The future is behind you

Technology is increasingly embedded in every element of the passenger journey. **Richard Williams** discovers how designing for digital innovation is impacting the very seats we're sitting on

The average passenger may not pay much attention to his or her aircraft seat – unless it's particularly uncomfortable – but those on commercial aircraft today are unquestionably different from those 20 years ago. They are likely to be lighter and less bulky, constructed from different materials, and increasingly 'smart' – adapted to serve our tech-centric lifestyles.

Craig Foster, of market intelligence firm Valour Consultancy, recently produced a report on the seats market. He says: "With airlines constantly looking to reduce fuel burn, there has been an intense focus on producing lighter and lighter seats and materials that promise to reduce ongoing operational costs. Airlines will pay more for lighter materials when fuel prices are high, but there is, of course, a breakeven point above which airlines cannot justify the cost."

Strong growth

Materials such as new iron-aluminium alloys and carbon fibre reinforced polymer (CFRP) composites, titanium, magnesium and graphene, are all in the mix, and when new designs and constructions incorporate passenger enhancing technologies too there's the potential for a further return on investment in terms of the passenger experience.

Airlines are investing, with the seat market showing strong growth, and Foster expects the commercial aircraft seating sector to be worth $4.9 billion by 2028 – up from $3.8 billion in 2018.

Above: The Air Lair cabin concept from Factorydesign

At the heart of the sector are the 'big three,' he says: Safran Seats, Collins Aerospace and Recaro Aircraft Seating. Together, these account for about three-quarters of annual revenues, but a clutch of new players are also seeking to chip away at the dominance of the big three.

And as airlines also look to invest in technology, to improve every element of the onboard experience, seating specialists are collaborating more closely with digital specialists to combine services to best effect.

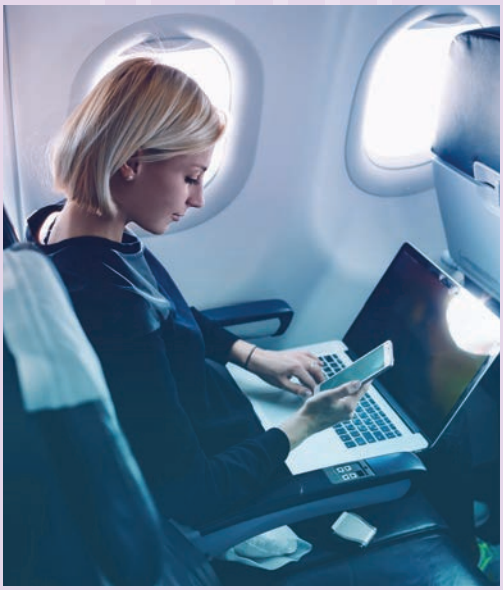
More control

Adam White, director at aviation design consultancy Factorydesign, says: "There is no lack of enthusiasm for bringing technology into aircraft interiors, or lack of knowledge of what is possible, but what has been hard is the transfer of new technology into the cabin without adding weight, without time-consuming certification, and all for an acceptable cost.

"Key is to create pieces of added value that enhance the experience. Once the technology itself is part and parcel of the seat, the ground and in-air experiences really start to align.

"We are already seeing passengers getting much more control over their environment, with growing opportunities for interaction in the luxury end of the market. But there is still an awful lot more that can be done to improve the Economy experience through technology.

"As inflight technology becomes routine



> you can piggyback on myriad features and enhancements on the back of that and customisation becomes far easier. It is an exciting prospect and we know this is becoming a significant driver."

Panasonic has been making headlines with its in-seat wellbeing initiatives – first with its Calm app giving wellness advice through the IFE system, and then most recently with its Wellness solution, which features Active Noise Control and technology to improve air quality.

Purer air

Active Noise Control aims to support more restful sleep on long-haul flights by reducing background noise without the need for headphones. The system can reduce ambient noise at the seat by up to 15 decibels, and is optimised for the 80-400Hz frequency range, with no impact on the ability to hear human voices. The technology is adaptable to each seat configuration and will calibrate automatically to a passenger's seat inflight.

The programme brings purer air to the seat environment too through Nanoe, a system that deodorises and neutralises the air in the cabin and around a passenger's seating area by applying a low voltage to moisture in the air, which bursts into nano-sized electrostatic atomised particles at a rate of 480 billion nm particles per second.

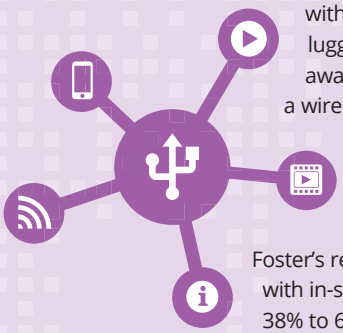
David Bartlett, cto of Panasonic Avionics Corporation, says: "Our mission is to leverage the latest advancements in technology to improve the passenger experience onboard all Panasonic-equipped aircraft. Wellness solutions are already proving popular with airlines and we are working with seat manufacturers and airline partners to identify ways our technology and fast-evolving systems can help support in-seat comfort, as well as the entertainment offering.

> **"The challenge is to add technology economically without adding weight or certification delays**

Innovative German company AMC encourages passengers to take a proactive approach to their own comfort and proposes the use of sensors embedded into the seat. These relay information to its SMEATED (smart seated) app to make inflight recommendations to the passenger on how to improve his or her posture en route for better long-term comfort.

