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2010SHOWCASE

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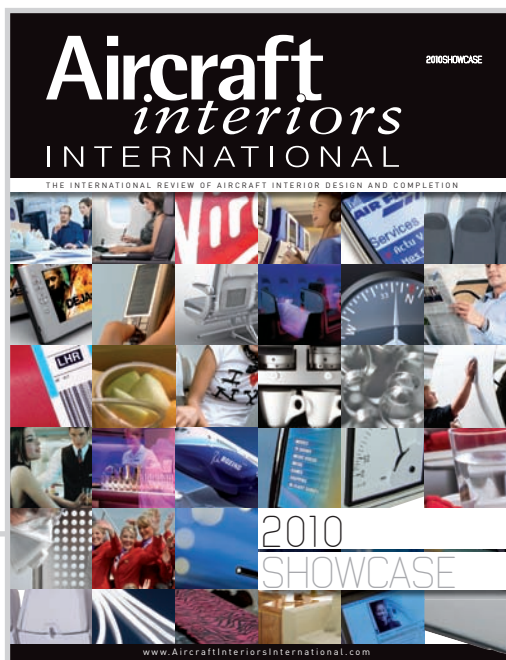
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fortune **favour** the brave!

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The desire to challenge the status quo and at the same time deliver an extremely consistent product experience across the cabin and throughout the passenger journey is probably best exemplified by Virgin Atlantic. The innovative British carrier turned 25 this year – see page 6 for an exclusive interview with its head of design, Joe Ferry.

It should be noted that Virgin Atlantic stole a march on the competition during the last slowdown in the air travel industry by continuing to invest in new products and the creative talent of its own design team and external suppliers. Surely this has to be the message going forward into 2010 – keep innovating and keep investing – and keep reading the pages of *Aircraft Interiors International*, of course!

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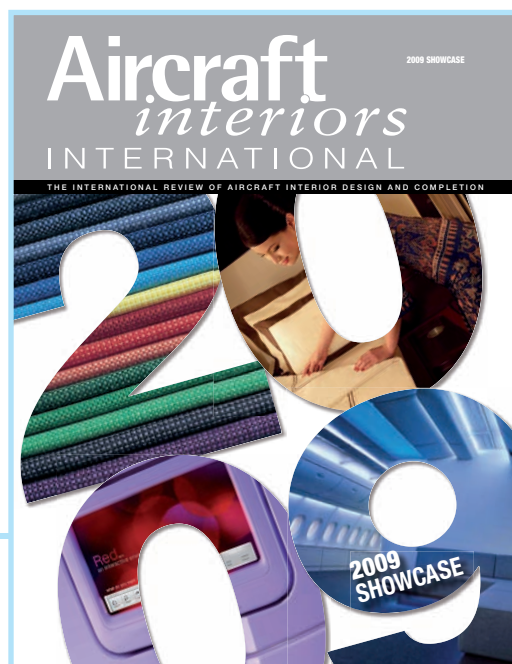
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premium rate

What a year – 2008 saw Emirates and Qantas take delivery of their first A380s, both using the super-sized aircraft to launch exciting new inflight products – Emirates going as far as introducing on-board showers, while Qantas opted to include a premium economy offering first introduced on its 747-400s, as well as moving to fully flat beds in business and new luxurious suites in first class.

Both aircraft reveal much about the key battlegrounds going forward. Originally introduced 15 years ago by Virgin Atlantic and EVA Air, premium economy is also available on carriers such as British Airways, United and now Qantas, with more airlines likely to follow suit in 2009.

Air France has announced plans to launch a premium-economy cabin across its long-haul fleet, with the exception of its 747s, which it plans to retire by 2012. Air France will replace four rows of seating in economy with three rows of a new seat type, in a 2-4-2 configuration, with 22 to 28 seats in total, depending on the aircraft type.

The trick is to offer a product in its own right with clearly differentiated advantages, rather than sticking with the same seats as economy and just increasing the pitch. In Air France's case, the new class will be divided from both the economy and business cabins by wall partitions rather than curtains, and the 'fixed shell' seats allow passengers to recline without encroaching on those seated behind.

Meanwhile, Emirates' decision to launch a new business class on its A380s, which in effect offers two different products in the same cabin, is further proof if any was needed of just how competitive and diverse the business-class seating market has become. Emirates' A380 offers business-class customers a choice between two seat variants: one with a seat pitch of 39in and a bed length of 70in; and a more generous alternative at 48in pitch with a 79in-long bed.

It remains to be seen how much the economic downturn will impact business-class revenues – and product strategies. Will higher density solutions prove the most successful, or will those still able to afford to travel in business seek more luxurious and spacious offerings? Carriers could also choose to strip out business seats altogether in favour of introducing a more affordable premium economy offering. However, the cost of converting cabins remains prohibitive – something both the 787 and A350 XWB aircraft programmes hope to improve.

Airlines will at least hope to make some money from ancillary revenues generated by a new raft of connectivity services – including the use of mobile phones in flight, a situation likely to generate a few hysterical headlines in 2009.



Anthony James, editor

Breaking new ground

A warm welcome to the first ever *Aerospace Testing International Showcase*. In case you were wondering, this is not a substitute for, or 'bolt-on' to, the well-recognized and respected *Aerospace Testing International* magazine, which has been published quarterly for the past eight years. This publication is different, and fills an important hole in the industry.

The *Aerospace Testing International Showcase 2010* does not cover aviation news (our website at www.aerospacetestinginternational.com fulfills this task), it does not have major news features, it does not explore the recent headlines, it does not have big dynamic images, and it is not intended to appeal to the spectator or the part-timer.

The *Showcase 2010* is an academic tome, entirely aimed at the core of the aerospace testing industry: the expert. To call it an annual reference magazine would undermine the entire project. This is a scientific focus at the high end of the latest developments in aerospace testing, in which the people at the front line can share experience with the global industry, and read about the latest testing technologies, systems, and programs.

If aerospace testing development organizations were to list their top 12 must-read articles, perhaps works from the following would be included: Missile Defense Agency, NASA, Fraunhofer Institute, Cranfield University, AEDC, Kingston University, Princeton, JAXA, Phantom Works, Aeronautica Brazil, Holloman AFB, and Woomera test range. They are all here, as well as a number of supplier solutions.

The year 2009 has been an interesting one in an aerospace testing context; it has been both swift and slow – slow, with particular regard to civil systems. The F-35 program has moved at supersonic speed. The first flight tests of the F-35C are almost underway, and the rest of the program is very much on course. Even the US Government has stated that the program is "substantially exceeding standards set in past programs". This is despite disagreements over

information rights between the USA and UK, and great international involvement.

Remaining in the slow lane is the 'overweight' A400M, which is now around four years behind schedule and in a critical design phase. Engines have been tested, but it could still be at least three to four years before it goes into service, and with leasing orders for C-17s and C-130Js increasing to fill the military transport gap, who knows how many customers will fulfill orders?

Sitting just slightly forward of the A400M are a number of civil projects that seem to have stalled. Delays, parts shortages, and last-minute fixes have cost the 787 billions of dollars in extra expenses and lost years. That's on top of weak demand for aircraft as air travel and freight shipments take a hit during the economic downturn. But Boeing's troubles have arisen partly from a new approach to airplane building. In recent years, the company has outsourced manufacturing and engineering work to suppliers around the world, and made ambitious use of carbon composites.

The technological leaps have proved troublesome for the company. "We have experienced a bridge-too-far, leading-edge kind of development, which is what we are trying to recover from right now," Boeing chief executive Jim McNerney said recently, following the company's earnings announcement.

The A350XWB is another aircraft whose profile has taken a downturn. The biggest news it has made lately is that it is using European government subsidies to keep the project moving ahead.

However, on a positive note, my favorite 2009 program has been the P-8A Poseidon, which completed its first flight this year. It is the ultimate 'pimp my ride': a Boeing 737 passenger-carrying commercial airliner changing role to an anti-submarine, torpedo-carrying, military surveillance aircraft. Wow. And all in just five years, since the company was first awarded the contract.



Christopher Hounsfeld, editor

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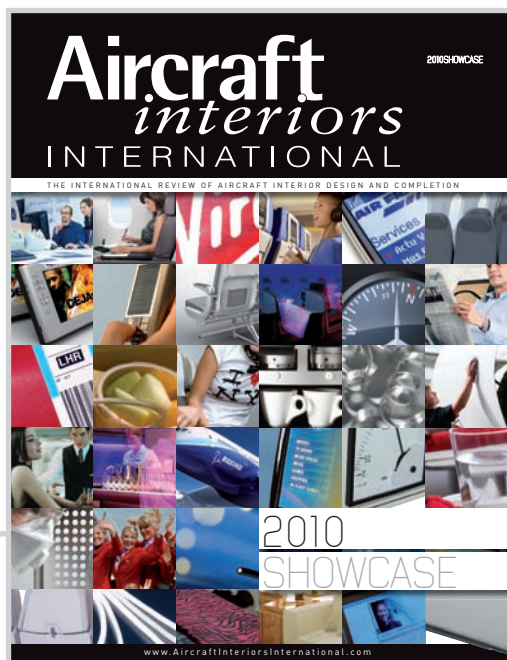
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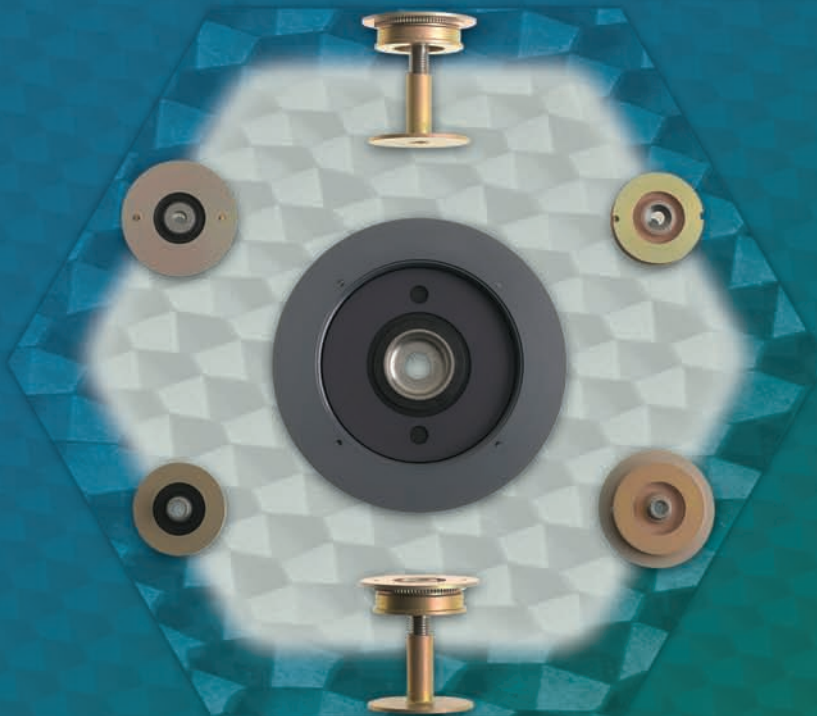
Anthony James, editor



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The occupants of an airline cabin can range in age from nine to ninety, in IT proficiency from complete familiarity to utter ignorance

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Virgin Atlantic celebrated its 25th birthday earlier this year, but Joe Ferry, head of design, is more concerned with the airline's future, writes Anthony James
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- 020 free thinking
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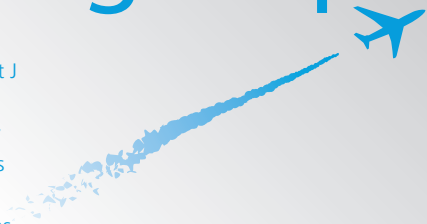
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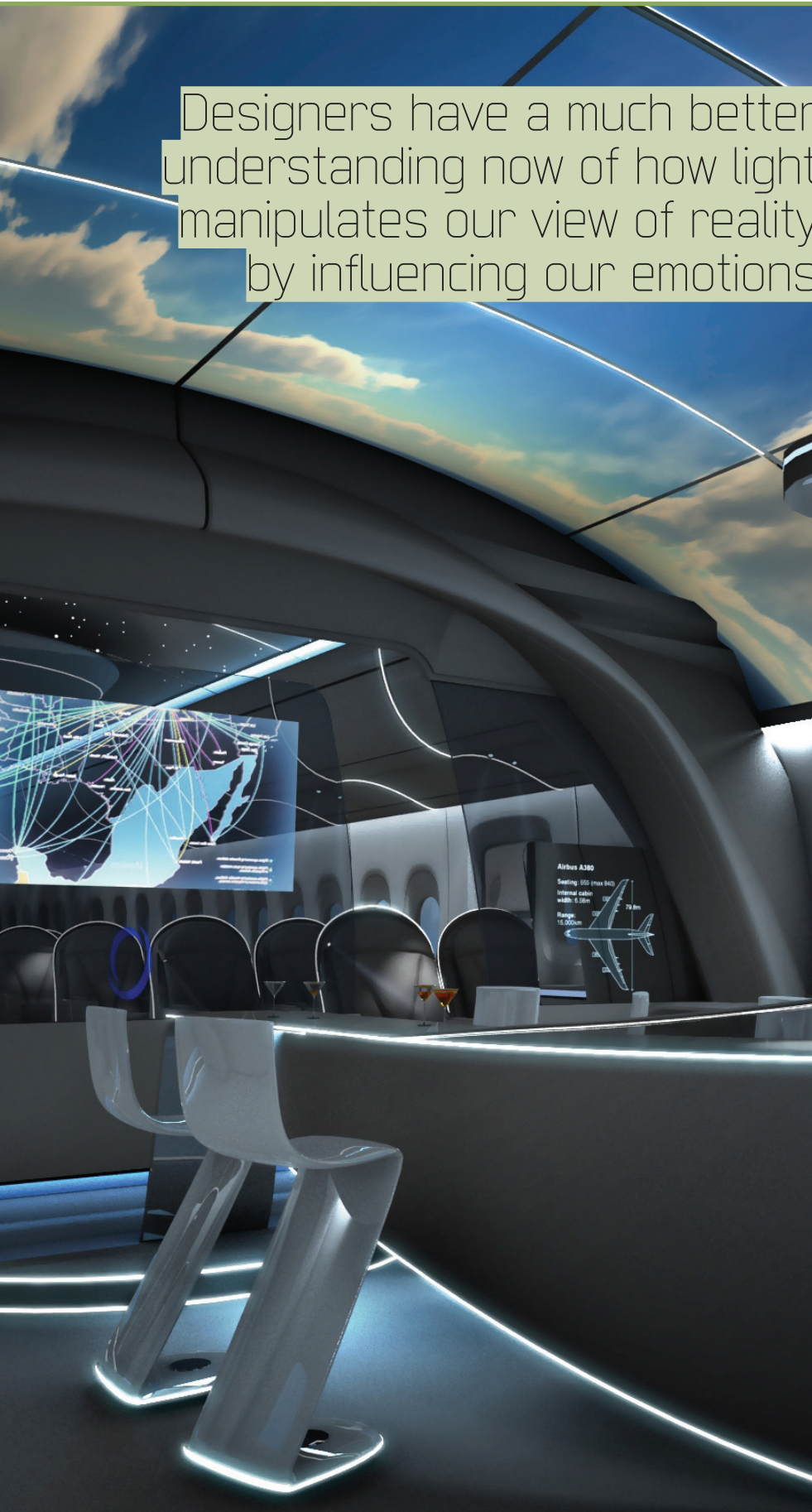


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Designers have a much better understanding now of how light manipulates our view of reality by influencing our emotions

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birthdaywishes

VIRGIN ATLANTIC CELEBRATED ITS 25TH BIRTHDAY EARLIER THIS YEAR, BUT JOE FERRY, HEAD OF DESIGN, IS MORE CONCERNED WITH THE AIRLINE'S FUTURE, WRITES ANTHONY JAMES

01. Virgin Atlantic's current business-class product, the Upper Class Suite, was first introduced in 2003
02. The J2000 seat, which Joe Ferry began working on as a student at the Royal College of Art



'Still Red Hot' – that's the claim made by Virgin Atlantic's current television advert celebrating its 25th anniversary, which passed earlier this year in June. As you'd expect, the advert is instantly iconic, stylish and humorous, with a sexy edge – capturing perfectly the key brand characteristics of an airline that strives to be both sassy and savvy.

Despite its relative maturity, and rather like its effervescent president, Sir Richard Branson, the airline continues to exude a youthful air of innovation – a fact not lost on Britain's Prime Minister, Gordon Brown, who commended the airline for its "vision and pioneering spirit" on the occasion of its birthday – while no doubt wishing he too could exercise the same Svengali-like powers over Britain's media as the airline's maverick figurehead.

Branson himself took the opportunity to thank "the thousands of staff who have created such a great airline" – one of which is Joe Ferry, head of design, who first joined the airline in 1996. "I think the airline was originally constructed in record time," says Ferry. "At the start, the product was secondary to the service – we just wanted to give customers a choice and prove there was another way of flying," he says of the airline's formative years. "The early focus was all about offering an improved service – it was all about someone that smiled, someone that cared about you and treated you like a human being."

FRONT RUNNER But with the help of Ferry and his team, the airline's onboard product is now just as important, with the changes most noticeable at the front end of the cabin. "When I joined, the airline offered a large, comfortable seat in Upper that reclined about 150°, set at 55in pitch – the policy was to offer a first-class seat at a



“

BACK WHEN I JOINED, IT WAS ALL ABOUT HOW MUCH KNEE CLEARANCE YOU HAD – BEING FLAT WASN'T ON THE RADAR AT ALL IN BUSINESS ”

business-class pitch, although at the time most of our competitors were offering around 45-50in pitch,” remembers Ferry.

In essence the airline continues to live by this philosophy – a first-class product at a business-class pitch *and* fare – but in the process it has championed a revolution in seating that has consigned the old ‘lounger’ style seats to the dustbin. “Today airlines are competing on how flat the bed is and how wide the bed is,” acknowledges Ferry. “Back when I joined, it was all about how much knee clearance you had – being flat wasn’t on the radar at all in business and it had only just come to light that you could have a flat bed in first class [British Airways launched its first-class flat bed in 1996].”

TOO COOL FOR SCHOOL Ferry didn’t waste any time organising Virgin Atlantic’s response – in fact he was already working on it before he joined – the airline approached him to develop a new product for its Upper Class passengers in his final year as a student at London’s Royal College of Art (RCA). The result was the J2000 seat, which transformed at the press of a button into an 80in-long bed, albeit at an angle, but also at an extremely competitive pitch. Ferry and his team





ONE OF THE ASPECTS THAT PEOPLE HADN'T EXPERIENCED BEFORE VIRGIN ATLANTIC'S LAUNCH WAS THAT FLYING COULD BE FUN AND GLAMOROUS

worked with Reynard Aviation, a joint venture between Virgin and an offshoot of Adrian Reynard's motor racing design company, to develop and manufacture the seat. Suffice to say it wasn't long before every airline was rushing its own 'lie-flat-at-an-angle' seat programme through production.

But Virgin Atlantic was already thinking about its next move and in 2003, when most of the competition was still reeling from the effects of 9/11 and consequently slashing investment, it splashed out £50 million on its award-winning Upper Class Suite (UCS). Passengers were treated to a reclining leather seat for take-off that



flipped over into the longest fully flat bed then flying, complete with a proper mattress for sleeping on, and installed in an innovative 'herringbone' configuration to maximise revenue.

Air New Zealand was so impressed it decided to pay to license the design, while the herringbone configuration has since been adopted by a number of rival carriers.

TOAST OF THE TOWN But it's not just the seat that keeps well-heeled customers coming back time and time again – there's also the iconic onboard bar, first launched in 1984; and until their retirement in 2008, inflight beauty therapists were on hand to provide Upper Class passengers with massages, manicures and facials.

The pampering now takes place at Virgin Atlantic's impressive London Heathrow Clubhouse instead. Opened in August 2005, this 2,500m² facility oozes style and sophistication and includes a 14m-long gleaming white bar, deli, restaurant, salon and spa, library and observation deck. The airline continues to open further clubhouses across the globe, and has since added to the experience at Heathrow with its Upper Class Wing – a private check in and security channel at T3, which allows its Upper Class passengers to get from check-in to the Clubhouse in minutes.

"One of the aspects that people hadn't experienced before Virgin Atlantic's launch was that flying could be fun and glamorous," says Ferry.



If its Upper Class achievements weren't enough, the airline also pioneered the industry's first premium-economy product back in 1992. Virgin Atlantic completely revamped the product in November 2006, again working with Reynard Aviation, adding leather seat covers and increasing seat width to 21in, making it one of the widest flying. "It really does look like a very luxurious seat, and certainly for the price you pay, it's great value," says Ferry.

HIGH EXPECTATIONS In its constant quest to reinvent and improve things, the airline has faced many hurdles, but Ferry says it has no other choice but to challenge the status quo. "People have an expectation of Virgin Atlantic that we will be at the forefront of

technologies and innovation and that's why they fly with us," he says. "They expect their whole experience to improve and so we have to continually reinvent ourselves to ensure that we're delivering against that."

The real trick, according to Ferry, is to ensure a constant flow of improvements – both large and small. "You have to remember the first time a passenger sees a brand-new product, they might think 'wow this is amazing' but after a few more experiences with it, it becomes their standard – so you have to constantly reinvigorate yourself," he says. "One of Virgin's strengths is that it is adaptable, it's versatile, it's not scared of change, it embraces change and wants to recreate itself whenever there is a need."



However, Ferry admits a certain frustration with the lengthy timescales involved when developing major new cabin innovations. "That's probably the only disappointing thing about this industry – everything takes so long," he says. "We've only launched two business-class products in the 13 years since I've been here and we're working very hard on the future at the moment, but it does take an enormous amount of time and effort to break down some of the barriers that stifle innovation."

Ferry identifies two key obstacles: strict safety rules; and a supply base he likens to a "cottage industry", which is reluctant to take risks in new technology. "It's not like the automotive industry, or any other industry that I'm aware of," he says. "It's obviously

- 03. VA's new premium economy, launched in 2006
- 04. Its previous premium economy cabin
- 05. The current Upper Class bar
- 06. An earlier version of the onboard bar

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- 07. Virgin Atlantic's current economy cabin
- 08. The carrier's previous economy offering



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imperative to have rules when you're flying at 35,000ft at 500mph, but the amount of legislation and restrictions that are imposed on you require your suppliers and manufacturers to be very innovative in their material choices – and with their business models. Unfortunately, they are geared towards very low-volume production, which doesn't give you the capabilities of the car industry where they are producing millions of parts and can afford to invest heavily on initial tooling costs. Instead it's all about low-batch volumes and almost bespoke products – everything is incredibly expensive and yet there is a distinct lack of investment in technology because the manufacturers don't see a return on that investment for many years, by which time the technology is redundant.”

CATALOGUE CONCERNS It's not just the interiors supply base that is sometimes reluctant to share the airline's hunger for change. The desire of the major aircraft manufacturers to exercise greater control of what goes on board their new aircraft in the interests of

greater efficiency also gives Ferry cause for concern. “Unfortunately it sometimes seems the industry is going backwards with manufacturers insisting that all the airlines buy out of the catalogue and imposing very tight restrictions on who you can and can't work with,” he says. “I think we're in danger of everything being specified out of a brochure – I can categorically say that Virgin Atlantic has no desire to be one of the many airlines that will be specifying their interior in that way. We believe our product differentiation is what gives us our lead in the market and we'll do everything we can to protect it. We want to work with the airframe manufacturers to get the best innovations that we can on board – we definitely don't want what everyone else has got, otherwise we'll just be like any other airline.”

With the industry facing one of its toughest periods yet, perhaps now is not the time to invest in new innovations – but Virgin's recent past suggests the opposite. “We leapfrogged our competitors by developing a product during some truly horrendous



- 09. The crew on board the flight earlier this year to celebrate the airline's 25th anniversary
- 10. Crew uniforms have changed considerably since the carrier's launch!



I'M STILL HERE BECAUSE I CAN SEE THERE'S STILL A WEALTH OF OPPORTUNITY IN MOST OF THE ELEMENTS WITHIN A CABIN INTERIOR



times just after 9/11," Ferry responds. "We didn't stop investment in our R&D and so when the upturn came, we had a brand new product in our Upper Class Suite. And we continue to invest now – my team are still employed, so we're investing in design and the future. I know that the majority of airlines, certainly after 9/11, disbanded the majority of their design departments. When the market came back and we launched the Upper Class Suite, it was a double whammy for them – they had to rebuild their product development teams and then come back at us with a new product, and it took them at least two or three years to get anywhere close, and the majority of them haven't even come close."

WHAT NEXT? The details of what Ferry and his team are currently working on remains a closely guarded secret, but the airline does have a number of new aircraft on order. "We've announced that we're taking delivery of 10 Airbus

A330-300 aircraft in 2011 and obviously you can't decide a day before what product to put on it. So we'll be ensuring that those aircraft have all the interior products that we'll need to take us forward in the future."

