

Aircraft *interiors* INTERNATIONAL

JUNE 2020

In this issue

BUILDING CONFIDENCE

How passenger trust, confidence and traffic can be boosted through factors including cabin engineering, brand expertise and psychology

A WEALTH OF OPPORTUNITIES

Experts from across the cabin design, passenger experience and supplier networks predict the positive changes and opportunities that will emerge from the Covid-19 crisis

COMFORT & SAFETY

The industry's response to the pandemic has been rapid and impressive, yielding comfort and hygiene advances that will help ensure safe travel



Nurturing GROWTH

THE ESSENTIAL INSIGHTS, DESIGNS, TECHNOLOGIES AND INNOVATIONS THAT
WILL RESTORE PASSENGER CONFIDENCE AND HELP AVIATION ON ITS ROUTE TO RECOVERY

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TOGETHER AGAIN

When I mentioned concerns about the coronavirus in my foreword for the March issue, I must admit I did not foresee its effects on the world becoming quite so profound. Discussing moments of ‘surprise and delight’ in the passenger experience seems like a distant memory as the world begins to heal and aviation responds to a whole new set of bigger challenges as travel restarts.

Even without passengers, commercial aviation has proved its essential role to governments during the pandemic as it has worked tirelessly to deliver essential supplies around the world. The interiors sector has also had a major role during the crisis, responding incredibly quickly to develop solutions that enable passenger fleets to carry life-saving supplies in the cabin as well as the belly. And while some initially criticised aviation’s part in the spread of the virus, the focus seems to be switching to its critical role as an engine to get the world’s economies working.

A change of tone is also happening with flyers. The health crisis brought an abrupt change to people’s lives, prompting in many a primeval urge to bunker down for safety. However, after a long spell indoors, and as many societies slowly return to normality, discussions are changing. The term ‘new normal’ already feels hackneyed – people want their old lives back and will appreciate them all the more as their freedoms return, from meeting family and friends, to visiting pubs (a hot topic in the UK), and indeed travel.

Humans are resilient and adaptable, and having been through pain and stress and seeing our worlds shrink, from the unlimited opportunities enabled by aviation to just four walls, many of us feel ready to

broaden our horizons and start living again.

While we have been locked away, we have perhaps never felt more connected with everyone else around the world.

Families separated during this trying time are desperate to reconnect, and aviation delivers that love across continents. Companies are keen to secure new deals, and while videoconferencing has been useful, it lacks soul, as businesses also found after 9/11. Those quick chats as you wait for the elevator or have a drink after a meeting are when you really connect. Aviation enables those essential bonds and lucrative deals.

Of course, changes will need to be made to the passenger experience as we negotiate a period with the virus, and this will be the overriding focus of *Aircraft Interiors International* as we look at every aspect that can help the sector recover, and the longer-term changes that need to be made to air travel so that such a heartbreaking crisis can never happen again.

This issue focuses on the immediate needs of restarting aviation, such as hardware to help separate passengers in the cabin (see p56), hygiene measures (p76), safety recommendations (p48), cabin cargo measures (p42), and psychological factors to reassure passengers (p20). Our panel of experts has also identified opportunities that the crisis may present for the passenger experience (p32), and throughout this issue you will find messages from senior figures in aviation that deliver something very important: hope and confidence.

As the now popular saying goes, ‘we are all in this together’, and as aviation restarts it will truly bring the world together once more. ✕

Adam Gavine, editor

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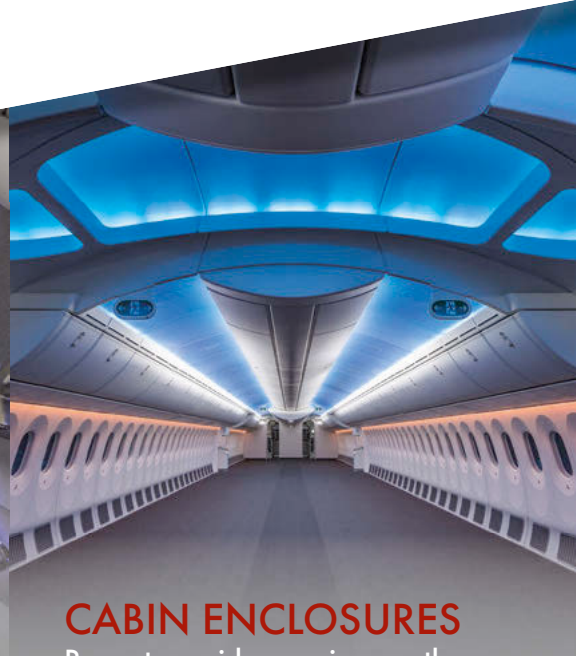
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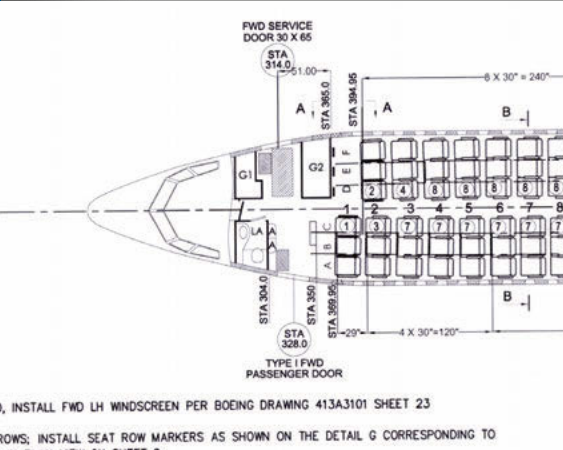
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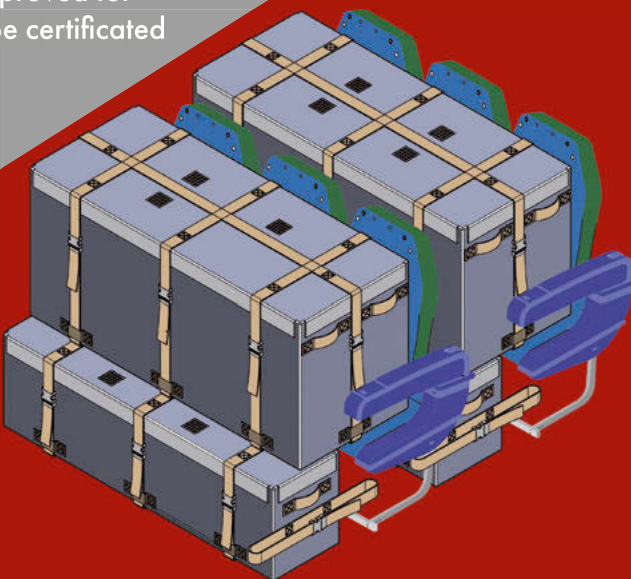
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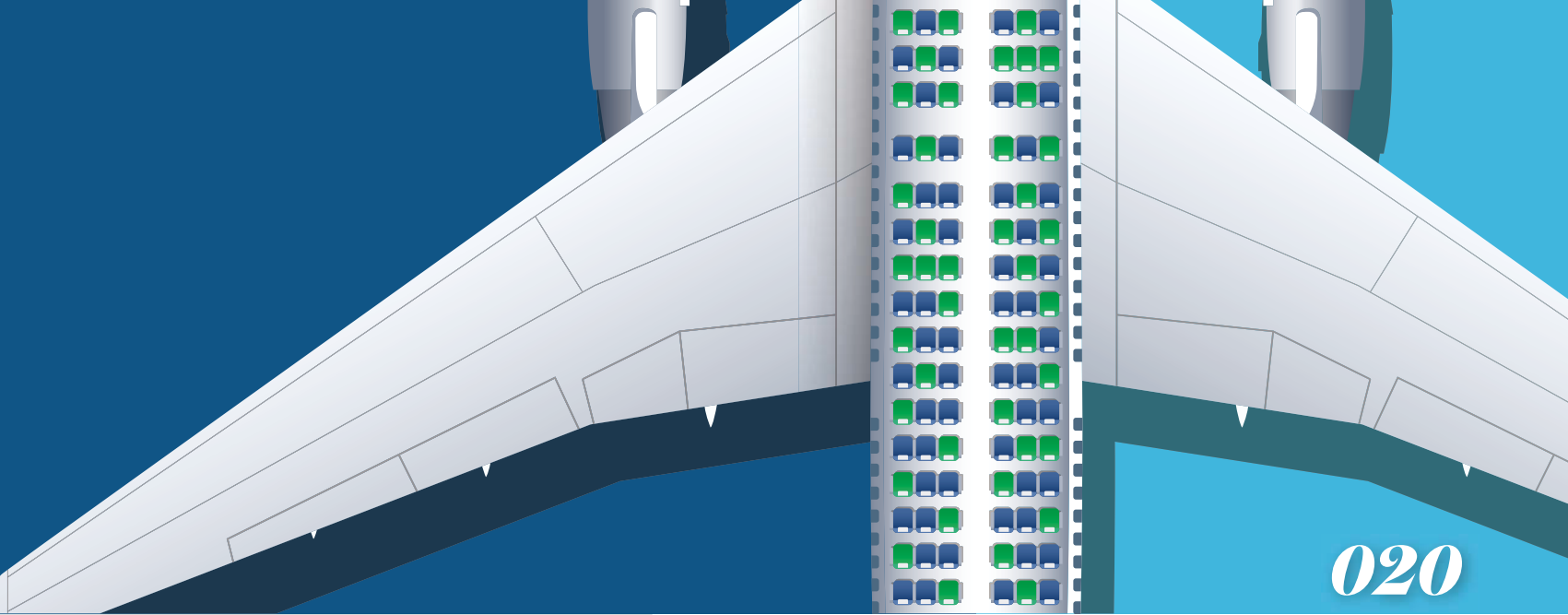


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Upfront

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BEYOND HORIZONS





"This is our simple contribution as part of the wonderful aeronautical world, which will soon return"
 Mario Schisa,
 CEO of JHAS

COMFORT ZONING

Airlines, cabin designers and suppliers are reacting quickly to assuage any health concerns passengers may have about the inflight experience. Mario Schisa, CEO of JHAS, proposes a LOPA, information campaigns, and other measures that could help boost passenger confidence

1. JHAS PROPOSES A NARROW-BODY LOPA WHICH MAINTAINS 1M OF SOCIAL DISTANCING AT A 65% LOAD FACTOR

Should antiviral shields be fitted to aircraft cabins? "Maybe", says Mario Schisa, CEO of Italian seating company, JHAS, but adds that the perceived feeling of safety would be tempered if passengers feel more claustrophobic when seated and indeed if any emergency procedures are compromised.

"The key point, in our view, is to give people a sense that their safety is the top priority of aviation," he says. "It is known that psychological factors have a great

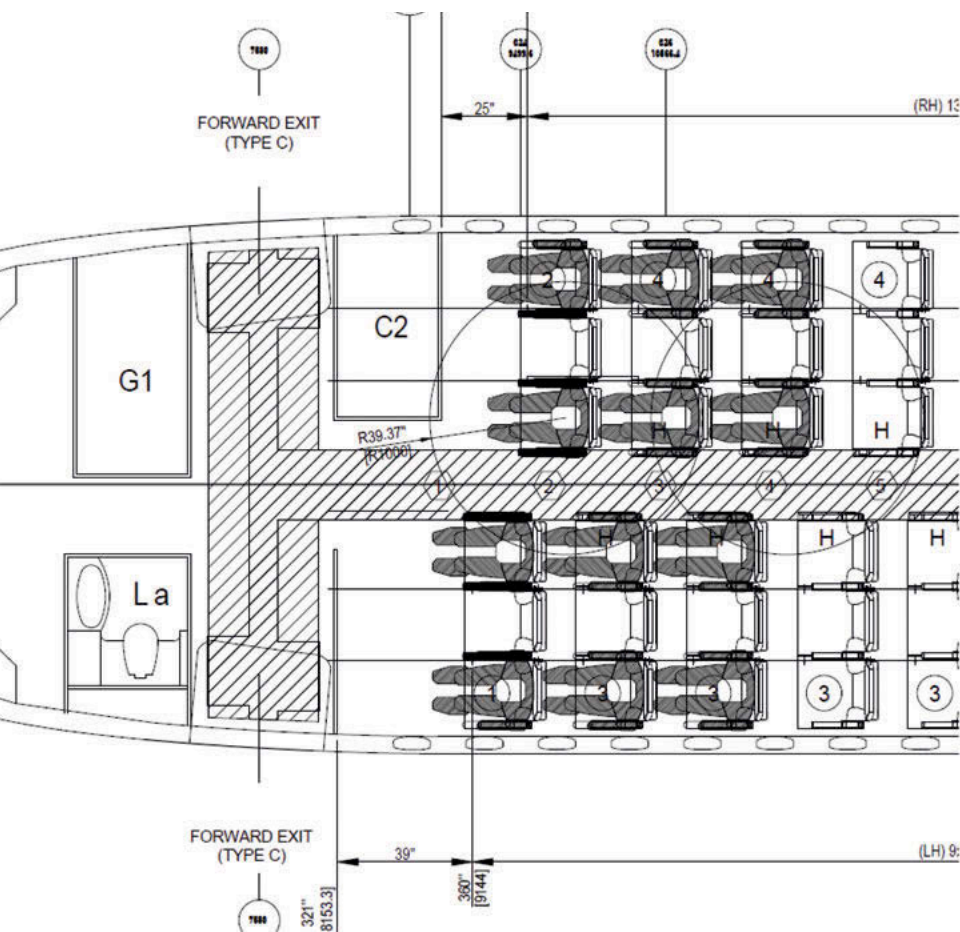
impact on passengers, and we believe that knowledge helps to overcome fears, so the first action to be taken is to inform passengers about the existing health precautions that can counter the spread of Covid-19."

He proposes giving passengers some simplified information about cabin hygiene, citing HEPA filters that remove up to 99.97% of viruses, cabin air that is completely recycled every three minutes on average, and cabin airflow systems designed to avoid horizontal flows, thus limiting the spread of airborne droplets between passengers. Other factors he thinks passengers should be informed of include the disinfection of cabin touchpoints before each flight, any social distancing measures, crew procedures if a passenger is identified with symptoms, and the use of masks and other PPE by staff at airports and on board.

There is also an ongoing debate about leaving the middle seats in economy empty in order to create a small level of social distancing between passengers. The true safety benefits are still being evaluated, but the measures could benefit the mental – and physical – comfort of passengers, raising confidence in travel. This has led Schisa to devise a seating layout that he says could be easily certified at low cost. The configuration is an asymmetric installation with an offset of 16in (41cm), which he says would make it possible to maintain a 1m distance between all passengers in the cabin, with the load factor reduced to 65%.

On top of the socially distanced LOPA, he suggests that airlines could fit those partition panels to the vacant middle seats (see p70 for examples) to enhance the feeling of personal privacy and security.

"Customers have encouraged us to pursue this idea," says Schisa. "JHAS wants to support to relaunch of the aviation sector as soon as possible through a passenger information campaign that will help passengers to overcome their fears. This is our simple contribution as part of the wonderful aeronautical world, which will soon return to flying more." ✕



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"I am convinced that Airbus and the broader aerospace sector will overcome this critical period"

Guillaume Faury,
CEO of Airbus

CABIN CONFIDENCE

Collaboration between aviation industry stakeholders is key to boosting passenger confidence as air travel prepares for recovery. Airbus's Daniel Werdung explains to Tomás Romero why the technology and engineering that make the cabin a safe environment are a key message for the flying public



Until a proven effective treatment or vaccine for Covid-19 is developed, a coordinated effort by all aviation industry stakeholders is key to maintaining passenger safety and growing passenger confidence. With this in mind, Airbus has launched an initiative named 'Keep Trust in Air Travel', and as Daniel Werdung, a spokesperson for the company notes, "We think that airports, airlines, aircraft manufacturers, suppliers and authorities need to drive this end-to-end approach together."

In terms of flight safety, security and sanitary safety, Werdung says that an airplane cabin is actually one of the safest enclosed places in the world, being a "controlled, closed environment". He says that the air filters of Airbus aircraft remove 99.95-99.97% of particles, microbes and bacteria from the cabin air.

"As a result the air in the cabin is very clean and hospital-like," says Werdung, adding that the cabin air is often cleaner upon landing than it was when the doors were closed for take-off.

Another element of in-flight hygiene that is likely to reassure anxious passengers moving forward, notes Werdung, is the direction of the cabin airflow itself.

"At the seat, air is constantly moving downwards, flowing in from above and then sucked out through the floor," he explains. "From there it is transported to highly efficient HEPA filters, then re-injected back into the cabin, with no airflow left-to-right or front-to-back, so there is no cross-contamination."

1. HEPA FILTERS, AS FITTED TO THE A220, ARE BECOMING A KEY MARKETING MESSAGE FOR BOOSTING TRAVEL CONFIDENCE

And while some passengers are expecting social distancing in the cabin for the near future, and stricter cleaning regimes for the longer term – before, during and after all flights – Werdung says that keeping the middle seat empty is "one of the measures too many", particularly in light of the limited potential for onboard transmissions due to the downward flow of air in the cabin.

IATA's findings in May that eliminating the middle seat could drive a 43-54% increase in airline ticket prices don't make this solution encouraging either.

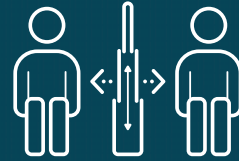
Werdung adds that Airbus is investigating the recent proposals of installing plexiglass separators between seats as a cabin hygiene solution. The engineering teams are studying the practicality of partitions in terms of weight and egress.

And while long-term cabin redesign solutions are still in flux, Werdung says that in the short-term, Airbus's 'Keep Trust in Air Travel' initiative is focusing on updating in-cabin operational procedures across the board.

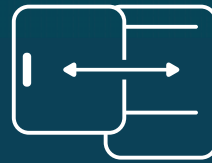
The initiative suggests procedural changes including everything from turning on the ventilation systems before passengers board – not just during TTL – to cleaning passenger's carry-on luggage before boarding, adapting/reorganising the overhead bins, and even "forcing passengers to store luggage under their seats or in the cargo hold," as Werdung explains. He adds that rethinking the way the industry looks at the aircraft environment as a whole will be key in terms of ensuring passenger and employee safety and well-being in the future.

"We're helping provide guidance to authorities [and] it is all about finding the smartest way forward," says Werdung. "This is an industry-wide issue and we are trying to play a role in connecting people in all countries. We see it as our duty, our role, to make us fly again!" ✈

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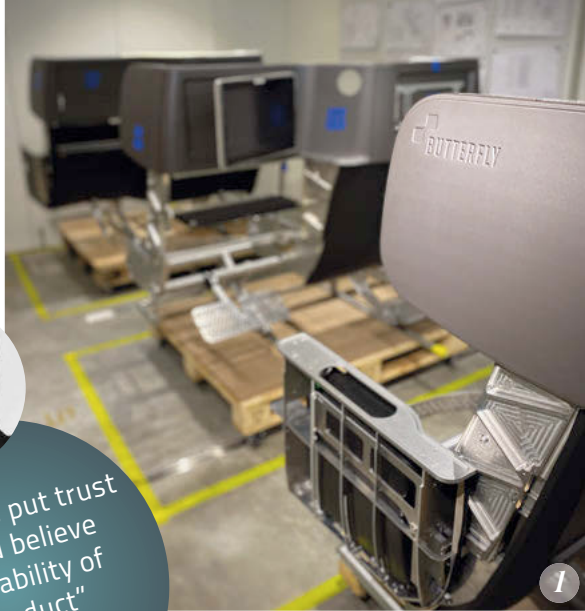
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"Companies put trust in us and believe in the viability of the product"
 Lars Rinne, co-founder of Butterfly



METAMORPHOSIS

The Butterfly seat project has advanced to tackle the challenges of moving from concept to market-viable product, discovers Marisa Garcia

1. THE BUTTERFLY PROTOTYPE IS A KEY TOOL FOR GAINING AIRLINE AND MANUFACTURER COMMITMENTS FOR THE CONCEPT

2. THE CONVERTIBLE BUTTERFLY DESIGN OFFERS INSTANTLY ADAPTABLE SEAT DENSITY FOR GAINING AIRLINE REVENUES, AND CAN ENHANCE THE FEELING OF SOCIAL DISTANCING IN THE CABIN

Like most bold concepts, the Butterfly seat, developed by Butterfly Flexible Seating Solutions, has faced a challenge in becoming market-viable. The concept has been lauded, but developing a certified design requires commitment from airlines and manufacturers, and they want a design to be certified before they feel comfortable committing to it.

The convertible Butterfly seat enables instant transformation between premium economy/regional business class and long-haul flat-bed suites. The design has won industry accolades including the Crystal Cabin Award and the IATA Passenger Innovation Award. After graduating from the Airbus BizLab accelerator programme, the Butterfly team developed a new skin model, which did the rounds at key industry shows and conferences in 2019. The design was well received, but to

prove market viability the company has been focusing on building an advanced working prototype.

The Butterfly team has found industry supporters, including Astronics, which is supplying LED lighting; Sekisui Kydex the shell; Tapis the fabric; and Thales the IFE. In all, more than 17 suppliers are supporting the project with components or engineering services.

"These companies put trust in us and believe in the viability of the product," says Lars Rinne, co-founder of Butterfly Flexible Seating Solutions.

Butterfly is a small team, working on a limited budget, but their design and engineering expertise, business strategy and determination have helped them advance. With input from industry veterans, they have enhanced the simplicity, practicality and certifiability of the seat.

Along the way, the team has also learned some hard lessons about the aircraft seat development process, as James Lee, Butterfly's inventor, explains, "The final, optimal solution can only be achieved through iterations of mockups, and discussions on small details – as well

as lots of testing. It takes a lot of time and effort to achieve design elegance."

The company has had to tackle the challenges of managing a cross-cultural and cross-timezone project while ensuring sound engineering, meeting certification requirements and managing budgets. Butterfly has worked with contract engineers in the USA and India, and is now recruiting in-house engineers to spearhead programme development as part of the team in Hong Kong.

In June, the prototype seats became ready to be shipped to airlines for testing. The prototype has three rows of seating to demonstrate two suites with different comfort levels, from a 37in base version with PED holder and simple materials, to a premium version with a 40in pitch, Thales 17in IFE, sound-absorbing quick-release panels, LED mood lighting, comfort belts and side headrests.

Getting a new concept seat to market is a challenge, but Butterfly believes the pay-off for airlines and passengers will be worth the effort. "What we are doing, with the support of our supplier partners, is solving the 'chicken or egg' conundrum so that manufacturers and airlines can commit to the seat without the risks that usually come with a groundbreaking new concept," Rinne says. ☒

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MGR Foamtex: Seat shell liner

Reell: Friction hinges

Rollon: Linear guides

Schroth: 3-point harness and comfort belt

Sekisui Kydex: Shell

Tapis: Fabric

Thales: IFE systems

TOK: Rotation dampers

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Question: Covid-19 and the commercial aviation industry: doom and gloom or hope and opportunities? Answer: Yes.

The aviation industry, like the entire world, is in a state of shock from the pandemic. It is quite possible that this pandemic will shutter some airlines for good. So yes, there is doom and gloom. However, this industry, and the people that drive it, are resilient, innovative and intelligent. Commercial aviation will recover, but it will be forever changed in the post-Covid-19 world. Just like it changed post-9-11. How, and to what extent is still evolving... and I believe it will continue to do so for the remainder of 2020 and quite possibly 2021 or beyond.

While composing this piece, airlines have already started to take some specific actions in an attempt to address the uncertainty of passengers travelling during the pandemic. Measures include issuing staff with personal protective equipment, public statements on cleaning regimes, seating assignment algorithms to help with social distancing, and more. While I appreciate these actions in the near term, I don't believe they will be successful as currently

deployed, and certainly it will be a challenge to sustain some of them for the longer term.

