



ASIAN AVIATION

VOL 21, NO. 03 MAY-JUNE 2023

ASIA'S ONLY COMPREHENSIVE INDEPENDENT INDUSTRY PUBLICATION

Crystal Cabin

'OSCARS' OF THE SKIES
HOPEFULS READY FOR AIX

MRO WOES

Supply chain hiccups
force repair workarounds

PILOT SHORTAGE

Situation improving but
airlines still suffering

AIRPORT DEVELOPMENT

India is upgrading its
facilities at a rapid pace

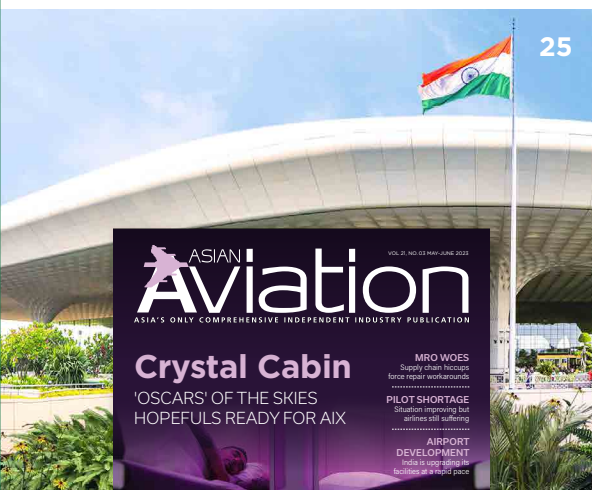


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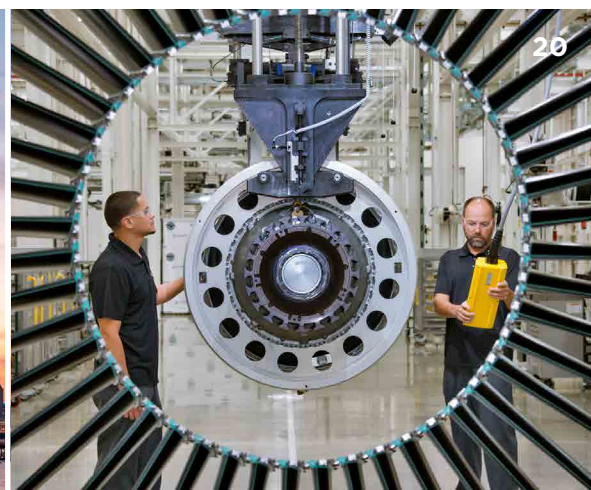
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IT.
SIMPLE.**

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IT'S THAT SIMPLE**

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On the cover: Air New Zealand's Skynest.
(Credit: Air New Zealand)



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Asia continues march to aviation top spot





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Call it urban air mobility, air taxis or some other acronym like AAM, but the dream of flying in something like a Volocopter still requires the need to sort out the airspace requirements, which is no easy feat. Matt Driskill looks at some of the latest developments.

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 Asian Aviation Magazine
 Asian Aviation (AAV)
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MICA (P) 198/02/2007

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Printer: Times Printers Pte Ltd
ISSN 0129-9972



April 23, readership 8761
© ASIAN PRESS GROUP Pte Ltd



Challenges ahead

PREDICTING THE FUTURE IS A FOOL'S GAME, which is why the aviation industry for so long has relied on historical data to plan for the future, whether it's an airline working to fine-tune its summer or winter schedule or a manufacturer like Boeing or Airbus forecasting how many planes will be needed by airlines over the next 20-year period.

Relying on that historical data went out the window during the COVID pandemic. Borders were opening and closing seemingly at random or at the whim of whichever government was feeling public pressure to keep out "foreigners" who might be infected. Airlines stored thousands of planes in the desert in Australia or the US (many of which will never leave the ground again) and millions in the industry lost their jobs.

Rest assured the industry has now input another future pandemic into its planning processes, but even with the incredible return of travel and millions of people taking to the skies now that things like pre-flight PCR tests are no longer required, aviation around the world faces a host of challenges that will likely not be solved anytime soon.

These challenges include people because the industry laid off hundreds of thousands of pilots, flight attendants, ground staff and MRO techs. Another is lack of planes because of the thousands that were stored or retired. Supply chains for parts are tangled (as we describe in a story in this issue) and airfares remain stubbornly high, which the airlines love, but which in recent days have put some travellers off booking trips.

Lest one think this is only my opinion, a report by consulting firm McKinsey outlined the challenges commercial aviation faces and how there is no easy solution to any of them.

"The commercial aviation industry is facing an uncertain future with arguably more unknowns ahead than at any point in its history," McKinsey wrote in the report. "In this environment, airline operators may find it more difficult than ever to forecast the demand for air travel. That, in turn, makes it challenging for manufacturers to confidently predict the long-term market for new aircraft and fleet upgrades and to ensure they will have the capacity, material, and labour to meet it."

Without repeating McKinsey's entire article the consulting firm outlines three scenarios that basically boil down to the Good, the Bad and the Ugly. These scenarios, McKinsey said, imply a range of compound annual growth rates of 0.8 percent under the worst

scenario to 3.8 percent for under the best scenario.

The good news for manufacturers in McKinsey's report is that "increased passenger air-travel demand and the replacement of older aircraft will translate into demand for new passenger aircraft. Based on the numbers from our three scenarios, future demand for new aircraft would total between 5,200 and 11,600 through 2027", especially narrowbody planes.

The bad news for manufacturers is the supply chain and workforce constraints. In consultant-speak, McKinsey says "aerospace manufacturers can prepare for an uncertain future by ensuring the health and resiliency of their supply chain, prioritising strategies for flexibility in their workforce, and taking calculated steps toward modernising manufacturing capabilities". Which in plain English means replacing those hundreds of thousands of people that were let go during the pandemic, and training them, working with suppliers to make sure their financials are in order, and they can deliver what they say they can deliver, and making investments in new technology.

For airlines, McKinsey once again delves into consultant-speak, saying "balancing available aircraft and crews with demand is a continuing challenge, and with greater uncertainties than before, they will need to prepare for agility in the coming years. A few distinctive ways to build an infrastructure for success, given the continued uncertainty of the air-travel environment, include taking appropriate measures in right-sizing fleet composition, preparing to meet travel demand by customer segment and route, and moving toward a vision for aviation of the future". In plain English they mean airlines need to fine-tune their network planning capabilities, right-size their fleets and plane types, as well as invest in "sustainability", which is quickly becoming the cause de jour for aviation.

As I said at the start of this column, predicting the future is a fool's game. McKinsey seems to agree, saying, "the only certainty in commercial aerospace today is that no one can confidently predict anything. There is no set of actions that will help a company contain all its risks".

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**NEXT
ISSUE**

ENGINE UPDATE
Will electric planes become a reality?

PASSENGER EXPERIENCE
It's getting easier to fly, but the thrill for many is gone.

WOMEN IN AVIATION
It's said women hold up half the sky, but not in aviation apparently.



ACC Aviation extends partnership with Freedom II for VIP Boeing 757-200

ACC Aviation, the global aviation services group, announced it will remain an exclusive marketing and sales agent for Freedom II LLC-operated VIP Boeing B757-200. ACC Aviation was appointed by Freedom II LLC last summer to support their 62-business-seat VIP aircraft, with ensuite bedroom. The aircraft has since flown several high-profile artists and music bands since obtaining their AOC in 2022 and is set to embark on more tours around Europe this summer. "We are delighted to continue working with Freedom II LLC. The aircraft has been well received by the air charter market. We had enquiries coming from multiple sectors, including music, sport, as well as operators and air charter brokers, who were seeking capacity to fulfil their global charter requests. This is a unique aircraft that can accommodate a range of air charter requests, and I am excited to follow how many countries VP-BBE will visit through the rest of this year and beyond," said Phil Mathews, CEO of ACC Aviation.

EUROPEAN AUTHORITIES APPROVE EXECUJET MRO SERVICES

European regulators have approved ExecuJet MRO Services Belgium to provide line maintenance in other European countries. "Following strong demand from customers, there was a need for us to offer line maintenance at locations away from our home base," says Regional Vice President of Europe at ExecuJet MRO

Services, Christophe de Coppel.

ExecuJet MRO Services' main base for line maintenance in Belgium is Brussels Airport and it has another maintenance, repair and overhaul (MRO) facility at Flanders International Airport, near the west Belgium city of Kortrijk, that does mainly heavy maintenance.

BIZAV ACTIVITY DOWN 2% IN Q1 2023 YOY, STILL UP 12% VERSUS Q1 2019

The first quarter of 2023 has shown a modest cooling compared to record-breaking Q1 2022, although the sharper decline in the US charter market has eroded a substantial amount of the gains compared to pre-pandemic 2019, according to data company WINGX. European bizjet gains

compared to 2019 have narrowed to 5 percent. There is still some record-breaking growth in large cabin long-sector flying. Bizjet activity in the UAE has more than doubled versus Q1 2019. Worldwide business jet sectors in Week 12 of 2023 amounted to 68,543 sectors, a 3 percent

JETCRAFT ACQUIRES CFS JETS

Jetcraft announced that it has acquired Corporate Fleet Services (CFS Jets), a prominent business aviation firm specialising in the turboprop, light and midsize jet markets. Jetcraft has mainly focussed on super-midsize, large, and ultra-long-range jets. By adding CFS Jets' specialties, Jetcraft is able to offer a diverse product line. This strategic alliance represents a significant milestone for Jetcraft while also bringing additional benefits to its clients, Jetcraft said. Together with CFS Jets, the company now offers more than 100 dedicated global advisors and the largest number of exclusive jet listings. Both companies are continuing to operate individually for the time being.

TAG AVIATION STRETCHES LIMITS OF GLOBAL 7500

TAG Aviation has highlighted its operations recently with long-range flights on their Bombardier Global 7500 fleet. The trips in question were from Hong Kong to Newark and San Jose to Hong Kong, non-stop with flight times of 14:58 hours and 15:48 hours respectively, which are the among the longest flight endurance range of the Global 7500. "Ensuring optimal efficiency is one of the top priorities for our operations team. To achieve this, we diligently monitor weather conditions to plan the most efficient route, both in time and fuel use. Working with the crew supports the planning process and allows us to tailor make the plan to the aircraft," said Karson Wong, senior manager ground operations, TAG Aviation Asia.

