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Low-Fare & Regional Airlines

Vol 37 No 1 February/March 2020

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# LARA

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## Thinking positive and planning ahead...



**There's nothing like** being optimistic and after the year Boeing had, the only way can be up. It has been telling customers and suppliers that its 737 MAX will not start flying regular operations again until mid-2020, based on the aircraft manufacturer's "experience with the certification process".

Boeing also stated this estimate is subject to ongoing attempts to address "known schedule risks" and warned further developments might arise that could affect the re-certification process.

"It also accounts for the rigorous scrutiny that regulatory authorities are rightly applying at every step of their review of the 737 MAX's flight control system and the Joint Operations Evaluation Board process determines pilot training requirements," the company said in a statement on Tuesday.

"As we have emphasised, the FAA and other global regulators will determine when the 737 MAX returns to service. However, in order to help our customers and suppliers plan their operations, we periodically provide them with our best estimate of when regulators will begin to authorise the ungrounding of the 737 MAX.

"Returning the MAX safely to service is our number one priority, and we are confident that will happen. We acknowledge and regret continued difficulties that the grounding of the 737 MAX has presented to our customers, our regulators, our suppliers and the flying public."

The three major US operators of the MAX – American, United and Southwest Airlines – have changed their schedules a number of times to reflect the return-to-service date being no earlier than July.

While the commercial aviation world waits patiently for regular MAX services to resume, what has to be remembered is the massive logistical and supplier back-up that is currently on hold. Boeing's MAX aircraft are racked and stacked waiting to be delivered to their customers who are now reducing or cancelling future orders. There are 400 completed aircraft stored in Washington State and Texas, all of which need to be paid for, because airline customers pay the bulk of what's owed upon delivery. This situation has seen Boeing temporarily halt production of the type.

Of course, the type will get back into widespread service but Boeing and operators are ignoring the offers by MROs and others to continue to teach, train and keep staff current on the MAX. It could be a very, very busy summer for Boeing and MAX operators once again.

**Glenn Sands – Editor**

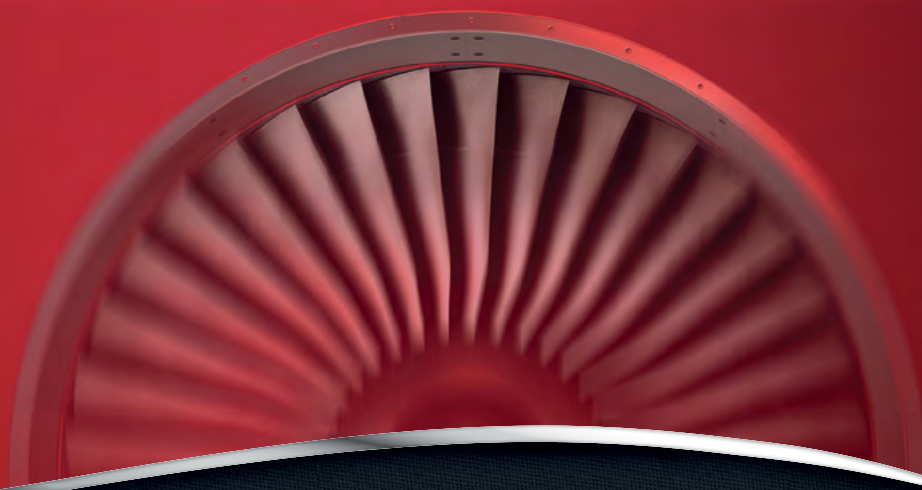


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Extraordinary together



# LOT parent group acquires Condor



**The Polish Aviation Group (PGL)**, owner of LOT Polish Airlines, has purchased German carrier Condor. Previously, owned by the Thomas Cook Group, Condor survived the collapse of the travel group in September 2019.

When Thomas Cook collapsed, the German subsidiary was granted a loan by the German government, allowing the carrier to continue operating in the interim period. The news of the acquisition by PGL was announced in Frankfurt on 24 January.

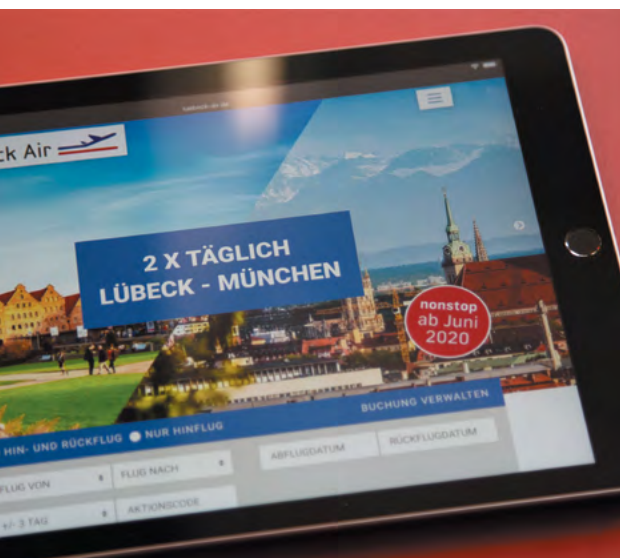
The purchase of Condor will mean the carrier can repay the bridging loan it was granted by the German government last year. The transaction for purchasing Condor is expected to be completed in April, subject to all the necessary approvals.

PGL's CEO, Rafał Milczarski, said that Condor is a perfect match for the Polish Aviation Group's strategy. Additionally, it seems that Condor will keep its branding. He commented: "The purchase secures the future of Condor and thus offers its

employees, customers and partners stability and a great perspective. We want to further develop the traditional Condor brand in Germany and introduce it to other European markets."

Condor's CEO, Ralf Teckentrup, said that the new ownership will "secure the future of our business" and suggested that, "together we will serve twice as many passengers, thus forming one of the largest aviation groups and the leading leisure airline group in Europe."

## Lübeck Air will connect north Germany



**Lübeck Airport** in north Germany has established a new regional airline which will operate scheduled services to Munich and Stuttgart from its launch in June 2020.

The airport last saw commercial services in 2016 following a filing for insolvency in 2014. After gaining a new operator, the airport is now in the process of modernising its terminal and plans to resume scheduled and charter traffic.

The new carrier Lübeck Air will provide scheduled, nonstop services for the city operated with an ATR 72-500 turboprop, which the company suggests: "has proven itself for regional traffic".

"We are creating an offer that many people don't even know anymore," Chief Pilot Tobias Oberschäfer commented.

Each ticket includes one piece of baggage and hand luggage, a small meal onboard and a seat pitch of 89cm.

"As the Lübeck Air plane surprises with seating for only 60 passengers – all of them window or aisle seats," Oberschäfer continued.

The airline's website describes it as a "private aviation company... operated in collaboration with Air Alsie of Denmark and closely affiliated with Lübeck Airport. We are looking forward to linking the Baltic Sea coast, home to beautiful resorts and Lübeck, a UNESCO World Heritage Site, with the south of Germany from spring 2020."



# Airbus establishes Skytra for revenue risk management

**Airbus has launched** a new venture called Skytra which aims to support aviation's risk management of its revenues by developing highly regulated financial instruments and infrastructure.

Discussing Skytra at the Airfinance Journal Dublin event in January, the team behind Skytra saw that the industry faces volatility in costs and revenues. This includes changes in airline ticket prices due to a variety of external factors (including politics or economic uncertainty) as well as last minute revenues; with the vast majority of airline tickets sold in the last five weeks before take-off.

Skytra aims to address this need through the development of a family of global and regional indices which track the daily changes in the price of air travel in each geographic market. The indices will be used to price standardised futures and options contracts to be offered on a regulated derivatives trading venue that Skytra is developing.

While airlines are currently able to hedge their cost base using derivative contracts



**Scherer: "Financial predictability is beneficial to the whole value chain."**

(such as fuel prices) – the team found there are no existing instruments enabling them to manage air travel revenue volatility effectively. This makes airlines financially vulnerable and affects the ability to plan

long-term and make the investments necessary to sustainable growth.

Drawing on research of how other industries approach risk management, Skytra is developing indices and platforms to ensure that air travel industry has its own class of derivatives to manage ticket price volatility.

"Airbus recognises that the air travel industry could see substantial value in being able to control its revenue risk," Airbus Chief Commercial Officer, Christian Scherer, said. "Financial predictability is beneficial to the whole value chain – from passengers to airlines, airports, lessors and aircraft manufacturers – enabling the industry to invest in reducing our carbon footprint."

In the year ahead, Skytra is seeking approval from the UK's Financial Conduct Authority (FCA) to become a regulated Benchmark Administrator for its air travel indices with the aim of making these available in late 2020. It is also applying to the FCA for a licence to operate a Multilateral Trading Facility (MTF).



## 'Green Financed' ATR 72-600 lands at BRA

**ATR delivered** the first ever 'Green Financed' aircraft to Swedish regional airline Braathens Regional Airlines, leased from Avation and financed by Deutsche Bank.

The aircraft is part of a new order for five 72-600s and on completion of the order in early 2020, the airline will operate an entirely ATR fleet, comprised of 15 ATR 72-600 aircraft.

BRA CEO Geir Stormorken said the ATR is an "essential" part of the airline's environmental strategy, adding: "By replacing parts of our

existing fleet of regional jets with ATR 72-600 aircraft we will emit 7,500 fewer tonnes of CO<sub>2</sub> per aircraft, per year."

The project to replace ageing regional jets with new ATR 72-600 aircraft was deemed by Vigeo Eiris, an agency providing Environmental, Social and Governance (ESG) ratings, as aligned with the Green Loan Principles created by the Loan Market Association in 2018.

Stefano Bortoli, CEO of ATR, commented: "We are proud to launch Green Financing in

commercial aviation and lead the way in terms of innovation and sustainable regional aviation," also suggesting "it is only natural that the first Green Financing deal for a commercial aircraft would involve an ATR and BRA."

"As a lessor, it is essential for us to progress our fleet into new technology low carbon emission aircraft such as the ATR 72-600 which maintain their value over a long period," added Jeff Chatfield, Executive Chairman of Avation, the Singapore-based leasing company.

# Airline CFOs: Consolidation must be allowed to happen

The **Airfinance Journal Dublin** event (21–23 January) brought together industry executives from across the leasing, aviation finance and airline sectors to look at some of the anticipated hurdles ahead and reflect on how the industry has changed – particularly looking back over the past four decades as the publication celebrated its 40-year anniversary.

With the ongoing cessation of Boeing 737 MAX services, discussions on the impact of the grounding and when the aircraft might be back in the air were high on the agenda, along with the trending topic of sustainability.

## LET THE MARKET DECIDE

Following a year that saw over 20 carriers cease operations, with Flybmi, WOW Air and Thomas Cook all closing their check-in desks for the final time, airline CFOs highlighted that consolidation in the European market “needs to happen”.

Responding to an audience question on how the CFOs see consolidation in the year ahead, Torbjorn Wist, CFO for SAS Airlines, said it is needed: “So far it is happening through survival of the fittest, through airlines going out of business and others going to pick up the pieces.”

He argued that capacity in Europe is extremely fragmented and adds that this isn’t helped by “artificial life support for state airlines that don’t have the right to life”.



**CFOs in discussion:** (From far left) Steve Gunning, Chief Financial Officer, British Airways; Raffael Quintas Alves, Chief Financial Officer, TAP Air Portugal; Iain Wetherall, Chief Financial Officer, Wizz Air; Torbjorn Wist, Chief Financial Officer, SAS Airlines; Steven Udvar-Hazy, Executive Chairman, Air Lease Corporation (moderating).

“Quite frankly, one should do the merciful thing and let them go out of business and let others come in and take it up,” Wist continued.

Wizz Air’s CFO Iain Wetherall agreed, pointing out that there are double the number of airlines in Europe than there are in the US, with “90% of the profits from a select few”.

Discussing his own Hungarian airline’s role within this environment, he explained: “We’re in a market that’s evolving, and we like slow dying dinosaurs... The further East you look this issue is going to get more pronounced.”

“The industry is ripe for consolidation, but it needs to be allowed to happen,” Steve Gunning, CFO of IAG, added to the debate. “If you look at the 100-odd airlines, the top 12 are

the ones making any significant profit and within that the top five or six are making the vast majority of the profit.”

“Things that have held that back are that we’ve had a long positive cycle – in 2016 the fuel price reduction breathed life into airlines that maybe would have gone by the board, and artificial life isn’t the right way forward.”