It will be challenging, but we need to approach the long-term solutions as holistically as possible. Consensus and cooperation across the entire aviation ecosystem (airports, aircraft OEMs, suppliers and airlines) will go a long way to help in this crisis. We will need to address physical processes that limit the transmission of viruses and germs, through the use of appropriate materials and systems, and informed design of spaces. In addition, even more so than previous events that have affected our industry, we will need to address the very real psychological impact this pandemic is having on global passengers.

Travellers already have the perception that air travel (especially on board an airplane) is inherently more 'germ-filled' than the rest of their lives. I won't argue why that is not true, but psychologically the pandemic will most likely magnify this perception. Whether this perception is true or not is

irrelevant. In our post-pandemic reality, we will need to address this issue and establish psychological trust in passengers of the safety of air travel.

Near term and especially long-term solutions that address physical and psychological challenges should be based on science and valid passenger research that delves into the deeper psychology of the flying public. This effort should be championed by the entire industry. It is in our best interests that we apply the resulting solutions and best practices ubiquitously across the global travel system. Trust cannot be established overnight. Trust is not built on words or even with initial actions. It is only built through consistently demonstrating the appropriate actions over time.

It will be challenging, but I have faith in my thousands of industry colleagues around the globe to find the path through the pandemic to blue skies and a robust commercial aviation industry. ✕

About Kent

Kent D. Craver is CEO of aviation consultancy, Craver & Associates Consulting. He was regional director for cabin experience and revenue analysis at Boeing from 2007-2019 and first gained his industry experience at Continental, as manager of on-board product marketing and research.



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Anthony Harcup

“This atmosphere of disruption presents an opportunity for carriers”

I've never seen travel anxiety levels as high as they are now. In the airline industry the pandemic has caused incalculable disruption, levelling the playing field and rebooting passenger preferences to entirely new metrics. While many airlines are in a commercial state of shock, this atmosphere of disruption also presents an opportunity for carriers to step up and lead the industry into uncharted territory.

In recent weeks I've seen the narrative change on Covid-19 travel. While we were in a period of hibernation, we are now starting to see signs of confidence emerging, with countries and consumers showing their eagerness to restart travel. Airlines have a large part to play in building travel confidence, and over the next 12 months, those airlines which earn passenger trust and reassurance will become the industry's leaders, while those that have paused product development and shied away from communication will become followers, no matter their size.

Instead of taking a conservative stand, airlines should invest in assessing changes in consumer preferences and evolving their passenger experiences. Such investment will elevate brands and build loyalty, winning business-critical market share.

As we have all awakened to a higher appreciation of altruistic values, airlines

now have to become more humanitarian by treating passengers with greater appreciation and respect. As recognised by business analysts, airlines will have to switch their focus to customer and employee wellbeing and healthcare. After all, as a species – even post Covid – we remain vulnerable to infectious diseases.

The healthcare industry is already proving to be a rich source of inspiration, both psychologically and physically. That's why Teague is working with many of the world's leading brands to help them navigate this new frontier, understanding and solving the immediate and long-term issues.

By spending time analysing and mapping out strong parallels between the healthcare and aviation industries, we have discovered that the fundamental differences between the two sectors lie in their approaches to anxiety management, sanitation and safety. While airlines promote physical safety throughout the passenger experience, healthcare companies put anxiety management and sanitation front and centre.

These transferable learnings between the industries will certainly improve passenger and crew safety in the long term, enhance the passenger experience, and even drive a new interior design language. These advances will not just reduce anxiety, but also

minimise the impact of future pandemics.

But there is a race on our hands, not just to return to service, but to respond to the pressing need to offer reassurance to travellers and create lasting emotional connections with them. Building next-generation 'clean design' cabin interiors will happen, but that will take time, and it may take years for airlines to demonstrate their commitment to passenger wellbeing.

That is why, in the short term, I expect to see airline initiatives such as heavy maintenance checks and dress cover replacements create high impact, low-cost transformations. Measures such as the rapid installation of anti-microbial cabin materials, and updating designs with paler CMF schemes and smoother, more easily cleanable details will help kickstart a new 'visibly cleaner' design standard. However, without a clear vision and long-term strategy it will not be possible for an airline brand to become the hygienic preference for the more anxious future travellers. ✕

About Anthony

Having led some of the industry's most significant aircraft interior developments for the likes of Etihad, Delta and JetBlue, Anthony Harcup joined Teague in 2019 to help build its growing roster of airline customers, further develop the team, and enrich industry relationships



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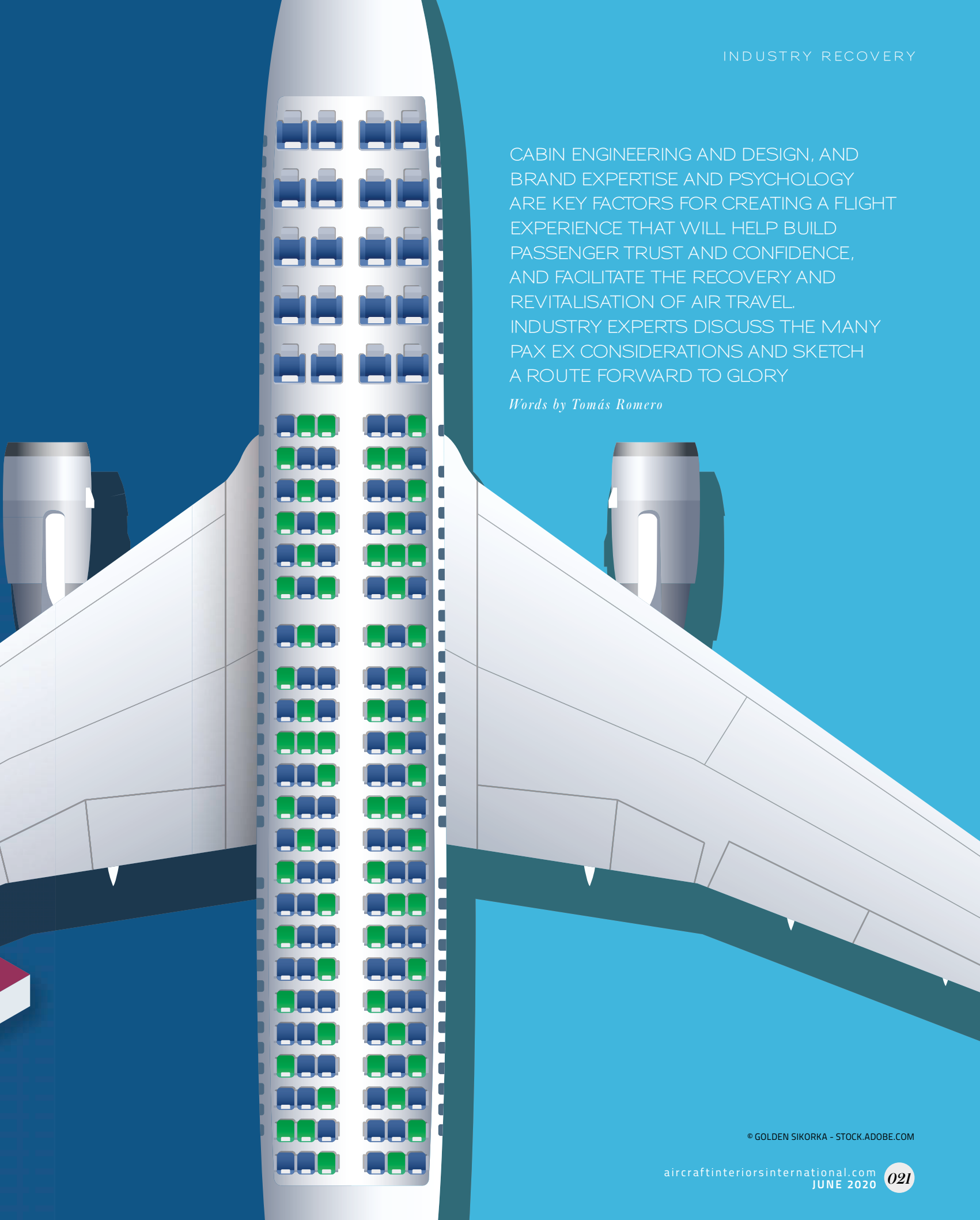
INDUSTRY RECOVERY

Flight plan



CABIN ENGINEERING AND DESIGN, AND BRAND EXPERTISE AND PSYCHOLOGY ARE KEY FACTORS FOR CREATING A FLIGHT EXPERIENCE THAT WILL HELP BUILD PASSENGER TRUST AND CONFIDENCE, AND FACILITATE THE RECOVERY AND REVITALISATION OF AIR TRAVEL. INDUSTRY EXPERTS DISCUSS THE MANY PAX EX CONSIDERATIONS AND SKETCH A ROUTE FORWARD TO GLORY

Words by Tomás Romero



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Many carriers around the globe have been quick to respond to the ever-evolving Covid-19 situation by embracing a host of innovative solutions, including electrostatic disinfection protocols, eliminating middle-seat sales, mandating face masks in flight and encouraging social distancing in airports and airplane cabins. However, assuring shell-shocked passengers that it is safe to fly again after they've been sheltering in place for months could prove to be a tough sell.

"One of the biggest areas we are focusing on is making people feel comfortable returning to the skies again," says Elliot Kutmus, acquisitions sales manager for United Airlines.

"We understand that demand will not immediately return to levels we saw throughout 2019, but rather expect it to grow over the next few months and years. Using that time frame we are working to help people feel comfortable travelling again, at their respective paces. Our primary focus right now is ensuring that our operation is safe and ready for customers who are eager to get back out there once travel starts to rebound."

United already uses state-of-the-art, hospital-grade air filters on its planes (which remove up to 99.97% of airborne particles) and thoroughly disinfects all contact points and surfaces in the cabin before each flight. Kutmus says that United is also rolling out plans to electrostatically spray every aircraft before each departure.

"The top priority of our airline is safety, and we are thoroughly reviewing all measures that involve human contact between our flight and ground crews with passengers to ensure that everyone is safe throughout their journeys," adds Kutmus.

Southwest Airlines spokesperson, Michelle Agnew, notes that Southwest is taking a similar approach.

Aside from providing regular online video updates from Southwest CEO, Gary Kelly, at the height of the lockdown, the carrier was also posting passenger-focused clips on its YouTube channel, highlighting its heightened safety and electrostatic cleaning protocols.



Plan B? PlanBay

Florian Barjot, a Toulouse-based aviation designer, is currently gauging airline and operator interest in his concept for a kit designed to physically separate passengers. Named PlanBay, the removable kit comprises plexiglass or polycarbonate sheets fitted between economy class seats and across the top of the headrests to help channel airflow from the gaspers, with the clear panels giving crew a direct view of passengers.

DELTA: SAFETY IS KEY TO CONFIDENCE

During the announcement of Delta's Q1 2020 financial results, CEO Ed Bastian, gave some interesting insights into how the airline is reacting to the Covid-19 crisis.

"When you ask people what's the most important thing to get them to start travelling again, it's going to be confidence in their safety – their personal safety, not just their physical safety," he stated, adding that the airline is applying its inflight safety expertise and analytical tools and working with the medical community "to help translate the return of business to where people feel safe."

He considers immunity passports as a way forward, possibly with a new public agency working alongside the TSA and Homeland Security.

"I do believe people will value not just the [flight] experience, but who's providing the experience, and the reliability and the service excellence of that. And that's our calling card, that's our brand, that's what Delta stands for," he stated.

"I think demand will be there when it's safe to travel. Once people feel confident that they, through both the medical progress we make through the medical community, and through government leadership when people indicate that it's safe to travel, that's when the recovery will take shape," Bastian added. "This is very unlike anything we've ever encountered. We've encountered a lot of crises in our industry. This one, where people physically do not feel safe to venture out of their homes, is unique to us, and we have got to inspire the confidence they need to start travelling again."

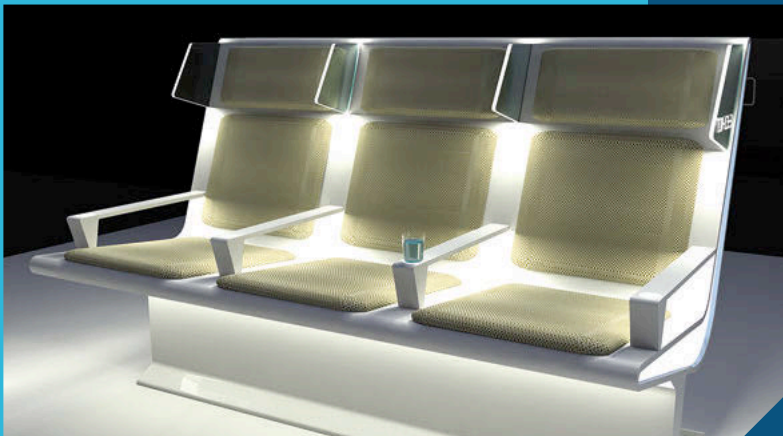


"One of the biggest areas we are focusing on is making people feel comfortable returning to the skies again"

Elliot Kutmus, acquisitions sales manager, United Airlines.

“All stakeholders – from human resources to ancillary services – need to work in perfect harmony... to communicate to passengers that a long-term plan is in place on how to handle this health crisis”

Dr Stathis Kefallonitis, Branding.Aero



“I strongly believe that we will one day look back at this crisis as a catalyst for positive change in aviation”

*Pieter Elbers
president & CEO
KLM*

Smooth operators

The cleanest cabins will have the minimum of areas that could be dirt traps, so design agency, Pierrejean Vision, has designed a bench-like premium seat concept with few gaps and recesses, and a lacquered finish that is easy to clean.

“Materials are going to be key, with every seat, surface and cover having the capability to be easily cleaned,” explains Jacques Pierrejean, founder of the studio. “We will have to think of airplanes more like hospital spaces – comfortable, yet always prioritising cleanliness and hygiene.”

“We are currently reacting to the pandemic by implementing enhanced procedures to support the well-being of our customers and employees,” says Agnew. “It’s too soon to know what the ‘new normal’ might be for us in the future; however, safety will always remain Southwest’s uncompromising priority.”

But as veteran passenger engagement specialist, Dr Stathis Kefallonitis, founder and president at Branding.Aero, points out, safety is very much a state of mind for many passengers these days. And with passenger anxiety at an all-time high, it might take more than a pre-meal service sanitised wipe to set passengers’ minds at ease right now.

Kefallonitis has a diverse background that ranges from industrial design to brand experience, to emotional marketing and consumer behavioural attitudes, and he advises clients including IATA, Airbus, APEX and IFSA.

“Passengers are human beings above all else,” says Kefallonitis. “And as such, they might not always know how best to articulate how they feel as they experience the rush of conflicting emotions that air travel in a post-pandemic world may represent.

“Under stress, many of us overthink things, worry about the unknown [and], at the same time, our ability to make decisions is affected,” explains Kefallonitis. “All stakeholders – from human resources to ancillary services – need to work in perfect harmony... to communicate to passengers that a long-term plan is in place on how to handle this health crisis.”

He adds that airlines and airports will be expected to perform a host of new tasks, including some measures that may be introduced on a short-term basis and some that are here to stay a little longer. Whatever their duration, ensuring that these new protocols are maintained properly is key to their success.

“Maintaining honest and clear communications at each passenger contact point is also important to ensure the safety and overall well-being of employees and guests,” says Kefallonitis.

One excellent way to accomplish this, suggests Kefallonitis, is through enhanced employee training initiatives.



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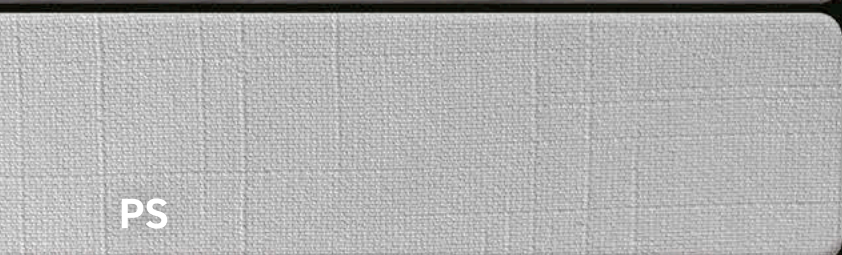
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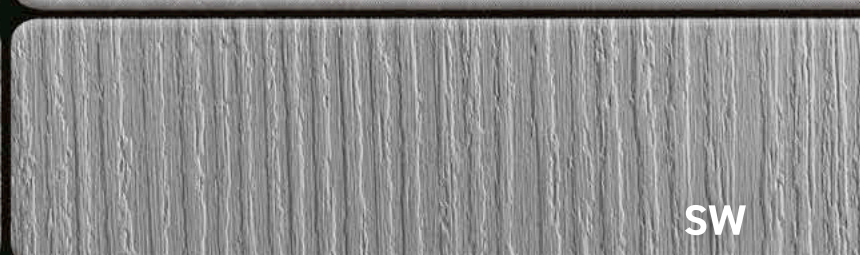
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A WAY FORWARD?

Emirates is the first airline to conduct on-site rapid Covid-19 tests for passengers as a way to help ensure a safe flight – and a warmer welcome on arrival. The quick blood tests are conducted by the Dubai Health Authority (DHA), with results available within 10 minutes.

Adel Al Redha, CEO of Emirates explained, “We are working on plans to scale-up testing capabilities in the future and extend it to other flights. This will enable us to conduct on-site tests and provide immediate confirmation for Emirates passengers travelling to countries that require Covid-19 test certificates.”

The airline’s check-in and boarding formalities have also been adapted, with protective barriers installed at each check-in desk, and gloves, masks and hand sanitisers made mandatory for all airport employees.

Passengers are also required to wear their own masks at the airport and on board the aircraft, and to follow social distancing guidelines.

On board the aircraft, magazines and other printed reading material are not available, and while food and beverages are still offered on board, packaging and presentation have been modified to reduce contact during meal service. Cabin baggage is currently not accepted on flights, with the only permitted carry-on items limited to a laptop, handbag, briefcase or baby items. In addition, all Emirates aircraft go through enhanced cleaning and disinfection processes in Dubai after each journey.

“People will slowly grow more comfortable readjusting back to normal life, being close to one another, and flying again”

Dr Stathis Kefallonitis, Branding.Aero



“Now is the time to focus on accelerating our recovery and rebuilding an industry that is stronger, more agile and fit for the future”
Dominic Walters, VP,
Inmarsat Aviation

“Happier airline employees provide a better passenger experience,” says Kefallonitis. “Airlines should ensure that there is a system in place – virtual or otherwise – that regularly educates and trains their employees to deal with current and upcoming changes, and what to do in case of sick or unruly passengers. Although some of their former training would have covered many aspects of this, re-training would make employees and the airlines they represent stand out from the pack. The more well-trained employees are, the more confidence they will project.”

The passenger experience is even more important in the aircraft cabin, where Kefallonitis suggests that an air of calm, steady-handedness in the face of a storm often translates directly into brand confidence as well. This brand confidence could prove to be a boon to cash-strapped carriers everywhere when airlines begin competing for the same, temporarily smaller pool of customers.

Kefallonitis does advise caution in modifying the in-flight experience though. “The recipe for disaster here, is to make any changes on the service and onboard features front too radically and too quickly, and risk making things worse.”

Changes will be required for on board products and services offerings, but as he says, “when it comes to flying safely in the Covid-19 era, every challenge creates an opportunity.”

For instance, Kefallonitis suggests that the likely elimination of complimentary snacks and beverages on short-haul flights could give way to sales of a host of fresh, individually packaged drink and snack options – with detailed information on when and where they were packaged, of course – and/or sponsored partnerships with classic brands that passengers know and trust, to help bolster airline’s bottom lines.

“Familiarity is key,” explains Kefallonitis, and the soaring popularity of comfort foods during the pandemic, from major brands like Frito-Lay, General Mills and Nestlé seems to reinforce that view.

And as Kefallonitis is quick to point out, seeking comfort with an airline brand that passengers know and trust is part of that equation as well. This is why providing



LEFT: EMIRATES PASSENGERS BEING TESTED FOR COVID-19 AT DUBAI INTERNATIONAL AIRPORT



First responder

The design team at Aviointeriors were among the first to release ideas that would maintain seat count while physically separating passengers. The Janus concept sees all three passengers in a triple seat separated by transparent shields to help limit breath propagation, with the centre seats facing backwards.

Aviointeriors also proposes Glassafe, a shield kit that could be installed on a range of existing seat models to help separate passengers, with fixing systems that enable easy installation and removal. See p70 for more details.



travellers with personal protective equipment (PPE) at boarding – including masks, disinfecting wipes and/or hand sanitiser – could go a long way towards creating value in the minds of passengers right now too.

“The spacing of seats and perhaps an increase in the pitch between seats is also something that may ease passenger minds when it comes to flying safely,” adds Kefallonitis.

That extra space could also be perceived as valuable, as he explains. “For instance, passengers could be given the option to buy an extra seat next to them as restrictions start to ease, which could be presented as part of a bundle of services related to seats, wi-fi, IFE, food/beverage options and other amenities. Introducing a basic fare with add-ons like these could prove to be very appealing to passengers.”

And with carriers and suppliers alike exploring everything from pre-flight rapid Covid-19 testing, to retrofit-ready hygiene screens and backwards-facing centre seat solutions like Aviointeriors’ Janus economy triple, United’s Kutmus agrees that change is definitely in the air.

“It’s rather tough to predict how airlines might change their onboard cabin configurations in the future [versus] keeping them as is with heavier preventative measures... like temperature checks, deeper cleanings, etc,” says Kutmus. “But one thing that is certain is that for the foreseeable future, all domestic airlines will begin practicing social distancing on all flights whenever possible.”

United’s gate agents are empowered to move passengers safe distances away from one another on under-booked flights, and Kutmus says the carrier is also staggering the boarding process and limiting the number of passengers in each group to ensure that contact between passengers adheres to strict social-distancing guidelines.