MITSUI BUSSAN AEROSPACE SIGNS FOR SIX AW139 HELICOPTERS

Mitsui Bussan Aerospace (MBA), the authorised distributor for the Leonardo AW139, AW169 and AW189 helicopter models in Japan, announced with Leonardo orders recently signed for a total of six AW139s, to meet the requirements of various upcoming opportunities in the country. These latest orders confirm the continuous success of the AW139 in Japan with nearly 70 units currently in operation. The AW139 fleet in the country is rapidly growing with new deliveries following previous and planned orders for end users in the country, which include two aircraft for the Japan Coast Guard (comprising 21 AW139s ordered by this operator) and two for the Japan National Police Agency this year. Moreover, three AW139s will be handed over in 2024 to Ishikawa Prefecture Fire Fighting & Disaster Relief, Ministry of Land, Infrastructure & Transport of Hokuriku, Saitama Prefecture Fire Fighting & Disaster Relief respectively.

BELL ANNOUNCES FIRST 407GX1 SALE IN TAIWAN

Bell Textron announced the signed purchase agreement of the first Bell 407GX1 helicopter in Taiwan to Ginger Aviation. Founded by Taiwanese conglomerates in the utilities and aviation industry in 2022, Ginger Aviation plans to use their Bell 407GX1 to address a growing demand for helicopter powerline wash and inspections in country. The Bell 407GX1 is outfitted with the new Rolls-Royce M250-C47E/4 turbine engine equipped with two dual-channel FADEC turbines, delivering exceptional hot and high performance, fuel efficiency and the ability to cruise at 133 kts/246 km/h. Garmin's G1000H NXi Integrated Flight Deck, complete with high-resolution displays and faster processors, offers increased brightness and clarity, faster start-up and map rendering, as well as connectivity to tablets and smartphones.



Australia's Carbonix signs deal with Quickstep

Australian drone manufacturer, Carbonix has signed a new \$2.3 million contract with Australia's largest independent aerospace composite manufacturer, Quickstep Holdings, that will see the company triple its drone production over the next year. Under the 12-month contract, Quickstep will manufacture 40 of Carbonix's latest long-range unmanned aerial vehicles (UAV). The UAV is the next successor to the Domani and optimised for linear asset inspections and features wings with advanced aerodynamics, increased payload capacity and an aviation-standard twin cylinder engine for propulsion in horizontal flight, allowing for steep climb rates to follow power lines in low density-altitude (hot and high) conditions. The deal is the second stage of a broader manufacturing partnership, announced late last year, which will eventually see Quickstep manufacture all Carbonix drones. Quickstep began manufacturing Volantis, Carbonix's smallest all electric fixed-wing VTOL UAV (Vertical take-off and landing Un-crewed Aerial Vehicle) drones, earlier in the year.

SKYTRAC PROVIDES CONNECTIVITY FOR OFFSHORE SAR

SKYTRAC Systems, a satellite communications (satcom) and intelligent connectivity solutions, announced, in partnership with Omni Helicopters International (Omni), and VIH Aviation Group, that they have enabled the most connected helicopter in the world. Omni's S-92, to be used for Search and Rescue (SAR) off the shores of Guyana, will feature connectivity through SKYTRAC's Iridium Certus satellite, 4G/LTE cellular, and Wi-Fi

intelligent connectivity solutions. The helicopter will be capable of delivering dozens of mission capabilities including automated flight following and mission management, medical data transfer, cockpit and cabin connectivity, real-time aircraft exceedance alerting, post-flight automated data offloading, real-time image transfers, satellite Push-to-Talk (PTT), satcom voice, text-based messaging, and email capabilities.

NEW DRONE PROGRAMME AWARDED AUSTRALIAN FUNDING

Students from across Australia's Northern Territory will have the chance to learn the ins and outs of the NT drone industry after a Charles Darwin University (CDU) programme received Federal Government funding. The CDU Drone program was awarded A\$99,020 through The Maker Projects: Community STEM Engagement

Grants 2022. The programme, in partnership with National Drones, will provide a pathway into Science, Technology, Engineering and Mathematics (STEM) careers for Northern Territory youths in years 9 to 12, including the option to achieve a nationally recognised/accredited Vocational Education and Training qualification.



SIA Engineering signs S\$120.8 million services deal with Scoot

Singapore-based SIA Engineering Company (SIAEC) announced it has signed a comprehensive services agreement with Scoot. The new agreement is for a term of two years, with an option to extend for a further period of one year. SIAEC's support of the Scoot fleet covers a broad spectrum of maintenance, repair and overhaul (MRO) and fleet management support services. The agreement (if extended after the first two years) is expected to yield a labour revenue of \$120.8 million over the three-year term.

LIEBHERR AND CHINA AIRLINES SIGN AGREEMENT ON A321NEO COMPONENT SUPPORT

Liebherr and China Airlines have entered into a long-term agreement under which the OEM Liebherr-Aerospace will provide repair support services for a wide range of air conditioning and bleed system components installed on China Airlines' fleet of 25 Airbus A321neo. All material support and component maintenance services will be provided by Liebherr-Singapore, Liebherr-Aerospace's dedicated service centre for the Asia-Pacific region. "We really appreciate Liebherr's service and place our trust and confidence in the company. We want to continue our long-term partnership and thus decided to choose Liebherr as our service provider for the component support on our new Airbus A321neo fleet," said Jason Tsai, vice president of engineering at China

Airlines. China Airlines is the largest airline in Taiwan, headquartered in Taoyuan International Airport. It operates short, medium, and long haul services to international and intercontinental destinations across Asia, Europe, North America, and Oceania. Further subsidiaries of the China Airlines group of airlines include Tigerair Taiwan as well as Mandarin Airlines.

PRATT & WHITNEY, MHI AERO ENGINES ANNOUNCE JAPANESE GTF MRO FACILITY

The Pratt & Whitney GTF MRO network welcomed its second operational facility in Japan, and 11th worldwide, with the addition of Mitsubishi Heavy Industries Aero Engines Ltd. (MHIAEL), part of Japanese Aero Engine Corporation. MHIAEL, a Pratt & Whitney maintenance partner since the Wasp engine and most recently the PW4000 and V2500 engines, have inducted their first PW1100G-JM engine at their facility in Komaki, Japan. This is part of the overall expansion of their facility, adding the latest technologies to increase efficiency. Having completed the industrialisation process, secured the required certifications, and finished the necessary training, the shop is ready to provide full disassembly, assembly and test capability for

the A320neo family, bringing more immediate support for customers in the Asia-Pacific region. "We are constantly evaluating the size and shape of the GTF MRO network to ensure that it can support the growing fleet and customer demand for aftermarket service anywhere in the world. Since 2019, the number of shops in the network has doubled," said Kevin Kirkpatrick, vice president of Aftermarket Global Operations at Pratt & Whitney. "MHIAEL's experience has already been demonstrated by their work supporting Pratt & Whitney's PW4000 engine and the IAE V2500 engine. We are excited to be working with them in a larger capacity." MHIAEL is one of several facilities in Asia supporting GTF MRO work, alongside Pratt & Whitney's

CFM, ST ENGINEERING TO EXPAND LEAP OPEN MRO NETWORK

CFM International and ST Engineering's Commercial Aerospace business have signed a CFM Branded Service Agreement (CBSA) for LEAP-1A and LEAP-1B engines. Under the terms of the CBSA, ST Engineering will provide the full scope of LEAP Maintenance, Repair & Overhaul (MRO) services for operators worldwide. ST Engineering is the first provider in Asia to join the LEAP MRO network under a CBSA agreement. Comprehensive MRO services will be provided at their facility in Singapore. ST Engineering has been a LEAP MRO network provider since 2020, providing quick turns for the LEAP-1A and LEAP-1B engines. The company will also add this year test cell capabilities for LEAP-1B engines. This CBSA agreement further expands their scope to provide a full range of maintenance solutions for LEAP engines to the highest standards.



Eagle Services Asia (ESA) in Singapore, IHI in Japan and MTU Maintenance Zhuhai in China. When it comes to world traffic growth, Asia Pacific is the fastest growing region. China alone is home to one of the largest GTF fleets with 11 airlines operating more than 200 A320neo family aircraft.

PANASONIC AVIONICS ANNOUNCES NEW SOFTWARE BASE IN PUNE, INDIA

IFEC maker Panasonic Avionics announced it would set up a new software design centre in Pune, India. The company's operations in Pune are the latest Panasonic investment in India. Panasonic entered the Indian market in 1972 and since then the company has grown from strength to strength and now Panasonic Avionics joins Panasonic Life Solutions India, which currently has 13,000 employees over 13 locations across India. Panasonic Avionics new software design centre is part of a company-wide effort to help airlines realise their passenger digital engagement vision using the most innovative IFE hardware, best-in-class enterprise software; seamless global high-speed connectivity; and worldwide support through maintenance, repair, and overhaul (MRO) services. Satyen Yadav, chief technology officer of Panasonic Avionics Corporation, says: "It's an incredibly exciting time in our industry as our airline partners are looking to enhance the travel journey in new and exciting ways. As a trusted partner to the world's leading airlines, our goal is to unlock the potential of IFEC with solutions that give airlines the same flexibility they enjoy with their web and mobile solutions so that they can maximize their net promoter score (NPS), increase customer loyalty, drive revenue, and optimize their operational efficiencies." To support this vision, Panasonic Avionics is investing in state-of-the-art labs in India that provide capability to build and validate new passenger experiences in both single and twin-aisle aircraft to match airlines' need for the right kind of software solutions — all from a one-stop shop. As a result, the company is expanding its talent resources to replicate the full scale of a narrowbody or widebody aircraft, ensuring that it can fully test its IFE and connectivity software in situ and help airlines transform their in-cabin product.



HK Express opts for Recaro SL3710 on A321neo

Recaro Aircraft Seating's SL3710 model takes flight for the first time on HK Express' A321neo. This is the first-ever order of RECARO seats by HK Express, and with the upcoming retrofit, the total seat order exceeded 4,000. The lightest seat in the RECARO portfolio, the SL3710 was customised for HK Express with a custom-made artificial leather dress cover and advertising frame on the backrest. "The SL3710 is a great fit for HK Express because of its lightweight structure and ergonomic design," said Dr. Mark Hiller, CEO of Recaro Aircraft Seating. "Our strong relationship with the Cathay Pacific Group paved the way for this opportunity, and I am looking forward to this strong new partnership with HK Express." A member of the Cathay Pacific Group, HK Express is a Hong Kong-based low-cost carrier that serves the Asia-Pacific region with a fleet of 27 Airbus aircraft. Recaro also announced its CL6720 Business Class seat with doors took flight in Iberia's A350 cabin on the route from Madrid to Buenos Aires. A total of 31 CL6720 seats are outfitted in the A350 Business Class cabin. The Premium Economy and Economy cabins are also fully equipped with the Recaro PL3530 and the CL3710, respectively. Recaro also unveiled a new streamlined design for its Final Assembly Line (FAL). Nearly 11,000 square metres of the space was renovated, it features >350m conveyor technology for the seats, 60 percent power savings through LED lighting, and an expanded canteen and coffee lounge. More than 4 million euros were invested in the project.