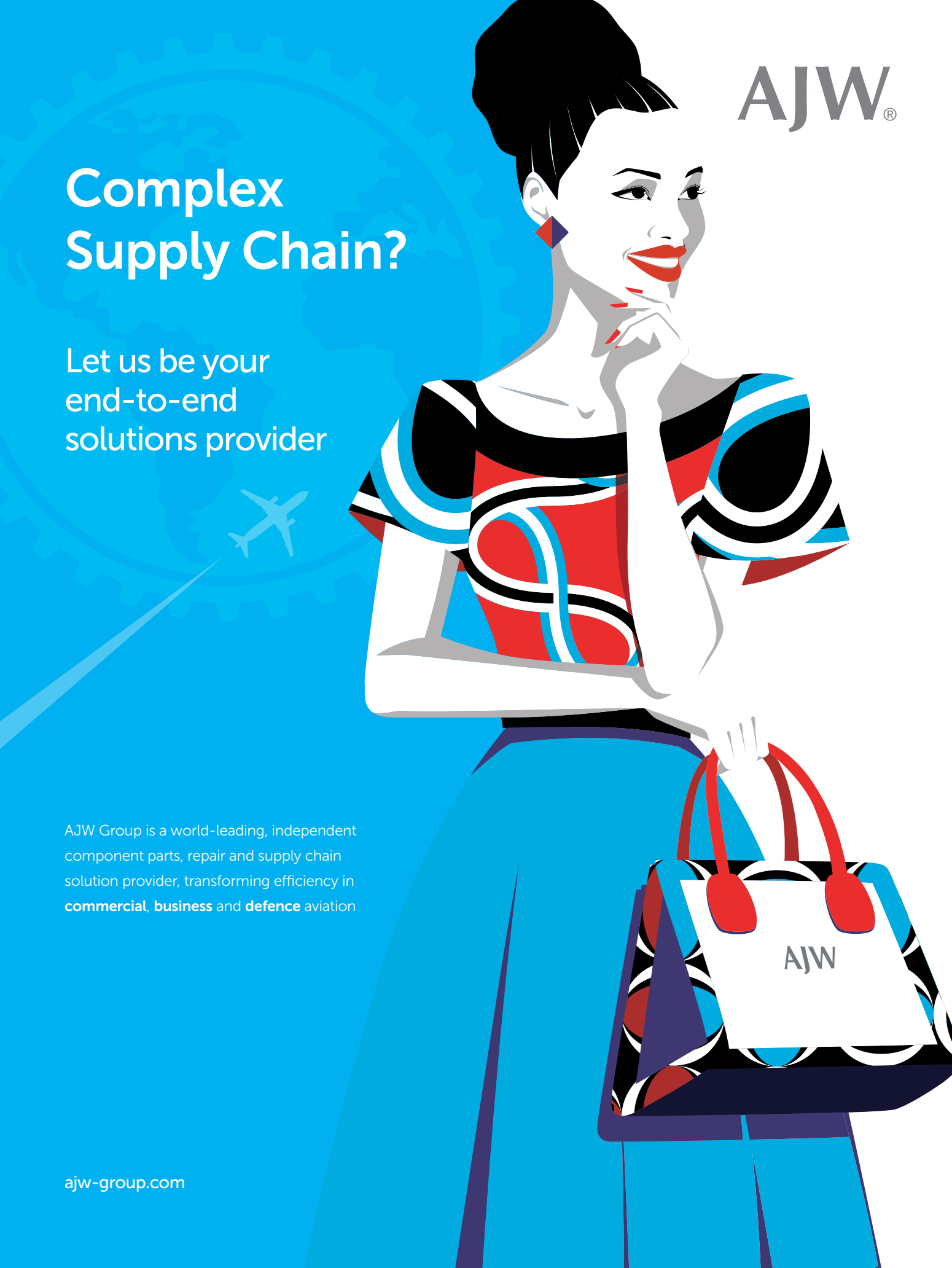
This comes as IAG’s outgoing CEO Willie Walsh condemned the UK government’s rescue deal of troubled regional airline, Flybe, announced in mid-January. Along with other airline executives including Ryanair’s Michael O’Leary, Walsh criticised the move, calling it a “misuse of public funds”. **Find out more about Flybe’s recent rescue agreement (pg 12).**



## Industry view

**John Plueger, Chief Executive Officer and President, Air Lease Corporation**

“The advent of LCC and ULCC... has been the single biggest game changer I believe that has led to the growth of traffic, aviation and the implementation of new aircraft types. The ability to travel to secondary, tertiary city pairs at cheap airfares has been a huge game changer, and I would say it is the single reason why commercial air transportation has become the world’s form of mass transportation today for anything over 500nm.”



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Boeing/Embraer strategic partnership: "I think Embraer has done a terrific job, but it has never competed with Airbus."

# Navigating new skies

With Boeing's issues over the MAX and a recent change of leadership, speakers at Airfinance Journal Dublin were asked to comment on whether they thought the manufacturer might still want to go ahead with its strategic partnership with Embraer, first announced in summer 2018.

"We've never had a time before like we have now, where one of the two behemoths – Boeing and Airbus – now owning the former C-Series (A220). That is a huge game changer," said Air Lease Corporation's John Plugger, CEO and President. "No matter how

good you are as an independent company, I believe you are handicapped if you are going to be marketing aircraft in that same space. I think Embraer has done a terrific job, but it has never competed with Airbus."

Taking a slightly different approach, meanwhile, Domhnall Slattery, CEO of aircraft lessor Avolon, commented that he thought the deal would be "imperative" for Boeing "because we're seeing the power of the Airbus/Bombardier C-Series link-up. It is transformational and has been a game changer for the aircraft."

# Magnetic MRO launches leasing arm

Magnetic MRO and Crestline Investments have launched a joint venture company, Magnetic Leasing, to focus on long- and short-term aviation asset management and leasing.

The JV will specialise in mid-life Airbus A320 Family and Boeing 737 CL/NG aircraft, along with engines and landing gear systems for narrowbody aircraft.

By the end of 2020, Magnetic Leasing expects to have a portfolio with \$100 million under its management, and in five years the company expects to manage at least 30 narrowbody aircraft and 20 engines.

The Chief Operations Officer at Magnetic Leasing, Alex Vella, commented: "As 2020 was approaching, there was a strategic decision made to continue diversifying our business in order to ensure further growth in the next decade. Thus, we decided that, among other business objectives, we need to expand our



Vella: Diversification strategy.

asset management activities, and teaming with Crestline Investments as our partners in this endeavour, created Magnetic Leasing."

The company has already signed a deal with Ryanair for a landing gear lease through an agreement covering an eight-month lease period during which the landing gear will be used on different aircraft based on the airline's demand.

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# Shedding light on Flybe deal

**Non-denial denials and a hurriedly worked-out “time-to-pay” arrangement: Glenn Sands takes a closer look at the extraordinary events surrounding Flybe’s rescue by the UK government.**

It was a chaotic 72 hours that followed the Sunday night news announcement that Flybe – the UK’s largest regional carrier – was on the brink of collapse. As the media were quick to lead with the story on Monday morning, it emerged discussions with the UK government were already taking place. By Wednesday, a deal had been reached. It was fast and furious on social media, but then came the fallout.

The year was barely a few weeks old when on 12 January a tweet appeared on Flybe’s account, stating: “Flybe continues to provide a great service and connectivity for our customers while ensuring they continue to travel as planned. We don’t comment on speculation.”

It was clear that, despite the airline’s rather non-committal statement, the speculation that had surfaced just hours earlier across social media, that the UK’s largest regional carrier was in financial trouble, had substance. It emerged that the airline had been in secret talks with two government departments – the Department of Transport and the Department for Business, Energy and Industrial Strategy – to determine whether the UK government could provide emergency financing to keep the airline afloat.

In the early hours of the crisis, Flybe’s CEO, Mark Anderson, when asked about the

possible collapse, replied to media reporters in a similar tone to the officially released statement, but added that his leadership team “was very focused on continuing to turn Flybe, soon to be Virgin Connect, around”. He asked employees not to be distracted by the “unhelpful and unproductive” speculation and “to continue to work and support each other as a team to deliver what we know we can do”.

Flybe was bought out in February 2019 by a consortium called Connect Airways for £2.8 million led by Virgin Atlantic. Also in the consortium were the Stobart Group and New York hedge fund Cyrus Capital Partners. Cyrus Capital Partners owns a 40% share of Connect Airways, while the other partners – Virgin and Stobart – each own 30%. The airline is due to launch as Virgin Connect later this year. The new owners have committed to injecting funds



“Prior to the acquisition of Flybe by the consortium which includes Virgin/Delta, Flybe argued for taxpayers to fund its operations by subsidising regional routes.

Virgin/Delta now want the taxpayer to pick up the tab for their mismanagement of the airline. This is a blatant misuse of public funds.”

**Willie Walsh, the outgoing Chief Executive of IAG, wrote to Transport Secretary Grant Shapps, criticising the government’s involvement in its rescue of Flybe. IAG has now made a state-aid complaint to the European Commission to overturn the decision.**



“It’s in breach of competition rules, it’s in breach of state-aid rules, which is why the government are covering up the deal. They won’t publish it... The government can’t keep lending a non-viable airline £100m every three months to keep non-essential services available.

“If Flybe folds, as it inevitably will, in exactly the same way as we did after Thomas Cook and after Monarch, Ryanair, easyJet, BA, Norwegian and others will step in... There will be no loss of regional services.”

**Michael O’Leary, Chief Executive of Ryanair**



in the turnaround and to build the 40-year-old airline into “Europe’s most loved and successful regional airline,” under its new brand name. The airline was also expected to serve as a feeder for Virgin Atlantic’s long-haul services, particularly at Manchester Airport and London Heathrow, even though the regional airline had just a handful of slots at London’s main airport.

Within a few hours of the first tweet, official confirmation by Flybe that it was seeking UK government assistance emerged. Unions reacted with anger and disbelief that, yet another UK airline was on the brink of collapse and talks had been in progress without any of its union members being contacted. “According to reports, the airline could have collapsed over the weekend, which would have been devastating. This is an appalling state of affairs and we demand that the owners of Flybe and the government departments involved stop hiding and talk to us about Flybe,” said Brian Strutton, the General Secretary of the pilots’ union BALPA on 13 January. The GMB Union released a similar statement and warned that up to 2,000 direct jobs and a further 1,400 jobs in the supply chain were at risk. “Our economy is tanking. The last thing we need is an airline to go under – especially one which provides a vital public service in some parts of the country,” the union’s national officer Nadine Houghton said: “If the UK government is serious about infrastructure investment in the regions, it must step in and protect what already exists.”

The UK government did step in. On the evening of 14 January, Flybe and the UK

government announced that they had reached an agreement on a deal to keep Europe’s largest regional carrier operating. Although specific details are still to emerge over the terms agreed, what has been revealed is a request by the carrier’s shareholders to receive an extended period of time to pay the airline passenger duty (APD) on its domestic services for three years – a total that is estimated to be around £100 million.

The government has since stated that it’s to launch a review of the amount of APD levied on domestic UK routes and of the country’s regional connectivity needs. “The reviews we are announcing today will help level up our economy. They will ensure the regional connections not only continue but flourish in the years to come,” said the UK Chancellor Sajid Javid.

On Twitter, Transport Secretary Grant Shapps said: “...delighted we have been able to work closely with Flybe to ensure Europe’s largest regional airline is able to continue connecting communities across Britain.”

Chairman of the consortium that owns Flybe, Lucien Farrell, said the three shareholders had “committed to keeping Flybe flying with additional funding alongside government initiatives,” while Flybe stated it was “delighted

with the support received from the government and the positive outcome for our people, our customers and the UK.”

It has proved to be a chaotic 72 hours within the UK’s regional airline market. From the initial denials, to confidential discussions that had been going on before the news broke, it demonstrated just how fragile the UK’s domestic regional airline market is, and brought to everyone’s attention the UK’s APD system; an area of taxation that is in dire need of reform.

Flybe’s financial difficulties can be linked to the APD. The Chief Executive of Airlines UK, a trade group, asserted that Brexit creates the possibility to shelve or lower the passenger tax on domestic flights. Under EU rules, member states may not differentiate between domestic flights and flights between EU countries because it considers the bloc one single airline market. By applying a lower rate for domestic flights, it amounts to illegal state aid, according to EU regulations.

When the UK leaves the EU, there’s the possibility of cutting or completely removing the APD on domestic travel. The UK levies £13 per passenger departing from a UK airport for a flight in the EU. In the case of Flybe, this can be £26 in tax for a flight that has an average fare of £52. For a regional airline it’s simply not sustainable, alongside the increasing other costs carriers are having to deal with.

However, although the 31 January ‘Brexit’ leave deadline is set, a transition period continues until 31 December 2020, and much of the current EU legislation will continue until then, so tying the UK government’s hands for removing or at least cutting the domestic APD in the immediate future. ■



“Her Majesty’s Government was notified about the difficulties of Flybe on 11 January, and since then we have worked intensively with the company to understand their financial position and explore options. In the light of these discussions the management and shareholders on 14 January took action to set Flybe on a recovery path.”

**Grant Shapps, Secretary of State for Transport**

“This is a standard time-to-pay arrangement with HMRC [UK tax authority] that any business in financial difficulties may use... This agreement will only last a matter of months before all taxes and duties are paid in full.”

**A Flybe spokesperson speaking after the deal was agreed.**



# Blue skies ahead

**Jazeera Airways has been rapidly expanding its network over the course of the past year, including the launch of the first new service between Kuwait and London in 55 years, but the airline isn't stopping there. Kimberley Young speaks to CEO Rohit Ramachandran about the airline's plans to connect Kuwait across the Middle East and abroad.**

Launched in 2004 as the first privately owned airline in the Middle East, Jazeera Airways has held its own in a challenging aviation environment. Now, from its HQ at Kuwait International Airport, the low-cost carrier is embarking on a pathway to further growth.

"Historically, I think the problem has been that many airlines are driven by ego. We, on the other hand, run it as a business," Jazeera Airways' CEO Rohit Ramachandran tells LARA. "We look at things pragmatically and we go after commercial opportunities wherever we find them."

"The Middle East and the Gulf in particular is a highly competitive landscape, and often in the news are airlines well-known for placing large aircraft orders and a super luxury experience," he says. "We judge our success not necessarily by fleet size or number of destinations. We focus on operational excellence and running a good

operation, but simultaneously ensuring a good return for shareholders."

Indeed, the Middle East is a competitive landscape and a challenging area for airlines to thrive. IATA's most recent predictions for 2020 painted a grim picture for airlines in the Middle East after weak economic growth in 2019.

Some rebound is expected for this year, but IATA suggested "announced schedules point to a substantial slowdown in capacity growth for 2020".

Despite IATA's downbeat forecast, Jazeera's CEO seems confident in his airline's position.

For the nine months ended 30 September 2019, revenue was over KWD82 million (approximately US\$270 million), up from KWD63 million in the same period in 2018. Operating profit measured over KWD22 million for the period in 2019 (approximately \$72 million), up from KWD13 million for the same period in the previous year.