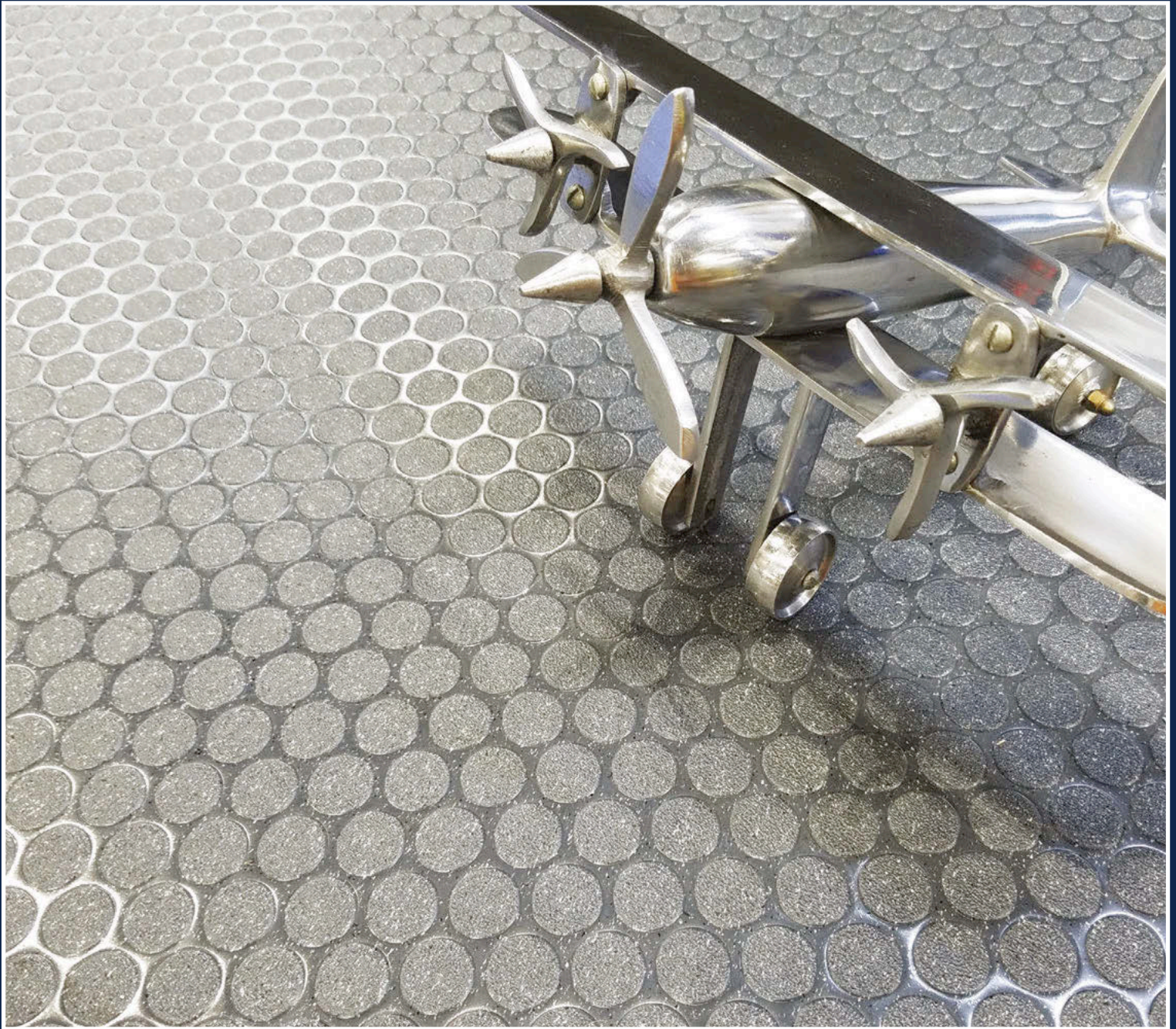
“Additionally, as we see load factors returning to higher levels, we expect to have the middle seat blocked as a way of continuing the social-distancing measures,”

“When it comes to flying safely in the Covid-19 era, every challenge creates an opportunity”

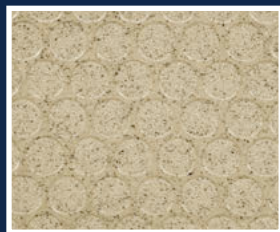
Dr Stathis Kefallonitis, Branding.Aero

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Cabin isolation

UK-based design studio, Factorydesign, has responded to the trend for passengers wishing to feel protected from each other. Its 'Isolate Screen' kit consists of a translucent thermoplastic screen mounted on a lightweight table top, which can be supported by the armrests and secured using the seat belts to swiftly transform a vacant seat into a protective screen. See p70 for more details.

adds Kutmus. "But, as with many other things, foresight into how long this will last and what will happen beyond that is still being determined as we follow new information being released by the minute about the virus, containment, and other preventative measures.

He warns that, over the long term, this will clearly not be a sustainable business practice if demand begins to recover at a gradual pace, because ticket prices will increase for consumers as airlines look for ways to generate revenue being lost from the middle seat being blocked out.

Kutmus goes on to say that major developments on the Covid-19 containment and vaccine front could also change things up considerably.

"As we emerge from this situation, data, statistics, and advice from our medical professionals will be key to helping us guide our customers and employees to return to a 'new normal', given the circumstances," says Kutmus. "The fear of not having a verified cure makes the worry of catching Covid-19 a lot scarier for people across the globe. I personally believe that once a vaccine is developed, people will slowly grow more comfortable readjusting back to normal life, being close to one another, and flying again."

Kefallonitis adds that remembering to incorporate empathy, patience and humanity into any post-pandemic PaxEx gameplan is crucial.

"The post-Covid-19 passenger experience should not only be dominated by measures of safety or generating revenue. Safeguarding passengers' emotional states is also very important," reminds Kefallonitis.

"This is a time to focus on providing loyal passengers with a meaningful and valuable experience. Oftentimes little things that mean a lot could be the way forward. Tokens of gratitude such as a handwritten note or a branded giveaway will now, more than ever, demonstrate total passenger devotion." ✕



"The airline industry has illustrated time and time again that if there's any industry in the world that knows how to deal with a crisis, it's this one"
Nick Careen,
SVP, LATA

A USA RECOVERY PLAN

The National Air Carrier Association (NACA) in the USA has issued an initial set of principles that it recommends for the resumption of regular commercial flight operations in the wake of Covid-19. Named 'SAFETY' (safety, access, flexibility, economic viability, testing, you), the plan outlines actions that NACA believes must be taken to ensure that the US airline industry can restore public confidence and be a safe catalyst for economic recovery.

The SAFETY steps are:

Safety: Every effort must be taken to ensure that passengers and crew on aircraft are protected from exposure to the virus.

Access: Access to air travel – and the resulting consumer spending at hotels, restaurants, resorts and retail establishments – will be a critical element of economic recovery.

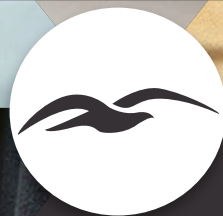
Flexibility: Airlines must have the flexibility to shift aircraft and routes to meet demand as it ebbs and flows during the recovery.

Economic viability: Restrictions on air travel cannot be so stringent that passengers can't fly easily and affordably, and airlines can't return to profitability and protect jobs.

Testing: The US government must work quickly to deploy a measured approach to Covid-19 testing in airports that uses technologies for both screening (e.g., non-contact temperature scanning and antibody testing) and credentialing (biometric or tamper-proof ID systems) for those safe to fly.

You: The most critical element in returning to the skies is you, the passenger. More than anything else, aviation cares about passenger health and helping us all return to better days.

"America's economic recovery will require enormous, coordinated efforts from governments, industries and people across the nation," said NACA president and CEO, George Novak. "We look forward to working with all stakeholders to plan for resuming regular activities and hope the SAFETY principles serve to kickstart those discussions."



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INDUSTRIAL DESIGNER,
AIM ALTITUDE



NATHAN MATTHEWS
CREATIVE LEAD,
FORPEOPLE



JAIME MORENO
FOUNDER AND
CREATIVE DIRECTOR,
MORMEDI



MARTIN
DARBYSHIRE
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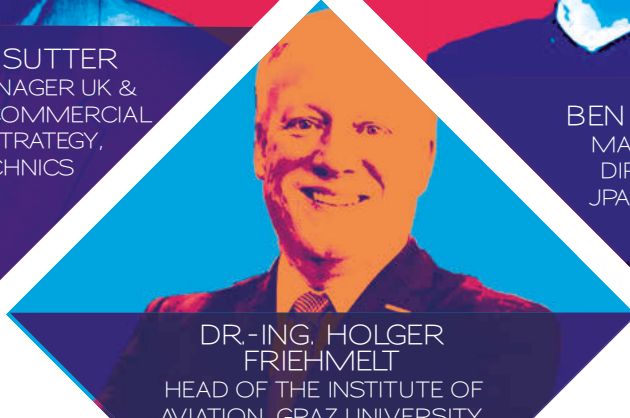
DAVID CAON,
FOUNDER, CAON
DESIGN OFFICE



CRISTIAN SUTTER
GENERAL MANAGER UK &
DIRECTOR OF COMMERCIAL
AVIATION STRATEGY,
GDC TECHNICS



BEN ORSON
MANAGING
DIRECTOR,
JPA DESIGN



DR.-ING. HOLGER
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CRISTIAN SUTTER, GENERAL MANAGER UK & DIRECTOR OF COMMERCIAL AVIATION STRATEGY, GDC TECHNICS

"Many factors could be affected by new passenger behaviours and expectations, from lower cabin density to allow for social distancing, to boarding and disembarking procedures and even lavatory design.

"For instance, as passengers start to bring their own non-aviation-grade sanitisers and wipes on board to clean any surface they interact with, considerable damage might occur to cabin and seat surfaces and trims alike. New antibacterial and antiviral materials that are resistant to a wider variety of cleaning products may be required. A new drive for introducing touchless technology will also fast track many cabin innovations that have been around for a while."

Question: how will Covid-19 change passenger expectations?

DIRECT APPEAL

HELENA TEICHRIB, INDUSTRIAL DESIGNER, AIM ALTITUDE

"I see three main drivers that might impact airline offerings: a new focus on hygiene for passengers and crew alike; a new appreciation for being able to distance ourselves from other travellers; and a broader appetite for direct flights, which will drive demand for ultra-long-haul routes."

WE MUST ADDRESS FEARS

BILL PERRONE, PRESIDENT, PERRONE AEROSPACE

"While comfort was once at the forefront of passengers' minds, safety will now outweigh that moving forward. Like 9/11, fear and speculation will linger long after commercial flights have resumed. Passengers will need assurance that all reasonable attempts have been made to protect them from possible pathogens. We will be required to provide them with the opportunity and appropriate means to take control of their environment through self-cleaning measures."

PASSENGER AWARENESS

DAVID CAON, FOUNDER, CAON DESIGN OFFICE

"Hygiene and wellness will play a much bigger role in the passenger experience. Passengers will need to feel confident that they're safe throughout their journey, and will be acutely aware of their environment. I think flyers will also be much more informed about their personal hygiene and will be focused on whether airlines are providing a safe space.

"For airlines exploring ULH options, it will help prove the case for the freedom that this kind of route capability will give them in adverse times. By limiting stops along a journey, passengers will be exposed to fewer situations. Needless to say, the drop in oil prices will also make this an attractive proposition."

NOVEL HYGIENE

DR.-ING. HOLGER FRIEHMELT, HEAD OF THE INSTITUTE OF AVIATION, GRAZ UNIVERSITY OF APPLIED SCIENCES

"A virus is not just an issue for cabin interiors, as it can potentially infect a passenger at any point of the travel experience. All stakeholders of an air travel service must now stringently and seamlessly work together to ensure the success of novel hygienic standards and procedures."

RESTORE CONFIDENCE

NATHAN MATTHEWS, CREATIVE LEAD, FORPEOPLE

"Passengers will expect to see stringent measures in place to protect them and the airline staff, and to mitigate the spread of potential future outbreaks. This will become a new metric by which airlines are rated.

"Meeting their responsibilities for passenger welfare, and the wider public health, whilst maintaining a unique and compelling brand experience will be a challenge for every airline. However, the airlines that rise to that challenge will be richly rewarded as passengers vote with their feet."

REVIEW LOPAS

JAIME MORENO, FOUNDER AND CREATIVE DIRECTOR, MORMEDI

"Reviewing the health of passengers and cabin crew before boarding will become a new standard, in order to help guarantee the health and safety of everyone onboard.

"Airlines will also have to review how they go about their customer segmentation and look into customer preferences, as I am quite sure that preferences will change after this crisis, and this will have an impact on cabin layouts and LOPAs.

"Inside the cabin, we are going to see an acceleration in the rollout of newer interfaces such as voice control (versus touchscreens), as well as CMF that will be determined not only by aesthetics, but also by antibacterial function."

USE DESIGN TO BUILD TRUST

NIGEL GOODE, CO-FOUNDER, PRIESTMANGOODE

"Airlines are going to have to build on instilling brand trust, showing leadership in safety and reliability, and developing the passenger experience to focus not just on comfort, but on health and wellbeing. This opens up opportunities to use design thinking to develop short- and long-term measures – both in cabin design as well as marketing – that will help build this trust. Crucially, this will not just come from how airlines adapt the passenger experience to this new climate, but how they look after their own crew."

continued >

A HUGE OPPORTUNITY

ANTHONY HARCUP, SENIOR DIRECTOR OF AIRLINE EXPERIENCE, TEAGUE

"Encouraging passengers to adopt a considerate, sanitary flying etiquette is the most important initiative for airlines to address in order to restore public confidence, and it's also a huge opportunity to innovate. This will redefine the airline brand experience and will demand new approaches to interiors as well as service. Helping airlines define the right strategy to navigate these new requirements and passenger needs will be our most important calling as designers."

COMMUNICATE FOR CONFIDENCE

BIRTE JÜRGENSEN, DIRECTOR OF STRATEGY & FINANCE, ZWEIGRAD

"The future interior design of the cabin must take away passengers' fear of infection and give them confidence. Touchless interaction will be an important hygiene issue and the BYOD trend will revive. In terms of confidence, communicating safety through feedback such as 'this seat has just been disinfected' or 'this passenger is tested and healthy' is extremely important."

MACRO NESTING

BEN ORSON, MANAGING DIRECTOR, JPA DESIGN

"Passengers will take their own personal protection into their own hands, much like they already do with sleeping comfort by using inflatable pillows. We will soon see a market flooded with inflatable walls, tents, and as much of a protective fort as possible that a passenger can assemble around them before take-off."

BE REALISTIC

MATT ROUND, CHIEF CREATIVE OFFICER, TANGERINE

"Pathogens contained in a single sneeze can travel up to 45m at speeds of 200mph+ and the filters in closed air-conditioning systems onboard aircraft are unlikely to filter them sufficiently to eliminate the risk of transmission. Therefore, ideas such as removing middle seats or increasing partitions around passengers will prove ineffective in combating the spread of Covid-19. Even if the economics of reduced seat count could stack up, which is unlikely, it would not be possible to create, manufacture, certify and install new seat layouts at the speed required to tackle the current pandemic. Instead the rapid introduction of PPE and increased hand sanitisation for staff and passengers, and regular sterilisation of surfaces, will likely prove more effective."

A CREATIVE OPPORTUNITY

NATHAN MATTHEWS, CREATIVE LEAD, FORPEOPLE

"Airlines should view the current challenges as an opportunity to tackle issues that passengers resent, but have come to expect. For example, a more civilised approach to boarding and disembarking an aircraft is long overdue - perhaps now is the time to solve this? "In the short to medium term, airlines can expect to see a reduction in load factors. This will coincide with passenger expectations, and possible regulation, demanding more personal space on board aircraft. Airlines should be considering how they'll utilise their aircraft interiors to best meet these needs."

CONTROL PERSONAL SPACES

DR PHILIP DE WULF, CEO, YELLOW WINDOW DESIGN

"A fear of contamination will increase our perception of personal space from 4ft to 6ft, and shift passenger priorities from comfort and entertainment, to privacy and hygiene. "Measures such as replacing fabrics with smooth, cleanable surfaces will facilitate regular and rigorous surface cleaning by passengers themselves, giving them a sense of control over their personal space in the cabin."

CMF PATTERN CONSIDERATIONS

BEN SMALLEY, AVIATION MARKET BUSINESS MANAGER, SEKISUI KYDEX

"A renewed passenger focus on cabin sanitation will demand materials that are chemical resistant, antimicrobial, and will not be stained by harsh cleaning agents. There will be emphasis on patterns that mimic texture but are flat and allow for ease of cleaning, as we have with Kydex thermoplastics with Infused Imaging technology."

PREMIUM ECONOMY ON THE RISE

MARTIN DARBYSHIRE, CEO, TANGERINE

"Screening at airports before travel may become a routine part of the customer journey from now on. Business downturn and the increased health risks of flying will reduce the demand for business class cabins and force airlines to reassign cabin space, in particular to premium economy.

"Operators will need to ensure that their onboard catering convinces passengers that there is no risk of transmission during food preparation. They may see an increase in people opting to BYOF (bring your own food) or asking specifically for sealed pre-prepared meals as complimentary services."

A CLINICAL APPROACH

JACQUES PIERREJEAN, FOUNDER, PIERREJEAN VISION

"Airlines will have to take measures to effectively and efficiently disinfect cabins (perhaps with disposable paper seat covers) in between each flight, and passengers will need to feel that they are entering a clean and safe space when boarding an aircraft, almost like a hospital environment."

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Question: will there be any new positives for airlines and the interiors industry following Covid-19?

PAUSE TO REFLECT

BILL PERRONE, PRESIDENT,
PERRONE AEROSPACE

"This 'pause' has given everyone in the industry a chance to reflect on business and manufacturing operations. We have the opportunity to reevaluate what is necessary, practical and urgent. While the shock will be severe in the short term, we can use this time to work collaboratively toward a common goal and drive new solutions and innovations that will help customers and passengers to feel safe flying again."

DEMOCRATISED FLYING

MARTIN DARBYSHIRE, CEO, TANGERINE

"I am not missing squeezing onto a tube train or fighting for an armrest in an economy seat. I don't mind paying 20-30% more for a better experience that makes me valued as a customer. When I look at the LOPA of a twin-aisle aircraft, 50-60% of the floor space is devoted to business class seats that are usually priced way beyond the budget of an SME owner, especially one that cannot book more than a few weeks ahead. I am hoping that market norms will change, and that real innovation will once again creep back in, bringing meaningful service and product propositions that democratise flying and really make the experience better."

AGILE INNOVATION

NATHAN MATTHEWS, CREATIVE
LEAD, FORPEOPLE

"Covid-19 has once again highlighted the airline industry's sensitivity to major global events. However, intelligent design can offer solutions that mitigate problems of this nature. Airlines should prioritise innovation over simple growth. If 'necessity is the mother of all invention', we could be entering an exciting time for aircraft interiors."

"We're experiencing a period of unprecedented travel restriction and social isolation. When these measures are lifted and confidence is restored, there will be some serious cases of wanderlust to treat. Despite the current disruption, airlines should remain focused on their innovation pipeline and prepare to capitalise on the resumption of normal operations."

RESILIENCE AND INNOVATION

CRISTIAN SUTTER, GENERAL
MANAGER UK & DIRECTOR
OF COMMERCIAL AVIATION
STRATEGY, GDC TECHNICS:

"Aviation has always responded to world challenges by innovating and even reinventing itself, and we are about to shift the paradigm once again into a more resilient and innovative industry."

RESTORING THE MAGIC OF FLIGHT

HELENA TEICHRIB,
INDUSTRIAL DESIGNER,
AIM ALTITUDE

"A 'new normal' will arise from our global experience of Covid-19. People will gain a newfound appreciation for travel, and this a great opportunity to bring back the 'magic of flight'. As hard as things might be now, it is an opportunity for new thinking to arise."

BUBBLING INNOVATION

JACQUES PIERREJEAN, FOUNDER,
PIERREJEAN VISION

"This new era provides an opportunity to rethink cabin design to accommodate the need for sanitation. Individual space is important, so I could imagine rethinking the seats with new, easy-to-clean materials, wider and more apart (or perhaps more like a bench), with individual bubbles to separate people from their neighbours. It gives us a chance to investigate new materials, and to integrate technology such as Bluetooth connections with smartphones to eliminate the need to use physical IFE touchscreens."

ADAPT AND SURVIVE

JAIME MORENO, FOUNDER AND
CREATIVE DIRECTOR, MORMEDI

"I think there is going to be a lot of space for innovation. Airlines that are able to adapt quickly to this new environment will survive and will get out of this crisis in a stronger competitive position."

"Isn't it likely that many passengers would pay extra for extra space and peace of mind? The way we will travel in the future will be much different than it has been up to now, and hopefully for the better in a lot of ways."

continued >

TECHNOLOGICAL ADVANCEMENTS

DAVID CAON, FOUNDER,
CAON DESIGN OFFICE

"Airlines will be focusing intently on technologies that push the boundaries in terms of creating hygienic and safe environments. This will include ideas such as gesture control of seats, and anti-bacterial materials. As much as possible, this will not be done at the cost of luxury or enjoyment and, in the long term, may create some unique technological advancements.
"Passengers will benefit as airlines and designers race to deliver new cabins that are keenly focused on their health and wellness. This has the potential to spill over into improving other adverse effects of flying, such as jet lag. Customers may be offered more support and flexibility should they be unwell before flying as airlines seek to further limit the risk of disease transmission on board."

COLLECTIVE CREATIVITY

BEN SMALLEY, AVIATION
MARKET BUSINESS
MANAGER, SEKISUI KYDEX

"While customer expectations for cleanliness will require industry-wide changes, it will drive designers and manufacturers to be more creative in developing new products and solutions, which will help airlines maintain revenue. We are looking forward to being a part of the new industry innovations that improve the passenger experience."

COMPARTMENTALISED CABIN DESIGNS

DR PHILIP DE WULF, CEO,
YELLOW WINDOW DESIGN

"During a period of lower demand for air travel, an increase of space per passenger is possible, leading to improvements in privacy and functionality by further compartmentalising the cabin, not unlike train interiors. Grouping of families could become standard, with seats that transform into modular furniture pieces with privacy panels, preferably with compartmentalised high-quality air filtering. Passengers will be willing to pay a premium for the feeling of increased personal safety and quality."

ESSENTIAL ECONOMICS

MATT ROUND, CHIEF CREATIVE OFFICER,
TANGERINE

"While the closed environments of transport systems have increased risk, they are the lifeblood of economies. This truth will give sharp focus to governments around the world when they consider how best to support airlines and the aviation industry."

PASSENGER-CENTRIC TRAVEL

DR.-ING. HOLGER FRIEHMELT,
HEAD OF THE INSTITUTE OF
AVIATION, GRAZ UNIVERSITY OF
APPLIED SCIENCES:

"Since there is the need to look at air travel holistically to combat Covid-19, I am sure that we will see a more passenger-centric and seamless travel experience in the near future."

A FRESH CANVAS FOR INNOVATION

ANTHONY HARCUP, SENIOR DIRECTOR
OF AIRLINE EXPERIENCE, TEAGUE

"The degree of change that passengers will expect of airlines with regard to their health and wellbeing will, in many cases, redefine brand values. This change of mindset will put sanitation on a par with comfort and safety, and represents a fresh canvas for the design community, with new materials, new constraints and new technologies. It will drive a whole new generation of interiors that will be better in every way."

KEEP SUSTAINABLE

NIGEL GOODE, CO-FOUNDER,
PRIESTMANGOODE

"We're going to see much faster innovation and implementation of new materials for aviation. While health and hygiene is understandably dominating the agenda, I think it's imperative that we also maintain the momentum we had built around designing more sustainable materials, onboard products and services."

A BIG OPPORTUNITY FOR CHANGE

BIRTE JÜRGENSEN, DIRECTOR OF
STRATEGY & FINANCE, ZWEIGRAD

"Aviation has to adapt its services to new requirements, and this is a huge opportunity for innovation. With our current experience of working more from home, there will be greater acceptance of digital technologies, so innovative solutions will be implemented more quickly. The environmental benefit of the shutdown is tangible. New, climate-friendly solutions are expected, which in turn could generate new industries." ✕

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Cabin Cargo

THE REDUCTION IN SCHEDULED FLIGHTS DURING THE COVID-19 SITUATION HAS LED TO A DECREASE IN AIRCRAFT BELLY FREIGHT CAPACITY AROUND THE WORLD. MODIFYING CABINS TO ENABLE CARGO IS ENABLING AIRLINES TO MAXIMISE CAPACITY IN CARGO-ONLY FLIGHTS, CREATING MUCH-NEEDED REVENUE OPPORTUNITIES AND HELPING ENABLE THE SUPPLY CHAIN OF ESSENTIAL GOODS TO CONTINUE. THE RESPONSE HAS BEEN AS RAPID AS IT HAS BEEN IMPRESSIVE...

“By offering cargo connections between different continents, we can do our part to help the world recover from the impacts of the pandemic. Thanks to the demand for cargo we have been able to keep more of our planes in the sky, and people employed both in the air and in our terminal operations”
Mikko Tainio, managing director of Finnair Cargo



KEEP THE SEATS IN PLACE

Europe-based aircraft seat cover manufacturer, Autostop Aviation, is working with its Part J partner to offer airlines specially made cargo bags and seat protectors to aid the safe transport of supplies in the cabin.

Autostop manufactures the components, manages the modification certification, and can also supply a zero LOPA option. If airlines already have a cargo solution in place, the seat protectors can be supplied to supplement it.