Despite having already spent 13 years at Virgin Atlantic, Ferry is optimistic he will be around to celebrate further milestones and birthdays for the airline. "The reason I'm still here is because I can see there's still a wealth of opportunity in most of the elements within a cabin interior – we're only scraping the surface of what's possible," he says. "There is so much you can improve and the best designs usually come out of the most challenging briefs. I still think we can come up with some brilliant designs –we just need partners with the energy and willingness to help us achieve those at a price that we can afford and that also works within their business model. It's a very fine balancing act, but I'm confident we'll get there." ☒

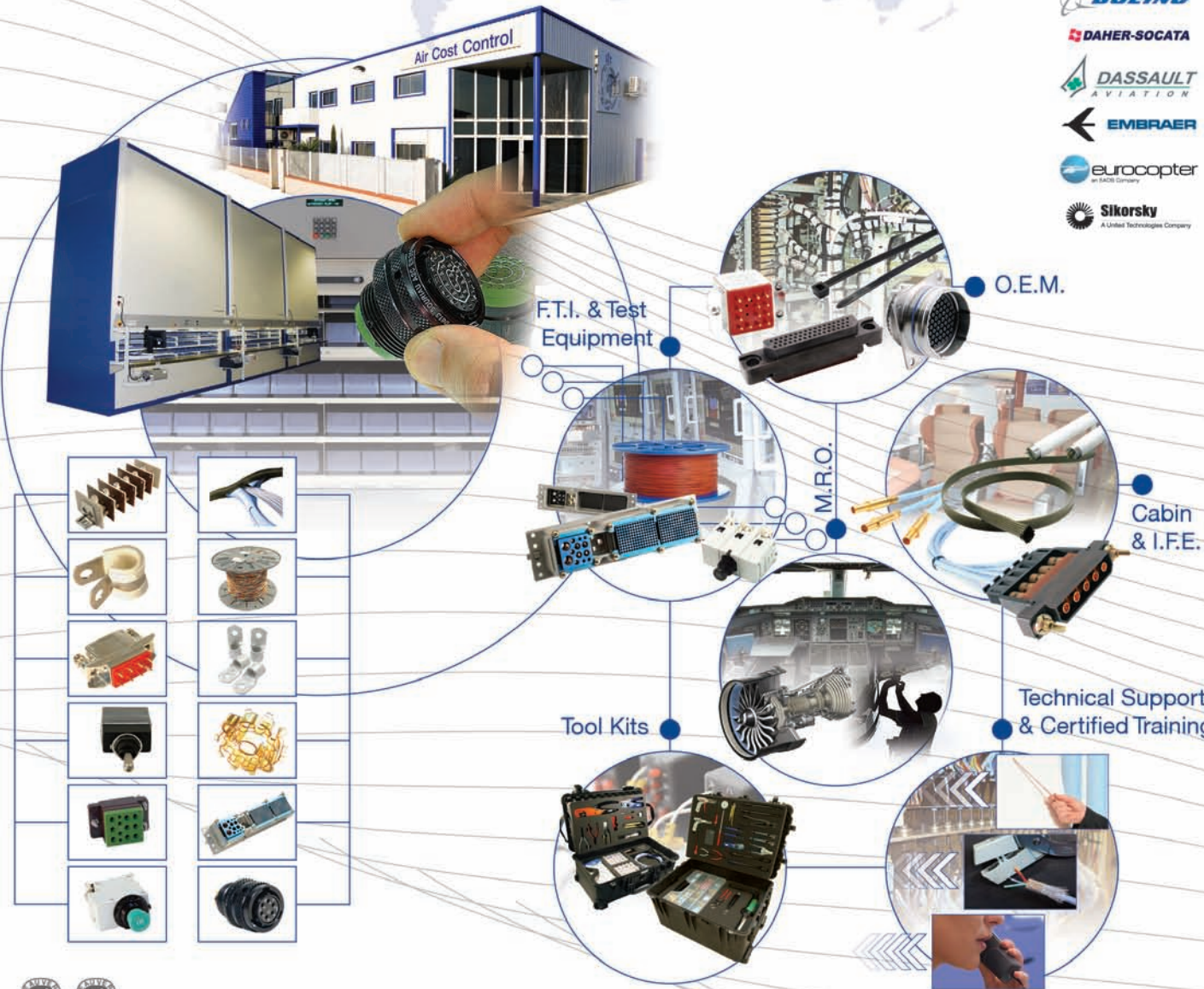


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DESPITE LIMITED REVENUE GAINS SO FAR, ROBERT SMITH ARGUES CONNECTIVITY STILL HAS THE POTENTIAL TO SAVE THE IFEC SECTOR



Queen Elizabeth II of The United Kingdom described 1992 as an “annus horribilis”.

You do not have to be a Latin scholar to realise that Her Majesty had a bad year. For many industries, both the second half of 2008 and much of 2009 would justify a similar description, with the effects of the credit crunch sending consumer confidence to an all-time low and access to borrowing nearly non-existent.

However, you could be forgiven for thinking that unlike most other industries, the airline industry should be a little more accustomed to dealing with such bad years. After all, they come round with alarming regularity. IATA statistics show that airlines have made losses in every year except 2007 since the 9/11 terror attacks in 2001.

Over the years, enhancing the customer experience has become one of the key tools for survival. As an industry, we are quite used to wanting more product when there is less money to pay for it. The need to differentiate and offer

01



02

01. OnAir provides a full range of cabin and cockpit connectivity services using Inmarsat SwiftBroadband
02. Air France offers mobile check-in and boarding passes on mobile phones from 30 hours before departure in Europe



INNOVATION IN INFLIGHT TECHNOLOGIES WILL HAVE AN
IMPORTANT ROLE IN DRIVING FUTURE EXPENDITURE



a high quality of service for international airlines usually means that suppliers in the IFEC sector are somewhat sheltered from the full force of the recession.

FIGURE IT OUT IATA reported the global airline industry lost up to US\$16.8 billion in 2008, including a particularly hard fourth quarter from the global recession and fuel hedging losses. In the same year, airlines spent a respectable US\$1.5 billion on IFEC hardware and a further US\$400 million on content and services. IMDC's latest market forecast shows that the spending in 2009 will have dropped by less than 10% compared to overall drop in airline costs of 15%. Allowing for lags and considering that the combined financial impact on airline industry of 2008-2009 is expected to be greater than that of 2001-2002, this shows evidence of resilience in the IFEC sector.

Innovation in inflight technologies will have an important role in driving future expenditure. Passenger communications is a developing sector that is capable of raising service standards across the industry. By the end of 2009, IMDC expect over 1,000 aircraft in the global fleet to be equipped with some form of passenger connectivity. This represents a great achievement by all those involved and the industry should be proud.

Unfortunately the industrious PR departments at connectivity providers managed to raise expectations of connectivity services perhaps a little more than can be justified. Now that connectivity is available on a significant percentage – and in



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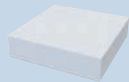


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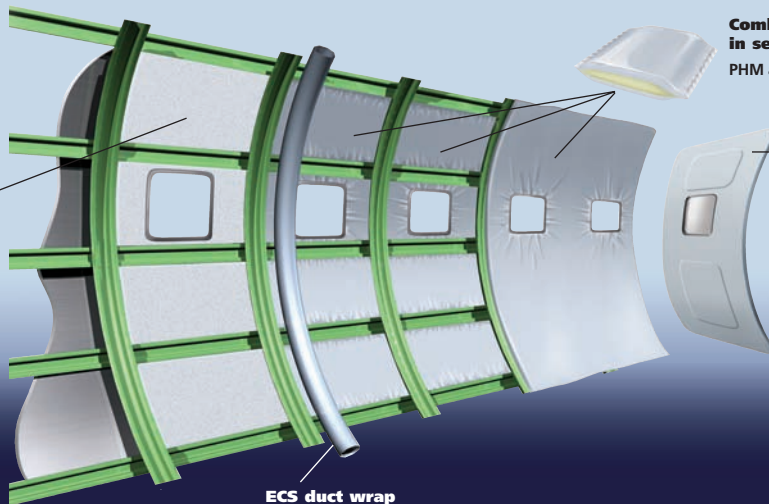
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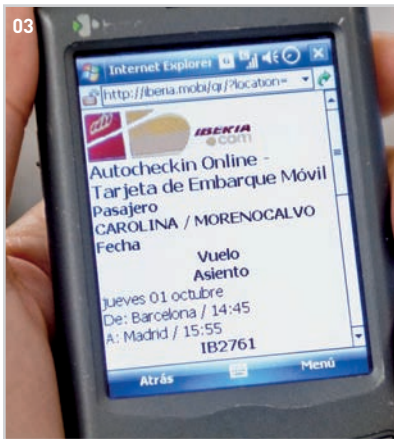


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LEVERAGING THE OPERATIONAL BENEFITS OF A CONNECTED AIRCRAFT ADDS A GREAT DEAL OF POTENTIAL TO THE CONNECTIVITY BUSINESS CASE



some cases the full fleet – of many airlines, usage and (crucially) pricing data is becoming available for analysis. The journey to introduce connectivity has been much tougher than many expected. Legislation, certification and testing have combined to push all connectivity programme schedules to the right. With roll-out constrained, 2009 will provide a tough test on cash-flow.

It is important to accept that passenger connectivity as it stands is not a service the majority of airlines feel they are compelled to introduce. In 2009 about a third of airlines had plans to introduce some form of passenger connectivity on at least part of their fleet. It seems fair to say that the potential for short-term competitive advantage and ancillary revenue potential alone do not justify the required capital expenditure of current connectivity services for most airlines.

It is often implied that the revenue potential for connectivity services is greater than that from traditional IFE. In the case of internet connectivity this should not be taken as given. If revenue trends on the ground lead those in the air, then the increasing availability of free WiFi hotspots is a concern for the passenger connectivity business model.

Nevertheless, IMDC expect that onboard communications will succeed and deliver benefits to airlines, albeit in a less spectacular fashion than some would like. Despite the resilience of airline expenditure on inflight technologies in even the leanest of times, it is not reasonable to expect huge investment in a new service like passenger connectivity. This argument against the service is enforced at a time when passenger traffic – particularly business travel – is falling.

SMOOTH OPERATION In markets where airlines are reluctant to make an additional investment in improving their service and passengers are not numerous or keen enough to pay for the service themselves, then the connectivity sector must find another way to give value and therefore receive sufficient income.

Leveraging the operational benefits of a connected aircraft adds a great deal of potential to the connectivity business case. Operational benefits can be defined more clearly and are more certain than passenger service benefits and revenues.

The airline demand for a more integrated connectivity service, combining passenger and non-passenger connectivity is illustrated by SITA survey results. The highest priority drivers of IT investment have been identified as reducing costs, adding revenue opportunities, and enhancing customer service.

Additionally, delivering extra services to crew rather than passengers over an onboard connectivity system was the most common intention amongst surveyed airlines in 2009. Such services could include inventory, reports and special passenger handling – all of which are more in demand than marketing directly to passengers and inflight passenger notifications.

An additional strategy is for connectivity service providers to focus their attentions on airframers. While recent connectivity installations will keep the service at the forefront of airlines' minds, retrofit programmes are more likely to be postponed in the current climate. For an airline, combining the connectivity purchase with airline finance makes the decision

- 03. Iberia has also adopted mobile boarding passes
- 04. Aircell's gogo Internet service is popular with US carriers



INTEGRATION OF BACK-OFFICE PROCEDURES WOULD BRING OPERATIONAL BENEFITS AND COST SAVINGS TO PROVIDERS AND AIRLINES



- 05. New twin-aisle aircraft deliveries, such as the 787, will hopefully drive the IFEC sector forward
- 06. Alaska Airlines' onboard internet trial using Row44 technology

much more likely. There are record backlogs at Boeing and Airbus. Making sure those aircraft in the future are equipped to deal with connectivity will have a huge impact on the speed of roll-out and therefore revenue streams for connectivity.

In fact all passenger experience products would benefit from a more seamless process going forward.



About the author

Robert Smith heads the market intelligence department of IMDC. He has worked with a number of airlines and vendors in the IFE industry, providing information and analysis as a foundation for strategy development. IMDC is a management consultancy and data analysis firm that provides management support services to airlines, media and telecoms companies. IMDC is widely recognised for its expertise in market, economic and technology trends in inflight technologies and media. IMDC's *Market Outlook 2009: Inflight Technologies, Communications and Media* report includes a five-year market forecast for both airline spend on IFE hardware and aircraft installed with passenger connectivity systems. Additionally there is a detailed description of the IFEC market structure and analysis of current issues affecting systems, content and connectivity sectors.

Integration of back-office procedures would bring operational benefits and cost savings to providers and airlines. Airlines that succeed in delivering a strong and value-adding theme through the entire passenger experience will lead to better efficiency and increased ancillary revenue.

JUST THE TICKET One way to do this is for airlines and providers to adopt a holistic approach to passenger mobile services in order to make the most of any inflight service. By initiating mobile services on the ground passengers become involved with the airline and the travel experience through their mobile at an early stage. Inflight connectivity then becomes part of a complete personalised experience delivered to the passengers' own device.

Sending boarding passes directly to passengers' mobile phones is potentially a very involving way in which to build the relationship with a passenger through their phone, delivering immediate cost benefits to the airline and increasing the potential for generating onboard revenue.

Notifying passengers of flight status and delays is an established priority for airlines when considered separately from inflight connectivity. There are clear mutual benefits to introducing both services at the same time. Passengers with connecting flights will be especially glad of personalised updates delivered to their own phone before they land. Such a service would

provide motivation for passengers to switch their phone on during the flight. In turn, this creates a larger potential market of passengers who will make or receive calls inflight, generating revenue for the airline.

According to IMDC's *Outlook 2009 Report*, installations of connected aircraft are expected to slow after a period of rapid roll-out on US domestic aircraft. Despite the slower installation rate, by the start of 2014 over 4,000 aircraft will offer passenger connectivity.

POINT OF RECOVERY In the same report, IMDC identifies a recovery point for IFE hardware expenditure. Some of the decline of this expenditure in 2008 was driven by delayed and deferred aircraft deliveries and a reduction in retrofit activity. Similarly, the recovery will be driven by a steady increase in deliveries of twin-aisle aircraft, including the 787, combined with pent up retrofit demand.

A significant installed base of connected aircraft and increasing expenditure on IFE hardware over the next five years is a positive outlook for the inflight technologies sector. Existing suppliers in the industry can reasonably expect their environment to improve in the future. There will also be opportunity for new entrants at what will be a time of new products, services and business models. What is left for the industry to prove is how well it can take advantage of the full potential of tomorrow's technology. ☒

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BLAKE EMERY AND RICK FRAKER OF BOEING ASK WHETHER THE USE OF IDEALISED DESIGN COULD LEAD TO A BREAKTHROUGH IN THE DEVELOPMENT OF ECONOMY-CLASS SEATS

01. Example of a seat that is compatible with its surrounding architecture



One thing economy passengers frequently complain about is the seating. The complaints often reflect seat pitch, but frequently respondents make specific comments about the nature of the controls, recline, and lumbar pain.

In response, a team from Boeing Commercial Airplanes' marketing department decided to conduct a series of 'idealised design' sessions to better understand the personal values associated with economy-class seats. These sessions were conducted with a major aircraft leasing company, airlines from three countries, and a group of Boeing interior experts.

Idealised design (for more information, see *Aircraft Interiors International*, February 2003 issue) is a process that allows consumers to create a vision of what they want a product to be, right now, assuming it could be exactly what they want. The ensuing design may never be able to actually be achieved, yet it points the way for product manufacturers. It provides direction.

Idealised design is subject to only two constraints: First, the design must be technologically feasible – it may not incorporate any technology that is not available. This does not preclude new uses of available technology. It does prevent the design process from becoming an exercise in science fiction.

Second, the design must be operationally viable – if it were to come into existence, it must be able to function within the system that would contain it. This requirement stresses the conceptual feasibility of the design, not its practicality. Practicality is not required of an idealised design – we are trying to uncover hidden values from the stakeholders.

All idealised designs are tentative, not perfect. They represent the best perfection-seeking system its designers can currently imagine. What follows



“

THE SEATS SHOULD ALSO LOOK AS IF THEY WERE DESIGNED TO GO WITH THE REST OF THE INTERIOR ARCHITECTURE ”



are some of the elements of an idealised design of an economy-class seat. It is important to recognise that these ideas are much more than the product of a brainstorm; for an idea to make the final cut, agreement on that idea had to be reached across all groups. We respectfully submit these ideas to our industry.

SPACE TRAVEL One of the most powerful ideas to emerge from these sessions was that the seat design process should be thought of more as the design of a space. It is not simply the design of a chair, or a set of three chairs. Another important finding is that the seat plays an important psychological role: the passenger wants the seat to validate the feeling that they ‘chose well’ in selecting the airline, and that choice in turn increases their self-confidence and self-worth.

Participants wanted seating that could define the passenger’s sense of personal space. That space includes the seatback in front of the passenger. The seat should clearly inform the passenger that only he or she can alter that space. Their comfort and privacy are not subject to the whims and preferences of their direct neighbours. For example, the seatback in front of them should not impinge upon their own personal space. Participants also identified a need to ensure there is no ambiguity associated with their allotted living space, for example, it should be clear which armrest belongs to whom.

The seats should also look as if they were designed to go with the rest of the interior architecture – they should match the design philosophy and language of the interior and look as if they were designed together, not separately. For example, if they are seats for a 787 Dreamliner, they should look ‘modern’ with more curves than seats installed in earlier aircraft. All this

should be achieved without completely overpowering the architecture.

We have included some renderings to illustrate this point. Note that these renderings are consistent with the Boeing “Seat Comfort and Living Space Standards” and described in the February 2003 issue of *Aircraft Interiors International*.

To better create the sense that the passenger ‘chose well’, the seating needs to reflect both the airline’s and passenger’s ‘brand values’. Each airline, as in other businesses, needs to stand for something in the marketplace: superior service, luxury, efficiency, etc. The brand is ultimately about the experience of the consumers of the service/product offered. Things like aircraft, livery, service, attendant’s uniforms, and seats are all among the tactics an airline uses to influence the consumers’ experience. The seat does more than reinforce the airline brand, it is one of the key defining elements. The ideal seat is one that can define and support the experience the airline wants to provide.

Passengers have a self-image and associated emotional needs and wants. They are looking for products that match and enhance their self-image and emotional make up. Because the seat plays an intimate role as a primary touch point in the flying experience, the seat must be able to facilitate expression of self. The personalities of the consumer and the brand should be able to merge, with the value of the brand ideally becoming positive self expression for the passenger.



02

The seating should also visually communicate its ability to adapt to the passenger in an understandable way. Ideally the seat should convey this before the passenger even sits down. Each seat should appear clean, ready to serve the current passengers’ needs in entirety, without showing traces of the previous occupant.

The seating should also look as if the designer anticipated more subtle user needs and wants. For example, the seat should allow the passenger to be social or private, and should not give the sense of ‘trapping’ the passenger. In an ideal world, the passenger would not have to step over anyone to reach the aisle.

The seats should be inviting – the passenger should want to sit in them upon seeing them.

They tend toward the ‘light and airy’ as opposed to ‘thick and chunky’. Even though light and airy, they should convey stability, and in no way appear flimsy. The seating should also trigger the sense that “I could see myself sleeping in that seat”.

We also asked participants to come up with a description of what the seat communicates to them. Put another way, what would the ideal seat say to you if it could talk? The consensus synopsis is: “Welcome! Sit in me and relax. I’ll protect you, cradle you, and help you keep engaged. You can easily get to



Make the grade

In 'Grade School', in the February 2003 issue of Aircraft Interiors International, Klaus Brauer introduced Boeing's seat comfort and living space standards, which specify measures for regions of the seat critical to maximising personal space and passenger comfort. In developing 3D models of seats embodying the idealised design principles, it was not difficult to both embody the idealised design principles and score well under the Boeing comfort and living space criteria. As one might hope, no intrinsic conflicts were found between the psychological ideal and the objectively comfortable.

me and get out as well. I will accommodate you and your needs."

ARE YOU SITTING COMFORTABLY?

The body should be well supported and the seats should feel sturdy. Airlines frequently use the word cradle or cradling to describe the ideal feeling a seat should convey. The ideal seat should allow passengers to find the amount of lumbar support that works for them, without resorting to a pillow, crumpled jacket, or blanket.

The ideal seat would also be designed to prevent the head from falling as a passenger 'nods off' into sleep. It would prevent any falling of the head in any direction. In the words

of one respondent, it should "prop me up and preserve my dignity". The ideal seat would accommodate sleeping by allowing a forward leaning posture as in a massage chair. The seat should be highly adjustable to adapt to different body sizes as well as positional and cultural seating preferences.

The ideal seat provides support for the legs and a place for feet regardless of the height of the passenger. It should accommodate leg movement and flexion. Participants did not feel passengers should have to use a carry-on as a leg support – the seat space should provide it.

The seat should provide all passengers with visual as well as physical comfort.

While sitting, the passenger should not be able to see too much of what the passenger in front is doing, such as working on a computer. At the same time, lines of sight should not be so blocked as to make a passenger feel claustrophobic. Ideally, the rear passenger should not be able to visually intrude upon the space of the passenger in front and vice versa. As stated before, the principle is that "my seat clearly defines my space", in both a physical and visual sense.

All aspects of the seat should be intuitive, and not confusing. The seat should provide psychological comfort – as a passenger I feel happy to be here, pleased with my choice, and in control of my space and my body.

02. A seat that is architecturally compatible with one interior is not necessarily compatible with another interior
03. Seats on older aircraft should still be designed to be more compatible, as shown here



04. How not to do it – these seats do not complement the surrounding architecture
05. A rendering of a seat that is architecturally compatible with today's 'modern' interiors

EXPRESS YOURSELF For a seat to be ideal, airlines must be able to use it to express their brand. The airlines participating in the idealised design sessions identified several areas where an ideal seat would allow for such 'customisation'.

Airlines believed these customisation options should expand well beyond the traditional choices of colour and fabric, to include modifying the

shape of the seat. They called for optional end bay sculpture combinations, foam sculpting, seat back design, methods of recline, and headrest design.

Airlines would like the seatback panels – the part of the seat a passenger sees while seated – to be modifiable for brand expression. Seats should do a much better job than today of accommodating IFE systems from multiple vendors in a more attractive and consistent manner.

The ideal seat would also allow for different arm rest and tray table options and features.

HEAD GEAR The idealised design process can facilitate the production of some very creative ideas, because the constraints which limit creativity are removed.

One creative idea that surfaced was the call for some kind of retractable "helmet," that could be deployed for each passenger. This helmet would serve multiple functions, such as noise abatement, personal video screen, purified personal air, privacy, and sleep enhancement.

Other creative ideas generated during the process included multiple level tiered seating, and special accommodation and treatment of passenger feet.

POSITIVE INFLUENCE In venues ranging from cocktail parties to syndicated columns, there is no lack of commentary about the shortcomings of passenger seating – yet actionable improvements rarely emerge from such commentary. The "idealized design" methodology has proven its' efficacy in a variety of industries – including aviation, in important aspects of the development of the 787 interior. It is my belief that idealized design can lead to a new breakthrough in passenger seating as well.

People in our industry are always thinking creatively. Processes and methods like idealized design can help industry experts to loosen up and remove traditional constraints. The method gives participants permission to have fun, and express their true desires, even if they were previously unarticulated. Airlines and the flying public will appreciate every move made in the direction of the ideal, and in turn, the companies that make progress towards it will certainly reap the benefits. ☒

**The authors would like to thank Klaus Brauer, Kent Craver, and Ken Price of Passenger Satisfaction and Revenue, Boeing Commercial Airplanes, for help in designing the seats pictured in this article.*



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JAY SORENSEN OF IDEAWORKS ARGUES BAGGAGE FEES AND FOOD-FOR-PURCHASE SCHEMES WILL EVENTUALLY BECOME COMMONPLACE ON ALL AIRLINES, REGARDLESS OF ROUTE OR BRAND POSITION, AS CARRIERS LOOK TO BOOST INCOME

01. Passenger credit cards are likely to take an even greater pounding if airline revenue managers get their way



Seemingly unstoppable fuel price increases over recent years have forced airlines to allow the genie of à la carte fees to escape from its bottle. Even though oil has returned to more normal price levels, airline management can't deny the financial magic produced by ancillary revenue. Many legacy airlines have made dramatic changes by implementing fees for services that once were included in the price of a ticket. The relatively high level of passenger acceptance – or at least the lack of a consumer revolt – surprised carrier management teams. As a result, the genie is not going back into the bottle – airlines are changing business models to capture customers who are willing to pay for perks.

There is ample evidence that airline marketing initiatives are becoming more revenue aware. Rather than provide free amenities, airlines have learned to 'ask for the sale' at every opportunity. À la carte fees are quickly becoming associated with checked baggage, call centre support, and onboard meals. IdeaWorks applied its ancillary revenue expertise, and its contact with airline clients worldwide, to anticipate the growing effect these changes will have on the air travel experience, making two important discoveries: Baggage charges, and other à la carte fees will spread to international markets, including the transatlantic, as more airlines become comfortable with the change; and food-for-purchase programmes will gain acceptance on longer haul flights, but will begin as offers to upgrade the dining experience.

WORLD VIEW The conversion to a new revenue-aware philosophy has been the most rapid for airline consumers in Europe and the United States. While à la carte pricing was largely conceived by Europe's low-cost carrier (LCC)



“

AMERICAN AIRLINES GENERATED US\$70 MILLION IN EXTRA REVENUE DURING THE THIRD QUARTER OF 2008 FROM THE FEES FOR A FIRST PIECE OF CHECKED BAGGAGE”



industry, the world's airlines have been avidly watching recent events in the US market. The revenue success realised in these two markets suggests the ancillary revenue movement is about to rapidly spread to the rest of the airline world.

The gradual unbundling of the air travel experience, and the growing prevalence of à la carte choices, demonstrates the growth of the ancillary revenue movement. Fees associated with checked baggage were once largely used by LCCs in Europe such as Ryanair and easyJet. Now these fees have also been adopted by the three of the largest names in the US airline industry: American; Delta; and United. Of course, all of this follows an already clear trend by many airlines to charge a flat fee for bookings made via airline call centres.