"If you look back at our financial performance, you will notice that every year going back perhaps 10 years, we have returned in excess of KWD7.5/8 million (roughly \$25 million) in dividends to our shareholders," he says. "That's not a bad return for a small airline, that until recently had just seven aircraft in the fleet."

And for an airline that says it doesn't judge success by destinations or fleet size, Jazeera has been going through a period of rapid growth, going from seven aircraft to 13 by the end of 2019 (made up of nine A320s and four A320neos). Ramachandran explains: "We were at seven aircraft for many years, up until 18 months ago when we decided to focus on expanding the business."

## SNAPPING UP OPPORTUNITIES

The airline became the launch operator for the A320neo in the Middle East when it took delivery of its first aircraft of the type in 2018. The airline now has a quartet of the A320neo aircraft, with the most recent delivered in December.

A further four deliveries of A320neos have been confirmed for 2020, with a possible fifth also under discussions with lessors, which would take the fleet up to between 17 or 18 aircraft this year.





The airline is running on an 'asset-light' model, choosing to lease its aircraft. Ramachandran says: "Rather than place big aircraft orders – which appears to be the norm with airlines in this part of the world, we are quite opportunistic. We go after distressed aircraft units which are being held by lessors for some reason or the other, such as if their customer has failed to take delivery of those aircraft. Then we come in and take delivery – helping the lessor and getting excellent terms for that lease."

The airline has also shaken-up its fare options for 2020, releasing three new categories to offer passengers more choice for the way they travel.

The options include Economy Class Light, which allows a carry-on and a small bag; Economy Class Value which offers an additional 20 kg of check-in baggage allowance; and Economy Class Extra which offers allows 30 kg in check-in luggage, priority check-in and a choice of Preferred Seats. The airline also launched a Priority Service option which can be pre-booked for passengers wanting a faster travel experience.

The airline previously offered Premium Economy and Business class on its A320neo aircraft, but with these new fare categories the airline has also opted for an all-economy class configuration (except on its Cairo flights).

"Jazeera has always had Economy class seats throughout the aircraft, though the first three rows offered a larger seat pitch and blocked-off the middle seat," Ramachandran

says. "But we believe that there should not be any ambiguity in the positioning of the product, and we should be disciplined in focusing on our low-cost DNA."

As well as removing complexity and costs from providing this differentiated service, reverting to an all-economy cabin also means that those six middle seats that were previously blocked-out now come back into the inventory, increasing the capacity of the aircraft, the CEO explains: "Which is very important as we move towards higher and higher seat factors."

### SERVING NICHE MARKETS

Along with the growth of the fleet, the airline has appeared to be on a route-launching spree, introducing nine new routes in just the past three months, reaching up to 36 destinations – some of which are rather niche.

In just November and December of last year, Jazeera Airways launched a service to the southern Kyrgyzstan city of Osh, followed by flights to Kathmandu in Nepal, Karachi in Pakistan and Dammam in the Kingdom of Saudi Arabia, and operations to a small airport in Abu Dhabi called Al Ain

– where the airline is providing the only scheduled service.

Commenting on the launch of flights to Al Ain, Ali Hassan Al Shaiba, Acting Executive Director of Tourism and Marketing at Abu Dhabi's Department of Culture and Tourism, said the new route "marks a significant milestone in tourism between Kuwait and Abu Dhabi," adding: "Our strong cultural ties and proximity make Kuwait a valuable tourism source for Abu Dhabi."

### SMALL IS BEAUTIFUL

"I find that the biggest success doesn't necessarily come from operating the busy international gateways – for us some of our most profitable routes are the smaller cities which are closer to our customers," Ramachandran reflects.

The Kuwait to Osh service for example, is the first direct route between the Middle East and Osh, which the airline suggested provides passengers "access to connecting flights between the second largest city in Kyrgyzstan and its majority Muslim population and other cities in the region, notably Jeddah and Medina."





“Whilst the jury is still out on the viability of long-haul low-cost, the real question is between widebody low-cost and narrowbody low-cost.”

Rohit Ramachandran, CEO, Jazeera Airways

Davenport MBE, more Kuwaitis are studying at British universities than ever before, more than 6,000. Britain is also a popular travel destination for residents of Kuwait, welcoming over 150,000 Kuwaitis last year.

Ramachandran explains that the route presented a “very strong commercial proposition” for the airline, with the large numbers of Kuwaitis living or studying in London, as well as the large South

Asian diaspora in the UK and the Muslim population. He says: “I think the Muslim population in the UK have been looking for low-cost options to be able to travel to Jeddah and Mecca to perform the Umrah and Hajj pilgrimages and for the first time with our connections to Jeddah they have a low-cost alternative to travel from London to Jeddah.”

Exclusive to the London service, Jazeera introduced a new Premium Economy class, offering passengers a 40-kilogram baggage allowance, 31-inch seat pitch, a middle seat kept free, as well as dedicated check-in counters, priority boarding and a complimentary in-flight hot meal.

While this upgraded option will no doubt be appreciated by those passengers who prefer a little more space at a budget-friendly price, the launch of Premium Economy on the London route came from an operational hurdle.

“We saw that, at least based on the planning stages of the flight, we would have

about a six-seat payload restriction,” Ramachandran explains. “Rather than just block those seats off at the rear of the aircraft to be in compliance with the payload restriction, we decided to monetise that problem.”

With this foray into longer-haul destinations, is the airline considering the possibilities for flying further afield and what does Ramachandran make of the notoriously risky long-haul low-cost model?

“Whilst the jury is still out on the viability of long-haul low-cost, the real question is between widebody low-cost and narrowbody low-cost,” Ramachandran argues. “I think it is clear that the results of operating widebody ‘low-cost’ aircraft are still ambiguous or marginal at best, whereas the narrowbody operation is well understood by good low-cost operators. With technology moving forward and the manufacturers extending the range of existing narrowbody aircraft, more destinations come within range from our home base of Kuwait – London being a prime example.

“We are in discussions with Airbus about the XLR and it certainly increases the radius of the circle around which we can fly,” he continues. “I think there is still a while to go before we get to that stage because there are many low-hanging fruits within the range of the existing aircraft type we have. From 2023 onwards it is an interesting option to augment our fleet with.”

### CLOSER TO HOME

In the meantime, the airline has ambitious growth plans for the year ahead that are closer to home, making the most of the range of its existing fleet. This strategy focuses on three main areas: the first being growth in South Asia, including India, Pakistan and Bangladesh.

“Who would have thought that Osh and Kuwait could generate enough traffic to sustain a scheduled jet service,” Ramachandran remarks, “The route is already highly profitable.”

### GOING LONG-HAUL

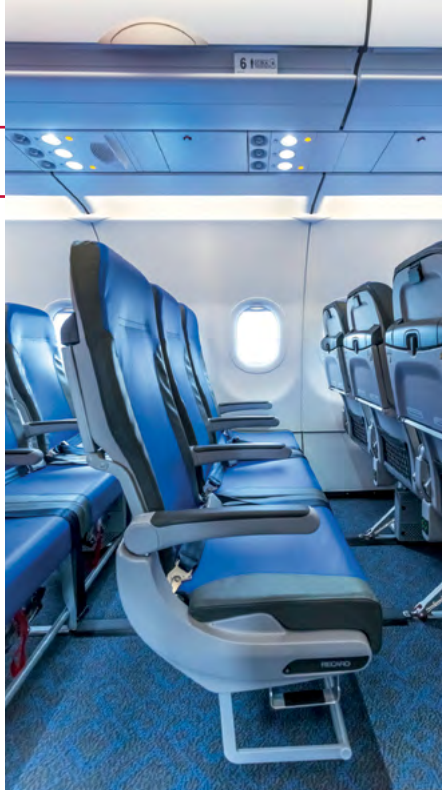
It is not all niche markets, however, as the airline celebrated a new milestone in October 2019, becoming the first low-cost carrier in the Middle East to fly to the United Kingdom, also marking the first new service to the UK from Kuwait in 55 years.

The route connects Kuwait International Airport with London Gatwick Airport utilising the A320neo. “The A320neo in practice has been generating a fuel saving of 18% which we are very pleased to see,” says Ramachandran, “so it makes quite a lot of sense for us to exploit the A320neo to more or less its maximum range, through the Kuwait – Gatwick service.”

According to Her Majesty’s Ambassador to the State of Kuwait, His Excellency Michael

"In India and Pakistan, we are currently limited by traffic rights, so we are in discussions with our own government in Kuwait, as well as the governments in India and Pakistan, to enhance and expand on the air services agreements," Ramachandran says. Meanwhile, the airline will be launching services into Dhaka and Chittagong in Bangladesh in February.

The second focus is the Commonwealth of Independent States (CIS) where the airline already flies into Baku, Azerbaijan; Tbilisi, Georgia; and Osh in Kyrgyzstan. Within the next year the airline plans to launch a service to Armenia, and is also looking at Tajikistan and Uzbekistan, and possibly Kazakhstan next year.



**The London Look:** Launched in competition with national flag carriers Kuwait Airways and BA, Jazeera Airways' 6-hour flight to London's Gatwick Airport is the longest journey in the airline's schedule and features a Premium Economy cabin within its A320neo.

Finally, the airline plans to continue expanding within the region, and particularly in Saudi Arabia.

"I believe Saudi Arabia has great potential," Ramachandran says. "Particularly in recent weeks and months with all the positive news coming out of the Kingdom with respect to business friendliness and tourism. Last month we launched services to Dammam and I expect at least another four or five destinations in Saudi Arabia in the next year."

The link to Dammam is the airline's fifth destination in the Kingdom, following Riyadh, Jeddah, Medina and Taif. Flights to the mountain city of Abha started in January.

Alongside the business opportunities for focusing on this region, it is also a key

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market for Kuwaitis, with the number of people crossing the Kuwait-Saudi border by road equivalent to the capacity of the Kuwait International Airport, Ramachandran says, which is about 13.5 million.

Outside of fleet additions and new routes, the airline is also planning to expand at its home-base at Kuwait International Airport where it operates its own terminal – T5.

“To the best of my knowledge, we are the only airline in the world that has designed, funded, built and operates its own terminal,” Ramachandran says. The terminal opened in May 2018 featuring self-service kiosks, duty free, dining outlets and complimentary Wi-Fi at each gate.

This operation carries two benefits, the airline suggests; operating the terminal gives Jazeera Airways a better end-to-end control of the passenger experience, and the profits add to the airline’s bottom line. Other airlines have taken note.

“I have received several requests from other like-minded low-cost carriers operating into Kuwait who want to fly in, and operate from our terminal,” Ramachandran says. “We are very open to that idea but at the moment, partly because of the rapid expansion of the airline, we are

almost maxxed out of the terminal itself.”

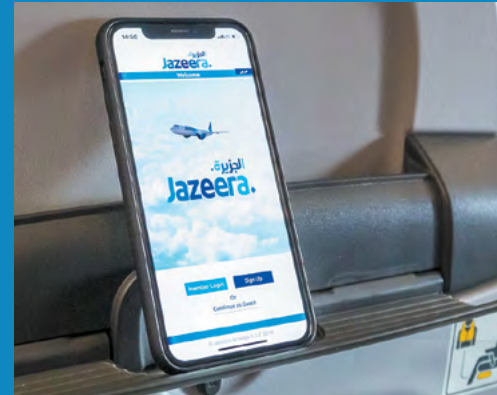
To accommodate this growth the next phase of expansion at the terminal is underway and set to be ready for the summer season. Another, “more aggressive” expansion will then follow, expected to be ready in two years’ time and growing areas across the terminal, from gates to check-in counters and parking.

It appears 2020 is going to be another packed year for the airline with passenger figures expected to continue rising. Reporting passenger figures for the third quarter of 2019, the airline recorded an increase of 14.3% over the same period in the previous year, while passenger numbers for the first nine months of 2019 grew 18.1% over the period in 2018, reaching 1.8 million.

Suggesting what we might see in the year ahead, Ramachandran tells LARA: “I would be very surprised if we don’t far exceed 3 million passengers this year.”

After the rapid growth of the airline over the past year, Jazeera Airways isn’t looking to stop and has much lined up for 2020. Ramachandran is buoyant: “The journey from seven to almost 20 aircraft in a couple of years is quite a challenge, but our team is up to the job.” ■

**Bishkek bound? Ramachandran meeting with Her Excellency Ambassador Samargiul Adamkulova from Kyrgyzstan to discuss a potential air service to the Central Asian city.**



## Free W-IFE puts Jazeera ‘ahead of the curve’

Discussions around in-flight entertainment and connectivity in low-cost cabins can sometimes seem to split the room. With some arguing these services are necessary to the passenger experience, while others argue that the costs of providing IFEC outweigh the benefits – or else, if passengers want the service – they need to pay for it.

Jazeera Airways falls into that first category with its wireless-IFE system Jazeera Screens, powered by Bluebox Wow, allowing passengers to connect to the network to enjoy content on their own devices. The airline also provides complimentary Wi-Fi at the gate, and in-seat power in its A320neo aircraft.

“Most people carry their own devices now, and this service works very well for the younger demographic of people who fly with us,” CEO Rohit Ramachandran says.

Meanwhile, he suggests the importance of in-seat power to passengers is going to rise, becoming almost “as necessary as oxygen”.

“Most people are going to need to charge their device if they are watching a movie, especially on a six-hour flight to London. I think it’s going to become more of a basic requirement moving forward – we’re just a bit ahead of the curve,” he says.