VAAYU GROUP TO BE LAUNCH CUSTOMER FOR EXPANDABLE LAVATORIES

Singapore's ST Engineering announced that its commercial aerospace division has signed a Letter of Intent (LOI) to provide Vaayu Group (Vaayu), an aircraft leasing and MRO company, with its Access expandable cabin lavatory. Under the terms of the agreement, ST Engineering will provide 20 of the Access

lavatory units for installation on Airbus A320 and Boeing 737 aircraft, which will make Vaayu launch customer for the unit. The Access lavatory solution is tailored for narrowbody aircraft, with its key selling point being that it can be expanded to create around 40 percent additional space when required.



People on the Move



TRACEY PATTERSON

AAR announced that Tracey Patterson has joined the company as vice president and chief human resources officer, overseeing global human resources, communications, and other functions. The

company also announced that John Dietrich has been named to its board of directors. Dietrich is the president and CEO of Atlas Air Worldwide Holdings.



JOHN DIETRICH



MARCEL KUIJN



PAUL CONWAY



MARTIN DE JONG

AFI KLM E&M has named Marcel Kuijn as vice president for European sales and key accounts. The company also named Franck Zoungrana as chief financial officer of its Barfield subsidiary. KLM UK Engineering, a subsidiary of AFI KLM E&M, has appointed Paul Conway as sales director and Martin de Jong as financial director.



ATR announced it has appointed Bernard Marquez as head of quality reporting directly to ATR's

Chief Executive Officer Nathalie Tarnaud Laude. Most recently he held the position of head of A320 Family Quality Value Stream Management Performance.



CATRIONA TAYLOR

CHAPMAN FREEBORN, the global air charter specialist and part of Avia Solutions Group, has promoted Catriona Taylor



JENNY VAN WYK

to the role of global supplier relations director and Jenny van Wyk to country manager for South

Africa, both newly-created positions.



DIEHL AVIATION has named Jochen Klink as the new chief operating officer and as a member of the

Division Board. Klink will also serve simultaneously as CEO of the strategic business segment Cabin Interiors.



HK EXPRESS said it has named Jeanette Mao as its new CEO, succeeding Mandy Ng, who will pass

on the baton as the first female CEO to lead a Hong Kong-based airline.



The **INDEPENDENT AIRCRAFT MODIFIER ALLIANCE** has named Frans van de Pol, a

seasoned aviation industry expert, as chairman of the executive board of IAMA.



MAAS AVIATION

announced that Jan van Engelen has been named chief executive officer. Van

Engelen has over 25 years of international experience in the aviation services industry. He succeeds Tim Macdougald, who has held the position of CEO at MAAS since 2017.



MAGELLAN AVIATION GROUP announced that Anthony Spaulding has been named CEO and

president, replacing Chairman Michimoto Asano who has been interim CEO and president since January 2022. Asano will now resume his responsibilities as chairman for Magellan Aviation Group.



PEGASUS AIRLINES has named Mehmet T. Nane as chairman of the board. Nane succeeds Ali Sabancı,

who served as chairman for 17 years.

Sabancı will continue to serve as chairman of the board of Esas Holding and as a board member of Pegasus Airlines.



PHENIX JET CAYMAN AND HONG KONG said it has named Denzil White as its new chief operating

officer. Before joining Phenix Jet, White held multiple executive leadership roles at several leading aviation companies in Hong Kong.



RAFT has appointed industry veteran Rod Talbot as vice president for sales in Asia to help

increase its presence and expertise in the Asia Pacific region.



CHIN YAU SENG

The **SIA GROUP**

announced Chin Yau Seng, senior vice president cargo, will leave Singapore Airlines (SIA) to join SIA

Engineering as CEO on 1 June 2023. Marvin Tan, senior vice president customer services and



MARVIN TAN

operations, will be appointed as senior vice president for cargo.



Mobility service provider **SUPERNAL** has appointed Jay Merkle as senior director of regulatory

affairs. Merkle previously spent 30 years at the Federal Aviation Administration (FAA), most recently as executive director of the agency's Unmanned Aircraft Systems (UAS) Integration Office.



TRANSPORT CAPITAL, has named Tom Zachariassen as the new head of South and

Southeast Asia, based in the Singapore.



Airbus and China aviation industry sign next phase in partnership

During a French state visit to China, Airbus signed new cooperation agreements with China Aviation industry partners. Witnessed by Chinese President Xi Jinping and French President Emmanuel Macron, Airbus CEO, Guillaume Faury signed with the Tianjin Free Trade Zone Investment Company Ltd., and Aviation Industry Corporation of China Ltd., an agreement to expand A320 Family final assembly capacity with a second line at its Tianjin site. The agreement will contribute to Airbus' overall rate objective of 75 aircraft per month in 2026 throughout its global production network. Currently, Airbus has four A320 Family final assembly sites worldwide: Hamburg (Germany), Toulouse (France), Mobile (USA) and Tianjin (China). The Tianjin Final Assembly Line (FAL Asia) started operation in 2008 and has assembled over 600 A320 Family aircraft to date. In March 2023 the first A321neo aircraft was delivered from the line, marking a new era of enhanced A320 Family production versatility. In addition, Airbus also signed General Terms of Agreement (GTA) with the China Aviation Supplies Holding Company (CAS) covering the purchase of 160 Airbus commercial aircraft. The GTA comprises earlier announcements for 150 A320 family aircraft and for 10 A350-900 widebody aircraft orders, reflecting the strong demand in all market segments by Chinese carriers. Airbus and the China National Aviation Fuel Group (CNAF) also signed a Memorandum of Understanding (MoU) to intensify Chinese-European cooperation on the production, competitive application and common standards formulation for Sustainable Aviation Fuels (SAF).

AUSTRALIA'S NEWCASTLE AIRPORT EXPANSION ON TAP

Avolon, the international aircraft leasing company, announced it has completed the delivery of 15 A320neo family aircraft to IndiGo, India's largest passenger airline. Delivery of the aircraft commenced in September 2022 and was completed in February 2023.

The sale and leaseback transaction comprised a mix of six A320neo aircraft and

nine A321neo aircraft. Avolon now has a total of 21 aircraft on lease with IndiGo. Paul Geaney, President and Chief Commercial Officer, Avolon commented: "We are proud to support IndiGo through this sale and leaseback of fifteen fuel efficient Airbus neo aircraft. We look forward to playing a central role with IndiGo as they continue to build on their position as a

GLOBAL AVIATION GROUP ASL INVESTS IN AUSTRALIA'S PIONAIR

ASL Aviation Holdings has confirmed that it has acquired Australian airline, Pionair, Australia's leading independent provider of charter and ACMI services. The Sydney based airline will continue to operate as a proudly Australian airline. Over time Pionair will reinforce its Australian identity and will be re-branded as ASL Airlines Australia in common with ASL Group's European airlines ASL Airlines Ireland, ASL Airlines Belgium, ASL Airlines France and ASL Airlines United Kingdom. ASL's investment in Pionair will be of significant benefit to the economy across the airline's main bases in



Sydney, Melbourne, Adelaide, Brisbane and Cairns. Pionair is set to become a stronger and larger service provider in the Australian aviation market, particularly in the important express parcel and e-retail sectors.

There will be no job losses due to this acquisition with staff numbers set to increase in line with ASL's growth and fleet plans. Pionair owner and CEO Steve Ferris will support ASL Airlines Australia with a continued leadership role in the airline.

leading carrier in the Indian market." Riyaz Peermohamed, Chief Aircraft Acquisition and Financing Officer, IndiGo commented: "We are pleased to have completed this deal with Avolon, which is part of IndiGo's broader expansion plans and the upgrading of our fleet. In 2023 we are committed to enhancing connectivity both within India and internationally."



Australia's Rex invests in Dovetail Electric Aviation

Regional Express (Rex) announced it had taken a 20 percent stake in Dovetail Electric Aviation which is pioneering the conversion of turbine powered aircraft to electric, emission-free propulsion. The equity participation agreement formalises the strategic partnership between Rex and Dovetail and builds on the Memorandum of Understanding between the two companies which was unveiled on 21 July 2022. Rex will appoint one of its board members to sit on the board of Dovetail. The Australian-headquartered Dovetail recently received a A\$3 million grant from the federal government's Cooperative Research Centres Projects (CRC-P) program. This will facilitate Dovetail's development of electric propulsion systems for aircraft used on regional routes operated by Rex and other regional airlines. Dovetail also recently announced the successful completion of initial ground tests involving a small-scale Electric Propulsion System (EPS) to spin a three-blade propeller for the first time.

BAE Systems, Heart Aerospace to collaborate on battery for electric aircraft

BAE Systems and Heart Aerospace, a Swedish electric aircraft maker, announced a collaboration to define the battery system for Heart's ES-30 regional electric aircraft. The battery will be the first-of-its-kind to be integrated into an electric conventional take-off and landing (eCTOL) regional aircraft, allowing it to efficiently operate with zero emissions and low noise. The ES-30 aircraft will be powered by four electric motors, and has an all-electric range of 200 kilometres, an extended reserve hybrid range of 400 kilometres with 30 passengers and ability to



fly up to 800 kilometres with 25 passengers. The ES-30 will also have a cost-effective and scalable upgrade path as future battery technology matures. The battery upgrade roadmap allows for increased usable energy at the same weight, resulting in longer flight durations and expanded route options. Heart Aerospace has a total of 230 orders and 100 options for the ES-30, along with letter of intent for an additional 108 aircraft.