The fees associated with checked baggage in the US market have been a revenue success story. According to an article in the *Los Angeles Times*, American Airlines generated US\$70 million in extra revenue during the third quarter of 2008 from the fees for a first piece of checked baggage. United announced at the 2008 Calyon Airline Conference that it estimates it will realise US\$300 million in additional revenue during 2009 from its new baggage fees. Delta was initially reluctant to initiate a fee for the first piece of baggage. However, it joined other US major airlines at the end of last year when it introduced a US\$15 fee for the first piece.

Delta only considered this after its chief operating officer observed: “The increase in bags being carried on board Delta aircraft this year tells us that customers are not differentiating Delta as the only major airline not charging for a first checked bag.” He went on to observe that these fees have been “broadly accepted in the marketplace”.

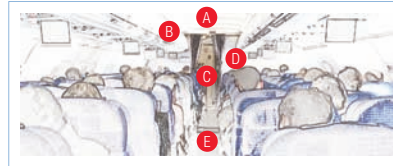
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AIRLINE MANAGEMENT SHOULD BE WARY OF ANY ABRUPT CHANGES TO SEEMINGLY MINOR ELEMENTS SUCH AS FREE SOFT DRINKS, COFFEE, AND PEANUTS



Europe's major airlines, and legacy carriers throughout the world, are likely to greet these events with enthusiasm. Lufthansa, SAS, Air France/KLM, and others, are most likely to copy the baggage fees already implemented by LCCs on shorter haul flights within Europe. Transatlantic markets represent a future frontier that will require one European or US carrier to make a bold move by being the first to charge fees for food in coach or the first piece of checked baggage. The revenue potential of baggage fees suggests it's an inevitable event.

Thus emboldened, legacy airlines will likely adopt the other à la carte fees already charged by LCCs. Some of this activity has already occurred. Delta recently matched Northwest's existing practice of offering coach customers the ability to purchase a better seat assignment for US\$5 to US\$25. Most surprising is Singapore Airlines decision to charge a US\$50 fee per sector to reserve exit row seats in economy.

Food for thought

No more free meals - Jay Sorensen of IdeaWorks considers the implications
Q: Will paid-for meals lead to less or more demand on inflight equipment and cabin crew?

A: This really depends on the length of flight. I believe the eventual take-up on long-haul services will be close to 100% of the passenger load. Medium- and short-haul will be less. Meal activity will reflect passenger demand, and this suggests the airline industry has been needlessly feeding lots of passengers through the years. I imagine adequate galley equipment already exists but in some cases more creativity will be required to offer an upgraded meal without the benefit of galley ovens. The bigger challenge is probably on the ground, as kitchen capabilities have decreased at many locations due to prior reductions.

Q: Is there the potential to remove galleys and cut crew to further save weight and reduce costs, perhaps even creating space for new features or more seats?

A: Galley reductions have already been made on most short-haul aircraft. The US-based LCC, Allegiant Airlines has taken it further by not having coffee-makers on board its aircraft. I suspect crew levels are already at the minimum levels required by regulatory agencies, but having crew on board the aircraft actually provides more opportunities to sell goods and services to passengers. This will require a cultural shift at legacy airlines.

- 02. More and more airlines are charging passengers for checking bags in the hold
- 03. Love them or loathe them, the inflight meal is at least free – on the majority of long-haul flights – but for how much longer?



Major airlines will likely show some restraint now that the price of fuel has fallen to more acceptable levels. Caution and thoughtfulness are warranted. Employees, the media, and consumers need to understand and accept these dramatic changes, however most airlines haven't dedicated sufficient resources to ensure successful product introductions.

FOOD FOR PURCHASE Airline food holds a special position in our travel culture. It has been the subject of derision by comedians, reporters and the general public. But airline management should be wary of any abrupt changes to seemingly minor elements such as free soft drinks, coffee, and peanuts. And as United Airlines recently discovered, the



AIRASIAX AND JETSTAR IN THE ASIA-PACIFIC MARKET ALREADY PROVIDE FOOD-FOR-PURCHASE OPTIONS



04. Virgin America's interactive Red IFE system lets passengers pay for a wide range of products and services during flight



04

About the author

Jay Sorensen is a veteran management professional with 25 years experience in product, partnership and marketing development. As president of the IdeaWorks consulting firm, he has enhanced the generation of airline revenue, started loyalty programmes and co-branded credit cards, developed products in the service sector, and helped start airlines and other travel companies. Jay has provided consulting services to clients in North America, South America, Europe, and the Middle East.

His career includes 13 years at Midwest Airlines (formerly Midwest Express) where he was responsible for marketing and product development. Jay speaks at leading conferences in Europe and North America such as the Low Cost Airlines Congress, Frequent Flier Program Conference (FFP), and the Ancillary Revenue Conference (ARAC). He is also author of the Guide for Ancillary Revenue and a la Carte Pricing (sponsored by ezRez); the publication has been purchased by aviation professionals from all over the world.

world is not yet ready for the sale of food in economy class on flights between USA and Europe... or is it?

United probably regrets its announcement in August last year that it was planning to test a buy-on-board concept on transatlantic flights operating at its Washington Dulles hub during the fourth quarter of 2008. Within 13 very unlucky days from making the announcement, the airline said it was compelled by overwhelming public feedback to drop its test plans. Surprisingly, food-for-purchase on long-distance flights is already an accepted fact for a number of airlines throughout the world.

AirAsiaX and Jetstar in the Asia-Pacific market already provide food-for-purchase options on long-distance flights. Air Baltic, which operates flights of over five hours from its Riga hub, has also replaced complimentary food with a buy-on-board café. All three airlines allow customers to pre-order meals, often at a discount, to guarantee the availability of a hot entrée.

Air Berlin also takes a unique approach with its Sansibar gourmet meals. The airline continues to offer complimentary snacks, meals, and beverages to economy passengers, however these customers may 'upgrade' their dining experience by ordering a specific gourmet entrée before departure.

Within Europe, the buy-on-board path has also been blazed by Scandinavian Airlines. The carrier offers a basic economy product on short- and medium-haul routes that exclude complimentary food and beverages. Consumers may choose to upgrade to Economy Extra, which provides a three-course meal box and drinks, along with other amenities.

But the biggest news might be the comments made by Willie Walsh, the CEO of British Airways, at the 2008 World Low Cost Airlines Conference, reported in British newspaper, *The Daily Mail*. "I think we are only scratching the surface at BA regarding ancillary services," said Walsh. The article also reports British Airways is "even investigating charging passengers extra for the option of an 'upgraded' inflight meal". While specific routes were not mentioned, the opportunity to purchase a better meal would probably have its greatest appeal on longer flights, such as transatlantic markets.

United's aborted buy-on-board test won't be the last attempt to bring à la carte fees to long-haul flights. Perhaps Ryanair, in its plans to launch low-cost flights on transatlantic routes, will nudge others to consider food-for-purchase fees. Or, maybe legacy airlines will take a more careful approach by adding a meal upgrade alternative as a first tentative step. ☒

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IN A WORLD OF LONG HAULS AND SHORT ATTENTION SPANS, FEW THINGS ARE MORE LIKELY THAN AN IFE FAILURE TO RAISE A PASSENGER'S BLOOD PRESSURE, WRITES BRENDAN GALLAGHER



There's no great mystery about the workings of an audio/video-on-demand (AVOD) in-flight entertainment (IFE) system. It's a local-area network, in many ways just like those found in millions of offices the world over, with central servers to store data, cables to carry it to where it's needed, and user terminals with varying degrees of local computing power. But there the resemblance ends, and the differences between the cabin and office environments can pose some of the biggest serviceability and maintenance problems known to aircraft operators.

Take the type and volume of data flowing round the system. The typical office network has to handle fairly infrequent demands from a few dozen people for kilobit-sized documents and pictures and presentations running to a few megabits. The cabin network, by contrast, can be hit by constantly shifting demands from two or three hundred passengers for megabits per second of streaming video.

Then there are the users themselves. Office workers are there to work, in a generally disciplined and focused way with familiar equipment and software. The occupants of an airline cabin can range in age from nine to ninety, in IT proficiency from complete familiarity to utter ignorance, and in mood from fairly relaxed and cheerful to anxious, confused and even angry.

And finally there's the real battlefield – the passenger-facing equipment. The stories of passengers using forks to operate touch-screens are no urban myth, according to the system manufacturers who have to pick up the pieces. As for the underseat boxes used to house processing and power for the screens in each seat row, one vendor says it all: "There will always be problems as long as sensitive



01. IFE system users cover the full age range – pity the parents of any child confronted by an IFE system failure during a long flight!



THE STORIES OF PASSENGERS USING FORKS TO OPERATE TOUCH-SCREENS ARE NO URBAN MYTH



electronic units are installed at floor level – how long would your laptop last if you constantly kicked it around your living room?”

This is the environment in which the system suppliers and their support organisations strive daily to achieve the 99%+ seat availability targets imposed by airlines all too conscious of the business-losing potential of IFE failures. Among those leading the charge for ever higher levels of reliability are top two vendors Panasonic and Thales, promising newcomer Lumexis, and Montreal-based IFE installations specialist, Inflight Canada.

PERCENTAGE GAME Over the years the manufacturers have put huge amounts of money into developing their designs and product support systems. Have their efforts paid off by improving performance in terms of seat availability, the industry-standard benchmark?

“There has been a clear progression in reliability from one generation of our product to the next,” says Panasonic product marketing director Cedric Rhoads. “Our first distributed system initially operated at 85% seat availability. That was unacceptable and since then we’ve worked on improving performance to the point where today’s eX2 consistently achieves 99% and often exceeds 99.5%. Our goal now is to achieve 99.95%.”

Thales came later to the IFE market but has recently begun to challenge Panasonic for leadership of the AVOD sector. Based in Irvine, California, it claims a current seat availability figure of 99.9% for its TopSeries range, having laboured at 92-93% in the early days of the system’s career.

These numbers have been achieved against a background of ever-increasing



“

THE NUMBER OF CHANCES FOR THINGS TO GO WRONG HAS GROWN BY ORDERS OF MAGNITUDE ”

system complexity and customer expectation, points out Thales' chief engineer, Ken Brady. "For example, when IFE systems were based on videotape, the quality of the tapes was never a measurable element of reliability. Now some airlines monitor parameters such as the quality and integrity of the encoding of MPEG video files."

The bar has been raised in other areas too. A typical content offering has expanded from nine tapes to as much as 500 video programmes, while the systems are also expected to deliver power for passenger devices, live satellite television and air-to-ground connectivity. "The number of chances for things to go wrong has grown by orders of magnitude," says Brady. "So it's rather remarkable that we should appear to have maintained or improved our reliability performance."

Appearances are everything, however, and even an average 99.9% seat availability figure can leave room for the occasional visible and embarrassing failure. Doug Cline is the chief executive of Californian company Lumexis, which recently announced that it had secured a launch customer for its Fibre To The



- 02. The ideal scenario when first boarding the aircraft
- 03. US Airways recently trialled Lumexis's fibre optic IFE system on an A320
- 04. Emirates' 'ICE' system uses touch-screens, but passengers have been known to 'interact' using less 'suitable' equipment, such as forks!

Screen (FTTS) fibre optic-based system and planned to start its first operational installations next year.

"On a recent round trip between Los Angeles and Hong Kong the IFE worked well outbound but went 'dark', without any video, for ten hours on the return flight," he reports. "I think there can sometimes be a significant disconnect between reported availability and the reality faced by passengers and cabin staff."

TRACK AND TRACE Such incidents are bad news for vendor and airline alike, and there can be no question of the willingness of the big two manufacturers to go many extra miles to eliminate them.

"We constantly monitor our installed base, either directly or through systems such as our Online Maintenance Tool (OMT) and Data Analysis and Reliability Tracker (DART), to spot performance problems



and trends so we can drive down software and hardware-induced failures,” says Panasonic’s Rhoads. “Our support engineers work closely with customers and conduct ‘fly-alongs’ to observe system performance directly. In our reliability lab we carry out highly accelerated life and stress testing of every new design. And we analyse new core technologies for their potential to improve reliability.”

The drive for tighter integration of IFE into seats, as exemplified by Panasonic’s new Fusion initiative, could bode well for reliability. “We’re now using LED backlights in place of the previously standard compact fluorescent lightbulbs (CFLs) in all our new screens, including the Fusion Integrated Smart Monitor,” says Rhoads. “LEDs offer better overall reliability as well as consistent light output over their



lifespan, whereas CFL output declines with time, often necessitating replacement before an actual failure. The Fusion screen will also feature a new low-power architecture, reduced complexity and a lower component count, all of which should further benefit reliability.”

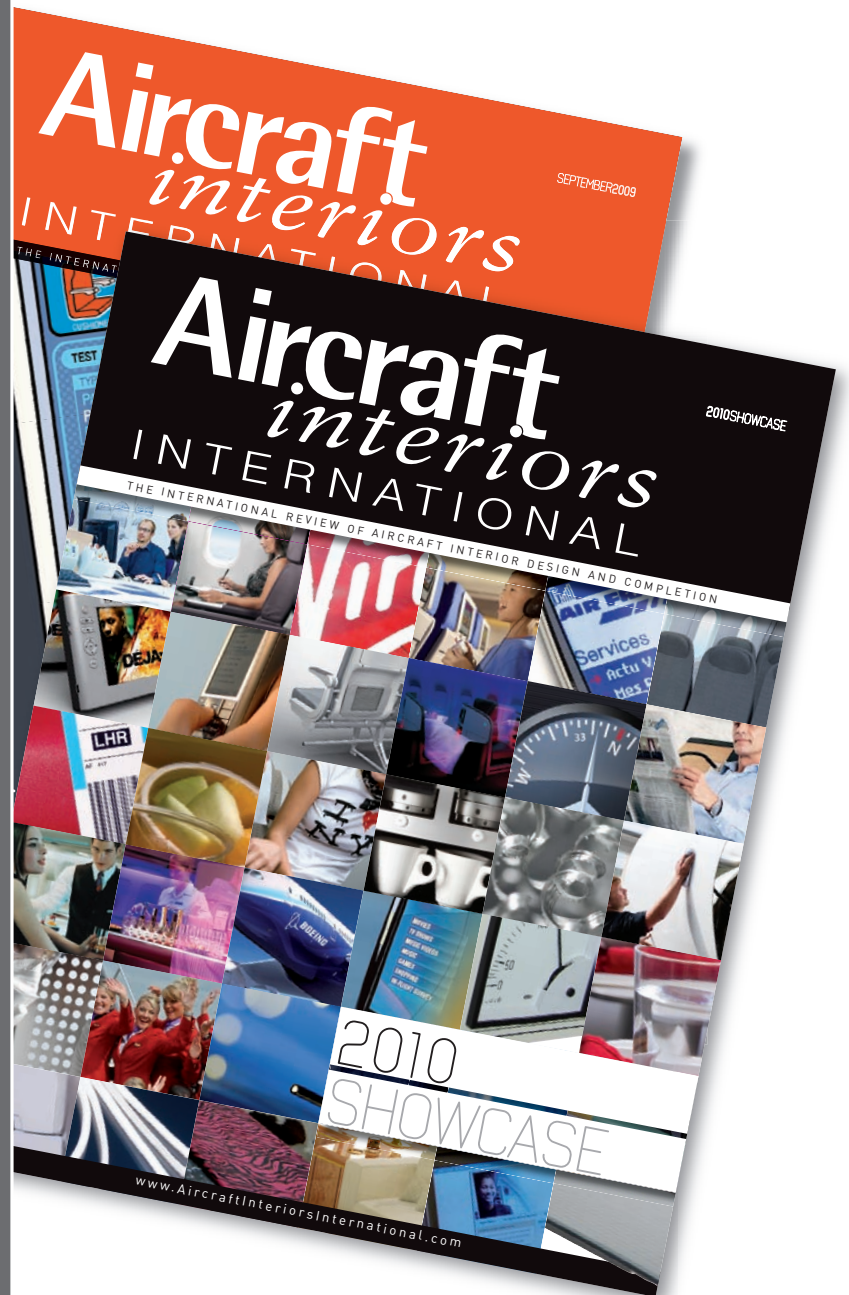
Thales also seeks continuous improvements in reliability, focusing in particular on three design principles – fault tolerance, minimal component counts, and redundancy in the passenger controls – with the aim of maintaining the level of service to the passenger in the face of component failures.

“The first interactive version of TopSeries was designed to tolerate a server failure,” says Brady. “The most recent versions are fully redundant to the seat-group, and one is fully redundant to the seat. So full service is maintained even in the event of failure of key components such as servers or intermediate network switches.”

He continues: “The fewer the parts, the fewer the opportunities for failure. So we continuously architect simpler systems with fewer components, while not compromising on functionality and redundancy. And at the seat we can provide both a passenger control unit (PCU) and a touch-screen, both of which can be used for any of the available functions.”

CLEAN SHEET While Thales and Panasonic currently dominate the AVOD market, new entrants like Lumexis are knocking insistently at the door, and they believe that only a revolution in system design will settle the reliability question once and for all.

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“Most of the systems now in service were conceived in the 1990s and have been the subject of subsequent upgrades that have left the underlying architecture untouched,” asserts Doug Cline of Lumexis. “Attempting to wring every last bit of performance out of complex, ageing hardware and software means that they remain susceptible to multiple modes of failure.”

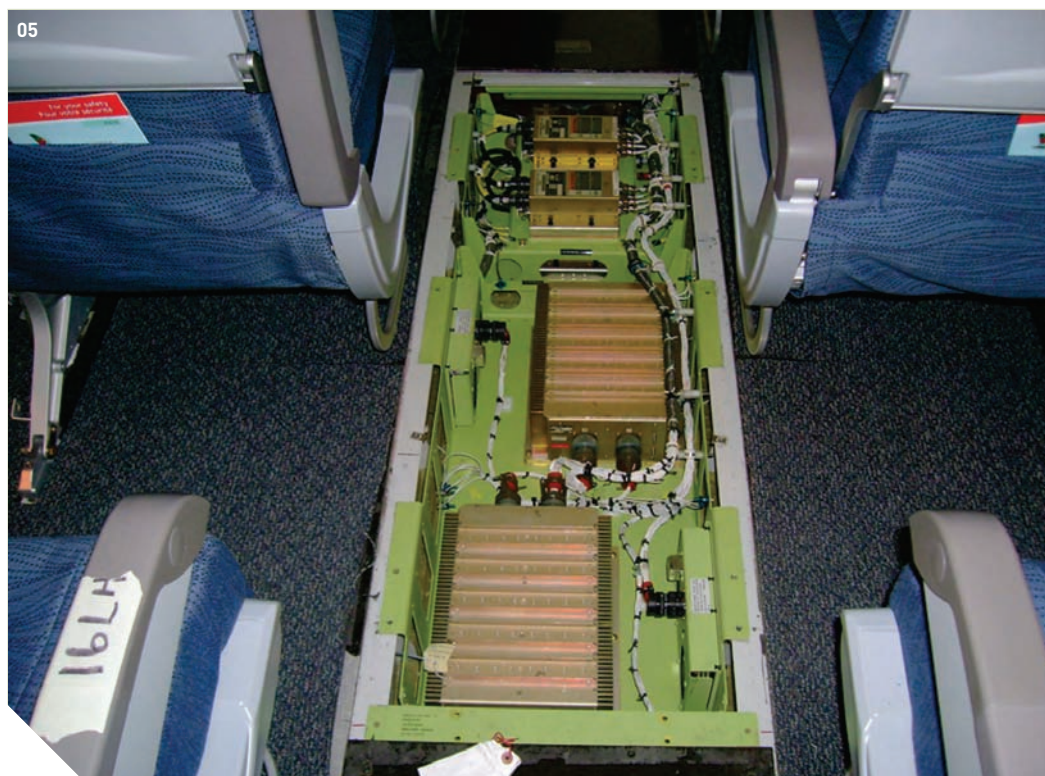
Compared with conventional systems, with their zone and seat boxes and seat-to-seat cables, Lumexis’ FTTS is very pared-down indeed. At the head end, one 4MCU, 13 lb Switch Server Unit (SSU) can feed content via 24 fibre optic cables direct to 24 screens – there are no zone boxes and no space-stealing seat boxes. Screen power, which conventionally resides in seat boxes, is tucked away, safe from kicks, spillages and overheating, beneath the floor.

Lumexis recently concluded an in-service trial of FTTS aboard a US Airways Airbus A320. “We experienced no head-end failures and never once had to reset the system in nearly 300 flights,” says Cline. “That’s an unprecedented level of performance compared with earlier-generation systems.”

BOXING CLEVER As well as designing the FTTS installation, Inflight Canada has for several years championed the elimination of seat boxes by shifting their contents to its iCACHE underfloor recesses. This, says company president George Smallhorn, is fundamental to improvements in IFE reliability. “No matter how robust the head end or how sound the software, there will always be problems in the cabin and at the seats as long as processors are housed in boxes on the floor,” he declares.

iCACHE has been selected by Air Canada, American Airlines and Virgin America and implemented in well over 200 aircraft. “No iCACHE-housed units have been removed from any of these aircraft as a result of failure for environmental reasons,” says Smallhorn. “There are aircraft among these fleets that still have seat boxes, however, and they continue to suffer failures.”

Two recent technological initiatives – the advent of fibre optic cable, and the ultimately abandoned efforts to produce wireless IFE systems for the Boeing 787 – could have important



THERE WILL ALWAYS BE PROBLEMS AS LONG AS

PROCESSORS ARE HOUSED IN BOXES ON THE FLOOR



implications for reliability. The industry appears divided on the first but in broad agreement on the second.

MILITARY PRECISION Inflight Canada designed a method of installing fibre optic for Lumexis that minimised the chances of damage to the cable while modification work was in progress. In preparation for the US Airways trial, the company sent a team to a Canadian Forces base to observe how the military install fibre optic in combat aircraft. “All work on the aircraft was stopped while fibre optic installation was going on,” says Smallhorn. “But the words ‘stop’ or even ‘slow down’ don’t exist in the air transport world. So we had to come up with a way of completing the modification of the aircraft while simultaneously installing the fibre optic.”

The result is a new version of iCACHE incorporating special routing rails that allow the cables to be quickly laid in place and then secured by means



- 05. Inflight Canada’s iCACHE moves vulnerable seat boxes into a dedicated underfloor storage compartment
- 06. iCACHE installation complete and ready to be carpeted

of a cushion clamp with a quick-release lock. “That allowed us to safely adjust the longitudinal location of each seat fibre optic run in relation to the transverse beams,” says Smallhorn. “It saved hundreds of man-hours and protected the fibre optic throughout. In the end, fibre optic is really not all that fragile.”

Doug Cline is equally emphatic: “In the US Airways flight trial there wasn’t a single problem with the cable during installation and operation,” he says. “I’m sure that all the manufacturers and airlines will move to fibre optic before long. It’s absolutely superior in terms of data capacity, and now we’ve proved it’s extremely durable in daily airline operation.”

The big two are more cautious, however. “We’ve used fibre optic in our products since December 2007 and it’s proved to be quite reliable in service,” says Panasonic’s Rhoads. “But it does require special maintenance techniques, and things can get complicated when termination points are damaged. Our applications are behind the scenes, well away from the cabin and its challenges, and have been very reliable as long as the maintenance rules are obeyed. But the jury’s still out on the long-term reliability of fibre optic in the cabin.”

Thales also keeps fibre optic far from the madding crowd. “We generally confine fibre optic to applications behind the walls, safe from potential access or abuse in the cabin,” says Brady. “And the use of these cables certainly does raise maintenance concerns: special cleaning procedures are needed when making connections, and terminating the cables is a highly specialised skill.”

WIRELESS KEY? One of the features of the Boeing 787’s troubled development was a dash to develop wireless IFE systems in order to save weight and facilitate cabin reconfiguration. In the end the savings proved to be negligible and the idea was dropped. But the idea is now back on the table in connection with projects like Bombardier’s CSeries. If wireless IFE does come to fruition, will it be any more reliable than today’s systems?

“On the face of it, wireless would be more reliable because the wire runs for data would be eliminated,” says



WE GENERALLY CONFINE FIBRE OPTIC TO APPLICATIONS BEHIND THE WALLS, SAFE FROM POTENTIAL ACCESS OR ABUSE IN THE CABIN



Rhoads. “However, for various reasons, problems with data wiring are increasingly rare. And in the whole wireless debate it tends to be forgotten that you still need wires to distribute power, so that source of potential failures won’t go away.”

