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double**vision**

"The future is already here – it's just not very evenly distributed," the words of sci-fi novelist William Gibson and the quotation of choice to open any debate about tomorrow's world. However, in the case of aviation, a better quote might be: "The future isn't what it used to be." As Teague's Paul Wylde notes on page 120: "Depending on whom you ask, we have between 40 and 60 years of economically viable petroleum left to mine on planet Earth."

So what will this lack of fuel mean for the aircraft cabin itself? Wylde foresees a twin transport system: ultra-efficient jets for the most critical 'business' travel (perhaps even requiring state approval); and more sedate solar-powered 'airships' for leisure travel. The former would feature radically reduced interiors stripped of their "lining package, overhead bins, carpet and flooring", while the latter would be destinations in their own right, complete with shopping malls and exercise decks.

UK design firm Seymour Powell is reportedly already working with Samsung Construction and Trading on a 'vertical' airship – its Aircruise concept is a giant, luxury 'hotel in the sky' powered by natural energy. "Aircruise questions whether the future of luxury travel should be based around space-constrained, resource hungry, and all too often stressful airline travel," explains Nick Talbot, design director at Seymourpowell and one of a number of forward thinkers quoted in our future cabin technology feature on page 52. "A more serene transport experience will appeal to people looking for a more reflective journey, where the experience of travel itself is more important than getting from A to B quickly."

Such a vision may seem a little far fetched – but in essence shares much with the early 20th century, where air travel was the preserve of the few and aircraft acted as elite, flying private members' clubs.

The difference today is that all of us expect to travel – and very cheaply too. Short-haul, single-aisle aircraft in particular have sprung up to cater to this need, whisking us away on short breaks, family vacations or same-day business trips. Both Airbus and Boeing are expected to announce replacement aircraft for this segment soon – we look at current short- and medium-haul cabin trends on page 100; and we cast our eye over aircraft turnaround times, critical to this sector, on page 42.

We also look at Cathay Pacific's new business class – Alex McGowan, Cathay's head of product, says passenger research for the project revealed some interesting insights: "Some people wanted open cabins with hammocks to sleep and armchairs to relax," he says. "Others wanted enclosed pods where they could control light, temperature and humidity. Oh, and some people thought a garden would be nice! We couldn't give them a garden but we do have orchids in vases between the centre seats." The future may not be entirely as we imagine – but it's good to dream!



Anthony James, editor



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Boeing has unveiled the new 747-8 Intercontinental, which applies interior features from the 787 Dreamliner, including LED lighting and a curved, upswept architecture designed to offer a greater feeling of space, while adding more room for personal belongings.

The aircraft features three cabin classes – first, business and economy. Highlights include a dramatic staircase at the main passenger entrance leading up to an upper deck configured with business-class seats in a 2-2 layout. Meanwhile the private first-class section (1-1 configuration) at the front of the main deck offers a nearforward view.

Korean Air and VIP customers have joined launch customer Lufthansa in ordering a total of 33 of the aircraft. "As the only aircraft in the 400-500-seat market, the 747-8 Intercontinental will give operators an aircraft perfectly suited for long, heavily travelled routes around the world," said Pat Shanahan, vice president and general manager, Airplane Programs, Boeing Commercial Airplanes.

SWISS enhances first class

SWISS is introducing a new service for its first-class cabin from 2 March. This includes a new à la carte dining concept on night flights that will give passengers control over both what and when they eat. The airline is also expanding the selection of meals available under the Taste of Switzerland concept with traditional Swiss dishes such as veal sausage with hash browns. An expanded selection of fresh à la carte fare will also be offered prior to landing. The airline is also providing new fine bone chinaware and Riedel glasses. Further new products will be introduced later this year, including a new amenity kit, pyjamas, cushions and blankets.

New manufacturer for interiors

Turkish Airlines, Turkish Technic and Turkish Aerospace Industries (TAI) are launching a joint venture to manufacture cabin interior products in Istanbul, Turkey. Turkish Cabin Interior Systems will also offer logistics support, modification and marketing. It will make galley, crew rest, magazine racks, literature pocket, divider and wind screen, doghouse and bustle, stowage, coatroom, video control compartment and stairhouse products. "Turkey will be a maintenance, repair and also manufacturing hub that should be taken seriously in the near future," said Hamdi Topcu, board chairman for Turkish Airlines and Turkish Technic.

Panasonic, Thales and Rockwell Collins in C919 agreements

Panasonic has signed a Letter of Intent (LOI) with the Commercial Aircraft Corporation of China (COMAC) to provide communications systems for the C919. The solution will let passengers use their own devices for mobile phone services and internet access on board. Panasonic has teamed with China Electronics Technology Avionics (CETCA).

In November 2010, Thales announces it had signed a LOI with COMAC and a memorandum of understanding (MOU) with CETCA, laying the groundwork for a joint venture company that would integrate a scalable Thales IFE system in the C919.

Earlier in 2010, Rockwell Collins was selected by COMAC to provide the cabin core system (CCS) for the C919. The CCS enables flight attendants to control all subsystems on the aircraft, including IFE, passenger connectivity, lavatory, heating/cooling and lighting. Rockwell Collins and CETCA also signed a LOI with COMAC to provide communication and navigation solutions for the C919 family.

Designed and built in China, the 156-190 seat C919 aircraft is scheduled to first take flight in 2014.



Delta Air Lines plans to introduce a premium-economy section on all long-haul international flights in summer 2011. The Economy Comfort seats will feature up to 4in (10.2cm) extra legroom and 50% more recline than Delta's standard international economy-class seats. The product, which is similar to upgraded economy services currently available on flights operated by Delta's joint venture partner Air France-KLM, will be installed in the first few rows of the economy cabin on more than 160 A330 and Boeing 747, 757, 767, 777 aircraft.

Customers seated in Economy Comfort will board early and enjoy complimentary spirits throughout the flight. Standard international economy-class amenities include complimentary meals, beer, wine,

Delta adding premium economy on long-haul flights

entertainment, blankets and pillows. In-seat power will also be available on aircraft equipped with personal entertainment systems (being installed through 2013), which come with free HBO programming (from July 2011) and other for-fee content.

Delta will also install 34 BusinessElite seats with direct aisle access in each of its 32 A330 aircraft by 2013. The flat bed is manufactured by Weber Aircraft.

ANA breaks language barrier with new inflight assistants

ANA is introducing inflight service assistants who speak the official local language on routes from Japan to Taiwan and South Korea to improve passenger service. The assistants, who will provide information, interpreting and inflight announcements, will be part of the onboard service with effect from 16-18 April 2011, depending on the route. "We already provide linguistic and cultural services for passengers from our destination countries by including foreign cabin attendants based overseas (in London and Shanghai) in our cabin crews," said a spokesperson.

Caribbean Airlines orders nine ATR 72-600s with Armonia cabin

Caribbean Airlines has signed a contract for the purchase of nine ATR 72-600 turboprop aircraft, valued at US\$200 million (around £124 million). First deliveries are due in October 2011. The aircraft are configured with 68 seats and equipped with the new ATR -600 series avionics suite and the new Armonia Cabin, which features new seats and larger overhead bins. The aircraft will replace the airline's fleet of five Dash-8 300s on domestic routes, and add frequencies. Some of the ATRs will be operated on the route network of Air Jamaica.

Boeing helps Saudi Arabian Airlines upgrade 777-200ER fleet

Boeing and Saudi Arabian Airlines have teamed up to modernise the interiors of 22 of the airline's 23 Boeing 777-200ERs. Boeing Commercial Aviation Services worked with the airline to develop a new cabin layout, and also provided engineering services and programme integration. Eight of the aircraft feature the airline's new Business Market configuration, with 24 seats in first, 38 in business and 170 in economy. The remaining aircraft are in a new high-density layout that accommodates 14 business-class and 327 economy-class seats.

The aircraft are configured with new Aviointeriors seats in all classes. There are widescreen displays at each seat, connected to a Thales TopSeries i5000 IFE system.

The cabin modification programme began in early 2009 after certification of the new Business Market seating configuration. Boeing produced the FAA-certified service bulletin and kit of parts to accommodate the seat installation and the new IFE system. Boeing also relocated and updated floor coverings, ceilings, sidewalls, class divider partition walls, stowage bins, closets and plumbing to enable the modernisation.



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Lufthansa is installing some 32,000 new seats on more than 180 aircraft in its shortand medium-haul fleet within the space of just one year. The seats are Recaro's new Basic Line 3520 economy-class model. The airline says that the seat will yield more than 1.58in (4cm) extra legroom. Lufthansa is investing about €170 million (£145.8 million/US\$234.4 million) in its new cabin. Recaro managed to reduce the weight of each seat unit to less than 11kg – making it about 30% lighter than the previous model. The new seats also take up less room than the previous ones, so up to two additional rows can be installed on each aircraft. Lufthansa will thus be able to offer about 2,000 additional seats, equivalent to the capacity of 12 A320s.

Boeing tests new Ka-band satcom antenna system

Boeing has conducted its first over-the-air ground test of a Ka-band satcom phasedarray antenna system that will enable wideband satcom on aircraft. The test demonstrated the system's ability to support applications including file transfer and a VoIP video conference. This third-generation system gives commercial and military aircraft operators worldwide the ability to offer communications using the growing fleet of commercial K- and Ka-band satellites. "This Ka-band, phased-array antenna system supports a significant increase in bandwidth with a smaller antenna than previous Kuband antennas, while still providing the same low profile, low drag and lower cost of installation," said Charles Toups, VP and GM, Boeing Network and Tactical Systems.

Iberia orders in-seat power systems for economy class

Iberia Airlines has chosen Astronics' Empower in-seat power systems for its economy cabins. The first installation is scheduled to take place in 2011, and the initial programme covers the entire economy cabin, or 267 seats, of seven A340-300 aircraft. The airline currently has Empower products in its business-class cabins.

Iberia is the launch customer for the newest generation of Empower products, which were introduced at the Airline Passenger Experience Association (APEX) Conference & Exhibition in Long Beach, California, in September 2010. The order includes the newest in-seat power supply system, which provides up to 200VA per passenger, USB power outputs and an integrated AC and USB outlet unit.

Hawaiian tailors inflight experience for new Incheon route

NEWS

With the launch of a non-stop service between Honolulu and Incheon in South Korea, Hawaiian Airlines has introduced a customised inflight experience for Korean travellers. Flight attendants and airport customer service personnel have undergone training to gain a better understanding of Korean culture and service expectations. This included research in South Korea, in consultation with travel professionals and an aviation services academy.

Meanwhile the new inflight dining experience features pan-Asian cuisine designed by Chai Chaowasaree. Gochujang (Korean red pepper paste) is available with all meal services. IFE on the route also caters to Koreans. Both the inflight magazine and video programme is offered in Korean, along with a new Korean-language Hawaii lifestyle TV show. Movies with Korean voiceovers and English subtitles are shown in flight, and also included on digEplayer IFE systems in business class. IFE on the flight to Incheon includes day-of-departure TV news broadcasts by SBS, and other daily programming from KBFD, a Korean-language TV station.

Hawaiian will initially serve the route using its twin-aisle Boeing 767-300ER, which seats up to 264 passengers – 18 in business and 246 in economy. United Continental Holdings has announced that it will retain United's Economy Plus seating on United flights and expand the option to Continental aircraft from 2012. The decision to maintain and expand Economy Plus across the combined fleet marks a milestone in the product integration of United and Continental.

Today, United offers Economy Plus on all its 359 mainline aircraft and more than 150 larger regional jets operated by United Express carriers. When the conversion process is complete, Economy Plus will be offered on more than 700 aircraft, including all Continental mainline aircraft, as well as larger regional aircraft. When fully deployed, United's new fleet will include more than 40,000 Economy Plus seats.

United introduced Economy Plus in 1999, offering up to 5in (12.7cm) of additional legroom to customers seated in the forward section of United Economy. Continental currently offers extra legroom seats and will continue to offer that option until those aircraft are reconfigured with Economy Plus seating.

United continues to reconfigure United and Continental aircraft with new lie-flat seats in first and business class – with the new product already on 112 aircraft in the combined fleet. In addition, more than 160 Continental aircraft feature DIRECTV.



United Airlines to expand Economy Plus to Continental

Relaunch for Lufthansa's FlyNet internet service

Lufthansa passengers on long-haul flights can once again enjoy broadband internet, Initially available on selected North Atlantic routes, the service should be on nearly the entire Lufthansa intercontinental network by the end of 2011.

Passengers with a WLAN-enabled laptop or smartphone will have unlimited online access. The price for one hour's online access is $\in 10.95$ or 3,500 miles, while the 24hour flat rate is $\in 19.95$ or 7,000 miles.

In spring 2011, data communication should also be possible in flight using the mobile phone standards GSM and GPRS, enabling passengers to use mobile phones to send and receive text messages and transfer data with smartphones or PDAs.

Lufthansa first flew with broadband internet in 2003, but the Connexion by Boeing service was discontinued in 2006. The new service is based on Panasonic's eXConnect system, with internet offered in cooperation with Deutsche Telekom.

bmi invests in cabin makeover for mid-haul routes

bmi has unveiled new business- and economy-class cabins for its mid-haul routes, which include flights to Addis Ababa, Amman, Beirut, Damascus, Cairo, Freetown, Khartoum, Moscow, Tbilisi, Tehran and Yerevan. The refurbishment of the A321 and A320 aircraft includes new leather, cushions and a dynamic lighting system. The programme should be complete by May 2011.

Brown leather covers with black stitching have been fitted to all seats, complementing recently introduced carpet and headrest covers. New multidensity foam cushions will be fitted on all of these aircraft, designed to provide increased customer comfort in both cabins. New lighting, bulkheads and curtains add to the new look and feel to the cabin.

"The interior changes are the final touches to a full overhaul of our mid-haul fleet that has included repainting the aircraft to the full bmi colour scheme from their temporary livery," said Wolfgang Prock-Schauer, chief executive officer at bmi.

Emirates, TAM and Alaska Airlines expand connectivity

Emirates has ordered an additional 84 eXPhone systems, for installation on Boeing 777-300ER and 777-200LR aircraft. The system – from Panasonic and AeroMobile – is already in service on 85 of the airline's aircraft, enabling passengers to make and receive voice calls and text messages, along with providing data services such as emails.

Meanwhile TAM Airlines has expanded its contract with OnAir to equip 26 single-aisle aircraft, following a successful pilot project. The aircraft are expected to start flying in the second half of 2011. The service, based on Inmarsat SwiftBroadband, allows up to eight passengers to make and receive calls simultaneously, with no limits on data and text messaging. Passengers can also access emails or surf the internet.

In other news, Alaska Airlines has expanded Gogo Inflight Internet to cover nearly the whole of Alaska, providing full internet access on WiFi-equipped laptops and personal electronic devices.

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Cathay Pacific has unveiled new businessclass seating and new cabin crew uniforms. The first aircraft to feature the new product will be an A330-300, due to enter service on some Sydney flights in March 2011. The Sicma seats will be installed on long-haul A330-300 and Boeing 777-300ER aircraft – on both new deliveries and those already in service. All 30 Boeing 777-300ER and 20 long-haul A330-300s in the fleet are expected to have the new product by February 2013.

The cabin has a 1-2-1 configuration, with outboard seats angled towards the windows and centre seats angled towards each other. The wing-back seat converts to a bed that is 82in (208.3cm) long (with a usable length of 75in/190.5cm), an improvement on the current businessclass seat, which is 81in (205.7cm) long (with a usable length of 71in/180.3cm).

A bed extension deploys automatically as the seat transforms into a bed, increasing the bed width. A retractable armrest can be lowered to further increase sleeping space or raised to act as a privacy screen.

Bed width has been improved from 23.5in (59.7cm) to 26.4in (67.1cm) with the bed extension and 27.6in (70.1cm) with the armrest retracted on the A330, and to 26.6in (67.6cm) with the bed extension and 29.5in (74.9cm) with the armrest retracted on the Boeing 777ER. In-seat width has been increased from 18.5in (47cm) to 20.2in (51.3cm) on the A330 and to 21in (53.3cm) on the Boeing 777ER.

Extra features include side storage, a side cabinet, a shoe locker and a mirror concealed under a flap inside the side cabinet door. An entertainment handset operates the widescreen on-demand IFE system, while a car-style seat controller enables passengers to adjust their seat at the touch of a button. Each seat is equipped with a universal power supply outlet to keep electronic devices fully charged. A multiport connector includes an RCA port, an iPhone/iPod connector and a USB port.

Finalists announced for 2011 Crystal Cabin Award

The Crystal Cabin Award's judging panel have chosen 21 finalists from 52 submissions for the 2011 cabin innovation awards, which will be presented on 5-7 April 2011 at the Aircraft Interiors Expo in Hamburg.

The finalists for the industrial design/ interior concept award are Acro Aircraft Seating (with Factorydesign) for the Acro Superlight passenger seat; Boeing (with Teague) for the 787 Dreamliner; and Recaro for the BL3520 economy-class seat.

The passenger comfort nominees are Contour (with Air New Zealand) for the SpaceSeat; mueller/romca (with Airbus and Dasell) for Lufthansa's A380 first-class bathroom; and Recaro (with Air New Zealand) for the SkyCouch.

In the greener cabin, health and safety category, the finalists are EIS Aircraft (with Flasin Faser) for a natural fibre; Elektro-Metall Export (with Schueschke Solid Surface) for the Non-Touch Waste Flap; and Schroth Safety Products' AirLite lap belt.

The material and components award could go to Heath Tecna's Wire Support Bushing; Leggett & Platt Automotive Group Europe's Fibre-So-Lite; or Lufthansa Technik's Galley Light.

The entertainment and communication finalists are Airbus for the Display-based Passenger Sign; PFW Aerospace (with HS Offenburg) for the Speaking Seatrail; and The IMS Company for its RAVE embedded IFE.

The university finalists are Dresden University of Technology (with IMA Dresden) for the Skyliner concept, Munich University of Applied Sciences (with EADS Innovation Works) for airgonomic smart material; and University of Applied Sciences Hamburg for Space Shift.

Finally, the judges' commendation prize could go to Airborne Hotel Systems' bi-level seating concept; Bishop's Flexible Seat Arrangement System; or Thales (with Qatar Airways) for the Touch Passenger Media Unit. Dassault Falcon has received approval from the FAA for the use of 3D data for type design in the completions process of Falcon aircraft. The approval applies to completions for production aircraft, including the Falcon 900 and 2000 series, as well as the 7X. Dassault previously received approval for 3D data on the basic design of the 7X when it was jointly certified by the FAA and EASA in 2007, making the 7X fully approved for the use of 3D data throughout the entire manufacturing process.

Dassault says using 3D data ensures greater accuracy during the specification and design process, including the opportunity for the customer to visualise the final configuration of the aircraft.

The approval process to validate the use of 3D data in completions activities was the result of nearly two years of collaboration between Dassault Falcon and the FAA, including more than 60 meetings held with the agency's three main branches (ACO, MIDO, FSDO). Dassault Falcon developed detailed processes for the use, storage and long-term retention of 3D data, including disaster recovery plans. It also developed an extensive training programme for those involved in the process.



Dassault to use 3D data for completions

Rainsford Mann Design tasked with Art Deco 'sky palace'

Rainsford Mann Design (RMD Air) has been commissioned to create an Art Deco'sky palace' with a contemporary twist for a Middle Eastern client's BBJ. With a brief to design a work environment with luxury accommodation for a family, RMD was also tasked with housing pieces from the owner's extensive collection of modern art.

Design highlights include a walnut veneer inlaid with shagreen, nickel panels and kid glove leather countertops. It also has a silk wall covering, sculptured cashmere rugs and nickel-finished panels for ceiling recesses. RMD Air will provide interior design, project management and assist in managing the completion centre tender process.

328SSG and ctm unveil new interior

328 Support Services (328SSG) has launched a new VIP product, the 328DBJ, which will be its standard for all future VIP conversions. The interior is the result of collaboration with ctm design, and features a galley designed to utilise the forward cabin more efficiently, generating nearly half a metre more cabin space. The interior can also accommodate a lounge and conference area. Other features include redesigned ceiling and sidewall panels with electric window blinds.

"The 328DBJ has a low unit cost price per airframe of around US\$3-6 million (unconverted or modified) and refurbishment can range between US\$4-6 million, depending on the customer's taste," said Ray Mosses, head of sales at 328SSG.

Jet Aviation Basel launches Jet Falcon refurbishment programme

Jet Aviation Basel has launched Jet Falcon, a cabin interior refurbishment programme specifically designed for Dassault Falcon 2000 aircraft. The programme is based on the standardised pre-production of a defined set of designs, which the company says means short aircraft turnaround times and costeffectiveness. Owners and operators can choose from three distinct cabin designs – Classic, Style or Fashion.

Refurbishment can also be combined with airframe maintenance or refreshing the exterior paint, to avoid additional downtime.

Jet Aviation Basel has performed more than 120 VIP completions on green Dassault aircraft, including the Falcon 2000.

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- Direct aisle access for all seats

Formation Design Group has developed a new lie-flat seating concept that represents the next major evolution in premium seating. The configuration features lie-flat beds arranged to allow seat counts comparable to traditional angled flat seats while providing larger beds compared to staggered arrangements. This highly efficient arrangement is made possible by the use of vertical cabin space through a small elevation change incorporated into every third seat. Formation is seeking airlines or seat manufacturers to license and codevelop this patent-pending concept.

To learn more, please read the editorial in the Products Services section of this issue or contact us.

MOREPEOPLE

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simpletruths

BRIEF: Simply Fly is a student project from the University of Applied Sciences Munich, supported by EADS Innovation Works' advanced design and visualisation team. "This was a cooperation, not a contract, with EADS taking a supporting and guiding role," explains EADS' Torsten Jaunich. The goal was to create an economy-class short-haul cabin that takes into account future social and environmental considerations, including an increasing scarcity of resources. The students were encouraged to move in a "minimalistic direction" and to concentrate "on the essentials – in other words, what is really necessary for a positive flight experience?"

DESCRIPTION: The concept sees a new seating aesthetic based on the latest orthopaedic research, which suggests only specific areas of the back need to be supported, rather than the entire surface. As such, the seats are made up of three elements: outer shell, neck and lower back pad. "After full-scale tests with mock-ups, the team settled on an organic form that stabilises the back - especially the lower part along the spine but also the neck, using a polymer gel," explains Jaunich. "The application of an electric current compresses the gel's molecular state, providing additional safety during take-off and landing. In its normal 'soft' state, the material offers comfortable seating during the flight." Each seat triple is supported by just two legs, creating a more open feel, as well as saving on weight and materials. "Reduction doesn't mean less comfort, as the design is inspired by the human body," explains Jaunich. "The high-tech gel provides high comfort as it can adapt to each passenger's body. An elastic band added to the back of the seat enables the passenger to store magazines, bottles or similar things during the flight." The organic shape of the overhead bins further enhances the general appearance of the interior.



VERDICT: Jaunich says the concept is a rational response to the main function required of any short-haul aircraft cabin – to provide simple, comfortable seating. "This makes it affordable for more people to travel by air, ensuring flying is not necessarily a privilege – everyone can 'simply fly'." Such a simplified interior would require less maintenance while its efficient use of space suggests it would be possible to install more seat rows, boosting profitability. However the stowage bins seem a little short on capacity – but if fuel costs continue to rise, there's every chance baggage will be banned in the not too distant future!





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viewpoint

BRIEF: A joint project between IMA Dresden (which specialises in structural fatigue and damage tolerance investigations) and Dresden University of Technology's Centre for Industrial Design Engineering, the 'Skyliner' is a visionary aircraft interior concept of the future.

DESCRIPTION: Skyliner conveys a breathtaking feeling of space as a result of its integrated 'Skydome' ceiling and expansive (1m-tall) side windows. "Every passenger has a window - even those sitting in the middle have a window in the roof," explains Matthias Gotze of IMA Dresden. "Together both window types improve lighting conditions during day and night enormously especially at night when a clear starry sky invites passengers to relax." The all-businessclass cabin features seats arranged in a 2-2-1 layout, with central seat pairs raised 15cm from the floor to provide a better view. "The asymmetric 2-2-1 layout divides the cabin into three zones: two for communication and one for privacy," continues Gotze. Luggage bins have been removed from the ceiling to ensure an unobstructed view of the Skydome. Bags are instead stowed in a box beneath the seat in front. "This accelerates the boarding procedure and ensures fast and comfortable access to cabin luggage during the flight," says Gotze. "Overall, this concept counters the trend of private cocooning in business class through the use of a more communicative, airy and light design language. Having a strongly improved perception of the outside world provides an outstanding travel experience."



VERDICT: Who wouldn't want to fly on an aircraft with such a wonderful view (other than the faint-hearted, of course!)? Currently aircraft manufacturers are restricted in the size of window they can offer due to structural strength and weight concerns. However IMA Dresden says it has used the latest Finite Element Analysis techniques to complete a first feasibility study, the findings of which confirm the idea's potential. "The project considers the entire range of technical design engineering," says Gotze.



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greatexpectations

Peter Vink of Delft University takes a closer look at the psychological factors behind passenger comfort

Visitors to this year's Aircraft Interiors Expo in Hamburg are sure to be impressed by all the welldesigned products on display – from flat beds with intelligent 'massage' functions to slimline economy seats created using the latest virtual design software, the show is proof of the industry's continuing investment in innovation. And the latest research carried out by Delft University clearly shows that investment in new equipment is worthwhile: A recent survey among 10,032 passengers showed that on a scale from 0 to 10, newer aircraft (7.8) receive a higher average comfort rating than older aircraft (6.2).

However there is another finding I would like to discuss here - the influence of passenger expectations and the importance of creating the best possible first impression. Let me explain a little more what I mean by 'expectations'. Research clearly shows it is possible to 'prime' humans to behave or think in a certain way. For example, an experiment first performed by psychologist John Bargh asked half of the test subjects to put words connected to the elderly in the right order ('bingo'. 'grey', 'old'), while the others had no task. All of the subjects were then asked to walk to the experiment room. The time it took to go to the elevator on the way to the room was recorded. It took the primed test subjects significantly longer - and their behaviour was slower.

How does this relate to the passenger survey? Its findings underline the importance of activities preceding the flight. A well-designed and easy-touse website helps set passenger expectations, while an easy check-in procedure, queues as expected, trustworthy airport signs and information on boarding and departure are all seen to influence comfort positively in the survey.

For airlines, there's an opportunity here regarding customer service. A passenger reporting "the ground staff was unhelpful and had personal conversations while I was in a hurry catching my flight" shows the importance of attention to factors beyond the products and technologies on display at the Expo.

The passenger's first sight of the interior is equally important. In a previous research study, 49 passengers were shown four identical seats that differed in colour. Three seats were light-coloured and one was brown. The first impression was that the brown seat would be less comfortable. Surprisingly, the first seating experience after this visual inspection also resulted in lower comfort ratings, showing the importance of the first sight of



PETER VINK

Peter Vink (PhD) is a professor at the Delft University of Technology, where he has performed comfort research for more than 20 years. His latest book 'Aircraft Interior Comfort and Design' (CRC Press), co-authored with Klaus Brauer, will begin circulation in April 2011 and contains more insights from a survey of 10,032 passengers.

> 01. Welcome aboard – Boeing has designed the 787 entrance area to ensure a positive first impression

the cabin. In the most recent study, one passenger reported "the metallic industrial look coming into the aircraft is like welcoming your guests through the garage in a hotel". Hence it's no surprise the Dreamliner and the A380 both feature a special welcoming area. So while walking around the Expo, please remember that 'first sight' can be crucial in setting the comfort expectations of passengers.

Please also remember to keep in mind how the passenger will interact with the product, particularly seating. For example, when reading and watching a movie, a reclined backrest results in higher comfort ratings, while for eating and laptop use, an upright position and more arm space is preferred. For sleeping, another environment is needed altogether. It all seems quite logical, but there is still no economy seat available that facilitates the most frequently seen passenger activities.

And it's not only the seat – the cabin lighting, food and overall service have an important role to play. For example, why serve food during the movie or on trays that disturb gaming, writing, reading and using a laptop? Airlines should look to contribute to increasing comfort by adapting the environment to each passenger activity. Even in business-class environments, improvements are still possible.