CATHAY TEAMS UP WITH SPIC FOR SAF

Cathay Pacific has teamed up with the State Power Investment Corporation (SPIC) to drive the further development of the Sustainable Aviation Fuel (SAF) supply chain in China. SPIC is one of the largest state-owned energy companies on the Chinese Mainland and a company with the world's largest solar power installed capacity. Cathay Pacific Group CEO Ronald Lam said: "We are very excited to be partnering with SPIC to support and accelerate the development of the SAF industry in China. Cathay Pacific has a target of using SAF for 10 percent of its total fuel consumption by 2030, which is a core component towards reaching our goal of net-zero carbon emissions by 2050. This collaboration brings together the complementary advantages of SPIC's strengths in the field of clean energy with Cathay Pacific's expertise as an end-user of SAF. We hope this partnership will play an important role in the decarbonisation of the aviation industry. Under the MoU, Cathay Pacific will share international experience and feedback on the SAF certification process, value chain and overall market know-how to facilitate SPIC in the successful establishment of four SAF plants in the Chinese Mainland." The four SAF plants are expected to be commissioned between 2024 and 2026, and each will have the capacity to produce 50,000 to 100,000 tonnes of SAF annually. The plants will use a pathway similar to "Power-to-Liquids" to generate the SAF, converting renewable electricity into liquid fuels.

DNATA WINS CATERING DEAL WITH AUSTRALIA'S BONZA

Dnata has expanded its retail catering footprint in Australia. The company won a multi-year contract with the country's newest airline, Bonza, to support its operations and services – including the delivery of the airline's on-demand 100 percent Australian menu. Dnata's global experience and comprehensive, end-to-end solution will ensure a seamless implementation and delivery of the airline's retail program across its operations. Dnata's retail experts have worked in partnership with Bonza to select and develop a broad range of Australian made products. These include quality meals, beverages, and snacking items, helping the airline provide a fresh approach



to the onboard experience and maximise ancillary revenue. Dnata Catering will support Bonza's operations from a new facility near the carrier's base at Sunshine Coast Airport (MCY) – the first of its kind for the burgeoning airport. Including its newest catering centre, Dnata Catering now operates 15 facilities with a team of over 3,000 highly trained professionals, providing tailor-made inflight catering and retail services to over 40 airlines in Australia. Having launched operations in January 2023, Bonza, Australia's only independent low-cost carrier, currently offer 17 routes across 13 locations from its home base.



Flight Safety Foundation sets up centre in Singapore

The Flight Safety Foundation announced it will set up a new Asia Pacific Centre for Aviation Safety in Singapore to help aviation stakeholders in the Asia-Pacific region raise safety standards and capabilities to restart and ramp up operations safely as air travel recovers to pre-pandemic levels. Supported by the Civil Aviation Authority of Singapore (CAAS), the centre will develop an annual work programme to meet the needs of regulators and industry in the region and undertake projects and studies to provide a deeper understanding of safety challenges and build capabilities in technology, data analytics and safety management processes. The centre will adopt a data-driven approach in its studies and projects. Through the collection and analysis of safety data and information, the centre seeks to provide insights and recommendations to advance safety in the region. For a start, it will work on three key projects in 2023; these include a regional safety assessment, the development of a safety culture leadership and pilot competency and training capabilities. The foundation has appointed Mitchell Fox, a former airline pilot and long-time executive with the International Civil Aviation Organisation, to serve as director. He will be based in Singapore.

ACI ASIA-PACIFIC SAYS HIGH AIRFARES HURTING RECOVERY

Airfares in Asia-Pacific and Middle East surged as nations emerged from pandemic-related restrictions, according to the Airports Council International (ACI) Asia-Pacific's latest Airport Industry Outlook. Airfares in Asia-Pacific and Middle East were above the global average – up 53 percent (nominal terms) or 35 percent (real terms) in 2022 vs 2019, although fares were trending down towards the end of the year as traffic recovers. Stefano Baronci, director general, ACI Asia-Pacific said: "Despite a consolidated recovery of domestic traffic as compared to 2019 levels, and a progressive improvement of international traffic, with peak performances in Middle East and

South Asia, the financial health of airport operators continued to be in distress, with 10 consecutive quarters in the red both in terms of EBITDA and net profit margin. Despite substantial efforts by airports to freeze or lower airport charges in 2022, the average 53 percent increase in airfares throughout 2022, compared to 2019, reveals a fundamental imbalance in the financial stability of the industry as well as pose a threat to the sector's full recovery in 2023. Fuel prices, wage inflation, insufficient seat capacity relative to demand and a lack of airline competition on specific routes, are the major determinants in the increase in airfares."



AIR NEW ZEALAND

'Oscars' of the skies at AIX

Sustainability, smart solutions, accessibility and comfort are among the themes dominating this year's Crystal Cabin Award shortlist. **Emma Kelly** looks at some of the innovative entries.

◀ *Air New Zealand's Skynest lie-flat sleep pods for Economy Class are also designed with ultra-long-haul flights in mind.*

ONCE AGAIN, the shortlisted finalists for this year's Crystal Cabin Awards — the "Oscars" of the aircraft interiors sector — do not disappoint, highlighting innovation recently introduced and for the future.

Themes of sustainability; smart digital solutions to improve the passenger experience; passenger comfort and wellbeing; and accessibility for all passengers resonate throughout the shortlist.

More than 80 entries qualified for this year's awards, with eight categories — Cabin Concepts; Cabin Systems; Health and Safety; IFEC and Digital Services; Materials and Components; Passenger Comfort; Sustainable Cabin; and University. Three finalists in each category will be selected by a panel of industry experts in May, with finalists to be awarded during the Aircraft Interiors Expo, in Hamburg, in June.

The latest developments in seats and cabin design feature heavily in this year's awards, as usual, with a focus on sustainability, particularly weight, as well as passenger comfort, space and functionality.

A number of airlines are finalists with their seating and cabin designs. Air New Zealand has two entries — its Business Premier LUXE and Skynest. The Business Premier LUXE seat is set to feature in the front rows of the airline's Business Premier cabins onboard its new Boeing 787-9s from 2024, designed to meet the comfort needs of customers flying ultra-long-haul routes. "This new offering is luxurious enough for two to dine, socialise and share the journey together in a more private environment, or for a solo traveller to lounge, stretch out and maximise rest with a bed surface that rivals most First Class offerings," says Air New Zealand.

The airline's Skynest lie-flat sleep pods for Economy Class are also designed with ultra-long-haul flights in mind, with the six lie-flat bunks on the main deck allowing passengers to rest, stretch out and boost mental and physical wellbeing. Passengers will be able to book four-hour sessions in the Skynest, in addition to their Economy Class seat.

American Airlines and design partner Teague are finalists with the airline's next-generation premium passenger experience, which "offers an exceptional and elevated experience in all cabins, delivering a consistent and unique branded experience". The new design, which will deliver a consistent cabin experience, is set to be deployed on the airline's new widebody and narrowbody aircraft before being retrofitted on existing aircraft from late 2024.

The Lufthansa Group is a finalist with its new long-haul product, Lufthansa Allegris, which will provide passengers with the choice of 14 seat types in four travel classes, allowing them to "design their own travel experience" from later this year. Lufthansa worked with designers Pearson Lloyd and PriestmanGoode, incorporating extensive customer feedback, putting individuality and choice first.

Low-weight seats which provide passengers with more living space continue to be a focus for several manufacturers. Acro Aircraft Seating is a finalist with its new Series 9 Economy Class seat, which combines low weight with enhanced living space, even at reduced seat pitch. Acro says Series 9 employs the "most advanced materials

and processes and, combined with intelligent engineering and a relentless pursuit of performance, has delivered a seat that offers a rewarding experience for the passenger as well as helping our airline customers reduce their operating costs and environmental impact." Series 9 offers more passenger width, armrest width, aisle width and legroom than any other seat of comparable weight, according to Acro.

Ameco's Economy Class Seat-Lite, designed for narrowbody aircraft, also gives back more space to the passenger, providing places for their personal items.

Turkish Cabin Interior's (TCI) Milligram is also an Economy Class seat optimised for narrowbody aircraft, featuring a "lightweight, cost-effective, innovative, aesthetic and comfort-oriented design", according to the manufacturer. The seat weighs less than 7.5kg per passenger, including dress cover, and offers 31 inches of legroom, even at 28 inches pitch, as well as under-seat space for hand luggage up to 35cm in height. The unique backrest design provides extra living space, says TCI.



▲ *American will be rolling new premium seating.*

Unum Aircraft Seating has sustainability at the core of its seats, adding a recycling code to each component, clearly identifying the material for end-of-life disassembly and recycling. The recycling reference code is referenced to the Green Cabin Alliance website, which is databasing the material codes and will detail the end-of-life recycling routes for materials.

Seat concepts of the future are also focused on weight savings, with the HORUS lightweight aircraft seat from the Delft University of Technology designed for the short-haul hydrogen aircraft being designed by Embraer, which are unlikely to enter production until 2030-2040. The seat, weighing just 6.1kg, is sustainable and designed for circularity.

Another entry from Delft University is the Alba Seating Concept, which is a human contour-based ultralight aircraft seat, weighing 7.5kg and featuring a fully netted seating design shaped to the human spine.

Comfort and providing a feeling of “home” — more space, freedom and privacy — are the aims of Stelia Aerospace’s Rendez-Vous new staggered widebody Business Class seat, designed by Design Investment. The “sofa-like” seat features smart integration of the backrest into the backshell and an exclusive space. Solo and Honeymoon (double bed) versions are available, offering a spacious full-flat bed and featuring doors and dividers to create a private suite environment.

If it’s comfort you want, then there’s Lufthansa Group’s Caynova seat heating and cooling system (HCS) and its Shoulder Sink-In (SSI) which will feature in first and business classes this year. The HCS offers passengers adjustable microclimates, allowing them to control the temperature and humidity, while the SSI is designed for side-sleeping passengers, with the shoulder able to sink deep into the cushion in the bed position.

New cabin designs are also featured. Adient Aerospace in cooperation with Boeing EnCore Interiors proposes a Front Row Business Class Retreat for narrowbody aircraft, providing a spacious travel experience. A companion seat allows the passenger to sit at a desk, be joined by a companion or provide somewhere to sit when the main seat is converted to a bed.

LIFT Aero Design’s Paradym 2.0 is a flexible Premium Economy concept for ultra-long-haul flights, comprising wide triple seats with double armrests that can be sold as seats or full-flat beds, providing flexibility that delivers to the airline higher yields and greater passenger loyalty, it says.

