which enables flight operations to filter onboard internet content according to passengers' preferences.

STAND: 434

### PANASONIC AND ARQIVA COLLABORATE ON WI-FI

Argiva, a communications infrastructure and media services company, has been selected by Panasonic Avionics Corporation to provide hosting, connectivity and teleport uplink services via Telesat's new highthroughput satellite (HTS), the Telstar 12 Vantage.

The multiyear contract will see Arqiva deliver a range of mobility services for Panasonic, including inflight wi-fi, which will operate round the clock from its teleport site near London. Signals are extended to the Panasonic Network over the Argiva's ArgNet managed core network, a 2.5Tbps resilient transmission network. Argiva's T12 Vantage 7.6m earth station is configured to access the entire Telstar 12 Vantage frequency range and multiple beams.

Todd Hill, senior director of global communications services at Panasonic

Avionics Corporation, comments, "As we launch our second-generation satellite communications services and bring the advantages of high-throughput satellites to our customers, we must ensure that our ground operations are also state of the art. Argiva has been a great partner for Panasonic since day one, and we are pleased to extend our partnership with them."

STAND: 814

### **Thales** enters EAN

Thales has signed a development and manufacturing agreement with AceAxis, a developer of wireless technology, to adapt AceAxis' remote radio head (RRH) design for use in a commercial aircraft broadband connectivity system.

According to the partners, the RRH will be a key component in the new complementary ground component (CGC) terminal, which Thales is developing and manufacturing for use with Inmarsat's European Aviation Network (EAN) high-speed inflight connectivity solution. EAN integrates an LTE-based ground network with satellite communications to provide aviation passenger connectivity.

"The CGC terminal we are developing will be fitted onto aircraft to provide a crucial link with the LTE-based ground network, and the system will switch automatically between satellite and terrestrial connectivity to provide a seamlessly optimized broadband service to passengers, wherever they are flying within Europe," says David Williams, procurement director for avionics at Thales

The EAN is expected to enter service during 2017, following completion of development work and system trials.

STAND: 1237

### Ku-band for developing markets

SES and Global Eagle Entertainment (GEE) have announced further Ku-band capacity agreements intended to help usher in the next-generation connected airline passenger experience across established and developing markets around the world.

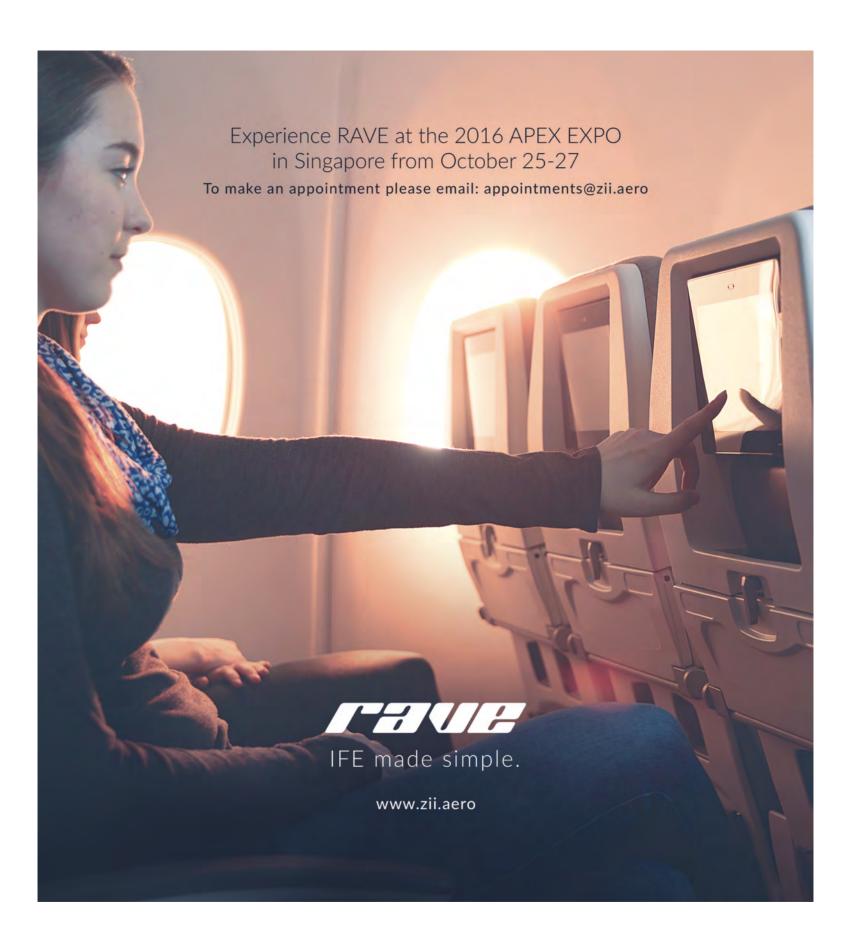
These latest agreements between GEE and SES secure multiple transponders of wide-beam Ku-band coverage aboard SES's NSS-12 and AMC-1 satellites to meet what the companies say is "fast-growing passenger and airline demand for more connectivity across India, Central Asia, the Middle East and North America".

GEE is now tapping 12 SES satellites to put together a mix of Ku-band wide-beam and upcoming Ku-band high-throughput satellite (HTS) spot-beam coverage to meet various levels of inflight connectivity demand along travel routes around the globe.

"GEE is in the midst of a strategic expansion of our global inflight

connectivity network to meet the growing and evolving demands of airlines and their passengers for a new wave of high-speed wi-fi-based services," says Dave Davis, CEO at GEE. "Together with SES, GEE continues to proactively add significant levels of bandwidth over established inflight connectivity markets, as well as developing regions such as Asia and the Middle East where passenger demand is accelerating the deployment of connected aircraft over new routes."







ZODIAC CABIN Connected Cabin Division



STAND: 739, 814 & 525

### Airbus teams with Thales and Rockwell Collins for connectivity

Airbus has selected Rockwell Collins and Thales as lead suppliers of highbandwidth connectivity (HBC) systems for the A320, A330 and A380. Under the terms of the agreement, airlines purchasing Airbus aircraft can select HBC from Rockwell Collins or Thales to meet the growing demand for high-speed connectivity, as both line-fit and retrofit systems.

STAND: 1451



The IFEC market will be worth US\$5.8bn by 2020 Source: MarketsandMarkets

### SIMPLIFIED IFE

Many airlines are rethinking their onboard solutions due to the costs of infrastructure, while also working to adapt to best practices and new technologies from the consumer electronics industry. In particular, connectivity offers a big opportunity to deliver innovative applications and create revenue streams.

Using the previous generation of management solutions, airlines have had to manage and update their premium IFE content manually at

their premises. Early Window movies delivered by Hollywood studios require MPAA-approved workflows and IT infrastructure, which are cost-intensive to build, and technically demanding.