The Expo is proof that the industry continues to innovate, however further improvements will rely on focusing on passenger expectations, first sight and activity-based interiors. Overall, airlines need to ensure that they positively influence passenger expectations in the pre-flight period; take into account how new innovations will first strike the passenger upon boarding; and check whether passenger activities can be better facilitated by any new product.



factfile:cathaypacific 🔊

AIRCRAFT TYPE No. of aircraft Last refurbishment		B777-300ER*	A330-300 (TYPE 1)*	B747-400	A340-300
		18 (further 18 ordered) 2011	13 (further 7 ordered) 2011	21 2009	11 2009
	Number of seats	6	0	9	0
	Configuration	1 - 1 - 1	N/A	1-1 (1-1-1 in last row)	N/A
	Seat pitch	N/A	N/A	N/A	N/A
	Seat/bed width	36in (91.4cm)	N/A	36in (91.4cm)	N/A
	Seat recline	180°	N/A	180°	N/A
	Bed length	81in (205.7cm)	N/A	81in (205.7cm)	N/A
	Seat supplier	Contour	N/A	Contour	N/A
	IFE system	eX2	N/A	eX2	N/A
First class	IFE supplier	Panasonic	N/A	Panasonic	N/A
	Number of seats	53	39	46	26
	Configuration	1-2-1	1-2-1	1-2-1 on main deck,	1-1-1
	5			1-1 on upper deck	
	Seat pitch	N/A	N/A	N/A	N/A
	Seat width	21in (53.3cm)	20.2in (51.3cm)	18.5in (47cm)	18.5in (47cm)
	Seat recline	180°	180°	180°	180°
	Bed length	82in (208.3cm)	82in (208.3cm)	78in (198 1cm)	78in (198.1cm)
	Bed width	29 5in [74 9cm]	27 6in [70 1cm]	23.5in (59.7cm)	23 5in (59 7cm)
	Seat supplier	Sicma	Sicma	B/F Aerospace	B/F Aprosnace
		oY2	oY2	oY2	aV2
Business class	IFE supplier	Papasonic	Papasonic	Papasonic	Papaconic
			1 anasonic		
	Number of seats	238	223	324	257
	Configuration	3-3-3	2-4-2	3-4-3	2-4-2
	Seat pitch	32in (81.3cm)	32in (81.3cm)	32in (81.3cm)	32in (81.3cm)
	Seat width	18.5in (47cm)	17.8in (45.2cm)	17.5in (44.5cm)	17.8in (45.2cm)
	Seat recline	13°	13°	13°	13°
	Seat supplier	B/E Aerospace	B/E Aerospace	B/E Aerospace	B/E Aerospace
	IFE system	eX2	eX2	eX2	eX2
Economy class	IFE supplier	Panasonic	Panasonic	Panasonic	Panasonic
AIRCRAFT TYP	ΡE	A330-300 (TYPE 2)	B777-200	B777-300	
No. of aircraft		18	5	12	
Last refurbishmer	nt	2005	2002	2005	
Total seats		311	336	398	
	Number of seats	44	45	45	
	Configuration	2-2-2	2-3-2	2-3-2	
	Seat pitch	45in (114.3cm)	45in (114.3cm)	45in (114.3cm)	
	Seat width	20in (50.8cm)	20in (50.8cm)	20in (50.8cm)	
	Seat recline	40°	38°	40°	
	Seat supplier	Recaro	B/E Aerospace	Recaro	
	IFE system	3000i	2000E	3000	
Business class	IFE supplier	Panasonic	Panasonic	Panasonic	
	Number of costs	247	291	353	
	Configuration	20/	27 I 3_3_3	3-3-3	
	Soot pitch	274-2 22in (81.3cm)	22in (81.2cm)	32in (81.3cm)	
	Seat pitch	32III (01.30III) 17.0m (/0.0mm)	32III (01.30III) 19 Ein (77mm)	32III (61.30M)	
	Seat would	17.3III (43.7CM)	10.0IN (47CM) 159	10.2111 (40.2CM)	
	Seat recline	10 Kaita	10 ⁻		
	Seat supplier	K0IT0	AVI0	Koito	
	IFE system	30001	ZUUUE	3000	
Economy class	IFE supplier	Panasonic	Panasonic	Panasonic	

New long-haul business-class product to be introduced progressively

HEADQUARTERS: Hong Kong

PASSENGERS CARRIED IN 2009: 24.5 million (Cathay Pacific and Dragonair)

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aboutturn

Cathay Pacific is flipping the traditional herringbone business-class format on its head to redress passenger concerns regarding seat width and privacy **ANTHONY JAMES**, AIRCRAFT INTERIORS INTERNATIONAL





The competition never sleeps – but in the business-class airline market, sleep is what defines a competitive product. Hence Cathay Pacific has invested over a billion Hong Kong dollars on new wingback seats from Sicma that convert into beds with a usable length of 75in – four inches more than its previous product. "The number one requirement for long-haul business class is sleeping comfort," says Alex McGowan, Cathay's head of product. "Privacy is a close second – this means no accidental eye contact, no rubbing shoulders, and no stepping over your neighbour or being stepped over."

Airlines differ in their response to these requirements – with Cathay only the second airline to plunge for a 'reverse herringbone' solution, working with London design agency, James Park Associates (JPA). "This configuration creates a very open and spacious cabin," continues McGowan. "The geometry of the seats means that privacy is easily achieved and every seat has direct aisle access. Outboard seats have a

perfect window view and inboard seats give the option of total privacy or easy interaction with a travel companion. It's also a highly efficient layout, with every cubic centimetre of space being usable by the passenger. The only real challenge is that it's a non-traditional layout and that means more effort is required on the certification front."

Set at a relatively close pitch, Head Impact Criteria testing is the main certification hurdle to be cleared by reverse or 'traditional' herringbone schemes. The addition of an airbag to the seat belt provides a satisfactory solution in this respect.

REVERSE ENGINEERING JPA was instrumental in bringing the reverse herringbone format to the business-class market, working with US Airways to install it on its A330-200 fleet. Casting his expert eye over traditional herringbone products similar to Cathay's previous offering, James Park quickly identifies some common shortfalls. "The downside to the normal herringbone arrangement is that when you're in the


Π2



colour and trim

Cathay Pacific's new business class features natural leather, brushed steel and richly woven fabrics that blend soothing green, brown and champagne tones. Abstract patterns on table tops, fresh-cut flowers and splashes of colour in storage areas provide elements of warmth.

A subtle bamboo print on the front cabin wall echoes the reception wall in Cathay's new Hong Kong lounge, The Cabin. This provides a crisp, clean backdrop for original artwork created by Hong Kong artist Maria Lobo. Maria's unique abstract works incorporate both Western and Asian techniques, supplementing the sophisticated, international appeal of the cabin with an Asian flavour.

"The scheme was inspired by the textures and rich colours of the Pacific region," explains JPA's senior colour and trim specialist, Annette O'Toole, "The concept was that the interior of your seating and sleeping area was dark and rich, whilst the outer privacy screening was light and pearlescent to keep the overall look of the cabin warm but light."

Strong textured woven fabrics using multiple coloured threads give extra depth and richness to textile elements. "Pockets and stowage unit interiors are in strong, bright, pure colours similar to those used inside lacquered boxes, adding an element of delight," adds O'Toole.

horizontal sleeping position, your legs are facing the aisle into what is effectively a public area - that's uncomfortable for a lot of people," he says. "You are also sitting with your back to the window, which is unpopular with some passengers. Finally, it's difficult to socialise as you've got high screens on both sides, so you're quite cut off - even in the central pairs you don't have any sense of being with other people."

Frequent flyer forums and message boards confirm Park's observations. Some of Cathay's customers never really took to its previous product, feeling too hemmed in by the high sidewalls, while seat width and privacy concerns are also mentioned in some posts. McGowan is understandably defensive of such criticism: "We designed our new product to be the best long-haul business class in the world, not to be better than our current business class," he says.

However, by simply reversing the format, Cathay and JPA have solved many of these problems: "In our new business class, the outboard seats are angled slightly towards the window, giving a perfect view," says McGowan. "The inboard seats are angled slightly together - if you sit back in the shell you are totally private, however you can track the seat forward up to 11in independently of recline," he continues. "If you and your neighbour do this, you are in the ideal position to have a conversation over the side cocktail table."

SAME DIFFERENCE Although US Airways already has a reverse herringbone product in the market, McGowan insists Cathay's new seat is significantly different: "Our product is unique in terms of both the styling and substance," he says. "From a styling perspective, we've sculpted the backshell into a wing-back design. We think this looks great but it also adds to the feeling of privacy and exclusivity. We've also opted for exceptionally premium materials - our fabrics [from rohi] are a weave of five colours, we have the finest leather and

- 01. Cathay Pacific has opted for a 1-2-1 reverse herringbone product, with . 53 seats on its B777s and 39 seats on its A330s
- 02. Side cabinet and shoe locker provide secure storage for small valuables and shoes

03

WE'VE ADDED A UNIQUE BED EXTENSION THAT DEPLOYS AUTOMATICALLY AND PROVIDES EXTRA BED WIDTH

03. The large cocktail table can be used in conjunction with the main table to allow passengers to spread out while they work
04. Latchable side cabinet with vanity mirror custom-designed Tedlar [Schneller]. We've also added soft, padded Aramid [Lantal] to the inside of the shell around the footwell and headboard – this attention to detail really helps with both comfort and soundproofing."

In terms of substance, McGowan points to a new bed extension as a critical detail passengers are sure to notice: "We've added a unique bed extension that deploys automatically when the seat reclines to 180° and provides extra bed width," he says. "We also moved the main table so that it deploys horizontally rather than vertically. This releases a large space, which can be used as storage or as a space for passengers to spread into when they sleep. This space and the bed extension combined make our seat one of the biggest and most comfortable flying anywhere."

But the differences don't stop there: "The latchable side cabinet, shoe locker and vanity mirror are also unique," continues McGowan. "We've also added a third actuator to our seat that provides a better 'relax' position and greatly aids interaction between centre seats by allowing forward tracking independent of recline. Finally, we have a 15.4in personal television that can accept video feed from the passenger's own device, including iPods." SLEEP ON IT The new extension sees bed width increase from 23.5in to 26.4in, while a retractable armrest takes it to 27.6in on the carrier's A330s; bed width is 26.6in (with extension) and 29.5in with the armrest retracted on its 777ERs. The bed is also an inch longer: "From tip to tip our new bed is 82in long," says McGowan. "We also assess bed length by calculating the point at which a 95th percentile male can comfortably fit his feet when lying on his back. In our new business class this is 75in (6ft 3in) - one of the best 'real' bed lengths flying," he says. "Bed width is the other key consideration, as this enables passengers to turn freely while they sleep. Our seat is up to 29.5in wide with the bed extension deployed and the armrest lowered. The width into the further reach of the side stowage pocket, which can be used by tall passengers in conjunction with the bed extension, is over 40in."

Cathay has also specified a new soft padded material (*see page 148*) from MGR Foamtex to line the inside of the suite to enhance comfort and provide sound proofing.

Beyond sleeping comfort, McGowan says the carrier's research revealed another important insight: "Storage space is incredibly important to passengers on a long-haul flight,"



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he says. "The moment they step into their space, they want to find a place for all of their belongings. We've tried to accommodate this by creating several distinct storage areas. There's a side cabinet with a latching door that's perfect for small valuables. A triangular space at the passenger's knee is large enough for a laptop or handbag – it also contains a pouch for a bottle of water. Finally, we added a shoe locker at floor level. We iterated continuously through the development process to get the small things right, as well as the big things. Two of the last changes we made were to enable the door of the side cabinet to be used as a privacy screen between centre seats and to add a vanity mirror."

SELF SATISFACTION Aside from pleasing passengers, any new product has to meet an airline's requirements – with seat density the prime consideration. Cathay's new business class uses the same cabin envelope as the previous product, but its B777s now have 53 seats, four less than before. Its A330s feature 39 seats, two less than before. "Of course seat count is important from an airline perspective and we rejected a number of concepts because they were wastefully inefficient," reveals McGowan. "Our new business class has two less seats on an A330 and four less on a B777 than our



Key features

- 82in-long bed with a usable length of 75in a 4in improvement on previous usable bed length of 71in
- Maximum bed width (with extension and armrest retracted) of 27.6in on Cathay's A330s and an even more impressive 29.5in on its B777ERs
- Plenty of dedicated storage space during flight, side cabinet can be fixed in the open position to double as a privacy screen
- Outboard seats are angled towards the windows enjoy the view!
- Centre seats are angled towards each other and passengers can
- track forward for a more social flight experience, if desired

current product – but all of this has been given back to the passenger in valuable storage and living space."

There is also a slight variation in the angle that the seating faces away from the aisle between aircraft types. "In both cases it is under 30°," says McGowan, "but I'd prefer not to give exact details."

Cathay has also designed maintainability into the product, paying particular attention to its choice of materials, as well as maintenance access to key components. "It is a testament to a terrific team effort that we have a product we think looks great in the marketing material and will continue to look great after years in service."

Finally, the new seat is considerably lighter, ensuring valuable fuel savings: "The new product is mounted directly to the aircraft cabin without the need for an intermediate pallet," explains McGowan. "This, plus the use of new 'crushed core' manufacturing techniques, and carbon fibre materials gives an overall weight saving."

Park notes the struggling economy will continue to effect product development going forward: "We've got to be looking at things like passenger density, cost of ownership and weight reduction, especially now we have very high oil prices again," he says. "With this particular product, we have managed to 05. Ottoman and footrest

Π7

06. Side storage is ideal for handbags or laptop cases and includes a dedicated water bottle holder
07. Centre seats slide forward allowing passengers to interact with neighbours



08. Each seat is equipped with a universal power supply outlet and a multiport connector so passengers can connect and charge their own devices 09. Wing-back design and sound-proofing materials ensure a private oasis of calm

knock out quite a lot of weight because it's track mounted, which saves about 20 to 30 lbs per seat."

MORE THAN JUST A SEAT Cathay's business-class overhaul involves more than just a seat - the airline is rolling out a new uniform and also opened a new lounge, The Cabin, at Hong Kong International Airport, last year. "Long-haul business class is an incredibly competitive segment," observes McGowan. "The passengers who fly it are important people, and are used to being treated as such. In order to attract passengers to fly with us, we have to provide the best overall customer experience. This includes the ability to speed through check-in, relax in a world-class lounge, and enjoy the combination of a great onboard product with genuine, personalised service. This is hard to pull off and it's not enough to get some of it right some of the time. We strive to deliver it consistently and have built the right team, processes and governance to help 115 do so "

Meanwhile, the airline continues to invest in its IFE: "We recently expanded our IFE content across all cabins from



over 350 TV programmes to 500," says McGowan. "This is in addition to over 100 movies, 888 CDs, 22 radio channels and 70 games. We're also introducing a multi-port adapter, which allows passengers to stream content from any videooutput device to the 15.4 in seat monitor. There's also a USB port that supplements the international power supply as a means of charging passenger's devices."

A large table that can be used in conjunction with a side cocktail table makes for a better all round working environment, while McGowan says broadband internet will be introduced across both Cathay Pacific and Dragonair's fleets from 2012, courtesy of Panasonic's eXConnect system.

FLEET MANOUEVRES The new seats are currently being line fitted to all of Cathay's new deliveries in Seattle and Toulouse. Meanwhile retrofits are being handled by TAECO in Xiamen, Southern China. "We have an aggressive schedule and by the first quarter of 2013 all of our long-haul A330 and B777 aircraft will be equipped with the new product."

Surprisingly, the airline is not fitting it across its whole long-haul fleet: "Our passengers really value the comfort of the existing business-class bed, as well as the privacy it provides; hence it will remain fitted to our A340 and B747 aircraft," explains McGowan.

Cathay has no plans to purchase any A380s at this point in time: "Our passengers tell us that it's the product and service that count, not the type of aircraft," he continues. "We've recently announced an order for 30 A350s and six more B777-300ERs. We'll configure these aircraft to provide a superb passenger experience. We're certainly keeping busy but aren't in a position to make any more announcements just yet!"

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thinkfast

The time taken to board and disembark passengers has a major impact on aircraft turnaround times – is there a better way? BERNARD FITZSIMONS, AIRCRAFT INTERIORS INTERNATIONAL

> Getting upwards of 150 passengers seated and their bags stowed is the single most timeconsuming activity in the complex process of turning round an aircraft between flights; at least in the sort of rapid turnaround on which low-cost operators depend. And for at least 20 years airlines, aircraft manufacturers and scientific researchers have been searching for ways to do it better.

> The aircraft characteristics documents that Airbus publishes to help with airport planning break down the typical turnaround times. In the case of an A321 on a 25-minute turnaround with minimum servicing, all activities should be completed in 24 minutes. Steps are positioned at the front and rear doors in the first two minutes, then 110 passengers take 5.5 minutes to disembark from each door, at a rate of 20 per minute. Seven minutes are allocated to security and safety checks, then the new passengers board at a rate of 15 per minute, taking about 7.5 minutes. That leaves three minutes to count the passengers, lock the doors and remove the steps.

This is a hypothetical example, of course, and other activities – refuelling, baggage and cargo unloading and loading – are going on in parallel. But with boarding taking nearly one third of the available time, doing it quickly is clearly crucial to maintaining schedule integrity.





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flying carpet

The Flying Carpet, brainchild of Australian inventor Rob Wallace, seeks to bring a modicum of order to random boarding on flights with assigned seats. The carpet is 2m wide and 5.6m long, and is marked with the seating plan of the aircraft to be boarded. Passengers step onto the rectangle corresponding to their seat number as they arrive, and once 25 or so are on the carpet they are directed to board while the next group take their place.

"Astrophysicists have shown that boarding can be done in a fraction of the time if passengers rigorously follow a pre-determined sequence," says Wallace. "But to achieve this the airline staff would probably need cattle prods. On the other hand, if you provide the means for passengers to sort themselves out you'll get a very good result with little hassle."

The spaces on the carpet are too small to accept all the passengers, in order to limit the size of groups boarding, and the outside spaces are bigger to increase the proportion of window seat occupants.

Wallace says he has discussed the scheme with Lufthansa and Swissair, but is still waiting for an airline or airport to do full-scale trials. Lufthansa, he adds, was concerned about how the carpet could cope with the 13 different aircraft types in its short/medium-haul fleet. "No problem," he comments. "One size fits all."

MODEL PASSENGERS There have been several attempts to analyse the boarding process mathematically. Boeing developed one early simulation to investigate how it could stop the gradual deterioration in boarding rates. By the 1990s, boarding speeds had decreased by more than 50% over the previous 20 years as a consequence of increasing amounts of carry-on baggage, increasing flight lengths, changing demographics, a greater emphasis on passenger convenience and new airline service strategies. So the airframer set out to build a model of passenger boarding behaviour that could help airlines plan their boarding strategies.

The resulting passenger enplane/deplane simulation (PEDS) modelled passenger behaviour in terms of the duration of each activity, from starting through moving, stopping and waiting, to starting again. Its first application was to analyse boarding rates for the 757-300. The airframer wanted to add 7m in length and about 40 extra seats to the 757-200 to produce the -300, but airlines were worried that loading the additional passengers would make it impossible to turn the aircraft round in the same time. The simulation showed that two-class passenger loading through Door 1 would take 26 minutes. Using Door 2 rather than Door 1 saved one minute, using both doors saved five, and using

'outside-in' boarding (filling window, then centre, then aisle seats) could reduce boarding time by as much as 17 minutes.

More recently scientists have used such exotic-sounding techniques as space-time geometry, random matrix theory, Lorentzian geometry and Boltzmann probabilities to model the boarding process. Whatever their method, they tend to agree in their conclusions that random boarding, whether seats are assigned or not, is one of the best methods, and certainly much better than the widely used system of boarding by blocks of rows, starting from the rear of the cabin.

It is theoretically possible, though difficult in practice, to optimise the process by giving each seat its own place in the boarding order. Outside-in boarding is less impractical but still more efficient than most other methods, and is employed by United Airlines, although like most airlines it has to compromise by allowing premium-class and highstatus frequent flyers on first.

Airlines have used PEDS and other simulations to explore and develop alternative means of boarding. Before its merger with US Airways, America West adopted the reverse pyramid technique, in which the seats are allocated progressively, starting with the window seats at the back of the cabin and ending with the aisle seats at the front. Air



static display

EAM RFID Solutions – a division of EAM Worldwide, which supplies aviation and marine survival equipment – says it can help airlines save money and reduce critical turnaround times by eliminating manual inspections while also reducing theft. Each life vest, raft and other EAM safety product can be equipped with an RFID chip that stores the birth record of the asset. A portable reader provides alert notifications including overhaul, missing assets, incorrect location and initialise paperwork. RFID technology can also be used to track oxygen generators, seat belts, seat covers, life rafts, slides, crash axes, smoke detectors, first aid kits, flashlights and placards.

Outside of the aircraft, the system can be used to track inventories, tool or equipment movement, logistics and improve processes for manufacturing and packaging operations. Through the use of a handheld scanner or fixed reader, the up-to-date information is transmitted into a server or an organisation's inventory management system, saving time and money compared to manual surveying and tracking methods. EAM RFID Solutions will present the technology at this year's expo in Hamburg.

66

RYANAIR'S BOARDING IS ALSO HELPED BY RUTHLESS ENFORCEMENT OF ITS POLICY ON THE SIZE AND WEIGHT OF CABIN BAGS

> Tran, meanwhile, opted for a rotating zone method, which fills the rear few rows first, then the front four or five, then the next few at the back and ending with the middle rows.

> The premium placed on cabin stowage by the increasing prevalence of fees for checked bags also means that airlines operating zonal systems – like low-cost carriers who board in groups sorted by order of check-in – can raise a little extra ancillary revenue by selling upgrades to the first boarding group.

PASSENGER PREPARATION Ryanair manages to get more than 70 million passengers a year on and off more than 1,500 daily flights at 160-plus airports in Europe and beyond with, it claims, the continent's best punctuality. The

airline attributes the robustness of its flight operations to a simple schedule, a crew absenteeism rate of less than 2% and a high level of technical reliability. On the ground it points to simple procedures, 100% web check-in, a low number of checked bags – just 0.4 per passenger – and what it terms "trained" passengers.

Like its low-cost peers Southwest Airlines and easyJet, Ryanair dispenses with assigned seats and favours random boarding. Even with assigned seats, random boarding does well in simulations, and when there are no assigned seats passengers tend to spontaneously accelerate the process by sitting down in a nearby vacant seat rather than queue for what they perceive to be a better one. Ryanair's boarding is also helped by ruthless enforcement of its policy on the size and weight of cabin bags.

Meanwhile easyJet would like a third door. Its ecoJet scheme for an environmentally friendly, short-haul aircraft features forward-swept laminar flow wings, as used by most modern gliders, partly for efficiency but also because moving the wing root aft makes space for a mid-cabin passenger door. The airline says the centre door would accelerate boarding even used on its own, because passengers would be able to head in either direction after





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quick check

During a rapid turnaround, airlines are likely to dispense with some of the common ground servicing activities such as catering resupply, toilet and potable water servicing and cabin crew changes. But they must still carry out safety and security checks after passengers have disembarked before new passengers can board. One of the this year's Crystal Cabin Award entries looks to ease the task by streamlining the stowage and inspection of emergency equipment. Developed by Airbus in response to a customer request, the module for the accommodation of emergency equipment also reduces the amount of baggage space taken up by the equipment. It uses an L-shaped emergency equipment drawer to accommodate a megaphone and an emergency locator transmitter in the hat rack spacers that normally hold just one of the items. The equipment is mounted on brackets to make it readily visible, and allow fire extinguisher pressure gauges to be read directly instead of requiring a mirror. As well as better space utilisation and a shorter pre-flight check, the module simplifies the search for foreign objects as the drawer can be pulled right out to allow inspection of the spacer interior.

entering, rather than forming a single queue in the aisle. The aft-mounted engines mean the fuselage would be closer to the ground, so there would be no need for a belt loader to load and unload baggage.

But easyJet considers a second aisle would be less beneficial than a wider single aisle – a single aisle is more efficient in environmental terms because a narrower fuselage generates less drag. The airline envisages a single aisle wide enough for two passengers with hand luggage or two catering trolleys to pass each other "will probably achieve shorter turnaround times on the ground, as well as better inflight service in the air, compared to two narrower aisles".

SECOND AISLE Morten Müller, promoter of the Twin-Aisle Feeder, would disagree with easyJet. Adapting a 1985 idea by former Scandinavian Airlines president Jan Carlzon, who advocated a twin-aisle 2-2-2 configuration for short-haul aircraft, Müller proposes to do away with one column of seats on existing single-aisle Airbus types in favour of a second aisle and 1-3-1 seating, a configuration he believes would improve cabin ergonomics, safety and comfort, without diluting yield.

In the case of the A321, Müller argues, losing one column of seats would reduce the total number from 198 (33 rows at 32in pitch) to 165. But the reduced number of seats would eliminate the need for the wide cross-aisles at

the over-wing emergency exits and enable the number of lavatories to be reduced, giving back room for another 14 seats, taking the total back up to 179.

With one AKH container of checked bags for each 33 passengers, the A321's two cargo holds would then have room for four ULDs carrying revenue cargo. And if the number of passengers actually boarded fell to 165, a load factor of 92%, only five baggage containers would be required and there would be five free ULD positions, plus the bulk cargo space.

In the cabin of what he dubs the A321HQR (twin-aisle quick rotation), Müller would install bigger overhead bins along the centre, giving 3.4ft³ per passenger instead of the current standard 2.05ft³. If the average passenger checks bags occupying 3.85ft³ and carries on another 2.05ft³, the bins would accommodate the equivalent of 49 passengers' checked bags, freeing a sixth container space of revenue cargo.



A SINGLE AISLE IS MORE EFFICIENT BECAUSE A NARROWER FUSELAGE GENERATES LESS DRAG



01. The Twin-Aisle Feeder – its inventor claims two aisles would help speed boarding



THE TWIN-AISLE CABIN WOULD BE MUCH MORE ATTRACTIVE TO PASSENGERS, SO A HIGHER YIELD PER PASSENGER COULD

The containers of checked bags typically arrive late, Müller says, and the two loaders normally used need to make three movements each to load the six containers. For the A321HQR he would use four loaders, each of which would have to load only one baggage container. As well as helping avoid delays, he maintains, this would help accommodate late-arriving passengers. Rental charges for the loaders would be the same because the four loaders would be needed for only half the time, and the increased proportion of bags taken into the cabin would reduce the cost of baggage handling. The result, Müller says, would be increased aircraft utilisation through reduced ground time, while the additional cargo carried would more than make up for the reduced number of seats – at an economic conversion rate of 12.6 ft³ of cargo to one economy-class passenger, the revenue cargo volume of the HQR is equal to 60 passengers, making the total equivalent number of passengers (179 plus 60) the same as a standard A321 with 198 passengers, and the equivalent of 40 passengers' worth of cargo.

The attractions don't stop there. Müller believes the twinaisle cabin would be much more attractive to passengers, so a higher yield per passenger could be expected. In fact, Müller calculates, the twin-aisle layout combined with the new engine options for the A320 NEO would produce the 25% improvement in operating efficiency operators are looking for. \boxtimes

CONTACTS

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Many have wild visions of the future cabin, but could the differences be much more subtle than we expect?

BRENDAN GALLAGHER, AIRCRAFT INTERIORS INTERNATIONAL

Daydreaming. We all do it: about our next holiday, winning the lottery, a better world. In business it's actually encouraged, under the label 'brainstorming' or 'conceptualising'. And in recent years no one has done more of it than the people whose job it is to come up with the next big thing in the airliner cabin.

The reasons are plentiful. Deregulated markets mean fiercer competition, so airlines have to work harder to stand out from the crowd. The pressure to cut costs, boost revenues and maximise capacity is relentless. And passengers are increasingly clued-up about what an uncomfortable and unhealthy place the cabin can be, with its noise, cramped conditions and dry, occasionally germladen or contaminated air.

There has been another stimulus, and it's a big one. In the run up to their first deliveries, the early A380 operators whipped up frenzies of expectation about their plans for the double-decker – inflight casinos, jacuzzis and onboard shops to replace the duty-free trolley. But the wildest flight of fancy to make it into the air so far is Emirates' first-class shower. As for a little more legroom in economy, Korean Air's customers may notice a difference from this summer, but otherwise it has been a cramped 'business as usual' for the folks at the back of the A380.

CRAMPED STYLE And there lies the first pointer to the cabin of the future – the brainstormers can dream, but when it comes to implementation they don't have a free hand. "Every airline I get a brief from emphasises the importance of seat count," says Luke Hawes, director at London design agency Priestmangoode, which includes Lufthansa, Qatar Airways, SWISS and Kingfisher among its clients. "We can design the most indulgent, luxurious space in the world for a four-seat, first-class cabin. But across the aircraft the airlines have to keep seat count up, and that fundamentally drives how much space is left over to play with."



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THE LEADING MANUFACTURERS ARE BEGINNING TO MINIMISE THE AIRLINES' ROOM FOR MANOEUVRE



The designers' style is also cramped by the airframers' increasing aversion to customisation on the production line. "Customising an Airbus or a Boeing is getting more difficult," says Hawes. "What Airbus is putting in place for the A350 - alongside similar moves at Boeing - means the days of a Lufthansa or a Qatar Airways being free to fill their aircraft with whatever they like are probably behind us."

Hawes is echoed by Nick Talbot, design director at Seymourpowell. Also London-based, the company works across a variety of sectors, from consumer electronics to transport, and includes in its recent aviation credentials the Aircruise concept for a giant luxury airship, and a cabin layout system based on swivelling seats. "The leading manufacturers are beginning to minimise the airlines' room for manoeuvre," says Talbot. "They've done that partly to manage complexity but mainly to limit cost. Airbus is offering a single economy seat type on new aircraft, for example. If the customer's not happy with that, he has to go and spend money to get something else."

Talbot believes these forces mean that at first sight the appearance of cabins won't change much over the next 10

eyes in the cabin of 2025 it would still look very much like a tube filled with seats. However, I'm confident there are going to be some surprising and delightful innovations and improvements at the detail level."

NEW TECHNOLOGIES If innovation starts with ideas, it's carried through with technologies, and there's no shortage of new ones being readied for potential application in the cabin over the next decade or two.

Innovation Works, the R&D shop of Airbus's parent corporation EADS, is looking at energy harvesting - the transformation of naturally occurring waste energy into usable electrical power for consumption by nearby aircraft systems. The first application could come in airframe and engine health monitoring. But other work is addressing the use of passenger movement and body heat to power a system that would monitor seat serviceability.

Also on Innovation Works' agenda is infrared wireless networking to complement WiFi and other radiofrequency (RF) systems. "We think the next generation of airliners could have several different wireless networks to provide increased reliability and security," says Dr Nikolaus Schmitt, senior expert in optronic systems. "We have demonstrated that infrared frequencies in diffused rather than line-of-sight mode can carry large volumes of information without interfering with existing RF systems."



04

04. Airbus Concept Plane
05. Exterior features include ultralong, slim wings, semiembedded engines and a U-shaped tail



Airbus itself twitched the veil at 2010's Farnborough International Airshow with its Concept Plane – an engineer's dream of how airliners might look by midcentury. With its ultra-slim high-aspect-ratio wings, semi-embedded engines and U-tail, the Concept Plane was a far cry from the cookie-cutter configurations that have dominated air transport for decades. In the cabin, the ideas ranged from the potentially achievable to the realms of science fiction – holographic decors and morphing seats made of environmentally friendly, self-cleaning fabrics, but also structural materials that could become see-through at the touch of a button.

Whatever Airbus does bring to market in the coming decades, it will be built on programmes like the one the manufacturer is carrying out to bring eco-friendly fuel cells to the aircraft. Fuel cells transform the energy contained in hydrogen and oxygen into electricity through a direct chemical conversion at low temperatures and without moving parts. The exhaust products are water and oxygen-depleted air.

"In replacing the APU, the fuel cell acts as an independent power source that could power any electrical system on the aircraft, including those in the cabin," says programme leader Dr Michael Enzinger. "The water generated could be used to humidify the cabin air to improve passenger comfort, and for drinking and flushing toilets. This would allow the aircraft's water buffer tank to be reduced in size, saving take-off weight."

The catalogue of technological innovations goes on. Seatmakers are looking at lighter, stronger, less environmentally damaging materials: metal-matrix alloys, porous plastics and recyclable soy-based foams. A new generation of IFE could feature interfaces exploiting haptics (the sense of touch) to give the user a heightened interaction with the system. And while "there's no power without cables" has long been one of the truisms of the IFE business, a group of researchers is even now developing a scheme to deliver both electricity and data via the seat tracks, eliminating wired connections entirely.