Guatemalan design company T36 proposes a radical Multicabin concept for extra widebody aircraft, reconfiguring the traditional economy cabin into three cabins, including an upper cabin, comprising two-two seating and a central aisle. The configuration would increase economy class seating by 19.64 percent. Regular windows and digital windows would be used to create spaciousness.

Design studio JTilde & Co’s Tilde Aviation Concept is aimed at people travelling together. It is a suite designed for up to four passengers to travel in privacy and comfort. It features four seats arranged in pairs opposite each other, with the seats opposite convertible into beds.

Universities have come up with several interesting solutions, including the Cafeviation Design Concept from a student at Reutlingen University, which is designed to have a café-type feel, with multifunctional seats and tables, while students at the University of Cincinnati have worked with the Live Well Collaboration on the Activity Pod, which is a customisable, multi-use room that can be booked by passengers to “escape the confinement of their seat”.

Connectivity, in-flight entertainment, and all things digital also feature heavily in the entries. Connectivity solutions include Thales Avionics’ FlytLIVE WiFi powered by the new SES-17 satellite; Hughes’ LEO In-Flight; Intelsat’s multi-orbit GEO/LEO electronically steerable array satcom solution; AirFi’s LEO connectivity solution featuring a tiny antenna installed in the window; Airbus’s Airspace



Link HBCplus high-bandwidth connectivity; Lufthansa’s FlyNet App allowing passengers to buy and access onboard internet; and the Seamless Air Alliance’s (SAA) Seamless Certification Programme for IFC which is the latest stage in the SAA’s efforts to drive global standards for the ever-expanding IFC sector.

With passengers increasingly using their own personal electronic devices for entertainment, several solutions are aimed at capitalising on this. These include Apios’s Reflect which allows a smart device to be used as a casting interface to a wireless IFEC system, enabling a connected digital journey, while IdeaNova Technologies’ Inplay Flow software tool works with the seatback IFE to deliver content from a passenger’s device. To power up those devices, KID Systeme offers its QuickMount retrofit off-seat power solution.

If you are worried about privacy and noise issues with onboard calls, Skyted has designed a mask that features a Wi-Fi connection and can absorb the human voice. The mask also opens up possibilities for voice enabled in-flight services, according to Skyted.

Hours and hours of wearing headphones on a long-haul flight can often lead to discomfort, prompting Safran to partner Devialet on the Euphony concept, which provides a headset-free individual sound



ADIENT

- ▲ Airlines are also creating spaces to 'retreat' from the crowds.
- ◀ Top left is Lufthansa's new Allegris premium cabin.
- ◀ The LIFT PARADYM long-haul cabin.

experience. Euphony is an integrated audio system, incorporating speakers inside the seat headrest which provide directed audio to the passenger without disturbing the rest of the cabin. Audio output volume adjusts automatically to the wing position and cabin noise environment, "preventing any sound leaking to disturb other surrounding passengers." Euphony is already available on Safran premium seats and has been ordered by airlines.

If you prefer to meditate onboard, ACM Aerospace offers the activeRest advanced meditation app which is integrated with an aircraft's IFE and sensors in the seat to integrate passenger's vital parameters, providing an immersive experience.

Solutions are also designed to help cabin crew perform their duties and improve the passenger experience. Collins Aerospace's IntelliSense provides cabin crew with deep insights to improve airline operations, cabin service and the passenger experience. It uses cameras, sensors, video analytics and deep-learning artificial intelligence to monitor interactions and collect information from objects within the seat environment which is communicated to the service team — "ensuring drinks are refilled sooner, bedding is made quicker and faulty equipment is remedied rapidly".

SkyPulse by Delta Flight Products is a live telemetry system providing airlines with insight into their IFE and other cabin

systems. Meanwhile information can be delivered to passengers via AERQ and Boeing EnCore Interiors' Smart View which provides real-time contextual content to passengers via a premium cabin monument featuring transparent OLED display technology.

To support the myriad of digital developments, Diehl Aviation has developed the Intelligent Digital Services Insert, allowing operators to roll out digital services via a smart cabin server, while Thales Avionics' Onboard Data Centre brings a state-of-the-art hardware architecture and web technologies onboard, supporting airline operations and passenger engagement.

Light and air quality also feature in the shortlist. STG Aerospace is a finalist with its Curve flexible LED light. The Delft Technical University proposes an interior light that enhances passenger comfort through improving the perception of space and enhancing passenger emotions via multiple lighting features and scenarios, including a light strip in the armrest to create the impression of privacy.

Teledyne's ACES cabin air monitoring system provides continuous insight into cabin air quality, sensing and monitoring any potentially harmful contaminants, with data automatically transmitted to a cloud service portal. Collins' Pothos ioniser system purifies and deodorises cabin air to levels that mimic natural, outdoor conditions, targeting areas of high odour and air recirculation, as well as mitigating volatile

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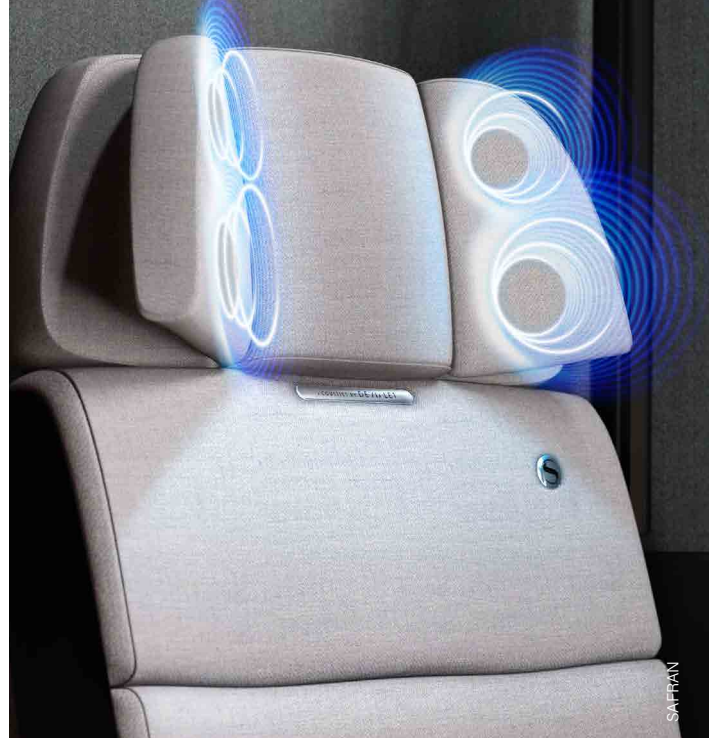
organic compounds, such as engine oil and de-icing fluid. CTT is also targeting volatile organic compounds and ozone from refuelling and de-icing and aircraft bleed air with the addition of an Active Carbon filter to its humidifying systems.

In-flight catering innovations also feature, including Air Premia and Zoslee Studio's Stacked Meal solution, which features food containers and a meal set tray that allows them to be stacked to avoid empty space and means more meals can be loaded on each trolley, reducing onboard weight and therefore fuel use. Lufthansa Industry Solutions' Food Waste AI helps an airline cater for each flight, optimising meals and reducing waste. The tool analyses catering trays after a flight, detecting untouched or partially eaten components, identifying potential areas of savings.

There are also interesting material developments, with sustainability at the heart, including Metzco's Orbis sustainable, lightweight and flame-retardant mattress. Lantal's Deep Dyed Carpet digital carpet manufacturing technology can produce ultra-lightweight carpets within days, reducing water use by 60 percent and production waste by 80 percent, while Anker is establishing a closed-loop system with the development of a PVB-based binder for its carpet backing material made from used car windshields and building glass which can be dissolved, allowing the nylon and polyester materials to be recycled.

Almadesign and Flowco, meanwhile, have an eco-friendly tile for cabin flooring using the waste of shoe sole production. JAMCO has developed a carbon neutral leather which features an integrated sustainable heating system controlled by Bluetooth which will appear in First Class and Business Class seats next year.

Diehl Aviation has developed new composite structures with integrated vacuum insulation which promise energy consumption reduction in the cabin, while Collins' Q-Tech replaces honeycomb panelling with flexible, bulb-arrays comprising acoustic metamaterials that mitigate sound transmission to provide a more peaceful cabin environment, reducing noise transmission by 10 times com-



▲ *Euphony is an integrated audio system, incorporating speakers inside the seat headrest which provide directed audi to the passenger.*

◀ *Design studio JTilde & Co's Tilde Aviation Concept is aimed at people travelling together.*

pared with a standard double-wall panel.

Airbus has developed a bio-based thermoset resin made from furan, which is a byproduct from industries that use biomass, such as the sugar industry. The resin can be used with reinforced fibres for aircraft interiors, including sidewall panels. The BioMat Resin when reinforced with recycled carbon fibre has successfully undergone laboratory testing to meet interior requirements; it meets cradle-to-grave lifecycle requirements; and is lighter than existing materials.

Accessibility and inclusivity are the focus for numerous finalists. Virginia Polytechnic Institute and State University, working with Boeing and All Wheels Up, has designed the Wheelchair Space and Securement System which allows a person with disabilities to use their own wheelchair on an aircraft.

Another entry comes from the Michigan Sustainability Applications for Aerospace Vehicle Engineering (M-SAAVE) Wheelchair Accessibility Mission (WAM) which is designing, building and testing an aluminium honeycomb floor plinth integration system that will restrain a wheelchair to the seat tracks of a Boeing 737-8.

Inflight Canada's Passenger Accessibility and Services System (PASS) allows disabled passengers to control their air vent, reading lights and call button — usually located out of reach above their heads — via a braille embossed control unit in the seat armrest or seatback.

Interior solutions for electric vertical take-off and landing aircraft, also make an appearance, including the cabin of Eve Air Mobility's eVTOL vehicles, designed in conjunction with Almadesign; Lilium's Pioneer Edition Lilium Jet; Hyundai Transys' HT-01 Urban Air Mobility Cabin Concept, developed in conjunction with PriestmanGoode; and Supernal and Formation Design Group's vertiport-to-vertiport process, including Supernal's eVTOL Accessible Cabin. →



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Cracks in the MRO supply chain

Flying demand is returning to Asia, but cracks are showing in the MRO supply chain and skilled resources are in short supply as **Michael Doran** reports.



BEFORE THE PANDEMIC Asia had cemented its place as the centre of global aviation, outstripping the more established markets in North America, Europe and the growth of the Middle East.

A side effect of Asia's rapid growth was that supply chains and resource availability, particularly in maintenance repair and overhaul (MRO), were already stretched before COVID hit.