At APEX Expo, Axinom will present a new set of products that empowers IFE service providers to create, manage and maintain the next generation of wireless IFE, e-commerce and connectivity services in a simplified and cost-effective and secure way. Axinom's CMS system ensures scalable handling of all types of content and services on the ground, while its CDS product offers innovative ways to deliver, pull and synchronize content, data and services intelligently between on-ground and onboard systems. Axinom DRM enables secure delivery to passenger and crew devices on board. The company's products are designed to run at customers' premises as well as in cloud data centers, enabling a global scale of service delivery.



# AN EYE TO THE FUNCTION OF THE

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# Content to keep passengers happy

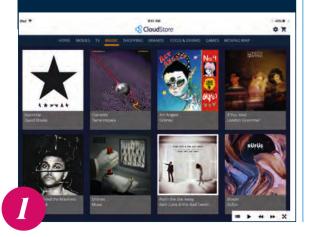
HAVING GREAT IFE CONTENT IS AN EXCELLENT WAY TO ENHANCE AND DIFFERENTIATE A BRAND EXPERIENCE. THESE NINE OFFERS WILL KEEP PASSENGERS OCCUPIED AND ENTERTAINED

STAND: 926

# BYOD REVOLUTION

Tigerair Australia recently deployed CloudStore wireless IFE from Arconics to its international fleet. The CloudStore app enables passengers to enjoy free and paid content on their own devices and it brings a range of technological innovations to the IFE experience. The app works on any certified server hardware, so it can easily replace an existing solution that is underperforming. It comes in at just 3Mb, making passenger download fast and easy. The app features an easily customizable user interface and can operate as a standalone app, or be embedded into an airline's existing passenger app.

CloudStore W-IFE was certified and flying on the Tigerair Australia fleet in just 12 weeks from the signing of the contract. CloudStore's backend is designed for ease of use, speeding up the content cycle from weeks to days, and features instant access to content from the six biggest Hollywood studios, with DRM already arranged.



STAND: 1627

# Prepare to be Wowed

Portable IFE specialist Bluebox is celebrating 10 years of thinking inside the box – and a product launch. When they began, the company founders had no preconceptions about how content should be delivered. After four years optimizing mobile PC devices for secure IFE hosting, when the iPad emerged in 2010, a new chapter began for Bluebox.

They worked with Apple and Hollywood to protect Early Window movies and make the first Bluebox Ai iteration a secure mobile platform.

Then came Bluebox Hybrid, which offered wi-fi plus EWC-enabled iPads, for a flexible service that didn't require embedded screens or cabin wiring. The latest innovation, Bluebox Walk-on wiFE, made things even simpler by enabling hybrid trials with no installation costs or STC concerns.

Bluebox Wow is a new product making its debut at APEX. In a way, it's just more of the same – but with 2016 technology that is so much more powerful.

STAND: 427

#### PERSONALIZED ENTERTAINMENT

The Spafax Group will be sharing a range of comprehensive content-based solutions, including its lcon suite of digital products. Icon provides airlines with a platform that ties together entertainment, media and advertising with the aim of creating meaningful customer engagement.

Icon Profile is a Netflix-style entertainment platform that recently made its live debut with Lufthansa. The platform creates personalized entertainment recommendations for passengers using viewing algorithms. Passengers can browse the IFE catalog, read the inflight magazine and create and share playlists. Icon Profile integrates with a variety of fitted IFE systems, and the Spafax digital product team has a road map in place to deploy additional features including device pairing and passenger login.



3





# BRING INNOVATION ON BOARD





**CONNECTIVITY SYSTEMS** 



**DIGITAL MEDIA SOLUTIONS** 



**CONTENT SOLUTIONS** 



**OPERATIONS SOLUTIONS** 





STAND: 1627



#### Print media is highly valued by premium passengers on long-haul

# PRINT MEDIA IMPORTANT FOR LONG-HAUL FLYERS

Typical premium long-haul passengers are highly engaged with current events and use print media to stay informed at the airport and during flights. That's the headline finding of an authoritative new study of media consumption among US travelers, commissioned by Dawson Media Direct (DMD).

The survey also reveals that the so-called 'digital generation' is marginally more engaged than its elders, with "staying informed" cited as more important to travelers in the 21 to 39 range than to those aged 40-plus.

To learn exactly how those key first and business class passengers use print and digital news content, in daily life and in flight, DMD appointed the independent specialist Atmosphere Research to carry out an online survey of premium US fliers, categorized as individuals who had recently taken three fully paid premium round trips between the USA and long-haul destinations overseas.

About 400 surveys were completed and analyzed, revealing print media to be tangibly more important to them on

a long-haul trip. The survey found that 77% of respondents saw it as a key time to read the press, and 54% read some print media at the airport or on board. Premium fliers also read more printed press during air travel, with those spending over an hour reading newspapers up by a third compared with everyday behavior.

The study affirms that DMD's provision of print and digital publications to airlines is delivering the media its premium end-user customers expect and value.

STAND: 941

#### Downloadable entertainment

Adaptive is working to reinvent IFE, enabling airlines to contact with their passengers at every stage of their journey. Before a flight, passengers can download their favorite newspapers and magazines directly from the entertainment section within the airline's own app thanks to the integration of Adaptive's SDK platform.

At the airport lounge, the passenger can enjoy dedicated content on preloaded tablets.

On board the aircraft, passengers can read the content they downloaded on their own device prior to departure, read an e-book, or watch a movie off-line on airline distributed tablets with preloaded content.

STAND: 931

# Second live sports channel for IMG

IMG has launched a second live sports channel for the inflight market, to complement its Sport 24 channel. Sport 24 Extra provides passengers with a choice of premium live sporting events to watch during busy periods in the sporting calendar.

The channel is an extension of the exclusive relationship between Panasonic and IMG for the provision of Sport 24. Sport 24 is the world's only live 24/7 sports channel for the airline industry and already broadcasts Barclays Premier League, Bundesliga, UEFA Champions League, Formula 1, NBA, NFL, Ryder Cup, golf majors and tennis grand slams. Roll-out of Sport 24 Extra will begin on Emirates and Turkish Airlines, with other carriers to follow. Sport 24 is currently available across

Richard Wise, SVP at IMG Media, says, "IMG's ongoing collaboration with our partners at Panasonic enabled us to develop Sport 24 Extra, which meets the growing desire of passengers wanting to see more premium live sport on airlines. We have such an outstanding portfolio of premium sport and the new channel will enable passengers to select from top events taking place at the same time."

Panasonic's eXTV television network uses the company's eXConnect inflight Ku-band communications service, including the same Ku antenna and onboard components, to deliver television programming to passengers during flight. It provides live, uninterrupted content to aircraft flying all over the world, even over oceans.