“We are all in this together and we have to help airlines to adapt during these challenging times”
*Andrius Norkevičius,
 CEO of Colibri Aero*

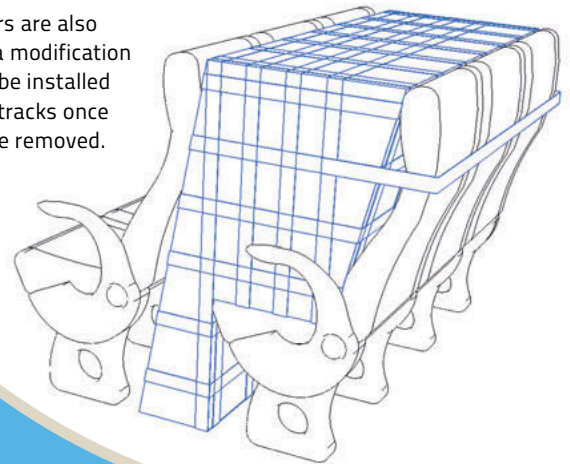
Cargo seat bags

A cooperation has been formed between Trip & Co and SII Netherlands, which sees the companies join forces in order to support airlines with cabin cargo. Trip & Co has designed passenger seat bags for cargo, which are watertight, resistant to chemicals and UV, and which can be used to transfer products in all kinds of temperatures. SII Netherlands’ design organisation is lending its experience in cabin reconfigurations, mod-kit deliveries and STC applications to ensure the kits are ready to enter service.

According to Tijmen Koster, CEO at Trip & Co, “With the combination of these two strong players, customers can choose from a broader spectrum of pax-to-cargo products, which are instantly ready for use and meet all the requirements set by their local authorities.”

The bags are delivered with an EASA Form 1 and approval for installation, including manual supplements and loading instructions.

The partners are also working on a modification kit that can be installed on the seat tracks once the seats are removed.



AN A380 CARGO CARRIER

Amid the outbreak, Lufthansa Technik rapidly established technical and engineering services for temporary operational changes, switching aircraft from passenger to cargo. The company reports “great interest”, having received enquiries from more than 40 airlines, with more than 15 projects for different aircraft types already in the implementation phase. A particularly interesting development is an award from an undisclosed customer to support the operational change of an A380.

Henning Jochmann, senior director of aircraft modification base maintenance at Lufthansa Technik, explains that it is essential to identify the engineering challenges, such as structural load capacity and special fire protection measures, and to prepare the technical documentation for the solutions in a way that will convince the aviation authorities.

“The current exemption, and our solution for it, can be transferred to our Supplemental Type Certificate (STC) at a later point of time without major adjustments” states Jochmann. “This means that anyone who opts for Lufthansa Technik’s solution now can easily switch to the permanent STC solution later.”

Lufthansa Technik is currently working flat out to obtain STCs for all common aircraft types so that airlines all over the world can quickly convert their passenger aircraft into auxiliary freighters.



“Our teams have been working tirelessly since March to identify the safest and most effective processes to increase our cargo capacity as quickly as possible”

Torque Zubeck, managing director of Alaska Air Cargo



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TAIL-SIGN SPECIFIC EOS

Lufthansa Technik now offers a tail-sign specific Engineering Order (EOS) with defined Special Conditions for commercial operators to transport cargo in passenger compartments. This work will be done in accordance with the operator's Operations Manual, actual LOPA and installed passenger seats, and any relevant regulatory authorities.

This service is available for all major commercial aircraft types within three to five days of receiving the order, at a cost of €14,500 per aircraft type. For example, Lufthansa Technik obtained EOS approvals from the German Federal Aviation Authority for four Lufthansa A330-300 passenger aircraft to transport medical goods. Within 36 hours, the aircraft were modified for cargo transport.

A321P2F gains EASA

For operators seeking a longer-term conversion of aircraft, ST Engineering has entered a joint venture with Airbus and EFW, which has received an STC from EASA for A321 passenger-to-freighter (P2F) conversions. The prototype unit, due to be delivered to launch customer Vallair, made its maiden flight test on 22 January.

The A321P2F is a useful option to the Boeing 757 converted freighter and is the first aircraft in its size category to offer containerised loading in both the main deck (up to 14 full container positions) and lower deck (up to 10 container positions). The aircraft has a payload-range capability of up to 27.9 metric tons over 2,300 nautical miles.



"The demand for cargo transportation, especially for medical protective equipment, is enormous. We are making room for more cargo on our long-haul jets. This will bridge the time until our passenger business starts up again. As soon as the demand for travel picks up again, we can convert the aircraft back into passenger planes at any time"

*Jens Ritter, COO,
Austrian Airlines*

COMBINE PASSENGERS AND CARGO

HAECO Cabin Solutions has launched a range of certifiable devices for stowing packages in the main cabin. An interesting aspect of the offer is that it sees cargo occupy the cabin alongside passengers, to maximise cabin yield. Cargo can even be used to help passengers with social distancing, and to help maintain weight and balance.

The company progressed four variants from concept to offerable in less than a month (partly due to them being based on existing seating and interiors technologies), each of which will be certified through an STC. The palletised variant can hold 454kg (1,000 lbs), the all-in-one seat frame 227kg (500 lbs), and the seat and floor systems can each hold up to 109kg (240 lbs). These options give airlines specific load authorisations and enable them to carry larger items in the cabin that can be held in the belly. The variants can also be combined to achieve the ideal operational payload, for both narrow- and widebody aircraft.

The kits can be delivered within four to six weeks, and installation is quick as it uses the same process used for fitting economy seating.

Doug Rasmussen, president of HAECO Cabin Solutions, reports strong interest in the kits from both airlines and leasing companies.

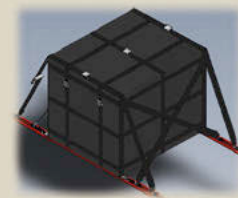


Storage bags

Innovint has developed a solution to remove seats and install cargo bags secured by belts, converting the main-deck passenger cabin into a cargo compartment. The bags are durable and include a fire barrier, with a payload example for the A350 being 260kg (573 lbs) for lateral mounting, and 500kg (1,102 lbs) for the centre. The bags would increase the cargo capacity of an A350-900 with all seats removed by 35% (an additional 38m² of volume and a payload of 20,000kg (44,092 lbs)).

The approval process for the installation is based on EU regulation 2018/1139 article 71 (provisions for flexibility in case of unforeseeable and extraordinary circumstances), which allows a faster certification approach with the national aviation authorities, as an STC via EASA processes would take too much time.

However, all relevant qualification and certification issues will follow the rules and methods as if an STC is in place. Innovint's EASA 21J Design Organization partner (DO Paustian Airtex) will guide and establish the data necessary to reach an equivalent level of safety.

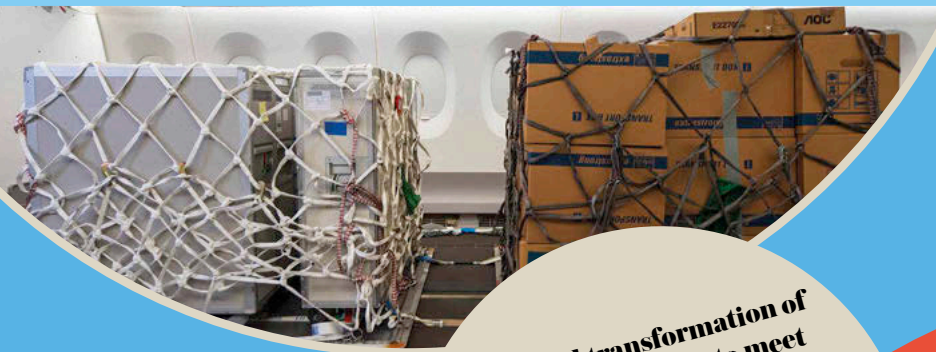


Palletise the cabin

Airbus is developing a modification for the A330 and A350 aircraft families, which will enable airlines to remove economy-class seats and install freight pallets directly onto the cabin floor seat tracks.

Compared with loading cargo onto seats, this solution facilitates easier and quicker loading and unloading operations, as well as reduced wear and tear to seats. Other benefits include robust fire protection, and 9g load restraint capability.

The modification is packaged for operators as an Airbus Service Bulletin (SB), whereby Airbus defines the engineering workscope and manages the process for obtaining the one-time certification from EASA. The scope of the modification includes the removal of the seats and IFE, installation of cargo pallets and associated safety equipment – and also the re-installation of the original passenger cabin elements for reverting back to passenger operations.



“The rapid transformation of some of our aircraft to meet cargo demand reflects our ability to maximise our fleet assets quickly when these aircraft would otherwise be parked”

Richard Steer, SVP of operations, Air Canada, on the cabin conversion of its B777-300ERs

BOEING EXPANDS FREIGHTER CAPACITY

In February 2020, Boeing’s Commercial Market Outlook stated that 2,820 freighters will enter the global fleet to meet market demand, including 1,220 standard-body passenger-to-freighter conversions. Responding to this market demand, Boeing plans to add a B737-800BCF production line at Guangzhou Aircraft Maintenance Engineering Company (GAMECO) this summer.

IATA recommendations

IATA has set out recommendations for the safe introduction of cabin cargo capacity. “Any reconfiguration of an aircraft in this manner requires full evaluation of cargo restraints connected directly to the seat tracks, to ensure structural loads are within design limits and the appropriate restraint system is applied,” state the guidelines. Reconfiguration of the aircraft also requires a formal authorisation from the national aviation authority of the operator.

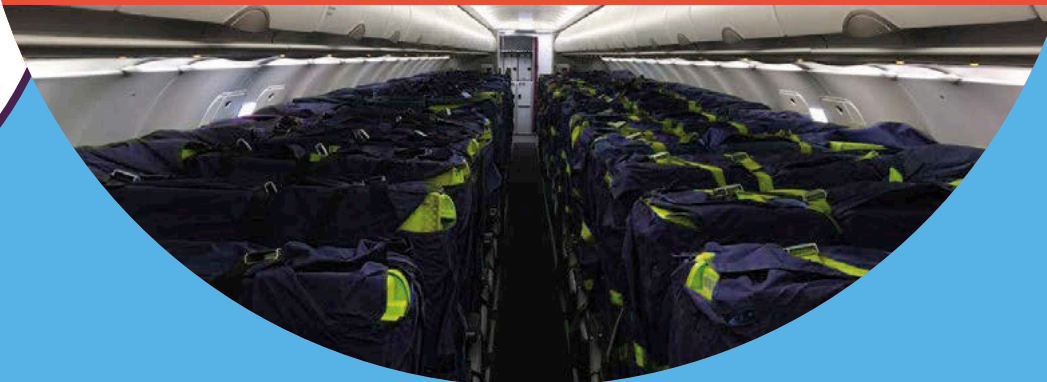
The FAA and EASA state that as passenger cabins do not feature smoke detection systems (other than in the lavatories), aircraft carrying cargo in the passenger cabin should also carry one or more company employees, sitting apart from the cargo, but with a clear view of it so they are alert to detect smoke or fire and deal with any issues using firefighting equipment, to which they should have unimpeded access.

A320 FAMILY CARGO BAGS

Interiors parts supplier, Colibri Aero, has collaborated with design and production organisation, J&C Aero, to develop universal Cargo Seat Bags for Airbus A319/A320/A321 passenger cabins. The newly developed interior modification kit has already been approved by EASA and has received an STC.

The Cargo Seat Bag kit measures 76x76x147cm (30x30x58in) for a triple seat, with up to 75kg (165 lbs) of cargo stored on the seat and an additional 9kg (20 lbs) under the seat, for a total of 252kg (555 lbs) per triple seat. According to Colibri Aero, the kit can be easily installed within minutes and can accommodate a wide range of cargo types, from postal correspondence, household goods, electronics and other commercial cargo, to medical equipment and humanitarian supplies.

“We started the development of the modification back in 2019, with numerous testing and continuous consultations with aviation authorities and airlines along the way. In February 2020, amidst the growing concerns over Covid-19, we decided to put additional resources into the project in order to have a certified modification as soon as possible,” states Laurynas Skukauskas, CCO at J&C Aero



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The same safety concerns apply to all, whether small, large, old or young”

IATA HAS A GREAT INFLUENCE ON PASSENGERS' WELLBEING IN THE SKIES, WITH A BROAD SCOPE INCLUDING GUIDANCE ON PASSENGERS' PHYSICAL AND MENTAL HEALTH DURING COVID-19, EVACUATION STANDARDS, AND PROMOTING TECHNOLOGICAL PROGRESS. JONATHAN JASPER, IATA'S MANAGER OF CABIN SAFETY, EXPLAINS HIS CURRENT CONCERNS AND RECOMMENDATIONS

Words by Adam Gavine

The main role of IATA's Cabin Operations Safety Technical Group (COSTG) is to keep the association informed about current operational safety issues so that it can focus its resources to the areas where they are most needed. COSTG comprises a team of senior cabin safety specialists from around 20 airlines, all of whom are dedicated to enhancing cabin safety globally across its 290 members, and these specialists are the bridge between IATA's head office and the operational environment of aviation.

To get a clearer picture of the activities and concerns of COSTG, we spoke to Jonathan Jasper, IATA's manager of cabin safety. Jasper stresses that IATA is a trade association, not a regulator, and that the COSTG team helps to ensure that IATA's global audit standards relating to cabin safety are realistic and appropriate, as well as compliant with the various global regulations.

“Standards are incredibly useful as a voice of reason”

“They are incredibly useful as a voice of reason and a source of advice and guidance for airlines,” says Jasper of the standards created.

As an example of the COSTG’s safety achievements, when the issue of lithium battery/laptop fires first arose, it was this group which worked rapidly to identify best practices in firefighting and prevention procedures, and these procedures are now a global standard.

The group also worked to encourage the acceptance of child restraint systems so that customers could use their car seats onboard, and helped influence updates to the regulations regarding the use of PEDs on board aircraft.

To formalise this continuous work, each year, the group updates the IATA Cabin Operations Safety Best



JASPER PARTICIPATES IN THE GLOBAL IATA CABIN OPERATIONS SAFETY CONFERENCE EACH YEAR

1 January 2020 saw the entry into force of Montreal Protocol 2014 (MP14), which enhances the capacity of 22 states to curb the escalation in the severity and frequency of unruly behaviour on board aircraft, whether physical assault, harassment, smoking or failing to follow crew instructions – with passenger anxieties about social distancing in the cabin being a potential new concern.

MP14, properly named the ‘Protocol to Amend the Convention on Offences and Certain Other Acts Committed on Board Aircraft’, is a global treaty that closes a legal gap under the Tokyo Convention 1963, whereby jurisdiction over offences committed on board international flights rests with the state where the aircraft is registered. This jurisdiction causes issues when

unruly passengers are delivered to the authorities upon landing in foreign territories.

“Everybody is entitled to enjoy a journey free from abusive or other unacceptable behaviour. But the deterrent to unruly behaviour is weak. About 60% of offenses go unpunished because of jurisdictional issues” states Alexandre de Juniac, IATA’s CEO. “MP14 strengthens the deterrent by enabling prosecution in the state where the aircraft lands. The treaty is in force. But the job is not done. We encourage more states to ratify MP14”.

IATA recommends that states also review the enforcement mechanisms available to them in line with ICAO guidance on using civil fines and penalties to supplement criminal prosecutions.

MP14 tackles unruly passengers

ACCESSIBILITY PROGRESS

In November 2019 IATA concluded its inaugural Global Accessibility Symposium, which brought together guests from airlines, regulators and accessibility advocacy groups with the aim of creating ideas that will improve the air travel experience for passengers with disabilities.

Five key issues were raised during the symposium. It was noted that consistency is required in global policy for work on accessibility and inclusion in aviation, including airline/ground processes and government regulation, as well as a better understanding of the requirements of travellers with hidden disabilities. A need for improved and standardised processes was also identified, to streamline handling of mobility aids as the damage rate is too high, and the importance of training was also recognised, especially for passenger-facing roles, to ensure inclusive, empathetic and human-centric service is delivered to travellers with disabilities. Finally, it was noted that inconsistencies in security policies across airports and states for passengers with disabilities need to be addressed.

The findings and results of this event are being used to build upon the existing IATA accessibility strategy that will lead to clear deliverables.

“It is a step in the right direction, but the work isn’t done. We will continue to facilitate the discussion and refine industry strategy. However, we need governments to help by developing harmonised regulations, in consultation with industry and accessibility groups, that provide clarity and consistency. Working together will help ensure a safe, reliable and dignified experience,” said Linda Ristagno, external affairs manager at IATA.



IATA'S INNOVATION PLATFORM

IATA has created Accelerate@IATA, an innovation platform designed to support airlines and their value chain partners by speeding up new technology implementation around IATA standards. The programme brings together airlines, value chain partners, and startups to pinpoint problems, find solutions and ultimately demonstrate value through pilot programmes and implementations. IATA has selected Plug and Play, a network of more than 15,000 startups, to help operate the programme and identify and connect with its members.

“All businesses are racing to introduce new technology that makes them more competitive. But aviation combines global interconnected processes, and multiple complementary players in the value chain and legacy infrastructure – and that can make the pace of digital

transformation more challenging,” says Aleks Popovich, IATA’s SVP of financial and distribution services.

The plan is to accelerate around 20 startups per year in two batches of 90-day programmes, matching their solutions with industry requirements. The initial batches will focus on digital retailing, but the intent is to expand to other industry issues. The accelerator supports startups through education, mentorship and, potentially, with financing from participating partners. IATA and programme members will set the technology and business focus for each acceleration batch. Each batch will be divided into four phases: startup sourcing and selection, followed by a three-month acceleration programme, presentations on a demonstration day, and a pilot phase with airline partners.

Practices Guide, which includes guidance and recommendations for all aspects of cabin safety and helps airlines comply with global standards.

One concern being evaluated by the FAA is whether 90-second evacuation times are being met in dense cabin configurations, especially with some slimline seats enabling a 27in pitch. Added to this concern is the potential for protective screens being fitted between seats as a Covid-19 measure.

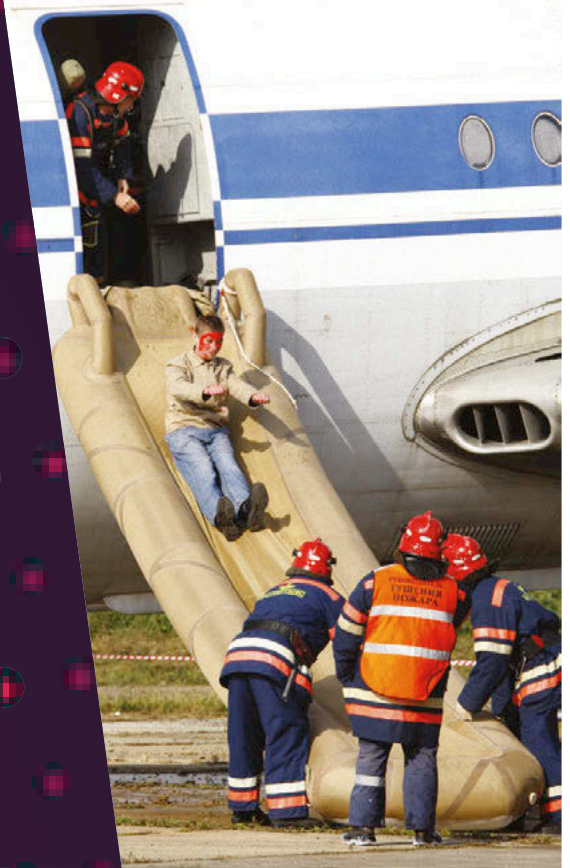
“During the aircraft certification evacuation demonstration, the aircraft manufacturer will want to demonstrate the full potential seating capacity. In reality, the actual seating capacity in service is less than the maximum which was demonstrated, so tighter seat pitches and widths should not cause concern for evacuation,” states Jasper. “Seat design is becoming very innovative and there are design features which

IATA MONITORS CABIN EVACUATION PROCEDURES, AND DOES NOT SEE ANY ISSUES AT PRESENT. IMAGE CREDITS: ANTON DENISOV (TOP) AND SUPERJET INTERNATIONAL (BELOW)

can improve comfort, while allowing seats to become smaller and lighter.

“Seat pitch and width only become an issue when the length of the flight is longer than the passenger can remain comfortable for. This in turn increases the possibility of disgruntled passengers, who then might become unruly. This is something an airline considers within its risk assessment process when selecting a seat for installation.”

Jasper sets out IATA’s recommendations for a safe cabin layout, which include an “unobstructed and



“Tighter seat pitches and widths should not cause concern”

uncomplicated” evacuation route from seat to exit, and ease of transfer between wheelchair and seat for passengers with disabilities. Another safety factor is that passengers are generally growing, which can influence evacuation times.

Jasper advocates applying the same considerations to all passengers when considering cabin safety, namely whether they can evacuate the cabin by themselves; whether they can assist the crew during an evacuation by opening doors, etc; what help they might need from the cabin crew, and whether crew have the time and resources to assist them; how passengers can be made comfortable so they don't become disgruntled or unruly; whether they are carrying anything which could be dangerous; and whether they are able to lift and stow their carry-on baggage.

“Every passenger is an individual and each brings with them their own experience, abilities, strengths and weaknesses. The same safety concerns apply to all, whether small, large, old or young,” he says.

Continuing the theme of the human aspects of cabin safety, we asked Jasper about his views on the issue of disruptive passengers.

“Unruly passenger behaviour represents a very small minority of the total number of passengers carried, but is a complex problem, with many contributing factors,” states Jasper. “IATA produces a lot of guidance for airlines in managing alcohol consumption, identifying and classifying inappropriate and unruly behaviour, de-escalating situations, handling and reporting to authorities. There are many different teams within IATA working together on this topic as it crosses into safety, security and legal.

“It's important for cabin crew to recognise signs early and take action to prevent or de-escalate any situation before it gets out of hand.”

Top priorities for passengers

IATA's Global Passenger Survey is designed to provide objective and in-depth insights into the preferences and behaviours of air travellers, helping to guide industry initiatives. The 2019 survey elicited 10,877 responses from passengers across 166 countries, who indicated that they are looking to technology to improve their travel experience, with top priorities identified including having more personal control over their journey via smartphones, being able to use biometric identification to speed-up travel processes, being able to track their baggage, having maximum wait times of 10 minutes for baggage collection and immigration/customs, and access to cabin wi-fi.

Regarding wi-fi, 53% of surveyed passengers feel that onboard wi-fi is important, which can be broken into geographical preferences: Africa (71%), Latin America (68%), the Middle East (67%), Europe (44%) and North America (49%).

The boarding experience was highlighted as a 'pain point', with the top three suggestions from passengers being more efficient queuing at the boarding gate (60%), not needing to catch a bus to the aircraft (51%), and more bin space for cabin luggage (46%).



ULTRA LONG-HAUL CONCERNS

Point-to-point flights are likely to grow in demand as passengers seek to minimise the transit process. Qantas' Project Sunrise, which was looking at operating 20-hour routes is on hold, but do longer flights present new concerns?

“These longer flights are typically operated on newer aircraft, with improved cabin altitude systems which are aimed at making the cabin a more comfortable environment. Ultra-long flights introduce new

challenges relating to cabin crew fatigue and wellbeing, and a knock-on operational effect of increased numbers of cabin crew being needed to cover inflight rest periods,” says Jasper.

“These issues and concerns have been discussed for many years already, and the differences between the 16-hour flights of today and the 20-hour flights of tomorrow are not substantial from an operational or cabin safety viewpoint.”

Covid-19 has created new stresses and concerns for passengers, which crew need to be trained and prepared to address.

A few potential issues have been identified, namely passengers refusing to continue wearing a face covering inflight; an increase in disputes between passengers according to their ethnicity or country of residence; and increased stresses created by new airport health-screening processes and the overall travel experience that may trigger stronger responses to disputes or requests for compliance, as well as stress related to concerns about missing flight connections. IATA also thinks that the fear of infection in the cabin may cause more disputes between passengers if they perceive any non-compliance with guidelines or poor hygiene etiquette, or the presence of symptoms similar to those associated with Covid-19.