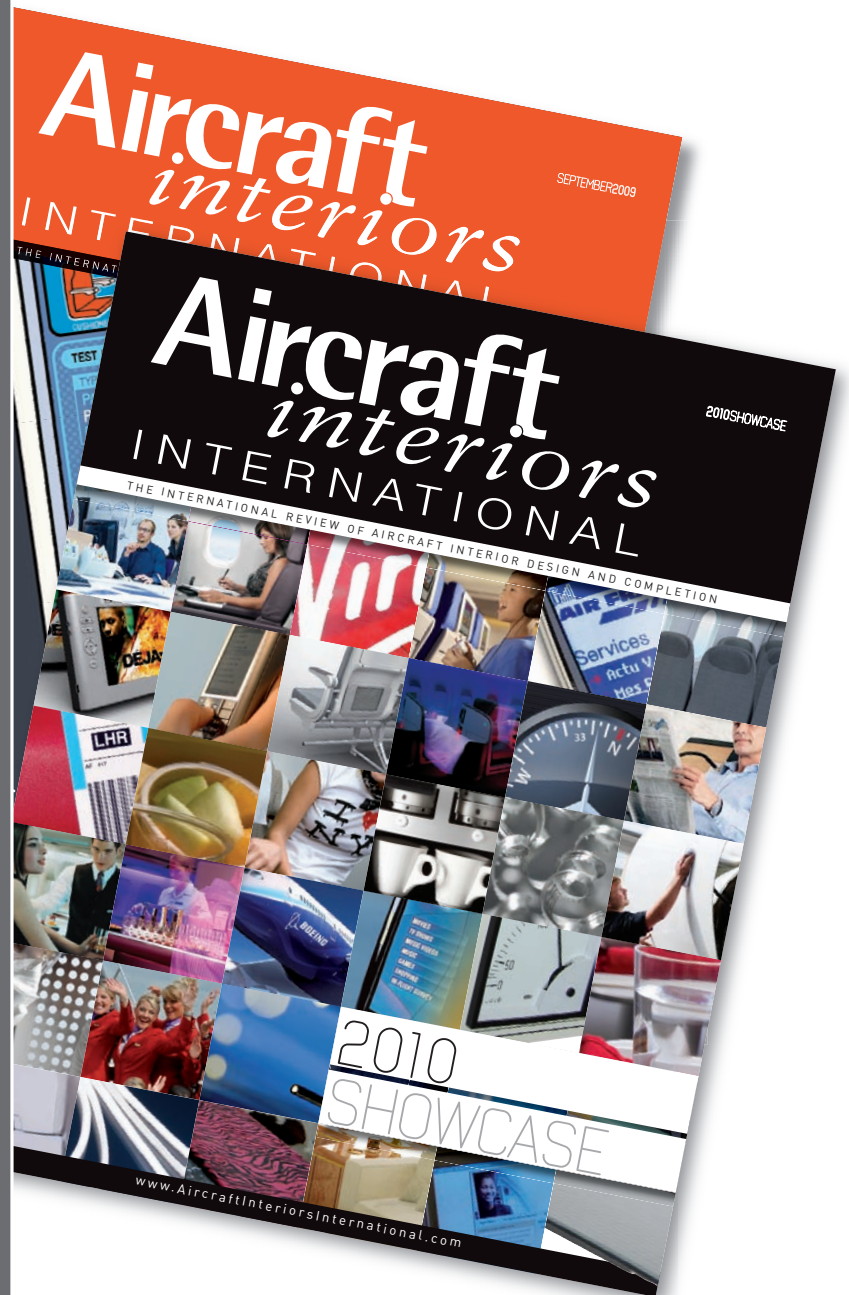
Brady has his reservations about the very concept of wireless for IFE content distribution. “Wireless networks are great when they work,” he points out. “But when they don’t, they’re not easy to troubleshoot. For instance, wireless is subject to interference not only from other devices but also from the movement of passengers and staff around the cabin.

Maintenance personnel whose training has been focused on resistance measurements on wires may find wireless networks much more difficult to handle.”

Top-quality IFE is a key weapon in the airlines’ struggle for commercial survival. Their customers have come to see it as a fundamental right. And the suppliers face ever-rising expectations of system reliability, even as extra complexity arrives in the form of new functions like connectivity and in-seat power. In this arena of moving targets, one thing can truly be counted on – reliability will be a hot topic for years to come. ☒

07. Fibre optic’s unrivalled data capacity makes it an attractive option for IFE

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THE FIVE PHASES RECARO AIRCRAFT SEATING ENGINEERS WENT THROUGH IN DEVELOPING THE ULTRA-LIGHTWEIGHT STINGRAY CONCEPT – AND WHY SOMETIMES IT IS BETTER TO BE A HOUSEFLY RATHER THAN A HONEYBEE!

01. The Stingray seat weighs less than 6kg per passenger
02. RECARO Aircraft Seating even takes the trouble to recycle metal shaved off its prototypes



Metal shavings fall to the floor from the milling machine in the RECARO Aircraft Seating prototype shop. Anything that is removed here ultimately reduces an aircraft's take-off weight. These high-tech aluminium leftovers – which are collected and recycled – document the current status of lightweight engineering at RECARO Aircraft Seating. The curled metal has been removed from the primary structure of Stingray, the ultra-light (it weighs less than 6kg per passenger) seat prototype built at the RECARO plant in Schwaebisch Hall, Germany, for the 2009 Aircraft Interiors Expo in Hamburg. But before going into this latest lightweight milestone, Hartmut Schürg, vice president of product development at the company, explains the five phases that RECARO Aircraft Seating engineers went through on the way to building this lightweight seat. “We wouldn't be where we are now if we hadn't laid the in-house groundwork,” says Schürg.


PRODUCTION EFFICIENCY In phase one, steps were taken to strengthen the company's development department. The unit continued to expand in 2008 and 2009 with young, well-trained engineers, designers, model makers and ergonomists joining the team. “Along with personalities like Jürgen Baumann and Kurt Müller, both backed by years of experience in the aircraft industry, we create an amazing dynamism,” says Schürg.

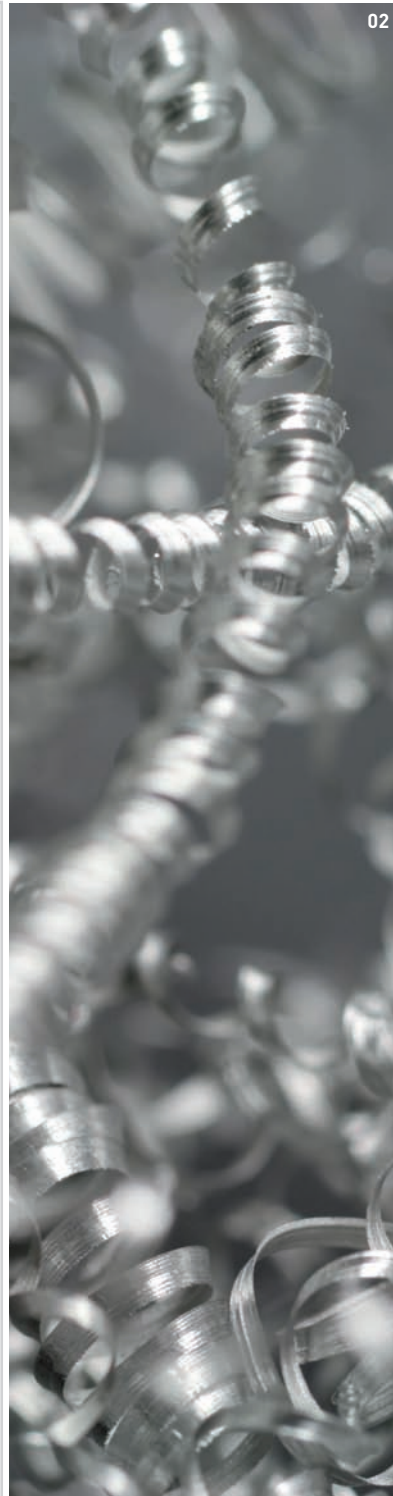
2008 was also the year of process improvement. All the product creation processes were carefully analysed and coordinated in an effort to achieve maximum efficiency. This involved full-scale implementation of CATIA V5, along with other essential programmes and tools, to ensure end-to-end virtual simulation. “Development is a corporate mission at RECARO Aircraft Seating. All

01





ALL OF THE KNOWLEDGE GAINED FROM OUR PEOPLE,
MARKETS AND CUSTOMERS FLOWS DIRECTLY INTO
OUR PLANNING 



of the knowledge gained from our people, markets and customers flows directly into our planning. We work in close cooperation with all disciplines,” says Schürg. The end result is a versatile, highly effective development team with plenty of drive.

MODEL UPGRADES Phase two, initiated by chief sales and technology officer Sven Achilles, was to focus on the company’s current product portfolio and evaluate each seat closely. “When we work on a facelift, we consistently take a holistic approach, and ask all of the key questions,” says Schürg. “How can we improve the ergonomics and comfort? Increase living space? Reduce weight? How can we meet the maintenance requirements more efficiently?”

Within a specified range of known parameters (customer, passenger, market) and self-implied limitations (profitability), RECARO Aircraft Seating focused special attention on the economy-class seats CL3520, CL3620 and PL3510. “These three products will once again define the benchmark for living space, ergonomics, styling and weight,” says Schürg. The finalised, upgraded range of seats was presented alongside the Stingray prototype at Aircraft Interiors Expo in Hamburg.

A NEW SHORT-HAUL SEAT Beyond model upgrades, developers at RECARO Aircraft Seating are working on phase three – a new seat that fills the gap in the short-range economy-class segment. The new SL3510 is designed to meet the requirements for short-haul routes. Foregoing in-flight entertainment (IFE) and recline features, this seat has a shorter armrest and an extremely thin backrest. It comes with fewer component parts for longer service life and offers an ergonomically optimal seating position



03-04. The SL3510, the basis from which Stingray was developed

for short-range flights. Best of all, the SL3510 weighs around 9kg per pax, making it a real lightweight in its class.

“As a new product in our portfolio, the SL3510 shows what happens when we combine the best qualities from existing seats with a large dose of innovation,” says Schürg. “The result is a production-ready, short-range seat that – despite its record-setting weight – is a genuine RECARO, featuring innovative technologies, lots of comfort and an attractive design.”

STRETCHING THE CONCEPT The first sketches of the SL3510 seat on the computer screen point the way to phase four – a new concept begins to take shape. What would happen if it were possible to forget about the cost factors? What if the company simply set out to build a lighter seat that implemented all the latest lightweight engineering technologies? How much can a seat be ‘trimmed down’ without compromising safety, reliability, comfort

05. Hartmut Schürg
06. Alfons Stachel



or design? After toying with the idea, a new project quickly evolved under the codename Stingray. This concept is elegant and light in form, reminiscent of the iconic Corvette design, or a graceful silhouette gliding across the ocean floor.

“Our goal was to create a prototype that weighed significantly less than the SL3510. A seat that could be certified and feasibly manufactured,” Schürg explains. RECARO Aircraft Seating achieved this. The layout of the components for the primary structure

is based on bionic construction concepts. All of the steel connecting parts have been replaced with titanium or aluminium elements, and lighter joining techniques were implemented. The primary structure is made from a high-tensile, weldable aluminium lithium alloy material that the company believes has never before been used in aircraft seating.

Parallel to the development project, a series of virtual feasibility and certification tests were conducted. Alfons Stachel, director of product certification at RECARO Aircraft Seating, and his team are extremely confident: “Based on the current homologation requirements, this seat is certifiable,” Stachel says. The first mock-ups built in the RECARO lightweight lab meet weight specifications. The final version of the jet-black Stingray was sent to Hamburg in late March for its tradeshow premiere at Aircraft Interiors Expo 2009.

FUTURE SAVINGS Schürg is satisfied – at least for now: “Stingray shows what we can do when it comes to lightweight engineering for economy-class seats. Of course, the next question is, are there any crossover parts or ideas that we can use for the next development projects?” This leads on to phase five – and a look into the future. It immediately becomes clear that the cost aspect is a very





07

“

STINGRAY UTILISES ABOUT 90% OF THE SOLUTIONS AVAILABLE TO US. THE REMAINING 10% WILL BE JUST AS COSTLY AS THE FIRST 90% ALTOGETHER”

”

important constituent of lightweight construction. “The Stingray utilises about 90% of the solutions available to us,” Schürg estimates. “The remaining 10% will be just as costly as the first 90% altogether.” Does this mean that it would be possible to reduce weight even further, but each gram would be disproportionately more expensive? Schürg answers this question with one of his own: “Where do we achieve the highest savings potential for a seat?”

According to Stachel, a third of the potential savings could result from new, lower-weight materials. “We’ve been keeping a close eye on the market. And there is an increasing tendency to supply new, light metals,” he says. Stachel is confident that, to meet the requirements, primary structures will generally be made from metal. As a materials expert, he is looking forward to the latest developments in non-conventional, aluminium-based alloys. He believes that compounds containing certain types of rare minerals offer viable alternatives, and sees magnesium as an option.

“The flammability requirements may soon be met,” says Stachel. “From the seat frame upwards is where light, fibre-reinforced synthetics, netting and honeycomb materials, foams and textiles can be used. These are some of the new materials and fabrics that RECARO has already implemented in Stingray.” He adds that some of the heavier components are to be found in the IFE package. “More than ever before, there is a demand for products and suppliers of innovative cable coating, housings, ventilation systems and connectors,” he says.

What about the other two-thirds of the potential savings? “We will gain the

08



rest from genuine innovations, by developing brand new approaches to seat engineering,” says Schürg. “For example, by determining which features the passenger actually needs in order to sit comfortably. Or by looking further into bionics to develop ultra-light, self-supporting designs, net structures, surfaces – a wide-ranging field.”

CHAOS THEORY Innovation is a question of creativity and persistence. It also involves being open to chaos at the right moment, says Schürg, who cites a scientific experiment with two glass bottles. In one of the bottles, some trapped houseflies try to escape

through the bottleneck. Flying in chaotic disorder, they repeatedly crash into the side of the bottle until they finally find their way out – more or less by accident. In the other bottle is a swarm of honeybees. Despite their highly developed navigation and communication abilities, the bees fail to escape and eventually die – a direct result of their strictly systematic approach. This leads full circle back to phase one and the versatile RECARO development team. “Depending on the specific situation or challenge, we switch from honeybees to houseflies and pull out all the stops in an effort to achieve our goals,” says Schürg. ☒

07-08. The upgraded economy-class CL3620

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thirst amendment

EVERY PASSENGER HAS THE RIGHT TO CLEAN POTABLE WATER, INSISTS INTERNATIONAL WATER GUARD, A LEADING PROVIDER OF AIRCRAFT WATER TREATMENT SYSTEMS



It's still not wise to use the water on aircraft. While the results of recent onboard water testing show improvement, the US Environmental Protection Agency's new requirements issued last month fall short of insisting that commercial airlines provide the best available solutions so that every member of the air-travelling public is assured of safe, clean potable water.

"While we applaud the strides made by the airlines in cleaning up their onboard water supplies, it's a shame that the EPA's new study and resulting regulations are still treating only the symptoms and not insisting on a 'cure' for the problem," says David C. Fox, president and CEO of International Water-Guard.

CUSTOMER EXPERIENCE For Fox and his colleagues in the aircraft water treatment business, every passenger should be entitled to clean, potable water and not have to just hope that the liquid in the serving jug is okay. "For all levels of cabin service, having the best customer experience for the price point is the hot button in the industry these days," Fox points out.



THE FIRST COMMERCIAL AIRLINE THAT GUARANTEES CLEAN WATER AT EVERY SOURCE FOR EVERY CUSTOMER THROUGH AN ONBOARD SYSTEM WILL LEAD THE MARKET





02



“People travelling are not satisfied with limited options. They are demanding telephone and internet connectivity, a wide choice of in-flight entertainment, all the comforts and even luxury. But above all they expect that the basics – clean food, water and air – will be provided. And consumers know that water on an aircraft is an uncertain proposition today. The first commercial airline that guarantees clean water at every source for every customer through an onboard system will lead the market,” he continues. “That airline will set the standard and will be able to brand itself as the airline that cares about its passengers above and beyond all others. Right now, that airline does not exist.”

IWG’s water treatment units, found on most large business jets and VIP aircraft, use ultraviolet radiation to disinfect bacteria, viruses and other potentially deadly organisms in aircraft water supplies. “By installing units at key locations – water tank exit, galleys and lavatories – every time a passenger turns on a tap, out comes clean, pure, water,” Fox explains. “Isn’t that what we all want?”

In the VIP and corporate aviation world, owners routinely jet around in beautifully designed, superbly engineered and luxuriously appointed private aircraft, and the water on those aircraft is almost certainly clean, safe and drinkable. “Those people have invested in a guaranteed supply of fresh, potable water no matter where they are in the world,” he continues. “And it does matter ‘where in the world’ an aircraft is, given that not all municipal water sources in every country are maintained to the highest standards. But on commercial aircraft, there is no guarantee for passengers or crew,” he pointed out. “That’s why there are those signs in the washrooms telling you not to drink the water.”

UNCOMFORTABLE READING The original whistle-blower for the crisis in aircraft water standards was *The Wall Street Journal* whose random, covert tests on 14 different flights in 2002 blew the lid off the problem. The EPA’s first industry-wide study was published in 2004. *The Wall Street Journal* article revealed “contamination was the rule, not the exception: almost all of the

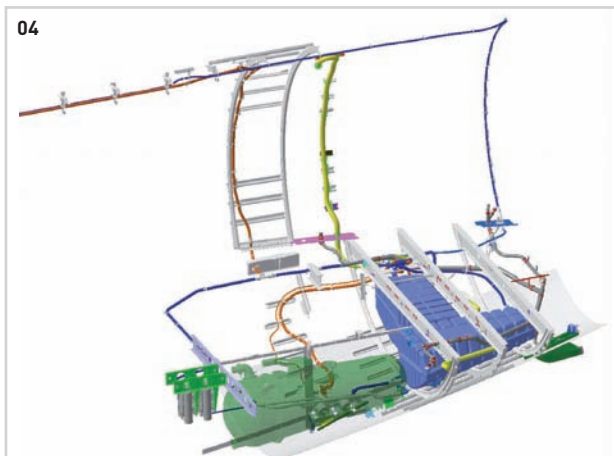
- 01. IWG believes every passenger has the right to expect clean potable water when flying
- 02. The IWG-A6 water treatment unit



03. IWG A4 water treatment units being inspected
04. Layout of an IWG circulating water system on a VIP airliner

bacteria levels were tens, sometimes hundreds of times above US government limits.” The independent laboratory that tested the samples obtained by *The Wall Street Journal* stated: “This water is not potable by any means.”

The EPA’s own 2004-2005 studies showed one in six airliners failed to meet safety standards. Health Canada’s 2006 tests showed over 15% of aircraft water systems contained bacteria –



AIRLINES HAVE 72 HOURS IN WHICH TO TREAT, FLUSH OR DISINFECT A CONTAMINATED SYSTEM AND DURING THAT TIME, THE AIRCRAFT CAN STILL BE IN THE AIR CARRYING PASSENGERS



The IWG solution

- IWG’s water treatment units feature ultraviolet radiation to eliminate bacteria, viruses and unwanted organisms
- The units treat water without using chemicals
- The units are placed at tank exits and at points of use such as galleys and lavatories
- Some units feature filtration, which removes particulates and improves taste and odour
- Special IWG water treatment systems, such as the circulating potable water system (C-PWS) feature water pumps and conformal, unpressurised tanks to save space
- IWG systems are freeze-proof in flight, provide consistent water pressure and increased water capacity
- All IWG products are flight-qualified and certified

again about one in six of the aircraft in service.

“The recently-released 2009 EPA rulemaking shows improvement,” notes Fox. “Now it is about 4% carrying questionable water, but with some 7,000 aircraft flying in the USA on any given day, that’s still about 300 aircraft with suspect water and of that group, a dozen or so have tested positive for E. coli. This is still unacceptable.”

The new EPA regulations for aircraft whose water supplies fail standard quarterly testing remain lenient, Fox argues. “Airlines have 72 hours in which to treat, flush or disinfect a contaminated system and during that time, the aircraft can still be in the air carrying passengers,” he explains. “Would you want to use the water on that aircraft?”

“Of course it is the job of the EPA and other health and safety agencies to set minimum standards that are not an

unreasonable burden for the industry to meet,” he continues. “But minimum standards do not guarantee that passengers have access to treated water, which in my mind is a denial of a very basic need, and for which a reasonable solution is already available.”

BRAND ADVANTAGE Fox suggests that airlines look at clean, potable water for all customers and crew as a service – not just another routine task for the maintenance crew. “The benefits to the brand are clear,” he says. “With an increasingly savvy and demanding flying public, an increased emphasis on customer service in all sectors and a heightened consciousness about health globally, it would be a very smart move for an airline to install active, onboard water treatment systems.”

After all, every passenger is entitled to a fresh clean glass of water – not just the VIPs. ☒

Contact: Giles Lapierre
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FIRST CLASS WATER FOR EVERY SEAT

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Even with the new EPA standards coming into place, statistics show that airliners continue to fail water quality tests every day. Commercial aircraft water systems offer no real protection. With IWG equipment, they will have it.

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mapping the future

ROCKWELL COLLINS CONSIDERS THE SUCCESS OF THE AIRSHOW MOVING MAP SYSTEM, AND DISCUSSES ITS IDEAS FOR DEVELOPING THE PERENNIALY POPULAR PRODUCT

With the abundance of choices in today's in-flight entertainment (IFE) and communications technology, the humble moving map application has retained prominence in customer satisfaction, consistently landing in the top three or four most popular inflight services in passenger surveys. The moving map system that represents approximately 90% of the installed base for both airlines and corporate jets continues to be the Airshow by Rockwell Collins.

How has such a seemingly simple technology as the moving map managed to be so popular for so long? "Technical know-how and continuous innovation," says Andrew Mohr, director of product marketing for Rockwell Collins Cabin Systems. "It seems like a very simple product to develop, but many similar systems have come and gone over the years, with most failing due to an inability to perform well, and a failure to match the breadth of features and system compatibility that Airshow offers."

For years, Airshow has been offered as a standalone computer that outputs its video to the IFE system. This has changed over the last couple of years with Rockwell Collins licensing its interactive Airshow technology as a software application that can reside on the servers of an IFE system. In fact, Rockwell Collins provides the vast majority of both standalone map boxes and integrated IFE map software today. "We actually have eight distinct Airshow moving map products between the airline and corporate aviation markets," says Mohr. "Each one is tailored to a specific platform and/or market, with some running on Linux and others on the Windows operating system. All of them are leaders in their respective markets, and are highly customised to meet the needs of each of our customers."

01



The Airshow models range from the true high-definition (HD) wide-screen maps of the Media Center (offered with Rockwell Collins' Venue HD Cabin Management System for business jets) to software applications licensed to the major IFE suppliers. The Airshow map is also integrated into the Broadcast Digital Server of Rockwell Collins' dPAVES single-aisle IFE system, requiring no additional hardware.

VERSION 2 The most important recent update to the Airshow product line is called Version 2, which Mohr calls the "second act" for the current generation

of Airshow map systems. "Version 2 is a complete refresh of our entire moving map software technology base, introducing over 100 new features and enhancements," he says. These enhancements include a dramatically more realistic 3D viewing experience, with real-time day and night imaging on all maps, more detailed aircraft models, and 10 times more map data, providing more information and detail for passengers during their flight. New features include a 3D time zone globe view, and heads-up display (HUD) that provides a 'pilot's eye' view of the upcoming terrain.

“

VERSION 2 IS A COMPLETE REFRESH OF OUR ENTIRE MOVING MAP SOFTWARE TECHNOLOGY BASE, INTRODUCING OVER 100 NEW FEATURES AND ENHANCEMENTS”

”



01. Airshow's instrument panel feature provides real-time flight information

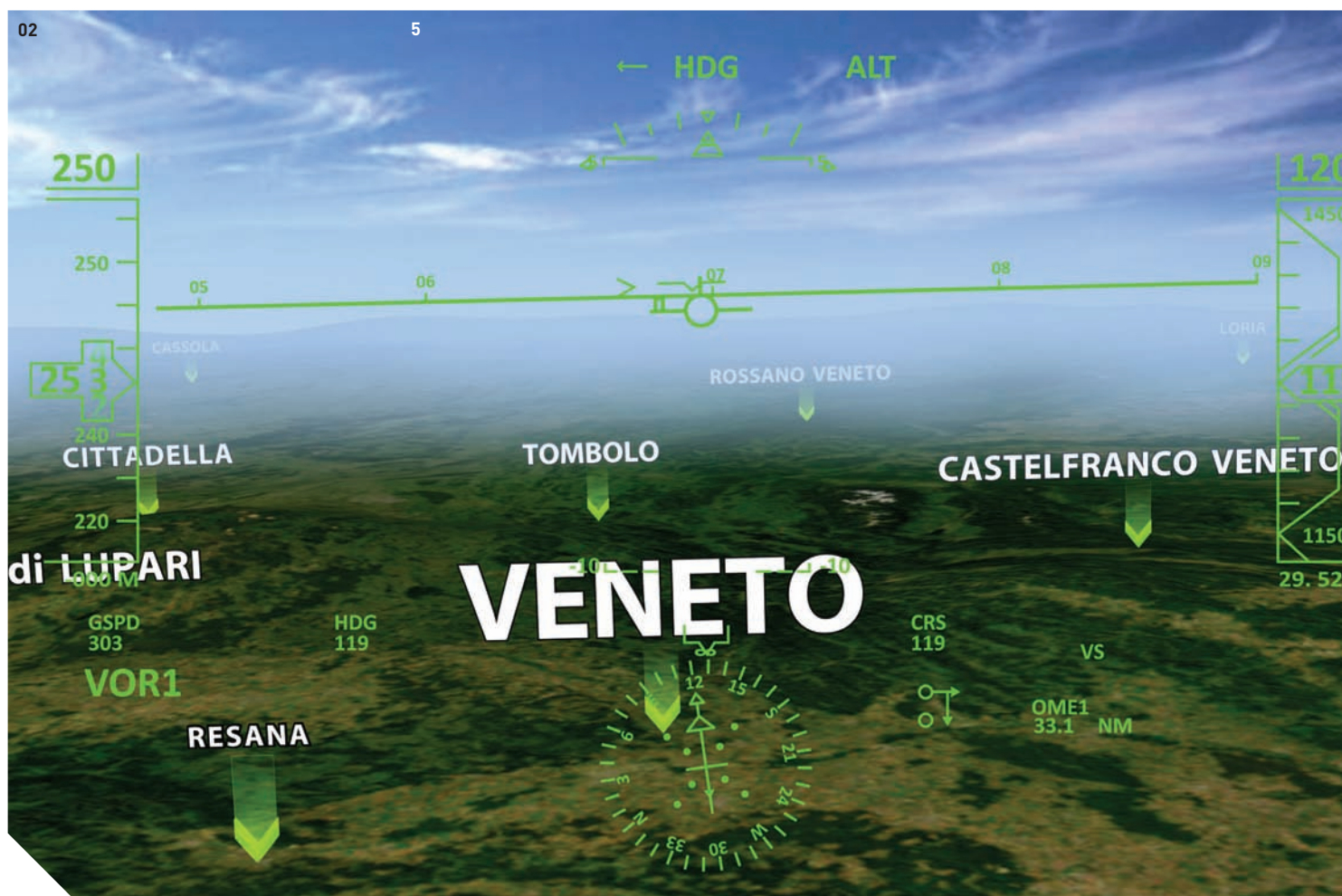
With Version 2, Rockwell Collins can deliver an improved Airshow experience without customers having to upgrade to new hardware. Existing Airshow customers simply upgrade to Version 2 through a software update that provides a faster time to market. “We realised our current map hardware platforms possessed an abundance of unused processing power, and Version 2 utilises that power to provide a whole new map capability without the need for hardware upgrades,” says Mohr.