THE TABLET CAN BECOME A VALUARI FLINK RETWEEN AN AIRLINE AND ITS PASSENGERS



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STAND: 1120

# Monetize your IFE platform

Passengers can get a sense of their destination during their flight with interactive destination guides from PXCom, a company that specializes in enhancing the passenger experience while generating ancillary revenues.

New features, available for tourism stakeholders, enable better integration of the onboard content in their own marketing strategies, leveraging their interest in this innovative media.

Airlines can also enhance their onboard digital inflight advertising with the IFE-dedicated ad-server. Airline teams work with PXCom to define the right balance between optimizing the passenger experience and generating potential additional revenue. PXCom's partners provide the advertisements, which operate on a revenue-share business model.

Other recent improvements to the company's systems include content such as thematic strolls (romance in Paris, Milan fashion, and the Romanov trail in St Petersburg.

More than eight airlines and 200 aircraft are currently flying with the company's technology.



A schedule of Expo networking events will be announced in

due course

PXCOM'S SYSTEM CAN GIVE - AND LOCAL BUSINESSES A LITTLE MARKETING AND PROMOTION

STAND: 1729

# LIGHTWEIGHT, LOW-ST WIRELESS IFF

More than a quarter of the world's population owns a smartphone or tablet, and according to eMarketer this proportion will grow to onethird by 2018. As more devices are brought on board aircraft, airlines are beginning to embrace their use during flight and many now even allow them to operate in transmission mode. This shift in attitude presents opportunities for IFE.

Phitek has recognized this progress with its new wireless content delivery solution for PEDs, a hardware and software package designed to deliver passenger content provision for low-cost carriers or network airlines looking for an effective alternative to full-blown IFE systems.

Using the system, passengers can watch movies, play games, purchase services and duty free, and view inflight magazines on their own devices without the need to connect to the internet. For airlines, this means substantially less weight and aircraft power use, as well as a costeffective and revenue-generating means of entertaining passengers.

The system's network architecture is designed to enhance network redundancy and media propagation, offering reliable content streaming, cost-effective installation, ancillary revenue generation, streamlined operations, and response to changing passenger entertainment requirements.

STAND: 1142

# A little learning

Pilot Productions, a producer of travel and adventure programming, will be unveiling a slate of new documentaries, including Travelling in the 70s, The Story of Spice, The Story of Beer, and Tough Boats.

Tough Boats is a series featuring epic boat journeys across the planet, often in the most challenging environments on Earth. Along the way the team encounters incredible histories of sunken ships and rides in indigenous boats. Also explored is the technology of boat travel, to understand how it has been adapted to meet our survival.

The Story of... is a new lifestyle series to set sail on voyages to discover the histories and mysteries of our most commonly consumed products such as coffee, tea, chocolate, cheese, beer, beef, sugar and spice.



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#### **TEAC CORPORATION**

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# Sets appeal

AN AIRLINE MIGHT HAVE THE BEST IFE HARDWARE AND CONTENT, BUT THE EXPERIENCE CAN BE LET DOWN WITH INFERIOR HEADSETS. THESE THREE LAUNCHES WILL BE A SOUND INVESTMENT

**Magnetic innovations** 

Phitek is proud to once again be sponsoring the APEX Monday Awards Ceremony held the evening before the Expo. The company will be offering guests at the awards a chance to win a pair of its premium noise-canceling headphones. "We will present each guest with a small gift, which the guest must take to the Phitek stand to see if they have won," says Chris van der Loo, product and marketing director at Phitek.

While visiting the Phitek stand, guests will have a chance to discover Phitek's latest innovations in noise cancellation. audio enhancement and other electronic touch points in the aircraft cabin. "We are extremely proud to have achieved Part 21G and AS9100 certification; a recognition of our technical expertise in the aviation market. Achieving these certificates gives us the opportunity to offer customers our magnetic connectors, which help solve a problem many airlines have with headphone jacks," says Roy Moody, Phitek chief executive.

Like this headset? It could be yours if you attend the APEX Awards STAND: 1623

To ensure product quality, Long Prosper, the exclusive licensed supplier of Serenity S1 headphones, has invested in new factory equipment that includes Swiss- made computerized test equipment and production systems.

The Serenity headphone design was conceived by world-renowned industrial design firm Designit, based in Germany. Their streamlined and articulating form-factor are comfortable for passengers on long-haul flights, while for airlines, the rotating cups fold flat for compact storage on board and the flat cable provides convenience.

The S1H model – developed exclusively for Panasonic HD-Audio – takes this specification further by integrating advanced digital features, including wide-band voice telephony and digital surround sound.

Serenity headphones are constructed using advanced materials, selected to improve product quality and reliability, including strengthened glass-filled plastics and aluminum caps that are cool to the touch.

STAND: 329

#### HIGH-PERFORMANCE HEADSET LAUNCH

Linstol has developed a new high-end noisecanceling headset for premium cabins, which will debut at the Expo. Key characteristics of the headset's development were audio performance, passenger comfort, affordability and a design developed specifically for the airline cabin environment.

The headset has customization options and a variety of finishes. The sleek earpiece alone features seven elements designed for material and color customization.

The 275 headset is also claimed by Linstol to be the most comfortable headset available for extended use during flight.

ceremony

Sound performance is ensured by using a speaker housing that has been designed to accommodate a very high-quality driver and high-end speaker unit. By harnessing these technologies, Linstol says the headset can offer a 20dB noise-canceling effect and a 25% better noise-reduction performance compared with standard noise-canceling headsets.

> THE MAGNETIC CONNECTOR IS A MAJOR SELLING POINT OF PHITEK'S HEADPHONES





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# Power play

AS MORE AND MORE PASSENGERS USE THEIR OWN DEVICES ON BOARD. IN-SEAT POWER IS BECOMING AN INCREASINGLY DESIRED AND EXPECTED OFFER. THESE THREE EXHIBITORS CAN PUT POWER IN YOUR HANDS...

STAND: 1414

# **Astronics** powers up in Asia

Astronics Corporation is doing rather well in Asia, having recently announced that the newest Empower in-seat power system from subsidiary Astronics Advanced Electronic Systems has been selected by three airlines in Asia for installations scheduled through the 2017 to 2021 timeframe. These awards will place in-seat power in more than 230 additional aircraft serving the Asia-Pacific region.

The installation deals, valued by the company at more than US\$16m, will see the systems fitted in Boeing 737, B737-800, B737 MAX, Airbus A320 and Bombardier CS300 aircraft.

This system includes various Empower configurations, including 110V 60Hz as well as high-power (2.1A) USB for use with laptops and other smaller personal electronic devices, such as iPads and smartphones.