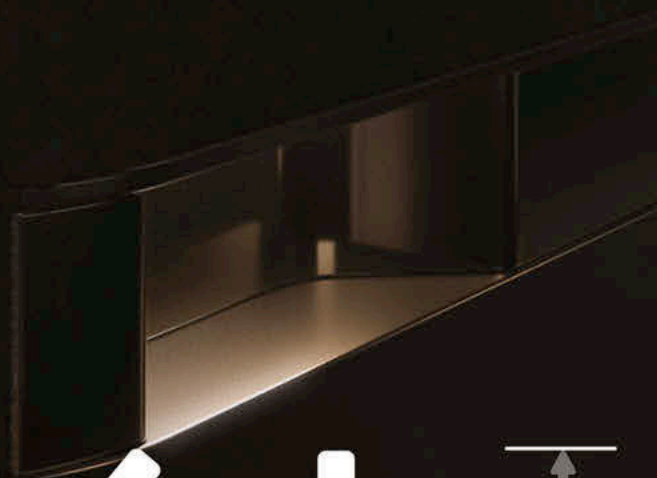
IATA does not anticipate that any changes to the ways that crew handle cases of unruly passengers will be necessary.

MOMENTS



Style and Design

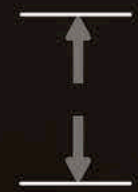
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44"

INTERFERING WITH THE CABIN

Passengers have been known to interfere with aircraft fixtures and fittings when flying during pandemics, in attempts to reduce their personal risk of infection. Such behaviours have included draping plastic sheeting over seatbacks in order to create enclosed spaces, obstructing air vents, and wearing 'unusual clothing or head coverings'.

IATA has responded with this comment: "Passengers should not be permitted to interfere with aircraft cabin fixtures in such a manner as to obstruct access to emergency equipment, prevent cabin crew access to monitoring passengers and seating areas, prevent access to oxygen masks, or impede evacuation routes."

SIX REASONS WHY THE EMPTY MIDDLE SEAT DOESN'T WORK

Mandating that airlines use empty seats to increase physical distancing between passengers is not an effective health precaution on board aircraft, according to IATA, which gives the following reasons:

- It does not afford a distance of 2m around each passenger
- There is little medical evidence of passenger-to-passenger spread on board aircraft
- To comply with safety regulations, children are required to be seated adjacent to their guardians during a depressurisation, so that they can fit their oxygen masks for them while remaining seated with their seatbelt fastened
- Young children, and passengers who have a fear of flying, often require the reassurance of having a travel companion alongside them during TTL
- Passengers travelling together within the same family group living at the same residence do not have to maintain a physical distance from each other elsewhere, and therefore might not be willing to be separated while on board aircraft
- Advance seat assignment and seat preferences/requests from travellers may not be able to be granted, resulting in increased possibility of disgruntled and/or unruly passengers.

IATA's Covid guidelines

As airlines resume passenger services during the Covid-19 period, there are many public health, regulatory, training, operational and crew and consumer confidence considerations. In response IATA has drafted guidelines to help airlines make appropriate revisions to their operations until restrictions are lifted. Where any changes relate to safety regulations, they should be submitted to the appropriate regulator for acceptance and/or approval.

SOCIAL DISTANCING ON BOARD

Travellers may expect 2m physical distancing to be practiced on board aircraft. However, IATA says that this concept does not reflect the screening of passengers before boarding (such as temperature checks), nor the protections offered by the cabin environment.

"On board aircraft, it is difficult to achieve 2m physical distancing, unless the aircraft loadings are so light as to be uneconomical and would require zero movement of persons within the aircraft cabin," says IATA.

The authority says that the cabin itself provides protections, including the physical barrier of seat backs; the majority of seating arrangements not being face to face; the direction of airflow from ceiling to floor reducing forward and aft movement of air; and HEPA filters on newer aircraft types that help clean recirculated air. Additional measures being widely adopted include increased cleaning programmes using products effective against Covid-19 (see p76); managing passenger boarding and disembarkation to reduce person-to-person contact; limiting passenger movement during flight, and the use of face coverings.

CABIN CARGO

If the aircraft has been used for the transportation of cargo and/or mail in the passenger cabin (see p42), some damage may have occurred in passenger seating areas.

IATA says that cabin crew should be vigilant and check for damage which may affect safety on hardware such as lifevests, seatbelts, tray tables, IFE system components, seat armrests, seat cushions etc. ✕

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2020

2020's

SEATING INNOVATIONS

FROM IDEAS TO HELP ENABLE SOCIAL DISTANCING IN THE CABIN, TO LIGHTWEIGHT ADVANCES, TO NEW DESIGNS THAT SATISFY THE VALUABLE BUSINESS TRAVELLER, SEAT SELECTION IS EVEN MORE CRITICAL IN 2020'S OPERATIONS

SINGLE-AISLE VANTAGESOLO

Thompson has developed the VantageSolo business class seat in response to the growing medium- to long-range markets being serviced by single-aisle aircraft. Designed with London-based studio, Factorydesign, the herringbone layout of the seat offers direct aisle access for all passengers, with generous seat widths and fully flat beds, starting from just a 33in pitch. The generous storage options include dedicated stowage areas and a large console area, as well as a stowable 20in IFE monitor.

The optional dividers and suite doors were originally offered with privacy and customer branding in mind, but may also appeal to passengers wishing to feel more isolated from their fellow travellers.

The VantageSolo platform also offers the possibility to create two front-row first class suites featuring extended soft side furniture, 27in monitors, additional large pull-out work surfaces, dual occupancy, dual dining and an expansive sleep surface – all offerable without any LOPA penalty over the standard full business-class arrangement.

VantageSolo is due to debut on its launch customer's first commercial flight in late 2020.

- **Weight (fully dressed):** Approx 100kg per pax (without IFE)
- **Status:** Currently undergoing final certification with launch customer on A321 platform
- **Bed length:** Minimum 77.4in
- **Seat width:** Minimum 21.9in between armrests
- **Table width:** 16.5in
- **Pitch:** 33-37in



- **Suitable for:** Widebody Airbus and Boeing aircraft
- **Weight:** 80kg fully dressed
- **Bed length:** 78in at a 42in pitch
- **Minimum and maximum pitch:** 42-46in, depending on layout



Recaro's next-generation business class

Recaro has taken passenger experience data and airline feedback from its CL6710 business class seat and introduced sufficient modifications to the styling, living space and privacy features of the platform to make a new model: the CL6720, due for launch in mid-2021.

The most obvious distinguishing aspect of the CL6720 is the sliding doors, which make it a mini suite. Within the suite, new features have been added, including a larger tray table and additional stowage (an extended centre console at every other row). Comfort features include lumbar support, an actuation system with a smooth motion curve,

and a six-way headrest, with options including a legrest, and wireless smartphone charging capability. The seat is also wireless-ready, to support predictive maintenance and smart seat control. A high degree of customer customisation is also available for the styling elements.

The CL6720 layout is space efficient, with a 78in bed length at a 42in pitch, partly enabled by the space-optimised geometric shell. The composite shell was developed by experts at Recaro subsidiary, AAT Composites, which helps enable the 80kg seat weight (fully dressed).

The CL6720 can be installed in two different cabin layouts (single passenger and companion).



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JIATAI AIRMATE

The AirMate is a new economy class seating platform for single-aisle aircraft, featuring engineering solutions with a focus on decreasing seat weight. Jiatai has not disclosed the specific weight of the seat, but claims it is more than 20% lighter than some comparable models.

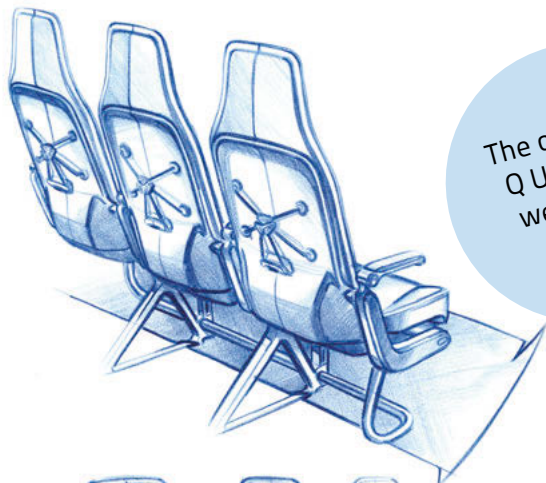
Weight, reliability and ease of maintenance have been a major design focus, with notable features being the use of foams instead of a conventional seat pan, and the integrated composite moulded seatback.

The modular design enables easy customisation, including multiple stowage options. Examples include a multi-functional stowage box with a PED holder, a spectacles clamp, a restraining strap for small items, a stowage box behind the seatback tray table, and a mini table that extends the tray-table surface.

Comfort features include a net to relieve pressure on the feet, a curved headrest for side support, and a 'blanket clamp' to prevent blankets sliding off the passenger.



- Suitable for: B737, A320 & C919
- Certified by: FAA, EASA & CAAC
- Minimum pitch: 28in



The one-piece Q Ultra-Slim weighs just over 7kg

The world's thinnest aircraft seat?

Pitch Aircraft Seating Systems has developed an economy seat for single-aisle fleets that it believes is "the world's thinnest aircraft seat yet conceived".

The seat, named the Q Ultra-Slim, has been co-developed as part of a grant-funded project through the UK's Aerospace Technology Institute (ATI), an entity which is pursuing innovative technologies that will benefit the aviation sector.

While a slimline design benefits weight, so too does the composite construction, which substitutes aluminium structural seat components with sustainable, FST-compliant bio-resins formed in a compression moulding process. The result is a one-piece seat with a claimed weight of just over 7kg. Pitch claims that the operating weight of a short-haul Airbus A320 could be reduced by a minimum of 500kg through the

replacement of standard economy seats with these lighter equivalents.

The Q Ultra-Slim project is a collaboration between Pitch, the Design Q industrial design consultancy, and Cecence, a composites manufacturing and advanced engineering specialist, with additional support from SHD Composite Materials, Wavelength NDT, and Plyable.

Gary Doy, chief designer at Pitch Aircraft Seating, comments, "This collaborative project challenges future aircraft cabin design and inflight service, as well as seating, so it is truly innovative and potentially controversial, but this is an important part of helping the industry improve its environmental credentials."

For example, to achieve the pared-back design the team sacrificed the traditional tray table, leaving the option of integrated cup and smartphone holders. Comfort has been addressed through an upgraded cushion system.



BOOM HEADREST

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PRODUCT DESCRIPTION & DESIGN

The Boom Headrest is an innovative headrest, designed to provide incomparable comfort to passengers for a pleasant and healthier flight experience in every seating position. Being able to reach unlimited setting options, the Boom Headrest can embrace the head, or support the nape, or the neck. Such on-board comfort shall avoid the portable orthopaedic pillow. Product's dimensions allow full integration with the most common economy and business class seat systems.

MATERIALS & PROCESSES

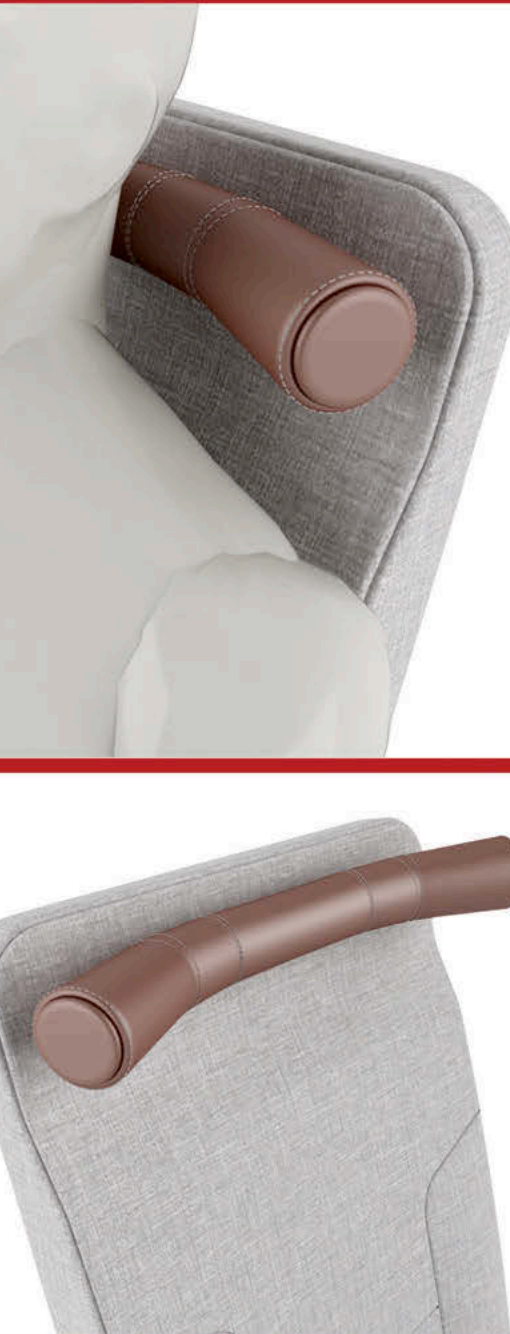
The headrest is manufactured using aeronautic state-of-the-art materials to grant long life material functionality. The flexible "gooseneck" is manufactured in aluminium alloy with steel and polyamide inserts to, respectively, increase strength and avoid any uncomfortable "noise" while in operation.

PERFORMANCES & CERTIFICATION

The Product is made up with flame-retardant materials, fully compliant with the CS/FAR 25.853(a) and CS/FAR 25.853(c) requirements. Whenever needed and based on product customization, dedicated tests may be carried out to properly certify both the materials and the compounds.

ACCESSORIES & CUSTOMIZATION

Personalized hygienic covers like antimacassars can be provided upon request. Wide array of cover materials (leather/eco-leather/fabric) as well as customized density and foam hardness are available.





Horizon Premier was launched on Aeroflot's A350 fleet in March 2020

HORIZON PREMIER PUTS BUSINESS FIRST

Horizon Premier is the newest premium seating product from Collins Aerospace, designed to bridge the gap between traditional first and business classes. The forward-facing, all-aisle-access seat features a privacy door as standard which, in combination with the 53in-high walls, creates the ambience of a private suite. The luxury feel is enhanced by latest-generation quiet actuation technology, seamless IFE integration (up to 21in displays), ambient lighting, device-charging ports and extensive stowage, including a wardrobe.

In order to help maximise comfort while keeping weight low, extensive

use has been made of composites and advanced aluminium alloys in the construction of the suite.

Customers can customise the trim and finish, including the integration of cutting-edge infused-image materials to help differentiate brands. Collins Aerospace can also incorporate an illuminated panel for the privacy door that creates a distinctive feature to enhance the overall cabin ambience.

Horizon Premier is available for multiple widebody platforms, including the A350, A330, B777 and B787. The seat is fully certified and entered service on Aeroflot's A350 fleet in March 2020. According to Collins Aerospace, it is currently working on a follow-on order with an undisclosed customer.

Acro's seat pan innovation

Acro has expanded its product range with the launch of two new seating products designed specifically for twin-aisle aircraft. These new long-haul models – ASP and the S6HD (see p62) – are variants of Acro's Series 6 seating family, which is already in-service on narrow-body aircraft with customers including Air New Zealand, Etihad and Qingdao Airlines.

Both variants incorporate comfort features including a curved 'extra-spatial' seatback design which optimises usable living space. For operational efficiency, the seats have a minimised part count for robustness, ease of maintenance and reduced cost of ownership.

The ASP of the Series 6 ASP stands for 'articulating seat pan', a feature which enhances comfort. The lowered height of that seat pan also improves passenger comfort, with other comfort features including a 6in recline, a single-piece tray table, a dual literature pocket, provision for a 13in IFE screen with pivot mount, and options including a footrest and AC power.

Weight is reduced via a single-piece composite backrest, a lightweight aluminium primary structure, an injection-moulded seatback shroud, injection-moulded aisle bumpers, and soft-touch two-shot injection-moulded armrest caps.

The Series 6 ASP can be fitted to an A330 in a 2-4-2 configuration and an A321XLR in a 3-3 configuration. The seat is also compatible with A350, B777 and B787 aircraft types.



- Minimum pitch: 29in
- Seat width: 18.5in with a 17.8in aisle

HIGH-DENSITY COMFORT

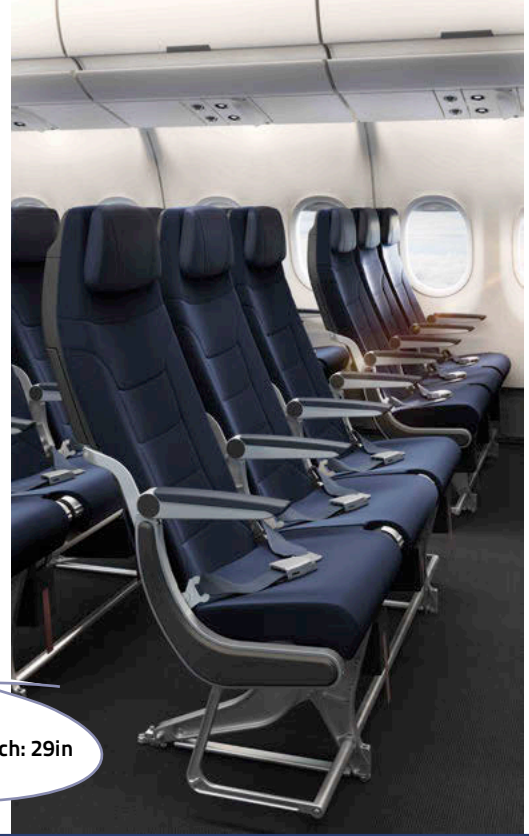
Another new Acro long-haul economy class seat is the S6HD (series 6 high density), designed with the A330 in mind. According to Acro the architecture of the A330 cabin creates unique spatial challenges, so this seat has been designed to optimise the available cabin space and achieve a 3-3-3 configuration at a 17in seat width with a 16.7in aisle, whilst maximising comfort and living space levels. The tapered design of the seat and its soft-touch headrest have been sculpted to optimise space in line with the curvature of the A330 cabin sidewalls.

As with ASP (see p61), weight has been considered through the single-piece

composite backrest, the lightweight aluminium primary structure, injection-moulded seatback shroud, injection-moulded aisle bumpers, and soft-touch two-shot injection-moulded armrest caps.

The Series 6HD features Acro's unique seat recline latch, which is intuitively located on the front spar area, and a range of baseline and optional features for airline and leasing company customers. Options include provision for USB sockets and 10in IFE, a lower literature pocket, front row IFE, a crew step, and dual-language placarding.

▪ Minimum pitch: 29in



Space For All

Bulkhead seats are preferred by many travellers as they can offer extra legroom as well as bassinet fixings. The Space For All 'SFA' concept from Adient Aerospace enhances the front row seat experience with a mechanism that extends out from the lower bulkhead wall. When locked in position, SFA provides each passenger with an extended flat surface to use as a lounge seat or, with all three surfaces deployed in a triple seat, it creates a shared space for children and adults.

The concept can be retrofitted onto existing aircraft fleets, but is further optimised with the Adient Aerospace front-row triple seat, which incorporates a folding centre armrest with bi-fold meal table. With the seat armrests in the raised position, SFA provides the front-row passengers with over 1.58m² of shared flat bed space. In bed mode, the centre armrest can be lowered and deployed, to create a coffee table or work station surface.



Lightweight engineering

HAECO Cabin Solutions has reengineered its Vector model from the seat track up to create additional weight and cost savings (< 8.3kg fully dressed). The result is the Vector Light, an economy model for single-aisle aircraft, which is designed to enhance passenger living space and comfort at a narrow pitch, aided by its tapered design.

The weight reductions have been achieved through the use of advanced materials, including titanium armrests and track fittings, an optimised composite backrest, a 'Cristal Flex' seat pan and forged seat spreaders. The patent-pending canted seat leg design allows for multiple combinations of aisle width and seat width.

- Suitable for: A320, A220, 737
- TSO certified: Q2 2020
- Seat width: 18.25in (on an A320 with 17.5in aisle)
- Minimum pitch: 28in
- First customer deliveries: Q3 2020



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Be agile in a crisis

HANK SCOTT, FOUNDER AND CEO OF MOLON LABE SEATING, DISCUSSES WHY SUCCESS CAN BE FOUND IN A CRISIS



Molon Labe Seating is among the smaller manufacturers in the aircraft seating sector, but the company's founder and CEO, Hank Scott, is feeling confident – bullish even.

"An event such as Covid-19 would normally be a nail in the coffin for a small seating company like Molon Labe. That said, I also believe that we have been very lucky as a company as we have always prided ourselves on running with a nimble and remote company structure. Just before this horrible pandemic we were planning to expand the team and move into a new showroom near our manufacturing partners. The outbreak happened at a time that may actually have been beneficial for us, as we did not have to worry about paying for hundreds of employees and a huge facility.

"That is probably the only good thing about this crisis, for us anyway, and we are truly lucky. The crisis has also cemented our belief that staying small and nimble whilst leveraging the expertise and capacity of our partners was the right business structure to have.

"When we first started Molon Labe we were really just trying to fix some obvious problems that the airlines seemed to have: easy to fix items like needing wider aisles and wider seats. We knew that trying to break into the interiors industry would be a big nut to crack, and it is an industry that is immensely wary of change, no matter how much it likes to throw the word 'innovation' around.

"Realising that, we set up Molon Labe to be more of an 'app' or software company structure, one that is nimble and able to pivot easily to meet market needs. For the first few years

we were a remote company, which worked fine. We had a really good understanding of what sort of time and money would be required to certify a seat, and at no point did we expect to do it alone. In fact our two most successful actions over the last few years have been to engage with testing and manufacturing partners to help us along, and to build industry confidence in our company. It's a lot easier to team-up with confidence-building partners than to build industry confidence from scratch.

"Of course we understand why aerospace is risk averse. We know all too well how a company can collapse because it rushed out a bad design full of latent conditions," he adds.

"That's where expert partners NIAR and Primus came in, to conduct work such as analysing designs and crash testing them digitally to help ensure the physical tests would not fail.

"We wonder if the post-Covid world will see more small nimble companies with big partners like us, or a return to the large operators with huge in-house capacity. I'm sure both models will survive, grow and thrive, albeit with a plan for the next crisis.

"Here at Molon Labe I think this crisis has reminded us that our choice of business structure was the right one. For the next few months we are taking this quiet time to progress our PRM seat, a design that may have stayed on the back burner for years as its business case is nowhere near as attractive as the need for it. So maybe something good will come out of this downtime for the industry and we can get folks flying in their wheelchairs sooner."

AID SLEEP, MAKE MONEY

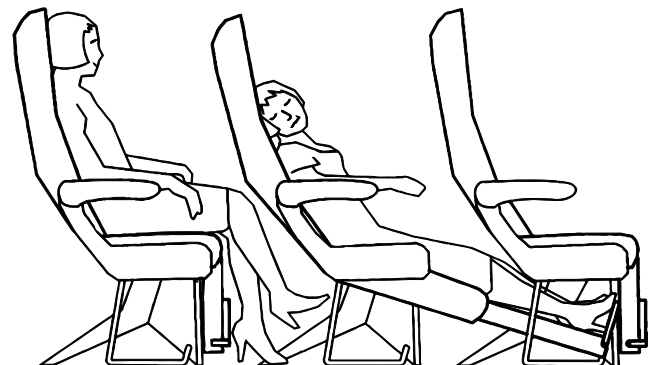
The Lseat retrofit kit offers a real enhancement to long-haul economy, as it can be swiftly converted from being a regular economy seat into one designed to improve sleep. At the press of a button, the seat pan lowers forwards and a footrest extends, creating the economy version of an angled lie-flat bed, with no requirement for power or crew assistance. The seat takes 'economy plus' to a higher level, without decreasing cabin density.

Its inventor, Yves Hendrickx, says that airlines could install two rows or more of Lseat at the front of the economy cabin, according to demand. He adds that a ticket mark up of €50 for each Lseat seat on an aircraft flying a long-haul route every day for 330 days per year would bring a revenue increase of €33,000 a year per seat, with the hardware investment paying for itself within three months on average.

Lseat has set up a partnership with industry manufacturer, Sonaca, and has secured financing with assistance of the Brussels region and private equity investors.