SMART MATERIALS Seymourpowell's Talbot has his own technological wish list. "We're continuously scanning the flame front, looking at both digital and materials technologies," he says. "And I think it's the latter, in the form of smart and functional materials, that could have the bigger impact."

He's talking about things like shape-memory alloys and smart fibres and fabrics (which can change shape when heat or a current is applied, resuming their original form when the input ceases) and biomaterials. "Many of these materials already have real-world applications, particularly

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in medicine, but until recently they have tended to be expensive. Now they're becoming more affordable and I expect to see them in the cabin before long," he says.

Talbot envisages seats embodying fabrics with a shapememory coating on the fibres. "Body heat or an electrical current would cause the fibres to expand or contract as needed to make the seat conform accurately to the shape and size of the person sitting in it," he predicts. "I see some very ergonomically sophisticated things coming along, much smarter than a lumbar support made of a bit of aluminium with a cam behind it."

Biomaterials offer the possibility of self-cleaning surfaces and self-repairing fabrics, according to Talbot. "If they're cut, for instance, the fibres link up again to repair the damage," he says. "These properties could be very usefully applied to the cabin surfaces that we touch and the fabrics we interact with. There's going to be some exciting stuff happening in this domain in the next decade or so."

WALLPAPER WATCH In the electronic domain, flexible displays are a potential game-changer, Talbot believes. "There's been a lot of talk about low-cost, ultra-thin, flexible displays over the years," he says. "I think that in time 'digital wallpaper' could be used to go far beyond today's intelligent lighting systems as a way of modulating passenger mood. And I'm fascinated by the idea of a chameleon interior that could be rebranded with nothing more than a new software load."

Hawes of Priestmangoode is also thinking of passenger mood, and how it can be unfavourably influenced by a clunky IFE user interface. "In our seat design work we face a continuous struggle to get the IFE hardware and interface up to the level we think the passenger expects," he says. "The way we interface with personal devices like the iPhone, iPad and BlackBerry has set the benchmark for how to do things in the cabin – it's an area where we need to see major progress."

Hawes regards Panasonic's Integrated Smart Monitor and Thales' corresponding TopSeries Gen 4 programme as first steps in the right direction. "I'm quite impressed with the concepts but I think we're still a long way from achieving the benchmark we have in mind," he declares. "I'm currently working on premium seat programmes for which traditional IFE interfaces have been specified, and that's very frustrating."

Magnus Aspegren, director of the Singapore studio of BMW Designworks USA, believes there's similar scope for making the seats themselves more usable. In fact he thinks the cabin of the future ought to be a more uncluttered place altogether. Aspegren and his team combine the parent company's years of automotive experience with a growing aviation portfolio – they have produced interiors for Embraer and Pilatus business aircraft. "Cars are becoming very technologically advanced and there's a growing need to present the electronics in a way that's more manageable for the user," he observes. "Now we're 06. Thales TopSeries Gen 4 slimline monitor07. Panasonic's

Integrated Smart Monitor





WE'RE GOING TO HAVE TO FIND DIFFERENT WAYS OF ACHIEVING THE WOW FACTOR

 08. Seymourpowell's Lounge Retreat seating concept
 09. Lounge Retreat uses rotating seats to allow passengers to choose a more social or private environment

looking to bring that to aviation as well. Sometimes when I'm travelling business class I feel as though I really need an instruction manual to operate the seat. These seats can be too complicated for comfort."

FRIENDS IN HIGH PLACES If Aspegren's attitude to cabin electronics can be summed up as 'less is more', he certainly does not rule out the possibility of significant social advances in airliner cabins over the next few years, and particularly in his adopted region. "We do quite a lot of work on contextual studies here in Asia to try to understand what people really want from cars and other types of transportation," he says. "One thing we have learned is that while Westerners often like to travel in their own little cocoons, in Asia there is an emerging expectation for more of a 'family and friends' experience. Meeting that need will call for new seating arrangements, shared IFE and improved provision for privacy and noise mitigation."

Hawes agrees that the air traveller can be a social animal, particularly when the more wide open spaces of the premium classes make it possible to give each individual a private sanctum as well. "Our new Lounge Retreat concept answers what we see as a growing premium-class demand for a more open environment that also offers a privacy option," he says. "On boarding, the passenger finds a light, open, stylish space. But then the sofas can convert into beds, and the curtains can be drawn for total privacy."

Cabin designers are dreamers, but they're also realists. On the one hand, Talbot has his sights set on technologies that open up the prospect, however distant, of passengers swaddled in ultra-comfortable, perfectly adapted morphing seats, immersed in all-round images of the holiday isle that awaits. On the other, Hawes acknowledges that in one respect at least the possibilities are beginning to run out. "Over the next ten years I think we're going to find that there are only so many ways you can lay out a premium cabin," he says. "In the last decade we've tried staggered, herringbone, closed capsules. But we still have to hit our seat count, and I think we're going to have to find different ways of achieving the wow factor – through branding, trim and finish, and surface treatments."

Given these realities, is there any scope at all for novelty going forward? Talbot offers some comfort: "I do think there will be lots of unexpected things that will help to improve the travel experience. The fascinating thing for me is second-guessing what they are going to be." \boxtimes

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WHAT LOOKS ACE WRITTEN HUGE DOWN THE SIDE OF AN AIRCRAFT MIGHT LOOK AWFUL ONLINE

Your airline might offer the best interior and inflight experience in the world but if the brand's logo and exterior livery aren't up to scratch no one will ever find out. It might seem like a simple matter of font, badge and layout, but in a world awash with logos, even the least brand-conscious of us can probably reel off some of the most enduring off the top of our heads – from the timeless wavy script of Coca-Cola to the bold and clever FedEx, with its subtle arrow formed out of the white space between the capital 'E' and lower case 'x'.

There have been some iconic airline logos and liveries over the decades, from early United Airlines to Air Canada's encircled maple leaf and more recently Virgin, but there are many more that never stick in the visual memory, or only for the wrong reasons. BA's brief move away from the Union Jack-inspired tail fins to multicultural designs in the late 1990s is just one example. A very high-profile political and public backlash forced the airline to revert back.

Beyond the bad PR, repainting a single aircraft with a fairly uncomplicated design can cost around €150,000 (£126,000/US\$203,500) so the design process shouldn't be taken lightly. "The key consideration for airliners should be to create a strong visual identification without just

sticking on the name and logo of the company like on cereal boxes," says Didier Wolff, owner and designer at transport brand and livery design specialist Happy Design Studio. "It is called balance and requires art qualification."

ITAL

NEW RULES Of course the basic canvas for this aviationrelated art hasn't changed, as Michael Johnson of Johnson Banks Design quips: "It's still a long, usually white, aircraft and a fin." But what makes aircraft logo design more complicated are the other related formats it must now work within. "What looks ace written huge down the side of an aircraft might look awful online," adds Johnson. "You might have the best idea for a fantastically unusual tailfin symbol, but stitched on a badge or a uniform, or screenprinted in one colour onto a catering pack it falls apart."Johnson's design business worked on the recent review of Virgin Atlantic's logo and livery in 2010. The logo's flexibility became integral to the brief. "We had to make sure it could work long and thin, or stacked, or square," says Johnson. "For a while it made things very difficult, but we managed to resolve it eventually."

Although the canvas may be familiar, Nigel Goode of design firm Priestmangoode, which recently worked with

- 01. Virgin Atlantic tailfin, part of a new livery designed by Johnson Banks Design
 02. Virgin Atlantic's
- rejuvenated flag carrying lady flutters a larger Union Jack 03. The Virgin
- Atlantic name, previously on the front end of the fuselage is now emblazoned large across the whole of the aircraft in a fine custom drawn font





04. Happy Design Studio's concept scheme for a Rafale fighter jet 05. Another Happy Design Studio concept scheme - for an A380 06. A SWISS A340 in service to San Francisco sports a suitably 'qroovy' livery design

Turkish Airlines and Swiss Air, warns about forgetting its shapely curves. "Often a lot of liveries are just a wallpaper exercise, they don't really consider that these aircraft are mostly beautiful shapes and forms," he says. "A logo can't fight that; it's got to work with it. With SAS or Lufthansa everything works well. The logo has to be carefully placed. It really annoys me when you get these truncated logos just plastered on aircraft."

When it comes to how the current crop of aircraft logos stands up in the context of aircraft history, opinion is – as is so often the case regarding design – divided. Many of the classic – and as Goode points out – mainly primarycoloured 1950s and 1960s logos are often cited first, but although Johnson also has a soft spot for that era of design, he also mentions a few newer and more unexpected ones.

finish wars: paint or film?

Paint has been the traditional finish of airline liveries but it's hellishly expensive. Happy Design's Didier Wolff says an average paintjob on say a single Gulfstream aircraft could cost up to €150,000 (£126,188/US\$203,586). By contrast he reckons a similar job done with a film decal could come in at a third of the price and be faster to complete. And it's not just small and temporary promotional designs that can be achieved with such an approach. For example, Wolff says the permanent Emirates tail fin was "all stickers".

However there are several major scenarios where a sticker will not do, like on parts of the aircraft's body that are affected by wind and heat - like the nose and near the engines - and also the aircraft has to be in very good condition, i.e. new and without old livery paintwork underneath. Otherwise only stripping back the old paint and applying a new coat will work.

"When life was a little simpler and applications more limited, things looked very elegant. In my head I replay old BOAC schemes and those early, beautiful American Airlines graphics, and yes they were great," he says. "Conversely, the explosion of the budget airlines also had a positive impact, for a while at least. I was actually a big fan of the early easyJet schemes with just that huge telephone number or the Go identity. Nice work. The congestion of aircraft, liveries and colours at airports now makes those kind of simple statements a little harder."

There's no whiff of nostalgia for branding expert Peter Knapp, executive creative director for Europe and the Middle East at Landor Associates, whose credits include working on Gulf Air's corporate identity and an overhaul of Siberian Airlines (S7). "Honestly, I think this is the golden age," he enthuses. "There is a far greater diversity of

OGG Aircraft Interiors International.com MARCH 2011

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logos and liveries than there ever has been. Historically the industry was characterised by white aircraft with 'go faster' stripes and logos of birds or flags. Things are very different now."

ENABLING TECHNOLOGY Not only can new technology enhance the final finish, but it can also make the process more accurate. "Paint, coating and decal product innovation has helped the designs to become more expressive as opposed to being just functional," says Knapp. "But the impact of technology has been most significant in the design process, where more complex liveries are conceived and implemented due to more accurate and transferable data between the designers and the suppliers and engineers. The requirement to accommodate consistency of logos on aircraft and screens is also a product of enhanced design programmes that allow design work to be passed through multiple communication channels simply and effectively."

Happy Design's Wolff is also a believer in using new technology to push the boundaries of livery design, but again Priestmangoode's Goode sounds a note of caution: "You've got to be careful not to overcook it," he says. "Just because you can wrap everything doesn't mean you should."

Although Goode and everyone else is excited by new metallic and iridescent paint finishes that have really moved the game on, he's also a big fan of the unusual approach of American Airlines in leaving the top of its

easy does it

In February 2011, easyJet announced it was trialling a revolutionary nano-technology coating on its aircraft, aimed at reducing drag and increasing fuel efficiency. The ultra-thin coating, already used on US military aircraft, is a polymer that cross links and bonds to the paint surface and only adds an estimated 4oz to the weight of the aircraft. It contains hard, durable acrylic elements and is designed to create a smooth finish, filling the 'pores' of a surface with a unique resin, reducing the build up of debris and thus reducing drag.

The coating is less than a micrometer thick, and its manufacturers estimate that it could reduce easyJet's fuel consumption by 1-2%. The airline has coated eight aircraft and will compare their fuel consumption with the rest of its fleet during a 12-month trial.

The coating is applied and distributed in the UK by TripleO. Firstly a dicarboxylic acid (a cationic/positive polarising wash) is used to purge the pores of the surfaces to be treated and electrically charge the surface with a positive polarity. Once cleansed and charged, the pores are ready to receive the anionic (negatively charged) molecules of the emulsion. These molecules are pulled into the pores magnetically and held there, while all of the protective chemicals have cross-linked, bonded and cured, locking the coating into the paint and preventing drifting, fading or degradation of the paint until renewal.

YOU'VE GOT TO BE CAREFUL NOT TO

aircraft unpainted to reveal the beauty of the polished aluminium body – a method that also has fuel-saving and environmental benefits. "I believe this finish takes quite a lot of maintenance, but the weight of paint on an aircraft is phenomenal, so this approach is one where everyone's a winner," Goode says. "You've got massive advantages weight-wise but also strong visual branding as well."

Where your aircraft operate around the world is also pertinent to the design's colours, with Landor's Knapp pointing out that hotter climates tend to suit lighter more heat-reflective colours – unlike Air New Zealand's new All Blacks rugby-influenced livery – because lighter colours limit the heat absorbed and thus reduce the strain on

- 07. easyJet is repainting its fleet with a new 'nano' coating to reduce weight and drag
 08. 'Visit Abu Dhabi in 2011' livery on an A330-300 for Etihad
- 09. Limited edition 'Formula One' paint scheme for Etihad



11. S7 Siberia Airlines livery by Landor
12. Landor also rebranded Gulf Air's fleet
13. A limited edition 'All Black' Air New Zealand A320





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IT'S A STRANGELY CONSERVATIVE INDUSTRY – I'D LIKE TO SEE SOMEONE BE PREPARED TO MAKE A REALLY BOLD STATEMENT WITH THEIR FLEET

air-conditioning when the aircraft is in downtime mode. Equally, "cold climates need consideration for the livery relative to fuselage ice shields for snow and ice protection", Knapp adds.

THE FUTURE In terms of future technology, Knapp believes that self-repairing paint is not far away. Indeed one of its first applications is already in production, on cars by Nissan's luxury brand Infiniti. Improvements in film wrapping and paint technology may enable one-offs or temporary liveries for promotions to look more professional, although this is another area of contention. Overall though, and from all parties interviewed, there seems to be a strong sense that as future technology makes more things possible there should be more design bravery, as long as it's harnessed in a responsible way.

Happy Design's Wolff wants to see more of the aircraft's surface feature livery design and Goode sees a huge opportunity for logos on the underside of aircraft to promote to those on the ground – as long as the whole approach avoids looking like a billboard, or as Wolff neatly puts it, "getting confused between airline identification and advertising space".

The last word goes to the seemingly always optimistic Johnson of Johnson Banks Design, who concludes: "I'm anticipating two things really – both airlines de-cluttering, streamlining their identities and liveries; and some being a little braver in what they do. It's a strangely conservative industry – I'd like to see someone be prepared to make a really bold statement with their fleet, rather than just write a word over the first door and stick a symbol on a tailfin. The possibilities are endless, if you're prepared to consider some slightly more unusual approaches."

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totallywired

A new concept from Contour and Factorydesign looks beyond a flat bed and a nice meal to create an onboard flight experience with a difference

GUY BIRD, AIRCRAFT INTERIORS INTERNATIONAL

'Something different' was the simple but potentially broad brief from UK seat manufacturer Contour when it asked a handful of agencies to pitch for the job of designing a new concept for this year's Aircraft Interiors Expo in Hamburg. The eventual winner was London-based Factorydesign, which took an unconventional approach to landing the business. As Adam White, one of the agency's directors and the lead on the project recalls: "We were the only candidate not to provide sketches. Contour had no idea what we were going to come up with, instead we provided a one-page letter explaining our thinking."

The mysterious route seemed to pay off as Contour's technical sales director, Bob Lovell, got in touch to give Factorydesign the deal. "After considering a number of design houses, we felt that Factorydesign was the most likely to push the boundaries the furthest," explains Lovell.

The design company is no stranger to the aircraft industry or Contour, having worked with the manufacturer on the last seats fitted to Concorde – the ones with the shapely armrests cast in aluminium that echo the look of British Airways' speed mark logo. Factorydesign is also working on Etihad's A380s, as well as Acro Aircraft Seating's Superlight seat.

For this project, while continuing the lightweight theme started with Concorde, White was particularly keen on emulating some of the forward-thinking designs regularly seen on the motorshow exhibition circuit. As he says: "Concept cars were exactly the sort of inspiration for this seat – and ones that reflect social change not just technological change. We wanted to tap into the people aspect of design, not just appeal to geek-heads."



01. Armrest detail – more intuitive seat control is an important trend NOT FOR WIMPS The concept Contour and Factorydesign have come up with is a striking video gaming station for the skies. Dubbed 'Not for Wimps' or NFW, it is dominated by a huge arc of composite Kevlar and carbon fibre that rises up from the top of a curving bucket seat and over the passenger to clip into a state-of-the-art monitor in front. The whole ensemble is designed to appeal to customers who would rather spend their precious time on board in an intense and enveloping gaming or viewing experience than lie flat and snore into their shoulders.

Although White says Factorydesign does a lot of thorough research for its projects, the idea for this seat also had an empirical element, as he continues: "We do a lot of long-haul flights and while the flat beds are good, every seat for daytime is dull as ditch water. You're just bored and restless. We do a lot of people watching. Some people drool over technology but we get excited about what people are up to and how they might want to spend eight or nine hours cooped up on an aircraft. Plus we have a PS3 and an Xbox in the office." To keep the experience intense – and personal – the canopy creates an almost helmet-like insulation from the rest of the cabin with speakers in the seats' Arne Jacobsen Egg chair-style 'ears'. Active noise cancellation is built-in to avoid the necessity for headphones but player-passengers can don them if they want to really turn it up and the seat can also move forward to be closer to the laser keyboard if a little light writing is required.

MATERIAL WORLD The seat structure is made of composite Kevlar, not a cheap material White readily admits – he reckons it would cost about twice as much to manufacture as a conventional business seat – but nonetheless one that could really appeal to certain carriers. "I could see a more adventurous airline dividing off a part of the J class cabin and rolling out a couple of rows of these seats straight away," he enthuses, "it would say so much about their brand."

Although using such materials has an aesthetic appeal that White was eager to expose rather than cover up, he's

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keen to promote the technical benefits too, saying the concept seat is considerably lighter and much more rigid than those employing more conventional materials. This lightweight know-how is far from pie-in-the-sky either. Factorydesign has already espoused a similar philosophy on production-ready seating – the design firm worked with Acro Aircraft Seating on its Superlight unit, which has been ordered for the new Jet2.com fleet. At just 31kg per triple seat compared to a 41kg average for other low-cost carriers, the fuel savings are considerable and sustainable credentials laudable.

LOCK AND LOAD The NFW concept was built in Maidstone, Kent, by Advanced Tooling Systems (ATS), a business with an automotive background in low-volume manufacture. Contour says the final concept for the Hamburg Expo is not intended to be something show-goers can place an immediate order for, but equally it's not an impossible dream either. As White adds: "We always try to ground our blue sky ideas with things we see going on around us in terms of social change. We deliberately didn't push the technology side too far. We wanted stuff to be recognisable. The screen is mounted to be upgraded. You wouldn't need to pull the seat out, you could adapt it."

This flexibility chimes with trend forecasting expert James Wallman, editor of the Lifestyle Network Global (LS:N) website. He sees an emerging breed of passenger confident enough with their own media to increasingly bring it with them on board. Just as iPods and their ilk have become the default musical storage device and iPads commonplace for video, the ability of such stations to dock with a variety of devices could become key. In the auto industry it's already happening, with Range Rover's latest high-end Autobiography models featuring iPads in the rear headrests instead of fixed screens.

ORIGINAL THINKING It was also important to White to show something original compared with what he considers are the usual aircraft interior clichés of "bunk beds and ladders, or seats you need to be strapped against. I'm really surprised there's so little innovation. It's very important for the airline industry that it examines different ways for people to travel. God knows when you're involved in big research projects as we are – passengers are far from satisfied with the amount of innovation in aircraft. There is an enormous opportunity. So it's exactly right that companies like Contour should commission this sort of project. I think all seat manufacturers should be going back to the carriers and saying 'look guys, have you thought about this?'"

Another trend LS:N's Wallman sees being integrated into aircraft is more intuitive technology, citing a BMW prototype where if the driver says, "my feet are cold" the response from the car is to turn on the air-conditioning to blow warm air into the footwell.

Further developments could be seats that monitor biorhythms so a hostess can tell when to wake a passenger

- 02. Rear view the seat structure is made from composite Kevlar
 03. Front view the
- monitor stand could also be a docking station, allowing passengers to use their own devices

04. Airlines would have the option to include dedicated game controllers 05. Cabin view – let

the games begin!

04

up, and in a global culture more open than ever to sharing information through social networks, passengers and carriers that do the same may improve their experience and service respectively. This is already done on a micro level when customers inform caterers if they are vegetarian or have an allergy but it could easily extend to any other aspects of wellbeing so for instance a carrier would know to stock the right kind of pillow for a traveller with a bad neck. The Rival Hotel in Stockholm already does this, offering guests the chance to choose from its 'pillow menu'. As Wallman says: "Airlines that open up a bit more may get something back."

LEGALISE IT! But could the fear of stifling safety legislation and relatively small production volumes be putting off designers, suppliers and carriers from pushing the boundaries a little further? White thinks not: "Certification issues are a huge comfort zone for the industry", he says, before chuckling, "it's the ultimate 'the cat was sick on my homework' excuse."

Factorydesign's significant work for many other industries, from writing products for MontBlanc and ideas for Ford car interiors, plus significant ethnographic research, gives the firm a confidence borne of outside experience to keep pushing boundaries and reaffirms what is possible to achieve too. As White concludes: "In reality, with care and consideration any designer worth their salt should be able to come up with a lot more innovation than is available at the moment and there is increasing pressure for them to do so. It's a very conservative place."



SHOW TIME Contour's Lovell is looking forward to debating the NFW seat with airlines at the Expo in Hamburg. "We'd like to know whether such radical thinking is viable," he says. "Whilst passenger density is always key to the economics of the offering, it is not that many years since first-class and business-class seats were very conventional and nearly all forward-facing. However in a relatively short time we now have multiple cabin configurations. Premium economy is also having an impact, best demonstrated by Air New Zealand – what will the next 10 years produce?"

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bandwars

The struggle for passenger broadband dominance started in earnest last year when two Ku-band satellite providers flung down the gauntlet to the L-band incumbent – but now a third technology – Ka-band – is about to enter the fray BRENDAN GALLAGHER, AIRCRAFT INTERIORS INTERNATIONAL

Military historians agree that some strategies have proved to be a very bad idea right from the start – invading Russia for one, invading anywhere without air cover for another. Until recently, investors might have taken a similar view of the air transport connectivity business, which has seen many a bold adventure come expensively to grief over the past 20 years.

But in 2010 the old, gloomy certainties seemed to be crumbling. Inmarsat, which had seen its aeronautical operation effectively subsidised by the maritime and landmobile markets for nearly two decades, revealed that aviation's contribution to its overall revenues had climbed from single figures to more than 16% over the past five years. Mobile phone service provider OnAir, which uses Inmarsat's 432kbit/sec SwiftBroadband for the air-ground link, saw its tally of committed airlines top 25, among them the glittering prizes of Emirates and Singapore Airlines. And Iridium, also operating in L-band, said its first airline-centric offering – the 128kbit/sec OpenPort-Aero – would soon be ready for market. On the other side of the technology battlefield, Panasonic and Row 44 each saw several years of effort rewarded with the launch of megabit-rated Ku-band services by Lufthansa and Southwest Airlines respectively. The latter programme, covering the prototypical low-fare operator's entire fleet of more than 500 aircraft, is believed to be the biggest in the history of satellite communications for aircraft. A third Ku operator, ViaSat, doubled the size of its business aircraft customer base by acquisition and made no secret of its air transport ambitions.

The company that should get credit for proving the existence of passenger demand for internet access in the cabin happens to straddle a technology divide. This is Aircell, whose terrestrially-based Gogo service is now in service on more than 1,000 aircraft belonging to major US airlines. Meanwhile, in the business aviation world, the Illinois-based company works with the Iridium and Inmarsat communities to serve customers who want to operate beyond the reach of its North American ground network.



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VIASAT ALSO HAS AIR TRANSPORT AMBITIONS, AND TO ACHIEVE THEM IT PLANS TO MOVE UP THE ELECTROMAGNETIC SPECTRUM, TO KA-BAND

GERMAN METTLE Following the launch of its eXConnect Ku-band service with Lufthansa in November 2010, Panasonic is now looking forward to seeing it implemented across the carrier's fleet of around 100 long-haul aircraft by the end of 2011. Programmes should also be under way with other customers, including Turkish Airlines, Cathay Pacific, Air New Zealand and Virgin Atlantic.

eXConnect allows passengers to access the internet, VPNs and email via their own WiFi-capable laptops and smartphones. The service is part of Panasonic's Global Communications Suite, which also includes mobile phone and live TV capabilities. Lufthansa has selected the eXPhone mobile phone product, offered in conjunction with AeroMobile, for installation from spring 2011, and is also evaluating eXTV live inflight television.

Row 44 has a similarly busy year ahead. Installations of its equipment on Southwest Airlines' Boeing 737s totalled around 60 at the end of 2010 and the rate was set to increase with the aim of completing the job by 2013, according to the Californian-based service provider. At the same time, it will be ramping up installations with first European customer Norwegian Air Shuttle, which operates dozens of Boeing 737-800s, as well as crossing its fingers for a successful outcome to a United Airlines trial on one of its Boeing 757s.

The Norwegian programme was to have begun over a year ago. But European regulatory matters dragged on, and it was not until the turn of the year that EASA granted the necessary supplemental type certificate to allow installation

of the Row 44 fit in the Boeing 737NGs. The company has also been licensed by the US Federal Communications Commission to offer service over the North Atlantic. The first taker for this capability has yet to be revealed, however: Southwest and Norwegian are respectively confined to North America and Europe, while third customer Mango Airlines is South African.

ONWARDS AND UPWARDS The third Ku-band contender is ViaSat, which in 2010 acquired the ARINC SKYLink business aviation service to push the customer base for its Yonder offering beyond the 200-aircraft mark. The Californian-headquartered company believes Ku-band has plenty of capacity to meet business aviation demand over the next couple of years. But ViaSat also has air transport ambitions, and to achieve them it plans to move up the electromagnetic spectrum, to Ka-band.

Inmarsat has come to a similar conclusion despite enjoying an Indian summer with its existing L-band services. In summer 2010 the London-based company unveiled strong recent performance and claimed 75% share of the overall aero satcoms market. "We have seen a lot of growth in passenger connectivity," said chief operating officer Perry Melton at the time. "Our aeronautical services are already strong in government and business aviation – now there's growing take-up in air transport."

At the same occasion Melton hinted at something new in the offing: "Our maritime and land-mobile customers need more bandwidth, along with global coverage and flat-



rate pricing," he said. "We're not far from committing to the new satellites we need to deliver that. Look out for an announcement soon - it could mention a frequency band beginning with K."

Two months later the secret was out: Inmarsat's next constellation, to be launched from 2014, would exploit Kaband to deliver typical data rates of 50Mbit/sec to the user terminal. The company went on to choose Boeing to build the three Inmarsat-5 geostationary satellites that will support the service, branded Global Xpress, and now system definition and vendor selection are proceeding apace.

At the end of 2010 Inmarsat was in final negotiations with one, possibly two, vendors to provide the ground segment, a maritime terminal designed around a 60cmdiameter antenna, and core modules for use by other suppliers in developing user equipment for other markets, including aeronautical. The company sees Global Xpress as

THOUGH INMARSAT IS FULL STEAM AHEAD ON KA-BAND IT IS LIKELY BE BEATEN TO THE MARKET, IN NORTH AMERICA AT LEAST, BY VIASAT a complement to its existing L-band services, including SwiftBroadband, allowing it to retain heavy users by transitioning them to Ka-band, and also to enter new markets.

FIRST STRIKE Though Inmarsat is full steam ahead on Ka-band it is likely be beaten to the market, in North America at least, by ViaSat. The US company has launched an air transport Ka-band programme with JetBlue, which plans to introduce a service capable of delivering tens of megabits on its A320s and Embraer regional jets as early as next year. The service will be available in North America, supported by a pair of satellites stationed over the continent: the new ViaSat-1, to be launched later in 2011, and the four-year-old WildBlue-1.

ViaSat antennas and SurfBeam modems will be fitted in JetBlue's 160-aircraft fleet, with first installations scheduled for mid-2012. Applications are expected to include not only email and web access but also personalised broadband entertainment. "We want to get this programme up and running first," business development director Bill Sullivan said recently. "Then we'll address other carriers and the government market before moving on to business and VIP aviation around 2013-14."

ViaSat sees Ku and Ka peacefully co-existing for some time. "Aircraft from the narrow-bodies upwards can readily support multiple antennas," said Sullivan. "We envisage a Ku and a Ka antenna accommodated beneath a single radome. Such a solution would give the operator access to the worldwide Ku capacity we already have in place, along



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with the higher data throughput that we will provide with Ka over North America."

TWO-PRONGED APPROACH So where does the rush to colonise Ka leave Panasonic and Row 44, who are just beginning to see the possibility of a return on several years' investment in Ku-band? Panasonic makes no secret of its readiness to advance on two fronts. "Our new Ku antenna from EMS Technologies is flying on a BBJ and undergoing qualification testing to meet the extremely difficult Boeing production line requirements," global communication services VP David Bruner said. "However, the airlines don't want to invest in technologies that may be replaced a few years later by something more capable or cost-effective. If or when Ka-band becomes available, we will offer an upgrade that will optimise our existing solution for that technology."

It has been reported that Panasonic is already working on equipment to support a dual capability. "Yes, we really are designing a hybrid Ku/Ka antenna," Bruner confirmed. "We were looking at the technology even before Inmarsat announced its Ka-band plans."

It has been speculated that Panasonic's connectivity roadmap might include adoption of London-based Inmarsat's new service, due for introduction in 2014-15. In that scenario, existing GCS users would swap in Ka-band airborne equipment, with Panasonic switching to Inmarsat for the satellite link. One advantage of that approach, it is suggested, would be to relieve Panasonic of the task of managing the present jigsaw of leased Ku-band capacity.

border skirmish

As the battle lines are drawn up for the next war of the connectivity technologies, two of the Ku players are fighting a border skirmish. In 2010 Panasonic applied to the US Federal Communications Commission (FCC) for operating authority for the aircraft Earth stations – avionics and antennas – now being fitted to the aircraft of launch customer Lufthansa and other airlines to support the Ku-band eXConnect service. The authority is effectively a licence for the equipment to be used in US airspace, and Panasonic hoped that, given the extensive trials already carried out, getting it would be little more than a formality.