Now that demand and capacity is returning to the region those cracks are widening, with supply chains and skilled resource availability partly to blame for Asia-Pacific's slow return to pre-COVID activity.

With borders now reopened and airlines active again it is surprising that in February the region only operated around 54 percent of its pre-pandemic capacity, carrying just 16.8 million passengers compared to 29.6 million in February 2019.

Subhas Menon, director general of the Asia Pacific Airlines Association, told Asian Aviation that airlines have not been able to put back as much capacity as the demand entails. "While the traffic is

▲ *Jetstar has been heavily affected by supply chain issues on its Boeing 787s.*

growing by five, six or seven times, capacity growth is only at the rate of double what it was in 2022."

He said there are "still some struggles on the resource side" and getting staff back takes time, although airlines are working at full speed to do that. "In the scheme of things it is not alarming, things are moving along, albeit a bit slowly but I think it will pick up pace in the coming months and after the northern summer season is fully started I think you will see that we are able to meet the demand requirements."

As a global aviation component parts supplier and repairer UK based AJW Group is at the sharp end of supply chain disruptions. The group has hubs and offices spread globally, including its operations in Singapore where business is quickly returning to pre-pandemic levels.

AJW's Head of PBH (power by the hour), David Shorter told Asian Aviation that availability of spare parts, lack of raw materials and



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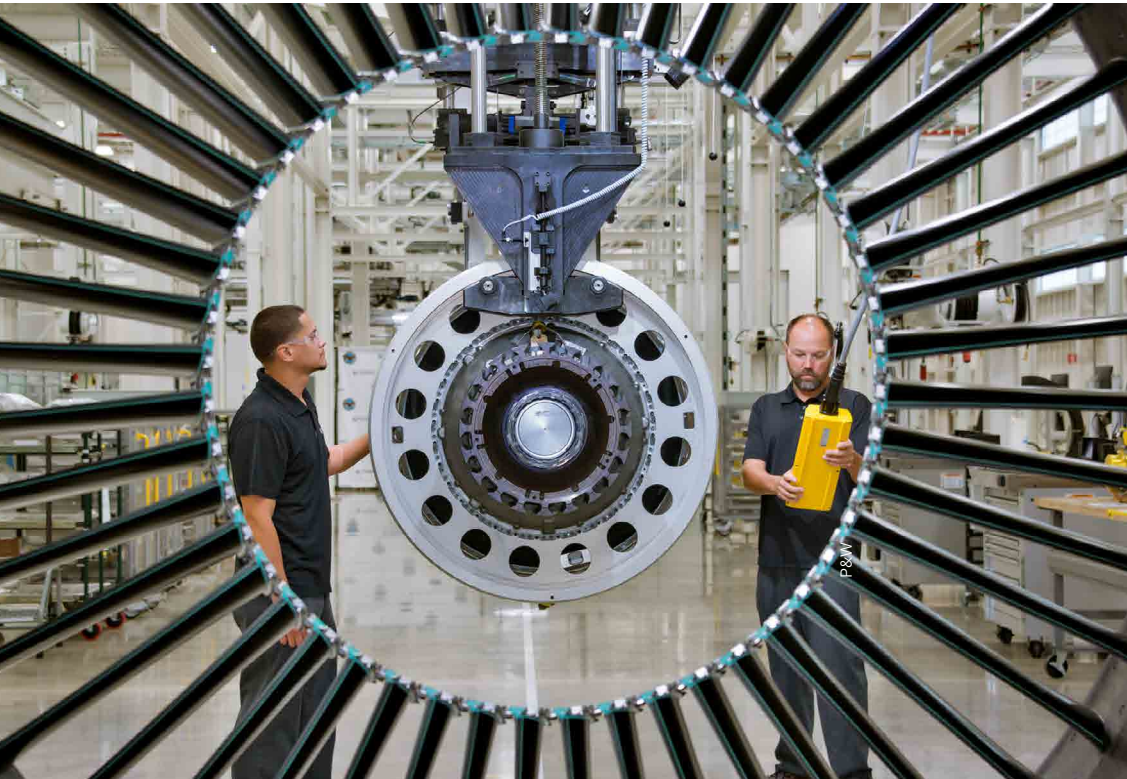
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▲ Pratt & Whitney's GTF is delivering but supply chain issues are keeping it off-wing too long.

"Our customer base in the Asia region has increased and was particularly strong in the final quarter of 2022. Looking at AJW Group stock sales from the latter part of 2022 moving into the first quarter of 2023 we have seen a 50 percent increase in the third quarter from the first, and a 100 percent increase in the fourth over the first."

DAVID SHORTER

longer lead times due to reduced manpower remain significant risks to MRO recovery.

"Our customer base in the Asia region has increased and was particularly strong in the final quarter of 2022. Looking at AJW Group stock sales from the latter part of 2022 moving into the first quarter of 2023 we have seen a 50 percent increase in the third quarter from the first, and a 100 percent increase in the fourth over the first."

A particular strength in Asia is AJW's sole distributor agreement with Honeywell for Air Data Inertial Reference Units (ADIRU) used on Airbus A320/A380 and Boeing 737NG/MAX aircraft. Shorter said they are seeing significant new orders, both for sale and exchange, for these and he is optimistic about further demand from the Singapore and China operations.

Running a global business relies on efficient logistics and that has challenged AJW, pushing the group to find new ways to deal with the current environment. Parts shortages and the transatlantic logistics routes mean that AJW needs an EU/UK and North American strategy, rather than predominantly EU/UK as previously.

"Transatlantic routes are no longer as consistent or efficient as before and that's forcing us in some cases to look at third-party supply rather than, or alongside OEM supply. We drive a sophisticated pooling strategy with inventory placed around the globe, allowing easy access and distribution to PBH and exchange pool customers," Shorter said.

Logistic uncertainties mean some deliveries are taking slightly longer to fulfill, but AJW is using more predictable and consistent airfreight routes to ensure that delivery happens.

Businesses all along the supply chain have had to be agile and adapt to whatever is thrown their way and that's no different at AJW. Shorter tells AAV that increased use of digitalisation has led the group to re-craft how it operates.

"AJW continues its digital transformation journey, developing strategies to improve operational efficiency within our business which are proving to be successful in maximising our customer service delivery. As industry leaders we are adapting to the changes that need to be made to strengthen and grow our business," Shorter said.

The introduction of new generation engines has driven most of the performance and efficiency gains in commercial aviation over the last decade. Each of the engine OEMs have developed game-changing new products that have met or exceeded the targets they promised.

While new engine technology has delivered gains it is not that long ago that Airbus was parking gliders in Toulouse because serviceable engines were not available. Entry into service issues with Pratt & Whitney's GTF, Rolls-Royce's Trent 1000 and CFM's LEAP grounded aircraft and left others undelivered.

Fast forward to today and engine issues are again surfacing, both in terms of endurance and supply chain disruptions. A common thread is that the engines are not on the wing for long enough and when they are off-wing parts and labour are unavailable.

In Asia-Pacific the clearest example of this is in India, where the

issue has caught the attention of the Directorate General of Civil Aviation (DGCA). The regulator first got involved in engine issues in 2017, when early versions of the P&W GTF (geared turbofan) engines led to grounding aircraft.

In April the DGCA stepped in again due to GTF issues, which are causing major operational problems to two carriers, IndiGo and Go First. Between them, IndiGo and Go First have around 60 Airbus A320 airplanes out of service due to engine unavailability, causing significant operational issues for both.

In November 2022, P&W President Shane Eddy and Commercial Engine Division president Rick Deurloo visited India and said the engine issues would be addressed by March this year. Putting engine reliability to one side, the problem boils down to a lack of replacement engines, MRO capacity and spare parts.

GTF engines are coming off-wing much earlier than planned, with various reports suggesting some are being removed after 7,000 hours instead of the projected 12,000 hours. The grounded aircraft represent 10% of India's commercial fleet with the flow-on operational impacts driving the DGCA's involvement.

A P&W spokesperson said it is actively working to mitigate the situation by improving supply chain performance and the availability of parts needed at their maintenance facilities. "We expect industry-wide supply chain issues to ease later this year which will support increased output of new and overhauled engines. In the interim we are providing direct logistical support to our suppliers as well as developing solutions to improve engine durability in hot and harsh operating environments."

India and the Middle East do present some tougher operating conditions and P&W is not the first OEM to highlight those impacts on engine performance. However that's certainly not the case in northern Europe, where Air Baltic had one engine off-wing for more than a year waiting for spare parts and MRO availability.

The supply chain shortages forced Air Baltic to wet lease four A320s to manage the upcoming summer season, and then adding four more when the delay for spare engines again ballooned out.

Air Baltic has a fleet of around 40 Airbus A220s and pre-COVID, a maintenance event would see the engine return to service in around 60-90 days. Today that same event sees an engine off-wing for closer to one year, which CEO Martin Gauss said is due to "insufficient parts and insufficient labour."

The other key factor is the drive by Airbus and Boeing to speed up production of their latest generation aircraft, which translates into a conflict of where new engines should go. Do they go to OEMs to deliver new aircraft or should they be used to get grounded aircraft back into operation?

The slower and more gradual recovery in Asia-Pacific has masked some of the supply chain issues that have affected airline performance in Europe and the USA over the last 12 months.

However, an example of how quickly that can change happened last year when Qantas Group airline Jetstar went into meltdown due to supply chain disruptions. Jetstar found itself in a situation in September where six of its 11 Boeing 787 Dreamliners were grounded in one 24-hour period.

The slower and more gradual recovery in Asia-Pacific has masked some of the supply chain issues that have affected airline performance in Europe and the USA over the last 12 months.

In a run of bad luck Jetstar's 787s suffered damage from bird and lightning strikes, while another was out of action from damage caused by debris on a runway. These events coincided with other 787s already out of service for planned maintenance.

The direct impact was that Jetstar's cancellations hit double figures and hundreds of passengers were left stranded in ports including Honolulu, Singapore and Bali. Again, the issue was not so much what happened but rather how long it took to get the aircraft back into service.

The runway damage happened to a flight leaving Bangkok for Melbourne when debris hit the aircraft and a 10-metre wing flap had to be replaced. With the usual supply and logistics chains unavailable the flap had to travel by road across the US to Los Angeles and wait until a suitable size aircraft was available for the transfer to Australia.