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# Making MRO the cool choice

**KLM UK Engineering is a world leading MRO offering high-quality products and services from its airport headquarters in Eastern England. It also runs an onsite technical training college that is delivering the next generation of EASA-standard aircraft engineers and technicians through an innovative training approach, and the introduction of Virtual Learning. LARA's Glenn Sands enrolled for the day.**

**“W**e’ve been involved in training for more than 45 years, even in our previous guises as Air Anglia, Air UK and now as KLM UK Engineering (KLMUKE), and are actively developing the next generation of technicians and engineers. It’s worth remembering that when they leave here, they’d have had far more exposure to technical and practical

procedures than they might get in the first year of their job,” says Ray Flower, Head of Technical College, at KLM UK Engineering’s impressive facility at Norwich Airport. It was clear that he very much enjoys passing on his knowledge and expertise to students after years in the industry.

Having moved into the specially built International Aviation Academy Norwich

(IAAN) in April 2017, KLMUKE is by far the biggest tenant within the facility, yet the company has managed to retain an almost one-on-one teaching capability for its students.

Although the requirements for qualification of aviation maintenance engineers is constantly changing, Flower is quick to point out that they’ve kept ahead of the game in this area. “Requirements have shifted rapidly from the British CAA to JAR 66 through to the EASA standards we currently have here and KLMUKE has always been at the forefront of this developmental process.”

KLMUKE is a fully approved EASA Part 147 training college and holds EASA Part 66 Approval for Category A1, B1.1, B2 and B1.1



**Engineering the engineers of the future:**  
Ray Flower (pictured right) is KLM UK Engineering's Head of Technical College at the Norwich Airport-based MRO organisation's standalone EASA Part 147 technical training college. The college offers students type courses, a BSc degree programme and aircraft mechanic apprenticeships.



to B2 Extension, delivers type courses, degree programmes and an apprenticeship programme for both in-house and third-party students.

"All of these courses are focused on the aircraft maintained within the KLMUK Part 145 and so it's making sure that KLMUK and the wider industry will have enough qualified certifying engineers to sustain future maintenance activities," Flower adds.

### LEARNING PARTNERSHIPS

The KLMUK apprenticeship is performed in conjunction with its training partner, City College Norwich, which at the end of the fully funded three-year course delivers a City & Guilds/NVQ Level Three/EASA Category A1 qualified aircraft mechanic. During the course the trainees focus on aircraft maintenance and structural tasks through a mix of practical and theoretical skills. The students are provided with all the tools and safety equipment they need and receive a salary throughout their 36 months of instruction. But in order to remain competitive Flower reveals that in the near future: "We're soon going to add a Level 4

apprenticeship programme. At present we offer a Level 3 which is to the Category A mechanic standard, the future Level 4 programme is to the Category B1 (Mechanical) or B2 (Avionics) standard.

"The time difference between the Level 3 and 4 programmes is approximately 12 months, which is currently within the guidelines of the Institute for Apprentice Aircraft Technicians," says Flower. "The Level 3 should be 48 months in total, but we have managed to reduce it down to 36 months without compromising the apprentice standard. This may still appear a long-time, but we must meet certain criteria for the apprenticeship certificate and more importantly the quality of apprentice leaving our College. Part of the mandatory requirement is that our apprentices have to complete a set of Professional Engineering Operations (PEO) modules, which are generic and transferrable engineering skills, whether automotive, marine or aviation."

The PEOs are delivered jointly by City College Norwich and KLMUK; the aircraft training Approved Cat A or Cat B courses are delivered by KLMUK. An extra option that's

available is a third-party apprenticeship. This means that during their study the third-party apprentices gain all the necessary work experience within their own organisation and simply return to KLMUK when instruction is being taught or a knowledge examination is needed.

"We currently have eight of our own trainees and four from BA CityFlyer on the Level 3 (Cat A) course," says Flower. "Along with traditional instruction delivery methods we provide all our students with access to our own self-study Virtual Learning Environment (VLE), which along with instruction equips our students for our assessment processes. The VLE product is open to our own staff and can be purchased by third-party individuals/companies/engineers that need to top-up their knowledge or skill set. For example, an aircraft engineer leaving the military >>>





who may well be seeking to move into the civil market.”

With the introduction of third-party students to the apprentice training programme KLMUKE took the decision to start with a clean slate for all these students regardless if any had prior knowledge within the industry. Flower explains why: “Although some may have completed Further Education programmes such as Level 2 or 3, we find it best to assume no prior knowledge and little or no practical skills – in essence we start from the beginning and cover all the basics.

“The demanding nature of the syllabus and the need to process a lot of technical information in a relatively short period of time means there are areas where some students may well struggle. Invariably we can overcome this by adding a bit of extra basic education at the start. As an example, getting students to develop the ability to work without a calculator (essential in current EASA assessments) and apply simple lateral thinking to potentially complex and multi-system or multi-faceted issues is essential,” says Flower. “It’s a gradual but positive developmental process, and our staff are always keen to put the extra effort in to instil mental agility during lessons and practical tasks. We require our students to develop an ability to think

quickly under pressure whilst being safe as they navigate the complexity and interactions of different systems; although we do not expect students to master the fundamentals of ‘thinking outside the box’ in the first two years of their programme.”

### TRAINING THINKING

Throughout the training the students are tested through quizzes, practical applications and of course formal examination at the end of each module. KLMUKE’s approach is to explain, demonstrate, playback and test and at all costs to avoid the traditional teach and examine; this in turn can lead to a ‘learn and dump’ approach by students. Formal tests take the form of multi-choice questionnaires and essays, the latter being a bit of a challenge as students must write logically using technical language when describing specific technical detail or representing maintenance processes. Flower explains by way of example, “If you ask a student how to boil an egg, he or she would invariably describe how you would ‘take an egg from the fridge, put it in hot water and boil for three minutes, take it out and eat it’.

“Whilst this is a true reflection of the process, it is what we would call a superficial response. There’s a lot more to processes

“It’s getting them to have the ability of being able to work without a calculator or apply some lateral thinking that they need to grasp at times.”

that we need to get them to think about. Taking the example above, the detail in the processes involved; selecting the egg, obtaining the water, the use of utensils and, importantly, any safety aspects, and the presentation and access to the edible elements of the egg. Our essays development is geared around this approach, and whilst students do find it a struggle initially, they do grasp the concept eventually.”

There are between 12 and 13 modules involved in the KLMUKE basic programmes and for many there is a practical assessment. Flower continues, “We are very conscious within programmes that not everything needs to or should be tested academically, so we have introduced a more competency-based approach to our assessment of students. An approach where we rely on other key indicators such as teamwork, engagement and attitude. This is all brought together in our Emulation Zone practical activities, which utilises many of the live operational systems in our Boeing 737 aircraft.”

No matter what the level of course being taught, Flower, as Head of Technical College, is keen to get away from traditional chalk and talk and “death by PowerPoint” as he calls it; where the students may well be sat in classrooms for very long periods with little or no exposure to equipment or a real work environment. “So, we instruct a specific lesson on an aircraft component or system in the classroom, then follow up the theory in our purpose-built Emulation Zone. We find this approach provides students with a varied and more interesting learning environment, one that reinforces the theory.” This mixture of classroom



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**Maintaining mastery: Feedback from the industry has been extremely positive in terms of the standard of aircraft technicians and mechanics that KLMUKE is producing within its courses.**

theory and hands-on practical maintenance tasks, gives a more rounded and interesting learning platform. He further explains his approach: “We do practical assessments throughout but in the second and third years of our programmes these tend to be more competency-based. We start to increase the student’s exposure to aircraft maintenance tasks to the point where by year three they’re carrying out the actual tasks with time pressures with absolute minimal supervision or guidance. Overall, the many maintenance activities carried out by students are those that they would not normally get exposure to in an MRO during the first two or three years of their post-training career.”

Flower goes on to say that “the beauty of our competency-based assessment approach is that students can progress at their own pace and it allows us to evaluate knowledge, attitude and teamwork skills and the

student’s overall approach.” He adds, “The aim is about giving students maximum exposure and experience before they leave the training environment.”

### VIRTUAL LEARNING

The use of a virtual learning tool allows for KLMUKE to present additional (and often bespoke) training packages to be bolted-on to the site with relative ease; Human Factors, Fuel Tank Safety, Electrical Wiring and Interconnection System (EWIS), Ramp Safety and Task Sign Off are examples that provide easy access for its customers and engineers to maintain currency or enhance skills and knowledge.

All KLMUKE training products and programmes have been developed to be immersive and interactive. The courses or programmes can be accessed anywhere and anytime by laptop, tablet, iPad or smartphone. Currently, the ‘in-house tech

team’ are seeking to embed more videos and simulations to illustrate and support the different and more complex aspects of maintenance tasks. The online forum has been highly praised, allowing an apprentice or remotely located student to discuss a specific topic with a subject matter expert. “No enquiry is ignored, and the aim is to respond within 24 hours.”

KLMUKE is a fully approved type training provider for the Boeing 737 family from the classic through to the MAX and the Embraer 170/190 series aircraft. These type courses are delivered in Norwich or can take place at the customers’ facility – which is often the more cost-effective method. Whilst type courses are regulated in terms of length, KLMUKE is actively introducing innovative simulation tools and augmented training aids to enhance learning of the complex systems and reduce the time spent on delivering theory and practical sessions.

KLMUKE is also involved with the BSc (Hons) Professional Aircraft Engineering Practice degree programme, which is accredited by the University of East Anglia. “This degree programme is like any other and applicants require a minimum qualification on entry of three Cs [at A level].

Flower explains the details: “The first two years are devoted to delivery of the EASA



## Peter van der Horst – Managing Director KLMUKE

The investment currently taking place at KLM UK Engineering’s site in Norwich is huge and is a clear indicator that the MRO company is thinking ahead and keen to take on more work. Peter van der Horst, Managing Director of KLMUKE, provides an overview of future plans for how it intends to manage the global technical staff shortage.

“We at KLMUKE are a subsidiary of KLM and we work in partnership with AirFrance /KLM Group. The facilities we have here are perfect for us but it’s not without challenges. With the new hangar being built we’ll be shifting from five to six bays. Although during the winter months the sixth bay will be relatively easy to fill, in summer it can be a challenge. Aviation is growing and the demand for winter slots is increasing and it’s an ideal opportunity to expand our business. For us it’s also an opportunity to move our workshops, located across a couple of old hangars, into the new centralised facility which is perfectly lined-up with the current hangars, meaning we can be far more efficient and continue to develop our capabilities.

“As far as the Technical College is concerned, the current facility with the emulation centre is perfect,

modules. In academic terms this equated to Levels 4 and 5 in the Higher Education system. Level 6, third year, takes the aviation studies to a much higher level and entails a significant number of hours in the Emulation Zone. The intention of the programme is that at the end of the three years the students will have more confidence, more competence in completing aircraft maintenance activities and tasks, and if successful, they graduate with an EASA and degree certificate." Flower goes on to point out the advantages of this programme to KLMUKE: "We have the bonus of seeing any new applicants first and can select the best. From the most recent degree course that graduated, we recruited several very good students."

Feedback from the industry has been extremely positive in terms of the standard of aircraft technicians and mechanics that KLMUKE is producing, and the students themselves report back that their programmes gave them a better insight into the operation of aircraft maintenance and that they were better equipped to face and adapt to the real world.

In terms of looking ahead and the predicted worldwide shortage of aircraft engineers, Flower has a pragmatic and experienced outlook: "We are kind of

hamstrung by what the regulation says in terms of what we need to be doing to meet the standards. At present, we can only work within the regulatory frameworks and whilst it is possible to have some alternative approaches it is difficult and unusual. There are several training issues that need addressing, and whilst EASA is actively trying to address them, it will take time. Currently there are initiatives relating to the updating of the Part 66 syllabus, composites damage

assessment and repairs and the introduction of new and innovative teaching methodologies."

"We do keep up with new technologies and react quickly to introduce new concepts as soon as we are aware of them. We do this by engaging with the industry, professional institutions, attending conferences/events and of course working with our mother company AFI KLM E&M that also has a technical training facility." ■



but it takes continuous promotion to let people know it is there and about the courses we offer. The plus side is that once students are in, we can grow our own mechanics and engineers for the future, which is especially important with the new hangar development.

"The apprenticeships have always been very successful, but the degree programme is still relatively unknown, and the challenge is making sure young people know that it is an option and what an inspirational place this is to study and have access to work on a real live aircraft in the emulation zone. It's not a case of not seeing the inside of a hangar or an aircraft for the first couple of years of training, which might occur elsewhere. Here you can describe it as a real hangar environment."

The passion van der Horst has for the products at KLMUKE is evident and he's made it a personal quest to get the next generation interested in aircraft maintenance.

"We all are aware of the shortage of technical staff in general, so it's important that we continue to interest people in this line of business. But we need to get them interested at an earlier age. We have been engaged with schools and have held open days here at our facility and have sponsored events such as the Norwich Science Festival. It gets individuals focused on aviation and look towards an apprenticeship or degree course."

The KLMUKE chief ended with a statement that should be read by all those who may be looking towards aircraft maintenance as a profession: "Aviation is an exciting environment and it's a great job, and if you are ready to take on an apprenticeship or degree course you will have a guaranteed job at the end, whether it's with us or another company, be it an MRO or an airline. There's a high demand so it's definitely the time to get into this profession."

# Seventy years creating cutting-edge solutions

**With the potential of pioneering the development of commercial regional electric flight in the pipeline, and a new Saab 340 to serve as the National Flying Laboratory Centre, Cranfield University and its commercial arm, Cranfield Aerospace Solutions, is quietly leading the way forward in aircraft development. LARA's Glenn Sands went along to find out.**

Located on the site of the former WW2 airfield of RAF Cranfield between the UK cities of Milton Keynes and Bedford, Cranfield University oozes aviation heritage, innovation and ideas related to the aerospace industry. No matter where in the world the postgraduate students are from, they and the lecturers and research professors all possess a common thread that runs through their DNA: To make aviation better, safer and more environmentally sustainable.