The Lake Forest-based company even amended its application to supply the FCC with additional data on antenna performance. Moreover, says Panasonic, it had already properly consulted – "coordinated with" – potentially affected satellite operators to ensure there would be no interference with their services.

The company's hopes were dashed in mid-October when Row 44 filed a petition with the FCC raising questions about the completeness and consistency of the Panasonic application. Panasonic volleyed back, then attorneys for the two wrangled inconclusively before the holiday season intervened and silence fell upon the Western front.

Commenting at the start of this year on the possibility of resumed hostilities, David Bruner, Panasonic's VP for global communication services, said: "The FCC's pleading cycle is over and we expect them to move forward with an affirmative decision in due course. We don't see the FCC addressing Row 44's criticisms because we have already fully coordinated our proposed operations. The FCC regards potentially affected satellite operators as the best judges of whether interference might arise, and in this case they have all expressly consented to the grant of our application."

Another pillar of the Panasonic case is the fact that the early eXConnect implementations are based on a legacy Connexion by Boeing aircraft antenna already authorised to operate in the USA on Lufthansa aircraft, and on iDirect modem technology licensed by the FCC to operate in thousands of land-mobile broadband applications. The company also pointed out that the overall system had been trialled for over a year without causing interference.

Row 44 begged to differ, however, with a source close to the company declaring: "Panasonic assumed it could be licensed quickly to redeploy the Connexion by Boeing antenna even though the modem and other aspects of the proposal differ significantly from the previously licensed system. But no applicant should get a free pass simply because some pieces of its equipment have been previously licensed for use by a different operator in a different system."

Fighting talk, though probably quite mild compared with the fusillades to be expected over the next few years as the protagonists begin to understand the true value of victory in the connectivity wars.



"We like having control of our Ku-band network and don't consider it a burden," Bruner insisted. "That said, we will always want to provide the best possible service, hence our interest in Ka-band. But the Inmarsat offering is at least four years away, and several technical and commercial questions remain to be answered. So there's much still to be done to determine whether Ka-band is the best course and, if so, whose service is right for our customers."

Panasonic is also keeping an eye on ViaSat. "They are capable providers of satellite modems and wholesale satellite service," said Bruner. "We will study all the available options – and there are several more – before making a decision around the end of this year or the beginning of 2012."

Row 44 is further away from any decision on the subject but likewise makes no secret of its interest. At last autumn's Airline Passenger Experience Association (APEX) event a company spokesperson declared: "Most of the technical issues associated with our Ku-band-based service are behind us. So now we're looking at upgrade technologies: we have a Ka-band study under way against the time when that technology is ready, and we have relationships in place with potential antenna manufacturers."

The connectivity industry has had its share of struggles in the past, and its winners and losers. But usually the victories were Pyrrhic ones, resulting in little net benefit for the last man standing. This time it could be different – as connectivity moves towards the passenger service mainstream, the spoils of war could be glittering indeed. \boxtimes

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01. Flydubai is the first carrier to receive the new Boeing 737 Sky Interior and the first to install Lumexis's Fibre To The Screen (FTTS) IFE system

At the end of last year a low-fare airline invited a party of journalists aboard a flight to sample its new IFE system. Any kind of media junket is something of a rarity in these straitened times, particularly when the invitation comes from the notoriously pennyconscious budget sector. Even rarer is IFE in these generally spartan cabins. So what prompted Flydubai, just 18 months old and still a projected two and half years away from profitability, to splash the promotional cash?

Low-fare or not, the airline is actually sparing no expense to offer its passengers an attractive service experience, and the December event was designed to show off a unique combination of cabin amenities. By the turn of the year the Flydubai fleet comprised 13 Boeing 737-800s, four of them fitted with the Seattle manufacturer's new Sky Interior cabin and the world's first fibre optic-based audio/ video-on-demand IFE system – Lumexis's Fibre To The Screen (FTTS).

In development since 2004 and successfully trialled by US Airways in 2009, FTTS was selected by launch customer Flydubai about 18 months ago. Combining lightweight, scaleable head-end equipment with a fibre optic network designed to deliver gigabits of data direct to advanced highdefinition screens, the system promises significant savings in weight, installation and running costs, and all the capacity in the world to accommodate new bandwidth-hungry applications.

sky's the limit

One of 46 airlines and leasing companies to have ordered the Boeing 737 Sky Interior so far, Flydubai was the first to receive the new-look cabin when it took delivery of a Next-Generation 737-800 in November 2010.

The Sky Interior features modern, sculpted sidewalls and window reveals, as well as new larger stowage bins that can accommodate more luggage while taking up less space in the cabin. The innovative assist mechanism of the new stowage bins gives easy access, and as they pivot up and out of the way, there is much more headroom around the aisle seats and a greater sense of overall space in the cabin.

Airlines can select from different lighting schemes that range from a welcoming, soft blue overhead sky simulation to a calm, relaxing, palette of sunset colours. LEDs replace incandescent signage, attendant and halogen reading lights. With an estimated 40,000 hours between replacements, Boeing says the LEDs last up to 10 times longer than the previous standard of lights.

Passengers will also notice a quieter cabin, more intuitive switches and call buttons, and improved sound quality and clarity through new speakers in each passenger row.

"Our airline customers will draw greater value from the superior passenger experience and from the many practical improvements we have made in the new design," says Beverly Wyse, 737 vice president and general manager. 02. Flydubai has opted for Recaro's popular BL3510 lightweight economy seating
03. The carrier's new IFE system has the capacity to deliver HD movies





ECONOMIC EXPLANATION Flydubai chief executive Ghaith Al Ghaith recently explained the reasoning behind the apparently risky decision to be the first to introduce a brand-new IFE technology. "Although we are a low-fare airline, we are still committed to investing in innovation when it improves customer service and makes economic sense," he said. "It's the economics of FTTS that have made its introduction with Flydubai possible. The use of fibre optic rather than copper cable makes it a lot lighter than competing systems. The weight saving translates into reduced fuel costs compared with a traditional solution and allows us to offer the service while continuing to keep ticket prices low."

At the same time, the airline has its sights set on directly extracting revenues from the system. "We charge our customers only for those services that they use," said Al Ghaith. "So IFE is available as an optional extra, in the same way as seat selection, extra legroom, baggage allowances and meals. Passengers are free to choose different offerings from the system, depending on their preferences and how much they want to spend."

Flydubai offers a mix of free content – flight information, music and games – and paid-for movies and television programmes, all refreshed monthly. Prices are in the range of 5-25 dirhams (US\$1.4 to US\$7) and payment can be made through a built-in card swipe at each seat. Food and drink can be bought the same way.

The capital cost of the Lumexis hardware will be amortised over eight years, according to Al Ghaith, while the airline expects revenues from the premium services to cover recurring costs such as those associated with the acquisition of new content and the additional fuel burn resulting from carrying the system.

Early operational experience reinforced the Flydubai chief executive's conviction that the bold move represented by FTTS would pay off. "The response from everyone who sees it has been extremely positive," he said. "The ability to offer movies in HD – which no other airline can currently do – and the ultra-responsiveness of the system really set it apart. Being able to sell food and drink on demand is another great strength, and one that our cabin crew are appreciative of. We're very pleased with the way the system has delivered so far and are totally convinced that we have made the right choice."

TALE OF THE SCALES Lumexis claims that FTTS is physically light to a game-changing degree. Has it delivered the promised weight and cost savings? "Absolutely," said Al Ghaith. "The shift from copper to fibre optic cuts total weight to around a third of that of traditional systems – even better

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than we had hoped for – and also reduces the initial purchase price. That combination makes it economically viable for us."

Improved reliability is another plus, according to the manufacturer. "We're the first airline in the world to take delivery of this system, so a few teething problems might have been expected," said Al Ghaith. "In fact we've encountered very few issues, and the team at Lumexis has acted immediately to rectify any problems that we have had."

As for ancillary earnings, Al Ghaith has his flag nailed firmly to the mast: "We do view the system as an opportunity to generate revenue. We expect the money we make will, at the very least, offset the costs of purchasing and operating the system, and over time will help us to become a highly profitable airline."

FLEET MANOEUVRES The Flydubai fleet currently comprises a mix of leased and owned aircraft, all equipped with 189 seats in a high-density, all-economy layout. The owned aircraft are being delivered against an order for a total of 50 Boeing 737-800s/900ERs announced in 2008, and it is expected that the fleet will have grown by at least 10 aircraft by the end of the year.

At the turn of the year the airline had received four Sky Interior/Lumexis-equipped aircraft, with a further two due during January and the remaining 44 to be outfitted as they are delivered. It is not intended to retain the earlier nine aircraft in the long term, so they will not be equipped.

The installation scheme, designed and certificated by Washington State-based Jamco America, requires the

WE EXPECT THE MONEY WE MAKE WILL OFFSET THE COSTS OF PURCHASING AND OPERATING THE SYSTEM

Lumexis screen and other in-seat hardware to be incorporated into the seats by German manufacturer Recaro at its Fort Worth, Texas, facility. The seat design is Recaro's popular BL3510 lightweight economy-class unit, modified with a new composite backrest to accommodate the generously sized Lumexis screen.

Completed seats and the rest of the FTTS system – the fibre optic cabling and head end – are installed in the aircraft by Aviation Technical Services at Boeing's Paine Field in Washington. "The first aircraft took 11 days from its arrival at Aviation Technical Services to delivery in fully certificated form to the customer, but the average is now down to three days," said Lumexis chief executive Doug Cline. "These timings would be remarkable enough for routine installations of an established system. But they are quite unprecedented for something so close to the start of its operational life."

He continued: "It wasn't all plain sailing: there were weather delays, components delivered late, learning curves 04. Flydubai's new 737 features a high-density, alleconomy-class cabin offering 189 seats in total







05. A new ceiling architecture and mood lighting enhance the sense of space on board
06. Redesigned luggage bins provide more storage
07. Enlarged window reveals are designed to

reconnect

flighť

passengers to the 'magic of to climb and plain old human error. But after just over five weeks we had four full-aircraft systems flying reliably in intensive daily revenue service with a young low-fare carrier. That has to send a message to an industry struggling with legacy systems and their associated costs of ownership."

TAKE THE STRAIN In developing and marketing FTTS, Lumexis has had to overcome a number of common technological prejudices, the biggest of which is that fibre optic cable is too fragile for the rough and tumble of air transport life. "So far, following the installation of hundreds of durable fibre optic cable assemblies, this has proved to be a complete non-issue," said Cline.

The Lumexis chief executive was also keen to reiterate the weight and reliability advantages of FTTS. "A legacy IFE data network comprises heavily shielded copper cables and failureprone zone and seat boxes together weighing hundreds of kilograms," he declared. "The FTTS data network, capable of delivering simultaneous but completely different streams of 720p HD video at 11Mbit/sec and above to all 189 seats in the Flydubai cabin, weighs in at just 16.3kg."

Lumexis puts total installation weight, including all headend boxes, screens, trays, cable assemblies, brackets and fasteners at 491kg, equal to about 2.6kg per seat. But Cline pointed out that FTTS itself contributed only half of that figure: "Our LRUs and fibre optic network add up to only 1.3kg per seat, with most of the rest coming from seat mounting hardware. Making those elements lighter is the next big opportunity for significantly reducing the weight of IFE."

WELL CONNECTED Flydubai now belongs to an elite, twomember club of low-fare operators who are using paid-for IFE to underwrite a combination of low ticket prices and high service quality. The other is Virgin America, famous for its Panasonic-based Red IFE offering. But there's one big difference between the two: while the US airline was an early adopter of the Aircell Gogo passenger internet service, Flydubai currently has no plans to get into connectivity.

"If they do decide to offer inflight internet once the present range of options has matured, FTTS will be ready," commented Cline. "Our system could simultaneously deliver email and web content over the fibre optic network to in-seat screens and via 802.11n WiFi to passenger wireless devices."

But he ruled out any imminent switch by Lumexis to wireless delivery of IFE content. "WiFi is still too prone to unpredictable interruptions from multipath interference or passenger devices," he said. "Passengers are accustomed to the sometimes halting delivery of internet access over ground WiFi networks and would probably tolerate something similar in the aircraft. But they would certainly not put up with having their inflight movies interrupted in the same way."

In Flydubai Lumexis has an enthusiastic and supportive launch customer as it bids to break the present market duopoly in the in-seat AVOD market. That position might have been filled by US Airways, but the recession intervened. So where is their second customer to come from? "We have a large number of advanced negotiations under way in relation to Airbus, Boeing, Bombardier and Embraer installations," Cline declared. "We'll go public as soon as we get agreement from those customers."

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broadenedhorizons

New lightweight seats are helping airlines transform their shortand medium-haul services, while passenger expectations are driving the addition of connectivity and IFE to narrow-body cabins

BERNARD FITZSIMONS, AIRCRAFT INTERIORS INTERNATIONAL

01. B/E Aerospace's Pinnacle seating continues to win orders A new generation of slimline, lightweight seats is proving to be the cabin furnishing equivalent of the proverbial better mousetrap, as their reduced weight and size make it possible to reconcile the previously contradictory objectives of reducing weight while increasing both capacity and comfort.

Since B/E Aerospace launched its Pinnacle seat in late 2009 the company has taken orders worth more than US\$400,000 (approximately £248,034) for the platform, which is already slated to equip more than 1,000 new and existing aircraft.

The company says that fewer parts and advanced materials contribute to reduced maintenance as well as a 15% weight saving. Significantly, the attractions of the new seat – said to be the lightest fully featured seat on the market – are so great that some airlines are placing simultaneous orders for retrofit and forward-fit airframes. "Airlines' new-buy aircraft decisions are driving contemporaneous decisions to retrofit the coach-class cabins of their existing aircraft fleets," says B/E CEO Amin Khoury. "We expect this trend to continue as the airframe manufacturers continue to increase their delivery rates."



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EUROPEAN UPGRADES Other manufacturers are also enjoying success with their new designs as established airlines target weight and space savings and enhance their short-haul products.

In 2010, Air France installed 6,000 Recaro Smart Line 3510 seats on the 37 single-aisle Airbus aircraft operated on its domestic network, which carries 11 million passengers each year on more than 730 daily flights. The new seat weighs just 9.1kg, nearly 40% less than the 14.5kg conventional seat it replaced, reducing the weight of each aircraft by around 750kg and saving enough fuel each year for 650 Paris-Marseille flights. It also enables the airline to add an extra row of seats to its A320s and A321s, increasing capacity to 178 and 212 seats respectively.

At the same time, the airline says, the new seat allows passengers an extra 2-3in (5.1- 7.6cm) of legroom. A new combination of foams is designed to makes the seat more comfortable, and it dispenses with a recline mechanism in favour of a fixed 15° recline. Their introduction in March 2010 was part of Air France's new European service, which saw fares reduced without losing the snacks, free newspapers and checked bag allowance that are the traditional perks of the network carrier.

At the end of the year, just as Air France was completing the installations, Lufthansa announced a much bigger seat replacement programme. The German airline plans to spend €170 million (approximately £142.9 million/US\$230.6 million) in 2011 on upgrading the cabins of the 180-plus aircraft in its short- and medium-haul fleets, including the installation of around 32,000 new Recaro Basic Line 3520 economy-class seats. The aim, says the airline, is to "create a new travel experience and ensure greater passenger comfort".

internet aloft

The USA still bans the use of mobile phones in flight – onboard picocell or not – but WiFi is fine and Aircell's Gogo (pictured) inflight internet service has been a principal beneficiary.

By the end of 2010, Aircell had equipped more than 1,050 aircraft to use the ground-based service, and the company expects to equip at least as many again this year. Delta Air Lines is expanding its use of the service from the 549 mainline jets already equipped to include 223 regional jets operated by Delta Connection carriers.

Southwest Airlines, meanwhile, has embarked on a programme to equip its fleet with Row 44's satellite-based broadband service. The airline, which operates around 550 Boeing 737s, expects the entire fleet to be equipped by the end of 2013. The Row 44 system promises connection speeds averaging better than 30Mbps. Weighing less than 150 lb (68.04kg), it can be installed in two nights, according to the vendor.

In February 2011, Norwegian Air Shuttle became the first airline to offer the service in Europe. Norwegian has ordered 73 Boeing 737-800s for delivery by the end of 2014. It expects to have 40 internet-equipped aircraft by the end of 2012.

Other elements of the revamp include snacks such as muesli bars and chocolate for economy-class passengers, even on domestic routes, and hot meals on cross-border flights lasting more than two hours. "We are setting new standards on European routes," says Lufthansa board member Thierry Antinori. "The slimmer seats will also enable us to increase the seating capacity of our short- and medium-haul fleet and thus ensure that we remain competitive in the future."



^{02.} Air France added Recaro SL3510 seating – and free newspapers – to its European economy product in 2010



03. Lufthansa is upgrading over 180 of its short- and medium-haul fleet with new BL 3520 units from Recaro
04. Air France says its new seating increases living space by up to

3in

The seats themselves, ergonomically shaped and with slim backrests, will give passengers more than 1.5in (3.8cm) of extra legroom. At the same time, the space saved by the slimline design will enable the airline to add as many as two extra rows of seats to each aircraft, a total of 2,000 additional seats or the equivalent of 12 A320s. The seat backs are shaped to enable standard roll-on bags to be stowed easily under the seat in front, and new overhead bins on the Boeing 737s will be deep enough for hand luggage to be stowed sideways, as on the Airbus models.

and the second second

Moreover each row of seats is more than 12kg lighter than the row it replaces, a weight reduction of almost 30%, cutting the overall weight of a Boeing 737 by more than 300kg. As well as lowering fuel consumption as a result, the seats use a lighter, chrome-free leather for upholstery. The interior of the backrest is perforated for high breathability and comfort.

LOW-COST OPTIONS Like Recaro's BL3510, the initial version of the Superlight seat from ACRO Aircraft Seating was designed without a recline mechanism. The company is due to complete deliveries of 42 shipsets to Jet2.com by May 2011, and has three customers already for a reclining version that received EASA certification in November 2010.

The original Superlight seat was designed to be more comfortable, lighter and easier to maintain, with simplicity as the basic principle, says Chris Brady, ACRO's commercial director. The seat pan and back are cantilevered off a single front spar and the backrest, angled at 15° rather than upright, is curved to give an extra 2.5in (6.4cm) of legroom, while the absence of a spar under the back of the seat increases chin room. "You can push your feet forward to the baggage bar without your knees or your shins contacting any structure," he says.



Each triple seat weighs 31kg, Brady says, saving around 720kg over an A320 shipset compared with a typical conventional seat. It's also designed to be very robust. "We've done that by careful use of design," he says. Aisle-end armrests, for example, dispense with the typical vacuum-formed plastic covers used to construct the bump strip.

"That bump strip will normally be on top of a plastic vac forming, which itself is on top of aluminium machining which is doing all the structural work," explains Brady. "Those vacuum formings are very expensive. It's a very expensive process because of the weight, the raw materials are very expensive because of the fire performance and they're comparatively fragile. There's a tough bump strip round but they're still exposed to the bumps and knocks." Take a step up in cost-saving.

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ACRO's design omits the covering and makes the unadorned aluminium machining part of the aesthetic.

The seat uses only 63 parts, which contributes to durability, and maintenance procedures are simplified. "A short-haul seat is on the ground for 25 minutes," says Brady. "There's no time for maintenance during a turnaround unless it's a three minute job." So every part is a line replaceable unit, a tray table can be changed in 20 seconds and a seatback in half that time.

The reclining seat uses the same armrest, legs, primary structural parts and table with a new backrest and recline mechanism. ACRO dispensed with the normal Bowden cable used to connect recline button to mechanism. Instead, a red anodised aluminium paddle under the seat cushion acts directly on the end of the hydrolock. "It's a lot less effort," Brady comments. "You don't have to move your body, you just pull the lever up and the thing goes back. And the armrest is much simpler and more durable."

The reclining Superlight R is slated so far for six Boeing 757s and seven Boeing 737s, all based in Europe, and should prove popular with operators who specialise in charter and wet lease operations, Brady believes. "They don't really sell to their own passengers, they're charter operators so they sell blocks of seats to other people who specify what the product is, so they don't want to lock themselves into a non-reclining seat," he says. "They like the idea of our seat being maintainable, but they couldn't buy the fixed-back seat because they aren't in charge of the product."

cabin calling

Single-aisle aircraft were the initial focus of onboard cell phone pioneer OnAir, and the company's service is steadily going global, with recent installations on Libyan Airlines A320s in North Africa, TAM Airlines A321s in Brazil, Aeroflot A321s in Russia and AirAsia A320s in Malaysia.

Since its connectivity programme was launched in October 2010, says Libyan Airlines's CEO, Emhemed Abrebish, "we have experienced a very good pick up of the GSM service, particularly the voice element. With the fast growth of smartphones in Libya, we should expect even more use of the service in the next few months." The airline's new A330s will have OnAir's WiFi internet offering as well as the GSM/GPRS service offered on the narrow-bodies.

TAM, which also introduced the service on a single A321 in October 2010, plans to extend availability to another 25 A320 family aircraft used on its domestic network. "The high use of onboard connectivity by our passengers has encouraged us to invest further," comments marketing officer Manoela Amaro.

Aeroflot service on a single A321 started in December 2010. "Aeroflot relies on the implementation of information technologies in every sphere of production and commercial activity for the improvement of the quality of customer service and economic efficiency," says CEO Vitali Saveliev.

SHORT-HAUL ENTERTAINMENT It seems likely that personal inflight entertainment will be increasingly common on short- and medium-haul services in the future, despite the relatively short duration of flights, as seats and screens become ever more tightly integrated. There have been several installations of at-seat IFE on single-aisle types in the

05. Acro Aircraft Seating's Superlight seating on Jet2.com







06. Air France says its new seat weighs just 9.1kg – making the flip down table ideal for a spot of 'light reading'!
07. Slimmer seats are allowing Lufthansa to increase seating capacity past, as well as current activity involving new systems, as airlines either extend the IFE provision from their longrange aircraft to shorter-haul fleets or look to differentiate themselves from their competitors. Asiana selected the Panasonic eFX system for its new single-aisle Airbus aircraft, while Qatar Airways specified the Thales TopSeries system for its fleet of 30 Airbus narrow-bodies. Meanwhile Brazils Azul opted to follow JetBlue's lead by selecting LiveTV for its Embraer 195s.

More daring was low-cost carrier FlyDubai's selection of the new Lumexis fibre optic-based FTTS system for the 44 Boeing 737-800s it has ordered. The first four aircraft were equipped in the last two months of 2010 – the first was modified and certified in just 11 days, with subsequent installations expected to take no more than five days. Beyond today's aircraft, seatback screens are being factored into the new narrow-body airliners from Russia and China, the United Aircraft Corporation (UAC) MS-21 and COMAC C919, from the start of their development programmes. At the 2010 Farnborough Airshow, UAC showed a cabin mock-up of the MS-21 featuring SICMA's Seat Integrated Technology (SiT) screens. The MS-21 is not due to fly for another three years, with service entry a couple of years beyond that milestone.

IFE will be optional seller furnished equipment on the C919, which is on a similar development schedule. Rockwell Collins will be the supplier, in partnership with Shanghai research institute SAMRI. A letter of intent with the manufacturer specifies a range of possibilities, from high-definition overhead video to what the vendor terms an "innovative client-centric in-seat solution with independent control of independent media players". The options will be enhanced derivatives of Rockwell Collins' existing dPAVES system.

CONTACTS

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A new cabin architecture offers enhanced options for customisation and enables Airbus to include provision for future reconfiguration in its A350 catalogue offerings **BERNARD FITZSIMONS**, AIRCRAFT INTERIORS INTERNATIONAL

The objective of the new cabin architecture Airbus has developed for its next wide-body aircraft is to facilitate airlines' needs for cabin customisation in a way that is manageable industrially both for the airframer and its major vendors.

The starting point, says head of aircraft interiors Bob Lange, was the fact that airlines know the cabin configuration they start out with in a new long-range aircraft is going to change during its service life: "In some cases it may change between the initial thoughts they have at the time they order the aircraft and what they actually select when they come to freeze their definition of the aircraft," he says. "Then it will continue to change once the aircraft enters service, with cabin elements typically changed every five to seven years in an aircraft with a service life of 20+ years."

Airlines, Lange says, have been looking for years for the flexibility to vary the number of classes of seating in their aircraft, the proportions of seats in each class, the location of boundaries between different classes of service, and the appropriate number of galleys and lavatories to support them: "That's the starting point in our business." The passing years have added complicating factors such as new and improved safety standards, the ability to withstand 16g deceleration forces, head impact criteria for seat certification and improved flammability characteristics. 01. A350 economy cabin – Airbus is designing the aircraft to enable airlines to more easily alter the position of monuments, partitions and seating





02. Airlines seek the greatest flexibility where premium seating meets economy
03. Window reveals are available in a range of options
04. Space protection of air systems in crown area

CAN MOVE?

At the same time, Lange says, "we're seeing more and more longer range services, which means the importance of the cabin as a crew workplace has increased." Seats have become more complicated, with electrical actuation, full flat beds and units mounted on pallets because they are at unusual angles relative to flight direction. "And in IFE we've seen a move towards video on demand in every seat and a far richer offer for the consumer."

LESSONS LEARNED Airbus started to address this growing challenge by studying the A330/A340 programme, whose products are now in service with more than 100 operators. "That means we've done a whole lot of different cabin definitions," says Lange. And one conclusion was that flexibility has more value in some areas than in others.

In the forward passenger door area, for example, "we don't see the inherent flexibility used very highly. People don't want to put passenger accommodation there, so you tend to get a lot of similarity in the way we arrange galleys and lavatories in that area." The same can be said for the rear door area at the back of economy class. "But when it comes to the mid-cabin areas, particularly the area around Door 2 in a wide-body, this is quite often close to the boundary between premium and economy accommodation, we see a lot of variation in what is required in that area. Which tells us that providing flexibility in that area is valuable to our customers." ENABLING PLATFORM For the A350, Lange says, "we realised it was important to be able to cater for flexibility and that we have a very stable baseline platform for any subsequent adaptation." Airbus calls it the enabling platform.

Martin Latrille, enabling platform architect in the A350 chief engineering team, explains that airlines ask for geometrical as well as functional flexibility. Giving them the ability to move monuments such as lavatories and galleys an inch at a time in the Door 2 area can help them optimise the seat count, he says. "But how do you connect the water provided by the aircraft to the lavatory if the lavatory can move?"

Answering that question involved a complete analysis, he says, starting with the primary structure of the aircraft fuselage structure, the floor and the brackets that support the big monuments and act as adjustment points: "We clearly say today these are the non-customised parts of our platform. We have a standard green aircraft which is not customised, which is ready to host whatever the customer selects from the catalogue."

Also protected in the digital mock-up of the A350 are spaces for all the interfaces that might be necessary for the water, air, cooling, waste and electrical interfaces to support the customer's specification. "Whatever the combination or configuration of monuments in a customer-defined aircraft,

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we know exactly what will be the maximum demand from the aircraft and we are ready to provision it," says Latrille. "So we know that whatever catalogue solutions we put together with the customer to optimise his layout, we will not have the burden of a newly developed integration on the head of version [Airbus nomenclature for the first of a series of aircraft in a new customer configuration] for the customer. We just plug and play."

UNFORESEEN CONSEQUENCES Moving a galley even a couple of inches involves more than just moving the mechanical attachments to the floor and ceiling, points out Lange: "You need to move the fresh water connection, the electrical connection, the waste water and the refrigeration. You want it to look nice, so you have various transition panels in the ceiling that have to mate with it, and they all have to be moved or changed as well. So if you don't have a stable starting point you very quickly get a snowball of consequential design and certification work. And whether it's for the supplier or us as the OEM, that work builds cost, lead time and risk into the finished product."

The enabling platform is that starting point. To capitalise on it, he says, mechanical and system interfaces are all designed to be standard but adjustable, enabling their positions to be adjusted using known design solutions rather than having to start the work from scratch. And this modular approach extends to the galleys and lavs themselves.

"When you look inside a galley today," says Lange, "you see a structural box providing cooling, water, waste and

waste management

The lavatories that C&D Zodiac is developing for the A350 offer a dazzling range of choice, from the size and shape of mirrors, countertops and cabinets to flush buttons, faucets, handles, trim colours and surface finishes.

"As a next generation wide-body aircraft, the A350 programme has the difficult task of providing high levels of customisation while managing costs, lead times and risk," comments Scott Savian, EVP customer and product with lavatory supplier C&D Zodiac. "The A350 lavatory is a smaller version of that same problem. Not coincidentally, we have both taken a modular approach."

With 29 different lavatory sizes and positions, 130 optional features and a full spectrum of decor and colour options, "we can provide for literally millions of lavatory possibilities," he says. "Fortunately, we had been working on a modular lavatory system that was perfect for this type of aircraft and set of requirements – in fact, I cannot possibly imagine providing this level of customisation at reasonable cost and lead time without a modular solution for the lav. It is the pre-designed, plug-and-play modules that make this level of customisation possible."

Interestingly, he adds: "In our minds, modularity was never a constraint, it was a necessity. However, outside factors continue to threaten the modular approach – most notably, the airlines' feeling that modularity could be a constraint on them. Providing even more custom solutions within this environment while maintaining modularity has been the toughest challenge."

electricity systems. Within that you have functional parts – ovens, refrigerators, coffee makers, rice cookers, toasted sandwich makers, there's a long list." Airlines' requirements for inserts vary according to their service concept and process. "So inside these monuments the locations of these inserts are also flexible."

05. Airbus says the A350's upper attachments allow 'inch-byinch' monument flexibility
06. Business-class cabin rendering

Not infinitely flexible, Lange cautions: people usually want to put the sink in one of two places in a particular galley, for example. But the 1,000-plus A330s and A340s Airbus has delivered have involved many heads of version: "We have a lot of experience in listening to our customers"



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needs and knowing what their expectations are. And our modular concept is built from that customer expectation. So we're able to avoid that snowball, because the combinations are already being designed and will be certified, and then you can choose from the catalogue and mix and match."

The extra width of the A350's XWB fuselage meant the galleys could be widened to incorporate a central port bay 5in wide. Flexible couplings are used to connect the galley port to the fixed handover points in the water, waste, cooling and vacuum pipes under the floor. In the areas where flexibility is allowed, the system ports are 25in apart, says Latrille: "If I move more than 25in with my monument I have to connect to the next port, but this port is connected with the same type of pipe as the port before, because even the supply pipes are standardised." A similar arrangement of dedicated handover points and flexible couplings is used for the lavatory water and waste connections, and for the overhead air-related systems in the crown of the aircraft.