POWER AND DATA OUTLET IS HIGHLY RELIABLE

STAND: 1745

# PAYMENTS AND CHARGING

IFPL has integrated products into the airline seat to enhance access, ergonomics and aesthetics for the passenger. Among the key elements developed by the company to be demonstrated in Singapore, are a new low-cost, low-weight USB power solution and a concept for an armrest integrated with IFPL innovations including inductive charging, 'Charge 2 Charge' and personalization solutions.

The company also offers NFC payment technology, with the latest advance being the ability to make high-value, PCI-compliant transactions via its new

'pin on-screen' technology, which it claims will be a "game changer" in making payments on board.

IFPL will also showcase the latest Breakaway Dual MagSignal audio jack, designed to help eliminate the problem of broken headset jacks and extend the life of airline headsets. The company will also demonstrate its reversible USB-A 2.0 power and data outlet, claimed to deliver 10 times the current industry standard of reliability. IFPL's latest USB 3.0 and USB-C outlets increase data speeds and power compared with the USB 2.0 standard.

STAND: 1124

# Pull down for power

The Solar Eclipse technology being developed by B/E Aerospace is a simple but potentially very useful idea for aircraft that do not already have in-seat power. A thin solar cell foil is inserted into each window blind, which provides power to two USB ports in the window surrounds, enabling passengers to recharge electronic devices during the

flight – even tablets. The design is weight-efficient as it does not require many wires and cables.

The system is still under development, including ideas for routing power to center seats, but the manufacturer is confident about gaining FAA approval and sees big potential in the regional jet market.















#### ZIM FLUGSITZ delivers seats for maiden flight

On 06 July 2016, the maiden flight of the first Bombardier CSeries took place at Zürich Airport. ZIM Flugsitz from Markdorf (South Germany) designed the seats for this new type of aircraft.

Before the CS100 by SWISS could take off, plenty hours of development had taken place. ZIM FLUGS-ITZ worked on the optimization of the interior furnishings along with the seats. The CS100 has 125 seats, the CS300 has 145 seats in the Swiss configuration. The ideas conceived by the airline were clearly defined: A new seat was supposed to be installed to reflect innovation and modern sophistication in a contemporary design. With regard to the use for short-hauls, the seat should offer maximum passenger comfort with a small amount of

spacing between seats. ZIM FLUGSITZ could offer a seat which has been developed by the ZIM engineers according to this requirement. This seat will be installed into the whole Swiss Bombardier fleet of 30 new CS100 and CS300 to be taken into service within the next few months. The selected seat is the EC00-ZIMunique, a seat that is impressive due to its light weight and maximum level of legroom. This was achieved by using new materials and by means of a new table mount consisting of only a single support arm. Using the table's patented single-arm attachment, more space between the seat rows is established, thereby resulting in optimised seating comfort. ZIM Flugsitz won the Crystal Cabin Award in 2014 for this specially developed seat concept.

The EC00-ZIMunique completes the series of the Southern German manufacturer's comfortable and lightweight seats. With EC01-ZIMflexible, the company is already offering an innovative economy-class seat for long hauls that is distinguished due to fully integrated entertainment electronics. The premium-economy-class seat, PC01-ZIMmagic, is setting new standards in the face of sophisticated demands.

For long-haul flights, the seat is well appreciated by Lufthansa, Singapore Airlines, French Blue and other airlines. The BC01-ZIMluxery offers a business-class seat for short-haul flights and is already being used in Air Transat's Airbus A300 and A330 aircraft and in the Boeing 717 aircraft belonging to Qantas.

The owner-run company, ZIM Flugsitz, is focusing on individually developed seats for airlines and aircraft manufacturers. Thus, economy, premium-economy and business-class seats for aircrafts from Airbus, Boeing and Bombardier are manufactured. Airlines such as Thai, Japan Airlines, Lufthansa, Singapore Air-lines, AZUL and SWISS appreciate the engineering performance and ZIM Flugsitz's high standard of quality. The company's situation concerning orders is going accordingly well. In order to expand production capacity, a new factory is going to be put into operation located in Schwerin (North-East Germany) during the spring of 2017. With the second production site not being far from Hamburg, the company can respond to customer requirements in an even more flexible manner.

# PRODUCTS & SERVICES

#### **Contents**



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## LIVE SPORTS COVERAGE

The launch of IMG's second live inflight sports channel means traveling fans now have more viewing options than ever before

s the dust starts to settle on a hectic summer of sport in 2016, it is worth reflecting that many air travelers were able to keep up to speed with every major highlight from Rio, Wimbledon, Royal Troon and beyond, as it happened.

Fans were given more choice when it came to watching those events in real time, as access to live sport in the air became even greater. Earlier this year, IMG launched a second live sports channel for the inflight market to complement its Sport 24 channel – the only 24/7 live sports channel produced exclusively for airlines.

Sport 24 Extra became available at the beginning of June, and provides passengers with a choice of live events to watch during busy periods in the sporting calendar.

As a result, sports fans flying on enabled airplanes were able to consume over 200 hours of live action from the Rio 2016 Olympic Games and all 51 matches of UEFA Euro 2016, with the additional channel giving viewers a choice of which game to watch in the final round of group fixtures, when both matches kicked off at the same time.

In addition to this, there was also live action from a host of other sporting events including Wimbledon, Formula 1, both golf majors in July – The Open 2016 and the US PGA Championship – and the start of the 2016/17 Premier League and Bundesliga seasons.

Sport 24 is currently available across 11 airlines, while the roll-out of Sport 24 Extra began on Emirates, Lufthansa and Turkish Airlines. Potential monthly audiences regularly reach some six million viewers.

"We deliver an unrivaled inflight sports experience," says Richard Wise of IMG, which owns and operates the



channels. "We have been producing Sport 24 since 2012, but our ongoing collaboration with our partners at Panasonic has now enabled us to develop our second channel to meet the growing desire of passengers wanting to see more premium live sport on airlines."

With the Ryder Cup, US Open Tennis and UEFA Champions League set to hit the channels' schedules during September, air travelers can now enjoy more live sport than ever before. And where NFL Sunday Night football goes up against action from the NBA, or when the UEFA Champions League throws up more than one intriguing clash on the same night, there is now a solution.

"The Olympic Games certainly made those airlines carrying the live feed a more appealing proposition to passengers when choosing their travel," adds Wise. "But it doesn't stop there. We will continue to show the biggest sporting events from across the world. As timelines are crossed, so viewers will invariably be able to go from watching one live event to another – and where they clash, well, we now have the ability to give them the option."

As well as producing the Sport 24 channels, IMG provides more sports programming to airlines than any other distributor, each year supplying over 600 hours of programming to more than 50 international airlines.