Although these changes are impressive, so is how Rockwell Collins is able to keep up with so much going

on in the consumer world, including web-based maps like Google Earth, and with most cars featuring sophisticated GPS map systems. “We focus on what is unique to the airborne experience, and then prioritise our features and technology on leveraging that uniqueness,” Mohr explains. Rockwell Collins has also developed an extensive number of customisation tools and customisable features that allow airlines to create Airshow configurations that specifically support their own branding and customer needs. “For example, we offer nearly 30 languages for the Airshow system, for all features,

addressing most of the international airline market needs,” says Mohr.

3D INTERACTIVITY With Version 2 software coming out early in 2010, and the numerous moving map applications that are either sold as Airshow, or are marketed under unique IFE brands, is there anything else that should be expected from Rockwell Collins in the near future? “We already provide state-of-the-art broadcast 3D moving map displays, and a separate, fully interactive 2D map application,” Mohr says. “Our ultimate goal is a 3D interactive map, which brings the best



of both worlds together. We are very far along in this technology, and working with our IFE partners on bringing this to market. We have just made our first public demonstration – at the 2009 WAEA Annual Conference & Exhibition in Palm Springs, California.”

APPLE APPS In addition, Rockwell Collins has been focusing on Apple’s iPhone and iPod Touch platforms as avenues for new IFE features, including



IT’S A FAIRLY MODEST PRODUCT. AND YET, THE VAST MAJORITY OF THE AIRLINES AND BUSINESS JET OPERATORS DEPEND ON THIS ONE APPLICATION



02. The HUD gives passengers a pilot’s eye view of the flight

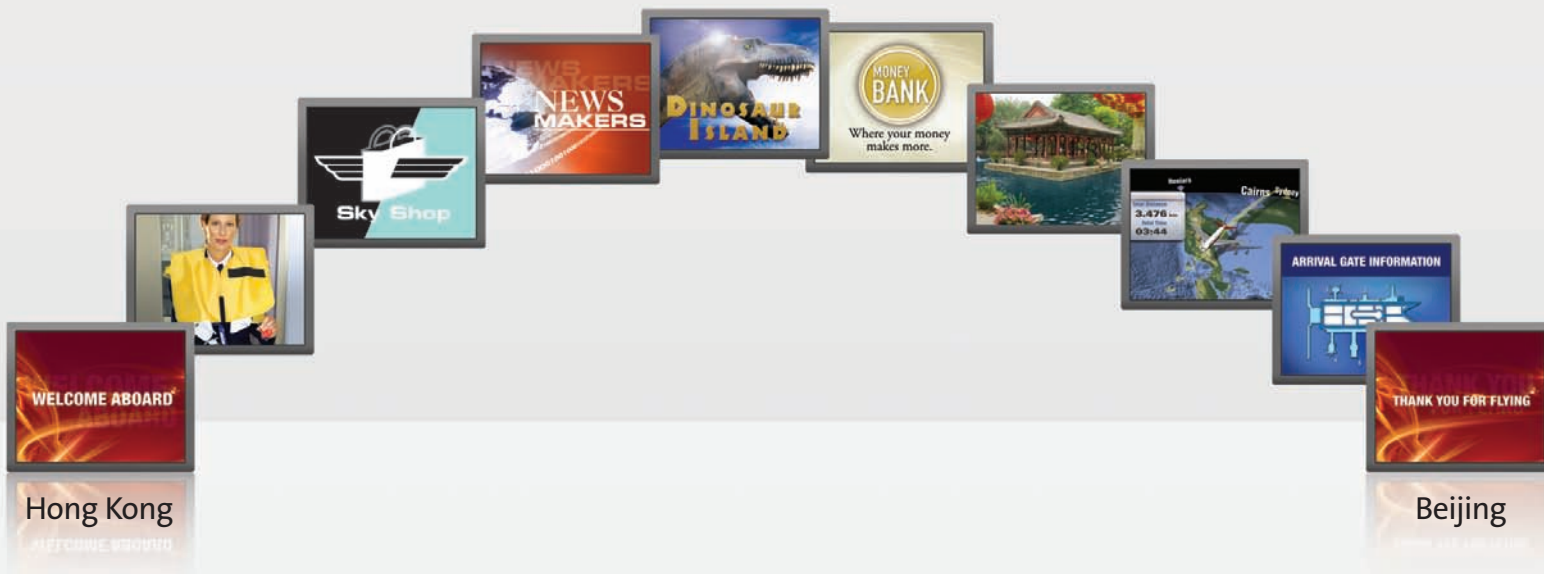
a special version of Airshow just for those devices. “We have a fully working version of an interactive Airshow map on an iPod Touch,” says Mohr. “We have been developing applications for these devices for some time in business aviation, and the Airshow map is a natural application for us to offer. It’s one thing to develop such an application, but quite another to bring it to market through something like the iTunes Store. We are still evaluating what would be the most successful method to introduce such an app to our customers.” No date as yet has been set for market introduction.

And so the Airshow map lives on, as it approaches the 25th anniversary of its introduction to the airline market. “The team involved in the Airshow product line has worked together for years, and simply has a passionate devotion to keeping it the best product of its kind,”

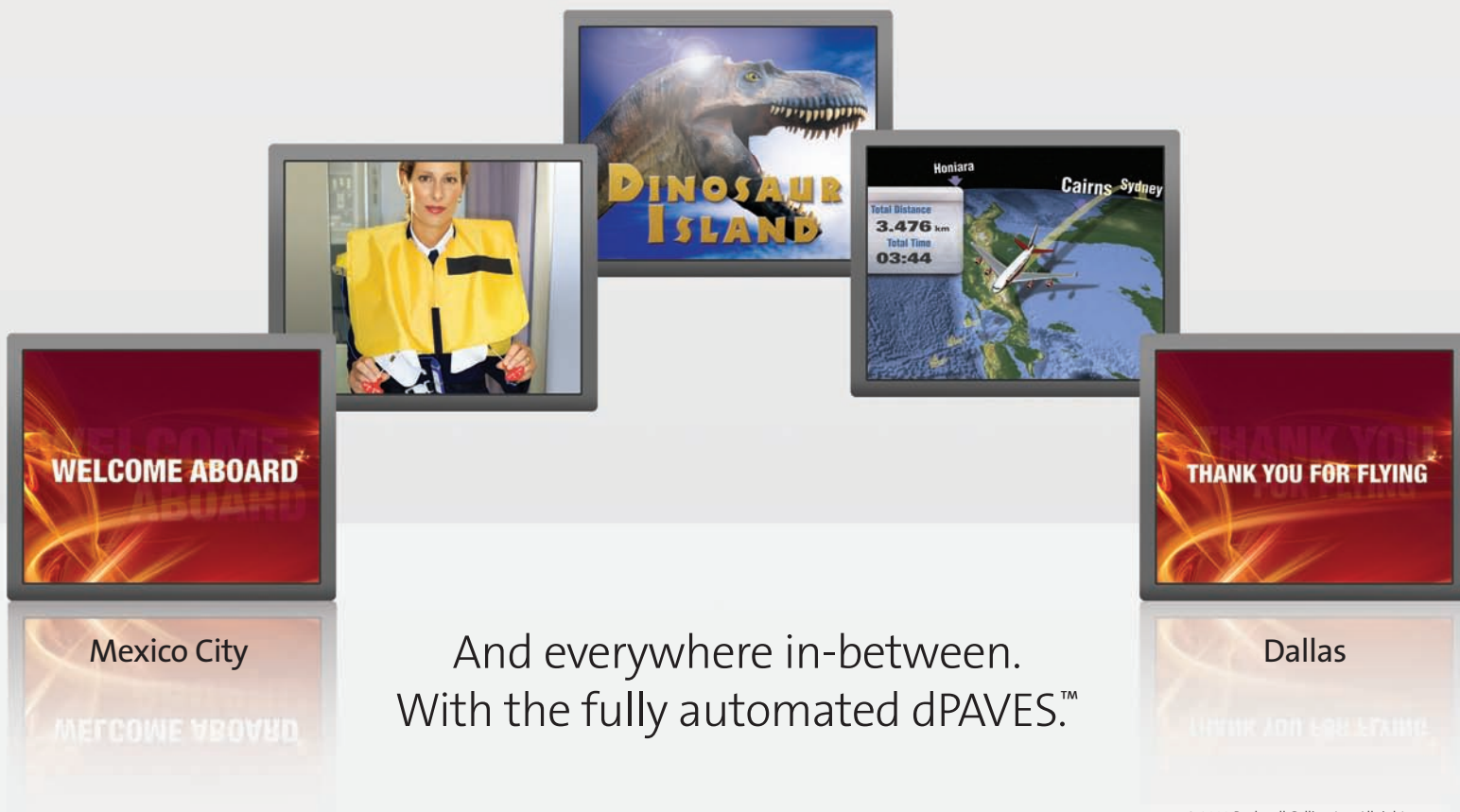
says Mohr. Having developed the core technology years ago, they can focus on the more fun features that keep customers satisfied, whether their Airshow map is bought from Rockwell Collins, or through the IFE system provider by way of software license. “Over 140 airlines and 4,000 business jet operators rely on Airshow technology today,” says Mohr. “It’s a fairly modest product, and just one in Rockwell Collins’s overall cabin product portfolio. And yet, the vast majority of the airlines and business jet operators depend on this one application, for which there is no immediate replacement.”

Rockwell Collins considers itself to be the steward of an important industry technology that has engaged millions of air passengers for well over two decades. It is its intent to uphold this tradition with a wide variety of new innovations to come. ☒

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
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liftoff

PRODUCTION IS IN FULL SWING ON THE FIRST ORDER FOR NEW GERMAN SEAT MANUFACTURER ZIM FLUGSITZ

 ZIM Flugsitz, although a relatively new player in the aircraft seating market after its establishment in 2008 by parent company ZIM GmbH, is growing steadily with the success of its economy-class seat concept – ECO-01.

To meet the growing market demand for eco-efficient products, the weight of the seat was considered from the outset. The seat structure is made from high-strength aluminium alloys combined with carbon fibre materials. As a result the short-range seat ECO-1-S weighs just 9.3kg per seat, when in a triple seat configuration.

A COMMON BASE The modular seat architecture was developed to offer a common base for different seat models and therefore reduce the number of parts used. To meet varying operational demands the seat is available in short-, medium- and long-range versions, as well as a premium-economy model. Each model shares the same basic structural parts, but varies in terms of standard features and selectable options to meet a wide range of customer requirements. The customer can also

- 01. The ECO-01 economy-class concept
- 02. ZIM Flugsitz's new assembly shop integrates half a A350XWB fuselage
- 03. The final inspection workstation
- 04. The assembly workstation



choose between the standard seat design for each model, or have a customised version developed to meet even sophisticated corporate design. The contour can be modified on the backrest and armrest, while the dress cover and the cover of the armrest can be customised in terms of colour and material used. The backrest and armrest can also be customised in terms of the integration of various in-flight entertainment (IFE) systems.

ADJUSTABILITY The new modular structure enables not only variations of the seat width, but also easy adaptation to different seat track distances. Consequently, every seat configuration – from single to quadruple seat within all current aircraft layouts (commuter to wide-body aircraft) – is adjustable.

ZIM Flugsitz also designed the seat to minimise maintenance costs. As well as ensuring easy accessibility to components that typically wear down



EACH MODEL SHARES THE SAME BASIC STRUCTURAL PARTS, BUT VARIES IN TERMS OF STANDARD FEATURES AND SELECTABLE OPTIONS TO MEET A WIDE RANGE OF CUSTOMER REQUIREMENTS



certification of the seats for the 16g and 9g tests (ETSO-C127a and ETSO-C39b). Because of good cooperation between ZIM Flugsitz, the German Luftfahrtbundesamt (LBA) and EASA during the certification process these certificates were awarded as scheduled in the summer of 2009.

NEW ASSEMBLY SHOP ZIM Flugsitz's new assembly shop is also up and running, after only five months building work. The company received Production Organization Approval from the LBA on 1 September. The building provides sufficient floor and office space (over two levels) to house the company as it develops, with ample production capacity to accommodate predicted future demands. Capacity can be enlarged at any time by introducing a second shift, the installation of a second floor within the production hall or expanding the building.

As a sign of its immersion in the aircraft industry, ZIM Flugsitz's architect integrated half of a A350XWB fuselage (in its original dimensions) at the front of the new building. This feature also serves to present customers with their new seats within an environment close to reality.

The building includes a test bench so the company can perform static and fatigue tests on the seats in-house – speeding up the process of testing and certifying new developments and making steady improvements to its existing products. For the dynamic

relatively quickly (such as the Hydrolok), great importance was attached to preventing early wear by selecting and installing appropriate materials and components.

The company holds all the required certifications for the development (Part 21O – ETSO Designs Organisation), manufacture (Part 21G – Production Organisation) and maintenance (Part 145 – Maintenance Organisation) of its economy-class seats, including





THE LAUNCH CUSTOMER WAS ATTRACTED BY THE MODULARITY, FLEXIBILITY AND QUALITY OF THE SEATS



05

05. A customised version of the ECO-01-L

06. The assembly shop is now producing seats for the first customer

tests (EASA regulation ETSO-C127a) ZIM Flugsitz cooperates with a specialist test centre nearby.

START OF PRODUCTION Production at the facility started in October 2009. A first ship set will be delivered in November, followed by others to be shipped every month until October 2010. The first airline to order has requested around 3,500 seats. For this customer the ECO-01 seat will be customised with features such as movable headrests, and installed in

various aircraft. The airline has another 3,000 seats on option. ZIM Flugsitz says the launch customer was attracted by the modularity, flexibility and quality of the seats.

ZIM Flugsitz develops, designs, tests and assembles its products, but where certain parts need to be outsourced, they are manufactured by certified subcontractors. To secure the supply chain the company is following a second source strategy.

ZIM Flugsitz believes that the flexibility and integration of its production system is crucial to efficiency and thus competitiveness. Therefore it has developed its production system along the lines of the 'lean manufacturing' or 'Toyota Production System' model, with standardisation, kaizen (continuous improvement), visualisation, team play, management ratios, and quality assurance components, along with other components reflecting the company's individual demands. The facility also includes independent workstations, each the responsibility of a small assembly team.

ZIM Flugsitz says it has attracted great interest – with many inquiries from both aircraft manufacturers and airlines – and is expecting to establish itself as a very competitive brand in the aircraft seating market. Consequently, it is continuously seeking and employing new highly qualified staff to cover rising demand.

THE YEAR AHEAD To present its new facilities to prospective airline and aircraft manufacturer customers ZIM Flugsitz plans to organise an in-house exhibition early in 2010 – to showcase both its products and the high standard of its modern production facilities.

Another highlight in 2010 will be the company's participation (for a third time) in the Aircraft Interiors Expo in Hamburg, which will be held on 18-20 May. The company plans to present new developments and innovations in its economy-class seat programme.

2010 could be another landmark year for ZIM Flugsitz, as it expects to attract more new customers following on from its seat concept's first operational experience. ☒



06

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- ✓ ETSO-C127a and C39b
- ✓ Part 210 - ETSO Design Organisation
- ✓ Part 21G - Production Organisation
- ✓ Part 145 - Maintenance Organisation

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WITH ITS NEW PARTNERSHIP SO FAR RESULTING IN TWO NEW PROTOTYPES, **DIGECOR** SAYS IT CAN OFFER PORTABLE IFE THAT IS HARD-WEARING AND LIGHT IN WEIGHT – AND THAT WILL PAY FOR ITSELF



Established portable in-flight entertainment (IFE) specialist digEcor is teaming up for five years with a relative newcomer, Lefeel Media Technology, in a bid to redefine the portable IFE market.

Having already designed two generations of portable players and an operational support system, Lefeel broke onto the international scene in early 2009, impressing booth visitors at the Aircraft Interiors Expo in Hamburg. “I could not believe my eyes when I saw a Lefeel representative throw one of its players up in the air, allowing it to fall and hit the floor,” says Brad Heckel, president of digEcor. “He then picked it up and demonstrated that not only was the player unbroken, but the movie continued to play seamlessly. At that moment, I knew that Lefeel would prove to be a high-value partner to help offer a superior IFE experience to airlines and passengers alike.”

The sentiment is shared by Lefeel’s COO and vice president, Xiaoming Deng, who said that the company was “honoured and excited” to be teaming up with digEcor. “This partnership, based on trust and integrity, will bring very attractive, high-performance and low-cost products, as well as fresh air, to the industry.”



EACH REVENUE STREAM, WHETHER IT IS FROM INFLIGHT SHOPPING, GAMING, OR A RENTAL PROGRAMME, HELPS ‘SPONSOR’ OR PAY FOR THE COSTS OF AN IFE PROGRAMME



01

TWO NEW PROTOTYPES Announcing the partnership at the 2009 WAEA Annual Conference & Exhibition in October, digEcor and Lefeel also debuted the prototypes for two new portable players already in development – the digEplayer L7 and L10, which feature 7in and 10in capacitive touch-screens respectively.

“Some of the key features of the digEplayer L7 include an optional 802.11 wireless card, up to 22 hours of battery life, optical mouse, and a rugged design that allows the player to be dropped repeatedly from at least 4ft and

still be operational,” says Glade Hulet, director of product management at digEcor. “The digEplayer L10 takes the same extensive feature set of the L7 and adds a 10in touch-screen. We also carried over key features from the digEplayer XT – such as the dual audio jacks – which have been very popular among passengers.”

The products are the result of months of collaboration with many parties. “We have made consulting airlines, flight attendants and passengers alike a high priority in the development process,” says Heckel.



01. The digEplayer L10 features a 10in touch-screen

Production of the two units is scheduled for the first half of 2010.

BUILT FOR THE FUTURE digEcor says that portable IFE can save airlines weight, and therefore money. “A handheld IFE solution drastically reduces the weight of an IFE system, producing large fuel savings all while offering increased functionality and customer satisfaction,” says Adam Williams, director of marketing at digEcor.

Understanding the airlines’ need to balance customer experience with cost, the new digEplayers are designed to

cross the line between portable and embedded. “Both the digEplayer L7 and L10 are designed to be easily converted from handheld to semi-embedded use. Or in other words, the players can be docked and undocked in the seatback,” says Hulet. While docked, the players are designed to receive in-seat power and distributed content, though to maximise flexibility for airlines, the players can still be battery operated and have pre-loaded content while docked. “The advantage then is that you can acquire a handheld solution now and have the flexibility

later to simply replace the front and rear cases at a low cost and upgrade to a logistically simpler semi-embedded IFE system without losing your initial investment,” says Hulet.

“When selecting an IFE provider, it is crucial that airlines partner with a vendor that has authored a flexible business model and designed a family of products and services that are adaptable for different airlines,” says Heckel. “Each factor of a successful programme must be carefully considered and implemented to lower IFE costs, produce net positive revenue for airlines, and ultimately bring a smiling customer back to the gate time and time again.”

REVENUE STREAMS Besides the system’s weight and upgrade path, digEcor has also paid close attention to providing ancillary revenue opportunities through its IFE offerings. “We firmly believe that there are many opportunities for airlines to create revenue streams from IFE that have a low impact on passengers,” says Brent Wood, CEO of digEcor. “Each revenue stream, whether it is from inflight shopping, gaming, or a rental programme, helps ‘sponsor’ or pay for the costs of an IFE programme.”

Some of the value-added services and products that digEcor is offering to airlines are free to the passenger, while others may be offered at a price. For example, airlines can place a limited number of high-quality advertisements in key locations throughout the IFE experience, while other services – such as inflight shopping or gaming – can pose a monetary cost to passengers if they decide to participate. Browsing through a digital catalogue of products is something to which most consumers are accustomed. If the decision is made to purchase an item, then the passenger

02



- 02. Some features of digEcor's digEPlayer XT will be carried over to the L10 and L7 models
- 03. Inflight shopping can yield extra revenue for airlines

03


FlaMall Press **Menu** for more options

Category: Electronics Your Shopping Cart contains 2 items (\$164.94)

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Sennheiser Noise Cancelling Stereo USB Headset

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- * Accent topstitching
- * Close-fitting design
- * Fashionable longer length
- * 100-percent cotton
- * Machine washable

has benefited by finding what they want, and the airline shares in the profit gained from the sale of the product.

Furthermore, digEcor says many of its clients successfully operate a rental programme. "We have some clients that see a 100% uptake rate on several routes. This one initiative alone makes the entire digEPlayer programme cash flow positive for these airlines," says Williams. "Imagine what that can do for an airline that feels the immense pressure of a down economy. As a key strategic objective, we are constantly developing and refining revenue programmes that sponsor an IFE programme and make IFE a competitive differentiator again."

The keyword is 'sustainable'. "In this case, sustainable means that the IFE provider has created a proven business model and developed strong relationships with key partners," says Williams. "Additionally, sustainable means that

the airline and IFE provider work together to promote ancillary products and services in a relevant, meaningful way, and continuously gather passenger feedback in order to refine the ancillary services and products offered."

STRONG PARTNERSHIPS "Working closely with Lefee and airline partners, digEcor is poised to take the next step in the evolution of the IFE market and help airlines sustain their IFE programmes," says Heckel. "We are excited to continue development of the digEPlayer L7 and L10. We are also dedicated to taking advantage of the ever-flowing infusion of new technology and creative solutions. We will continue to offer competitive and profitable IFE services to loyal clients and their passengers. As partners and as a community, solutions will be increasingly defined by teamwork and a strong supply chain." ☑

Contact: Adam Williams
Email: awilliams@digecor.com



“

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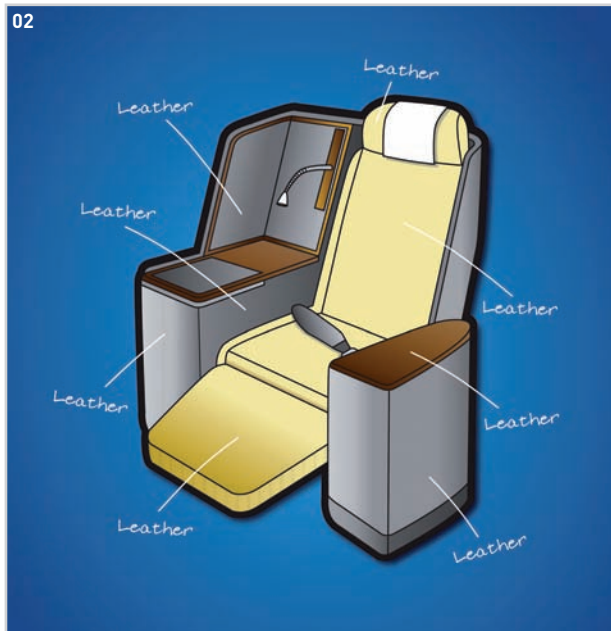
YARWOOD LEATHER NOTES THAT A DECADE OF INNOVATION HAS LED TO COMPLEX SEAT MODELS AND THEREFORE INTRICACIES IN HEAT RELEASE CERTIFICATION



In recent years premium-class seating has become more and more advanced. In 1999, the typical business class was differentiated from economy by a wider seat with a larger pitch, and the latest innovation was an in-flight entertainment (IFE) screen that folded out from the armrest. “A decade later, seats have become beds and airlines are talking about a fully integrated multimedia experience – and that’s just in business class!” says Matthew Nicholls, group managing director of Yarwood Leather.

CUSTOMER AWARENESS Nicholls also says that the last 10 years have seen consumers becoming more and more design aware. “The effect of customers’ increased awareness is undoubtedly spreading into aircraft interiors, although it could be argued that the stringent but important safety regulations have had a natural delaying effect on the roll-out of new products,” says Nicholls. As consumers have become more aware of design, so too have airlines and manufacturers, with more and more industrial designers

- 01. SWISS's new long-haul business-class seat features KalorLite leather
- 02. Over half the leather used in the SWISS seat is on sections classified as wall panels





THE IDEAS AND CONCEPTS BEING DEVELOPED ARE REVOLUTIONISING THE PREMIUM SEATING MARKET, WITH DESIGNERS TRYING TO ENSURE CUSTOMERS' CONTINUED BRAND LOYALTY



turning their talents to aircraft interiors to meet the high expectations of premium customers. “The ideas and concepts being developed are revolutionising the premium seating market, with designers trying to meet the requirements of their customers to ensure their continued brand loyalty,” says Nicholls.

The certification bodies have also been busy, making sure these new and complex seats do not compromise the industry’s safety record. EASA and the FAA have been hard at work making sure that the new technologies employed do not affect the intrinsic health and safety of passengers, in particular with regard to flammability performance. As new designs emerged for premium seating, EASA and the FAA determined that large parts of premium-class seating were technically not seating panels, but wall panels.