Jetstar chief operating officer Matt Franzi said that the airline is now managing its spare parts program differently as a result of limited freighter space and global supply chain challenges. "We are holding more spares, ordering parts weeks earlier and making sure we have

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▲ To increase production Airbus is setting up a second final A320 assembly line in China.

as many freight options as possible. We are also working with manufacturers and suppliers on new spare parts markets as a result of global sanctions impacting supplies from Russia."

Lightning strikes on aircraft are nothing out of the ordinary with most aircraft encountering at least one to two (on average) every year. In May last year a Jetstar 787 was hit with an especially powerful lightning bolt that left the fuselage with scores of small holes, burn marks and blistered paint.

The aircraft was grounded and expected to remain out of service for four to eight weeks, adding to the airline's reliability woes. This turned out to be way off the mark with the aircraft ultimately out of action for around five months between May and October 2022.

Adding in the supply chain issues that were at their peak when the event occurred it is not difficult to understand the long time it took to get the jet back into service. For Jetstar it meant losing around 10 percent of its widebody capacity for five months at a time when passenger demand was surging.

The issue for airlines is not that unexpected events, like those at Jetstar, happen but how much longer it now takes to recover and get operations back on schedule, and that's without factoring skills shortages in MRO facilities.

At the end of March, Boeing and Airbus had a combined backlog of more than 12,000 unfilled orders with nearly 11,000 of those for single-aisle aircraft, such as the A320 and 737.

After putting orders in the bin or on hold for three years airlines are

now scrambling to get hold of new generation, more fuel-efficient aircraft, particularly with fuel still at higher than normal prices.

Last year Airbus missed its production target of 700 aircraft deliveries and for this year it set an even higher goal of 720. In the first quarter of 2023 Airbus delivered 127 new planes and while production is not always linear it is well down on where it needs to be.

CEO Guillaume Faury said that 2022 was a year characterised by a complex environment and that supply chains remain "constrained by the impact of COVID, the war in Ukraine, energy supply issues, inflation and constrained global markets."

He added that the situation showed signs of stabilizing in December but that 2023 might bring some more unexpected reasons for supply chain disruption. "So as the old problems get better, we might be hit by the consequences of the energy crisis in Europe or the very challenging and chaotic situation in China."

Whatever Faury thinks about the situation in China didn't stop Airbus signing a deal in April to install a second A320 Final Assembly Line (FAL) at its Tianjin facility. Airbus has four A320 FAL sites, the others being in Hamburg (Germany), Toulouse (France) and Mobile (USA).

The new FAL is aimed at supporting the growth of Airbus sales in China but will also be an important element for Airbus to meet its delivery and monthly production targets globally. Despite missing the 2022 target Faury confirmed a target monthly production rate of 65 in 2024 and 75 by the middle of the decade. →

India looks to speed airport development

India is building, upgrading and modernising airports at a rapid pace to meet future demand while meeting its commitment towards green aviation as **Shelley Vishwajeet** reports.

GIVEN ITS POPULATION, geographical expanse, rising national aspiration and of course the projected impressive growth in the number of air travellers in the coming decades, India has far fewer modern and operational airports than what it needs now and in the next two decades. Little wonder, one of the key development focus of the Modi government's second term has been to augment aviation infrastructure.

In the first term, lasting from 2014-2019, the prime focus of the government was to augment regional connectivity and make air travel more accessible to more of Indians by way of many seminal policies, incentives and financial concessions.

For the record, the number of operational airports in India have risen from 74 in 2014 to 141 currently. Of this, the Airports Authority of India (AAI) owns and operates 133 airports including 100 domestic airports, 23 international airports and 10 exclusively cargo airports. AAI has leased out eight of its major airports including Delhi, Mumbai, Ahmedabad, Guwahati, Jaipur, Lucknow, Mangaluru and Thiruvananthapuram to private operators through Public Private Partnership (PPP) arrangements for long-term operation and management on a revenue sharing basis. Apart from these, there are around a dozen exclusive-use private airports owned and maintained by individuals and corporations.

V K Singh, the Union Minister of State for Civil Aviation, said India plans to develop, modernise and operationalise 220 airports by 2025. Towards this objective, the government has targeted a capital outlay of US\$12 billion to the airport sector with AAI committing US\$3 billion while the rest of the money is private. Of this, US\$7 billion has been allocated for the development of existing airports and US\$5 billion for the establishment of new Greenfield airports.

The thrust for aviation infrastructure is driven by future requirements. At a recent CAPA Aviation Summit in New Delhi, the Union Minister of Civil Aviation Jyotiraditya Scindia pointed out that India will have more than 140 million passengers in FY 2024 alone, while in the six years from FY2014 to FY 2020, the number of domestic passengers more than doubled from 120 million to about 275 million at a CAGR of 14.5 percent. Had there been no COVID outbreak India would have reached a CAGR of about 18-20 percent.

According to Minister V K Singh, under the National Monetization Plan, any airport having a footfall of more than 0.4 million passengers a year, would be handed over to private operators. As per this criterion, a total of 25 airports have been selected for privatisation by 2025. These include Nagpur, Varanasi, Dehradun, Trichy, Indore, Chennai, Calicut, Coimbatore, Bhubaneswar, and Patna airports. Subsequently, Madurai, Tirupati, Ranchi, Jodhpur, Raipur, Rajah-



▲ *Mumbai's airport. Operational airports in India have grown to 141.*

mundry, Vadodara, Amritsar, Surat, Hubli, Imphal, Agartala, Udaipur, Bhopal, and Vijayawada will also be handed over to private operators. The government expects to raise around US\$2.25 billion by 2025 through monetising these airport assets.

As for new airports, under the Greenfield Airports Policy 2008, India has accorded 'in-principle' approval for setting up of 21 Greenfield Airports in Goa, Navi Mumbai, Shirdi and Sindhudurg in Maharashtra, Kalaburagi, Vijayapura, Hassan and Shivamogga in Karnataka, Dabra (Gwalior) in Madhya Pradesh, Kushinagar and Noida (Jewar) in Uttar Pradesh, Dholera and Hirasar in Gujarat, Karaikal in Puducherry, Dagadarthi, Bhogapuram and Orvakal (Kurnool) in Andhra Pradesh, Durgapur in West Bengal, Pakyong in Sikkim, Kannur in Kerala and Itanagar in Arunachal Pradesh.

Out of these, 11 Greenfield airports, Durgapur, Shirdi, Kannur, Pakyong, Kalaburagi, Orvakal (Kurnool), Sindhudurg, Kushinagar, Itanagar, Mopa and Shivamogga have already been operationalised. The government of India has also granted the first stage clearance i.e. site clearance for construction, to three greenfield airports namely Alwar in Rajasthan, Singrauli in Madhya Pradesh and Mandi in Himachal Pradesh.

The government has also set a target to achieve 100 percent use of green energy by 2024 and net zero by 2030 for most airports. Under the Airports Council International's Airport Carbon Accreditation Programme, Delhi and Mumbai airports, the top two major airports in the country, have achieved the highest Level 4+ Carbon Accreditation of ACI. →

Pilots still in demand, but shortage may be easing

Despite the mass layoffs of pilots around the globe during the worst of the pandemic, a recent report by consulting group Oliver Wyman shows the pilot shortage may be easing. But there's still work to do to get new recruits trained up as **Matt Driskill** explains.

AFTER YEARS OF WARNING of the impending pilot shortage, Oliver Wyman said it has compiled new data that shows industry efforts may be reducing the severity of the shortfall. "Thanks to rising salaries, faster career paths, and greater awareness of the need for pilots, the number of candidates pursuing certification to fly commercially is rising. While this won't address the immediate problem, it does mean that the gap between the supply of pilots and demand for them will shrink later in the decade", Oliver Wyman reported.

Previous forecasts by the company predicted a gap between supply and demand of nearly 30,000 in 2032. The report now says the industry can anticipate a smaller shortfall of 17,000. In 2023 and 2024, that gap is also at about 17,000. The biggest spread between supply and demand is now expected in 2026 when we project it reaches 24,000, Oliver Wyman reported.

The company said there was a larger pool of new candidates and the "value proposition for pilots changed in 2022. As a result of industry actions and a consequence of the shortage itself, pilots started seeing improved salaries and a renewed focus on pilot quality of life, a faster career progression timeline, and more job security. For regional airline pilots, salaries are as much as 86 percent higher than they were just three years ago; for the larger carriers, they're up modestly but recent labour agreements and those expected to be negotiated in 2023 suggest significant increases to come".

The consultancy also said the industry could benefit by recruiting more women and minorities. "For example, currently, women represent about 4.6 percent of commercial airline pilots in the United States. Besides an improved value proposition for new recruits and expanding the pool of candidates, carriers will also need to explore other solutions such as better sponsorship of candidates to make the career path more accessible.

Airlines for their part are also making moves to make it easier for pilots to get into the cockpit and keep the ones they have with moves like delaying the retirement age for pilots and lowering the bar to becoming a pilot. Southwest Airlines in the US recently took



▲ Some airlines are considering cutting the required hours for pilots to qualify.

steps to cut the experience hours required for pilots by half, from 1,000 to 500 "turbine time." Turbine time refers to the time spent flying turbine-powered aircraft, such as jets, turboprops, or turbopfans. While the new requirement allows pilots with less turbine time to join the airline, overall flight time requirements remain the same.

"Cutting the required turbine time flight hours may provide some benefits to pilots in terms of career growth and mobility between airlines. However, it is unlikely to be a comprehensive solution to the pilot shortage issue facing the aviation industry," said Alison Dsouza, Director of Aerviva Aviation Consultancy, a Dubai-based international consultancy, specialising in aviation recruitment and document management. "Furthermore, if other major airlines also start reducing the experience hours required for pilots, it could potentially attract less experienced professionals with limited turbine time experience, resulting in a talent drain from smaller airlines. This could also raise safety concerns as less experienced pilots may be drawn to the opportunity to join major airlines. It is important for the industry to strike a balance between addressing the pilot shortage and ensuring the highest levels of safety and competence." ➔

SAF is the answer

Everyone in aviation agrees that Sustainable Aviation Fuel (SAF) is the easiest and fastest way to lower carbon emissions to meet the net-zero goal by 2050. The problem is, there's not enough, it costs too much, and governments are slow to approve its use. **Matt Driskill** reports.

THE LATEST "FLY NET ZERO" report from the International Air Transport Association (IATA) shows progress is being made in switching to SAF, but it also points out more needs to be done.