For the mechanical interfaces, he says, flexible solutions mean there is no need to do a new design for a new monument position. The seat tracks provide a connection every inch, and in the A350 the monuments are attached to the seat tracks, either directly or using a large floor panel in the case of heavier monuments, using standardised upper and lateral attachments.

DESIRE FOR DIFFERENTIATION "We're in an industry which has been crying out for differentiation between different aircraft for different airlines," Lange observes. "Airlines absolutely need that when you walk onto their aircraft you immediately identify with their brand and their

menu of options

According to sole source galley supplier B/E Aerospace, a modular design approach and early engagement in early trilateral discussions (among Airbus, the airlines and B/E) will enable the company to supply a product that is already robust and mature by the time the A350 enters service.

"The modular approach enables a comprehensive catalogue of galleys with many options to be developed, allowing the airlines to configure their LOPAs to meet their service requirements for today's and future service requirements," says B/E's Craig Cunningham.

"The flexible service provision along with the modular approach meets the requirements of the many different airline LOPAs while still meeting the short industrial lead-time initiatives for the aircraft."

B/E says it is working closely with Airbus to ensure that the modular and flex concepts are efficiently approved through the substantiation and certification processes that are critical to supplying a product that is both robust and mature at service entry.

"B/E has worked very closely with Airbus through the integrated engineering systems developed for the new sourcing policies developed for A350XWB to realise the many technical challenges of the modular and flex concept," says Cunningham. "This innovation will be seen by the airlines when they start to develop their LOPAs."

cabin and their choices and the products in that cabin." Legacy platforms were not designed to accommodate that, he says. "So we've ended up with a kind of can-do approach which at the end of the day gets a quality product into the cabin, but in a way which is extremely onerous for all the actors involved – not least the airline customers. What we have tried to do is create a structure and a platform that allow for flexibility and innovation in the cabin but based on what is fundamentally an inviolable platform. So when people do need to develop new cabin products they know exactly what they're designing to match with."

The result is a catalogue of highly modular design solutions. "The catalogue for the lavatory, for example, has a huge variety of mix and match options," he says. And in a first for a large commercial aircraft, customers can not only delay their final decision until as little as eight to 12 months 07. Modular galley unit – the central bay below the counter holds the connections to water, waste and refrigeration systems, and the standardised attachments on top attach it to the overhead structure and services

08. First flight of the A350 is expected in 2012





FOR LESSORS OF AIRCRAFT, IT GIVES MUCH MORE FREEDOM TO RECONFIGURE THE AIRCRAFT BETWEEN CUSTOMERS

 09. The enabling platform will allow seats to be re-pitched and class boundaries moved overnight
 10. Space

protection of supply systems in passenger floor before delivery, but can change those options once the aircraft is in service without removing the lavatory.

There is also a process to accommodate future innovation, whether from the airlines or their suppliers. "We are always looking for new ideas," Lange explains. "When we see a new idea we look at how it can be developed in a way which enhances the catalogue." And if an airline wants a degree of exclusivity over an idea, "our process allows that to happen, but not at the same lead time and cost as taking a solution from the catalogue."

FUTURE PROOF The advantages of the modular approach extend beyond simply allowing the airlines a less risky flexibility to get what they want, Lange says. "It also provides us savings when we're building the aircraft and it creates opportunities to reconfigure the aircraft that airlines haven't had on previous generations of aircraft."

In fact, the catalogue will include optional reconfiguration provisions, with additional interfaces to support "a light reconfiguration in a short lead time," he explains. "That again is an industry first. It will be the first time that the selection catalogue of a commercial aircraft lets you choose a reconfiguration pack as an option. And

what that allows you to do is if you take that pack, once your aircraft is delivered there is a particular scope of change you will be able to accommodate typically in an overnight stop."

10

The scope of change in an overnight stop may not run to moving the monuments around to a significant extent, but it allows for seats to be re-pitched and class boundaries moved. "Where we saw market demand for that from the airlines was for seasonal schedule changes," he says. "For lessors of aircraft, and let's not forget that a good third of aircraft are on operating leases, it gives much more freedom to reconfigure the aircraft between customers, which ultimately makes that business support from the lessors to the airlines more dynamic."

The reconfiguration provisions liberate some cabin configuration changes from the heavy maintenance cycle to which they have traditionally been tied, but they do need to be specified and installed before the aircraft is built and delivered. "It doesn't mean you can't do it later," Lange says, "but that would involve a much greater scope of work."

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01. Those travelling for business will be greeted by a new interior aesthetic that places efficiency above all else



Born from (some would say) drug-induced quasireligious and idealistic sub-cultures in the 1960s, incubated by pressure groups in the 1970s, hijacked by radicals in the 1980s, repositioned and repackaged by the media in the 1990s and used as a political differential and industry unifier during the 'noughties', sustainability has now found its rightful home as a 21st century business model. Ultimately, the world is slowly realising that sustainability goes hand in hand with modern business best practice: community, efficiency, harmonisation and creativity.

However, sustainability and all it entails can often sit uncomfortably with clients and agencies alike when conversations naturally migrate towards the long-term thinking that design for aviation involves. Everyone in the industry agrees sustainability is a very important issue that needs addressing, yet the complexities inherent in air travel can be overwhelming, intimidating and daunting. Progress will rely on the aviation community working together: aircraft manufacturers, suppliers, airlines, airports, governments and travellers all need to pull together around a common goal.

Collaboration will be key – Teague recently worked with Southwest Airlines, InterfaceFLOR and The Boeing Company to jointly develop a recycled, modular carpet concept. The 100% recyclable carpet can be returned to the manufacturer at the end of its service life to be fully recycled into new carpet using a completely carbon neutral process. The carpet also helps to reduce labour and material costs as it can be installed in sections, thus eliminating the need for total replacement of areas such as aisles, where Southwest

lean thinking

Despite arguments to the contrary, sustainability and aviation actually have much in common – as both strive for the ultimate in efficiency. The following fundamentals of cabin design should help ensure a greener planet and a more profitable airline industry:

- Weight saving the quest to deliver solutions that deliver a credible weight reduction without compromising safety, functionality or overall aesthetics is a constant in aviation circles.
- Ease of embodiment ease of installation, efficient replacement of parts and more convenient procurement – the easy implementation of interior packages is increasingly important for an industry striving to reduce cost while retaining competitive advantage.
- Part count reduction the industry needs to consider the wider ramifications of design realisation from manufacture through to implementation, cleaning, maintenance, retrofitability and the eventual afterlife or disposal of components.
- Adaptability ensuring the controlled customisation of some cabin elements to enable ever more sophisticated brand differentiation and product enhancement. The industry also needs to provide a cabin infrastructure capable of accommodating passengers' changing needs and expectations, particularly with regard to personal digital technologies, which will increasingly redefine the traditional role of in-flight entertainment.
- Reclamation of space the relentless search to find and repurpose hidden and redundant spaces within the aircraft interior without negatively impacting systems and structures.

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currently uses one single piece of carpet. This innovation, a major breakthrough for the industry, is a testament to the power of system design and community collaboration. Only by thinking holistically, courageously and creatively could a viable and sustainable alternative to inflight carpeting be successfully conceived and implemented, elevating all four companies in the process.

SAME AS IT EVER WAS One saving grace for all of us concerned with aircraft interiors is that the fundamentals of aviation design have much in common with many of today's 'sustainable' principles and practices (see sidebar). After all, aviation has always strived for efficiency – and efficiency is fundamental to sustainability. However, in order for the industry to reach its targets going forward – an IATA directive calls for a 50% reduction in carbon emissions by 2050 – we need to add a few more 'fundamentals' to this list: design for disassembly, cradle-to-cradle system thinking and lifecycle analysis.

In fact Teague's aviation team has identified three 'P's to focus its energies going forward with regard to sustainability: product, politics and perception. Through product, we want to continue maximising efficiencies via weight saving, simplification, reduction of part count, ease of retrofit and ease of installation. The near future, however, requires a new generation of materials from composites through to titanium and carbon fibres. Longer term, biomimicry and nano technologies offer vast potential, although their refinement and application will require the aviation industry to collaborate with new partners from other sectors such as automotive, architecture, medical and energy in ways not yet seen before.

AN IATA DIRECTIVE CALLS FOR A 50% REDUCTION IN CARBON EMISSIONS BY 2050

Politics requires the industry to self regulate through a shared success criteria and collective agreement on measurable targets (emission levels or increased product life cycles). All stakeholders within the aviation community need to take responsibility: airlines, airports, aircraft manufacturers and suppliers. This is already happening in other sectors, including automotive, construction, food, agriculture, health and well-being industries.

02. Solar-powered airships could cater to the demand for leisure travel

Perception, however, is ultimately the most effective agent of change. Society will increasingly take responsibility for its consumption habits as it becomes more and more aware of the long-term impact of using the planet's limited resources for personal mobility. We've only just started this conversation, which will be informed by our children and finally acted upon by our grandchildren.

BRAVE NEW WORLD Shocked by this reality, I asked my team of strategists, designers and engineers to tackle this challenge head on. How can we deliver air travel to a society that has grown up with technology, modernity and the false expectation of speed, immediacy and choice in a world with



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 03. Improved ground services would enable business travellers without luggage to pick up what they need at their destination
 04. Business travel would require official approval finite and precious resources? Depending on whom you ask, we have between 40 and 60 years of economically viable petroleum left to mine on planet Earth. Apparently, we have gas reserves for another thousand years or so, but during this century, it will become more expensive to extract than it will be to utilise it as energy. If this proves to be true, we have one or two generations of aircraft left before we drink the planet dry of fuel.

Using our 'three Ps' of product, politics and perception, we explored a radical solution, dubbed Flight 2.0, which is frankly more attractive than the threat of drinking the planet dry of fuel.

FUTURE VISION Flight 2.0 suggests that 80% of commercial air travel is much slower – huge airships powered by a combination of hydrogen, solar energy and fuel cell technology transport the volume of traffic across the world. Travelling slower means providing a different experience for passengers. It blurs the notion of work and pleasure and challenges our convention of unsustainable speed. It reminds people of the beauty of slowing down. There are huge opportunities here for airline and hospitality brand partnership. Airships bring with them the advantage of increased flexibility in terms of onboard experience, payload options, integration with related transport infrastructure and landing zones.

Such a mode of transport should be aggressively statesubsidised, to encourage a change in consumer attitude and behaviour when planning travel. Governments have always played a fundamental role in the evolution of aviation. They control and manage slots and flight paths. They facilitate trade and energy supply. In the future they will need to have a meaningful voice in the restriction, education and provision of air travel for the good of the entire planet.

What about the 20% minority that genuinely need the luxury (in its truest sense – the burning of fossil fuels) of speed? These will be catered for by modes of transport that

03

optimise performance, including the removal of everything that is non-essential from the cabin interior. In so doing, we stripped out decades of evolved design detail. The lining package, overhead bins, carpet and flooring.

The resulting and at first rather austere aesthetic offers a different beauty and encourages passengers to understand what the compromises are when burning fossil fuel in the pursuit of speed. It has happened in our homes – think loft apartment. It has happened in retail, hospitality and the work-place. Motorbikes and bicycles are statements of engineered beauty in their own right. Why not aircraft interiors?

Airlines would then need to expand their ground offer to compensate for not allowing luggage on board. We even suggest minimal crew and no galleys with (grab-on-theground) catering provided before the flight.

Passengers would need to apply to a suitable authority to be allowed the right to travel. The criteria could be a combination of economic, social, political and cultural factors – many frequent fliers do this now in the form of visas and work permits.

TRADING PLACES Our explorations led us to an interesting paradox: first class becomes an experience more associated with economy travel, whereas economy travel becomes an event more synonymous with luxury.

The interesting learning with this particular study is the importance of context and design. Only by thinking beyond our immediate terms of reference with the aircraft cabin and considering the bigger picture regarding airline operation, government legislation and user acceptance could we envisage such a challenging statement. The future of cabin design will rely on understanding the issues that effect the wider aviation system and ultimately form the cabin experience.

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Over 500 companies will exhibit, so we've sifted through to find some of the most interesting concepts and products appearing at the show. From seats to IFE, from galley equipment to soft furnishings, the following pages are packed with both new innovations and updated classics.

Many of their creators have their fingers crossed for the Crystal Cabin Awards, which will again be presented at the show. The awards recognise cabin interior innovation and excellence, and this year the pre-selection committee has accepted 52 submissions from ten countries. Trophies are awarded in six categories (materials and components; entertainment and communication; greener cabin, health and safety; passenger comfort; industrial design and interior concept; and university), plus a judges' commendation prize. See page 143 for more details.

Finally, while you're at the show, don't forget to stop by the Aircraft Interiors International stand (5B4) – whether you want to share an idea or simply chew the fat, we'd love to meet you!

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Franklin Products will present designs to optimise cushion comfort. Its premium comfort designs include Soft-Touch foam, Comfort-Pro and Comfort-Core Technologies, which were developed to improve weight distribution and reduce pressure points. Soft-Touch comfort foam is formulated to have a very soft feel, but with the chemistry of higher density polymers for long-lasting durability. Vesa Vannas, Franklin Products' certified ergonomist, has compared Soft-Touch comfort foam with memory foams and says that Soft-Touch provides better support and is faster reacting to passenger movements.

The company will also introduce a global recycling programme. Airlines can now return cushions for conversion into alternative cushioning products and electricity.

Another area of expertise for Franklin Products is in laminated dress covers. Its Style-Pro Cover product can be used with most aviation-grade fabrics, leathers and alternate leather fabrics. Airlines including Qantas Airways, British Airways and Cathay Pacific Airways have selected Style-Pro Cover solutions for their cabins.



magic carpet

Greensky Carpet will showcase its eponymous carpet, which is made completely of PET polyester and is designed for the lowest weight possible. The company says it meets FAR 25.853 burn, smoke and toxicity tests for aircraft interiors, as well as passing Boeing (47064 A-M) wear testing.

The carpet weighs $920g/m^2$, which Greensky says translates into average fuel savings of US\$100 per year per kilogram, and CO_2 savings of about $300kg/m^2$ of carpet per year. It is also 100% recyclable after use.

The carpet is designed not to fray, the edges don't need serging, and the Velcro-like tape used for installation can be reused 6-8 times, allowing operators to easily access the floor.

"Photos, intricate shapes, perfect circles and colour variations are easily reproduced"

The top (visible) surface is printed, so airlines can match existing tufted carpets or be even more creative – photos, intricate shapes, perfect circles and colour variations are easily reproduced.

The product even eliminates the need for airlines to hold onto a large inventory – as once the design file is on system, carpet can be printed whenever needed.



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HYBRITE

The Top 5 Reasons to Change your Trolley Fleet;

🖸 Enhance your Cabin Interior Image with new Designs

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- Reduce your Environmental Footprint with Fuel Savings & Less Weight
- Vew standards in Design and Care for Crew & Cabin
- 🜠 Reduce Maintenance Costs with fewer Parts & less Time

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DRIESSEN GALLEYS & EQUIPMENT

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what is Hybrite?

Driessen will show its Hybrite line of trolleys, all of which feature a hybrid design; a combination of aluminium and composite materials. The range includes a full-size meal trolley, half-size bar trolley, waste trolley and air through, all of which are available in ATLAS and ACE configurations. Weight starts from 10kg for a bar trolley and from 15kg for a full-size meal trolley, dependent on the customisation.

The trolleys are designed to blend into the most stylish, modern and technical advanced cabin interiors; be modular; flexible in configuration and quantities; fully maintainable and recyclable.

High points include a handle with more hand space designed to make it easier to pull the trolley out of the galley; and a new brake system that acts on all four swivel castors (or on either two or four swivel castors for the half-size trolley.

To reduce maintenance time and reduce the number of spares required, Driessen has introduced complete interchangeability of major components throughout the line. The line has more than half the number of parts of Driessen's existing model.



Michiel Maris

DIRECTOR SALES AND MARKETING,

GALLEY EQUIPMENT, DRIESSEN

How did your new line of aircraft trolleys, Hybrite, come about?

Ever since Driessen – Zodiac Aerospace introduced lightweight aluminium trolleys, it has been looking at new materials and technologies to further reduce the weight of the trolleys, while not compromising the strength and long lifetime that Driessen is renowned for. We also wanted to increase the functionality and reparability of the trolley while drastically improving its looks, and creating new saving opportunities for our customers.

Why did you choose a hybrid design of aluminium and composites?

We initiated the road towards full composite trolleys, but were confronted with the fact that material prices were so high that these would make the trolley too expensive and durability could not be guaranteed. Our customers informed us that this was not what they were looking for. We still want to make a full composite range, but customers will only be interested if the materials are available in a lower price range and if materials prove to be more reliable and durable for the heavy duty task they have to perform. The Hybrite line is a smart combination of new and proven materials that still guarantees durability at an affordable price.

What testing have you done to ensure quality?

Driessen testing programmes go far beyond meeting all airworthiness and major airframe manufacturers' requirements

and approval with EASA or FAA certification. The trolleys are designed to withstand even severe abuse in day-to-day operations, and have undergone field tests and lab tests.

One of the most critical parts of securing certification is static testing. The trolley has to prove its strength under severe crash situations. In these tests forces equal to almost 1000 kilos of pressure are applied. These tests specifically show the strength of the structure in combination with its lock, hinges and doors. The Hybrite trolleys passed with flying colours.

Then there is the drop test, which tests the strength of the trolley's base and base part. To do this, a fully loaded trolley (weighing 100kg) is dropped from a height of 80cm. Tests show that the Hybrite base, brake mechanism and castors remain functioning and show no visible or mechanical damage.

The durability test, which is performed with a fully loaded trolley, is not specifically used for testing the castors, but primarily to test its superstructure and bonded joints for fatigue strength. The Hybrite trolley travelled more than 140km in the test, going over almost 30,000 bumps without having any impact other than the normal wear and tear.

Finally, for the wash tests, the Hybrite trolleys endured more than 720 wash cycles – which is equivalent to at least two years of daily washing.

When will it be launched?

Hybrite is fully certified and ready to use for inflight catering. Following the rigorous lab tests, we have been test flying the trolleys with several airlines over the past months. As all tests were passed, we are proud to introduce these new-generation trolleys to the market. We will accept the first orders from airlines, airframe manufacturers and catering companies from March 2011.

"We still want to make a full composite range, but customers will only be interested if the materials are available in a lower price range"

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Virgil

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SMOOTH OPERATOR

WASP will show how it can offer designers the opportunity to create seat/suite controls with a variety of smooth, ergonomic shapes that can include any combination of membranes, touchscreens, switches, push buttons and rheostat controls.

These design solutions can be adapted to suit almost any switching requirement and can also incorporate communications protocols including USB, RS232, CANbus, i2C, RS485, discrete and 802.15.4. Once designed, WASP will also qualify the unit for use on the chosen aircraft.

Already in use with several carriers, WASP's latest units provide a host of functions for passengers. Menu controls, lighting controls and status indicators can be combined and manufactured to fit almost any shaped aperture.

The company has extended and developed its suite lighting designs and has some completely new models to complement its mood, reading, puddle and wash lighting. The lights – incorporating LED technology – enable passengers to control angles, light intensity and diffusion. The lighting can be operated locally via a separate unit or through passenger/seat control or suite control units.



SERIOUS BIT OF KIT

Innovint will show its VIP kit for commercial or charter operated airliners. The company says the kit provides a quick and flexible way to upgrade the aircraft with minimum installation effort. The add-on executive lounge can, upon request, integrate electrical and IFE modules.



water feature

Franke Aquarotter was recently appointed to provide a customised lavatory water supply system for the müller/romca-designed first-class washrooms on Lufthansa's A380 (pictured). The manufacturer developed automatic optoelectronic fittings with a matt chrome design. With an intuitively usable temperature adjuster and associated LED temperature display, Franke created a modular design that can be integrated into the mirror. Invisible and inaccessible for the user, the technical components are located behind the mirror or under the washbasin.

"The technical components are located behind the mirror or under the washbasin"



LIGHT DUTIES

Perrone Aerospace will showcase its new EnduraLite Leather product, which it says is an economical, lightweight and durable leather alternative.

Weighing 1.3oz/ft², Perrone Aerospace says EnduraLite Leather is more than 50% lighter than traditional leather, netting carriers critical weight and fuel savings. The product looks and feels like leather, while being composed of a 100% fire retardant polyurethane face, and a proprietary blend of polyester backing, designed to yield incredible durability for years of service.

Perrone Aerospace says that EnduraLite Leather performs as well as or better than competitive leather or synthetic upholstery materials in all crocking, abrasion, flammability and flexibility tests; and excels in stitch tear strength and tongue tear tests.

The non-porous, solvent-resistant composition of EnduraLite Leather is designed to contribute to the complete removal of even set-in ink stains (when treated with the company's specially formulated EnduraLite Ink Remover), returning the product to like-new condition.

In summary, the company believes that its new leather alternative will yield substantial economic benefits for carriers in the form of weight and fuel savings, durability and longevity, ease of cleaning and more in-service time.

is the species most responsive to change hat survives Charles Darwin

The Top 5 Reasons to Change your Trolley fleet;

- 🗹 Enhance your Cabin Interior Image with new Designs V Reduce your Environmental Footprint with
- Fuel Savings & Less Weight 🗹 New standards in Design and Care for Crew & Cabin
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DRIESSEN GALLEYS & EOUIPMENT



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sit up and take notice

Zodiac Aerospace will showcase its new SiT AVOD IFE system, which is now flying with Royal Jordanian. Since 1 November 2010, passengers on Royal Jordanian's A340 fleet have enjoyed 100% dispatch reliability with the SiT system. Other passenger-pleasing aspects include a highly responsive touchscreen on which all functions can be instantaneously activated, stopped or put into stand-by mode with a simple tap of a finger or pen. Zodiac Aerospace says benefits for airlines include smooth integration and a short turnaround time; 12 days is sufficient to modify a complete wide-body aircraft, including STC approval.

SiT is based on standalone media players, which do not need servers for content streaming. An aircraft network interface is only necessary for the passengers services system, safety functions and additional streaming applications like landscape camera. The company says the key characteristics of SiT include fewer LRUs to minimise spare stocking, lower weight to reduce fuel consumption, and simplified IFE architecture for easier troubleshooting.

At the show Zodiac Aerospace will also announce new designs for 8in (20.3cm), 10in (25.4cm) and 15in (38.1cm) TV screens with new functions and new partnerships, but still embodying the same aim to keep things simple.

SiT will be implemented on South African Airways A340s in June 2011. Most recently, it was selected by Corsairfly for A330 and Boeing 747 aircraft, and for its A330-300 line-fit aircraft. For both its line-fit and retrofit aircraft Corsairfly also selected Zodiac Aerospace for seats (Sicma Aero Seats) and galleys (Sell).

Zodiac Aerospace strengthened its Cabin Interiors business with the acquisition of Sell from PAIG in 2010. Sell designs and manufactures aircraft galleys and galley insert equipment, as well as providing associated services for the global commercial aerospace industry.

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"Benefits for airlines include smooth integration and a short turnaround time; 12 days is sufficient to modify a complete wide-body aircraft"

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Pablo Picasso

HYBRITE

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leather launch

Wollsdorf Leather will show a new leather that will be used for a completely new aircraft seat. The company says that compared to traditional aircraft leather, the newly developed material offers weight savings of 40%. This was achieved by reducing the specific density of the leather – without, the company says, compromising any of its tensile strength. The leather used for these seats is manufactured employing an alternative, environmentally friendly tanning process that no longer requires the use of chromium. To improve the product's dirt and grease resistance, the leather is also treated with Wollsdorf Leather's newly developed Surface Protection System (SPS), which is designed to improve the material's soiling characteristics many times over, in particular for light colours. In addition, the company says SPS ensures simple and quick cleaning of dirty leather surfaces – a huge advantage for airlines.

Lufthansa Austrian Airlines will use this new leather product for its complete European fleet.



HOLD THE FLOOR

Gerflor will present its new and refined Batiflex AV 135 wood and mineral patterned non-textile floor coverings. These are all are suitable for installation in entrance/exit areas, galleys and lavatories.

The floor coverings were designed to boast a light weight and distinctive performance in terms of durability, antislip, dimensional stability, ease of cleaning and maintenance. They are available in rolls for ease of installation, fewer seams, ease of storage and minimised waste.



PAPER TRAIL

Linstol will launch a new double-wall paper cup featuring high-resolution photo-quality printing. This design will allow airlines to feature promotions such as special offers, new destinations, corporate images or images of local scenery. In addition to the airlines' own artwork, Linstol offers an unlimited photo library at no additional charge. It says the ink is eco-friendly, foodgrade quality and will not bleed or affect the flavour of the beverage.

The company will also debut the second generation of its wooden earbud made from sustainable wood and aluminium. The new PW-75 is designed to provide airlines with a high-quality, high-margin product designed for onboard retail.

Linstol is well known for its ability to customise all details of passenger-related products including design, logo, colour, size, weight and packaging. In addition to English, Linstol's offices in London, UK, and Naples, Florida USA, also offer communication in Spanish, German, French, Dutch, Danish, Swedish and Norwegian.



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what is SPICE?

Airbus will showcase SPICE (SPace Innovative Catering Equipment), a galley concept that it believes has the potential to become the first new industry-wide standard for galleys in over 40 years. It plans to make it available for deliveries early next decade.

To save weight, the concept puts today's standard meal trays into lightweight boxes instead of trolleys. Foldable Service Carts are then used to transport the boxes during passenger service. The design of the boxes, galleys and equipment is harmonised to use space in the most efficient and modular way. With these changes, Airbus says SPICE can save 400-600kg of weight and enough space to gain two to three economy seats on a typical wide-body aircraft seating 250-300 passengers. SPICE also offers equipment to segregate waste for recycling; and plug and play galley equipment to enable airlines to implement route-specific menus or adapt catering to changing tastes. Another advantage for crew is the elimination of lifting heavy boxes.





Daniel Percy

MARKETING MANAGER, AIRBUS

How has Airbus's SPICE galley project progressed since last year's show?

SPICE has been making steady progress during 2010. For the first time mock-ups and demonstrators were shown to a wider audience at the Aircraft Interiors Expo in Hamburg, Germany (18-20 May 2010) and Aircraft Interiors Expo Americas in Long Beach, USA (14-16 September 2010). We took these opportunities to seek further input from its customers and gauge their level of interest in the new galley concept.

How are airlines reacting to the idea?

Of 44 airlines surveyed, 98% rated SPICE more highly than today's galleys and 67% stated it was "very necessary" to update galley designs. Airlines rated SPICE ergonomics even more highly than the hundreds of kilogrammes of weight savings plus the extra seats that it would bring to wide-body aircraft. IATA took the initiative in mid-2010 to survey its member airlines and caterers worldwide to determine the level of interest in the broader issue of galley standardisation. 87% of IATA member airlines surveyed considered standardisation to be a goal worth pursuing and this view was supported by 96% of caterers. When asked whether the industry is ready to face this challenge, in each case a clear majority of respondents think we are. Of course the devil lies in the detail, and it is of prime importance for airlines to continue to be innovative in the inflight service they provide.

Have you trialled the concept recently?

The SPICE team spent most of last year deep in the details, but this effort culminated in December 2010 with the first full-scale cabin service trials in Toulouse, France. Over one week, 13 specialists from eight airlines (including Lufthansa, Virgin Atlantic, Air France and KLM) used our newly built SPICE Full-Scale Test Facility, which includes a Door 4 galley inside an A330 fuselage, a complete economy cabin, and a geometrical mock-up of a catering truck. A range of tests were completed, including the first application of a SPICE training programme and tests for cabin security during turbulence, with the week culminating in a complete meal and drinks service to a cabin full with 200 people. The main goal of these trials was to give the airline community hands-on experience of using the SPICE galley to complete typical tasks in a realistic environment. We wanted to go through a complete meal service, to get validation from airline cabin crew of the SPICE galley architecture and processes.

What did you learn from the trial?

We proved the value of using items that have been pre-prepared on the ground, such as the Beverage Box. The preparation for drinks service took just over five minutes. Today, this can take around 20 minutes, so SPICE brings a major improvement. There was a 50% reduction in food preparation time when compared to industry standards. We also got excellent feedback on training, with the majority of participants telling us that it was easy to learn how to use SPICE. On the ergonomics side feedback was very clear that SPICE is better. Finally, we got a resounding thumbs-up for our proposal on handling the equipment during turbulence.

Are there any tweaks that can be made?

As one would expect for a concept still under development, the airlines could still find room for improvement. The benefit of doing these kinds of trials is that you learn so much from the end users. We had a brilliant atmosphere of cooperation among the airline participants and they were very straightforward with us about what they liked and disliked. So now we have a really valuable list of ideas for making SPICE even better. With the number of items remaining to validate getting smaller and smaller, 2011 is shaping up to be a big year for SPICE.

"87% of IATA member airlines surveyed considered standardisation to be a goal worth pursuing and this view was supported by 96% of caterers"

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behind the curtain

EIS Aircraft will showcase its Transparent Curtain system, which has been installed in Lufthansa's A380 business-class cabin. This new separation system has been designed to create the impression of a visually downsized cabin space while at the same time providing direct view and easy removability. With its light yet firm and stable texture, the fabric is designed to withstand any flapping during flight, meeting service procedures while also offering visual attractiveness.

On its path to expand its green product portfolio, EIS Aircraft has – in cooperation with Flasin – added a lightweight curtain header system entirely made of natural bast fibre. In doing so the company has tried to tackle two key industry issues – weight reduction and subsequently, cost reduction.



By use of natural fibres instead of glass fibres, the company says the curtain header weight could be reduced by up to 40%, translating into fuel savings.

EIS Aircraft says that airlines' ecological considerations and technical requirements such as stability and deformation resistance were fulfilled by creating an entirely new assembly process.

GRAND DESIGNS

Chameleon Products will showcase its expansion into the interior design of bespoke executive business jets. It has produced several designs, selecting colours, wood, leathers and the overall look, and incorporating its surface decoration technique for aircraft seats and furniture.

Designs include Polar (featuring fresh cream leathers), Blackbird (with strong dark tones) and Moulin Rouge (defined by strong red and sober grey tones).