To achieve these goals the university has a unique facility: Its own airport, aircraft and air navigation service. These offer unrivalled access to 'at-scale' research, and a teaching environment that's directly adjacent to the specialist technology centres and laboratories.

Perhaps the most dynamic and visually impressive aspect within the university is the National Flying Laboratory Centre (NFLC), which operates a Jetstream 31 as a 'flying classroom' and engineering

laboratory. It's a capability that's rare within the global academic sector and is used to support pioneering teaching, research and consultancy. The NFLC is regarded as a key national asset by the UK's aviation industry and the Royal Aeronautical Society (RAeS).

The Jetstream 31 provides the flying component of the broader Cranfield Aerospace Solutions future strategy and is critical for flying Cranfield students, both in terms of official accreditation and for the quality of their learning experience. It is used by many UK universities in order to deliver flight test experience, which is required as part of the RAeS accreditation for aerospace engineering students.

A single flight can show students the lift, drag and pressure tests which they will become very familiar with later in their careers. The specially instrumented Jetstream can supply real-time data on

a range of performance parameters, allowing students to be flight engineers during the flight.

The NFLC's remit extends to industry research and consultancy, and the aircraft has been used by a host of organisations like Rolls-Royce, BAe Systems, Airbus UK and several specialist agencies within aviation. Industry partners use the aircraft to test new parts and equipment, develop advanced airborne systems and sensors, trial future technologies, including those associated with UAVs. The NFLC is regarded as a viable alternative to flight test research work more commonly carried out in simulators, wind tunnels or more expensive jet aircraft.

## NEW FLYING CLASSROOM

However, despite the benefits the Jetstream offers, the aircraft is old and is now due for replacement. Fortunately, a replacement aircraft has already been sourced, a 1998-built Saab 340B, which previously flew with Northwest, a regional airline based in the US and was leased directly from Saab.

Professor Nicholas Lawson, the lead for the NFLC group, explains the need to



ensure that industry and students are supported in the best possible way.

“We acquired the Jetstream about 15 years ago and it has done a lot of flying with us. It’s probably flown over 10,000 of our own students since we bought it for NFLC and we have flown around 20,000 students in total, of which most have been from the UK. Many of whom are now out working in the industry since graduating.

### INDUSTRY BENEFITS

“Having the Jetstream also allowed the us to support industry. BAe Systems operated a similar type until they retired it. We were involved in the development of autonomous systems with BAe’s aircraft and helped plan the test flights. At times we flew the aircraft for them. Theirs was equipped with a pod under the fuselage which could house additional electronic kit. Our work focused on developing the so called ‘see and avoid’ concept for BAe’s autonomous flying systems programme. When you have similar unmanned systems flying in the same area, it’s important they are not crashing into one another. As a result, we developed a lot of experience in this field.”

Despite the long and impressive teaching career the NFLC Jetstream has racked up, it’s old now and Lawson admits that the aircraft requires a lot of maintenance hours to keep it airworthy. He is keen to promote the benefits the Saab will bring: “The Saab 340, which we now have, is at the stage where we are

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“We are able to take the students up to 2G which no ground simulator can currently replicate in the UK. So, the trainee student engineers can get a feeling of what it’s actually like. It’s a far more immersive teaching experience for them.”

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beginning to fit the aircraft out in a laboratory configuration. It’s a bigger and more capable aircraft, it has a cargo bay in the back, and this means that we will be able to work more regularly with industry. It will allow us to fly the aircraft around with other people’s kit in the back, and our students in the front. So, we can have test equipment on a semi-permanent basis in the back. If a company wants to trial aspects of a new digital aviation solution or to develop new autonomy techniques, we can have the equipment mounted in the rear of the aircraft for longer. It opens the possibility of industry flying the aircraft one week, and the university the alternate week.”

The new NFLC Saab 340 will enter service in autumn 2020 and is regarded as a big step for Cranfield. It will serve alongside the university’s two light aircraft, which offer students one-to-one flight experience. It was discovered that a lot of the aerospace students that were on the courses had not flown in a small aircraft before, and simply didn’t know what it felt like. It’s regarded as

a massive positive for students to be able to have a “hands-on approach and let them handle the controls,” says Lawson. A flight can easily point out to a student how an aircraft handles at specific flight envelope points, which may well link in with a lecture the day before. It’s all part of the core teaching process to demonstrate “aerospace,” as Lawson calls it.

Professor Helen Atkinson CBE, Pro-Vice-Chancellor of the School of Aerospace, Transport, Manufacturing, was on hand to explain how the acquisition of the Saab was achieved: “It’s a big financial commitment and the university has covered a large percentage of the cost, but a lot of industrial partners have also contributed, which is an indication of just how important they think it is for the UK’s aerospace industry.

“Companies like Rolls-Royce, Airbus, Boeing, BAe Systems, GKN, Meggitt and Spirit Aerosystems have also made a contribution for the new aircraft. We are now building up the last part of the funding which will allow all the final modifications to take





Professors Nicholas Lawson (left) and Graham Braithwaite of Cranfield's National Flying Laboratory Centre taking delivery of the Saab 340 (pictured below). Inside the cabin of the Jetstream 31 (centre images).



place," she adds.

But why the Saab 340B? Lawson explains why the aircraft was selected: "If you look at the turboprop market, it's quite difficult to find something that fits our needs. We wanted a large aircraft, but we didn't want it so big that it would be expensive to operate. So, the Saab fitted the bill. It's one of the final examples of the 340 to come off the production line.

There's about 400 still flying globally, so it's a well-supported aircraft. And the additional capacity in the back is a real bonus.

"The reason why we bought the aircraft rather than lease it from Saab is due to the modifications that we need to do to it. We couldn't really lease it, because you have to return the aircraft in the same condition you acquired it at the end. With the modifications we are making, we'd simply not be able to return it in an original configuration."

Atkinson continues: "The modifications are quite extensive, and they all need to be certified so it means there will be sensors all over the

aircraft feeding data into the cabin during the students' flight."

Once in service the Saab will allow the NFLC to respond to the needs of the industry far quicker when a manufacturer

requests a flight trial. It may simply mean putting a 'widget' in the back of the aircraft to explore a certain data parameter, and the scheduled student flights will still be able to continue unrestricted. An example of this could be autonomous flight. "We can do a dual role approach of a flying lab for both students and industry requirements at the same time. Such as a surrogate autonomous flight, where we will be able to keep pilots in the loop, as a safety element. The CAA is far happier with this style of approach," explains Lawson.

### FLYING A DESK

For a regular teaching flight, the aircraft is configured in its flying laboratory role. The students are referred to as 'task specialists' which is the term used at the top of the forms they are handed prior to any flight. Every flight is planned with an academic angle and the booklet the students are given is to record data during the sortie, which they then collate to produce a written report. It's an academic log where they record all details of the flight, so allowing the students to get a thorough understanding of why certain manoeuvres are performed. Lawson explained what's coming up for the students: "We are able to take the students up to 2G which no ground simulator can currently replicate in the UK. So, the trainee student engineers can get a feeling of what it's actually like. It's a far more immersive teaching experience for them.

"The Saab aircraft seats will each have the capability to display flight data via an iPad, which the students will be able to take from the classroom and mount on the seat in front of them. They will be able to measure all sorts of calibrations from sensors located all over the new aircraft. In much the same way we do on the Jetstream. Students, under supervision, will be able to move in-flight to different seats, in order to demonstrate how the centre of gravity can shift. The new Saab will be a superb addition for us." ■



# Electric dreams – Project Fresson

The trend to develop electric flight has taken on far greater significance in the past few years as the push for aviation to become ‘green’ has gained momentum. Leading the charge in the UK is Cranfield Aerospace Solutions – a wholly owned subsidiary of Cranfield University – with its CEO Paul Hutton (pictured above) at the helm of Project Fresson.

I’d describe Hutton as an honest genius in terms of his outlook on the UK’s current position in aviation, and the need for the nation to push forward in developing leading aerospace solutions.

He explains the current British predicament: “The UK has gradually lost the ability to design new aircraft concepts because we have focused on being part of somebody else’s supply chain. What I mean by a concept, is somebody basically says ‘I have a specification which I’d like an air vehicle to meet; here’s the range, speed requirement and the operational scenario. What’s the ideal configuration for an aircraft to meet this?’ Although we have retained this core capability, albeit within a very small group of people. We are also able to perform complex modifications to existing aircraft and have both the military and civilian approvals. When you combine all these certifications, we’re a unique facility. This is reinforced by the number of OEMs who we have worked with in the past such as Boeing, Lockheed Martin and BAe. We’re able to do things for them far quicker and more cost-effectively than they can themselves.

“But this has meant that as a company we are at the discretion of the OEMs in terms of work. We recently reviewed our past work strategy and discovered that we have good and bad years which are solely dependent on if an OEM passes work to us. So, if our core

abilities are really valued by the OEMs, we needed to change our approach by using our capabilities to develop our own products.

“We decided to focus on aircraft design and manufacture, although we’re aware that we’d not be competitive immediately, but by focusing on a specific type, such as the sub-regional aircraft market, it would be the best place to start. This class has not had any large investment in the last 10 to 15 years because traditional aerospace wisdom was, with the cost of fuel increasing, the nine-to-19-seat market was not economically viable to develop. So, most manufacturers shifted to the 40-seat and above class. It’s only when there’s a need, when the aircraft is effectively a flying bus, where a nine-seater is advantageous. What it means is that the aircraft is doing the job very well, but no one is investing in its future, so the entire sector has been neglected.

## GREEN AGENDA

“It will only become attractive again if something significant changes, which will be electrification. Once you have invested in an electric aircraft its operating cost is a fraction of AvGas. Suddenly, this segment that didn’t make sense, now does if the electric technology is applied. Globally the market competition is limited, and it meets the growing green agenda, too.

“It makes sense that if you seriously want to have a viable emissions-free electric aircraft, you will have to look at the nine-seat segment. Simply because the technology is not there for a large regional single-aisle aircraft and, adding the technology to a two-seater – there’s simply little point. So, where we can do something credible is in the regional nine-12-seater market, which is how the source of this strategy was developed and formed Project Fresson.

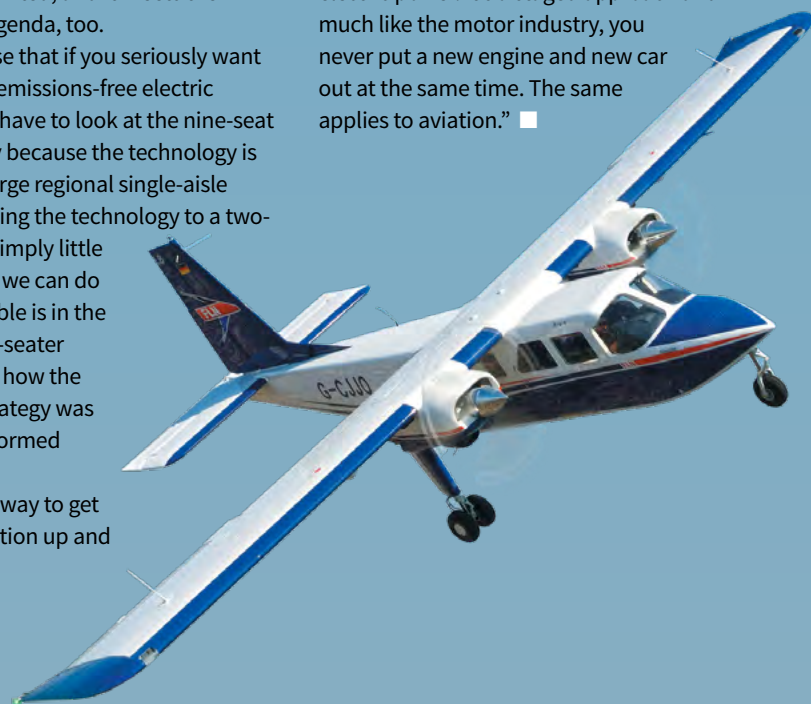
“The quickest way to get commercial aviation up and

running on electric power is to use an aircraft that the regulator already knows and has approved and simply change the propulsion system. We decided to narrow it down to the Britten-Norman BN-2 Islander (pictured below), which is a well-known type. When we spoke with Loganair, they love the aircraft, but were keen to improve the propulsion system and desired something more cost effective. Simply, a lower operating cost. This will be the quickest way to get an electric commercial aircraft in service in the UK.

“What makes this important to the UK is that it will allow us to create a supply chain off the back of this project, and it will be the first EASA-approved electric aircraft. Also, the first EASA-approved electric motors and the first EASA-approved power management system; all of which can be created in the UK.

“If we don’t do this now, we run the risk of similar projects in the UK being created elsewhere such as in the US and Far East, after which it will be hard for us to catch up.

“What has to be remembered is that this is just Phase One of Project Fresson. Phase Two could mean converting a larger aircraft, such as a 19-seater like the Twin Otter, when we use what we have learnt in the first phase. And as I see it Phase Three is an entirely new 19-seat aircraft which is design-optimised for electric power. It’s a staged approach and much like the motor industry, you never put a new engine and new car out at the same time. The same applies to aviation.” ■



# Where the action is — Asia

Regarded as a powerhouse in terms of the rise of regional and LCC carriers, Asia is a region that offers huge potential for those airlines or start-ups prepared to take a gamble. With political changes and a population eager to travel, the potential is huge. LARA's Glenn Sands reports on a land of opportunity and threats.



Asia is currently one of the fastest growing regions in terms of start-up regional and low-cost carrier airlines. Through a series of partnerships between the big airlines or standalone carriers launching new routes, the relentless demand for connectivity within the region appears to be showing no signs of slowing. According to IATA, the region is expected to see unprecedented growth in aviation beyond 2030, by which time it estimates that air travel in Asia would be greater than the next two markets – North America and Europe – combined.