IATA quoted a United Nations report that says "production process improvements and cost reductions are important to encourage the wide adoption of sustainable fuels needed for aviation to help limit the projected rise in global temperatures. In addition, the report notes that even with a wide adoption of SAF, some hard-to-abate residual...emissions remain and would need to be counterbalanced by deployment of carbon dioxide removal methods to achieve net-zero". This makes it clear that carbon removal will be a critical necessity for the industry...where emissions that cannot be eliminated at source will be taken out through out-of-sector options such as carbon capture and storage and credible offsetting schemes."

In Singapore, the Civil Aviation Authority of Singapore (CAAS) announced it will set up a US\$50 million Aviation Sustainability Programme to support Singapore's drive to develop a sustainable air hub. The Aviation Sustainability Programme will provide selected applicants with funding towards delivering measures that help to reduce aviation's carbon emissions, build sustainable operational capabilities, or unite industry partners to help create a sustainable aviation ecosystem.

Japanese oil and metals company Eneos Holdings agreed to study production of up to 500 million litres of SAF and renewable diesel per year with Australia's Ampol, in the northeastern Australian state of Queensland. Also in Australia, the Qantas Group and Airbus have announced a joint investment of A\$2 million in a biofuel refinery being set up in Australia's Queensland that would convert agricultural by-products into SAF. The funds will be used for a detailed feasibility study and early-stage development of the proposed facility jointly developed by Jet Zero Australia and LanzaJet.

And while the industry is focussed on SAF, others are making bets on electric planes to decarbonise. Australia's Regional Express (Rex) announced it had taken a 20 percent stake in Dovetail Electric Aviation (Dovetail) which is pioneering the conversion of turbine powered aircraft to electric, emission-free propulsion. The Australian-headquartered Dovetail recently received a A\$3 million grant from the federal government's Cooperative Research Centres Projects (CRC-P) programme. This will facilitate Dovetail's development of electric propulsion systems for aircraft used on regional routes operated by Rex and other regional airlines.

Dovetail also recently announced the successful completion of initial ground tests involving a small-scale Electric Propulsion System (EPS) to spin a three-blade propeller for the first time.

BAE Systems and Heart Aerospace, a Swedish electric airplane maker, also announced a collaboration to define the battery system for Heart's ES-30 regional electric airplane. The battery will be the first-of-its-kind to be integrated into an electric conventional take-off and landing (eCTOL) regional aircraft, allowing it to efficiently operate with zero emissions and low noise.

The ES-30 airplane will be powered by four electric motors, and has an all-electric range of 200 kilometres, an extended reserve



▲ Companies like Neste are pushing hard for SAF.

hybrid range of 400 kilometres with 30 passengers and ability to fly up to 800 kilometres with 25 passengers. The ES-30 will also have a cost-effective and scalable upgrade path as future battery technology matures. The battery upgrade roadmap allows for increased usable energy at the same weight, resulting in longer flight durations and expanded route options. Heart Aerospace has a total of 230 orders and 100 options for the ES-30, along with a letter of intent for an additional 108 airplanes. →

Still safe in the air

Flying is one of the safest ways to travel as anyone in the industry will tell you. The figures for 2022 from the International Air Transport Association showed a reduction in fatal accidents, despite some notable losses in places like Nepal. **Matt Driskill** reports.

THE INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

released its 2022 Safety Report for global aviation that showed a reduction in the number of fatal accidents and the fatality risk compared to 2021 and to the five year average (2018-2022). In 2022, there were five fatal accidents involving loss of life to passengers and crew. This is reduced from seven in 2021 and an improvement on the five-year average (2018-2022) which was also seven, IATA said.

The fatal accident rate improved to 0.16 per million sectors for 2022, from 0.27 per million sectors in 2021, and was ahead of the five-year fatal accident rate of 0.20. The all-accident rate was 1.21 per million sectors, a reduction compared to 1.26 accidents for the five years 2018-2022, but an increase compared to 1.13 accidents per million sectors in 2021.

The fatality risk declined to 0.11 from 0.23 in 2021 and 0.13 for the five years, 2018-2022. IATA member airlines experienced one fatal accident in 2022, with 19 fatalities.

“Accidents are rare in aviation. There were five fatal accidents among 32.2 million flights in 2022. That tells us that flying is among the safest activities in which a person can engage,” said Willie Walsh, IATA’s director general. “But even though the risk of flying is exceptionally low, it is not risk-free. Careful analysis of the trends that are emerging even at these very high levels of safety is what will make flying even safer. This year’s report, for example, tells us that we need to make some special efforts on turboprop operations in Africa and Latin America. Safety is aviation’s highest priority, and our goal is to have every flight take off and land safely regardless of region or aircraft type.”

The industry 2022 fatality risk of 0.11 means that on average, a person would need to take a flight every day for 25,214 years to experience a 100 percent fatal accident. This is an improvement over the five-year fatality rate (average of 22,116 years).

Despite the reduction in the number of fatal accidents, the number of fatalities rose from 121 in 2021 to 158 in 2022. The majority of fatalities in 2022 occurred in a single aircraft accident in China that claimed the lives of 132 persons. The airline involved was not an IATA member but is on the IATA Operational Safety Audit (IOSA) registry. The next largest loss of life occurred in an accident to an



▲ Nepal’s reputation took another hit in January when a Yeti Airlines twin-engine ATR 72-500 aircraft crashed as it was approaching Pokhara International Airport.

IATA member in Tanzania that resulted in 19 fatalities.

The global average jet hull loss rate rose slightly in 2022 compared to the five-year average (2018-2022). Five regions saw improvements, or no deterioration, compared to the five-year average.

The number of turboprop accidents declined in 2022 compared to 2021 but they accounted for four of the five fatal accidents last

“Accidents are rare in aviation. There were five fatal accidents among 32.2 million flights in 2022. That tells us that flying is among the safest activities in which a person can engage”

year with loss of life to passengers and crew onboard. Although sectors flown by turboprops represented just 10.6 percent of the total, turboprops were involved in 36 percent of all accidents, 80 percent of fatal accidents and 16 percent of fatalities in 2022.

In Asia, countries like Nepal continue to struggle with poor safety records. Nepal’s reputation took another hit in January when a Yeti Airlines twin-engine ATR 72-500 aircraft crashed as it was approaching Pokhara International Airport, killing all 72 people on board. The crash was one of the worst in the history of Nepal, which has seen dozens of crashes in recent decades due to difficult terrain, sudden weather changes and ageing planes. ➔

Clearing the air

Call it urban air mobility, air taxis or some other acronym like AAM, but the dream of flying in something like a Volocopter still requires the need to sort out the airspace requirements, which is no easy feat. **Matt Driskill** looks at some of the latest developments.

THOSE OF US FROM A CERTAIN GENERATION might remember a cartoon series called “The Jetsons” where everyone had a flying car. You might also recall that there were traffic jams in the air even in the future. But companies involved in urban air mobility (UAM) are trying to solve that and several are based in Asia.

Singapore-based digital aviation and cybersecurity provider Heron Technology recently announced the incorporation of Heron AirBridge, the company’s stand-alone Advanced Air Mobility (AAM) and drone technology business. The formation of Heron AirBridge reflects the company’s progress in the development and testing of its proprietary Unmanned Traffic Management (UTM) solution, AirBridge, in real-world conditions. The newly formed entity will serve an essential role in enabling the fast-moving AAM industry by developing and providing customised digital platforms on which the industry’s hardware will operate. Through the multi-year course of the AirBridge platform’s development, the company has worked closely with AAM industry partners, regulatory bodies, and Air Navigation Service Providers (ANSP) across the region to design a secure, reliable and tailored solution.

Ryan Lee, co-founder and CEO of Heron AirBridge said, “The aviation industry experienced a slowdown amidst Covid-19 pressures, but talks surrounding the AAM industry remained – owing to the promised potential of AAM to positively impact our current mobility processes and standards. As we approach a revival of the aviation industry in 2023 with the introduction of unmanned aircraft regulations in the near future, AAM stakeholders need reliable, secure and rigorously tested technology solutions that will enable their aircraft, vertiport infrastructure, and fleet and customer management systems to be realised.”

Established in 2021 after the management buyout of Nova Systems’ Asia business, Heron Technology has led the development of technology solutions to support AAM deployment in the region since unveiling Singapore’s first UTM system in 2021. Over the past year, the system’s latest iterations were showcased to a host of regulatory authorities and ANSPs from Europe and across the Asia-Pacific region.

Eve Air Mobility, once a part of Embraer and a major player in the field, said its UAM air traffic software is an agnostic solution that will enable the integration of all airspace users in an urban environment. This is critical to support the safety, efficiency, and improvement of the entire UAM ecosystem, including fleet and vertiport operators.

China’s leading developer of eVTOL planes for air taxi operation,



▲ Volocopter is making great strides in developing the UAM ecosystem.

EHang, is broadening its work with authorities in Europe to help usher in urban air mobility (UAM) operating systems and services. EHang announced it will be participating in the European Union-backed project testing the use and effectiveness of the European Geostationary Navigation Overlay Service (EGNOS) in UAM activities. As part of that work toward developing reliable eVTOL traffic management systems in Europe, EHang said it will be operating its EH216 air taxi craft during trials held at Lleida-Alguaire Airport, a major facility about 100 km west of Barcelona.

Those trials will fall under the aegis of the Satellite Based Augmentation System Adoption in Multicopter VTOL Aircraft (SAMVA) program – another of the separate but linked efforts all working on various aspects of building UAM air traffic systems for eVTOL craft like EHang’s air taxis.

One element of that is the continued development of EGNOS to further refine and improve global navigation satellite systems (GNSS) like the well-known GPS, and the Galileo variant operated in Europe. The objective of EGNOS is to monitor the accuracy of positions provided by those GNSS, and tweak data as needed to ensure accuracy.

Three South Korean telecom companies are also getting into the game. SK Telecom, KT, and LG U+, have formed a consortium to develop and commercialise UAM services and will be testing air traffic management using 4G and 5G technologies. →

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+65 9736 1722
Margaret@accessgroup.aero

23-25 MAY 2023

EBACE Geneva
+32 2-318-2800
events@ebaa.org

06-08 JUNE 2023

Aircraft Interiors Hamburg
+44 (0)20 8271 2174

19-25 JUNE 2023

Paris Airshow Le Bourget
visiteurs@siae.fr

29-30 AUGUST 2023

APATS Singapore
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26-28 SEPT 2023

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