Chameleon was also able to introduce its Visionairy 3D picture process to create a 'Skygallery'. The Skygallery is a new concept that allows airline logos, brands, portraits or just other pictures to be displayed in the cabin in 3D. Chameleon Products has signed up two artists who specialise in 3D pictures to produce the designs, and the company certifies these into the aircraft. This was showcased on a Boeing aircraft at a recent air show and the company says it received strong interest.



CRYSTAL CLEAR

The 2011 Crystal Cabin Awards will be announced at the show. A pre-selection committee has accepted a total of 52 submissions from 42 companies, spanning 10 countries. These entries will be judged by an international panel of 18 aviation experts – including *Aircraft Interiors International's* very own editor, Anthony James – and distilled to 21 finalists.

Trophies are awarded for aircraft interior innovation in six categories – entertainment and communication; materials and components; greener cabin, health and safety; passenger comfort; industrial design and interior concept; and university. There is also a judges' commendation prize.

"This year, as in the past, there are several interesting innovations, along with positive enhancements to existing concepts and ideas," said Christian Körfgen, vice president of product management and innovation at Deutsche Lufthansa, and president of the judging panel.



SILICON ALLY

Rogers Corporation will exhibit its range of BISCO silicone aerospace materials. With over 175 years of materials science knowledge, Rogers offers BISCO silicone materials for interior applications including acoustic solutions, gaskets and seals, carpet padding and premium seating materials. On display will be the recently improved A2 Sound Barrier material, now available with reinforcement for enhanced mechanical strength. Visitors to the Rogers booth will be able to take the A2 Performance Sound Barrier Challenge and be entered into a draw to win a Bose noisecancelling headset.



WINNING CUSTOM

rohi will present the next generation of its fabric programme Customised Design Solutions (CDS). The programme – a modular tool box of yarns, colours and fabric styles – is designed to allow for rapid customisation, simplified certification and short lead times, starting at only six weeks. With its flexibility and short lead times, CDS supports short lead time aircraft programmes such as A350 or Boeing 787.

The company's 2011 aircraft fabrics collection is inspired by the theme of perspectives. Alternating colour contrasts and graphic elements feature strongly. Meanwhile Carbon Looks is a design study about the implementation of high-tech material appearance into aircraft textiles. A series of designs in shades of black and grey coordinates with carbon fibre surfaces – a trendy material in high-end seats.

rohi will also showcase Amba ECO aircraft leather. With a weight of approximately 650g/m², the company says the leather is 40% lighter than similar leather qualities and allows for airlines to reduce the fuel burn of their aircraft significantly. A unique Surface Protection System (SPS) protects the surface and enables easy removal of soiling.

what is Pinnacle?

B/E Aerospace will exhibit its new Pinnacle seat. In January 2011, the company announced airline awards worth approximately US\$200 million (£124 million) for its main cabin seating platforms, driven primarily by Pinnacle. The awards were for both new and retrofit narrow-body aircraft. Since its launch in late 2009, Pinnacle has captured awards to equip more than 1,000 new or existing narrow- and wide-body aircraft – initially valued in excess of US\$400 million (£248 million).

B/E Aerospace says that Pinnacle offers a 15% weight reduction over today's lightest fully featured seat, achieved through the increased use of composites, an integrated comfort suspension system and a 25% reduction in parts. The seat is configured to order and its modular design allows customers to mix and match features. Pinnacle can accommodate a variety of IFE options, including conventional screens of up to 10.6in (26.9cm), and up to 12.1in (30.7cm) for integrated seat monitors. Minimum pitch is 28-36in (71.1-91.4cm), and recline is 6-7in (15.2-17.8cm).





Dede Smyth DIRECTOR OF CORPORATE MARKETING, B/E AEROSPACE

When did you first attend the show?

B/E Aerospace has attended Aircraft Interiors Expo since its inception in 2000 in Cannes. Aircraft Interiors Expo is an opportunity for us to showcase all our current products and services and demonstrate our innovative new products to airframe OEMs and the world's airlines.

What new products or mock-ups will you display at this year's show?

We will be demonstrating our latest seating products, including three new super-first-class suites all designed to optimise the LOPA in the front of the aircraft. We will exhibit our businessclass offering Diamond, and Pinnacle, our new main-cabin seat platform that has already been sold for 1,000 aircraft. We will also display a Boeing 777 overhead crew rest, and an A320 bin extension that increases usable overhead storage capacity by 100%. Our new vacuum waste toilet system, which has just been certified for commercial aircraft, will be displayed, along with passenger service unit (PSU) systems for the Boeing 787 and A350XWB. The lighting system for the Boeing Sky Interior will be demonstrated in a unique lighting tunnel on the stand. You can also learn about our newest product offering, Thermal and Power Management.

What's special about your IGTC, which is shortlisted for a 2011 Crystal Cabin Award?

B/E's new Integrated Galley Trash Compactor (IGTC) allows airlines to improve the passenger experience while reducing flight attendant workload. Medium- and long-duration flights require considerable storage for food, beverages, consumables and other materials that consequently requires a significant amount of waste storage. Traditionally, trolley cart-size trash compactors are installed in galleys throughout the aircraft to reduce the trash to a manageable size. Our IGTC leverages galley integration methods coupled with novel compaction technology (patents pending) to condense the waste to a single container in the main cabin per flight. The compactor fits into the underutilised aft galley corner space(s) in wide-body aircraft, typically freeing two additional galley carts for food service or other uses such as duty free. The equipment is simple and intuitive to operate and requires no inflight trash bag servicing as they are changed by the catering crew during aircraft turnaround.

What are you supplying for Airbus's and Boeing's next-generation aircraft?

We are the sole-source supplier of the passenger oxygen system for the Boeing 787 and A350XWB, and are supplying the PSU for the Boeing 747-8. We are also the SFE supplier of the galley system for the A350XWB and our full line of galley inserts are selectable in the catalogue. Our LED lighting system is being installed in the Boeing Sky Interior for the 737. In addition, our seating and insert products have been chosen by many airlines for their Boeing 787 and Boeing 747-8 aircraft.

"The compactor fits into the under-utilised aft galley corner space(s) in wide-body aircraft, typically freeing two additional galley carts for food service"



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sharp shades

Inspectech and **MSA Aircraft Products** will display many products together. These include SPD/APD lenses in combination with a pleated shade for wide-body cabin windows; and the E³ Tri-Tech shading system with iShade dimmable windows.

They will also show iCabin, a solution for cabin management, productivity and entertainment that can use Apple's iOS operating system and iPads as core architecture; and iCMS, which employs the iOS mobile operating system as its platform. iPhones, iPods and iPads are used as core hardware to control lighting, heating and other CMS features. HD movies and other IFE features can be streamed wirelessly to the devices.

ENJOY THE SHOW

Rockwell Collins is showcasing its secondgeneration high definition (HD) Digital Programmable Audio Video Entertainment System (dPAVES), a single-aisle IFE solution. The latest version of Airshow 4200 and 4200D will also be on display with dramatic enhancements. Meanwhile for business jets the company will feature its Venue HD CMS, which incorporates HD audiovisual display and integration of portable media devices.





"iPhones, iPods and iPads are used as core hardware"

LEADING LIGHT

STG Aerospace will reveal the latest addition to its SafTGlo photoluminescent (PL) floorpath marking system range.

In 2010, STG achieved sales success with orders from existing customers of SafTGlo bolstered by new client wins for both SafTGlo and STG's Wireless Emergency Primary Power System (WEPPS). The WEPPS emergency lighting battery system, which will also be on display, has also expanded its STCs, extending its availability.



SCREEN IDOL

PGA will present the latest developments in each of its business fields. For the IFEC/ CMS market, a new 15in (38.1cm) highresolution Digital Video Touch Screen will be introduced. This product can be used to control the latest version of the company's AVOD-friendly Graphic User Interface. The company will also showcase a VIP seat equipped with a PGA motion system and 32in (81.3cm) HD monitor.

PGA also offers LED reading lights, which have been installed on several airlines. Its new Swing light has been developed with mono-LED technology and is available with various leather and coating options.

Finally, PGA is working on a new generation of its Smart Motion System, based on two new products – the Nano Seat Controller (NSC) and Master Power Supply (MPS). The company says that the NSC can be easily integrated in tight spaces, for example behind the backrest. The MPS is a deported power supply and can interface with IFE systems. Both these products are adapted for staggered passenger layouts.

In parallel, PGA is developing a new ECU to allow speed regulation and meet the latest requirements for the Boeing 787 and A350 programmes.



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panel show

Celebrating 25 years in the aircraft interiors industry, **MGR Foamtex** continues to launch breakthrough designs to improve the passenger experience. This year the innovative British company will present MPS Lite and MGRSoftWall.

MPS Lite is a multipostural foam system designed to take comfort to a new level within tight weight constraints. Meanwhile MGRSoftWall is a brand-new, patented vertical soft trim panel that has been shortlisted for a 2011 Crystal Cabin Award. It was created to meet demand for a pleasingly soft surface around sitting/ sleeping areas in premium cabins while meeting all the latest flammability requirements. Another benefit is its ability to be changed out quickly using its quickrelease system.

Both these new products have been launched in Cathay Pacific's new long-

haul business-class cabin (pictured), which will be progressively installed across the airline's long-haul A330-300 and Boeing 777-300ER aircraft from March 2011.

"As seating programmes get more complex the relationship between the airline, seat manufacturer and upholstery system provider becomes more important to the success of the final product," says Les Simpson, CEO of MGR Foamtex. "In the teamwork between Cathay Pacific, Zodiac and MGR, MGR was the 'upholstery partner' - the contact point for all upholstery issues relating to design, engineering, certification and materials control. Our specialised knowledge and experience in this area helped us deliver the best product more efficiently and effectively and reduced the burden on Cathay and Zodiac."

MGR developed MGRSoftWall in partnership with Zotefoams, manufacturer of cross-linked, closed-cell foams. "Their Zotek high-performance foam not only meets aviation flammability requirements, it's at least three times lighter than any silicone-based alternatives, it's hypoallergenic and the sound-deadening properties it gives to the panels will make them useful in crew rest areas as well as around passengers," says Simpson. "We love its flexibility. Sections or panels can be produced to almost any size or shape, and unlike many alternatives, the rapid-release attachment allows quick and inexpensive change-out. We've already successfully tested a wide range of covering materials including leather, ELeather and aramid and we're looking forward to showing it off at Aircraft Interiors Expo in April."



"Sections or panels can be produced to almost any size or shape, and the rapid-release attachment allows quick and inexpensive change-out"

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travel light

Recaro Aircraft Seating is presenting its new economy-class seat – Basic Line 3520 - at the show. The company says it has managed to reduce the weight of each seat unit to less than 11kg - making it about 30% lighter than the previous model. This was achieved by combining high-tech materials with intelligent design. Another key feature of the new seat is that it offers passengers more living space. This is made possible by patented Recaro solutions, including a higher literature pocket positioned above the tray table instead of in the knee area. This is designed to give passengers more comfort even when the seat pitch is reduced.

The Basic Line 3520 model has already attracted an order from Lufthansa for its new European cabin. More than 180 aircraft in Lufthansa's short- and mediumrange fleet are to be retrofitted with 32,000 Recaro seats by the end of 2011. The airline says that the seat will yield more than 4cm extra legroom.

"We focused on three characteristics in the development of the new BL3520 seat. Our aim was to make the seat lighter and more comfortable than the previous model while giving passengers more living space. At the same time, we paid close attention to the product quality and attractive design. We wanted the seat to be a genuine Recaro," explains Recaro Aircraft Seating CEO Axel Kahsnitz.

Recaro engineers reduced thickness by replacing conventional foam with a netting material integrated into the backrest core. New materials are also used in the seat divider, which is made from a modern, lightweight alloy. A major benefit for Lufthansa is that the seats take up less room than the previous ones, so up to two more rows can be installed on each aircraft. "The slimmer seats will also enable us to increase the seating capacity of our short- and medium-haul fleet and thus ensure that we remain competitive in future," says Thierry Antinori, member of the Lufthansa German Airlines board.

Recaro Aircraft Seating will also show another new product at the show – a console that swings upward to enable handicapped passengers to conveniently move from a wheelchair to an aisle seat – even when space between rows is limited. This design also allows the Premium Line 3510 armrest to be raised up if equipped with video controls.

In addition the company will present successful economy-class seats including the Smart Line 3510, the Comfort Line 3620, the Basic Line 3510 with various monitor options, and the Skycouch.



SOUND ADVICE

IFPL will showcase the latest addition to its audio jack family, which features IFPL's noise cancellation jack (INCAM) and a USB port. The jack is aimed at economy and premium seats. The company says that with the increase of carry-on personal electronic devices comes the need to recharge everything from the laptop to the iPod. All of this can be done via the appropriate cable by plugging into a simple USB port.

"This jack takes care of many of your passengers' needs in one simple module," says Neil Thomas, business development manager at IFPL.

INCAM is already used in thousands of aircraft seats worldwide. Noise cancellation electronics are housed in the jack, thus allowing airlines to offer noise cancellation without needing to provide headsets. The jack features IFPL's Rapid Fit cassette, which the company says allows it to be replaced in a matter of seconds, without removing the whole module. IFPL is planning a second module that will use a cassette USB to deliver the same feature, as it has proved popular.

"Audio and power in one module has got to be a simple, but effective way forward for airlines wanting to cover all the bases," says Thomas. "We will be showing the module in a number of finishes to show how airlines can incorporate the module into their livery."



cable guys

Carlisle Interconnect Technologies (CarlisleIT) will introduce its LITEflight Optical high-density (HD) cable and assembly solution to support the next generation of bandwidth-hungry applications. The company says that LITEflight Optical HD fibre optic cable is compatible with small form factor interconnects and multifibre push on (MPO) fibre optic connectors while maintaining stringent aerospace, environmental and mechanical performance requirements.

Designed to perform in the harshest installation and operating environments, CarlisleIT's fibre optic cables and assembly products are tested and certified to the most rigorous standards.

The company says that LITEflight Optical HD fibre delivers a 50% reduction in cable bundle size and weight compared to current optical cables, providing system engineers and network architects significant advantages in

SWEET HARMONY

Tisca Tiara mobility textiles will launch its new collection of harmonised carpets, seat cover and curtain fabrics. The collection reflects the latest global trends in terms of designs, textures and colour combinations.

Also on display will be a variety of steampleated, ready-to-fly curtains. The company produces the curtain fabrics and processes them all in-house.

Moreover, the company maintains a huge stock programme with over 1,500 curtain fabrics. All sorts of colours, patterns and qualities are available immediately. As a result customers can be served with readyto-install, steam-pleated curtains within a couple of days.

"LITEflight Optical HD fibre delivers a 50% reduction in bundle size and weight"

weight reduction and system size, while increasing available bandwidth with fully flexible installation and routing options. Its also designed to offer non-flammable properties, low smoke, low toxicity and resistance to caustic fluids.

CarlisleIT has been delivering products to aerospace, defence, medical, industrial and other markets for over 70 years. Originally founded as the Tensolite Company in 1940, CarlisleIT now encompasses brands beyond Tensolite, including CDI, ECS, Jerrik and QMI. Headquartered in Florida, USA, the company has operations and sales offices in the USA, UK, France and China.





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an eventful year

digEcor's most recent announcement was that GuestLogix's OnTouch retail technology and merchandising platform will be integrated with digEcor's digEplayer family of handheld IFE products. The idea is to help airlines develop profitable inflight programmes through OnTouch merchandising, advertising, gaming, movies, TV shows, music and device rental. The offering can be tailored for specific flights and classes of travel.

Ancillary revenue was also the goal behind its Mill Creek Shoppe shopping application, launched in late 2010 for the digEplayer XT and L series. A tailored subset of products is loaded on the digEplayers for purchase, while a built-in credit card swipe makes it possible for passengers to make impulse purchases in flight. The revenue is then split between digEcor and the airline.

The latest airline to chose digEcor is United, which opted for the digEplayer L7 (pictured) on premium service transcontinental flights. Other awards since last year's show include Wataniya Airways (for premium-economy and Business First flights to Europe); Azerbaijan Airlines (digEplayer L7s for business class on certain international flights); Danish charter airline Jet Time (digEplayer L7s for rental on its fleet of Boeing 737s); Thomas Cook Airlines Belgium (digEplayer L7s for rental on some medium-haul A320 flights); and Sun Country (which offers the digEplayer L7 on select flights for free in first class and US\$6 in economy class).



Adam Williams

MARKETING DIRECTOR, DIGECOR

When did you first attend the show and what are you hoping to get out of it this year?

digEcor has been a proud supporter and exhibitor of the Aircraft Interiors Expo since 2004. It is an excellent forum for generating new leads and furthering current negotiations. Since we are an American company, Germany is often a perfect meeting ground to meet with prospective clients based in Europe or the Middle East.

What products will you display this year?

We will again be showcasing our digEplayer L7, which has experienced tremendous uptake recently in the airline market. Also, we will show the improvements and new development work on our digEplayer L10.

What is portable IFE's place going forward?

Portable IFE will continue to have strong footing in the regional and low-cost market. However, as legacy carriers such as United look for low-cost alternatives to meet specific needs, portables will experience acceptance and growth.

How do you square up to consumer electronics?

We love that companies such as Apple are bringing the concept and popularity of a handheld device to the forefront of businesses' and passengers' minds. In the last year, consumers have fallen in love with handhelds; so renting one in flight seems natural. And despite strong sells from Apple and Samsung in the tablet market, many passengers still fall into one of three categories – first, those who don't own a tablet; second, those who don't want to get their tablet or laptop out of their bag or the battery is dead; and third, those who want to use the IFE because it provides new content that they don't have access to on their tablet. Further, many off-the-shelf products were never designed for constant inflight use. So airlines attempting to employ them run into challenges such as studio approval, lack of ruggedisation and logistical/update obstacles. A solution like the digEplayer was designed for airlines, with requirements set by airlines. We work daily to optimise every facet of the programme for airline life. A consumer product is built for terrestrial use.

What benefits will passengers and airlines see from your new partnership with GuestLogix?

From its beginnings, when big, boxy TVs were rolled onto aircraft, IFE has been a cost centre. Airlines have had to offer IFE to pacify passengers and stay competitive, not because it was a big money maker. We, however, do not believe that is or should be the case. For several years, we have helped lead the thinking that IFE should contribute directly to the bottom line. In fact, we have customers making money off of the programme net of expenses. Our relationship with GuestLogix takes our ancillary revenue efforts to the next level. GuestLogix and the OnTouch programme offer a suite of profit-making options. So what will airlines see? More money in. What will passengers see? More options and a better travelling experience. And by being PCI compliant and building a robust system, we are able to minimise the risk of identity theft to passengers and the risk of fraud to airlines.

What is the next big challenge for portable IFE?

Since the inception of the digEplayer, the first portable IFE device to fly, we have been striving to legitimise the business. I believe that we've largely climbed that hill. The next challenge is to innovatively supply hardware and content that is competitive in every way to embedded systems.

What will the IFE offering be like 10 years from now?

Ten years from now, who knows what the form factor will look like. However, I believe that the hardware will be commoditised and the focus will be on providing a customised content experience with targeted branding opportunities.

"In the last year, consumers have fallen in love with handhelds; so renting one in flight seems natural"



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hot seats

EADS Sogerma will display Solstys, Equinox (on the shortlist for a 2011 Crystal Cabin Award), Class 180, Ultimate 17 (a first-class suite, pictured), Ultimate Sleeper (a firstclass product with a fold-out bed, based on Ultimate 17 and the result of cooperation with Lufthansa Technik) and a new concept seat at the show.

Ultimate 17 was designed by EADS Sogerma with the assistance of Jacques Pierrejean Design. It incorporates a full-flat bed and an independent sliding seat. Features include an electrical backrest/seat

"Features include an electrical backrest/ seat bottom and integrated massage"

LIGHT SHOW

EMTEQ will feature its 115VAC ceiling and sidewall wash light, ELW83. The company says the product provides enough intensity to illuminate the ceiling of a wide-body cabin with only two sets of lights. It was designed to replace the four lights needed with fluorescent lighting systems. With several colour temperature and dimming options, this product runs directly off of aircraft power, eliminating ballasts.

Emteq will also feature Daylight, a variable white lighting system. It is designed to replicate natural light, and offer a bright environment for working or a warm, cosy atmosphere for relaxing. bottom, integrated massage, one-piece meal table, cocktail table, literature pocket, storage for luggage and laptop, and an open wardrobe. Overall suite length is 81-86in (205.7-218.4cm), and width is 39-44in (99.1-111.8cm) depending on application. Ultimate 17 also incorporates internet access, USB and audio connection, a large LCD screen and massage controls.

Ultimate 17 has been designed to be certified by FAA and EASA on A330/340 family, A380, A350 XWB, Boeing 747, Boeing 777 and Boeing 787 aircraft.



HOT AND COLD

B&W Engineering will display its A-LogEqu system of thermally insulated containers for food and beverage service, offering hot and cold storage in one product. The company says it enables cost-effective and flexible service options according to HACCP, and allows airlines to utilise the functionalities of coffee

makers, dry ice, refrigerators and ovens, without power consumption and connection to the galley.



FULL FLOW

General Ecology will show its Versa-Pure QC aircraft potable water systems, which it says eliminate tank type, stainless steel pressure vessels, V-clamps and other complexities, allowing lighter weight, smaller footprint, pointof-use installations.



Versa-Pure QC canisters are installed at desired service points. Water supplies are turned off and on automatically as automatic vacuum-break, self venting canisters are removed and replaced.

All canisters are interchangeable among all interface units, a feature designed to enbale quick and easy optimisation of flow rates and treatment to route and service requirements. For the first time, two canister sizes are now available (one for galleys and other high-flow areas and one for lavatories and fountains, where flowrestricting taps conserve water usage).

CLOSE BOND

Biolink, which manufactures pressuresensitive adhesive tapes, will showcase Relink 2318, a carpet tape developed in cooperation with Airbus. This product is designed to provide easy and quick application, secure fixation of all carpet

backing types with one piece, and rapid removal without residue or damage. Biolink will also present an NTF solution.



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what is HILA?

Dasell will display its High-Integrated Flexible Lavatory (HILA), which won a Crystal Cabin Award in 2010 in the passenger comfort category. The lavatory is based on a flexible space concept and is designed to offer greater room, convenience, comfort and hygiene than a traditional lavatory.

During boarding, the lavatory is compacted to the size of a standard lavatory. However, when the aircraft has reached cruising altitude, the cabin crew will enlarge the lavatory, which is done swiftly in a few steps. The lavatory then provides extra space and additional amenities such as a urinal or changing room facilities.

The extra space is taken from the cross-aisle area near the main door, which is only used during boarding but not during flight.

HILA was developed and produced as a fully functional prototype by Dasell together with Airbus Operations and in cooperation with iDS Hamburg, shortly before Dasell's acquisition by **Diehl Aerosystems** in 2010. Diehl Aerosystems also encompasses Diehl Aerospace (a joint venture with Thales specialising in cabin lighting) and Diehl Aircabin, which boasts an extensive product range including crew rest compartments, sidewalls and ceilings.





Rainer von Borstel

BOARD MEMBER AT DIEHL STIFTUNG, AND PRESIDENT OF THE DIVISION BOARD AT DIEHL AFROSYSTEMS

When did you first attend the show?

Before 2009, Diehl was present with its Diehl Aerospace unit until the former Airbus site in Laupheim became part of our group as Diehl Aircabin. Then in 2010, the corporate division Diehl Aerosystems attended Aircraft Interiors Expo in Hamburg for the first time with three units after the acquisition of Dasell.

Who do you want to meet and what new products will you display at the show?

We are most interested in meeting our OEM customers as well as airline representatives and suppliers, and networking with other industry contacts. The Aircraft Interiors Expo in Hamburg is the annual lead event for the aircraft cabin interiors business, which offers us the opportunity to optimise the benefits of our expo presence. This is the reason why we more than doubled the space on our stand in 2011.

Our enlarged stand will be dominated by a 'Big Picture' mock-up, incorporating the full range of our cabin products,

including large modules such as cabin crew rest compartments and lavatories and technical innovations on the cabin systems side. In addition to the Big Picture mock-up, interested visitors will also be able to look at other samples of our cabin and avionics product range.

Have you made any tweaks to Dasell's High-Integrated Flexible Lavatory (HILA) concept since it won a Crystal Cabin Award in 2010?

The HILA module has been developed in cooperation with Airbus as a supplier furnished equipment part. HILA will be presented to customer airlines as an optional part for their cabin specification, or as retrofit solution. Further progress and introduction into regular airline service will depend on demand. The HILA module will be displayed at Aircraft Interiors Expo 2011 on the BDLI stand.

What other areas would you like to expand into?

We are still looking into the possibility of adding galleys to our product line – if this is really required and desirable, and if so, whether we want to enter that business field by acquisition or in-house developments. Apart from this, our priority for the short-term future certainly is more on operational excellence than on further growth by acquisitions.

"We are still looking into the possibility of adding galleys to our product line – if this is really required and desirable"

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new generation

Custom Control Concepts (CCC) will present the third generation of its digital high-definition IFE/CMS system, the result of its ongoing quest to improve user interaction and reduce installation effort.

Among the items being featured is the second generation of iPlane, CCC's iPad/ iPod/iPhone app, a sleek intuitive user interface that has come to be expected from CCC to control every aspect of the IFE/CMS. iPlane will be different for every project, since its graphics are developed with the customer to complement the aircraft interior décor.

The demonstration will include CCC's SkyShow, a high-definition, 3D and

QUARIUM BILL OCEAN

interactive moving map system. SkyShow, also customisable for each project, can be set to interactive mode, allowing the user to control pan, tilt, rotate and zoom to view any area of interest on the globe. SkyShow can be controlled by a touchscreen or even using iPlane on the passenger's iPad.

Integrated monitors with AVOD control and built-in playback will also be on display. Constant advancements in technology allow the company to make electronics smaller and more powerful. The company always strives to combine components to reduce box count, weight and wiring and therefore installation effort, time and cost. These 'smart'

-

monitors will have the ability to control and playback AVOD as well as providing internet browser capability.

Every new IDC monitor from CCC has the flexibility of providing graphics control capability with custom graphic user interfaces developed with CCC's proprietary XEdit software for controlling the IFE/CMS functions.

With more than 120 customised projects completed on narrow- and widebody applications (from the BBJ to Boeing 747; A318CJ to A340), CCC says it has the in-house experience, production and engineering capabilities to handle any project required.

"Graphics are developed with the customer to complement the aircraft interior décor"

Aircraft Interiors International.com MARCH 2011

feather weight

Geven will show Piuma, its new seat, which has been designed with weight, well-being and style in mind. The Piuma, which in Italian means 'feather', is designed to offer a combination of comfort, innovation and Italian style. Some 230 shipsets of the model have been sold and will be line-fitted to aircraft for six airline customers.



NATURE'S WEB

Lantal will feature its Conceptional Forecast, a yearly trendletter compiled to inspire cabin interior professionals. Natural themes such as webs and honeycombs dominate this year's forecast, and have been translated into degradable Climatex LifeguardFR seat upholstery fabrics and weight-optimised carpets. Designs incorporate a 3D effect and refractive patterns. The palette ranges from warm oriental tones and grey-goldbeige blends to deep blues and dark reds.



VOYAGE OF DISCOVERY

Andrew Muirhead & Son will show its Voyager leather. Launch customer Gulf Air has just received the first consignment for business-class seating on its A320 fleet.

The company says the made-to-order leather is 30% lighter (approximately 600g/m²), while still a full 1mm in thickness and still 100% genuine leather.

"Voyager will benefit the aviation industry; reducing weight helps reduce energy and fuel used, which is hugely important in a competitive industry where customers are looking for greener options," said Archie Browning, sales director at the company.

John Tighe, senior manager at Gulf Air said his company's decision to order Voyager was based on improving competitiveness, reducing operational costs and offering customers a greener product: "Gulf Air has a history of being a pioneer in the airline business and we are always on the lookout for new products that help to keep us ahead of our competitors."

Andrew Muirhead & Son says that Voyager offers savings in operational costs because of its light weight. It estimates that Gulf Air will burn an estimated US\$200,000 less fuel per year with its A320 fleet alone once the fit out is completed.

on track

ONLINE

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Onboard Logistics launched a Castor Alignment System for trolleys at last year's expo. Since then, the company has secured an agreement with Sovereign Online for the system to be used on trolleys supplied by Sovereign for the train industry. The Castor Alignment System is designed to give the operator directional control over the trolley, so they can guide it through the aisle without hitting the seats. Onboard Logistics will also display its Flex-e-bag and flex-e-clip products, used for managing waste.

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what is Aura?

Intelligent Avionics is launching a new seat-centric IFE system at the show, which can be configured for any aircraft, from single-aisle to long-haul wide-bodies and even private jets.

Features include gesture-touch controls with all the usual PSU functions integrated into the screen. Aura copes with a wide range of media content from movies to games in high definition. Functions for passengers' carry-on devices – such as recharging a phone or playing user content – come as standard. Aura is also compatible with other airline systems such as broadcast flight maps, legacy video and satcom.

Intelligent Avionics claims Aura's installed weight (all screens, controllers, wiring and connectors) will be under 1.5kg per passenger place. It places processing power and large data storage in all seat units – not head-end servers, and is configured to operate over copper, fibre or wireless aircraft backbones.





Martin Cunnison MANAGING DIRECTOR, INTELLIGENT AVIONICS

What market is there for a new IFE system?

Aura delivers on the four big things that airlines and airframers urgently want to see from new IFE systems: lighter weight, more reliability, better passenger experience and a much lower cost of ownership. Being ultra-lightweight means long-haul operators save upwards of one tonne per wide-body aircraft. Single-aisle operators can for the first time contemplate introducing a profitgenerating seatback AVOD IFEC system. Aura is a low-cost investment that can pay back in a matter of months; perhaps surprisingly, Aura is also lighter per pax-place than most portable IFE devices and has none of the logistical hassles.

How will you compete with the IFE giants?

We are very confident that we will deliver a more compelling proposition than our peer group against the four key buying criteria mentioned above. As well as offering them a great product, airline clients want to be reassured we will be here for the long haul. Being part of the Aero Technics Group, we are a new name in the market, but not new to the market. We are working closely with a core group of well-known supply partners who provide key components in our system that meet our high reliability standards. These factors will ensure we put a first-rate product into the market that will be supported for its entire life. One thing a smaller company like ours can do better than the big companies is innovate quicker to meet changing requirements.

How has the product been developed?