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## CURTAIN CALL

When printed curtains also serve as display ads in aircraft cabins, curtains can pay for themselves

or more than 20 years, Lantal has served the aircraft market with curtains. This experience makes Lantal a global leader when it comes to aircraft soft interior projects. Innovation has always been a crucial part of Lantal's heritage. Creative thinking, in combination with the use of new technologies, has generated novel ideas in the design and functionality of textiles, and even in new business models for curtains.

Lantal's 100% polyester, customized and ready-to-fly printed blackout curtains are not used simply as class partitions. In fact, they serve as attractive cabin outfitting elements and have evolved into smart and functional interior products for the aircraft industry.

With these printed blackout curtains, Lantal has created a new procurement model for airlines, as cabin curtains can now be purchased by third parties for advertising purposes. This novel marketing idea could enable the time and financial investments involved in selecting and ordering curtains to be outsourced. Because the curtain surface can be custom-printed, businesses have a new way to advertise their products and services in aircraft cabins.

The printed blackout curtain offers a multitude of design, form and color options. Both sides of the curtain can be printed with any high-resolution photo motif. Additionally, given the infinite spectrum of design choices, the curtain can emphasize and enrich the airline's individual cabin interior and livery concept.

Flight destination advertising is another possibility. Beautiful pictures of the destination country can create a vacation ambiance on board so that passengers can look forward to their holidays during the flight. As another

EXIT Lantal is also well known for its Pneumatic

example, the printed blackout curtain can also be used to attract attention to special sports events or cultural and seasonal highlights at the getaway destination. Furthermore, travel groups can be personally welcomed aboard with tailored curtain designs.

Lantal's fully customized, ready-tofly printed blackout curtains are also available with steam-set pleats. The optimized opaqueness and noise abatement functions, together with the quality of the curtains, enhance passenger comfort and well-being.

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ABOVE: THE CURTAINS CAN BE PRINTED WITH ANYTHING FROM A DESTINATION SCENE, TO OVERT PRODUCT ADVERTISING

Comfort System

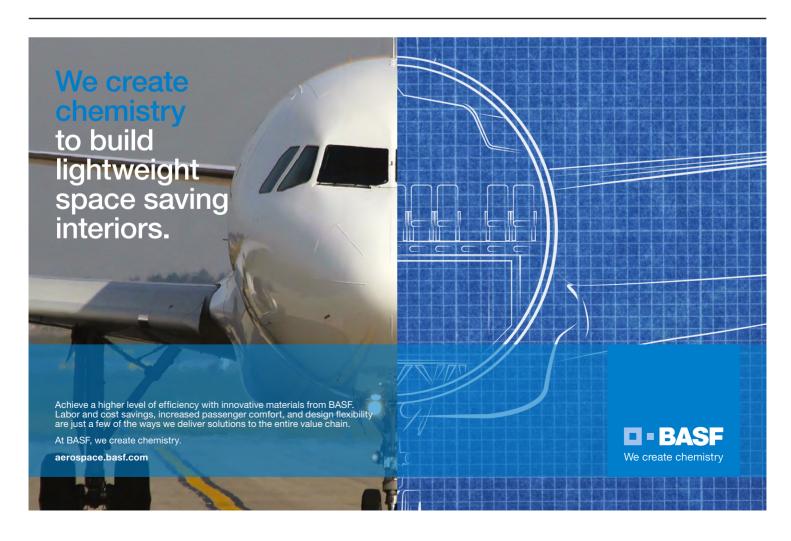
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and have a proven track record of millions of air miles.



#### VARIATIONS ON A THEME

Some cabin designers may think their ideas fanciful, but the materials and technology to bring their ideas to life do exist

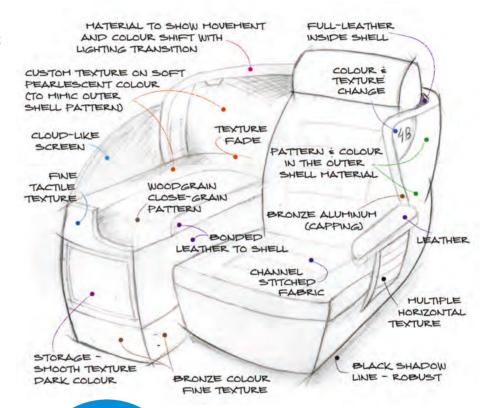
n aircraft interior design, a movement of thought is gaining momentum. Designers and project teams are well aware of the limitations present when designing seats that require stringent regulations to be met. A seat can contain dozens of components and as many different materials. The more sources that provide the components, the more complicated and arduous passing design reviews becomes.

Pictured to the right, we see a designer's musings while sketching a seat design concept. There are a lot of different finishes by most standards. Would a score of different surfaces made from one material work? Evidently the designer thinks so, but is it possible? Today's material suppliers are saying, "You bet it is."

Now let's answer the designer's question: "I have all these ideas. How can I make it happen?"

First, you need the right material. Thermoplastics offer designers a just-tapped world of possibilities. Using the same thermoplastic sheet product to achieve a variety of different surfaces delivers a more cohesive fit and finish. Next, combine the inherent buildability of thermoplastics with the right technology.

Pressure forming the same thermoplastic sheet product in the same color can achieve high gloss in one area and matte finishes in another within the same part, and also enables the seamless transition from one surface finish into another. Texture introduces different subtle hues of the same color and can vary in intensity for a tactile and



Sekisui SPI
will be exhibiting
at Aircraft Interiors
at Asia 2016.
Expo Asia 2016.
See p125 for
details

ABOVE: THIS SKETCH OF A SEAT CONCEPT FEATURES 21 MAJOR TOUCH POINTS FOR COLOR, TRIM AND FINISH color movement experience. The patternin-product on the designer's sketch pictured (outer shell), which has been replicated with an embossed texture (pearlescent inner shell), is also a reality in the industry.

The materials and technology are here. All it takes is the vision to make it happen.

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### SIT TIGHT

The high-density cabin configurations available for the Airbus narrow-body family are attracting low-cost carriers. In response, Geven has created seat designs optimized for this market

n perfect step with the ongoing trend for increasing cabin density, Italian seat supplier Geven is now supplying its customers with seating for the new increased passenger-count cabins on the Airbus single-aisle family.

For example, for A320s, Geven is providing low-cost carriers including VivaAerobus, Volaris, Vietjet and Spring Airlines with seats for the new 186-pax cabin configuration.

Geven's longest-standing partner, Wizz Air, has also ordered seats for its A321s, which have a maximized passenger count of 230. Wizz Air is the largest low-cost airline in Central and Eastern Europe, and Geven expects their relationship to last well into the future.

Over the past six years, more than 50 A320 shipsets of Geven seats were delivered to Wizz Air, for a total of about 4,000 pax places. As a sign of the trust given to Geven, the partnership was consolidated recently when Wizz Air placed a further 18 firm orders for its new A321s, plus options for another 75 Airbus narrow-body aircraft.