SWISS BUSINESS CLASS A current success story in premium seating is SWISS’s new long-haul business-class seat, manufactured by Contour and based on Thompson Solutions’ Vantage concept. The seat – which features pneumatic air cushions from Lantal and full iPhone integration – recently won rave reviews in the airline’s latest customer survey.

Over half of the leather used in the seat is in a non-seating area. The sections in question are technically deemed to be wall panels by EASA and the FAA and so must pass the more stringent parameters of FAR 25.853(d) heat release test. The heat release test is a radical departure from the existing tests used for seating materials (25.853a and c, vertical burn and kerosene burn) in that it measures the calorific output of the composite as it burns – the specific energy contributed to the combustion process. The test was developed at Ohio State University and for aerospace interiors relates specifically to composite wall panels.



03. SWISS's new business-class product is winning positive reviews from customers



THERE WERE FEW MATERIALS THAT WHEN TESTED AS A COMPOSITE WOULD CONSISTENTLY PASS THE REQUIREMENTS OF THE HEAT RELEASE TEST



“This posed a significant problem for seating manufacturers when it came to choosing materials, as there were few materials that when tested as a composite would consistently and successfully pass the requirements of the heat release test,” says Nicholls. “For a long time, only a few man-made synthetic products could pass the heat release test. Whilst these products were well received by customers, there was a strong desire for genuine leather in premium class seating.”

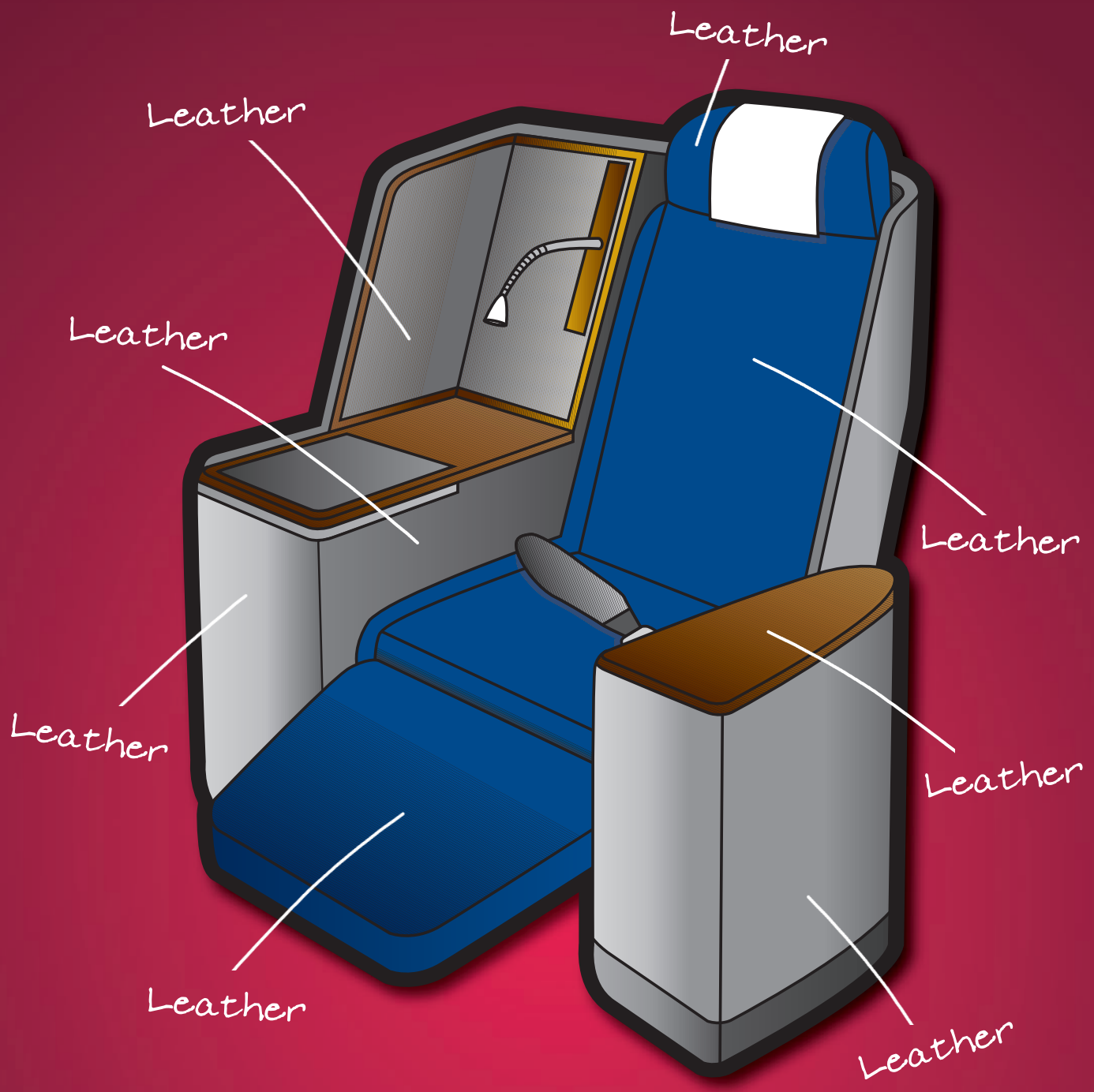
LEATHER AND LUXURY Leather has long been associated with ostentatious products in the same way that cigars, champagne and caviar have, so it is perhaps obvious that it would appeal to passengers in premium cabins. “So far the options of airlines and airframe makers have been limited to man-made synthetic products, with leather an increasingly difficult product to achieve

consistent pass results for the heat release test,” says Nicholls.

Yarwood Leather is bucking this trend with its flagship product KalorLite, which was the principle leather product used on SWISS's Vantage seat, which took its maiden flight earlier this year.

KalorLite is named for its low thermal properties and was built from the ground up to pass the requirements of the heat release test. “The product is a real testament to the scientific experience of our technical team, who have in effect gone back to the grass roots of the combustion process in order to understand what is needed to pass the heat release test and make a desirable product that fulfils all the necessary requirements,” says Nicholls. “With modern premium-class seating evolving in the way that it has in the last decade it is hard to envisage what the next 10 years will bring.” ☒

Contact: Matthew Nicholls
Email: matthew.nicholls@yarwood.co.uk



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gastronomicdelights

IACOBUCCI HF ELECTRONICS HAS JUST BECOME THE WORLDWIDE SALES REPRESENTATIVE FOR TWO PRODUCTS DESIGNED TO REVOLUTIONISE CATERING ON BOARD

 Iacobucci HF Electronics, a leading manufacturer and supplier of electrical galley inserts for the aeronautical market, is celebrating its 15th anniversary. Since 1994, when it launched the first Iacobucci Hi-Fly coffee maker on board, the company has striven to offer innovative and reliable solutions for the aeronautical market. Today Iacobucci HF Electronics is an established brand, recognised both in commercial and business aviation for its high quality, advanced technology and design – with products including its trash compactor, and its espresso and beverage makers, which are designed to deliver perfect Italian espressos and cappuccinos even at 35,000ft.

The last three years turned out to be very important for the company. In 2008 Iacobucci HF Electronics's revenue grew at 60%, while it took on 30% more staff. The professionalism of its staff is vital for Iacobucci HF Electronics, which boasts experienced

Catia designers, highly skilled engineers and qualified craftsmen.

RESEARCH AND DEVELOPMENT

Rather than resting on its laurels, the company aims to improve the quality and performance of its products continuously, and invests more than 10% of its revenue in research and development (R&D) every year. Its R&D department rewards this investment with improvements in the materials, technical characteristics, design and performance of its products, along with weight reductions, faster production and easier maintenance.

Iacobucci HF Electronics says its evaluation of the latest market trends reveals that attention to service and quality of food in first-class cabins continues to grow, making the inflight meal a crucial factor in the overall flying experience, especially during a long-haul flight.

RESTAURANT-STYLE COOKING

Recently the company extended its offering to introduce the ability to serve restaurant-quality food on board – in July it became the official worldwide sales representative for Modular Galley Systems (MGS), one of the leading suppliers of multifunctional cooking units for the aeronautical market. Consequently, Iacobucci HF Electronics presents two innovative products – the Induction Heating Unit (IHU) and the Inductive Hot Plate (IHP).

The IHU is designed to enable airlines to offer restaurant-quality meals freshly prepared on the aircraft. The short heating time allows the use of one unit several times within one regular meal cycle and facilitates new business ideas such as 'meal on-demand'. The IHU can be used in combination with different accessory inserts to prepare various dishes – from eggs and toasts to perfectly fried steaks or steamed vegetables. For reheating meals the IHU

- 01. MGS's Induction Heating Unit
- 02. The Hi-Fly WastPak trash compactor





03



04



03. The Hi-Fly Espresso Maker and Hi-Fly Americana
04. MGS's Inductive Hot Plate

combines induction heat and steam to ensure that passengers receive a top-quality meal that is hot but not overcooked. Importantly, the unit is designed to enable easy and safe handling for the operator.

FREE COOKING The IHP was developed especially for first-class passengers. It is based on the same technology but is designed as a big Ceran cooking top and allows free cooking as in restaurants on the ground. The Ceran cooking top features two standard cooking zones and one extra-large cooking zone for woks. To ensure safe use on board, the IHP has easily removable and cleanable fixtures to secure pans.

As well as paying great attention to its products, Iacobucci HF Electronics promises extensive after-sales service and customer assistance through its network of more than 20 authorised repair stations worldwide.

Above all, Iacobucci HF Electronics is constantly looking for new ideas, moving towards maximum flexibility in the galley. "I consider today's business environment a continuous challenge. To win this challenge one company has to fear obsolescence and must always try to be ahead of its time through innovation and development. The moment this stops the obsolescence era begins," says Lucio Iacobucci, chairman and CEO of Iacobucci HF Electronics. ☒



ONE COMPANY HAS TO FEAR
OBSOLESCENCE AND MUST
ALWAYS TRY TO BE AHEAD OF ITS
TIME, THROUGH INNOVATION AND
DEVELOPMENT



Contact: Lucio Iacobucci
Email: marketing@iacobucci.aero

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firststeps

ALTITUDE'S FIRST YEAR HAS BEEN PACKED – WITH RECOGNITION AS A BBJ COMPLETION CENTRE AND GAINING EASA PART 21J CERTIFICATION JUST TWO HIGHLIGHTS



During 2009 Altitude Aerospace Interiors (Altitude) experienced an extraordinary time of growth – especially impressive given the global economic climate.

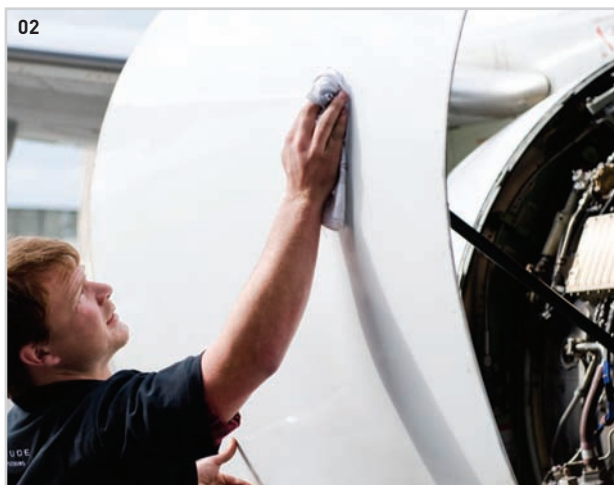
With offices in Auckland and Christchurch, New Zealand, Altitude has spent the last year reaffirming its position in the commercial and private aircraft markets. Its skilled designers, engineers and technicians offer interior services ranging from product design, refurbishment and reconfiguration, through to repair, engineering, installation and certification.

Although Altitude celebrated its first anniversary in August 2009, the company brings a wealth of design engineering and heavy maintenance experience spanning over 20 years. Formerly known as ANZES Design Engineering, and operating as part of Air New Zealand, Altitude was rebranded in 2008 as a wholly owned subsidiary of Air New Zealand.

Last year was one of firsts for Altitude, with the company gaining EASA Part 21J certification and also being recognised by Boeing as a BBJ completion centre. Altitude also delivered numerous programmes, including the reconfiguration of Air New Zealand's B777-200 aircraft, and



01. A BBJ cabin by Altitude
02. One of Altitude's VIP completion technicians, checking a 737



Aero Mexico's B777-200s, and the continued delivery of buyer furnished equipment (BFE) for Boeing's B777 production line.

The year ahead for Altitude is one of optimism mixed with challenge and a desire by the entire team to produce some truly innovative, functional and unique solutions for its commercial and private clients.

VIP AIRCRAFT When it comes to VIP aircraft, Altitude's core competencies are threefold – refurbishment and completion; interior reconfiguration; and interior product design and

manufacture. The Altitude team has grown over this period to gain experience in project management, industrial design and supply chain management. Pascal Jallier has recently relocated to New Zealand from Switzerland to join the Altitude team as head of VIP programmes and procurement.

"New Zealand has a strong super-yacht industry – with skills and craftsmanship ripe for transfer to the VIP aircraft industry," says Jallier. "The competitive market, exchange rates and geographical location put Altitude to the front of the turnkey solutions



NEW ZEALAND HAS A STRONG SUPER-YACHT INDUSTRY – WITH SKILLS AND CRAFTSMANSHIP RIPE FOR TRANSFER TO THE VIP AIRCRAFT INDUSTRY

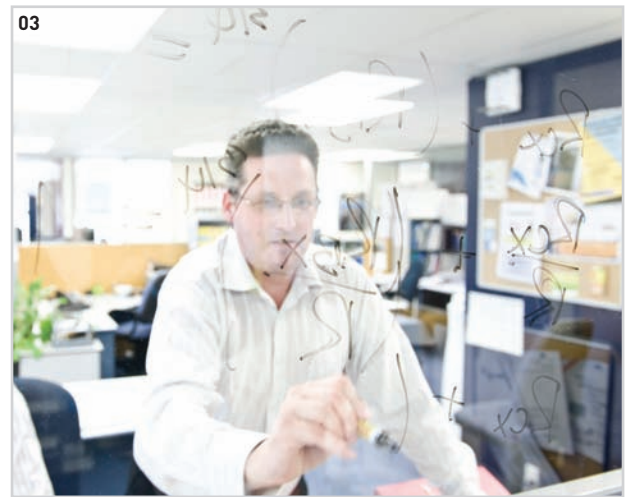


for completion – way above the European competition.”

Altitude foresees Asia-Pacific as the next growth market for BBJ completions, and the company has been quick to recognise the needs of private aircraft owners. This has seen the company invest in developing a talented team of industrial designers to complement its experienced engineers. This team develops bespoke products for clients, working collaboratively to generate solutions that are both fully functional and beautifully crafted. “Altitude’s attention to functionality without compromise to craftsmanship

and comfort cannot be better demonstrated than through the launch of Altitude’s BBJ-C interior modules,” says Matthew Woollaston, head of commercial – VIP aircraft at Altitude. “To offer a solution that enables the same aircraft to deliver a head of state in the morning and fly a humanitarian mission in the afternoon is innovation and flexibility at a level not yet seen by the industry.”

At the core of this multicharacter aircraft are the benefits of a true cargo transporter. The ability to rapidly change out modules depending on the mission of the flight offers operators



flexibility and maximises asset utilisation. Altitude developed several configuration options to suit the most varied aircraft missions and clients, and launched these at the 2009 NBAA show in Orlando, Florida, USA.

Private aircraft clients also have access to Altitude’s dedicated hangar and selected technical personnel from Air New Zealand in Christchurch. This single-bay hangar is for the sole purpose of VIP aircraft activity, thus eliminating the risk of resource fluctuations across multiple aircraft.

This package of designers, engineers and technicians, all supported by a dedicated management team, allows clients to pick the level of consultation and work tailored to their specific requirements. From product designs for full green fit-outs to an interior refresh or technical and certification work, Altitude is now positioned to offer a customised service no matter how small or big the job may be.

COMMERCIAL AIRCRAFT Over the last 12 months, Altitude has invested heavily in developing a complete end-to-end solution for the development and delivery of customised products for aircraft interiors – products such as bars, closets and ceiling features.

03. Altitude’s in-house design teams develop products tailored to clients’ needs



By introducing an industrial design and visualisation team at one end of the process, and developing a closer relationship with the manufacturing partners at the other end, Altitude has built a supply chain to span the entire development and implementation process. In practical terms it means that Altitude has the capability to develop products and concepts from a very basic customer specification. This includes helping customers through the initial 'ideation' phase of a project, where the needs of the customer are not well defined, and the concept is unknown. The ideation process helps to draw out the customer's needs and desires, and through a process of feedback and consultation, finally ends



IN SOME INSTANCES THE REMOTE LOCATION HAS MEANT THAT THERE IS NO 'BAGGAGE' AND THAT THE OLD FASHIONED AND TRADITIONAL APPROACHES TO SOLVING PROBLEMS AREN'T USED JUST BECAUSE THAT'S THE WAY IT'S ALWAYS BEEN DONE



04. A bar unit designed for Air New Zealand's B777-200ERs
 05. Altitude's VIP aircraft hangar in Christchurch

in a detailed specification from which the engineers can go to work.

With this team in place, Altitude has been busy working with customers developing new products that will be launched very soon. These will be seen on new B777-300 aircraft and also for entirely new, first-of-type programmes. Already the fully integrated team has shown real benefits by making new product development more design focused, streamlined and efficient.

Altitude has also delivered a number of completion programmes over the year, including the reconfiguration of Air New Zealand's B777-200ERs. A real challenge for the engineering and design teams was the need to design and deliver a fully customised bar unit at the cross isle, with a flow time of around six months, as well as the reconfiguration engineering.

Although located almost as far south as you can go, Altitude is making headway into the interior commercial and private aircraft markets. It doesn't see New Zealand's geographic position as a disadvantage. "In some instances the remote location has meant that there is no 'baggage' and that the old fashioned and traditional approaches to solving problems aren't used just because that's the way it's always been done. Innovation is necessary to create sustainable competitive advantage," says Baden Smith, Altitude's head of commercial – airlines.

With ambitious plans for 2010 and beyond for both arms of the business (commercial and VIP aviation) Altitude without a doubt has its work cut out. But the company is confident that its skills, experience and drive will enable it to succeed. ☒

Contact: Baden Smith
 Email: info@altitude-ai.com

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
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Altitude previously operated as ANZES Design Engineering.

thebrightside

DESPITE A DEMANDING YEAR FOR THE INDUSTRY IN GENERAL, ANDREW MUIRHEAD & SON IS BUSY ON SEVERAL HIGH-PROFILE PROJECTS, AND OPTIMISTIC ABOUT THE FUTURE

 Andrew Muirhead & Son (Muirhead), based in Glasgow, Scotland, has won the contract to supply leather to Olympic Air, Greece's recently re-launched, privatised airline (formerly known as Olympic Airlines). Muirhead will initially replace the seating on six aircraft taken over from the leasing company that was operating on behalf of the airline, using leather in a colour known as 'Sateen Ink', a dark blue.

"It has been a difficult year for the industry, however we have kept our edge by continuous investment in technical innovation and in pioneering new markets," says James Lang, group marketing director of Scottish Leather Group, of which Muirhead is a subsidiary. "We are very resilient and fleet-footed and we have developed our own unique manufacturing process, which has allowed us to turn leather from a craft-based into a technology-driven industry."

Muirhead aviation-specification leather is repeatedly chosen by prestige airlines around the globe, including flag carriers such as British Airways, Qantas and Cathay Pacific. Muirhead credits this success to high standards of safety and durability, as well as its environmental credentials (Muirhead holds ISO 14001 accreditation). The company also holds accreditation from United Kingdom Accreditation Service (UKAS) for its fire testing services.

"We have a reputation for delivering a high-quality product on time and on budget, and this makes us a low risk when aircraft downtime is all important," says Lang. "Equally, when business-class travellers are spending their own or their company's money on an expensive long-haul flight they need to feel comfortable and arrive feeling relaxed and ready to do business."

Lang says leather has some natural advantages over fabric. "Leather is more



01. Singapore Airlines chose Muirhead leather in 'Fawn' and 'Mocha' for first and business class (shown here) on its A380s
02. Muirhead will supply leather for six Olympic Air aircraft

practical, durable and hygienic with a longer life expectancy than fabric, at least 10 years to three for fabric," he says. "We anticipate that demand for our top-quality hides will continue to grow. The opening up of markets in Asia and China makes us optimistic for the future."

However, Lang adds that cheaper leathers may be a false economy: "Cheap and badly dyed leathers can cause allergies and don't have the

supple, smooth feel of top-quality hides. Each business-class seat finished with our leather uses an entire hide, which has been hand finished in the factory and treated to meet the highest safety and durability specifications."

Muirhead believes the market for business-class seats (a key market for leather) is strong – citing the recent launch of British Airways' business-class-only service from London City Airport to New York. He also expects



WE ANTICIPATE THAT DEMAND FOR OUR TOP-QUALITY HIDES WILL CONTINUE TO GROW. THE OPENING UP OF MARKETS IN ASIA AND CHINA MAKES US OPTIMISTIC FOR THE FUTURE



the “huge explosion” in international air travel to continue, along with continuous investment in a new generation of mega-aircraft such as the A380 – which will of course require fit-out and subsequent refurbishments.

A380 PROJECTS The company has definitely benefited from the launch of the A380 so far – it is supplying leather for both Emirates Airlines’ and Singapore Airlines’ A380 fleets.

Singapore Airlines, which will have 19 of the aircraft when they are all completed, chose Muirhead leather in ‘Fawn’ and ‘Mocha’ colours for its first- and business-class seats. For Emirates Airlines Muirhead is also refurbishing other aircraft types – mostly business-class seats – as well as furnishing its A380s. Six aircraft have been completed so far, with another three scheduled for completion before the end of the year.

Muirhead is also encouraged by Airbus’ most recent forecast (September 2009), which predicted a demand for some 25,000 passenger and freighter aircraft over the next 20 years. In anticipation of the upturn Muirhead is gearing up for the future and has recently appointed a new sales manager – Archie Browning – and has also promoted Bernadette O’Shea to programme manager, in charge of Muirhead’s transportation division. “We


03



03. Arisaig, one of Muirhead's high-end leathers



WE CHOOSE OUR OWN HIDES,
MANUFACTURE OUR OWN
LEATHER AND HAVE THE FINAL
SAY IN WHETHER OR NOT THE
HIDES MEET THE QUALITY THAT
CUSTOMERS HAVE COME
TO KNOW



are optimistic about the future and are prepared to back this up by investing in our people," says Lang. "We have a good workforce and their flexible attitude and commitment to a top-quality product means we can stay ahead of our competitors."

QUALITY CONTROL Muirhead is in control of the entire manufacturing process, from raw material to finished leather. "We have two tanneries that are part of the group and they supply us with wet blue hides, which we in turn make to the customer's specification. Every hide sold is tested and certified in our own UKAS approved testing facilities," says Lang. "The final part of making quality leather is the control and measurement processes. At Muirhead we choose our own hides,

manufacture our own leather and have the final say in whether or not the hides meet the quality that customers have come to know. The company has full control over the whole process, right down to delivery."

Quality standards achieved at the company to date include ISO9002, ISO14001: 2000, BS6608: 1985 and TUV approval – along with its status as a Boeing Qualified Leather Supplier and Airbus Approved Leather Supplier.

"It is not a time to rest on our laurels and although we have a good stream of work in the pipeline we need to ensure that our reputation for customer service, reliability and high standards is maintained," says Lang. "Continuous improvement and innovation is key to the company's future prosperity." ☒

Contact: James Lang
Email: sales@muirhead.co.uk

Our Leather Is Right Up There



What makes Muirhead the world's Number 1 aviation leather?

Is it the quality? We control every stage of production from hide selection, to tanning, to delivery. so we guarantee every piece we produce.

Is it the technology? Our leather meets and exceeds the most stringent performance standards demanded by the CAA.

Or is it the reassurance of knowing we can work with you to achieve the exact colour and specification you require, at the right price.

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BUCHER AEROSPACE PRESENTS THREE MODULAR, SCALABLE TABLE SOLUTIONS, DESIGNED TO DELIVER COMPETITIVE ADVANTAGE WHILE STREAMLINING DEVELOPMENT AND CERTIFICATION

01. Bucher Aerospace's console-stowable tables



As airlines continue to seek increasingly high levels of luxury for first- and business-class passengers in an effort to differentiate themselves, the premium-class seats and suites on offer evolve constantly. With the development of those offerings comes a demand for modular, installed equipment, such as video deployment mechanisms and tables that mirror the passengers' expectations for increased functionality, quality, user-friendliness and reliability. Five years ago, with an established history developing in-flight entertainment (IFE) deployment mechanisms for aircraft seat manufacturers as a springboard, Bucher Aerospace began offering business-class, first-class and VIP table products.