The retrofit kit can be fitted to existing seats, but requires design and engineering adaptation work to comply with regulations AC25-562 and crash testing compliance. Lseat's collaboration with Sonaca's engineering team covers this requirement.

Hendrickx sees particular potential in the long-haul single-aisle market, as he predicts a rise in demand for point-to-point travel and a desire for strong ancillary revenue opportunities. "As soon as air traffic picks up, this kind of investment will be worth it, as airlines all need to make easy profits to help them recover from their Covid-19 losses. Two major airlines we spoke to since we launched our programme less than two months ago are already preparing orders," he explains. "Those airlines we have spoken to since are very excited about our solution. Lseat is the right product at the right moment, and the industry has to think ahead."



Lseat's inventor sees it as an easy way for airlines to increase profits

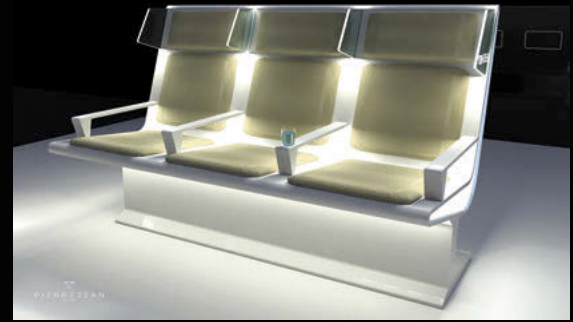
Clean lines, clean experience

"I believe that the aviation industry was ripe for some changes, and this crisis could be an opportunity to re-think the way we fly both commercially and privately," says Jacques Pierrejean, founder of the Pierrejean Vision design studio.

"As a designer, one of the first things that came to my mind (having spent considerable time considering the passenger experience) is how to adapt the cabin layout to best accommodate both the efficiency of the sanitation processes, together with passenger comfort," he adds. "Materials are going to be key here, with every seat, surface and cover having the capability to be easily cleaned. Using some variety of paper material, each seat would be covered completely, and this cover could then be removed and replaced, ready for the next flight."

Pierrejean has conceptualised a premium economy seat design which prioritises individual privacy and hygiene. Instead of individual seats in a row, a bench-like design has fewer gaps and recesses, making it easier to clean, while each passenger could have a bubble around their head to separate them from their neighbour. In order to minimise the touching of surfaces, the IFE systems would be controlled by passengers using their smartphones via Bluetooth.

"We are entering a period where air travel is going to be looked at with a certain amount of trepidation, so everyone in the industry – from designers and manufacturers, to airlines and cabin crew – will have to make a shift in order to ease this fear and assure passengers of their safety on board," adds Pierrejean. "We will have to think of airplanes more like hospital spaces – comfortable, yet always prioritising cleanliness and hygiene."



SOCIAL DISTANCING WITH HIGH DENSITY

The design and engineering teams at Aviointeriors have been studying solutions that would enable social distancing while maintaining cabin density. One proposal is the Janus seat, an economy triple with the centre seat reversed, facing aft in order to maximise separation between passengers. Passengers seated in the outer seats face the direction of flight.

Facing a different direction helps separate passengers, but that alone doesn't isolate them; hence all three passengers in a triple are separated by transparent shields to help prevent breath propagation, with the centre seats contained at the rear and on both sides. Further

shields on the aisle seats would help protect occupants from people walking through the aisle.

According to Aviointeriors, the backwards-facing centre seats occupy the same space as the outer seats, and do not require additional seat pitch or extra space for access and exit clearance.

Fitting shields could create an issue for disabled access, an issue which Aviointeriors has worked to solve by adding a foldable or sliding function to the shields on the aisle seats. The shields are made of easy-to-clean materials to aid hygiene, and could be specified in an opaque material or with different degrees of transparency.



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FRANGIBLE SUITE DOOR

Collins has developed the Frangible Suite Door, designed to provide a more isolated business class experience while complying with current safety regulatory requirements. The name of the design is in reference to its innovative latching system, which allows the door to completely separate from its carriages during an emergency, thereby permitting the passenger to exit unencumbered. The door fits within the standard seating footprint so it does not reduce revenue-generating seat count.

The Frangible Suite Door is shortlisted for the 2020 Crystal Cabin Awards

Smart BYOD

Geven's R&D team has devised and patented a PED holder that can be perfectly integrated into a seatback. The solution is light, functional, user intuitive and versatile, and can accommodate all the latest PEDs on the market.



TOYOTA'S NEW GENERATION SEATING

Toyota Boshoku has introduced the second generation of its economy class seating range. The company is still a relative newcomer to the aircraft industry, but its seat designs benefit from its deep knowledge of the automotive seating sector.

The development of the second-generation seats has focused on seating comfort, the usability of the meal table, and styling tweaks to maximise the perception of cabin spaciousness. Thus the seat is designed to stabilise the lower back, reducing muscle fatigue and maintaining a relaxed posture. The surface area of the meal table has been maximised and includes a patented cup holder design which reduces friction when picking up a paper cup.

TSI Seats enters Airbus BFE catalogue

In Q1 2020 TSI Seats entered Airbus's Buyer Furnished Equipment (BFE) catalogue. This arrangement builds on a cooperation between the two companies that began in 2015, and TSI Seats' Skysofa and Epianka economy class models will feature in the future products section of Airbus's BFE catalogue for the A350 XWB, A330 and A320 aircraft families. Additional seat models like the Elesá S economy class seat and Royalux, TSI's first business class product, will also be added into the potential future products section of the catalogue once their certification phase is completed.



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Passenger isolation

AS AIRLINES SEEK TO INCORPORATE NEW HYGIENE MEASURES IN THE CABIN, SOCIAL DISTANCING IS BECOMING A KEY CONSIDERATION. WHILE PHYSICAL DISTANCING MAY NOT ALWAYS BE POSSIBLE, MORE DEFINED PHYSICAL SEPARATION IS, AS THIS RANGE OF SWIFTLY DEVELOPED, QUICK-FIX SOLUTIONS SHOWS

Passenger protection screens

Autostop Aviation, usually best known for seat cover manufacturing, has been tasked by airline customers to design protective screens that can help isolate passengers in economy class. A clear divider has been produced by the company's cabin solutions team and certification partners, and CEO Jon Robinson says the company has successfully completed trials of the screens on several aircraft types, leading to swift airline approval.

Airlines seeking to fit this modification will need to send their LOPA details and seat part numbers to Autostop Aviation. The company's certification partners can then release the units on an EASA Form 1 and supply an EASA-approved SB and EASA Change Approval to permit installation.



REMOVABLE DIVIDER SYSTEM

Aerofoam Industries has developed the Removable Divider System (RDS), a removable seat-blocking device that can be easily installed on any existing seating platform by using the passenger restraint system, without restricting the functions of the seat. This attachment method allows for quick installation and removal, and eliminates the need to make modifications to the existing seat assembly.

RDS is available in two different configurations. RDS Shield features a clear partition that creates a sanitary divider between passengers, while still allowing visual connection and communication between passengers and crew. The RDS Standard version does not include the partition, but still provides a physical divider for the empty middle seat.

Both configurations include cup holders and recessed stowage for passengers on either side of the device, and can be easily sanitised. Aerofoam's design team can adapt and configure the RDS to any airline brand identity, including those utilising multiple seat models, aircraft, or cabin layouts.



Isolate Screen

Factorydesign has considered the desire to feel shielded from other passengers, as well as the currently reduced passenger loads, and identified an opportunity to adapt existing cabins quickly to address these needs. The studio's 'Isolate Screen' is a kit that transforms a vacant seat into a screen that maximises personal space and helps separate passengers from each other or the aisle.

The translucent thermoplastic screen is mounted on a lightweight table top, which can be supported by the armrests of any seat model and secured using the seat belts. For passengers seeking a deeper sense of isolation, the screen can be specified in a lightweight thermoformed foam with a cleanable leather trim. Both versions are designed to be easy to clean, without any 'dirt traps'.





PlanBay

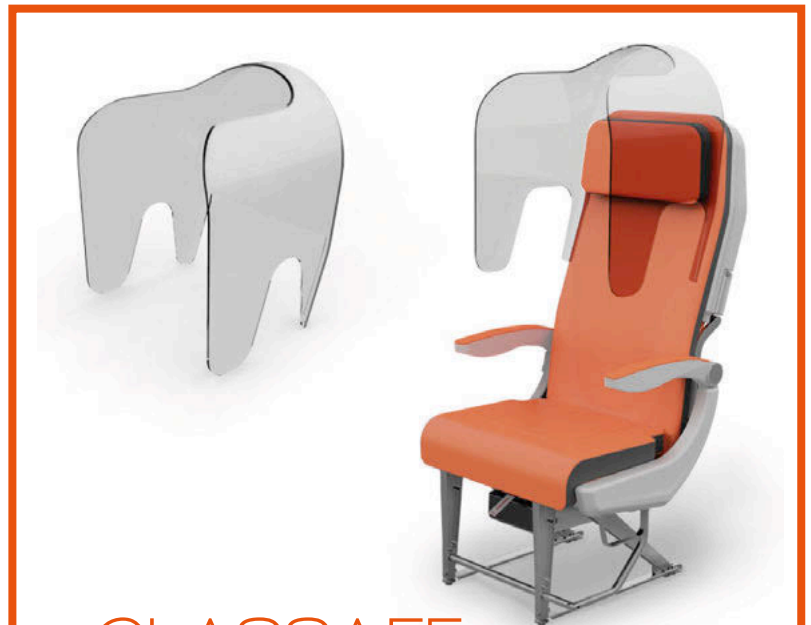
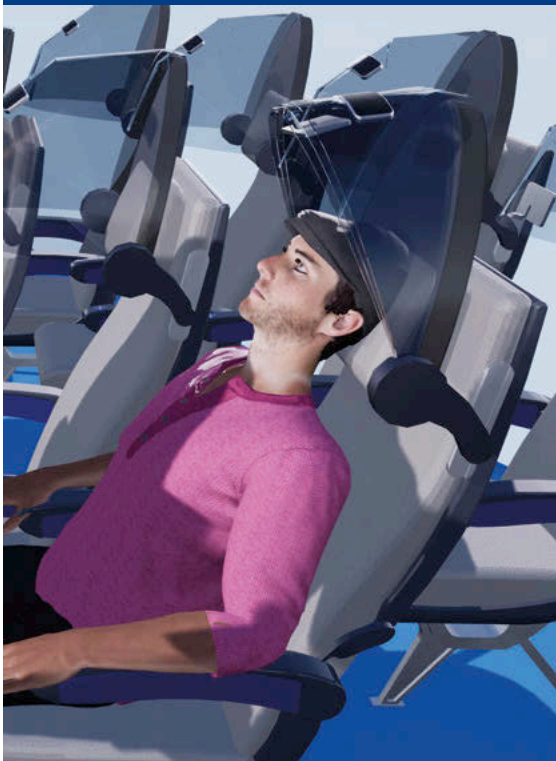
Florian Barjot, a Toulouse-based aviation designer whose idea to fit a panoramic window in widebody aircraft we featured previously, has developed something on a rather smaller scale: a quick-fit, removable kit that can be fitted to economy class seats to help separate passengers. Named PlanBay, the kit would be fitted to an unoccupied seat.

The proposed kit would be produced from plexiglass or polycarbonate sheets for minimised production costs, with the clear panels enabling direct view of passengers by the cabin crew.

Barjot is currently gauging airline and operator interest for the concept and investigating partnerships with aircraft interiors suppliers for production, logistics and certification.

Cocoon concept

Priva is a concept developed by Golnoosh Torkashvand, a student at the Florida Institute of Technology, intended to provide economy passengers with personalised privacy levels. The design consists of an adjustable interactive shade which opens and closes over the occupant's head on demand. Once deployed the wearer can select adjustable visibility, dimmable lighting, and IFE options, as well as a messaging system that facilitates communication with flight attendants.



GLASSAFE

Aviointeriors proposes Glassafe as a kit-level solution that could be installed on existing seats to help separate passengers in double or triple seats. The company has stated that Glassafe could be supplied in various versions for a range of existing seat models, with fixing systems that enable easy installation and removal.

The shield is shaped to maintain elbow space and to enable easy access to seatback features such as tray tables, magazine pockets or coat hooks. The Glassafe transparent panels enable disabled access, as the panels on the aisle side can be rotated to make ingress and egress easier.

Aviointeriors says that Glassafe could also be supplied in opaque materials or with different degrees of transparency, all of which are designed with easy cleaning in mind.

BESPOKE SOLUTIONS

INNOVATIVE GALLEY EQUIPMENT

AIR GRILL
POLISHED STAINLESS STEEL 304
2 OFF
ATTACHING PARBEVERAGE MAKERS • REFRIGERATORS & FREEZERS • OVENS
4 OFF EACH 6-32 X 1/2" PAN HEAD SCREWS

TEMP CONTROLLER

'ON/OFF FAIL' SWITCH INDICATOR

'CHILL/FREEZE' SWITCH

SECONDARY LATCH
PT.No- A27024-1-6S

SWITCH FASCIA
POLISHED STAINLESS STEEL 304
ATTACHING PARTS
4 OFF 6-32 X 1/2" PAN HEAD SCREWS

Bespoke solutions to customer's requirements including design, testing, qualification and manufacture of equipment to match the exact end user specifications.

CASE STUDY

Brief from Finishing Centre for Refrigerator/ Freezer for corporate Aircraft (2 off required plus unit for testing and qualification).

Summary of brief and stated specification:

- Envelope dimensions
- Performance required (temperatures, time and capacity)
- Weight limitations (net, payload, gross)
- Galley attachments
- Electrical characteristics (Vac, wild frequency, bonding resistance, power)
- Testing and Qualification Compliance to RTCA DO 160G

PROJECT STATUS: The finishing centre reports that the project is on schedule and the aircraft will be delivered on time.

REF / AL-RF15-100-72

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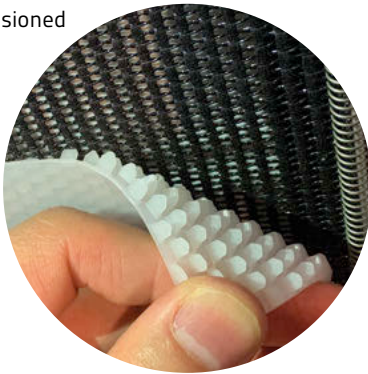
Aerolux Limited established 1988 for the purpose of design, manufacture, certifying and servicing of galley insert equipment. Aerolux has grown to become a key supplier to major commercial airlines, corporate operators, major air framers, finishing centres and leasing companies.

Our approvals include CAA and EASA Part 21 and Part 145, FAA Foreign Repair Station Transport Canada and EN9100.

Passenger comfort

SUSPENSION SYSTEM

Franklin Products has revealed the pre-tension portion of its new SLIM diaphragm attachment system, designed to offer passenger comfort, space savings and weight reductions. This pre-tensioned suspension system is available to both OEM and aftermarket customers, and is claimed by Franklin to “significantly simplify” the installation and maintenance of an otherwise cumbersome comfort option.



Soft cabin divider

Jamco America has launched the Soft Divider, a leather-wrapped eyebrow-type hanging cabin class divider for single-aisle aircraft. The simple design has a larger surface area than Jamco’s previous hanging dividers, to create additional visual and physical separation between the passengers either side of the unit, as well as potentially reducing the spread of germs.

The divider also enables maximum seat density and allows for additional legroom, or in some cases an additional row of seats, depending on the aircraft configuration. As the unit is flexible, it can bend sufficiently that it will not restrict seat recline, and only encroach into passenger space to a minimal degree. Upon request, the Soft Divider can be formed to follow the contour of the seatback in the reclined position.

According to Jamco the divider is easy to install and integrate with existing header provisions certified for Boeing 737 divider systems, and is scheduled to be certified for the Airbus A321 later this year.

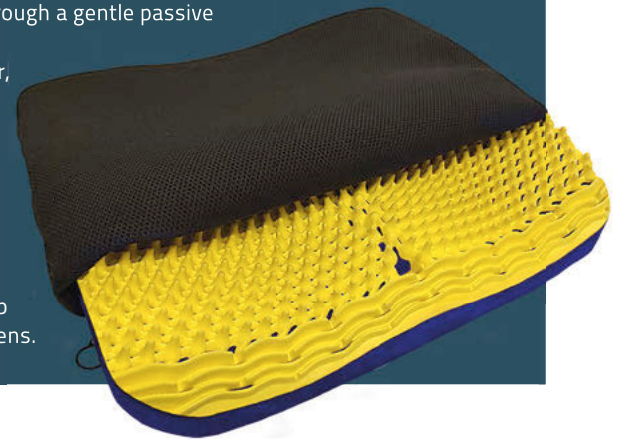


SP1KE CUSHIONING

Starr has invested 10 years of R&D work into creating its Impression aircraft seat and back cushions, which feature ‘Sp1ke’ cushioning technology. The structure of Sp1ke has been designed based on ergonomology, a scientific approach designed to mitigate impact, absorb energy, manage loads and dampen vibrations.

These properties are enabled by fitting hundreds of tiny bendable ‘nubs’ in a lightweight complex matrix with free airflow. The result is that the surface responds to the seat occupant’s individual weight and size and continues to adapt as they move in the seat, dispersing pressure, promoting good body posture, and stimulating blood and oxygen flow through a gentle passive massage effect.

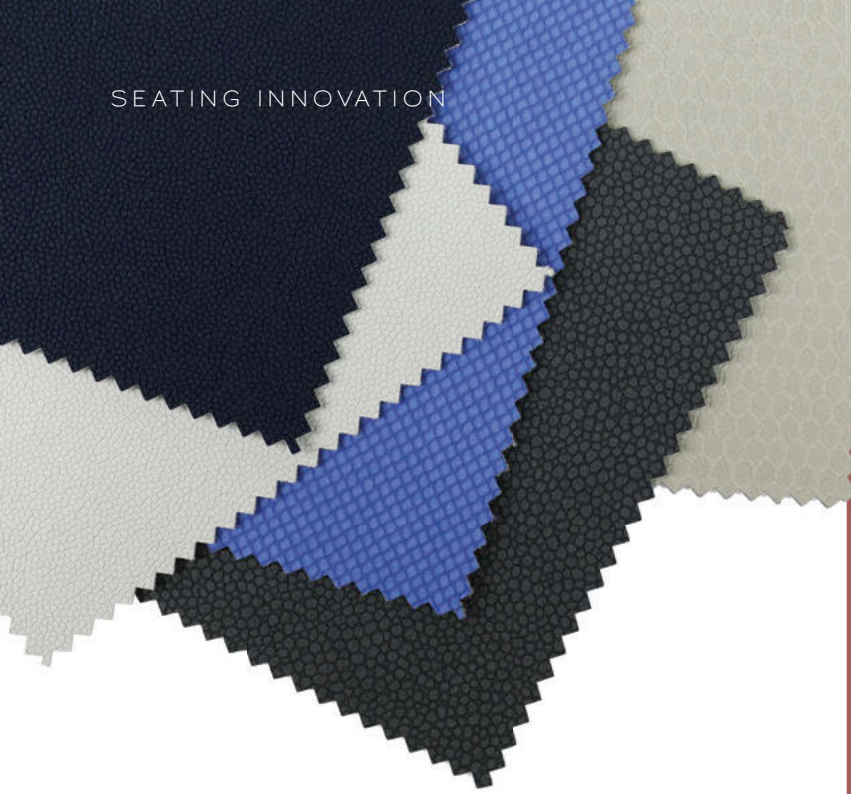
According to Starr, the structure is made from a proprietary flame resistant, low-toxicity closed-cell foam that is extremely durable, and does not absorb moisture or pathogens.



Rigid, lightweight foam

Cellular materials technology specialist, Zotefoams, has developed Zotek F OSU XR, a closed-cell OSU-grade foam. This polyvinylidene fluoride (PVDF) foam is an extra-rigid, closed-cell crosslinked foam available in densities of 120 and 150kg/m³. The foam is claimed to be up to 70% lighter than some solid thermoplastic and silicon alternatives, and can be used in locations such as the interior of seat pods, stowage lockers, rigid armrests and tray tables.

Different grades of Zotek F can be laminated together to create a single material that is rigid on one side and soft/flexible on the other, which makes it a useful option for forming curves and complex shapes.



PATHOGEN-FREE SEAT FABRICS

Tapis Corporation was all set to show off some new seat fabric innovations at Aircraft Interiors Expo 2020, but of course the show was cancelled. To find out what we missed, we spoke to sales director, Matthew Nicholls.

“One of our product highlights was our Ultraleather Linen product. It has the visual appeal and comfort of a fabric, but its advanced coating means pathogens can be wiped from the surface with hospital-grade disinfectants without damaging the surface,” he says.

“When long-haul travel resumes, we think that customers will have a renewed focus on clean, pathogen-free surfaces, which traditional woven fabrics cannot achieve without being removed from the aircraft for dry cleaning. As we adapt to the post-Covid-19 future, products like Ultraleather might be the solution.”

Boom Headrest

ABC International has launched the Boom Headrest, an adjustable and flexible headrest design that enables passengers to create their own individually optimised orthopedic posture to help support the neck and nape, and to aid sleep.

The designer of the headrest, Aysegul Durak, formerly a chief engineer for cabin interiors at Turkish Airlines, explains that many of today’s headrests do not have nape or neck support, which is why many passengers use their own orthopaedic pillows during flight. She says that advanced postural studies have shown that the ideal headrest must support the weight of the head by tightly embracing the nape, neck and head.

The ‘gooseneck’ of her design, the multifunctional mechanism within the headrest, provides neck and head support options by applying a light pressure on the arms to create any position desired by the passenger.

The main structure of the Boom Headrest is manufactured from lightweight aluminium alloy, with steel and polyamide inserts for durability. The headrest can

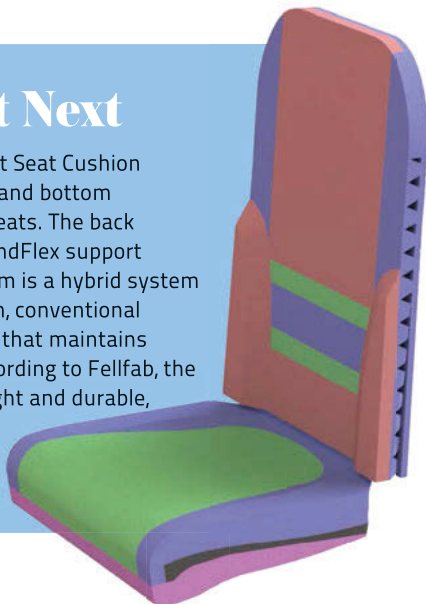


be fitted to any seat, both retrofit or linefit, with an interface that works with most common seat types.

The kit can be delivered with EASA Form One, including an Engineering Order for Installation, and its dimensions, foam stiffness and trim can be specified by customers wishing to tailor the headrest to their individual seat models and branding.

Air Comfort Next

The Fellfab Air Comfort Next Seat Cushion System is a two-part, back and bottom design for economy class seats. The back uses the company’s DiamondFlex support technology, while the bottom is a hybrid system incorporating memory foam, conventional foam, and an AirString core that maintains form and functionality. According to Fellfab, the cushion system is lightweight and durable, with the bottom cushions lasting up to six years in heavy rotation.



DISPOSABLE SEAT COVER

AviationRFI has designed the ‘Dual Disposable Seat Cover’, initially with frequent flyers in mind. The one-piece cover is double ended, with one end suitable for fitting an aircraft seat, and the other a car seat (useful for taxis), and is intended to help reduce germ transfer from seats to clothing during travel.