But there is concern that the aviation infrastructure in the Asia-Pacific region will not keep pace with the anticipated growth in traffic. If this isn't addressed within the immediate future, analysts believe that the region could lose up to 20% of the anticipated growth in jobs and GDP if anticipated bottlenecks at airports are not cleared. It's a fine balancing act that now needs to be resolved, according to senior management across a host of regional and LCCs in the area.

According to 'Resolution 7' set in place by the Association of Asia Pacific Airlines (AAPA) in 2018, it agreed to adopt the International Civil Aviation Organisation (ICAO) objectives whereby the AAPA would focus its efforts on the provision of cost-effective and efficient airport infrastructure in order to meet the projected growth in passenger and cargo demand. Any development of airport infrastructure is a significant local capital investment and the financing and operation must be organised in a way to include both private and public sector involvement. Where possible the air operators themselves pay for their own infrastructure costs, but the various ownership structures and operational arrangements that carriers may have with specific airports also has to be considered.

The governments in Asia have also been called on by the AAPA to ensure that regulatory frameworks on airport

infrastructure investment are fit for purpose and balance the interests of all airlines, not simply the internationals, along with passengers and airport operators.

Since November 2018, the investment in time and resources has paid off with a substantial increase in regional passenger traffic. But, there has been a downside to this rapid growth. The fierce competition among the host of relatively new budget carriers which operate across much of Asia has decimated their profits, in many cases, despite the increase in passenger numbers. The LCCs have become extremely popular among Asia's enthusiastic middle-class travellers, but their proliferation has resulted in a profit margin of less than US\$5 per passenger according to AAPA.

### WATERED MARGINS

Last year, a Kuala Lumpur-based trading group analysed the earnings of the top 25 airlines in the region. Its findings made for sombre reading. Net profits halved to US\$4.7 billion in 2018, accounting for the low \$5-per-passenger profit. Figures for 2019, when released, are anticipated to show little significant change, although a substantial downturn has been ruled out.

"Asian airlines... were not able to pass on the full cost impact of significantly higher fuel prices we saw in 2018," stated Andrew Herdman, the AAPA's Director-General. "Asia-Pacific airlines continue to face significant headwinds in the form of persistent cost pressures, stiff competition, as well as further volatility in oil and currency markets."

The fierce competition within the region raises questions about the rapid expansion of capacity currently being pursued by Asian airlines, and the orders they have placed for new aircraft. These factors combined mean that the reserves of even the most competitive LCC in the region are being sapped away.

The AirAsia Group, Asia's budget pioneer, saw its operating profit almost halve in

2018, and the presumed 2019 figure is unlikely to offer any significant improvement. Even some of Asia's full-service long-haul legacy carriers are now in a position where they are fighting for survival.

AirAsia Group's chief executive, Tony Fernandes, commented in early 2019, that Malaysia was to be the principal source of profits for his airline. The group's operating profit in 2018 plunged 44% from 2017 to \$286 million. Although the airline remains profitable in Malaysia, where it is based, its operations and routes in Indonesia, Thailand and elsewhere are seeing their profit margins shrink, and in some cases operating regularly at a loss.

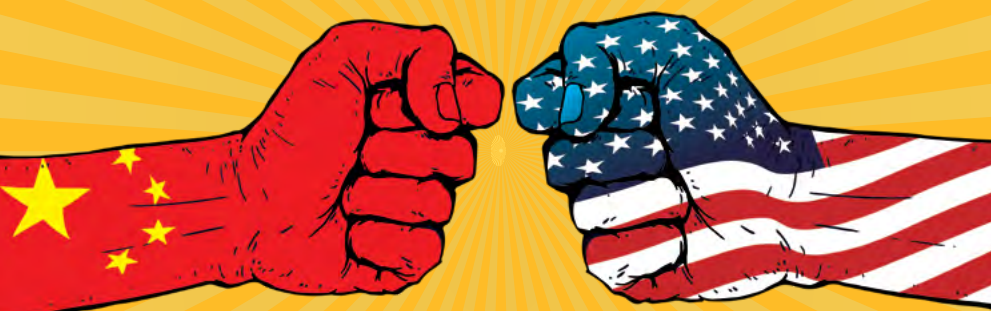
Despite AirAsia positioning itself as the leading player in the region's fast-growing commercial aviation market, it has not been able to shrug off the industry's profit crunch due to the competition, which in some cases have been inspired by Fernandes's business tenacity. Well, they do say imitation is the sincerest form of flattery.

### COMPETITION UNCHECKED

The number of seats among the region's LCCs has quadrupled in the past 10 years and Asia's aircraft supply is growing faster than demand, according to the Center for Asia-Pacific Aviation (CAPA). The organisation regards the situation a result of irrational competition, which needs better regulation in some areas.

In 2017, which is viewed now as an aviation turning point within the region, passengers in the Asia-Pacific area surged 11% to 1.5 billion, accounting for a third of the global total. The figure is expected to grow to 3.9 billion in the next two decades. But the relentless competition in Asia's airline industry is casting a doubt over any regional or LCC's growth potential. Despite this toxic combination, the Asian region is expected to take the lion's share of new aircraft deliveries between 2018 and





**China v USA: Comment by John Persinos**

## The “Phase One” Trade Deal: Less Than Meets the Eye

President Trump touts the “phase one” trade deal, signed 15 January by the US and China, as a “beautiful monster” of a deal. On closer inspection, the monster is a mouse.

As part of the deal, China pledges to buy \$200 billion of US goods over a two-year period, in return for a lowering of US import tariffs. However, it’s finally occurring to many aviation analysts, as well as to many traders on Wall Street, that this deal is a public relations stunt. China is merely agreeing to buy from America the agricultural goods (e.g., soybeans) that it was buying before the trade war started.

In return, China retains the privilege of selling the US sophisticated manufactured products. What’s more, several existing tariffs on Chinese imports are set to stay in place until after the US elections in November.

The pact calls for China to buy an additional \$35 billion in US manufactured products in 2020 and \$45 billion next year. Jetliners are the largest US manufactured export to China, so we can expect a widely publicised aircraft purchase down the road.

Boeing’s new CEO Dave Calhoun stated: “Boeing applauds Presidents Trump and Xi as well as Vice-Premier Liu, Secretary Mnuchin and Ambassador Lighthizer for their leadership in building a fair and mutually beneficial trading relationship between the United States and China.”

Yet this deal does nothing to address structural problems in US-China trade. And that’s why aviation optimism over this deal is unfounded.

For starters, Chinese airlines typically order jets but must first obtain final approval from the central government before going public with these orders. By insisting on this process, the Chinese government claims credit for adroitly managing the economy. Beijing also gets to use these aircraft orders as bargaining chips in trade negotiations.

Boeing currently has 931 backlogged airliner orders on its books designated for “unidentified customers”. Aviation insiders say that many of these aircraft are already pegged for Chinese customers. So here’s what will happen: the Chinese government will announce impressive sounding orders, but many of them will merely entail formal approvals for orders that were already in the pipeline. In other words, the aviation component of “phase one” is largely smoke-and-mirrors.

Then there’s the dilemma of the 737 MAX, which represents the single largest US export product. The Chinese aircraft market is largely comprised of single-aisle jets, which represent around 85% of Chinese airline demand. Indeed, of those 931 Boeing orders for undisclosed customers, 867 are for the 737.

However, Boeing’s sole single-aisle product is the 737 MAX, which remains grounded due to the safety scandal. And finally, overall demand for aircraft has slowed in China, as travel in that country enters a slump and authorities attempt to quell the Coronavirus outbreak.

John Persinos is the managing editor of *Investing Daily* and a frequent contributor to *LARA* magazine.

2037. Estimates predict that 37,258 new airliners, of all types, will be delivered globally during this period at a cost of \$5.55 trillion. The Asia-Pacific region, currently the largest market, is expected to buy 15,530 of these aircraft at a cost of \$2.3 trillion. So, that’s all good, nothing to worry about here?

### STORM WARNING

But recently there have been signs of darker clouds on the horizon, which could mean that the predicted orders for new aircraft could dissipate.

Myanmar, in Southeast Asia, was once viewed as a promising market for regional carriers, with as many as 11 budget airlines created after the country’s long-ruling junta made way for a new civilian government in 2011. By the beginning of 2020, five of these carriers had collapsed.

In Vietnam, VietJetAir, created in 2011, has grown at a breathtaking pace, even overtaking AirAsia in market value, and attracting the attention of a host of investors. But once again competition, mainly from newer LCCs, is creating issues with any potential business outlook of the airline.

In January 2019, Bamboo Airways, owned by a large Vietnamese real estate conglomerate, FLC Group, began flying. It’s enticing passengers by offering low fares for large seats in a state-of-the-art aircraft. Chairman and former CEO Trinh Van Quyet is confident about the company’s ability to beat its rivals. This capability means that Asia’s larger airlines are finding themselves in the position of having their passengers picked off by budget airlines with the offer of lower fares.

Mumbai’s international airport, once one of the main hubs for Jet Airways – the bankrupt and grounded Indian airline – have converted the airline’s former counters to budget operators. The airline suspended all flights on 18 April after it ran out of money. Indian authorities reportedly allocated Jet Airways’ international flying rights on some routes to other carriers, including IndiGo. Incredibly, Jet’s collapse arose despite the

number of domestic passengers having doubled in the past five years.

In Thailand on 16 May 2019, Thai Airways International, which has been a constant source of concern for successive Thai governments over the decades, posted an operating loss of \$26 million for the quarter ending in March, down drastically from its operating profit of the previous year. The airline blamed intense competition with other airlines including low-cost carriers and the effect of the US-China trade war on its cargo business.

In neighbouring Malaysia, its Prime Minister Mahathir Mohamad said he was considering two choices in regard to Malaysian Airlines: whether to shut it down or sell the country's financially troubled

national carrier. On 27 May 2019, the airline announced a business tie-up with Japan Airlines, but currently it's unclear if this move will help the airline resolve its predicament.

### CHINA CRISIS

Currently Asia's regional airlines and LCCs are making strategic moves in order to survive. Hong Kong's Cathay Pacific Airways has acquired Hong Kong Express Airways, a budget LCC. While Cathay Pacific stated at the time that the airlines' business models are "largely complementary," 60% of Hong Kong Express routes overlapped those of its new owner, a fact that raises competition concerns among rival regional carriers operating in the area.

The volatile nature of the regional airliner network in Asia has also caused significant ripples within China. Its vast state-controlled airline market is insulated from the fierce battles that have impacted LCC and regional carriers in Southeast Asia and India.

In May, a senior Chinese civilian aviation official said the country's international air transportation sector had entered a new stage and that across Asia competition would gradually increase.

Much like 2019, the Asian regional and LCC market looks set for another turbulent year. As to who the winners and losers will be remains to be seen, but it will be anything but routine given the volatility of the regional market. ■

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An aerial photograph of a Mitsubishi SpaceJet M90 aircraft in flight. The aircraft is positioned on the right side of the frame, with its left wing and engine clearly visible. The wing has the registration 'JA21MJ' painted on it. Below the aircraft, a winding river flows through a landscape of terraced fields, some of which are green and others brown. Long shadows are cast across the terrain, suggesting a low sun position. The overall scene is a high-angle, wide-area shot.

# Two Steps

**David Willis examines the complex development and changing requirements impacting Japan's first steps into the competitive world of the regional jet market.**

A question mark hangs over the schedule for the service entry of the Mitsubishi SpaceJet. Its launch customer, All Nippon Airways, is due to receive its first SpaceJet M90 in time for the airliner to enter service with its regional

subsidiary, ANA Wings, to fly passengers attending the Tokyo Olympics, due to start on July 24. Reports of a possible postponement of deliveries – the sixth delay in the history of the programme – appeared in Japanese media from October 2019. Mitsubishi Aircraft Corporation's (MITAC) parent company, Mitsubishi Heavy Industries, is understood to have sought the input of an external review panel to help define a new delivery date beyond mid-2020. No formal announcement about the results of the review has been made by



# Forward...

either company, but in late 2019 Seiji Izumisawa, Chief Executive of Mitsubishi Heavy Industries, was unable to confirm if the mid-2020 target remained current.

One cause of the latest review is understood to be the need to configure representative test aircraft for certification purposes. CEO Izumisawa, speaking at an earnings briefing in Tokyo at the end of October 2019, linked the longer than expected time producing the M90 certification aircraft and the review of the schedule.