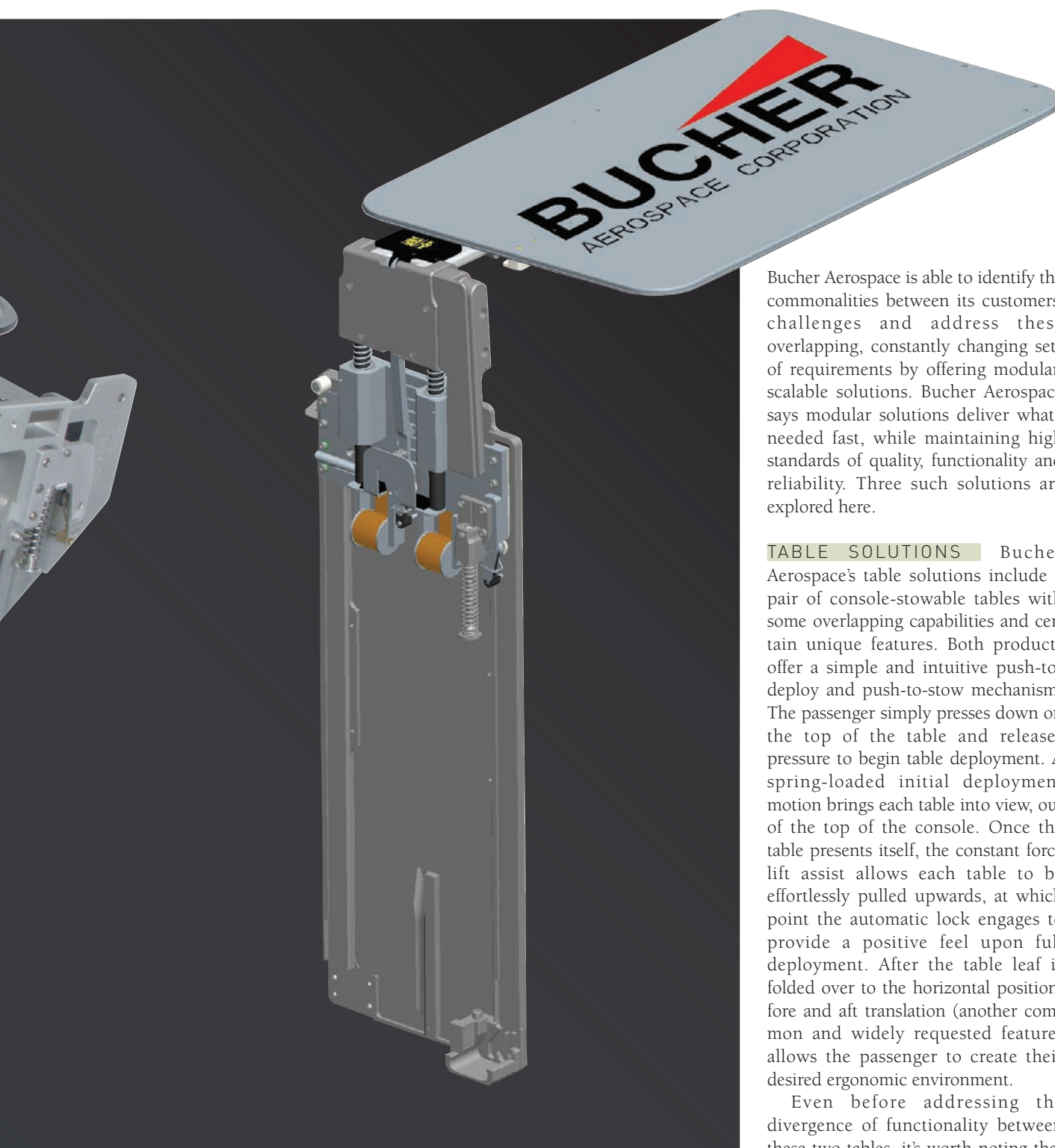
Bucher Aerospace recognises the challenges facing seat manufacturers, and is positioned and focused on partnering with the industry's key players to minimise their risks and unknowns. With new premium seating programmes often entered into based on brand-new, blue-sky concepts, the company believes that incorporating modular Bucher Aerospace solutions reduces uncertainty for its customers and increases the likelihood of programme success. These tables often benefit from the confidence inspired by prior testing and service history (of particular features or the entire design), and they always benefit from the focus applied to the product development process by the company.

As the air travel industry becomes increasingly competitive, airlines are continually striving for unique interior design solutions to differentiate their services. Bucher Aerospace constantly receives requests for one-off deployable table solutions to address seat manufacturers' challenges. Although this would seem to, and often does, drive ground-up design efforts, there is another approach that can be taken.





MODULAR SOLUTIONS DELIVER WHAT'S NEEDED FAST, WHILE
MAINTAINING HIGH STANDARDS OF QUALITY, FUNCTIONALITY AND RELIABILITY



Bucher Aerospace is able to identify the commonalities between its customers' challenges and address these overlapping, constantly changing sets of requirements by offering modular, scalable solutions. Bucher Aerospace says modular solutions deliver what's needed fast, while maintaining high standards of quality, functionality and reliability. Three such solutions are explored here.

TABLE SOLUTIONS Bucher Aerospace's table solutions include a pair of console-stowable tables with some overlapping capabilities and certain unique features. Both products offer a simple and intuitive push-to-deploy and push-to-stow mechanism. The passenger simply presses down on the top of the table and releases pressure to begin table deployment. A spring-loaded initial deployment motion brings each table into view, out of the top of the console. Once the table presents itself, the constant force lift assist allows each table to be effortlessly pulled upwards, at which point the automatic lock engages to provide a positive feel upon full deployment. After the table leaf is folded over to the horizontal position, fore and aft translation (another common and widely requested feature) allows the passenger to create their desired ergonomic environment.

Even before addressing the divergence of functionality between these two tables, it's worth noting that

despite all the aforementioned similarities, each basic style is scalable and modifiable for the particular ergonomics and environment of the premium passenger accommodation. Both of these tables, as standard, perform many of the same functions yet do so over different ranges of travel and required input forces.

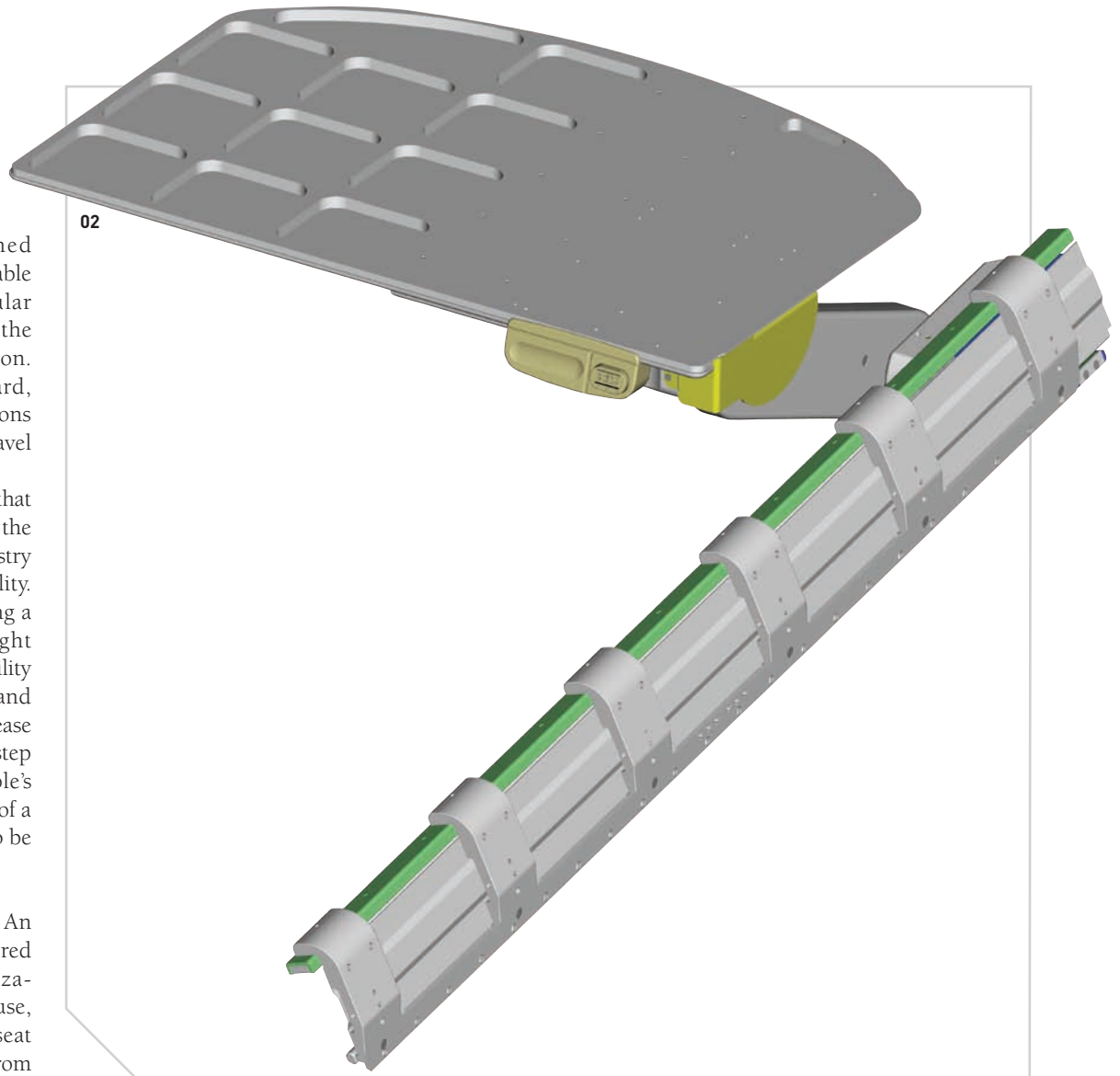
Where there are many features that are selected by multiple customers, the differentiation drive within the industry often leads to specialist functionality. Each of these tables offers something a little different during the flight experience. While one boasts the ability to rotate the table leaf forwards and away from the seat occupant, for ease of egress, the other offers another step in ergonomic tailoring – the table's height can be adjusted at the touch of a button, allowing the leg clearance to be incrementally varied as desired.

CREDENZA-MOUNTED TABLE An entirely different possibility is offered by Bucher Aerospace's credenza-mounted solution. When not in use, rather than stowing away in a seat console, this table can slide away from the passenger to its forward location. Such a system has the advantage of inherently providing fore-aft adjustment capability, while height adjustment can also be selected as part of the product configuration.

Beyond these three products Bucher Aerospace also offers fold-down options, linear lateral deployment units and built-in deployment sequencing



WITH MULTIPLE PARTIES INVOLVED, COMMUNICATION IS A VITAL CHALLENGE THAT NEEDS TO BE ADDRESSED FROM THE OUTSET



02. The credenza-mounted table

logic. Development of the product range continues apace.

The company attributes the success of these deployable table products, among other things, to a strong focus on customer communication and service. Bucher Aerospace partners with the seat manufacturer, airline, aircraft manufacturer and industrial design consultant as applicable in each case to develop solutions that take their requirements into account. Such requirements are extensive and include functionality, intuitiveness, reliability, styling, abuse resistance, weight, cost, maintainability and ease of installation. Airworthiness authority and aircraft manufacturer requirements must also be strictly adhered to, for instance low flammability, heat release, smoke and

toxic gas release for the materials used in the table construction, and also retention under dynamic testing.

With multiple parties involved, communication is a vital challenge that needs to be addressed from the outset. Bucher Aerospace focuses on aiding efficiency through the thorough documentation of requirements, design decisions, information exchange, programme planning, test planning, test reporting, and of course, the final product itself.

Through the successful completion of life simulation cycle and abuse testing, mock-up and research and development testing, and flammability testing, Bucher Aerospace is confident that these tables are rugged, reliable and user friendly. ☒

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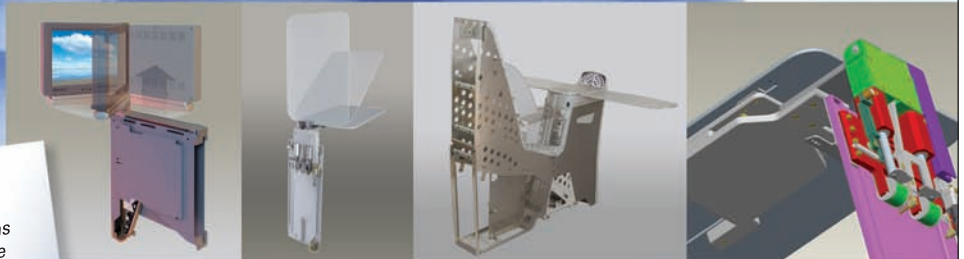
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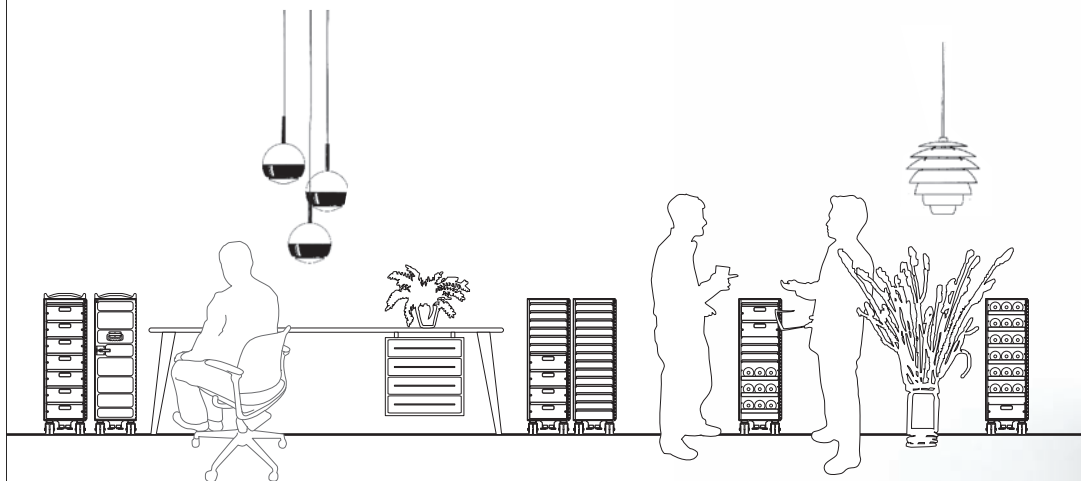


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
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serveandprotect

AEROCARE INTERNATIONAL SAYS MUCH CAN BE DONE TO IMPROVE CABIN HYGIENE – AND DOING SO COULD BOOST PASSENGER SAFETY AND CONFIDENCE, WHILE PREPARING AIRLINES FOR FUTURE LEGISLATION

 With the global outbreak of H1N1 swine flu and the rise in awareness of onboard communicable diseases such as SARS and XDR-TB, cabin cleanliness is high in the public consciousness at the moment. This, coupled with the ever-changing raft of existing and proposed legislation – such as WHO’s Guide to Hygiene and Sanitation in Aviation (GHSA) 2008 – means that there is pressure on airlines to provide evidence that their fleets are both cleaned and disinfected to acceptable standards.

“Pro-active airlines have been working on plans to ‘future proof’ their businesses against existing and forthcoming legislation for many years, and routine cleaning and disinfection procedures now form an increasingly important element of airline operations,” says Kevin Waud, sales director at Aerocare International. Thomas Cook Airlines (TCX) set in motion a plan with Aerocare International over six years ago. The plan focuses on the main areas highlighted by the World Health Assembly and Executive Board – namely, the provision of safe water, food and the correct procedures for the collection and disposal of waste.

“The aircraft interior can be a hotbed for biological contamination and many



- 01. Aerocare International recommends that its sanitiser is regularly and systematically applied throughout the cabin
- 02. Public perceptions of aircraft cabin hygiene could be vital to airlines’ income



customers and crew have experienced the effects of bacteria, fungus and mould at one time or another – especially in the form of odour in both galley and toilet areas,” says Dave Hickson, managing director of the company. Many effective cleaning solutions are not approved for aircraft use. “Historically, in order to gain aircraft approvals, the chemicals used to clean interiors were weak solutions, so as not to damage interior components. While their lack of strength means they have been an inexpensive option, they



are not effective in meeting the latest hygiene and sanitation regulations.”

TCX uses Aerocare International's approved cleaning system to destroy odour-causing bacteria. Hickson says that with the regular use of the cleaning system, odours in galley and toilet areas have been drastically reduced. Similarly, unwanted bacteria and odours, which can filter from the toilet tanks of certain aircraft types into the cabin area, have been eliminated with the introduction of a regular soak of the toilet system during the maintenance programme.

WHAT'S COOKING? The confined aircraft galley also presents unique compliance challenges for airlines. Whether prepared in an airline-owned flight kitchen or obtained from an outside caterer, airlines are responsible for the food served on board. All steps involved in food supply – including preparation, transport, storage and serving – need careful coordination to prevent contamination.

In the UK, the Food Safety Act designates aircraft galleys as food preparation areas and stipulates that

“

HISTORICALLY, IN ORDER TO GAIN APPROVALS, THE CHEMICALS USED TO CLEAN INTERIORS WERE WEAK SOLUTIONS THAT WOULD NOT DAMAGE INTERIOR COMPONENTS ”

airline crew must observe correct food handling procedures. “However, galley design and layout make it practically impossible to comply with these regulations,” says Waud. “The toilet, for example, is used by both public and crew and opens into the kitchen. The issue is further exacerbated by the fact that no sink is available for crew to properly wash hands before and after meal service.” To combat this, all TCX crew are trained to understand the importance of safe hygienic practices and are issued with cabin crew wipes from Aerocare International. “The wipe has proved to be an easy, practical and very popular solution to the problem of sanitising this cramped working environment,” says Waud.

DRINK UP Airlines also have full responsibility for the management of water on the aircraft. “Once an aircraft water system is contaminated with unfit drinking water it is extremely costly and disruptive to put the problem right,” says Hickson. “Harmful bacteria in the water system begin to multiply at an exceptional rate and traditional audit methodologies may not pick up the lapse for a number of weeks between maintenance inputs, thereby potentially exposing hundreds of people.” A proper water system, and clear operation and



BY EMPLOYING THE BEST AVAILABLE TECHNOLOGY TO COMBAT THE SPREAD OF INFECTION THROUGHOUT THE AIRCRAFT, IT IS THE MOST PROACTIVE AIRLINE OPERATORS WHO HAVE STOLEN A MARCH ON THE COMPETITION ”

03. Biological contaminants not only cause unpleasant odours - they can affect human health

maintenance procedures are necessary to ensure potable water is safe. In addition, Hickson says that the regular cleaning of aircraft water tanks must become an integral part of the aircraft maintenance process.

Designed and tested in conjunction with Aerocare International, a water filtration system is now installed across TCX's Boeing 757 fleet, with designs in hand for the 767 and Airbus aircraft. The filtration system forms part of the Water Safety Plan required by the WHO's GHS 2008 and has passed ENBS6920, ensuring that any accidental uplift of unfit water will not affect passenger and crew health. Once passed through the filter, water is classed fit for human consumption to the standard required in the UK.

THE HUMAN FACTOR Unfortunately while airlines can do much to train and guide their employees and suppliers, there is little they can do to control the hygienic discipline of their own passengers. Any hard surface touched by a passenger can introduce the possibility of cross-contamination – and as the WHO GHS 2008 (under 3.2.3 Aircraft: Routine cleaning and disinfection) demands that “aircraft are kept in a sanitary condition at all times”, airlines must take proactive steps to ensure compliance.

TCX solved this thorny problem by introducing a deep and intermediate cleaning programme, ensuring sanitiser



is regularly and systematically applied. Moreover, Hickson says the Aerocare International sanitiser demonstrates residual properties in its effectiveness in killing bacteria – and in certain areas of the aircraft has remained active for up to five weeks, thus providing longer lasting passenger protection.

“Of course, whatever processes an airline chooses to employ should be accompanied by a fully auditable procedure to verify effectiveness,” says Hickson. “A meaningful audit should show in detail exactly how well each clean has been performed by contractors, and also how long the product is lasting in certain areas.”

TCX's cabin presentation team is provided with a fully auditable manual and easy-to-use equipment to allow

them to test each area in 30 seconds and apply pass or fail criteria. This system is designed to give the airline operator confidence in the standard of cleanliness across their fleet – providing them with all the documented evidence necessary to present to the authorities on request.

“By employing the best available technology to combat the spread of infection throughout the aircraft, it is the most proactive airline operators who have stolen a march on the competition,” says Hickson. “A march achieved by demonstrating compliance with UK and international standards of hygiene, and offering a commitment to staff and customers alike to provide an outstanding, hygienic and safe environment to travel.” ☒

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THE HIDE HOUSE OFFERS AVIATION-GRADE LEATHER IN 25 COLOURS FROM ITS FACILITY IN THE HISTORIC TANNING AREA OF NAPA, CALIFORNIA

Long before the wine industry took prominence in California, USA, the city of Napa had a sizeable leather industry that began on the banks of the Napa river in 1869. It was at that time that Sawyer of Napa was founded to process the abundance of raw material – the sheep and cattle hides that the area provided. Soon another tannery – Calnap Tanning Company – was constructed to meet the growing demand for leather on the West Coast. In its heyday, Napa employed hundreds of people involved in making footwear, garments, personal leather goods and gloves. The Hide House's sister company, Napa Glove & Safety (founded in 1888), was the first of five customers for the tanneries. So steeped in tradition is The Hide House, that the term 'Nappa' leather is derived from its history of producing fine leathers and garments in Napa.

The Hide House was set up to act as a factory outlet for the two tanneries some 30 years ago. Ceasing operations a few years ago, the tanneries no longer exist, however, The Hide House carries on the tradition by sourcing and importing leathers from around the world. Domestically, it does a lot of contract tanning – of various leathers,

01-02. The Hide House's huge stock includes many leathers suitable for aviation



including cowhide, deerskin, elkskin and bison.

A HUGE RANGE IN STOCK Today, The Hide House offers a huge range – stocking well over 1,000 types of high-quality leathers. For the aviation industry, it has made a concentrated effort to offer some of the world's finest aircraft upholstery leathers. The Hide House says these leathers are available in 25 colours, and meet all applicable certified vertical burn tests. The leathers are made from top-grade raw material from the USA, and average 45-60ft² per whole hide.

In these economically challenging times, the company has made an effort to source lightweight hides that are 0.9-1.1mm thick. Reducing weight in the cabin enables airlines to save fuel and therefore money, while reducing CO₂ consumption. Although the hides are lightweight, their tensile strength is not compromised.

The company prides itself on its friendly and knowledgeable staff, and its ability to expedite orders within 24 hours of receipt. It is prepared to send 10 hides or thousands of feet – it says that no order is too small or too large for it to handle. ☒



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HIGHLIGHTS OF THE COMING YEAR FOR EADS SOGERMA WILL INCLUDE THE FIRST CABIN INSTALLATION OF SOLSTYS, AND THE LAUNCH OF ULTIMATE SLEEPER

01. Solstys, a business-class seat
02. The first installation of Solstys will be on Etihad Airways aircraft

2009 has been an eventful year for EADS Sogerma, not least because of the success of Solstys, the company's latest business-class concept, which was developed following the success of the Pearl seat designed with Etihad Airways, and launched in 2008.

PRODUCTS The forward-facing Solstys turns into a full-flat bed, and offers direct aisle access for each passenger. With a seat pan width of 21in, the seat also offers an electrical backrest/seat bottom, automatically folding side armrest, integrated massage system, one-piece meal table, and power outlet. "Airlines really appreciate this new and innovative product, and we will deliver our first seats by the end of the year," says Didier Guinot, EADS Sogerma's vice president of cabin interior.

Etihad Airways will be the launch customer for Solstys, installing it on five A330-300s, eight A330-200s and three A340-600s.

Joining Solstys on EADS Sogerma's trade show stand this year was its new super-first-class seat, Ultimate 17 – displayed at the Aircraft Interiors Expo in Hamburg and the Aircraft Interiors Expo Asia in Hong Kong.

EADS Sogerma is also working with Lufthansa Technik to develop the



'Ultimate Sleeper', a variant of Ultimate 17 that integrates Lufthansa Technik's Aerosleeper concept to offer a premium-class bed that folds out over the seat.

"Our cooperation with Lufthansa Technik in the development of Ultimate Sleeper will meet passengers' requirements by providing an all-in-one product combining the advantages

of an ergonomic seat for entertaining and business work with larger space and stowage and the comfort of a genuine bed for sleeping in a private environment," says Guinot.

EADS Sogerma is responsible for transferring the concept to production and plans to offer its customers the new model in 2010. Lufthansa Technik is supplying technical expertise and will also continue developing the concept.

CUSTOMER SERVICE Aside from the product developments, Jeffrey Forsbrey, EADS Sogerma's new vice president of sales and marketing, says the company's strategy for the future includes maintaining its excellent delivery performance to airlines and OEMs (currently 100% on time), developing its products within the boundaries of ISO 14001 and looking at the impact of the environment in its designs; and maintaining and expanding strong customer support for airlines globally.



ULTIMATE SLEEPER WILL MEET PASSENGERS' REQUIREMENTS BY PROVIDING AN ALL-IN-ONE PRODUCT COMBINING THE ADVANTAGES OF AN ERGONOMIC SEAT FOR ENTERTAINING AND BUSINESS WORK WITH LARGER SPACE AND STOWAGE AND THE COMFORT OF A GENUINE BED FOR SLEEPING

EADS Sogerma's headquarters are based in Rochefort, France, and are reinforced by local customer support partners in Miami, Singapore and Dubai, with dedicated customer support teams offering technical assistance to customers in the region.

"EADS Sogerma's major customer support commitments are to maintain its rate of on-time spares delivery (95% since January 2009) through the coming years, having in mind to continuously improve this percentage; and to uphold the maintainability and reliability of its products, which are designed to be compliant to new supplier support condition requests from Airbus and Boeing," says Mathieu Marraud des Grottes, EADS Sogerma's head of airlines' support for technical seats and cabin interior.

In conclusion, EADS Sogerma's vision for the coming year is to continue to deliver its products on time, to support these products as they enter service with airlines, and to grow its share of the premium seating market. ☒



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
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ALTHOUGH SPECIALISING IN DIFFERENT AREAS, SHARING THE SAME PARENT COMPANY ALLOWS DIEHL AEROSPACE AND DIEHL AIRCABIN TO COORDINATE AND OPTIMISE THEIR WORK ON THE A350XWB

01. Diehl Aircabin is providing cabin linings for the A350XWB
02. Engineers from each company work together in shared workspaces

 Diehl Aerospace and Diehl Aircabin have now been under the Diehl Aerosystems umbrella for more than a year, after the former Airbus site at Laupheim in Germany was taken over by Diehl and Thales and transformed into the Aircabin subsidiary in October 2008.