We began researching the market intensively about two years ago; hardware and software development started last year. The Aura technology team comprises in-house technical expertise and specialist external partners. At this stage, who our supply partners are is commercially confidential. We are planning to be in full revenue service by summer 2012. We are working through the airworthiness qualification and certification processes now and have a number of aircraft types under evaluation.

How have you minimised weight and optimised installation and maintenance?

Firstly, and most significantly, we have removed the need for heavy head-end server equipment, without compromising any of the functionality expected from a fully embedded (controlled) IFE system – in fact we have added functions. Our in-seat equipment is also a fraction of the weight of the kit required for traditional systems. Aura has a very low component count, so fewer parts can fail. Our components come from highly reliable and accredited sources with excellent in-service performance records. We have designed the installation architecture to conform with airframe line-fit standards so that installation will be simple, quick and relatively low cost. And we have designed the heavy-use parts to be 'hot-swappable' and easily repaired or replaced.

What is the company's background?

Intelligent Avionics is part of the Aero Technics Group of EASAapproved aircraft interior design, production and maintenance companies. The management team has many years experience in the IFE and avionics industry. I am fortunate to be working with a hugely talented team and among my colleagues are former senior executives from American Airlines, Boeing, Zodiac and Gate Gourmet, which gives Aura a unique perspective from all angles across the passenger experience value chain.

What are your plans for Aura?

Our first priority is to bring Aura to market. We will focus our offer on two economy screen sizes and two standard premium-cabin screens, with a bespoke service for alternative screen sizes. Our design approach means we can be extremely responsive to customer desires to upgrade hardware and software services, for example to roll out a 3D IFE system or a full inflight e-commerce platform. Aura has a full product development roadmap to keep it ahead of the pack, which we can announce in due course.

"One thing a smaller company like ours can do better than the big companies is innovate quicker"

ABLE CABLE

WL Gore & Associates will display its new RG coaxial cable for aircraft communication and navigation systems. The company says that compared to standard RG coaxial cables, these cables reduce operating costs because they are as much as 20% lighter with a 15% smaller diameter – while meeting the stringent electrical and mechanical requirements of MIL-T-81790 and EN 3475-503 (the cables engineered for electrical impedance of 50Ω and 75Ω also exceed the electrical requirements of MIL-C-17G).

The cable's jacketing material is designed to offer a reduced size while maintaining shielding effectiveness, controlling impedance, and withstanding operating temperatures ranging from -65°C to 150°C. The company will also feature its expanded family of Skyflex Aerospace Materials.



LIGHT RELIEF

Aviointeriors will show its new line of economy-class seats, UltraLight. The company tried to optimise living space, part count, maintainability and weight. It says the Ultralight Two Eight weighs 9kg per passenger place, because it boasts a low number of parts and a frame made from both aluminium and composite panels. The company says UltraLight Two Eight offers exceptional room for the passenger at 28in (71.1cm) pitch, while the UltraLight R offers recline for larger pitch installations, with a weight of 10kg per passenger place.

leisure time

Vision Systems will showcase its new IFE system, the VisiTouch. This AVOD system is integrated in the seatback. The company has designed it for easy installation and maintenance – with a special plate to fix the screen on the seat. The VisiTouch also offers airlines a lot of customisation options in terms of its colour, GUI and applications.

Thanks to a memory card integrated into each screen, Vision Systems says it is able to offer an AVOD system to an unlimited number of passengers. This technology, linked to the central VisiBox unit, is designed to avoid flow problems during flights and allows cost and weight savings compared to optical fibre solutions.

VisiTouch also offers passengers the possibility to have internet connection during flights as well as multimedia features. The tilt of the screen is adjustable for a better comfort, and because of wiring termination, laptops, iPods and headphones can also be connected to the screen.



COMPLETE CONTROL

Crane Aerospace & Electronics will demonstrate its new, next-generation mcX Premium Modular Control System. The system features a patent-pending modular architecture designed to reduce system hardware and wiring complexity, while ensuring that the system is easily scalable and customisable. The company says mcX gives passengers smooth and simultaneous seat motion, less system noise and a variety of luxury features.

Crane Aerospace & Electronics has over 60 years' experience in seat control with

over 28,000 passenger seats currently installed and flying with Crane seat motion control systems.

The company will also show the newest member of its family of Hydroloks, the new Compact Hydrolok Seat Recline System.





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With a new CEO and plenty more seat projects in the pipeline, Aviointeriors isn't resting on its laurels

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keep**on**running

Italian aircraft seat producer Aviointeriors has recently reached an important milestone, shipping its 500,000th aircraft seat, in this case one of its Perseus business-class seats destined for a Boeing 777 owned by Saudi Arabian Airlines.

"This is an important milestone for Aviointeriors, that we have celebrated with the team," says Marc Uleman, the company's newly appointed CEO. "It illustrates the position that our company has in the market. Our Perseus sleeper seat has been a bestseller for quite a while and continues to increase its market penetration – its installation in Singapore Airlines' Boeing 777 business class being the latest example."

With references that vary from supplying the economy-, business- and first-class cabins for SIAECO/JAMCO's Boeing 777s, as well as a long list of tailor-made solutions, Aviointeriors is well placed to satisfy even the most specific demands. The Dutch royal family, pop legend Paul McCartney, as well an array of Middle East royalty, are examples of its long-standing history in the high-range seat segment.

"On top of our excellent design and engineering capabilities, which have been a significant success factor so far, we have been investing heavily in operational efficiency and will continue to do so in 2011," says Uleman. "Our factories now have all unit operations in-house, enabling much greater control over the whole supply chain, leading to 100% proven punctuality during 2010. I am pleased to see that the commercial results of these efforts are beginning to show."

Indeed the company's Andromeda model (a traditional short-haul business-class seat) has recently been selected by several leading airlines.

Moreover, in the long-haul economy segment, Centaurus New Generation – already installed in over 50 Boeing 777s – will soon be installed in a twin-aisle configuration on Iberia's A340 fleet. The seat has also been certified by EASA for installation on the A380, thus opening further possibilities for growth.

Aviointeriors' most recent certification success is the Ultralight seat for installation on the ATR-600. The company says this seat, which weighs 8.95kg, gives the airlines a saving of up to 1.5 tonne per aircraft in a typical configuration.

At the upcoming Aircraft Interiors Expo in Hamburg, Germany (5-7 April 2011), Aviointeriors will present various new developments, from improved versions of its most successful models to more revolutionary developments. Among these is the Third Dimension concept, a high-density business-class solution designed to allow the installation of lie-flat beds with minimum pitch, without losing the standard business-class configuration. The arrangement uses overlapping bed surfaces with minimal usage of height. The concept allows pitches of 63in (160cm), but the company says the comfort level is comparable to an 80in (203.2cm) pitch.

For the economy segment, Aviointeriors will present new models in its Ultralight range, with pitches ranging from 28in (71.1cm) to 32in (81.3cm). The first installations are planned for the second half of 2011.

"With a product pipeline full of new concepts and a clear focus on delivery performance, I am confident that Aviointeriors will soon be celebrating its next 500,000-seat milestone," concludes Uleman.

best**of**both

Aircraft seating requires a durable yet comfortable fabric. While genuine leather has long been a popular choice for seating, Tapis' Ultraleather is designed to offer the same luxurious appearance and style, but with many advantages (including reduced weight and shrinkage) over leather. Ultraleather has been successfully used in seating applications for more than 10 years, for example on Express Jet's fleet of Embraer aircraft.

Tapis says that at 11.4oz per square yard, standard Ultraleather weighs in at less than half the weight of real leather, driving down fuel consumption and associated costs. It also offers 100% yield – which means low-waste, 100% usable fabric. Ultraleather also maintains a consistent texture throughout the entire roll and production lot, and can be cleaned using only soap and water.

"Ultraleather is part of a new generation of technologically advanced, polyurethane-based products that are recognised for the ways they protect the environment," says Jason Estes, sales manager at Tapis. "The manufacturing process used to create Ultraleather minimises effluent, reduces emissions and consumes less energy."

Ultraleather is made of polycarbonate, a durable polyurethane resin boasting high-performance resistance to heat and light. To extend its lifespan even further, Tapis has partnered with The Leather Institute, an expert at repairing leather and Ultraleather, to offer a biodegradable cleaner that works with Ultraleather. In addition, The Leather Institute offers a complete line of restoration services, including cleaning products, conditioning, touch-ups, colour restoration, repair and training.

Meanwhile, Tapis' custom-matching capabilities offer the ability to match any look a designer wants.

Over the last two years, Tapis has developed custom grains and finishes with Ultraleather for leading airlines including Singapore Airlines, Etihad Airways, Swiss Air, Kingfisher Airlines and JAL. On each occasion, Tapis created a customised programme to meet the designers' and airlines' precise needs for texture and colour.

One of the company's most durable Ultraleather fabrics, Promessa, is designed to blend durability with a luxurious two-tone texture. This combination makes Promessa a versatile option for a wide variety of high-wear uses, including seating for regional jets, jump seats or economy class.

Many fabrics in Tapis's product line complement each other, allowing for even more customisation and balance in the cabin. Ultrasuede (made of 100% recycled ultra-microfibres) and TapiSuede Flannels are also suitable for seating applications, and have been used in combination with Ultraleather as seat inserts. LOT Polish Airlines and El Al Airlines are just two customers currently using Ultrasuede for seating.

TapiSuede is made from 88% recycled polyester and 12% polyurethane. The polyester fibres are made from a mixture of post-industrial and postconsumer recycled polyester. These fabrics are designed to be durable, luxurious and, like Ultraleather, environmentally friendly.

Finally, TapiSuede BHC-SS maintains the same characteristics as the standard TapiSuede, but is designed to be extremely lightweight and meet the most stringent flame-retardant requirements for commercial aircraft. Tapis says the product's durability, flexibility and ability to function on many panels with various adhesives makes it an excellent choice for aircraft interiors. A faux leather designed to blend the aesthetics of leather with the advantages of polyurethane

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Connectivity is becoming more commonplace, but without in-seat power outlets passengers may not be able to enjoy it fully

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plug**and**play

For passengers who have paid for the pleasure of being able to use WiFi on board, a dying laptop or phone battery can be frustrating. But airlines can also choose to install power outlets and USB charging facilities to enable passengers to make the most of the services offered.

Astronics, which provides in-seat power systems for aircraft, has seen a growing demand for its EmPower products as more and more passengers bring on a multitude of powered devices. The introduction of WiFi to aircraft has increased the demand even more. The company says most airlines installing new data services on their aircraft are also installing in-seat power and in most cases, in all classes of service.

Along with this, Astronics says a new trend has emerged – full cabin installation of in-seat power on narrow-body aircraft. "Some of this demand is because of new data service installations, but a significant portion is because of the realisation by airlines that in-seat power is an expected feature and provides passengers with an easy way to entertain themselves, remain productive and pass the time," says Dennis Markert, director of business development at Astronics. "Demand for in-seat power is increasing as passengers carry multiple digital appliances such as laptops, eReaders and mobile phones on board; it's an increasingly expected feature and is a brand discriminator for airlines."

Keeping current with technological and industry advancements, Astronics performs extensive battery life testing regularly on the most popular and newly released laptop brands. Markert says this research reveals that when using WiFi to surf the internet and send emails or using embedded DVD to watch a film, passengers are likely to experience a 34% reduction in laptop battery life. "With the average laptop battery lasting a significantly shorter time than advertised, passengers actually have a 1.2-hour operating period on average. This assumes they boarded the aircraft with a fully charged battery, which is not always the case," he says.

Astronics continues to improve its products in line with what passengers and airlines want and need. One recent innovation is the integration of a USB power port, enabling passengers to charge their USB devices while still having 110V AC available for items such as a laptop.

Airlines worldwide cite inflight power outlets as a factor in passenger airline selection. For example, American Airlines reported in May 2009 that dead laptop batteries topped frequent flyers' complaints in an online survey sponsored by HP. A combined 67.7% of those surveyed said a dead battery (41.4%) and no place to plug in (26.3%) were their largest complaints. Power outlets were in high demand at the gate and on board – 24% said access to electrical power is the most important technology amenity on board.

Astronics thus believes in-seat power will play an ever-increasing role in passenger satisfaction and the success of connectivity business models. "Passengers willing to pay a fee for data services may not do so if power is not available," says Markert. "In-seat power is a complementary system that will promote usage and increase the take-up rate of such connectivity systems, as well as provide passengers with the ability to generate their own entertainment experience or work, via their own personalised digital environment."



freshproduce

Following its acquisition of aircraft induction oven specialist Modular Galley System (MGS), lacobucci HF Group is now focusing its activities in its new trolley division. The Ferentino, Italybased group, famous for its electrical galley inserts, completed the acquisition of the aviation division of lacobucci SpA, and set up a new company, lacobucci ATS (Aircraft Trolley Systems), with a new management team, a dedicated production site and consolidated processes to support growth. lacobucci ATS incorporates all the group's activities regarding meal and beverage trolleys, folding trolleys, standard units and other related products.

The former company, Iacobucci SpA, was founded in the early 1970s and became a leader in trolleys for the industry after only a few years. Over its 30-year-plus history, its products were chosen by airlines such as Air France, Alitalia, American Airlines, Cathay Pacific, Continental, Emirates, Lufthansa, Qantas, Singapore Airlines, US Airways and Virgin.

lacobucci ATS, backed by the group's financial resources and know-how, is investing heavily in people, processes and new material and technologies. With a new management team in place and the objective of continuing to offer the best products in terms of technology, quality and safety, the company has set up a new research and development department to build on the successes of its extensive product range. In addition to this current range (which includes folding and standard trolleys that can be made to customer specifications), lacobucci ATS is developing a lightweight trolley line with a fresh new design that it says will be very reliable and easy to maintain. Two new lightweight prototypes (with ergonomic shapes based on stability, safety and durability), and a standard product designed to have the greatest weight/quality/price ratio will be displayed at Aircraft Interiors Expo in Hamburg, Germany in April 2011.

lacobucci ATS collaborates with Tencate Advanced Composites on a new panel for the trolley; which it says offers reduced weight, extremely good resistance with high thermal performances and is compliant with all aeronautical safety standards.

Furthermore, lacobucci ATS has teamed up with some important airlines and aviation suppliers in a joint consortium to develop a new sealing solution for catering and duty free carts. lacobucci ATS says the AV Seal product improves security and offers real-time data relating to each cart's operational status. Environmental improvements are also envisaged with a significant reduction in the use of plastic tie seals. The consortium is looking to set up trials in the next 12 months with the aim of bringing the product to market in early 2012. lacobucci HF Group has revitalised its aviation trolley business and has several exciting new developments underway

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over**and**above

Formation Design Group has developed a new lie-flat seating concept designed to offer significant improvements in comfort and efficiency. The configuration features lie-flat beds arranged to allow seat counts comparable to traditional angled flat seats while providing larger seat and bed sizes compared with staggered arrangements. This is made possible by the use of vertical cabin space through a small elevation change incorporated into every third seat.

The concept is the result of intensive geometric analysis of cabins in existing and planned airframes. The seating arrangement provides legroom for two seats under a centrally located raised seat and bed area. As a result, one of the lower seats and the upper seat are forward facing, with one of the lower seats aft facing. Formation applied for patent protection of this arrangement in early 2008.

The company has continued the development of the concept and subsequently created an approach to provide all passengers with direct aisle access. This was demonstrated at last year's Aircraft Interiors Expo Americas (held in Long Beach, California, on 14-16 September 2010) with a scale model of an A330-300 forward cabin. The configuration featured 32 fully lie-flat seats arranged between Door 1 and Door 2. All seats in this LOPA had direct aisle access and included 79in (200.7cm)-long lie-flat beds. In addition, four of the forward-facing upper seats were outfitted as premium seats measuring 30in (76.2cm) wide with 80in (203.2cm)-long beds. These four seats also feature dedicated stowage compartments large enough for a roller bag accessible from the seated position, and can be configured as enclosed suites. The enclosure of the suites provides an even further product differentiation between these and the business-class seats in the cabin. These features are all accommodated in the same amount of space as this already high-density business-class cabin.

While most wide-bodies have sufficient overhead clearance to accommodate an elevated seat, Formation proposed selectively removing the bins over the higher seats while keeping the remaining bins to balance the aesthetic enhancements with practical storage needs. Overhead transition panels have been designed to provide an integrated appearance. For a view of the cabin, see page 24.

Having attracted strong interest in the concept at Aircraft Interiors Expo Americas, Formation continues to explore and refine related concepts. As a result it is strengthening its intellectual property position with additional patent filings. Formation is actively seeking airlines and seat manufacturers to partner with to further develop the concepts.

Formation has developed products in a diverse range of industries, from transportation to consumer packaging. The Formation seating concept is not the first cabin space optimisation programme the group has undertaken. It worked closely with Airbus on the development of the space-efficient SPICE Galley System. This work garnered both a Crystal Cabin Award and an IDEA award for design research.



hotticket

One of the world's leading leather specialists (Yarwood Leather) is hosting a special event to celebrate its continued growth in the aviation industry. The LeatherLounge will be launched on Wednesday 6 April 2011 and it is hoped it will become a regular fixture at the Aircraft Interiors Expo (held in Hamburg, Germany) in future years.

Managed by one of the UK's leading events companies, the event will be a relaxing but entertaining networking event, with VIP-hosted table service and a DJ flown in from London. Yarwood is reluctant to reveal too much information at this point, but advises that there will be a few surprises in store in what promises to be an unforgettable evening.

Yarwood Leather has enjoyed spectacular growth over the last 10 years and the event is a way of celebrating its success. With access by special invitation only, the event is designed as a show of gratitude to the airlines, seat manufacturers, seat cover manufacturers and MROs that have supported Yarwood Leather over the years.

"We are the most exciting brand within the aviation interiors market and have established

a reputation for offering a truly professional and world-class service, while remaining friendly, approachable and innovative. In particular, our customers frequently comment how much fun we are to work with," says Matthew Nicholls, managing director at the company. "By hosting our first Leatherlounge event, we hope to be able to offer our customers the chance to meet in an informal setting with a unique atmosphere. Our VIP hosts will be in attendance at the show, so please make sure you stop them for your invitation. The venue is sophisticated yet informal, and reflects the Yarwood brand."

The company will also be launching several new products at this year's exhibition, including the next-generation KalorLite product, a bovine leather that Yarwood says passes the heat release requirements of Airbus ABD0031. Previous incarnations of KalorLite have been used on projects including a long-haul business-class seat launched by SWISS in 2009. Over half of the leather used in the seat is in a non-seating area – technically deemed to be wall panels – and so had to pass the FAR 25.853(d) heat release test. Yarwood Leather is toasting its success with an exciting event at this year's Aircraft Interiors Expo

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mealdeal

Zodiac Aerospace company Driessen has developed a new line of catering trolley, Hybrite, using both aluminium and composite materials. Following rigorous lab tests, test flights, and certification (even for the A350 and Boeing 787), the trolleys are now ready to launch in the market. The company will begin accepting orders from airlines, airframe manufacturers and catering companies in March 2011.

Driessen aimed to create a patented trolley to fit the next generation of cabin interiors, with a modern and stylish design and improved scratch resistance. The line was also developed with ergonomics in mind. For example, the company says a specially designed handle with more hand space makes it easier to pull the trolley out of the galley. User friendliness is also created by positioning the locks on a higher level for ease of opening and locking.

The newly designed wheels and braking system also aim to make the trolleys easier to manoeuvre. The trolley is equipped with a maintenance-free brake system that acts on all four swivel castors. The brake system of the half-size trolley can act on either two or all four swivel castors. Brake and release pedals have a flip-up design, while maximised wheelbase and track width are designed to offer optimum stability within the airframers manufacturers specifications. Meanwhile rounded corners, a secure deep top and fewer impact possibilities reflect the development team's focus on safety and damage control.

Another focus point during the design was reducing maintenance time and cost on components that traditionally have high service requirements. To this end, the total number of parts is reduced by more than half compared with the company's existing trolley.

Driessen has also succeeded in introducing complete interchangeability for the major components throughout the whole Hybrite line, reducing the number of spares required. It says this innovation will translate into reduced out-of-service time and stock requirements for customer airlines.

The Hybrite line is available in ATLAS and ACE configurations, with a full range including a full-size meal trolley, half-size bar trolley, waste trolley and air through. The company can also support a joint development programme with airlines that require other configurations.

The trolleys are available from 10kg for a bar trolley and from 15kg for a full-size meal trolley. The exact weight will be dependent on the customer's requirements.

Driessen says it is offering the new product at a price "very much in line with current pricing standards" and that customers will enjoy very short payback. The range will be on display at Aircraft Interiors Expo 2011, to be held in Hamburg, Germany in April.



closebond

As manufacturers move towards lightweight, nonmetallic structures in the aerospace market, adhesive specialist Forgeway says a fresh challenge has arisen – namely the need to specify materials with a greater heat resistance. "Traditional metal structures have acted as very effective heat sinks and enabled much lower operating temperatures," says Rod Buckley, sales manager at Forgeway. "The demand for more sophisticated and personalised onboard entertainment has added to the problem – more electronics, more heat."

Forgeway developed the Aerok range of products to provide performance at temperature, combined with fire performance. "Traditionally it was accepted that the addition of fire, smoke and toxicity (FST) additives resulted in reduced temperature and durability," says Buckley. "However, extensive research has resulted in a range of products that offer both FST and high-temperature performance, and perhaps most importantly, are free from halogens or other toxic chemical compounds."

Recently a manufacturer of critical assemblies requested an adhesive and sealant that could bond metallic and composite parts at temperatures of up to 300°C. Foregway provided Aerok 7001P (for bonding a metal structure) and 7001LV (to seal the surface of an insulation material), which achieved certification for the OEM. Both products are singlecomponent systems designed to retain up to 85% of their tensile shear strength after heat ageing for 1,000 hours at 260°C, and withstand service temperature of up to 315°C. They will shortly be in service on the latest generation of aircraft.

Meanwhile there has been a notable trend towards more carry-on luggage, particularly on short-haul flights where budget operators charge a premium for hold luggage. This has challenged designers to maximise overhead compartment space, and has implications for stress loadings. Once again operating temperatures are under scrutiny. Aerok 8298/8299 and 2132/2042 have been developed with the need for a higher operating temperature in mind. Offering 85% performance retention at 120°C, these adhesives have been selected on a number of new projects where performance at temperature is critical. One application where they have been specified is for bonding seat shells.

First-class modules are another area where airlines and OEMs are investing, and the designs are making ever-increasing demands on the materials. One OEM specified Aerok 9110R for bonding phenolic skins to aramid honeycomb core to create complex 3D shapes. "Not only does 9110R provide the structural integrity needed, it also enabled the OEM to achieve full FST certification on the finished components," says Buckley. "A bonus is the density of 9110R, which at 0.7sg enables designers to add flair without incurring a weight penalty."

Pyrok – another of Forgeway's ranges – is also used in the cabin for structural bonding applications. Pyrok 803 has been used for a number of years for meal trays, and is supplied matched to most of the common colours of ABS and polycarbonate, while Pyrok 9142 is a water-based heat-reactive adhesive for the soft trim market. Again the company says full FST can be achieved even with difficult substrates such as leather.

Forgeway boasts extensive equipment for structural, environmental, temperature (-70°C up to +350°C) and infrared spectroscopy testing on all materials and substrates. It carries out many test programmes at no cost for customers. Innovations in adhesive technology are closely tied to real-world needs in the aircraft market

SOKN Max.

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With two new seat concepts and work progressing on inclusion in the next-generation airframe catalogues, 2011 is looking bright for EADS Sogerma

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takingstock

With more than 80 years of experience in the aeronautical field, EADS Sogerma, a subsidiary of the EADS Group, is focused on three main activities. These are the design, development, manufacture and assembly of aerostructure parts for Boeing, Dassault, Airbus and ATR; pilot/copilot seats for aircraft and helicopters; and firstand business-class passenger seats for airlines.

For EADS Sogerma, this year's Aircraft Interiors Expo (to be held in Hamburg, Germany, on 5-7 April 2011) offers a chance to take stock of its achievements over the previous year, and look forward to what the next has in store.

"2010 was a continuance of a very successful 2009 when we grew our business revenues, extended our installed customer base and logged record sales revenue since our reorganisation some five years ago," says Cedric Gautier, president and CEO of the company. "This was achieved in a declining market with a global recession, so obviously we are very pleased with our performance, especially as we maintained some very key metrics that we pride ourselves on in the interiors market."

These metrics include a fourth year of 100% on-time delivery to OEM and retrofit customers, 95% on-time delivery for the company's spares business, and a maintained quality level of 0.9 quality defects per seat when inspected after manufacture, against a target of 1.0.

The company also moved into a new and enhanced cabin interior production facility at Fort Vauban, Rochefort, France. EADS Sogerma also owns another site in France (Mérignac), and a design office in Toulouse. It has four subsidiaries around the world – EADS Maroc Aviation in Morocco, EADS Composites Aquitaine in France, EADS Composites Atlantic in Canada, and EADS SECA in France; as well as two trade offices in Seattle, USA, and Bangkok, Thailand, thus totalling 2,200 employees.

"So looking back 2010 was a very good year for our cabin interiors business, coupled with very decent performances from EADS Sogerma's other business units," says Gautier. "I am confident that 2011 is going to be another challenging but rewarding year for us. Our commitment to our customers is to maintain and improve our key performance metrics, expand our customer base and continue with our approach to propose products that offer innovation, design quality, comfort and luxury."

The company has specific goals for product definition and product development in 2011. These include working on the Solstys businessclass seat for the Airbus Catalogue System for the A350; working with Boeing to become fully offerable for the Boeing 787; and growing its airline business worldwide.

"To our customers we say thanks for your wonderful support, and to those who have not yet experienced EADS Sogerma's products and services, we invite you to experience our world at Aircraft Interiors Expo," says Gautier.

At the show the company will display businessclass seats Solstys and new model Equinox (on the 52-entry shortlist for a 2011 Crystal Cabin Award); first-class products Class 180, Ultimate 17 and Ultimate Sleeper (based on Ultimate 17 but with a fold-out bed – the result of cooperation with Lufthansa Technik); as well as a new concept seat.



buildingup

At the upcoming Aircraft Interiors Expo in Hamburg, Germany (5-7 April, 2011) ZIM Flugsitz will display its revised product portfolio, including a new family of economy-class seats with new styling and additional weight savings, and its new business-class seat (BC-01), which is due to be delivered to the launch customer in the first quarter of 2012.

The company has built an enviable reputation over the past few years among seat suppliers. "We are highly pleased with our business development," says Peter Zimmermann, CEO of ZIM Flugsitz. "Compared with the previous year we expect significantly higher sales in 2011. Our products reflect a high technical standard. With our advanced product portfolio – ranging from a basic short-haul economy-class seat via a fully IFE-equipped long-haul seat to the new business-class seat – we will become even more interesting for potential customers."

New customers have responded very positively to ZIM Flugsitz seats, as confirmed by orders for both economy- and business-class products. In 2010 ZIM Flugsitz won THAI Airways as a key account, with shipsets starting to be dispatched in February 2011. The airline is installing the ECO-01 seat on five A330-300s and six Boeing 747-400s. In addition, a followup order from THAI Airways has already been signed. "This order from THAI Airways means a breakthrough for our lightweight concept," says Christoph Heinrich, director of sales at ZIM Flugsitz. Other well-known airlines have also decided to go forward with ECO-01 for their cabin seat programmes. The development of ECO-01 was focused on providing the lowest weight, best reliability, highest quality standards and passenger comfort. ZIM Flugsitz managed to combine innovative designs with advanced materials (such as carbon fibre) to optimise weight.

The modularity of ECO-01 is designed to shorten lead times, make the product adaptable to all narrow- and wide-body aircraft, and simplify customisation. A number of features are available, including headrest, recline, articulated seat pan, different kinds of backrest and seat bottom cushions, several armrests (full-length, slim), footrest and IFE integration.

The focus on reducing weight and a modular seat structure employed in developing the ECO-01 model was also a baseline requirement for the new business-class seat, BC-01. This seat is available in a standard configuration which can be customised according to individual customer specifications.

Meanwhile, ZIM Flugsitz has boosted its manufacturing capacity. The company says that significant increase in activity in the second half of 2010 made it imperative to review its original production concept so that it could maintain an efficient and continuous process. As a result it now has assembling crews working on three production lines.

Currently ZIM Flugsitz's top management is fine-tuning the strategic planning to realise the company's vision – to become one of the top four players in the aircraft seat business within the next five years. ZIM Flugsitz's infrastructure is already geared up for future growth. German seat supplier ZIM Flugsitz is continuing its growth strategy with new seats, expanded production and ambitious plans

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With its newest seat, Optimares aims to create a whole new class of service

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differentclass

Optimares' strategy to establish a number of production facilities (directly or through partnerships) in various strategic locations around the world is taking shape. The idea behind this business plan is so that the company can be close to its customers, enabling it to offer enhanced service for both airlines and OEMs.

The first production line is based in California, USA. Optimares Production USA is the result of a partnership with another established aerospace interiors company. This partner has been supplying interior products to the commercial airline industry since 1999, specialising in passenger and crew seating components. The production facility is completely dedicated to seats engineered and designed by Optimares. A second production facility, Optimares Production Europe, is due to open before summer 2011.

But this is not the only announcement from the company. During the first quarter of 2011, it will unveil two new products – the Mini-Business long-haul seat, and a premium business-class for single-aisle aircraft. Mini-Business is conceived for twin-aisle aircraft, especially for those premium carriers that want to introduce an upscale premium-economy product.

Optimares' vision was to create a premiumeconomy product close enough to business class to deserve the name Mini-Business. "There are many companies and private passengers, who used to purchase discounted business-class services and are now paying more attention to travel expenses," says Alessandro Braca, CEO of Optimares. "These customers do not want to give up the comfort and service required for business travel, and airlines should try to capture this market. Optimares engineered Mini-Business to match this demand, enabling airlines to offer a service that is suitable for business travellers, but also boasts a strong value proposition."

"During the developmental phase we envisioned a new generation of premium class that we would name 'Mini-Business' class – a step forward from the current premiumeconomy offering on the market," says Massimo Berti, director of research and development at the company. "With an abreast configuration of seven or eight seats, this could be a real opportunity for airlines to create a brand new class of service."

The new business-class product for singleaisle aircraft is based on the same seat structure. It is designed to offer a high level of privacy and a premium feel on connecting flights in single-aisle aircraft. "For the first time premium single-aisle operators will be able to propose to their interlining passengers a fixed back shell product similar in shape and form to what the airline is offering on their long-haul products," says Marco Tonucci, sales and marketing director at Optimares.