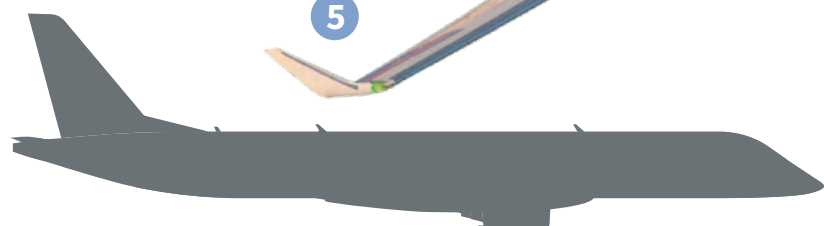
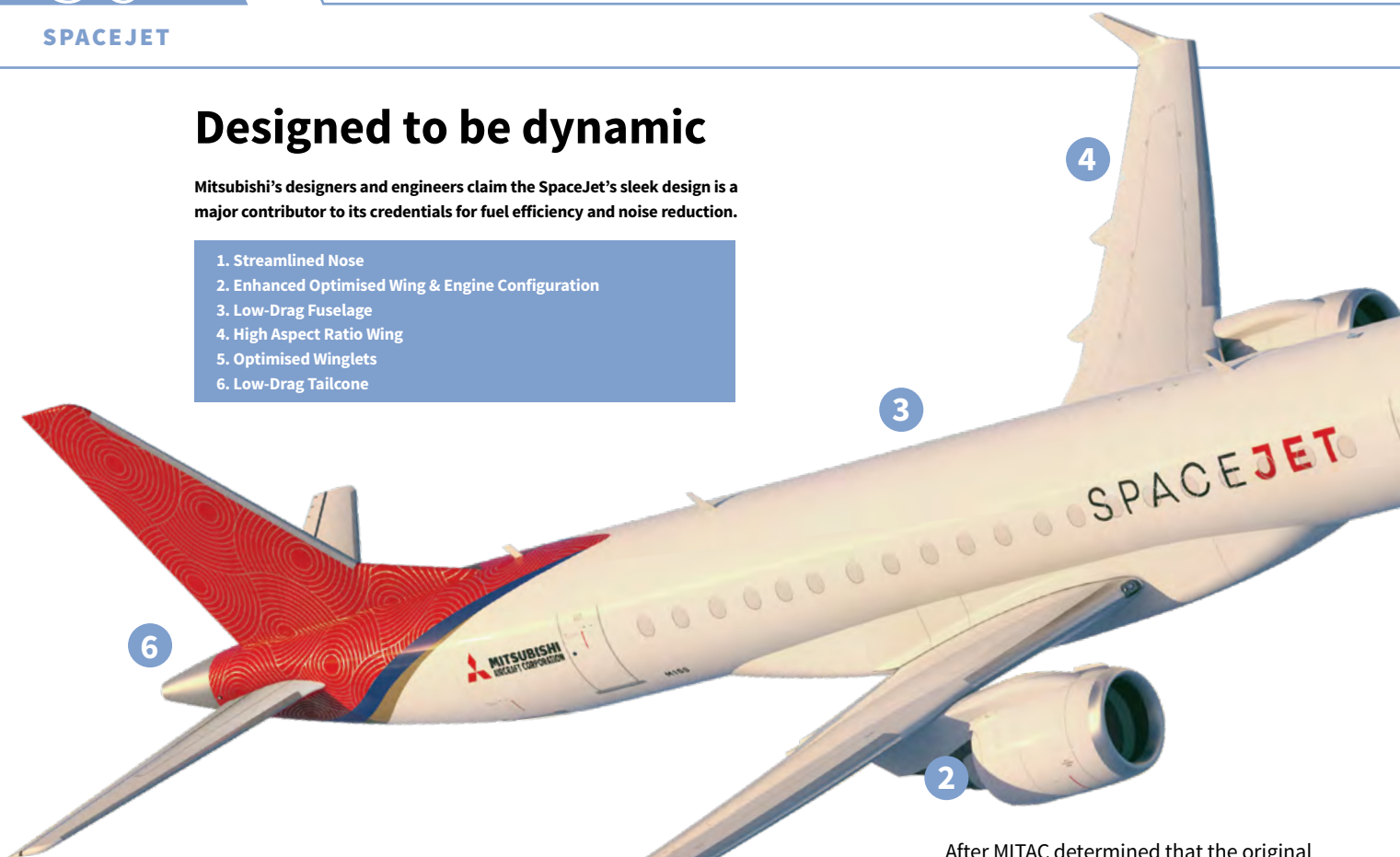
The bulk of flight testing has been undertaken using the four initial flight test aircraft (FTA1 to FTA4) based at the Moses Lake Flight Test Center in Washington, with the fleet passing over 3,000 flight hours in July 2019. Between February and April this year, two or three SpaceJets will deploy to the Roswell Air Center, New Mexico, for the fourth time, as part of its Federal Aviation Administration certification programme. Ground-based FTA5 is dedicated to software release testing at Nagoya, Japan.



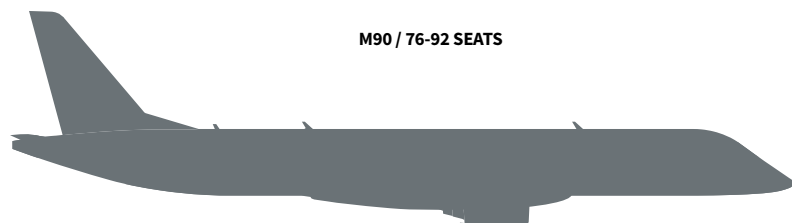
## Designed to be dynamic

Mitsubishi's designers and engineers claim the SpaceJet's sleek design is a major contributor to its credentials for fuel efficiency and noise reduction.

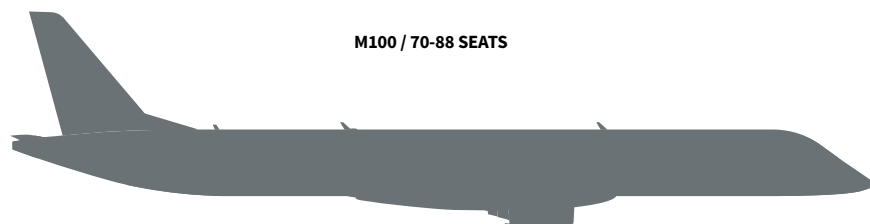
1. Streamlined Nose
2. Enhanced Optimised Wing & Engine Configuration
3. Low-Drag Fuselage
4. High Aspect Ratio Wing
5. Optimised Winglets
6. Low-Drag Tailcone



**M90 / 76-92 SEATS**



**M100 / 70-88 SEATS**

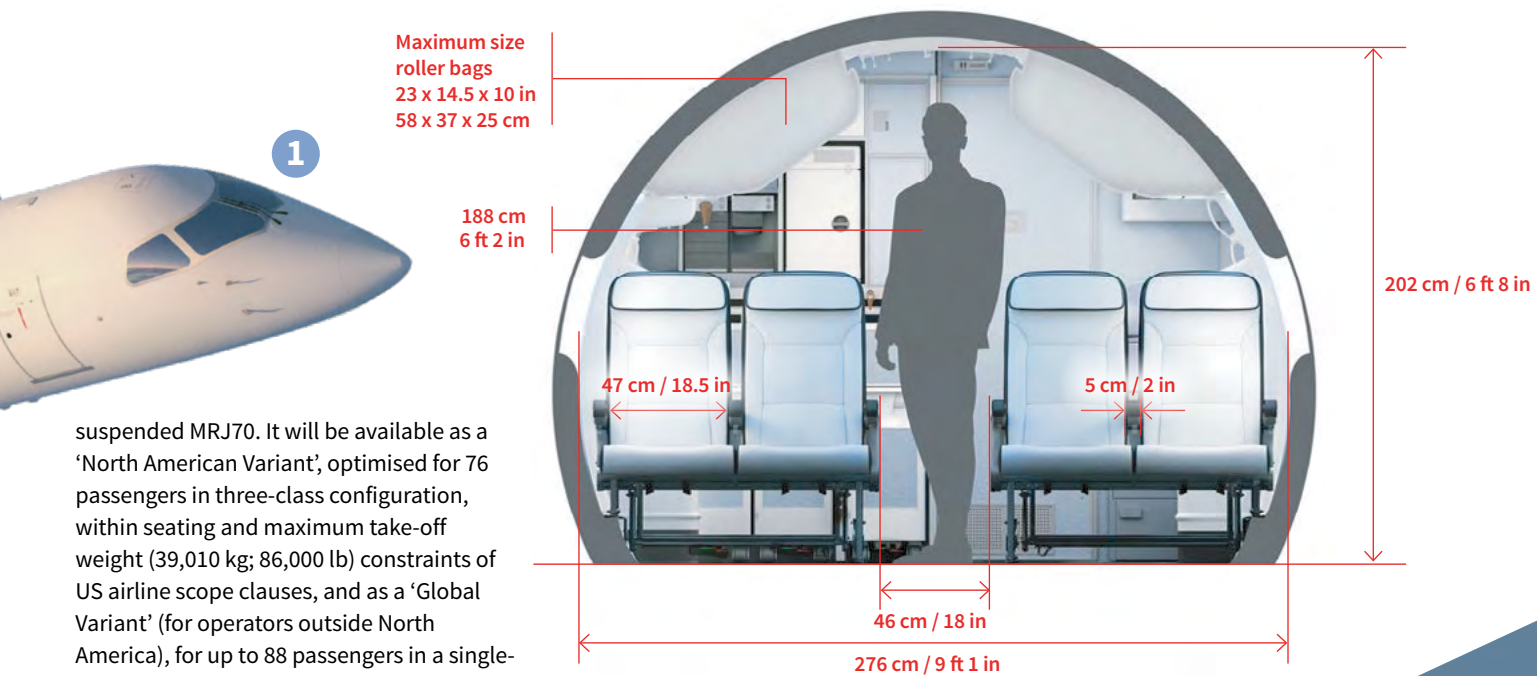


**LARGER M200 UNDER STUDY / UP TO 100 SEATS**

After MITAC determined that the original four flight test aircraft could not fully meet all certification requirements, the seventh and tenth, originally identified as the first for customers, were committed to final acceptance tests. FTA7 will complete functional and reliability flights, operational evaluation and customer work. FTA10 is the first test aircraft in the final, certifiable configuration and will be used to qualify the SpaceJet's avionics equipment configuration. Power-on for the aircraft was achieved in late 2019.

Another possible brake on certification is that the Japan Civil Aviation Bureau has not certified a new airliner since the NAMC YS-11 of the early 1960s. In September 2019 MITAC opened an office in Montreal, Canada, to initially support certification of the M90.

The last major changes to the programme were revealed on 13 June 2019, when the MRJ was rebranded as the SpaceJet. The MRJ90 became the SpaceJet M90 for 76 to 92 passengers, while work on the MRJ70 switched to the new SpaceJet M100. The M100 features a fuselage stretch of some 1.1 m (3 ft 7 in), and wingspan reduced by some 1.2 m (4 ft), in comparison to the



**Open and shut case:** With its extra large wheels-first overhead bin design, the SpaceJet cuts gate checks and turnaround times.

suspended MRJ70. It will be available as a 'North American Variant', optimised for 76 passengers in three-class configuration, within seating and maximum take-off weight (39,010 kg; 86,000 lb) constraints of US airline scope clauses, and as a 'Global Variant' (for operators outside North America), for up to 88 passengers in a single-class interior, with a maximum take-off weight of 42,000 kg (92,594 lb). Provision for one roller bag per passenger is provided in the overhead bins, although cargo space at 13.6 m<sup>3</sup> (480 cu ft) is reduced from the MRJ70/90's 18.2 m<sup>3</sup> (643 cu ft). A future growth variant, the M200 for 100 passengers, was also announced.

### LACK OF SCOPE

To a large extent the changes were forced upon MITAC by the lack of movement in the scope clauses of US regional airlines. Scope clauses between the pilots' union and employers limit the number and carrying capacity of aircraft that US carriers can outsource to third parties, as well as their maximum take-off weight. American Airlines, Delta Air Lines and United Airlines have limits of 76 passengers and 39,010 kg (86,000 lb).

When the latest generation of regional aircraft was conceived the limits were expected to increase (more passengers equals greater profits) and customers placed orders with this in mind. In practice, regional carriers instead increased the number of first class and premium economy seats in the cabin, rather than carry more passengers overall.

Market approval for the SpaceJet M100 came in June 2019, when an undisclosed



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**US Domestic Flights  
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Under 100 Seats**

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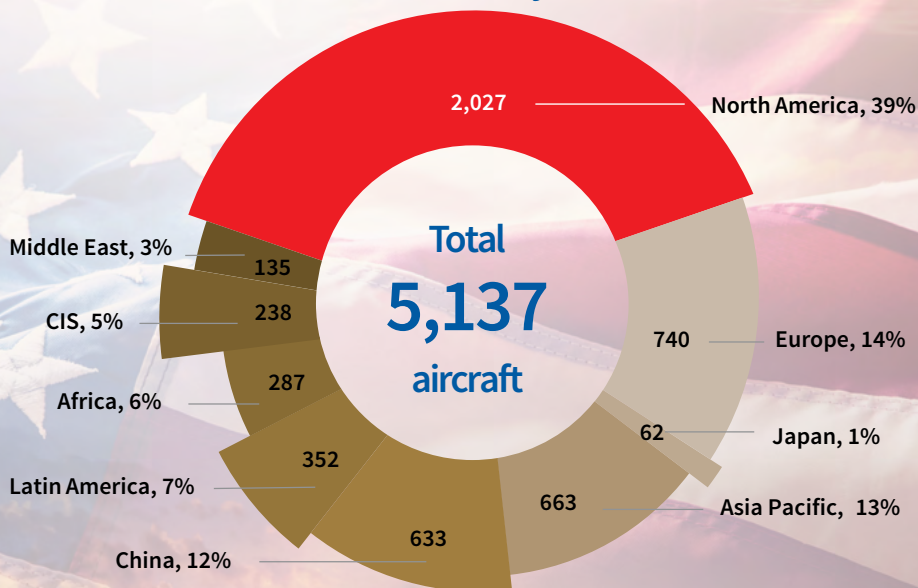
**63%**

**US Airports Where Air  
Service is Only  
Provided by Regionals**

**110+**

**New Routes Opened  
by US Majors with  
RJs in 2018**

**20-Year RJ Delivery Forecast**

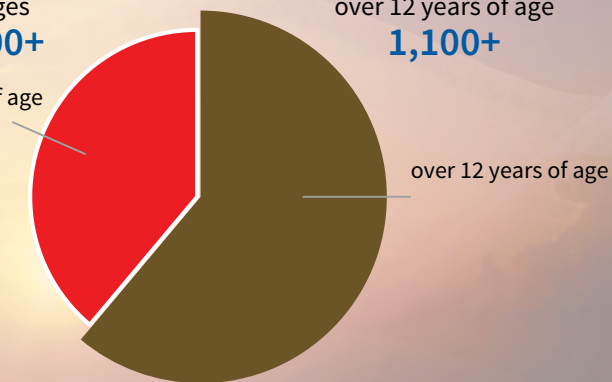


**Total regional jets**

all ages  
**1,800+**  
under 12 years of age

**Ageing regional jets**

over 12 years of age  
**1,100+**



In-service regional jets in North America

Source: Mitsubishi Aircraft Corporation

North American customer announced a memorandum of understanding (MoU) for 15. Later, on 5 September at the Regional Airline Association annual conference at Nashville, Tennessee, Mesa Airlines signed a MoU for 50, plus purchase rights for another 50. According to Hisakazu Mizutani, President of MITAC, "Mesa Airlines' selection of the SpaceJet M100 confirms that our

aircraft fulfils current and future needs of this industry." Upon progressing to the status of a formal order, both customers will receive their M100s from 2024.