The lightweight cover is made from medical-grade PPE fabric, and is recyclable and disposable. The company is receiving enquiries from around the world, with increasing interest from airlines. ✕



Touch the Future™



FROM OUR FAMILY TO YOURS

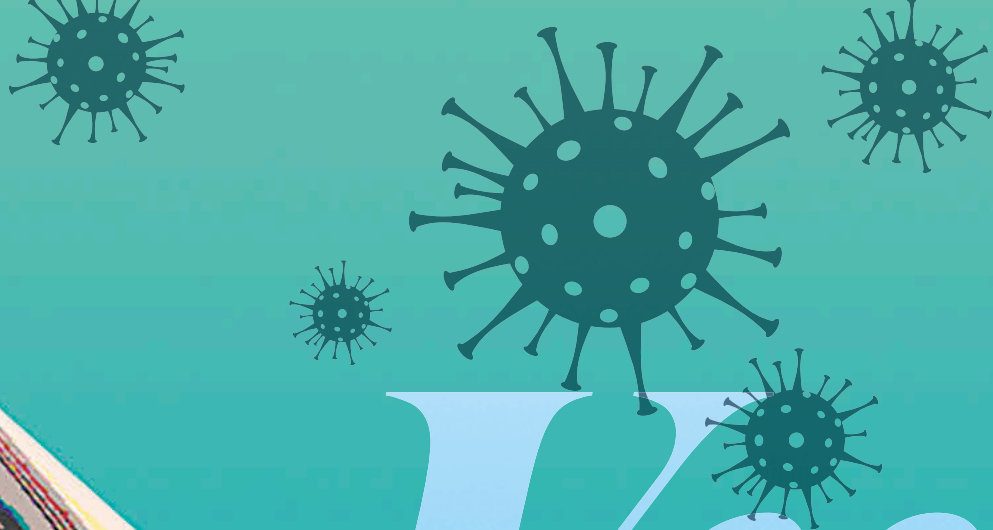
As COVID-19 increasingly impacts our everyday lives, the safety and well-being of customers is top priority.

The CDC recommended cleaners and disinfectants to combat the coronavirus have been tested on Ultrafabrics materials with no adverse effects when guidelines are followed as directed.

- 1:5 Bleach/Water Solution
- Alcohol-Based Cleaners
- Quaternary-Based Disinfectants
- Hydrogen-Peroxide Based Cleaners

The Ultrafabrics and Tapis teams are here to support you. We look forward to working together as a community to navigate this unprecedented time. From this global pandemic, we will emerge together and stronger.

CABIN HYGIENE



Vir





us-free CABINS

COMPANIES AROUND THE WORLD HAVE DEVELOPED
INNOVATIVE TECHNOLOGIES AND FORMULATIONS THAT
CAN HELP AIRLINES DELIVER ON A PROMISE THAT
THEIR INFLIGHT EXPERIENCE IS TRULY HYGIENIC

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BARRIER COATING

The Leather Institute has developed the 'ClearCabin system – Powered by PreventX', an antimicrobial barrier treatment that when applied to a surface forms an invisible bio-barrier coating that kills microbes by piercing their cell walls, and prevents the growth of bacteria, mould and fungi. The product can be applied to any surface leather, plastics or laminates and can be sprayed on textiles and carpets. The system is odourless and colourless, and remains active for up to 90 days. According to the company, validation tests by third-party European labs have shown that the system is effective across a broad spectrum of known bacteria and has 99.99% effectiveness against Covid-19 surrogates.

Light relief

A coating that activates in low-intensity light to kill bacteria such as *Staphylococcus aureus* and *Escherichia coli* has been developed by a team of researchers from University College London (UCL). The research is the first to show a light-activated antimicrobial coating killing bacteria in low intensity, ambient light (300 lux), such as that found in hospital wards and waiting rooms. Previously, similar coatings needed intense light (3,000 lux), like that found in operating theatres, to activate their killing properties. The bactericidal coating is made of tiny clusters of chemically modified gold embedded in a polymer with crystal violet – a dye with antibacterial and antifungal properties.

Dr Gi Byoung Hwang from UCL's chemistry faculty explains, "Dyes such as crystal violet are promising candidates for killing bacteria and keeping surfaces sterile. When exposed to bright light, they create reactive oxygen species, which in turn kill bacteria by damaging their protective membranes and DNA. This is amplified when they are paired with metals such as silver, gold and zinc oxide."

UCL's Prof Ivan Parkin adds that, "Other coatings have effectively killed bacteria, but only after exposure to UV light, which is dangerous to humans, or intense light sources, which aren't practical. We are surprised to see how effective our coating is in killing *S. aureus* and *E. coli* in ambient light."

The team unexpectedly discovered that the coating kills bacteria by producing hydrogen peroxide – a relatively mild reagent used in contact lens cleaner. It works by chemically attacking the cell membrane, and therefore takes longer to work on bacteria with more layers of protection. The gold clusters in the coating are key to generating the hydrogen peroxide, through the action of light and humidity. Given the clusters contain only 25 atoms of gold, very little of this precious metal is required compared to similar coatings, making the coating attractive for wider use.

SYNERGISTIC BIOCIDES

Aerocare 1-03 Sanitiser, which contains a unique formulation of multiple synergistic biocides, can be applied to any cabin surface using a spray and microfibre cloth and has been tested to EN 14476, a standard specific to enveloped viruses such as coronaviruses. Specific testing against strains of coronaviruses have shown 48 hours of protection (28 days of protection against other microorganisms), and the company is awaiting Covid-19 test results. Aerocare 1-03 can also be used in a foaming dispenser for hand washing. The company says the product has been successfully tested to BS EN1276, BS EN 1650, EN 13704, EN 13623, EN 1500, EN 6920, Boeing D6 7127, AMS 1452B, and EN 14476.



PURIFICATION SYSTEM FOR GROUND USE

The Ionization Purification System is a portable ion distribution unit developed by Aviation Clean Air (ACA) and International Aero Engineering that disinfects cabins within two hours while the aircraft is on the ground. The unit creates positive and negative ions from the hydrogen and oxygen molecules in the water vapour present in the cabin air, which are then distributed as a cleaning agent to purify the air and surfaces, with no chemicals, ozone or other emissions, and with no damage to fabrics or carpeting.



ANTIBAC SURFACE TREATMENT

Wollsdorf has developed Evo+, an antibacterial surface treatment for leather, which is applied into the lacquer during the leather-finishing process in the tannery. Following a series of JIS Z 2801/ISO 22196 tests verified by laboratories, the company says the treatment effectively reduces bacteria on leather surfaces by 99.9%, and that this protection can last for several years between cleaning cycles. The active agent used fulfils all requirements according to the European Biocidal Products Regulation (BPR, No. 528/2012) and the US Environmental Protection Agency (EPA).

The company is also conducting surface tests to evaluate the treatment's antiviral properties and has reported "very exciting" results in tests with viruses comparable to Covid-19. Tests are ongoing.

SAFELY AND EFFECTIVELY Decontaminate Your Aircraft Interior

ACA4800GU-1 ION Distribution Unit is a Proven Solution

The BiPolar Ionization Process:

- ✓ Kills Surface and Airborne Pathogens.
- ✓ Neutralizes Mold and Bacteria.
- ✓ Removes Odors.
- ✓ Increases Air Quality.
- ✓ Reduces Static Electricity.
- ✓ Reduces Dust, Pollen and Smoke.
- ✓ Neutralizes Common Industrial Gases.



The process produces **NO OZONE** and leaves no residue.

Safe for:
All Aircraft Interiors
Fabrics and Leathers
Avionics
Carpeting
Furnishings
Cabinetry



Ion unit creates positive and negative ions.

The ions are distributed at 2800 CFM throughout the aircraft cabin

The ions surround harmful pathogens

Hydrogen bonds are severed by a reaction that takes place on the cell's surface.

Without these hydrogen bonds, the pathogen will not be able to mutate, grow, nor reproduce, and will quickly die.



The ION DISTRIBUTION UNIT for Ground use is a portable 110v electric powered ionization and air blower unit that is placed on the floor of the cabin and activated to fully decontaminate your aircraft interior in 1-2 hours.

The ACA COMPONENT for Airborne use keeps passengers on board business aircraft and airliners safe and protected. The Proactive System operates through the aircraft's existing ECS, and kills pathogens in the air and on surfaces where they live, improves interior air quality and eliminates odors.



ACA-RN-0001
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Our systems are in use globally by major OEMs, MRO facilities, FBOs, a wide variety of aircraft operators and the U. S. Government.

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Clean, Sanitise and Protect

Keep your passengers and crew safe



OUR CONTINUING COVID-19 SUPPORT

AEROCARE UPDATE

In the difficult circumstances we're all experiencing today, the safety of passengers and crew is more important than ever before.

At Aerocare, we are continuing to support our airline customers by providing comprehensive cleaning and sanitation products, ensuring everyone remains healthy, safe and well informed.

Whether you're looking for an effective aviation approved sanitiser for aircraft cleaning, wash room sanitiser, or individual sachet wipes for passengers and crew, Aerocare are well positioned to support a total solution.



On The Ground

Bulk Sanitiser

Available in 5L, 20L & 1000L IBCs



Foaming Hand Sanitiser

Available in 150ml bottles

In The Air



Sanitising Sachet Wipes

Available in pack of 1000

AEROCARE SANITISER BENEFITS

- ✓ 28 days antimicrobial protection
- ✓ Effective against all enveloped viruses as defined in EN14476, including Human Coronavirus and SARS-CoV2
- ✓ Approved to Boeing D6-7127 and AMS 1452B

The Benefits

Order today

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How to Order

STAY SAFE
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PROTECT
PASSENGERS
AND CREW
→
SAVE LIVES



NATURAL APPROACH

An environmentally focused solution is Reeflect, developed together with the Salveco Laboratory for the aerospace industry. Based on natural-origin active ingredients, the plant-based formulations are non-toxic and 100% biodegradable. Various formulations are available, including one for leather, leatherette and vinyl; one for carpet and fabric; a glass cleaner; and a multipurpose cleaner. The range is currently for general cleaning, not disinfecting, but the company is currently working on developing a disinfectant formula for the aerospace market.



SMART HEALTH PROTECTION

In October 2018 Germany-based Decorative Products started developing a smart health protection system for air travel that provides microbial protection. The system, named Airdal, is now market ready and is made from natural and 'nature identical' ingredients that provide sustainable, environmentally friendly protection that is harmless to humans while eliminating bacteria, germs and viruses. There are two Airdal product families. Airdal D-Med is a non-toxic medical-grade surface disinfectant free of alcohol, phenyls, aldehydes and quaternary ammonium compounds. The bactericidal and virucidal product, which contains lactic acid and formic acid, perforates the cell membranes of microbes and destroys the helix of the DNA, which prevents renaturation and mutation. The product is effective against enveloped viruses Like nCoronaV, Influenza A/B, EbolaV, HIV, HCV and HBV, and unshielded viruses including murineNoroV, Adeno and PavoV, and it keeps working for up to 12 months, according to the company.

10 DAYS OF DISINFECTION

Virus Guard's 'All in One' product, which is based on nano technology, is claimed to be the only product on the market that offers up to 10 days of disinfection with a single-use. The alcohol-free product is food safe and can be applied to any surface in the cabin using either a 'spray, wipe and dry' process, impregnated wet wipes, or using a diffusion device, to form an ultra-thin nanoprotective layer. This layer contains biocides that diffuse in the event of contamination, and are claimed to be effective against all viruses, bacteria and fungi, including coronaviruses, E. coli, Ebola, SARS, H1N1, H5N1 and H8N1. Testing is currently underway under the auspices of the Global Virus Network at two of the organisation's centres of excellence, to confirm the efficacy of the product on the SARS-CoV-2 virus. The BioProtectUs System is being implemented by Jet Linx's fleet of 112 aircraft and private base terminals across the USA, as well as schools, music venues, housing developments and local businesses.



AMORPHOUS GLASS

After a surface is thoroughly cleaned using Airdal D-Med (see above), an Airdal coating can be applied, which forms a long-lasting wear resistant, ultra-thin layer of 100% transparent amorphous glass. This surface creates a permanent, self-disinfecting, antimicrobial protective coating that is effective for up to 12 months. The coating is only 150-300nm thick and destroys bacteria at contact.

The liquid coating can be applied to any cabin surface using either a spray or use wet wipes. The user then polishes the surface and leaves it to cure at room temperature for six hours. According to Decorative Products, tests conducted in March 2020 proved the virucidal efficacy of Airdal against the TGEV coronavirus, which acts as a model virus for the SARS CoV-1. The test showed that 90% of the virus was killed one hour after application, and after eight hours 99.8% were destroyed.

Ultrafabrics

The Ultrafabrics range of seat materials from Tapis can be cleaned and disinfected using hospital-grade disinfectants, including alcohol, hydrogen peroxide and even diluted bleach. Indeed Ultrafabrics is the best-selling material in the dental chair market, due to its combination of comfort and cleanability. If an airline wishes to move away from woven fabrics, the Ultratech from Ultrafabrics range looks and feels like a woven fabric, but is actually a high-performance synthetic leather.

SELF-DISINFECTING SURFACES

Premium Purity from ACT.Global is a cleaning system based around its ACT CleanCoat technology, which when applied by electrostatic spraying to surfaces and exposed to any light, become self-disinfecting and decomposes microbes such as bacteria, viruses, airborne mould spores, and chemical compounds such as VOCs. The coating is transparent and odourless and can be applied to all surfaces, where it is effective for 12 months. Once exposed to light, the coating starts a photocatalytic reaction that decomposes microbes and purifies the air.

ACT CleanCoat was tested by virology experts from Dr Brill & Partners, who concluded: "After successful experiments with three non-enveloped viruses [we found] the test product is also effective against so-called blood-borne viruses including HBV, HCV and HIV as well as against members of other virus families such as orthomyxoviridae (including all human and animal influenza viruses like H5N1 and H1N1), coronaviridae (MERS-CoV) and filoviridae including Ebola virus."



SEAT COVER CLEANERS

All Leather Maintenance (ALM), a division of Perrone Aerospace, has developed a range of non-corrosive cleaning chemicals for cleaning genuine leather and synthetic aircraft upholstery, including Deep Cleaner, Leather Conditioner and Leather Cleaner with Conditioner, available in spray or wipe form.

Deep Cleaner and Leather Cleaner with Conditioner are effective in creating a more sanitary environment due to the chemical and mechanical action of cleaning, which assists in the simple removal of soils and particulate matter that can harbour viruses, bacteria and fungi. The products are not disinfectants – rather the cleaning process helps maintain the seat cover, which can help minimise the transmission of germs in much the same way as hand washing.

These non-corrosive cleaning chemicals meet or exceed Boeing D6-7127 and AMS-1550B, and have no adverse effect on the flammability rating of leather to 14 CFR 25.853(a).



HUMIDITY FOR HEALTH

An aircraft is an extremely dry environment; indeed it is more dehydrating than any other place on Earth. Generally, extremely dry air increases the ability of viruses to spread and transmit. In a very dry atmosphere, droplets lose their moisture content through evaporation and the smaller droplets remain airborne for prolonged periods, increasing the time and distance over which transmission can occur. In an airplane, this risk is mitigated by advanced and efficient air ventilation systems. Significantly higher humidity in an aircraft cabin is another measure that is effective against the spread of viruses between passengers in the cabin.

Raising humidity is effective in reducing the risk of spreading and transmitting viruses, as well as lowering passengers' susceptibility to viruses. Thus CTT Systems has developed the Inflight Humidification system (IFH), which increases the cabin relative humidity level to a normal comfort level of about 22%, which could reduce the risk of catching viruses.

Humidity is essential for wellness and for the immune system. Indeed cabin air with almost no moisture content increases humans' susceptibility to viruses due to the weakened function of the mucous membranes.

The IFH system is designed to add moisture content (i.e. humidity) via the aircraft ventilation system, using water from the potable water supply to evaporate air through the humidifier pad, in line with the environmental control system. CTT Systems has retrofitted almost 100 systems to VIP aircraft, and they are available as OEM line-fit options for the B787, A350, B777X and MC-21. More than 2,500 IFHs are in operation, with more than 50 airline customers on the B787 and 12 on the A350.



Safe, potable water

As we collectively embark on a more determined quest to make air travel healthier for passengers, with efforts to maintain a sterile cabin, social distancing on flights, and increased screening of passengers for potential symptoms, a key component to include in risk assessments is potable water.

Whether airport water fountains, the water used onboard for coffee, or the water served to passengers to keep them hydrated, it is imperative that water is disinfected at the point of use, as it is the last contact point before consumption.

With this in mind, IWG has introduced the Passenger Water Dispenser (PWD) that applies UV-C radiation from LEDs at a wavelength of 260-270nm, which deactivates the DNA of viruses, eliminating contamination at touch points while helping to keep passengers safely hydrated.



Feel different.

Better wellbeing. Better relax.
Better sleep. Better taste.

Humidifier Onboard transforms the experience.



CABIN DISINFECTION

Albatross Aircraft Detailing has launched 'Wrap Around Application Technology', which uses electrostatic sprayers to deliver an atomised dose of aviation-approved disinfection solution, creating a germ-killing mist with a force of attraction claimed to be stronger than gravity. The output becomes magnetised, ensuring that the disinfection mist immediately covers and adheres deep into all surfaces of the cabin. The process is claimed to kill over 99% of bacteria and cover more surface area than traditional sprayers.



SOLID GEL NANOLAYER

The team at Fraser Aerospace has been working around the clock to increase its supplies of 'Bacoban For Aerospace', a treatment for continuous disinfection of aircraft cabins for up to 10 days. Once applied to a surface, the product develops an ultra-thin solid gel nanolayer. The biocides used to kill germs and viruses are embedded in the porous structure of the sponge-like sol-gel and are washed out again slowly when they come into contact with water (bacteria, enveloped viruses and fungi are always surrounded by water). A fogging formula has also been introduced that allows airlines or airports to treat large areas such as entire aircraft cabins in a short time.



SWIFT SANITISATION

The GermFalcon is a rather eye-catching and swift way to sanitise all cabin surfaces. This trolley-like device features wings that extend to cover the seats, directing germ-killing UVC light on the most commonly touched surfaces as it is pushed down the aisle, from the aisle seat, to the passenger overhead controls, IFE, tray tables, armrests and window shades. Dimer, the maker of the device, claims it can be used to treat 54 seats within a minute. While it could take around two hours to apply a multi-step chemical disinfectant to the surfaces of a narrow-body jet, the GermFalcon could sanitise that same area in less than 10 minutes.



MX14 AERO PASSES TESTS

A water-based cleaning system which shifts deep-seated stains in aircraft interiors has won new certification for its ability to wipe out potentially deadly bacteria and decontaminate surfaces of Covid-19. Flitetec also reports that its MX14 Aero antibacterial cleaner for soft furnishings, leather and plastics, has passed clinical tests of its ability to eliminate E.coli, listeria monocytogenes, salmonella typhi and staphylococcus aureus. Scientists at Kappa Laboratories in Florida rated the solution as 99.9% effective within 30 seconds of use against the bugs. The product can be applied to leather and soft furnishings, as well as plastics. The company is offering free trials of the product to airlines and MRO operators.

Flitetec MD, Trevor Lea says, "MX14 Aero is effective for decontaminating surfaces of Covid-19 and complies with regulations and rigorous aerospace specifications so operators can use it with confidence both for maintenance and for any deep cleans of aircraft before they return to service."



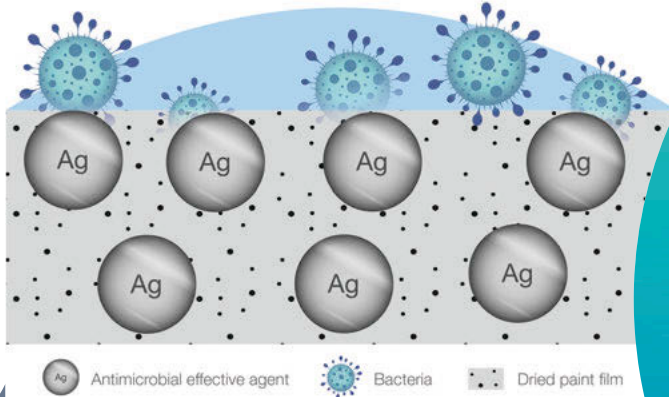
GREEN DRY-CLEANING

A chemical-free dry-cleaning process for carpets has been developed by MayorPure that does not require any seating to be removed. The cleaning process begins with the machine's spinning brushes collecting any coarse dirt, which also raises the carpet fibres so they are ready for the pre-treatment spray, which dissolves grease and binds the dirt. Cleaning granules are then massaged into the carpet, which absorb dirt and, after a short soak time, they are collected by the machine, leaving a dry and ready-to-use carpet. The system conforms to EASA/FAR 25.853, and the company claims that during tests involving 50 cleaning cycles, carpets and seat cushion specimens still met the flammability requirements without needing to renew any protective chemical treatments. A system for upholstery cleaning is also available.

GALLEY AND LAVATORY DEEP CLEANING

The appearance and cleanliness of galleys, lavatories, galley and entry mats, food service carts and meal trays can be enhanced through a combination of steam cleaning, mechanical surface polishing and isopropyl alcohol, which is safe to use on most non-porous interior surfaces. FDA Aerospace Solutions, an entity which focuses on FDA (Food and Drug Administration) regulatory compliance and aircraft certification, offers these services, as well as the refurbishment and replacement of silicone sealant and closeout seals.

The company uses Isopropanol TT-I-735, a 99% alcohol solution, for both sealant smoothing and disinfection, and while not officially documented as proven to kill Covid-19, the company says it is generally accepted that the solution will kill 99.999% of all germs when used on almost any non-porous surface. Pricing starts from US\$4,000 for regional jets, with substantial discounts available based on large order quantities. Clients have included Delta Air Lines, Aviation Technical Services, Safran, AIM Altitude, MRO Holdings, Airbus and the FDA.



SILVER IONS

The Alexit FST BioProtect paint system from Mankiewicz is an antimicrobial topcoat based on silver technology that kills bacteria. The silver ions in the coating are highly reactive and interrupt vital processes in the bacterial cells, ultimately killing them, while being safe to humans. According to the company, while it cannot definitively prove the topcoat is effective against viruses, its engineers say that silver is generally effective against many viruses, and test samples with micronised silver applied were shown to contain 90% less viruses after 20 minutes.

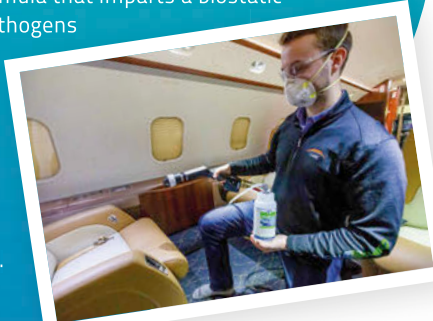
The silver content in the coating does not wear off and remains active for many years. The topcoat has been used in aircraft lavatories for several years.

ANTIMICROBIAL COATING

MicroShield 360 is an EPA-registered, FDA-approved antimicrobial coating system that is claimed to kill 99.99% of pathogens, including bacteria, viruses, mould, algae, yeast, mildew, fungi and odours. It can play a role in helping to protect passengers and crew from a range of illnesses including MRSA, E. coli, Norovirus, C. diff, flu strains, gram-positive and gram-negative bacteria, enveloped viruses including the common cold, and more than 90 additional diseases and conditions.

The protocol for MicroShield 360 requires that the aircraft cabin be cleaned thoroughly prior to a three-step treatment that takes less than two hours on a large aircraft. The first step is a electrostatic disinfectant application; next, the application of a specially formulated disinfectant to all surfaces that air-dries within minutes; and finally, the application of a coating formula that imparts a biostatic finish to treated surfaces, preventing pathogens from living on them for up to one year.

Constant Aviation is the only aircraft MRO licensed to apply the treatment in aircraft cabins. The company is currently testing the product's effectiveness against Covid-19 in a laboratory setting.



Boeing develops polymer coating

Boeing has developed an anti-viral, anti-bacterial polymer coating that can be applied to seat areas such as armrests and tray tables, and other surfaces such as glass, metal, fabric and plastics. The polymer works by disrupting the microbe's outer shell and dehydrating the area around the microbe. It is 'smart' and adaptable, changing shape based on the environment (heat, fluids, acidity) to kill the microbe, and self-cleans to prevent surface fouling. This self-cleaning capability enables the coating to remain effective for longer, lasting for a year or more before reapplication.