Wizz Air's new A321 aircraft, expected to be delivered by June 2017, will have the now very popular high-density configuration of up to 230 pax, and will be operated on the airline's most popular routes. The highly efficient cabin configuration will reduce the airline's unit



costs considerably, enabling a very attractive low fare offer and creating more opportunities for passengers to find seats on the flights they want.

The partnership between Geven and Wizz Air began seven years ago with the delivery of the first shipset of Geven Slim HD seats. These were installed on aircraft MSN 3807 and delivered to Airbus in January 2009. In the years that have followed, the two companies have developed a strong relationship.

After the Slim HD order, Wizz Air went on to order the new Piuma seat, trimmed



GEVEN AND WIZZ AIR'S RELATIONSHIP BEGAN WITH THE SLIM HD (LEFT), FOLLOWED BY THE PIUMA (RIGHT)

in the airline's unmistakable pink and burgundy leather upholstery.

For the recent refresh of the Wizz Air brand, including a complete restyling of the livery, and with the low-cost carrier celebrating its 11<sup>th</sup> anniversary, Wizz Air has chosen a new version of this seat, which will debut on the A321 family.

The Piuma with the new pink and electric blue trim and finish, dedicated to the first A321 – MSN 6848 – was delivered to Airbus on September 18, 2015. The aircraft started its routes in Europe in November 2015.

All in all, many of Geven's customers will now be creating more seating slots for their passengers, which will also offer comfort and living space. Everyone will be sitting tight and sitting pretty, from Eastern Europe and Asia to Mexico!

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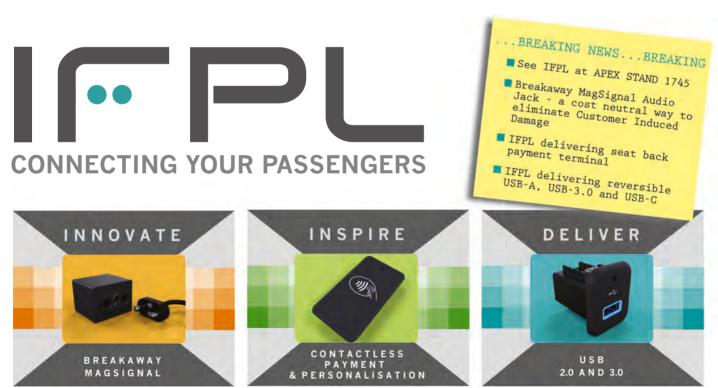
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#### FORWARD MOTION

Astronics PGA's new avionics control unit for motion systems is ready to fly

ver the past two years,
Astronics PGA Avionics has
invested in the development
of a new optimized seat motion control
unit with an unprecedented number of
features housed in a highly compact unit.
The final product, named the ECU Gen VII,
is complete and ready for installation,
having reached and surpassed all the
company's targets in addition to passing
all the latest Airbus and Boeing tests.
It is already certified for the latest A350
family and is even ready for the incoming
B777X model.

At its final size and weight, the ECU Gen VII has a better form factor, more functions and better performance than the preceding unit, and was designed to meet the needs and requirements of end users well into the future. Weight reduction is also impressive, with a saving of 650g from the current product family, down from 1.85kg to 1.2kg. Overall weight and volume are down 30%, which facilitates maintenance and integration into even the most demanding of seat frames, reducing service costs per flight hour.

An improved power supply technology was designed that allows in-depth diagnostics to reduce service times for maintenance teams, although Astronics PGA Avionics has a record of nearly perfect service reliability, with a rate of 99.9% for electrical seats.

Due to its unique hardware design, the setup for all power and drive control resources for the ECU Gen VII is fully customizable through the programmable software. This design makes the ECU Gen VII compatible with any type of seat configuration and adaptable to any seating electrical options.

Furthermore, the company is committed to protecting the environment by designing new products that help



make flying cleaner. Its development team has enlisted environmental design experts to bring more environmentally friendly designs to the next generation of products. The ECU Gen VII was developed with special consideration for the principles of sustainable development and environmental impact. Most notably, its reduced weight contributes to lower fuel consumption for aircraft.

In developing the ECU Gen VII,
Astronics PGA Avionics leveraged its
experience as a long-time provider of
aircraft motion systems for all major seat
manufacturers, as well as its record of
meeting the requirements of all major
airlines and compliance with the
strongest Airbus and Boeing certifications
and regulations.

The combination of lower weight, compact design, increased functionality, easier maintenance and lower service costs makes the company confident that the ECU Gen VII will soon become the best-in-class product for aircraft seating motion control.

The ECU Gen VII will also add to the reputation of Astronics PGA Avionics as an innovative designer and builder of in-seat motion, lighting and in-flight entertainment systems suitable for use in commercial, VVIP and business jet aircraft.

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### NEW FACE

The CFyO2 economy class seat from ComFly is now in the process of certification and will be ready at the end of 2016

uring the development of the CFy02 long-range economy class seat, Italian seat manufacturer ComFly investigated the possibilities of applying new mixes of materials such as carbon fiber, titanium and magnesium for the primary structure, and new, multi-density foam chemical compositions that could reduce weight and still meet flammability requirements. ComFly has also entered into new partnerships to work on new materials such as self-cleaning leather.

The company is also evaluating an ergonomics idea that involves the study of how passengers' postures change during flight. This work is supported by an Italian university, and the results of the research will be ready at the end of September, together with a prototype of a revolutionary seating concept that adjusts to the shape of the human body for improved comfort and health.

ComFly's design and engineering department is also working on a new premium business class seat – named the CFb01 – a demonstration version of which will be ready for Aircraft Interiors Expo 2017. The ComFly team is working with an airline (ComFly's potential launch



customer), which is also asking them to develop a bespoke business class. The focus of ComFly is to create a seat that works like a dream for its customers – and their passengers as well.

Thanks to the experience and support of partners such as GetShaped and other Italian companies, ComFly is confident its products will be defined as being advanced, innovative, comfortable and ergonomically perfect.

In the meantime, a new industrial site is under construction and a new, innovative, efficient and eco-friendly building will become the company's

ABOVE: THE CFYO2 DESIGN FEATURES A MIX OF MATERIALS TO OPTIMIZE COMFORT AND MINIMIZE WEIGHT

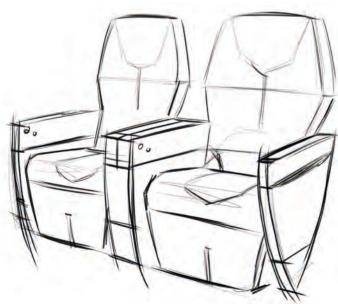
LEFT: A FUNCTIONING MOCKUP OF THE CFB01 BUSINESS CLASS SEAT WILL BE AVAILABLE TO TRY OUT AT AIRCRAFT INTERIORS EXPO 2017 home in Latina. The development of this site is a major, fundamental step for ComFly, and will help it build a culture of competence and professionalism, skills that are crucial to aircraft seating activity.