In the same vein, Aviointeriors has >

Above from left: Connectivity onboard is becoming a must-have for many passengers; and the key asset of a long-haul Economy seat (Singapore Airlines) **Below:** Recaro's Business seat for WestJet



› incorporated a massage system into its new Business seat, The Adagio.

As growing numbers of passengers board with their own technology in their hand luggage, the seat design trend has moved away from seatback screens in favour of a wireless IFE systems that allow passengers to use their own personal electronic devices (PEDs) for IFE and connectivity. With this has come a boom in the market for in-seat power provision. Foster's report predicts the proportion of seats with in-seat power is set to increase from about 38% to 66% in the next 10 years.

Power to the people

The retrofit opportunity for in-seat power – especially in the largely untapped single-aisle segment – will represent an increasingly fierce battleground going forward.

Foster explains: "In 2018 Astronics and KID-Systeme generated a combined 98% of total revenues, with six or seven companies fighting it out over the remainder. But with the likes of IMAGIK, Burrana and Inflight Canada all winning sizeable contracts recently, concentration is set to shift."

In-seat power vendors have begun to strike up relationships with seat manufacturers. KID-Systeme and IFPL are integrating their system with Mirus's Hawk seats for AirAsia. IMAGIK and Recaro had a similar relationship for deployment with the GOL airline, while Burrana is collaborating with Acro, Recaro, HAECO and Aviointeriors on various programmes. Seatmakers are starting to view pre-integrated in-seat power as a design feature that can help set them apart from competitors and increase profit margins.

Inflight connectivity

Safran Seats' new generation of A+C in-seat USB electrical power systems are capable of charging most types of personal electronic devices, including smartphones, tablets and laptops, and these sockets can provide up to 45W of power to each passenger. And Recaro's BL3520 Economy seat makes it easier to hande personal electronic devices with a tablet PC holder, a new pocket for stowing, as well as power supply for charging.

Collins Aerospace has a Pinnacle seating range that offers optional audio inflight entertainment integration, PC power and USB integration, and the company says it recognises that for more and more passengers, being connected inflight is no longer a luxury. It has also evolved the CabinConnect wireless inflight connectivity solution, which allows airlines to keep passengers 'engaged, entertained, empowered and informed through all phases of flight'. Its partnership with Inmarsat's GX Aviation service, to deliver global high-speed aviation broadband onboard, is also opening the way to more fully-connected and offer personalised services, as well as creating new revenue generation opportunities.

Foster identifies some real benefits for airlines integrating their seat and tech investments: "The benefits of these integrations include lower part count and reduced installation and maintenance costs. And power that can be integrated into the seat design in a more aesthetic manner that does

not compromise ergonomics is viewed more favourably by passengers, which helps drive better Net Promoter Scores (NPS)," he says.

"Furthermore, the seat structure itself can be used to help with heat dissipation, resulting in lighter and less obtrusive power equipment."

Burrana, formerly digEcor, is one of the largest and most dynamic players in this new market. It focuses on supplying in-seat power flexibly to airlines, with minimal investment or aircraft down time. Standalone in-seat power solutions can be either USB-A (5V 10W), USB-C (power delivery up to 100W), or 110V AC (160W). The system can be delivered in any configuration of these options.

David Withers, ceo, says: "Passenger Power is a great area of focus for us at Burrana and we have been successful in implementing unique design approaches to fit specific airline seats and configuration needs including redesigns of line-replaceable units (LRUs) and designing mounting kits that enable airlines to install power without any further seat testing. We continue to drive down cost, weight and options for more efficient consumption of aircraft power. Our reduced componentry approach also delivers efficiencies to streamline supply chains."

> **"Power integration to the seat design can help drive a better NPS**

Super First

A blurring of the lines between cabin categories as the airline industry moves away from four clearly defined classes (Economy, Premium Economy, Business and First) is also creating opportunities in the seating sector.

"Super First class is emerging, and mini-rooms, rather than seats, are seen to represent the ultimate in comfort and a way to differentiate top-tier service from an ever-improving Business – where suites with sliding privacy doors are becoming more commonplace," says Foster.

One example of this new flexible approach comes from Safran Seats. Its Versa seat is built upon a modular platform that delivers weight and space savings. Thanks to its architecture, the Versa is ready to receive modules and technology bricks developed across the Safran Seats premium range, such as wider screens, wireless charging and audio, advanced lighting, and new control systems. With a herringbone layout and its ability to provide passengers direct access to the aisles, Versa also offers a spacious fully horizontal bed.

Foster concludes: "Premium Economy and fully flat Business beds with direct aisle access on single-aisle aircraft will become increasingly important as longer-range narrow-bodies like the new A321XLR and 737 MAX are deployed more frequently. The likely knock-on effect is increased demand for multiple in-seat power options in the more premium cabins." •

Above from left: Manufacturers such as Safran Seats are using high-tech materials to cut seat weight; Emirates has its IFE offer at the heart of its A380 First offer **Facing page from left:** Virgin Atlantic's new loft space allows for communal IFE viewing in belted seating; and FactoryDesign is working to inspire new ways to incorporate tech with style