DISINFECTION SERVICE

AIRE offers a disinfection service for entire cabin and cargo compartments, which involves the release of disinfectant through nebuliser machines, followed by a deep spray and scrub process, in compliance with the substance composition required by EASA in its SDs. The products used are bactericidal, fungicidal, virucidal and mycobactericidal and, according to AIRE, have been found effective against coronavirus families.

Upon request, AIRE can also include a dry-cleaning and vacuuming service for carpets. Full cabin and cargo area cleaning and disinfection takes up to two hours for a narrow-body aircraft, and up to four hours for a wide-body. At the end of the entire process, AIRE releases a certificate of disinfection.

EPA APPROVED DISINFECTANT

Celeste's Sani-Cide EX3, a broad-spectrum disinfectant and multi-purpose cleaner, has been included on EPA's 'List N: Disinfectants for Use Against SARS-CoV-2', the novel coronavirus that causes Covid-19. The solution is sprayed or wiped on surfaces, and Celeste says the product has demonstrated effectiveness against viruses similar to SARS-CoV-2 on hard, non-porous surfaces and is thus suitable for use on seats, walls, carpets, tray tables, windows, overhead bins, lavatories, galley workspaces, windows and mirrors.

The product has also been tested to be effective against Feline Calicivirus (a surrogate for Norovirus), Pseudomonas aeruginosa, Methicillin-resistant Staphylococcus aureus (MRSA), Staphylococcus aureus, Salmonella enterica, Influenza A, and Influenza B.

The active ingredient is lactic acid, a natural, organic acid commonly used as a food preservative, in conjunction with synergistic boosting agents.



Anti-viral surfaces experts converge

International coatings specialists from academia and industry are gathering virtually at the UK's Royal Society of Chemistry to discuss how special surface technologies can be used to tackle Covid-19.

Helen Pain, CEO of the Royal Society of Chemistry explains, "Bringing together the biggest and brightest names in materials research to tackle this issue is of paramount importance. While we already have a number of technologies and techniques at our disposal, there is a clear need to accelerate research output."

"It's crucial that the direction taken from here is representative of the diverse range of views and experience from across the anti-viral community, which is why we are calling on anyone with relevant insights to join our Surface Coatings Interest Group."

A key participant, Stuart Clarke, professor of surface science at Cambridge University adds, "There is an acute need to provide new information and insight about anti-viral surfaces and coatings in the current climate, particularly to confirm antiviral behaviour and get appropriate products to market and into use promptly. The Surface Coatings Group is trying to connect individuals and organisations with relevant products to specialised anti-viral testing facilities."

Advanced discussions are continuing on a dedicated collaborative Slack platform, which is open to new participants. Visit rsc.li/surfacecoatings. ☒

TAKE HYGIENE INTO YOUR OWN HANDS

Most passengers will carry a bottle of hand sanitiser on board, but airlines can enable passengers to take safeguarding their hygiene a step further with Health-PAX, a system which places a touchless sanitiser at each seat. Each seat row is connected to a reservoir containing a choice of hand washes with or without alcohol, which is sprayed onto hands when placed under the dispenser. Outlets can be installed in areas including the armrest, PSU or tray table areas. As an option, the system can be modified to spray the entire aircraft cabin without human intervention.

The price of the system has not been determined yet, but its developer, SaniTene, says it will work out less expensive for airlines than cleaning aircraft after every flight, especially as once installed, very little maintenance is required. The company says the design's use and technology has been FDA, CDC, WHO and industry approved.

John Squicciarini, president of SaniTene states, "There is no reasonable reason to completely disinfect and sanitise aircraft after flights – just provide passengers and crew with the ability to keep dangerous pathogens and other infectious agents from entering their bodies. The project lets passengers see, feel and smell their ability to clean, not just be notified that the aircraft was cleaned."

The company conducted a survey of 4,264 passengers and crew in four international airports and found that 96% of had strong opinion that such technology should be mandated. 100% reported they would be very likely to use it.





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CASE STUDY

Enquiry for the design, manufacture, testing and qualification for a chiller for a helicopter installation.

Summary of brief and stated specification:

- Designed to fit above a galley drawer and keep the contents of the drawer cool
- 28Vdc
- Rapid chill function

MAX UNIT WEIGHT: Net 15.75Kg

CERTIFICATION: Helicopter

COMPLIANT WITH: RTCA DO-160G for 28Vdc, non-emergency equipment

PROJECT STATUS: Required equipment supplied, testing and qualification completed. Additional equipment ordered for similar project by same customer.

REF / ALRF7-502

Aerolux Limited established 1988 for the purpose of design, manufacture, certifying and servicing of galley insert equipment. Aerolux has grown to become a key supplier to major commercial airlines, corporate operators, major air framers, finishing centres and leasing companies.

Our approvals include CAA and EASA Part 21 and Part 145, FAA Foreign Repair Station Transport Canada and EN9100.

HYGIENIC SEAT COVERS

Tapis considers the effect that Covid-19 will have on the aircraft interior fabrics sector

The advent of Covid-19 is likely to change the way we behave, from the way we think about hygiene, to the way we plan for disasters and manage our emergency response systems. The way that airlines sanitise cabins to safeguard passengers will come under increased scrutiny as it becomes a main focus for customers. So what impact will this have on customers and their decision-making processes when booking a flight? What will the effect be on the passenger experience? What are some of the trends that might emerge from the post Covid-19 world, and are we prepared for them?

When we look specifically at hygiene, until recently we might perhaps have only looked at the aircraft interior from a surface cleanliness perspective. Whilst hygiene was important, it was probably lower in the list of passenger priorities than it is now. Indeed flights operating today see teams clad in biohazard outfits disinfecting the aircraft interior.

How will this crisis affect cabin design choices? One key theme is the use of woven fabrics. Woven fabrics have an open weave, porous structure with a high degree of perceived comfort, which is one of the major reasons why they have often been chosen for long-haul seating. The breathability of the open-weave structure allows for much greater heat dissipation and water vapour moisture absorption, which are two key factors in defining comfort. However, this open structure can work against the material from a cleanliness and hygiene point of view.

The open structure of the weave allows microbes, bacteria and viruses to hide in the niches and crevices of the fabric, and the only way to truly disinfect or clean it is to remove the fabric and either wash or dry clean the materials. There is an obvious practical aspect for



Actual safety as well as perceived safety are key drivers for encouraging passenger confidence

the logistics of this process, and as such fabrics are typically only taken off the aircraft for cleaning every three or four months. Whilst fabrics can be spot cleaned for localised stains, how comfortable will customers feel sitting on fabric seat covers that might not have been cleaned for months?

Another factor to consider is the seat colour. In the past the prevalence of dark blue and dark grey interiors has often been seen as a way to mask the presence of soiling and contamination in order to present the customer with a pleasant interior. By contrast, medical and biohazard workers typically prefer white or light colours, as they need to be able to see when their protection layer has been contaminated – they need a visual cue as to when they should respond quickly to disinfect and clean the product.

In the future, we could see a much greater prevalence of materials such as Ultrafabrics, which offer textures ranging from fabric-like to classic leather grains, all of which can be quickly and easily disinfected with hospital-grade disinfection wipes. Ultrafabrics products retain the look, feel and thermal comfort properties of fabric, but the coated

surface provides an effective barrier layer against bacteria and virus pathogens. By incorporating premium ingredients, including durable 100% polycarbonate resins, these materials can stay ahead of care and disinfection challenges, allowing designers to explore new and lighter colour options for future aircraft interiors.

“When it’s time to clean or disinfect, the surface can be wiped clean, safe in the knowledge that there are no woven crevices for the pathogens to hide in,” explains Dr Kevin Hyde, head of R&D at Tapis Corp, the global supplier of Ultrafabrics for aerospace applications.

“The ability of Ultrafabrics materials to withstand cleaning from hospital-grade disinfectants and the fact they are proven market leaders in the medical and dental industries, makes this a perfect product to address hygiene and cleaning seats in the current environment.”

Customer safety is the primary aim of aviation, but so too is the perception of safety if we are to win back the confidence and trust of passengers. ✕

ABOVE LEFT: THE RESISTANCE OF OPEN-WEAVE STRUCTURES TO PATHOGENS MUST BE CONSIDERED

ABOVE RIGHT: SEAT COVERS MUST NOW BE EVEN MORE RESISTANT TO CLEANING PRODUCTS

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CASE STUDY

Brief from a MRO leading a project to refurbish commercial aircraft. The customer required replacement Ovens and Remote Controllers. The ovens were ACE external dimensions and KSSU internal dimensions.

The request was for identical ACE external dimensions for installation into the ACE envelope with Atlas Standard internal racks. Remote Oven controllers were also required which matched the aircraft wiring without any aircraft wiring modifications.

MAX UNIT WEIGHT: Oven Empty 28.15KG

CERTIFICATION LEVEL: B777-300ER

COMPLIANT WITH: RTCA DO-160G for 115/200Vac, 400Hz 3 phase non-emergency equipment

PROJECT STATUS: Between November 2018 and April 2020 over 140 sets of Ovens and Controllers have been delivered and installed on aircraft. Typical installation per aircraft is 8 - 10 sets.

REF / AL-OU50-2032-13 & ALRM100-13 respectively.

Aerolux Limited established 1988 for the purpose of design, manufacture, certifying and servicing of galley insert equipment. Aerolux has grown to become a key supplier to major commercial airlines, corporate operators, major air framers, finishing centres and leasing companies.

Our approvals include CAA and EASA Part 21 and Part 145, FAA Foreign Repair Station Transport Canada and EN9100.

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HIGH-TECH CABIN PRODUCTS

JCB Aero is producing a wide range of highly engineered aircraft interiors products from its facilities in France

JCB Aero is a key player within the aircraft cabin interior industry. With over 30 years of experience, the French company provides state-of-the-art products for the aviation industry, manufactured using the latest technologies.

Since 2016, when AMAC Aerospace acquired JCB Aero, the company has gradually expanded from VIP manufacturing, to serial production for companies such as Safran Seats France, Airbus Helicopters, Dassault, Sabena and Stelia Aerospace. All these products are delivered from its facility situated in Auch near Toulouse, which has over 10,000m² of offices, workshops and hangar space in one location.

The company's first serial production contract was signed with Sicma, known today as Safran Seats France, for Emirates Airlines' A380 front row monuments (FRMs). Since then, JCB Aero has widened its range of serial production to seating for business class and VIP seating areas for A350s, as well as passenger cabin and cockpit cabin linings for H175 and B737 aircraft.

HIGH-OUTPUT PRODUCTION PROCESSES

Continuing its successful business with Safran Seats France, the company has secured various contracts for monuments and business seats for A350s, as well as privacy doors for business class seats in B777-300 and B777-900 aircraft. JCB Aero's production process is efficient, with a production rate that allows for delivery every month of 1-1.5 shipsets of privacy doors (76 doors per shipset), a complete shipset of front row monuments (left, central, right), 18 seat shells, and more than 640 loose parts. Manufacturing cabin panel linings is also an important activity at JCB Aero,



producing cabin and cockpit linings for Airbus helicopters.

PLUG & PLAY FOR HELICOPTERS

For more than seven years, JCB Aero has been producing cabin and cockpit linings for EC175 search & rescue helicopters, as well as oil & gas versions. Today, JCB Aero produces cabin and cockpit carbon composite lining panels, totalling more than 21 panels per month, fully equipped with electrical harnesses. Each panel is pre-installed and tested in a mockup before delivery, to be sure the panels are fully functional when they are delivered, ready for installation.

JCB Aero offers a standard panel configuration, including a choice of different cores and skins, such as aluminium, phenolic and epoxy glass fibre skin, with a maximum size of 1,500 x 3,700mm, and A & B design values. The company also provides curved panels for commercial and VIP aircraft on a regular basis. All panels are tested internally, using A & B design values to ensure compliance with different client requirements.

A RANGE OF APPROVALS

JCB Aero holds Part 21J, Part 21G and Part 145 approvals, meaning the



JCB Aero is introducing a manufacturing execution system during 2020

ABOVE LEFT: 3D SCANNING FOR FAI IS A NEW SERVICE BEING INTRODUCED BY JCB AERO IN 2020

ABOVE RIGHT: BUSINESS CLASS SUITE DOORS FOR B777S BEING PRODUCED AT JCB AERO

company is able to provide full cabin refurbishment and equipment packages, as well as specifications to print, using its own design organisation to complete a certified package. The company also provides custom-made composite parts and equipment for cabin interiors. JCB Aero is an EN9100 qualified company.

FULL TRACEABILITY OF PRODUCTS

The company is continuing to invest in improving its production processes, including a manufacturing execution system (MES) which will become operational during 2020. The system will digitise the whole production process at JCB Aero, switching to a paperless process, with access in real-time allowing a quicker, smoother process for serial production. The MES setup even enables guaranteed product traceability throughout the full production cycle. ☒

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NEW
Innovation

**antiviral & antimicrobial
armrests and tray tables
for a healthy and clean
flight experience**

ANTIMICROBIAL AND ANTIVIRAL

Ebco has developed antimicrobial and antiviral armrest and tray table surfaces for a healthy and clean flight experience

Ebco, a specialist in manufacturing components for aircraft seating and cabins, with a track record in supplying tray tables and armrests to many aircraft seating manufacturers, has been considering how it should adapt its product range to benefit the

passenger experience during the Covid-19 situation.

Clearly hygiene has become an increasingly important factor for flyers, especially in terms of aircraft seating.

Have you ever considered how many germs accumulate on armrests and tray tables between cleaning processes? These surfaces are among the least hygienic parts of an aircraft seat, and can often be contaminated with pathogens.

Ebco has therefore implemented measures to protect the surfaces of its armrests and tray tables against infection. Thanks to the completely closed surfaces without pores, its range of armrests and tray tables can enable quick and easy cleaning and disinfection.

The biologically active compounds embedded in the varnish on the surfaces attack the shell of viruses. As a result, the virus shell becomes porous and the compounds kill the virus. Coronaviruses can stay on surfaces for up to nine days, but the application of this special varnish can reduce the risk of infection by a claimed 99%. The surface treatment can kill any viruses present within two hours, according to Ebco.

"With this highly beneficial feature, Ebco provides a considerable level of added safety for passengers, and an enhanced level of health-oriented comfort on flights", states Michael Graf, Ebco's sales manager. ☒

Ebco's quality management system is in accordance with DIN EN 9100



VIRUSES CANNOT PENETRATE THE SURFACES OF EBSCO'S TRAY TABLES AND ARMRESTS

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SUSTAINABLE LEATHER TANNING

Wollsdorf has developed a new sustainable tanning method to make leather an even more sustainable option

Real leather products are synonymous with durability, sustainability and natural quality. Bovine raw hides are a by-product of the meat and dairy industries, and if these hides were not processed by tanneries, they would be discarded, putting additional strain on the environment. The leather tanning industry harvests, refines and transforms these hides into sustainable, valuable products, making leather production a perfect example of upcycling.

Leather production is subject to strict environmental restrictions. Tremendous advancements are being made with regards to R&D, and therefore modern, responsible tanneries like Wollsdorf Leather are very environmentally friendly. Wollsdorf Leather applies its high standards to all its sites worldwide.



Tanning has evolved over the years and become more and more sustainable. The latest evolution is BrighTan, Wollsdorf's innovative tanning process.

Bright tanning represents the state-of-the-art in tanning and combines the functionality of modern leathers with ecological values. The tanning agent used is based on natural raw materials and the process is completely free of heavy metals, chrome and glutaraldehyde. Another benefit of Wollsdorf's production

process is that it uses minimal amounts of water and energy, which makes its natural leather products even more sustainable. There is also good news for design departments: the BrighTan process can create nearly white leather, as well as bright and intense colours.

Wollsdorf Leather has been producing bovine leather for aviation for more than 30 years. The BrighTan process can be used for all its aviation leather products, whether lightweight or standard ranges, and its finishing systems incorporate the Evo+ anti-bacterial treatment. Wollsdorf offers warranties of up to eight years. ❖

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WOOD-LOOK FLOORING

Just because it's wood, that doesn't make it a perfect fit. Lonseal goes beyond traditional wood elements and studies human needs to achieve perfect wood designs

A lot has changed since the world's first commercial airline took off in 1914. Wood design is gaining the attention of many aircraft owners because of its dual purpose: it can make an aircraft interior feel more luxurious and it can also provide a calming effect. However, weight is a major factor when designing aircraft interiors, so real wood is not an option. Lonseal sheet vinyl flooring is considered by some to be the best option for wood-look flooring in aircraft cabins.

Lonseal designs and manufactures sheet vinyl flooring for a range of aircraft. The Cirrus Collection offers realistic wood-looks, from intricate grain details to the unique characteristics of real wood, replicating its timeless beauty.

The Cirrus Collection has three options. Lonvirga is a classic wood-grain look that adds a design touch, particularly to lavatories and private cabins.

Lonmistrail is a linear pattern that is visually lively, yet brings a touch of class and warmth to an otherwise sterile interior. Finally, Loncontrail resembles a natural striated wood-look, with a continuous brushstroke.

Lonseal products meet REACH criteria, and the flooring range also meets FAA requirements. All products in the aircraft collections come with GreenMedic and GreenAir. GreenMedic is an antimicrobial



formulation that improves infection control, while GreenAir provides low VOC for improved cabin air quality.

Lonseal became an aviation industry leader because of the Featherweight feature in its flooring products, which makes them up to 30% lighter than standard NTF (non-textile flooring) products, with a high strength-to-weight ratio. ❖

LONMISTRAL, PART OF LONSEAL'S CIRRUS COLLECTION, IS AVAILABLE IN DIFFERENT SHADES

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DECORATIVE PLATING

Signature Plating is implementing several hygiene measures in its operations to ensure it delivers high quality, virus-free parts to customers

Covid-19 has pushed most of us out of our comfort zones, making us look beyond those things that were previously normal in our lives. Signature Plating has always been a 'customer centric' organisation that depends on its people to always do whatever is necessary to achieve customer goals. The company recognises that its team is its most valuable asset, and is therefore taking all necessary steps and precautions to protect them.

As soon as the virus became an imminent threat, Signature Plating took measures to protect its staff and customers. For example, the temperature of staff is measured as they enter the building for work and when they leave, and during the workday, social distancing is enforced. The company is also spreading its teams, and customer work, over a three-shift period in order to create a safer work space.

Signature Plating also requires those employees that can work remotely, to do so, while administrative personnel work in the office for only the hours needed to accomplish their daily tasks before going home. The plant is closed to outside personnel except for any essential



maintenance necessary to support operations.

In other measures, hand sanitising stations have been installed throughout the plant for employee use, and all personnel in the building have been mandated to wear masks during work hours and are being encouraged to employ the above measures within their own households in order to keep their families safe. Another layer of protection is that all touchpoints within the building are cleaned and disinfected nightly.

Signature Plating is also taking steps to protect customers and their shipments. The Covid-19 virus can live on surfaces for between several hours to days, depending on the material. The

Signature Plating team has always worn latex/nitrile gloves when handling customer parts and, as added protection, gloves are now being changed more frequently. Additionally, N95 masks are now worn by shipping department personnel. Customer parts are being processed to normal standards by individually wrapping line items with corresponding labels for easy identification. Prior to parts being wrapped, they are inspected and surface cleaned using isopropyl alcohol to remove dust and microorganisms, ensuring the plated surfaces are completely sterilised. The goal is to ship parts that meet the expected quality standards and are safe for customers to handle.

Signature Plating will continue to look at its processes to ensure that the latest medical guidance and preventative steps are taken to create the safest work environment and to deliver quality, virus-free parts to customers. ❖

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Air France A380

THE WHITES AND GREYS USED IN THE CABIN COLOUR SCHEMES REFLECT THE A380'S LIVERY, AS DO THE EYECATCHING SPLASHES OF RED FROM AIR FRANCE'S BRANDING

We should have been looking back on Air France's A380 in 2022, but alas this cruel 2020 has accelerated the airline's retirement of the aircraft. It is a sad moment as Air France, like many airlines with a flagship A380, embraced the potential of the spacious interiors to be a showcase of cabin design excellence and an expression of national style and pride.

Air France operated its A380 fleet from November 2009 to May 2020, during which time it introduced a steady stream of designs and innovations across all classes, with the headline act being La Première (first class). The first of its 10 A380s launched with a cabin design that had already been in service for seven years, but in 2012 the airline decided to invest in an upgrade. With an eye on finances, the design team had to work within the existing seat model and footprint for the nine-suite cabin on the main deck, but the redesign of the Contour seats represented quite a hike in costs, with the redesigned models costing an estimated €200,000 (US\$218,000) per seat – €140,000 (US\$153,000) more than the originals.

Yellow Window was brought in for the project, the France-based design consultancy which had previously worked with the airline on its B777-300 bar areas. For La Première the brief was to enhance seated comfort and create a boutique hotel feel.

"They wanted something more slender and lighter, which corresponded with an image of Air France that is feminine, refined, French, open, spacious," recalls Patricia Bastard, a partner at Yellow Window.

Passenger surveys and feedback groups indicated that more privacy was desirable in first class, but not

enclosed suites, which led the design team to opt for a privacy level in between the suites favoured by Asian and Middle Eastern airlines and the open style of carriers from the Americas.

The team found inspiration for the desired sense of elegance, protection and delicacy of form in the tulip, a flower which represented a major trade in France before the Netherlands' 'tulip mania', and which became a symbol of prosperity.

While the overall dimensions of the seat remained unchanged, its form appeared sleeker, with ergonomics improved, and technology and controls concealed. There was even a slight weight reduction as some trim was removed, such as "the fake wood that gave it a downmarket feel", as Bastard recalls.

Over the years, as Air France introduced various refinements to its A380 fleet, the overall aspiration was for the spacious interiors to create a spatial experience akin to travelling on a luxury ocean vessel.

As Carole Peytavin, VP of customer experience at Air France explains, "We designed the A380 to give the sort of pleasurable experience you used to get when travelling across the Atlantic on a cruise liner".

The two decks of the A380 helped create the classic liner feel, as passengers could promenade around the aircraft and between decks. However, as with cruises, paying for a higher class of ticket did bring privileges.

La Première passengers had exclusive access to the curved staircase, rising from the front of the cabin to the first-class bar and Galerie d'Art area, which showed art exhibitions via video displays. However, there was a touch of égalité, as the A380 had a further five bars across all classes, playing a role in what Peytavin sees as a characteristically French touch of conviviality and café culture, a place where business and leisure passengers could mingle. We wish we were just bidding au revoir to Air France's A380s, but sadly it's adieu. ✕



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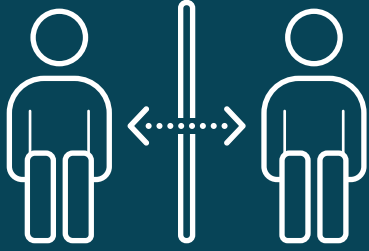
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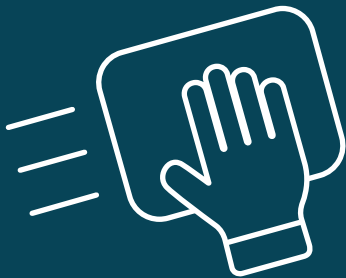
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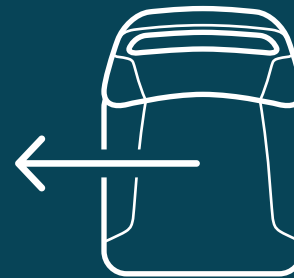
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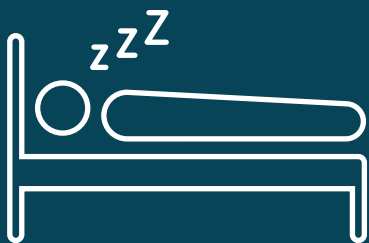
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