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Commercial airlines' concerns have been addressed in an enhanced version of Willow Tex's popular synthetic leather product

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nextgeneration

Synthetic leather producer Willow Tex has developed IZIT Leather Enhanced Plus, an advanced version of its aviation leather with a permanent stain-resistant finish. The company (which is based in Rockford, Illinois, USA) says the product makes most seat cover stains a distant memory – ink, mustard, ketchup, red wine and nearly all other severely staining substances can be wiped off with a damp cloth, translating into significant cost reductions.

The original IZIT Leather Enhanced was introduced in 2004 after several years of research and development. "Our objective was to produce an inherently fire-resistant aviation version of IZIT leather versatile enough to be used in sidewall and headliner applications as well as upholstery fabric for aircraft seating," says Drew Clabough, general manager at Willow Tex.

IZIT Leather Enhanced gained quick approval at OEMs including Gulfstream, Dassault and Hawker Beechcraft. Designed to boast a luxurious calfskin feel, two-way stretch and superior durability, the product gained success in corporate and VIP markets.

It was launched into the commercial airline market in 2009 with the assistance of Spectra Interior Products, a 20-year-old company specialising in marketing soft goods to the commercial aircraft sector. Immediately, several airlines expressed interest and began evaluating the product. Willow Tex reports that after a year in commercial service, an airline customer commented that the covers performed very well, exceeded expectations and retained their original appearance far better than previously used seat cover materials. The latest incarnation of the product, IZIT Enhanced Plus, was made specifically for commercial airline seating. It was designed to have the look and feel of high quality, supple leather (to benefit the airline's corporate identity), while reducing fabrication costs. IZIT Enhanced Plus is produced in 54in (138cm)-wide rolls for high yield with CNC cutting; there is virtually no trim waste. It weighs 340g/m^{2.}

The company says seat covers utilising IZIT Enhanced can be cleaned easily 'on wing' with mild soap and water, lowering maintenance costs – the removal of covers for dry cleaning is practically eliminated, resulting in a near total reduction of spare cover inventory.

The elimination of dry cleaning can also feed into airlines' environmental aspirations. In addition, Willow Tex's production facility is ISO-14001 certified, and in accordance with its green procurement policy, the company says none of its materials contain PVC, formaldehyde, heavy metals, nitric acid cellulose, or organic substances that continue to contaminate the environment; nor are any other materials incorporated that cause concern regarding potential toxicity after use.

IZIT Leather has been specified by designers and other professionals for high-wear commercial seating applications for nearly 25 years. Besides its long history of success in the corporate and VIP aircraft markets, IZIT Leather can be found in luxury hotels, casinos, health care facilities and cruise ships. Customers include Wynn Las Vegas, The Four Seasons Hotel, the Bellagio Casino, John Hopkins University Hospital, and Disney Cruise Lines.



quietendown

A quiet and comfortable passenger experience is a growing focus for next-generation commercial aircraft manufacturers. Both the airlines and OEMs are keenly aware of the importance of differentiating their interior experience for passengers, particularly on long-haul routes. While offering a safe, quiet and comfortable ride is becoming a design imperative, it is presenting some challenges for design engineers.

The next-generation aircraft are taking technology to new heights, integrating more and more composite material in the fuselage and other interior spaces, replacing aluminium and other metals traditionally used on commercial aircraft. While composite material is achieving the goal of reducing weight, Rogers Corporation says it is presenting other challenges for interior acoustic designers, and new materials and techniques are now required to ensure a quiet cabin and address the acoustic performance of composite materials.

To this end it developed the BISCO A2 Sound Barrier in partnership with a commercial aircraft OEM. This material was specifically designed to meet the strict flammability, toxicity, durability and mechanical requirements of the aircraft industry, including the radiant panel FAR25.856 (a) test. The company says the engineered solid silicone material is a thin, flexible and durable material used to block out noise (for example from the aircraft engine or boundary layer air flow over the fuselage) and can be added to an insulation package or adhered to interior panels. Recently, Rogers Corporation improved the material. The original was launched in 2008, but enhancements in formulation and processing have enabled Rogers to improve its mechanical strength (tensile strength) and durability. These enhancements allow BISCO A2R (reinforced) to be used in more places throughout the interior and also for the acoustic insulation package. The A2 and the A2R materials are available in 1kg/m² to 8.2kg/m² surface weights, with or without a fibreglass reinforcement layer.

Rogers Corporation is a global technology leader in speciality materials for aircraft interiors. With over 175 years of materials science knowledge, the company has provided reliable solutions to the aircraft industry for decades. Mike Brock, product manager for Rogers Corporation's BISCO silicones, explains that "as a materials technology leader, we've partnered with aircraft manufacturers and tier suppliers to develop industry-leading material solutions to address specific design needs; our materials are excellent examples of that."

As the aircraft industry evolves, Rogers Corporation says there will continually be new technologies (such as composite material) that will solve one issue and present other challenges for interior design engineers.

"BISCO A2 is an example of how engineering a material for a specific application can solve a design issue and ultimately help create a quieter and more comfortable passenger experience," says Brock. Increased use of composites is presenting challenges for sound attenuation

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Known within the industry for its expertise in manufacturing laminated leather and fabric seat covers, Sabeti Wain Aerospace's products grace many major airlines. Less well known is the fact that it has never lost a customer. It doesn't have a sales team, so all its business comes through recommendation, typically from seat designers and manufacturers, as well as fabric and leather suppliers within the industry. It must be doing something right.

From the company's point of view, this can be attributed partly to its total commitment to customers. For example, all the directors are hands on, and are always available to oversee requests from their customers.

The company also prides itself on its meticulous attention to quality. "The company employs several full-time quality personnel, who constantly examine the products," says Mahnoush Sabeti Wain, one of the company's directors. "From cutting to sewing and packing, each item is inspected before dispatch, therefore there is a 100% inspection quality system employed."

Sabeti Wain thinks that the company's success is as much about how it does business as the products it sells. The business has been family owned since its inception over 29 years ago and now employs three generations of the Sabeti and Wain founding families. "Our customers value our quality service and personal touch," she says. "They know that as a family business our long-term success is important to us and we work hard to provide a cost-effective service that meets their needs, regardless of their size."

Nick Wain, one of the other directors of Sabeti Wain Aerospace, concurs. Wain has vast experience in both design and engineering, having started his career working at a seat manufacturer. He works closely with each customer to build up a bespoke product through sketches, computer-generated designs and samples in a range of materials to meet different price points.

"Each design is unique to a customer; no one else will ever be offered that design," he says. "Once a design is signed off, we manufacture it in-house so that we can keep control of the quality and speed of service. If more seat covers are required at a later date, our customers know that because we are in charge of production, we can respond quickly."

The company maintains two manufacturing facilities, one in the UK and one in Dubai. Its airline customers include Emirates, Etihad, Qatar Airways, British Airways, Qantas, Jetairways, Jet 2 and Fly Dubai.

With 100% customer retention, Sabeti Wain Aerospace credits its success to its people-orientated approach

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materialsscience

Sabic Innovative Plastics says its latest specialised materials for aircraft interiors contribute to significant weight and emissions reductions, while new flameretardant materials support compliance with global environmental requirements.

Lexan XHR6000 (extremely low heat release) sheet is designed to provide weight-out of up to 11% versus PVC/PMMA products while fully complying with flame, smoke, heat release requirements according to FAR 25853 (a) Appendix F Part I, FAR 25853 Section (d) Appendix F, Part V and FAR 25853 (d) Appendix F, Part IV; toxicity requirements according to Airbus ABD0031 AITM3.00005 and Boeing BSS 7239 for aircraft seating, cockpit linings, window surrounds and door shrouds. Sicma Aero Seat has selected Lexan XHR6000 sheet for business-class seating. Transparent Lexan FST copolymer resin can be combined with Lexan XHR sheet to match colours for components (e.g. personal service units).

Meanwhile Ultem composite aerospace board (CAB) sheets, co-developed and manufactured with Crane & Co, provide an alternative to thermoset aramid fibre-reinforced honeycomb composites. Sabic Innovative Plastics says that Ultem CAB sheets can be quickly thermoformed, offer high-performance properties, are recyclable, and have great potential to be refurbished with a newly developed decorative film layer while meeting FAA requirements. The company also offers 40% carbon-filled Ultem resin technologies to replace die-cast aluminium in structural components. It says benefits include up to 50% less weight and up to 40% higher strength. Ultem foam, up to 20 times lighter than Ultem resin, is a thermoformable, rigid foam that is suitable for use as the structural core in multilayer systems.

Another of the company's materials is transparent Lexan F2000A sheet for windows, light diffusers and signs, designed for flame retardancy according to DIN/VDE 0472 part 815. The sheet is flame smoke toxicity (FST) compliant with FAR 25853 (a) and (d) and ABD0031 AITM3.00005.



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freshenup

Who has never undergone this experience: after a six-hour flight, a reasonable meal and a few drinks one has to fulfil a human need and visit the toilet. Still lulled by the relaxed lighting in the cabin and the gentle floating of the aircraft, you quickly find yourself back in reality: in a dimly lit lavatory that even after a very short flight has a rather battered look? Regarding the smells and dirt only the service staff can help. But the general appearance of a lavatory can be greatly enhanced by clever lighting.

In recent years, through advances in light source development in general and in LED technology in particular, special LED lights can now be developed quickly and cost efficiently for such applications. AES, one of the leading providers of aircraft lavatory lighting, has not only gained much experience in the A380 and A350 programmes, but has also conducted its own investigations to provide these locations with suitable lighting and a pleasant atmosphere.

This research is not limited to the assessment of the main lighting, but all lights (mirror lights, wash table lights, flush switch lighting, etc) thus creating a total concept. Colour temperature, the colour rendition index and the intensity of individual lights have been individually arranged, along with special lighting effects and colours. The results, reports the company, are lighting concepts that are highly thought of both by OEMs and airlines – even after six hours of flight passengers still have a pleasant overall experience of the lavatory.

AES is now offering this expertise to airlines that want to upgrade their lavatories' lighting technology. Retrofit kits have been developed with major airlines for various types of aircraft, designed to meet the highest aesthetic, business and technical requirements.

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partpartner

Qualified and designed into Airbus, Boeing and Gulfstream aircraft for applications ranging from flooring to stowage bins, TenCate Advanced Composites's thermoplastic composites are designed to enhance performance and reduce cost and weight. TenCate says its range of structural composite aircraft interior materials is fully qualified as having ultra-low smoke and toxicity characteristics, and delivers real benefits to both sandwich and monolithic composites structures within the cabin.

TenCate's Cetex thermoplastic PEI laminates are designed to enable sandwich panels to be produced with a high-quality surface requiring little or no finishing. The company says these panels can be thermoformed into 2D structures easily without affecting the quality of the surface. This characteristic, coupled with base colour systems and a variety of textures (such as gloss, leather look and anti slip) allows the products to be utilised in many applications. The company says that because both facing sheets and core (Tubus Bauer) are thermoplastic, the sandwich panel's resistance to moisture is excellent and negative effects of long-term exposure are eliminated.

Recently the company collaborated with lacobucci ATS, part of lacobucci HF Group, on its modular trolley design. The trolley requires tough, light and strong materials that are not susceptible to moisture and can be produced in large numbers very quickly. Cetex PEI thermoplastics were used on these products, which will be presented at the lacobucci HF Group booth at Aircraft Interiors Expo 2011 in Hamburg, Germany (5-7 April 2011).

TenCate's materials have also been used by 2011 JEC Innovation Award winner Cutting Dynamics, which has developed a thermoplastic aircraft passenger seat designed to provide light weight, fire resistance and 16g load performance.

As well as sandwich structures, Cetex can also be used to make seat parts and brackets. TenCate says the benefits include low weight, the ability to mould parts very quickly from Cetex laminates, and the ability to weld moulded parts together.

nostrings

There have been a few attempts over the last couple of years to achieve a wireless AVOD IFE system. While for some, the dream became nothing more than an ever-elusive mirage, InFlight Entertainment Products (IFE Products) has finally made it reality.

"Our overall objective was to reduce infrastructure, lower costs, and introduce the latest technology to maximise both airline and passenger experience," explains Jim Shipley, COO at the company. One of the greatest challenges with a wireless AVOD system has always been how to stream a lot of content wirelessly with limited bandwidth. The answer, says IFE Products, is to store content at the seat and stream only what is absolutely necessary – moving map, flight attendant announcements, and of course, content changes.

IFE Products has taken this concept and made efforts to overhaul every aspect of the AVOD system. It has utilised the latest in LED touchscreen technology for seat displays, developed proprietary wireless access points with fast connection speeds, and integrated drives into the 15in (38.1cm) flight attendant control panel so that it doubles as the content server. It believes it has solved some of the longest standing issues of a wireless AVOD system – including power loss or connection interruption during content changes.

"We've reduced infrastructure by removing cabling and extra server boxes; we're offering this system at an unbeatable price, and we firmly believe that with the LED touchscreen and our dynamic user interface, passengers will love it, "says Shipley.

This system will be launched at Aircraft Interiors Expo in Hamburg, Germany (5-7 April 2011) providing a great opportunity for visitors to go and see it.



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softlandings

Aircraft Interiors Expo 2011 will see the premier of a new cushioning material that could change the way aircraft seats are designed. Made from a flexible form of aerospace honeycomb, its creator (Supracor) says that Stimulite relies on the same anisotropic characteristics of structural honeycomb to provide uniform weight distribution at a fraction of the thickness of typical foam cushioning. Aircraft seats with Stimulite are typically 1-1.5in (2.5-3.8cm) thick for economy seats and 2-2.5in (5.1-6.4cm) thick for business class. Supracor says Stimulite contours to the passenger's anatomy at minimal thickness for enhanced comfort, while perforations in the cell walls create a microclimate eliminating heat build-up, and the 'footprint' of the honeycomb cells and their flexing action stimulates blood flow to enhance circulation.

Stimulite has been a leading technology in medical seating for pressure sore prevention since the early 1990s. Its benefits are also recognised in military seating where Stimulite is the specified ejection cushion for the F-18 Hornet fighter jets. In commercial aircraft, Stimulite mattresses are used in the crew rest of the new Boeing 787 Dreamliner.

Supracor says Stimulite has been certified to the 16g requirement and meets all flammability requirements with standard dress cover materials. It is also antimicrobial, allergen free and washable. It is made from advanced thermoplastic elastomer materials that are environmentally safe, highly durable and 100% recyclable.

armcandy

With its comprehensive range of IFE deployment solutions, Bucher Aerospace Corporation is a well-known and trusted supplier to the aircraft interiors industry. For economy and premium-economy classes for instance, the company offers various derivatives of its front row arms. These arms are modular and customisable for the specific application and can be produced with the capability to remove and replace the fully terminated IFE cable. Add to that arms that rotate from their console-stowed location (both from the front and the top of the furniture), pop-up deployment units, VIP sidewall mounted and crew-rest arms, and customers have an extensive range of options and variants to choose from that have been successfully brought into service to marry passenger accommodations and IFE systems.

However, the plethora of new furniture and cabin designs that have been seen in recent years continually drives the company to build and develop its range. As requirements have become more stringent for newer models of aircraft such as the Boeing 787, A380 and A350, and screen sizes have increased, Bucher has seen the need for designs that no longer rely solely on the passenger to achieve the correct deployment sequence. One such design, pictured, accommodates a 12.1in (30.7cm) smart monitor on a frontrow deployment arm. The system automatically avoids contact with the aircraft sidewall and bassinette throughout its range of motion by employing built-in deployment sequencing logic, which allows the rotation of certain joints only at the desired point during deployment and stowage.

With this and other innovations under development, Bucher Aerospace intends to continue to meet the needs of the industry as it has successfully done in the past.





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restassured

In 1994 Cascade Designs developed its lumbar and base cushions for commercial aviation under the brand name Jestrest. The products feature a self-inflating/active cushion. Today there are upwards of 50,000 units in operation with some of the worlds' leading airlines.

Cascade Designs says its Jetrest range of cushions incorporates features to provide personalised self-regulated comfort, controlled pressure venting for cabin decompression and meets FR approval. Jetrest is designed to reduce seating pressure points thus increasing the user's comfort. The design addresses economy class syndrome (ECS) and deep vein thrombosis (DVT). The cushions are custom designed to give adjustability and a personalised interactive seat.

Jetrest control options are highly versatile and available as a direct operation, whereby the passenger operates the cushion-mounted valve; and remote manual operation, the traditional route where the cushion is remotely operated by cable with the push button mounted where the passenger expects it to be – in the armrest. This is suitable for all cushioning options.

All valves regardless of their design have two standard features. The decompression feature

vents excessive air pressure from the cushion in a safe and controlled manner in the event of cabin decompression. This means the passenger is not subjected to the discomfort of an over-inflated cushion, while the integrity of the cushion itself is protected. Meanwhile an auto-bleed feature allows the partially deflated cushion to return to its original shape after the passenger has vacated the seat. As well as preserving the life of the seat it also saves personnel time in reinflating the seat cushions after each flight.

The Jetrest is an enhanced comfort system for installation in all cabin classes of airline seating. The cushion system can be designed to fit any seat, and is suitable for both new and retrofit seating programmes.

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weightyissues

When motor parts manufacturer Gary Seale started to question why aircraft parts were so expensive he had no idea of the road his thoughts were about to take him. His inquisitive mind wouldn't rest as soon as he came up with the idea for lightweight, low-cost seats and soon the industry was taking note after he presented his thoughts in 2010 at Aircraft Interiors Expo in Hamburg, Germany, and MAKS Airshow in Moscow, Russia. Now less than two years since he began, Seale has CobraUK on the verge of starting mass production at Welshpool in the UK. His plan for a fully dressed Superlight Economy Seat that weighs just 6.2kg has seen a constant stream of potential clients visiting his offices and he is currently in talks with two unnamed major airlines about production of 7.1kg seats.

Seale has formed Cobra AS (Aircraft Systems) as a subsidiary of his main company, and there is no shortage of potential partners. He is confident that Cobra can deliver a gamechanging solution. "By recognising that a traditional aircraft seat's trim accounts for 40% of its mass, and that on short- to medium-haul flights comfort is less critical, we have employed automotive concepts to devise a fully dressed carbon-polymer hybrid seat which weighs in at a scant 6.2kg," says Seale. "Again employing automotive design concepts, the seat also features fewer parts and a much lower assembly time."

Seale says he is learning quickly what the aircraft industry wants and that is to slash weight. One prospective Russian customer outlined his top three requirements as "low mass", "low mass" and "low mass". Seale believes automotive thinking can also open the way to products in other component sectors, from toilet seats to overhead bins.

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foamtruths

Zotek F is a range of closed-cell, cross-linked PVDF foams manufactured by Zotefoams using its unique Nitrogen expansion technology. The company says Zotek F foams have outstanding fire, smoke and toxicity (FST) characteristics and comply with the FAR 25.856(a) radiant panel test requirement, as well as boasting BMS 8-371D, NATO and NASA OEM approvals. Zotek F foams are also designed to offer low outgassing, low water absorption and excellent chemical, temperature and UV resistance. Used increasingly for thermal and acoustic insulation, Zotek F is also being used to manufacture low-pressure ducting and other structural components.

Further development in PVDF polymer technology has led to the launch of Zotek F OSU flexible, semi-rigid and rigid foams, which Zotefoams says combine excellent FST performance with very low OSU heat release, meeting the requirements of FAR 25.853(d). These grades are being used for soft trim applications in combination with leathers, textiles and decorative laminates; such as MGR Foamtex's MGRSoftWall system (a new soft laminate for vertical surfaces within the passenger seating area), where Zotek F OSU is a key component.

The Boeing 787 Dreamliner will also benefit from Zotek F Window mounts manufactured by Technifab, a Zotek F designated aerospace licensee, which are designed to offer up to 50% weight saving over traditional silicone seals, along with outstanding UV resistance.

Zotefoams says the purity, crush resistance and low resin uptake of these materials also makes them ideal for use as FST cores for lightweight composites and divider panels. Aeroplastics and Structures incorporates Zotek F foams into its cabin wall panels with the aim of reducing weight while improving insulation. Zotefoams says key factors in selecting Zotek F foams were the low weight, compliance with FAR and CS part 25,853(d) flammability requirements along with ease of processing and bonding to other substrates.

coattales

In 2009, Europe Airpost launched a very ambitious project to make its aircraft interiors more attractive. One of the key points was its desire to step away from the standard beige, white and grey usually applied in aircraft, to brighten up the cabin interior. The solution recommended by HSH Aerospace Finishes was to renew the cabins with its waterborne paint, including Interplan 1065B.

This single component coating, containing only a small amount of volatile organic compounds, can be applied directly in the cabin. The company says it boasts an extremely short drying time, making it particularly suitable for quick touch-ups between two stopovers.

HSH also arranged FAA and EASA certification for Europe Airpost's entire Boeing 737 fleet. This certification consists of three documents – covering an engineering order, weight and balance, and flammability. The certification also gives Europe Airpost the opportunity to apply this paint on sidewall panels, the films or structure of the galleys, bins, ceilings, PSUs, baseboards, wait seats and exit doors, all in compliance with FAR 25-853. HSH Aerospace Finishes says it means Europe Airpost can paint the interior cabin of all Boeing types on the market.

"HSH responded very quickly with the right products for our needs," said a representative from Europe Airpost. "We also worked with HSH Aerospace coatings for other MROs, with total satisfaction resulting from the competencies of all HSH employees involved. We are very pleased to have achieved our goal, and the outstanding feedback of our customers."



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AIRCRAFT INTERIORS EXPO 2011

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sunyourself

The most basic aircraft interiors now offer IFE, advanced communication systems and the ability to control ambient cabin lighting, all via means not previously available. However, Aerospace Technologies Group (ATG) says virtually nothing has been done to address a key area directly in the passenger's line-of-sight – the cabin windows.

"With the introduction of advanced lighting systems, less emphasis was placed on using natural light. Aircraft cabin windows became smaller, and less important," says Simon Kay, president and CEO of ATG. "Although huge advancements with artificial lighting have been made in recent years, the harsh reality is that it is still artificial light. Until recently, the benefits of natural light were based largely on anecdotal evidence, but studies conducted in the last few years now offer hard data that aircraft interior designers can no longer ignore."

Kay says the studies have shown that natural light not only makes interiors more attractive, but also that daylight stimulates the brain to release serotonin, a chemical that increases feelings of wellbeing. "So the challenge is finding a balance between controlling natural light (being able to filter high-UV direct sunlight) and providing complete darkness when needed," he says. Incorporating two separate capabilities into a simple but advanced product design is ATG's answer to this challenge. The Powertech Shade System's light filtering pleated fabric provides natural lighting ambiance, while its separate blackout fabric enables complete darkness. "Although artificial light will always be needed, aircraft interior designers and OEMs should not ignore the benefits resulting from passenger exposure to natural light," says Kay. "Sometimes by providing the most basic necessities the result can be the most powerful benefits. Let the sun shine in!"



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trackrecord

EAM Worldwide, a leading manufacturer of life jackets, rafts and survival kits, is proud to present its latest RFID-enabled applications for aircraft equipment tracking. Its technology division, EAM RFID Solutions, works with aviation clients to assess their current inventory tracking needs, builds a customised system and then provides the necessary training and support to successfully integrate the advanced tracking programme.

"From life jackets and oxygen masks to seatbelts and carts, EAM can tag all vital aircraft equipment to allow for instant tracking and expiration alerts," says Miriam Oroshnik, CEO and president of EAM Worldwide. "Including RFID technology into the daily operations of aviation service can eliminate the need for physical counting, which takes additional time and resources to complete."

Whether for inventory management control, anti-theft measures or confirmation of necessary routine maintenance and inspection, EAM RFID Solutions can work with any client in the aviation industry to help them optimise their internal operations. Starting with a consultation of specific monitoring needs, the EAM RFID team builds a unique programme of strategically selected hardware and software to either work as a standalone system or integrate with any established software system.

EAM will provide live demonstrations of the RFID technology solutions at Aircraft Interiors Expo 2011 (being held in Hamburg, Germany on 5-7 April). Celebrating 60 successful years in business, EAM is headquartered in Miami, Florida, USA, and has a newly expanded sales office in Dubai, UAE. EAM also recently achieved two certifications for excellence in quality management systems: the ISO 9001:2008 certification for general recognition and the AS9100:B for distinction in the aerospace industry.



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makingamark

First impressions are a major element in airlines' promotional strategies. An unusual or distinctive livery always sparks interest at airports worldwide. When in the late 1990s British Airways adopted new tailfin logos across its fleet, Larchfield Aerospace and Graphics was heavily involved in the supply of the new ethnic designs and images used to replace the Union Flag.

The work carried out for British Airways signalled the start of a business now in its 16th year – supplying exterior logos and mandatory markings to many of the world's prominent airlines, and also providing bespoke liveries, including Formula 1 markings for Etihad's fleet when advertising the Abu Dhabi Grand Prix, and the earlier nose-to-tail logo used to promote the 2004 Athens Olympic Games, installed onto a Boeing 747.

Larchfield supplies exterior kits and markings, produced either in vinyl or spray mask form, and where requested can provide a fitting service for vinyl on a global basis.

Complementing its exterior products, Larchfield extended its capabilities to include a range of interior decals, using approved materials that meet the requirements of both EASA and the FAA. At present, its language availability includes languages as diverse as Russian, Chinese and Arabic. Recently Larchfield added cabin interiors to its portfolio, whereby the company offers a service to source materials and manage interior projects.

Larchfield prides itself in attentiveness to customer needs, both in timescale and technical assistance. Its database of exterior and interior placards ensures a quick response to customer demands.

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 \bigcap

) reza<mark>soltanian</mark>

Want to know more about key industry individuals, but haven't got the time to search for their Facebook profile or LinkedIn page? This issue's 'FaceSpacer' is Reza Soltanian, a familiar face to anyone who regularly attends the expo in Hamburg, and the president of the largest independent aircraft interior reconfiguration, restoration and refurbishment company in the world.

HOW DID YOU FIRST GET INTO AVIATION? I graduated in 1980 from UCLA (University of California, Los Angeles), where I majored in structural engineering with the goal of having my own business in construction and building development. However due to the economic downturn in the early 1980s, I struggled to find suitable employment so I decided to pursue a masters in mechanical engineering while looking for a job. As soon as I started my masters at LMU (Loyola Marymount University) I received an offer to be a design engineer at Trans Aero, a company specialising in seat refurbishment and producing new 737 and 757 flight attendant seats for Boeing.

WHAT STRUCK YOU ABOUT THAT FIRST JOB? You can imagine my anxiety as a recent college graduate with no industry experience being put in charge of designing a new flight attendant seat for an industry giant like Boeing. It was scary, exciting, demanding and definitely very valuable experience that I have never forgotten. Those seats are still flying today so we must have done pretty well!

WHEN DID YOU ESTABLISH REGENT AEROSPACE AND WHAT WERE THE EARLY LESSONS YOU LEARNED? Regent

was first established in 1993 – its first customer was Aloha Airlines, for whom Regent provided passenger and crew seat refurbishment for its entire B737 fleet. The company then received an order from GECAS to refurbish two shipsets of DC10 seating. In terms of lessons learned, the key is to provide airlines and leasing companies with a turnkey operation, hence you need to be self-sufficient in manufacturing. Quality, on-time delivery, flexibility, cost management, excellent customer service and a 'can do' approach are also essential.

04 HOW LONG DOES IT TAKE TO REFURBISH A TYPICAL BUSINESS-CLASS SEAT? It depends on the availability of

materials specified by the customer. The more specialised, the longer the delivery. Regent carries a large inventory of the materials most often used, which can reduce lead times to six to eight weeks. If major modifications and re-certification (especially 16g) are required, lead times may run 10 to 12 weeks.

COULD THE INDUSTRY DO MORE TO RECYCLE CABIN COMPONENTS? Yes. Our sales team frequently reports back that the airlines have set dollar amounts to repair/refurbish individual components. However, when you look at the potential cost savings, we believe airlines are missing opportunities by only focusing on the most low-hanging fruits. I also think airlines are sometimes too quick to change out seats when for a fraction of the design and engineering cost, the seats can be re-designed to present an entirely new look to their passengers. Regent has in the past worked well with design agencies to do just that.

SECONDS

STORE

C YOU MUST HAVE SEEN A LOT OF AIRLINE PRODUCTS -

m

ANY COMMENTS? My advice to the airlines would be to create a better partnership with their respective suppliers, as well as their own engineering, quality and maintenance teams, to ensure more unbiased feedback regarding issues with inservice items. This knowledge could then be used to create more viable solutions next time around. In particular, I think airlines need to review overhead stowage bin and other monument design with the airframers to come up with much better solutions that use the space better, resulting in improved passenger perception and weight savings. I would be more than happy (at no charge) to present solutions to the airframers or airlines who attend the Aircraft Interiors Expo Steering Committee meeting for the above.

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HOW MUCH DOES A SECOND-HAND BUSINESS-CLASS OR FIRST-CLASS SEAT COST TO BUY? The price varies but for business-class seats completely refurbished with all new plastics, cushions and dress covers, in 'like new' condition, the price will range from US\$2,000 to US\$6,000 per pax; and US\$2,500 to US\$8000 per pax for first class. The real cost these days is related to IFE.

REGENT ALWAYS TAKES THE BIGGEST STAND AT THE

EXPO – WHY? Image has always been the key in our corporate strategy along with providing sufficient space for our various product lines and giving our guests more privacy and comfort.

WHERE DO YOU LIVE AND WHAT DO YOU DO TO RELAX?

I came to the United States in 1976 from Iran as a college student and I have been living in Los Angeles ever since. I used to play tennis, football, volleyball, as well as ski, but then I got married to a young, beautiful and very smart dentist in 1989. We started a family and had a daughter in 1991 and a son in 1994, so now I relax just by spending quality time with my family and friends. If visiting Los Angeles, besides the world famous beaches, I suggest readers take a 1.5 hour drive across town to visit the local mountains. Great for skiing in the winter and hiking and swimming in the summer.

DO YOU EVER MEND AND REPAIR PERSONAL ITEMS OF

YOUR OWN? Have you been talking to my wife?! Reason being, I'm always the person blamed for not fixing things around the house – apparently, I'm the most useless individual when it comes to DIY! However, in my defence, since I'm working 12-18 hours a day there is barely any time to fix things – unless I decide to give up on sleep altogether!

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