Diehl Aerosystems says that separating its capabilities into two first-tier suppliers means that each can specialise and excel in their area, while also benefiting from the cooperation that naturally comes from sharing a parent company. Together, the units can offer integrated solutions from cockpit to cabin. Simply speaking, Diehl Aerospace provides cabin lighting and avionic systems, while Diehl Aircabin provides cabin lining and monuments.

The most recent airframe project for Diehl Aerosystems is the Airbus A350XWB, a new long-range wide-body aircraft. As well as avionics and air ducting components, the Diehl Aerosystems companies are first-tier suppliers for the cabin – supplying modules that can be applied to other



commercial aircraft in the future. Diehl Aerosystems has been selected to supply the entire lighting package for the cabin and cargo area, along with the emergency lighting system and several key avionic systems.

The cabin lighting for the A350XWB, produced by Diehl Aerospace, is an 'all-LED illumination system' designed to provide a high level of brightness, accuracy in colour and brightness, and efficiency – all over a long lifetime. Its granularity enables dynamic light scenarios (for example a sunrise effect) to create a pleasant atmosphere for passengers.

Sister company Diehl Aircabin is engineering and manufacturing cabin lining elements for the aircraft. The company follows the floor-to-floor concept, where dado panels, sidewalls,

luggage bins, ceilings, entrance areas as well as light covers are delivered to the airframer as a single module. Air ducts, cabin crew rest compartments (CRCs) and flight crew rest compartments (FCRCs) are also part of Diehl Aircabin's A350XWB work package.

Engineers from both companies work together on 'plateaus' where they share their workspaces, offices and laboratories – making communication easier, and coordination more efficient. The close cooperation means that lighting and lining complement each other – for example, the engineers can discuss how geometric shapes and lighting elements work together and how they should be positioned.

"We are just at the beginning of implementing all measures that lead to an optimisation of synergies between



WE ARE JUST AT THE BEGINNING OF IMPLEMENTING ALL MEASURES THAT LEAD TO AN OPTIMISATION OF SYNERGIES BETWEEN OUR TWO COMPANIES



our two companies,” says Dr. Gerardo Walle, CEO of Diehl Aerospace and member of the board of Diehl Aerosystems.

Another example of Diehl Aerospace and Diehl Aircabin working ‘hand in hand’ on the A350XWB project is on the CRCs and FCRCs. While the crew rest compartments for the long-range airliner are standard, they can be ordered with a privacy door module, offering enhanced separation of working and resting environments for the flight crew. While the crew rest compartments are Diehl Aircabin’s responsibility, the locking mechanisms are provided by Diehl Aerospace, which

is responsible for the control system for all doors and slides on the A350XWB.

FEWER AND BIGGER SUPPLIERS

Close cooperation such as practised on the A350XWB between Diehl Aerospace and Diehl Aircabin fits neatly into Airbus’s New Systems Policy. The airframer intends to concentrate its links to fewer – and at the same time bigger – suppliers, who again supply larger work packages to the OEM. This implies of course more coordination

work on the level of first-tier suppliers, which is a task that Diehl Aerosystems can fulfil by synchronising the work of its two units, Diehl Aerospace and Diehl Aircabin. The company is perfectly placed to take on its role in the network of strong suppliers. “Working together for only one year is just the glimpse of a moment. With the ongoing integration of Laupheim into Diehl Aerosystems, there are more benefits to come,” adds Axel Rodenberg, CEO of Diehl Aircabin. ☒

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
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MAGNUS POWER HAS EXPANDED ITS RANGE OF FREQUENCY CONVERTERS FOR TESTING AIRCRAFT SYSTEMS AND COMPONENTS – AND PLANS MORE DEVELOPMENTS FOR THE YEAR AHEAD

01. The LF1-400 3kW frequency converter
02. LF3-400 has a three-phase output
03. LDC-28, a compact 28VDC unit launched in 2009

 Magnus Power started out in 1985 as a manufacturer of electronic power units (EPUs) for the oil and gas industry. The company has supplied over 600 of these systems worldwide over 20 years – systems that have had to withstand some tough environments, such as oil rigs in the North Sea, or on board ships in the Indian Ocean. The company later used this expertise to create frequency converters and power supplies tailored for the avionics and aviation industry.

EXPANDING NETWORK Magnus Power's frequency converters range from a 1kW bench unit (LF1-400) up to 150kW floor standing unit (ME3 range), typically with 400Hz, 60Hz or variable frequency outputs. These have been sold in over 25 countries and Magnus Power has a growing distributor network in Europe that it is presently looking to expand to include North America and the Far East.

The company's products are used by a number of major companies in the aerospace and aviation industries for applications such as testing seating, instrumentation, galley systems, aircraft braking systems, de-icing systems and aircraft ground power.

01



Magnus Power's standard products include the LF1-400 – a compact 1kW power unit with a fixed output frequency of 400Hz and an output voltage of 115VAC with a single-phase output. LF1-400-3kW is the same as the LF1-400 except that it has 3kW of output. The final product in this range is the LF3-400, which has a single-phase input but a three-phase output with a fixed output frequency of 400Hz. The total power available is 3kW (1kW per phase).

Meanwhile the LP1 has a single-phase output but the output voltage and frequency are variable – the voltage can be adjusted from 0-270VAC, and the frequency can be adjusted between 45Hz-1kHz. The LP3, like the LP1, also has a variable voltage/frequency output, but has a three-phase output.

Magnus Power is currently upgrading the LP3 to be able to vary the voltage on each phase individually and also to enable a voltage dip to be

programmed on each phase. These modifications should be ready by the end of 2009.

NEW PRODUCTS The company's new product launches in 2009 included the LDC-28, a compact 28VDC unit (30A) that is the same physical size as the LF1-400; and the LDC-28-50, a more powerful version of the LDC-28 which nevertheless boasts the same size case.

All the LP- and LF- and LDC-products are available in bench top or 19in rack-mounting versions.

The company also offers the ME1 (single-phase output) and the ME3 (three-phase output) – floor-standing models with fixed outputs of 400Hz ranging from 3.2kW-32kW on the ME1 range and from 10kW-150kW on the ME3 range.

THE YEAR AHEAD Magnus Power is currently developing a number of new products that it will bring to market over the next 12 months. These include the LF3 6kW and LP1 3kW. In another development for 2010, the company will launch its own aircraft ground power units, which will be floor

02





MAGNUS POWER IS CURRENTLY DEVELOPING A NUMBER OF NEW PRODUCTS THAT IT WILL BRING TO MARKET OVER THE NEXT 12 MONTHS



standing/trolley mounted and will range in power from 15kW-120kW.

In addition, Magnus Power designs bespoke products for customers who need a power source to test aircraft interior equipment (such as seating, galley equipment, lighting equipment) and for some reason cannot find what they need from the company's standard equipment range.

The company also has a dedicated service department, offering service contracts to suit various customer requirements – including annual inspection visits, annual service contracts with unlimited call-outs and annual health checks. ☒



Contact: Keith Hammond
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www.magnuspower.co.uk



FREQUENCIES 45 Hz 1 kHz

Major manufacturers of frequency converters

LP Range (Variable Output)

- LP1 Single Phase 45Hz - 1kHz @ 1kW
- LP3 Three Phase 45Hz - 440Hz @ 3kW

LF Range (400Hz Fixed Output)

- LF1 Single Phase 1 or 3kW Model
- LF3 Three Phase 3kW Model

ME Range (400Hz Fixed Output)

- ME1 Single Phase from 3.2kW to 32kW
- ME3 Three Phase from 10kW to 100kW

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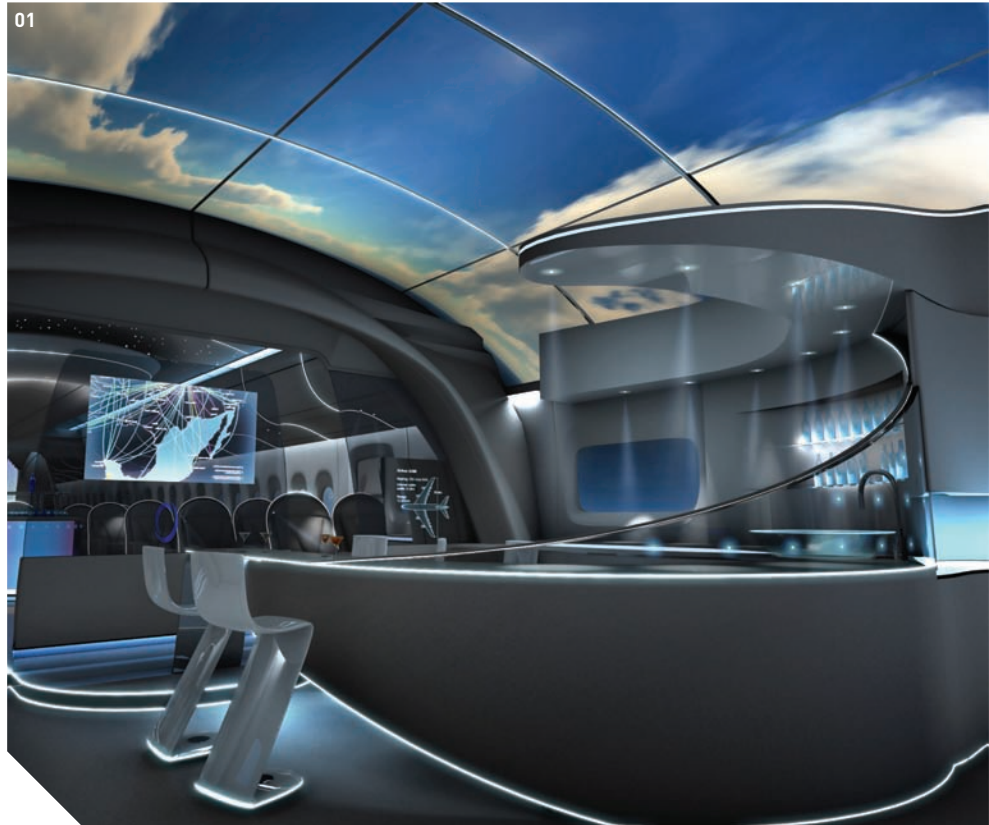
SCHOTT AVIATION SAYS AIRLINES ARE WAKING UP TO THE POSSIBILITIES OFFERED BY CABIN LIGHTING – FROM CREATING THE ILLUSION OF MORE SPACE TO ADDING A WOW FACTOR THAT SETS THEM APART

 Aircraft cabin designers and airlines are continually tackling the issue of limited space within the aircraft cabin. After the introduction of mood lighting concepts, the industry is now seeking advanced solutions to combine the overall cabin appearance with special visual effects to create the illusion of more space. Schott Aviation is a major partner when it comes to the realisation of these concepts.

“For decades, aircraft interior designers focused on a purely functional approach, where passengers’ psychological states had a rather limited influence on technical solutions,” says Dr Armin Plichta, business manager at Schott Aviation. “Even after the introduction of mood lighting and LED driven light sources, the overall cabin appearance was often neglected and not contemplated as a whole.”

- 01. The cabin considered as a whole – using various lighting products from Schott Aviation
- 02. Fibre optics are particularly useful in tight spaces

CONSISTENCY Plichta says that today, there is a better understanding of the need for consistency in colours, materials and services throughout the



entire passenger experience – from check-in to disembarkation – with more attention paid to lighting within the cabin. “Designers have a much better understanding now of how light manipulates our view of reality by influencing our emotions,” says Plichta. “Space, colour and light are related to each other and linked to the perception of the viewer.”

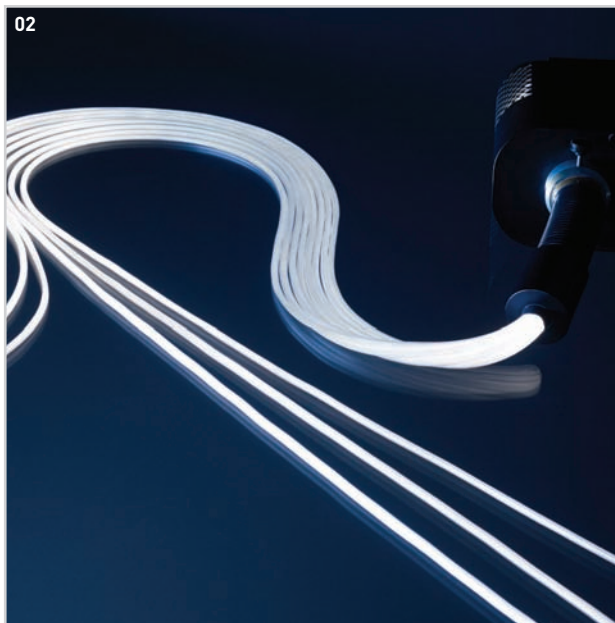
Schott Aviation balances design, technology and market-driven demands in the creation of its lighting products for the modern aircraft cabin. “Each of these elements must be balanced against each other since they all impact one another,” says Plichta.

One obvious trend is the demand for cabin flexibility. Plichta says individual passenger lights are now more likely to be placed on the seat

rather than the supply channel, with the result that electricity needs to be made available at each seat. However, this has to be balanced with what designers and manufacturers can achieve where space is limited.

DIFFERENTIATION Airlines have recognised that design and architecture are important instruments when it comes to differentiation. “Major trends in aviation interior design – such as domes, different structures or flat beds – support the illusion of space and add a luxurious touch to premium cabins,” says Gerhard Zwickel, sales manager at Schott Aviation.

By combining lighting expertise with technological know-how, Schott Aviation has developed an impressive number of solutions for interior





DESIGNERS HAVE A MUCH BETTER UNDERSTANDING NOW OF HOW LIGHT MANIPULATES OUR VIEW OF REALITY BY INFLUENCING OUR EMOTIONS



designers to really make an impact – wash lights for soft wall or ceiling illumination, super-thin LED panels for homogeneous light effects such as daylight simulation, flexible fibre optic cables for night sky applications, and contour lighting wherever straight or curved light strips are requested.

One of the most famous light design solutions is the night sky simulation created with Schott HelioStar. Here, the combination of light points with different sizes, light intensity and colours creates the impression of a natural night sky.

As space in monuments, galleys or seats is limited, linear lighting can be a

big challenge. Since no single design can fulfil all application requirements for length, width and colour rendering, a whole host of applications can be created that can drive enormous investments to meet all the necessary FAA and/or EASA certifications.

“A way out of this dead end is a hybrid lighting system that combines LED light sources with fibre optic light guides, enabling a perfect working system even when space is limited, as the light source can be placed far away

from the light output,” says Plichta. “Any kind of linear, indirect or punctual illumination can be realised this way.”

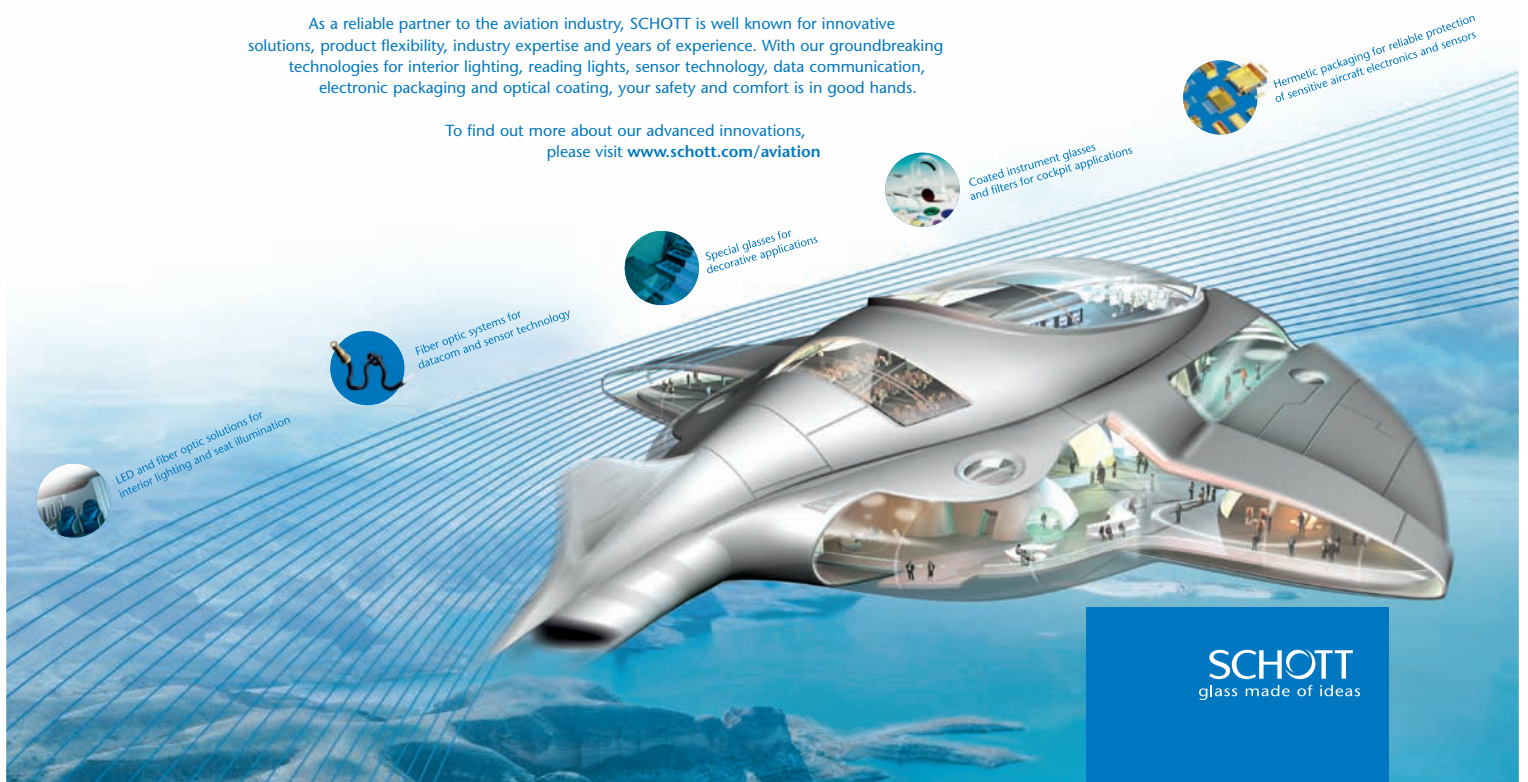
Schott’s fully qualified fibre optic product, Schott HelioLine, has a total installation depth of 7mm, so no electrical testing or wiring is required. “We are not limited in length and do not have to qualify our product every time all over again,” says Plichta. This also opens new areas of applications like emergency or ambient lighting. ☒

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AIDA DEVELOPMENT HAS CREATED A CONCEPT AIMED AT IMPROVING CHILD SAFETY THAT TRANSFORMS AN ADULT AIRCRAFT SEAT INTO AN INTEGRATED CHILD SEAT

Ensuring the safety of children carried on board aircraft represents a challenge.

Investigations carried out by entities such as the German Technical Control Board (TÜV Rheinland) suggest conventional child restraint systems (CRS), such as the loop belt or other add-on devices, may be ineffective and in some instances, may even increase the risk of inflicting permanent damage to the spine and the internal organs of the infant traveller. Add-on CRSs (ordinary baby seats like those used in cars) can be difficult to install to a standard adult aircraft seat. In some cases, these can't be oriented against flight direction, a detrimental factor in terms of safety, according to the Maximum Abbreviated Injury Scale (MAIS).

A solution may be the integrated child seat. "The idea is not really novel – a few mock-ups exist where the child seat is integrated in the backrest of the seat," says Enrique Geck, general manager of German engineering firm

01. The child seat is integrated into an adult seat, and can be adjusted to the size of the child
02. For enhanced safety, the seat faces away from the direction of travel



AIDA Development. "However, in our opinion, the existing concepts fail to accommodate an appropriate range of infant travellers in terms of size and weight, and the design also offers room for improvement in terms of excursion limits and head injury criteria (HIC)."

Within the framework of a dedicated research programme sponsored by the City of Hamburg and in cooperation with the German Zentrum für Luft- und Raumfahrt (DLR), AIDA Development took up the challenge to investigate and develop the concept of an integrated child seat that would accommodate infants of up to four years whilst fulfilling the strictest safety criteria and adding no more than 2kg net weight per seat.


"We knew this was going to be one of these challenges that requires all our experience and knowledge in seat design," explains Peter Miehle, AIDA

Development's vice president, who is responsible for seat development at the company. "Child safety, at present, is loosely regulated by the authorities, so operators tend to view any innovation in this field as a potential threat to their direct operational costs."

Three years of research by AIDA Development's aircraft seat designers led to a concept where the seating surface transforms easily (without the need for any special tools or training), at the press of a button, into the backrest of the child seat. This can be adjusted in any position between 115°-145°, allowing for maximum comfort throughout different activity phases, as well as during sleep.

SIZE ADJUSTABLE The seat can be integrated into a standard, 31in-pitch economy-class seat, and is adjustable for infants between 0-2 years (in the



TODAY'S BURDEN MAY BECOME
TOMORROW'S ADVANTAGE –
SOONER OR LATER, CHILD SAFETY
WILL NOT BE AN OPTION – IT WILL
BE A MUST 

95th percentile) or 0-4 years (in the 50th percentile). As it is placed against flight direction, the seat is installed at the rear of the aircraft to avoid interference with a seat behind, as recommended by FAA AC91-62A. An adjustable headrest and lateral support, a five-point safety belt, an extendable footrest and integrated cup holder are further key features of the design.

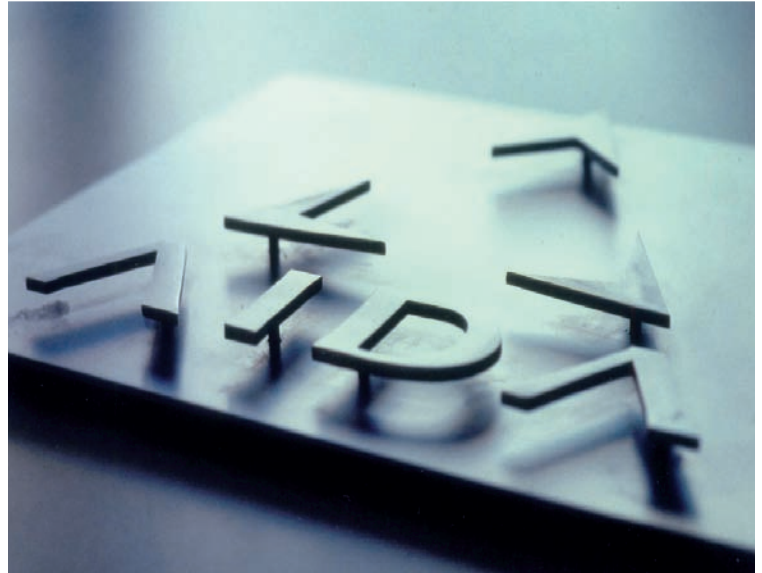
“A simple and reliable mechanism, few parts, low weight and an ergonomically sensible design that enables eye contact between the child and the accompanying adult passenger was our response to the specification,” says Miehle. “Most of our designers involved in this project have children themselves, and each of them has their own experiences. Particularly on long-haul flights, travelling with kids can turn into a real nightmare.”

AIDA Development provides design solutions for aircraft interiors, systems and structures for a range of customers, with three design centres in Germany – Hamburg, Schwäbisch Hall and Munich. “Our strategy is quite simple,” says Geck. “We react to the trends of the market much quicker than others and drive our expertise into niches most people didn't think of before.”

AIDA Development takes particular pride in its involvement in research projects, such as the integrated child seat. “Some airlines think their future is set on today's cheap buck and tend to view innovation with scepticism. We believe that, with the right strategy, today's burden may become tomorrow's advantage. Sooner or later, child safety will not be an option – it will be a must,” concludes Geck. ☒

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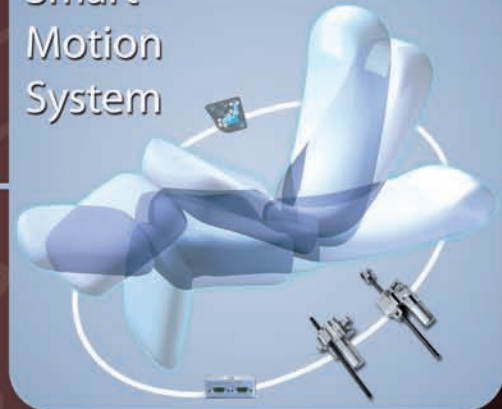
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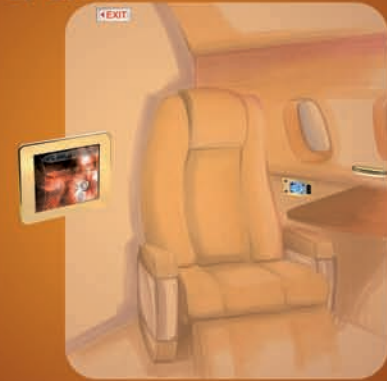
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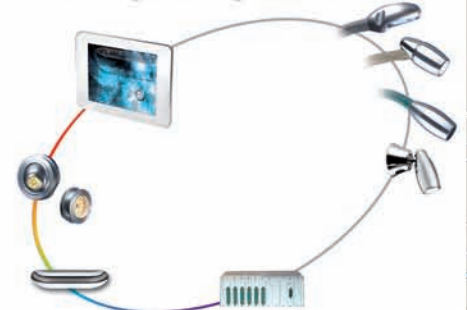
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