At Aircraft Interiors Expo 2016, ComFly introduced a conventional seat design that was simply reliable and comfortable. The company took this cautious approach because it was young and a newcomer to the market. However, following that conservative introduction, ComFly believes that it is now time to demonstrate its innovative thinking and competence.

ComFly has also made a strategic alliance with an aeronautical partner – which will be formally announced in the coming months – that will support the company in accelerating and strengthening the process of introducing its seats into the market. The company expects that the alliance will help it to have the CFyO2 seat certified and ready for installation within six months – and that it will reduce delivery times.



To request more details from ComFly visit www.ukipme.com/info/aim







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### ANNIVERSARY PARTY

Wollsdorf Leather has a lot to celebrate this year, including its 80<sup>th</sup> anniversary, a successful product range, and CO<sub>2</sub>-neutral production

his year sees Austrian tannery Wollsdorf Leather celebrating the 80th anniversary of its founding in 1936. Over the years the company has established itself as an experienced and successful producer of high-quality leather for the aviation, automotive, furniture, train and marine industries.

The leather products created by Wollsdorf Leather are as individual as its customers' wishes. As a globally recognized supplier of high-quality upholstery leather for the aviation industry, the company is able to meet the latest technical requirements for customers, with a highly flexible production process. Wollsdorf Leather is also happy to develop individual leather solutions jointly with customers.

In the field of aircraft leather, Wollsdorf Leather is an extremely competent and reliable partner for many major airlines. Being a vertically integrated tannery, Wollsdorf Leather enjoys the benefit of having control of all aspects of production, from raw hides up to finished leather. Various leather articles for the aviation markets are offered, including a lightweight bovine leather called Amba Eco, which has been used successfully since 2010 on more than 140,000 economy and business class aircraft seats with various airlines and seat manufacturers around the world.

Amba Eco combines the benefits of reduced weight and ease of maintenance. Ease of maintenance can be credited to the company's SPS anti-soiling finishing system. Amba Eco, with a weight of less than 650gsm, is up to 40% lighter than standard aviation leather and yet retains 100 % of its structural integrity.





In addition to full leather hides, the company produces cut parts and stitched dress covers at its brand new state-of-the-art cutting and sewing facilities in Varaždin, Croatia and in Fuzhou, China. A turnkey solution is offered, including the relevant certifications.

With production facilities and sales offices in Europe, the USA, Hong Kong, China and Australia, Wollsdorf Leather is in a good position to provide on-site customer service around the world.

Wollsdorf was the first tannery to achieve all ISO certifications and is quite possibly the only tannery in the world to hold the EN 9100 (Aerospace Certification), ISO 9001, TS 16949 and OHSAS 18001 certifications. Wollsdorf Leather also received the Global Tannery of the Year 2014 prize at a ceremony in Shanghai, the most prestigious award in the tanning industry.

Environmental protection and sustainability play an important role at Wollsdorf Leather. As early as 1997, the company was the first European leather producer to be awarded the EN ISO 14001 environmental certificate for its efforts to implement a clearly practiced environment policy. The certificate has been re-issued every year since.

Great importance is placed on the optimal usage of resources such as water, energy and other raw materials, as well as environmental compatibility of all processes within the company, with the result that the production processes at Wollsdorf Leather are CO<sub>2</sub>-neutral.

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# **Engineered to perform**





#### FIRST-CLASS COOKING

Aerolux has developed a comprehensive range of products to offer a full kitchen in the air

ounded in 1988 on the northwest coast of the UK, Aerolux has become well known for producing quality custom-engineered galley inserts for commercial and corporate/business aircraft.

Standards of air travel have become increasingly demanding, with customers being especially discerning about onboard experiences such as the quality of food and beverages served. For breakfast, lunch or dinner, galley equipment is essential to meeting the needs of customers. From Nespresso coffee to chilled chardonnay, from the perfect slice of toast to the smoothest ice cream, the range of equipment has to be right for the job.

Starting off in the early days with a range of refrigeration products, and in particular a wine chiller, at the request of its customers Aerolux has developed specific products to enable differentiation of the cabin service, not only for the standard and premium galleys, but also from airline to airline. These products include an award-winning espresso coffee maker, a toaster, a skillet, a rice cooker, warming ovens and fridge/freezers.

Wherever possible, Aerolux has designed its galley equipment to meet







The Aerolux coffee maker is a self-contained unit specifically designed for inflight preparation of espresso coffee. This is the only coffee machine approved for aircraft use to carry the Nespresso brand name, using its patented coffee capsules.

Aerolux has also designed a unit to help prepare toast or even a toasted sandwich in the galley. Just like at home, the Aerolux toaster will toast two or four slices of bread, from lightly toasted to dark. The unit has been designed and built from food-grade materials. It enables easy cleaning for hygiene purposes and minimizes crumbs with its removable crumb tray.

For the complete breakfast in the air, Aerolux has developed the Aero-Skillet – a safe and easy-to-use hot plate, which is suitable for cooking eggs or hash browns.

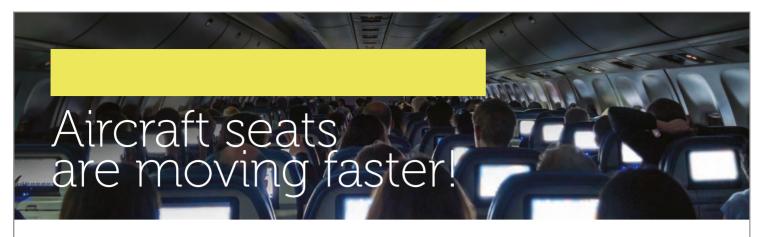


Initially designed for the preparation of rice on Asian routes, the rice cooker unit has also been adapted for heating liquid food such as consommé. The unit has been designed and built to maintain hygiene and be easy to clean, especially in an aircraft environment.

Designed to warm bread rolls or plates, the warming oven is adaptable to suit the particular requirements of the airline. A range of ovens, from high-speed convection ovens to steam ovens, is also available to heat prepared food. The fridge units keep food chilled or liquids cold before serving, and have also been adapted to keep medical supplies cold for long-term use. Aerolux's freezer products have also been designed to meet the exacting requirements of airlines the world over – as well as to keep ice cream frozen and prevent ice from melting.

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### PHENOLIC PRE-PREG

A reinforced polymer specialist has created a phenolic pre-preg with a difference

Reinforced polymer specialist FTI has been manufacturing custom pre-pregs for over 20 years. Now its R&D department has developed a phenolic pre-impregnated polymer – FibaRoll PH – which overcomes the usual difficulties experienced when processing these resins. The result is faster processing and safer handling.

Phenolics are used in interior composite components due to their outstanding fire, smoke and toxicity characteristics, but have suffered from slow cycle times and poor surface finish. Consequently they are laborious and expensive to process, even though the resins themselves are relatively cost effective. In contrast, the new formulations from FTI cure in less than 10 minutes and produce a paint-ready

surface finish direct from the tool. And this is without any additional gradual heat-up or cool-down time for the tool.

In the past, aerospace has only had access to very light pre-pregs of 200gsm or 300gsm. While these materials are satisfactory for some uses, thicker plies would give a considerable reduction in laying up time for many interior parts.

FTI's processes are cost effective at light thicknesses, but its speciality is in manufacturing thicker plies. The company can efficiently manufacture 0.2mm up to 2.0mm-thick laminates with a range of glass, carbon or aramid fiber reinforcements. And when supplying thicker laminates, there is also the facility to combine woven fabrics with chopped fibers – adding rigidity and further reducing cost.



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### PLATFORM FOR SUCCESS

Launched in 2015, the Vector seating platform has already found a major airline customer

HAECO Cabin Solutions has introduced a long-haul seat model based on its innovative Vector platform. The seat features carbon-fiber construction and a range of selectable passenger amenities from among which airlines can choose to meet their requirements. The new seat platform has been designed specifically to provide passengers with comfort while ensuring a low cost of ownership for airlines. The company has emphasized its MRO experience as a key factor in helping it to build improvements into the seat that bolster durability and minimize maintenance.

HAECO recently announced that the new seat will launch on Cathay Pacific

Airways' new A350-1000 fleet. Cathay said it selected the seat after considering its low weight, comfort and features such as recline with seat pan articulation, integrated IFE and leg support.

Mark Peterman, president of HAECO Cabin Solutions, says the company has the capacity for fast delivery on both Vector seat models: "We have production lines in place for Vector deliveries in six months in most cases. In addition to an efficient production system, our precertification of selectable features enables us to meet delivery dates."

A third Vector seat model is expected to be launched later in 2016 for premium economy cabins.



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#### RAPID PROGRESS

The benefits of additive manufacturing are really helping innovation to take flight

Over the past few years, aircraft interior designers have embraced additive manufacturing (AM) technology, commonly known as 3D printing. While prototyping is still the main application for AM today, it is quickly becoming the method of choice for low-volume production runs.

A major factor in its success is speed: a complex part that previously took weeks to manufacture can now be delivered within 24 hours.

"If we run into an issue and have to modify a part, we can get it turned around in a day," says Kosta Gianakopoulos, founder and CEO of the Techne design studio, headquartered in Dallas and Montreal, who works with many of the world's commercial carriers.

Gianakopoulos also depends on the expertise of the 3D printing vendors to help with selecting the right materials.

"It's important to collaborate with a supplier who can say, 'We understand FAA requirements and have a range of materials you can work with that are within your budget'," he says.

Vendors such as Fast Radius now offer additive manufacturing of prototypes and parts in more than 200 materials, with a wide range of physical properties.

One key benefit of additive manufacturing technology is that you can design parts that simply couldn't be made before.

"With 3D printing, design complexity is free, so a single part can replace what was previously assembled from several components, at the same time improving tensile strength," says Gianakopoulos.

"The right manufacturing partner that offers both subtractive and additive manufacturing can really help designers push the envelope."



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Let's join Qantas in its 95th anniversary celebrations with a look at one of its best-loved cabins, the Captain Cook lounge. Introduced in September 1971 on the airline's first B747, this onboard lounge was a real statement feature, billed as 'a luxury penthouse in the sky' in the airline's promotional materials. The claim was pretty accurate, with the entire upper-deck bubble of the aircraft dedicated to this lounge.

The space was designed by Harry Rogers, a hugely talented Australian artist who from the 1950s to the 1970s specialized in poster art, with clients including Coca-Cola, Colgate-Palmolive, Kimberly-Clark and, of course, Qantas. He also developed logo fonts and aircraft liveries for the airline, and was art director of its inflight magazine from 1976 to 1984, but the lounge represented a departure from his usual artistic media.

As first class guests ascended the spiral staircase to the lounge, they found themselves entering something of a time warp, with the vivid colors and jazzy fabrics so in vogue at the time juxtaposed with an 1800s nautical theme. It was certainly striking.

Qantas advertised the lounge as being "styled with the gentle atmosphere of a clipper of the 1800s", with a portrait of the eponymous explorer and navigator in pride of place to keep an eye on the rowdy landlubbers. The space was also festooned with references to his ship, the Endeavour, on which he discovered the east coast of Australia in 1770.

Thus those snazzy textiles were teamed with timber finishes, the pedestals of the seats trimmed with rope for a capstan effect, the rope-wound wooden table stands recalling ship masts, and the tabletops and cabin dividers decorated with sailing charts. The Cook theme didn't stop there, with this cutting-edge aircraft trimmed with

brass lanterns, wooden balusters and even a ship's wheel - just imagine how many passengers must have taken the helm after a few cocktails.

It's easy to be flippant about the styling, but the Captain Cook lounge was a truly large and usable space, which was really appreciated by passengers, especially given the long routes that Qantas's B747s flew. This was the sort of space that cabin designers dream of working on, but that airlines can no longer justify offering. Indeed many airline executives interviewed by this magazine over the years have said that a major challenge of onboard lounge design is that the spaces involved are so tight they can't provide something that feels like a real bar or lounge – just a compromised aircraft equivalent. Qantas's Captain Cook lounge offered the real deal and was an incredibly on-brand experience that was well and truly differentiated from the competition.

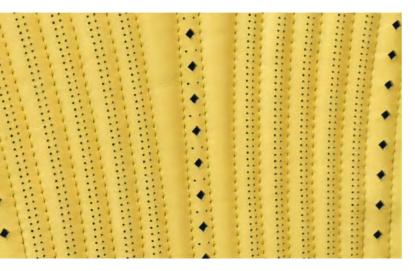
airline's finest moments

However, the lounge was scuppered in 1979 – the same year the airline phased out its last B707 for an all-B747 fleet - when Qantas decided to really make a success of its business class and needed to use the bubble for seating. This was made possible following the upper deck finally being certified for seating during TTL. Given that Qantas says this was the world's first introduction of business class, at least the lounge lost out to a good cause. Whether Qantas's claim is valid is still debated today, but it does seem the airline invented the term 'business class'.

All in all, Qantas's B747s of the time were highly innovative, with the lower deck having some 15 washrooms, separate shaver bars to minimize time spent in those washrooms, and even a galley moved down into the hold to minimize noise for passengers.

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