In October Trans States Holding (TSH) cancelled its order for 50 M90s (with options for a further 50), stating that the 88-seat version did not meet the requirements of the US market. According to Mizutani,

"When we established our contract with TSH [from October 2009], the outlook on the regional market was very different. The scope clause, however, was not relaxed as anticipated." Negotiations between TSH and MITAC concerning a potential M100 order reportedly began soon after.

MITAC also expects existing US orders for the M90 (MRJ90) to convert to the new



“This year will be an important one for the SpaceJet.

Any delay to the initial deliveries would be unfortunate and add additional costs. However, it should not overshadow the significant steps taken over the preceding 12 months that have significantly strengthened the programme.”

variant. The largest commitment for the SpaceJet is by SkyWest of the US, which ordered 100 M90s (plus options for a further 100), with the right to convert to the M100. With contracts to provide services for American Airlines, Delta Air Lines and United Airlines, SkyWest is likely to be looking at the M100 with much interest. At the start of this year MITAC held firm orders for 157

SpaceJets (10 Aerolease Aviation, 15 ANA, Japan Airlines 32, and SkyWest 100) and options for 120, plus the 2019 MoUs for 65 and 50, respectively.

Support infrastructure will be as important to customers as the aircraft itself – especially for a new player in the market – making Mitsubishi Heavy Industries’ purchase of the Bombardier CRJ

programme a big deal. Announced on 25 June 2019, it is expected to conclude in the first half of this year. While the existing backlog of CRJ900 orders is expected to be fulfilled within 12 months, it is the infrastructure that supports the fleet that is of primary interest to Mitsubishi, comprising all CRJ maintenance, marketing, refurbishment, sales and support activities, including two wholly-owned service centres in both the United States and Canada.

This year will be an important one for the SpaceJet. Any delay to the initial deliveries would be unfortunate and add additional costs. However, it should not overshadow the significant steps taken over the preceding 12 months that have significantly strengthened the programme. ■

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# Sitting tight

**The number of single-aisle aircraft in service is growing and set to continue to do so for the foreseeable future, so as more airlines invest in their cabin experience, Kimberley Young looks at some of the projects enhancing comfort in high-density seating and the suppliers breaking the mould.**

**W**hen it comes to in-cabin comfort, low-cost carriers often get a bad reputation. It's partly down to a "what you pay for is what you get" approach, in addition to cost pressures on already tight margins and a drive to make the most of the capacity of the cabin in seat numbers. While this is positive for environmental efficiency, it is perhaps less appreciated by those passengers who regularly find their knees bumping against the chair in front.

As of November 2019, there were 15,342 Airbus and Boeing single-aisle aircraft in service, Ben Bettell from Counterpoint told audiences at the RedCabin Aircraft Cabin Innovation Summit in London. By 2028, however, the analyst predicts that with backlog and retirements taken into account, this figure will be about 25,500 single-aisle aircraft flying. With the number of single-

aisle aircraft increasing, the trend for high-density cabins isn't likely to go anywhere other than up.

Also speaking at the RedCabin event, Pitch Aircraft Seating gave a presentation on how to define and improve comfort in a high-density cabin, highlighting that the physical ergonomics of 'comfort' can be considered in three areas: perceived, initial and general.

Curved surfaces, for example, help to improve the impression of comfort, while the initial comfort of the seat is influenced by the amount of compression and resistance felt when first sitting. Finally, according to Pitch: "General seat comfort is arguably the most beneficial attribute, so a good cushion system should provide support and hold the passenger in a suspended position."

The UK-based company says it launched the industry's first fixed-recline economy

seat for the single-aisle passenger market, aiming to maximise individual room and the perception of cabin space. The original design of the seat has been recently upgraded to the PF3000 model, offering 3" additional legroom over a standard economy seat at 28" pitch.

## UNDERSTANDING LEGROOM

The Florida-based low-cost carrier Spirit Airlines has similarly been exploring the factors influencing passenger comfort while investing in its cabin experience.

Spirit chose to work with Acro Aircraft Seating and was the launch customer for its next-generation seat, which Acro says was designed to meet the requirements of low-cost carriers. The Crawley-based manufacturer explains: "Passenger comfort is improved with thicker cushioning and lumbar support and a pre-reclined seatback. In addition, the middle seat will be an inch wider, and the exit row will gain over an inch of pre-recline."

Acro's Series 6LC Economy Class seats are made of a composite skeleton and are also

“General seat comfort is arguably the most beneficial attribute, so a good cushion system should provide support and hold the passenger in a suspended position.”

padded with ultra-lightweight foam to increase comfort without adding weight to the seat. Other features include a sliding single-leaf table and an upper literature pocket (away from the valuable space around the knees).

Investigating comfort, the airline asked the UK's Chartered Institute of Ergonomics and Human Factors (CIEHF) to study the ergonomics of the new seats. In its report, CIEHF found the design of Spirit's new Acro seats, with its curved seatback, unlocked more usable legroom otherwise unavailable with a flatback, suggesting the seat would offer passengers 20% more space than a traditional seatback.

Explaining the findings, CIEHF Chief Executive Steve Barraclough said: “Pitch is an outdated industry term for measuring seat comfort, as it does not consider a range of important key factors like seatback curvature, seat width, cushion thickness, and usable space.”

The airline also conducted a research study to understand perceptions of seat comfort with a sample of more than 1,000 air travellers, finding that only 5% of respondents were able to accurately describe seat pitch, with most not knowing the true definition and 44% not familiar at all with the term ‘seat pitch’.

When considering the elements of seat comfort the highest percentage of guests mentioned ‘legroom/space’ (54%) by a large margin, followed by size (15%), cushion (8%), recline (6%), amenities (5%) and head, neck and back support (3%).

The airline argued it is “time for our industry to rethink the concept of seat pitch”, suggesting instead that “Usable Legroom” is a clearer metric for passengers. The metric measures the distance from the

centre of the back of the seat cushion to the outer edges of the seat in front, defining the space available to a passenger and taking into account factors including seat width, curvature and row spacing.

“Our research shows that many guests not only misunderstand the concept of pitch, but strongly believe that comfort derives from usable legroom,” Spirit Airlines’ President and CEO, Ted Christie, concluded.

### THINKING OUTSIDE THE BOX

Creative firm New Territory has also identified a need to shake up approaches to passenger comfort with the launch of a new company – Universal Movement – aiming to address what it perceives as a “lack of innovation” within high-density seating in aircraft and other transport environments. Along with the launch of the company came the reveal of its first project, Interspace, a new approach to the airline seat which utilises a patented wing support system.

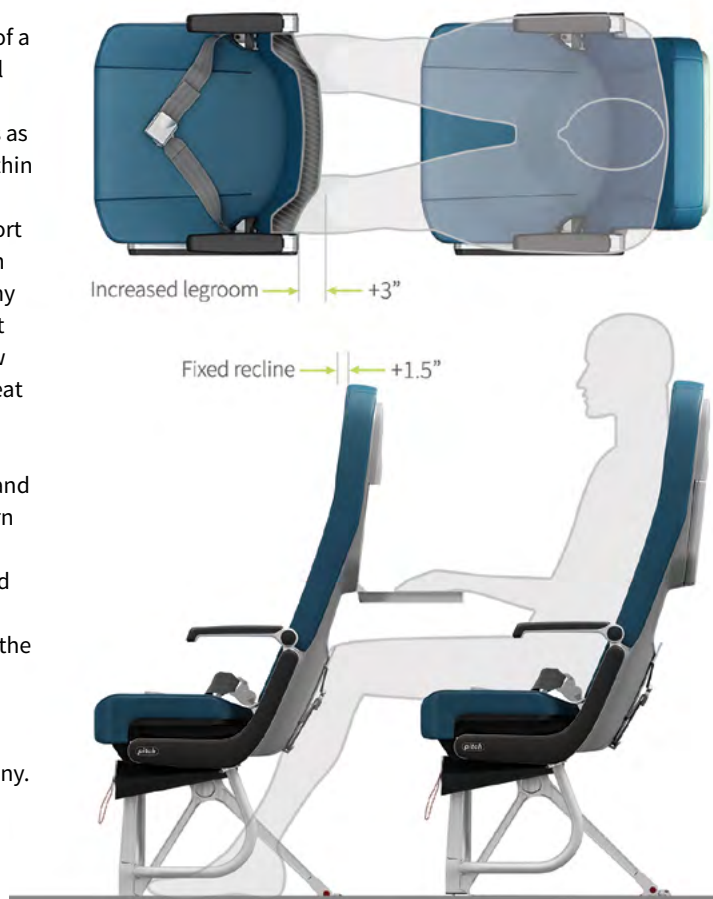
“Universal Movement and Interspace have been born from the fact that not enough time, thought and resources have been invested into the back of the aircraft cabin,” said Luke Miles, Founder and Chief Creative Officer, at the launch of the new company.

**Pitch PF3000: The fixed-recline seat offers passengers 3 inches of additional legroom.**

“The industry has been fixated on the same variables within an aircraft cabin including linear ergonomics, catering and in-flight entertainment, but we were keen to find a new use for the volume of a seatback.”

The two-deployable padded wings fold out from the cavity of the seatback and allow passengers to rotate and lean on a cushioned surface – providing greater lateral support. There is also an option to deploy only one wing on either side of multiple adjacent seats to create a cove or more private area for families or small groups.

The possibility of moving parts in a high-density cabin with the potential for rough handling or misuse might raise concerns of breakages, but Interspace has been designed with ‘living’ hinges – flexible hinges to



connect the composite seat and wing panels within the upholstery and assembly of the cover with no mechanical parts.

"With Interspace, we had this nagging thought that actually we don't sit in a linear format at home; I want to be able to rotate in my seat," Miles tells LARA. "I naturally go to sleep in a different position from when I eat, work or watch IFE. This idea of rotation and shifting weight seems almost an impossibility in those high-density scenarios. Even the seats themselves are designed in such a way that there are hard points, such as armrests or centre consoles, that when you shift your weight you get something digging into your back."

He suggests it is common to see passengers booking window seats and

"Passenger comfort [of the Spirit seat (right)] is improved with thicker cushioning and lumbar support and a pre-reclined seatback... the middle seat will be an inch wider, and the exit row will gain over an inch of pre-recline."

stuffing pillows between themselves and the cabin wall to provide themselves with a surface to lean against.

In addition to physical comfort, setting up the panels increases privacy. Miles says: "I think perception is key to comfort. In a high density scenario, if your neighbour is asleep and invading your space, or you feel there is a lack of privacy, that can make you feel agitated – so being able to close yourself off makes it more private."

Considering seat pitch, Miles still sees the relevance: "I think pitch is still important, if you are a higher percentile passenger [taller] then you need more knee room and that is always going to be important. I think there is a balance between a decent amount of pitch and being able to move and swivel."

New Territory worked with partners SWS to make the design fully certifiable to enable carriers to retrofit a cabin rapidly. "It's rare that such simple, innovative solutions can



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be so easily implemented in areas of the aircraft that are traditionally hard to evolve and improve,” says SWS Managing Director Nigel Smith.

At the launch, Miles commented that the seat could improve the comfort of journeys for more passengers across the cabin and could be particularly valuable for the growing ultra-long-haul market.

He explains: “With Interspace, it creates a different mode of use which could be especially useful in the long-haul approach, creating a physical sense of change in the seat space.”

### LONG-HAUL LOUNGING

Last year saw the reveal of Airbus’s A321 extra-long-range aircraft (the XLR), bringing new destinations within reach of narrowbody operators.

According to Counterpoint analysts, around 15% of the single-aisle fleet will be long-haul going forward by 2028 – approximately 4,350 aircraft flying long-haul single-aisle services.

“With the single-aisle market going up, I think there will be more long-haul travel with these single-aisle aircraft,” Counterpoint’s Bettell told LARA at the RedCabin event in December. “As a consequence of that, we have to look at what that means for the passenger and how the aircraft can be changed or modified for the future.”

It will of course be a balance between running costs and attracting passengers to fly in the aircraft, Bettell added, saying: “My view is that you make it so the aircraft is flying in its lightest possible weight, so that passengers on the plane can enjoy more room and space, and a little less cost.”

In the US, JetBlue celebrated the arrival of its first A321neo aircraft which featured new interiors developed from feedback received from crewmembers and customers to enhance the in-flight experience.

The aircraft benefits from the Collins Aerospace Meridian seats (also on the airline’s phase two restyled A320 aircraft) which are the widest in any of the airline’s fleet and also offer adjustable headrests and increased living space.

“Our research continues to show that customers value legroom,” a representative for JetBlue tells LARA, “so we’ve maintained a minimum baseline of 32” through the Core experience of our fleet.”

While pitch isn’t the only indicator of comfort, the airline highlights “our new Meridian seats offer ample ‘living’ space” and feature enhanced memory foam, as a key measure for comfort.

Along with state-of-the-art seatback screens, the seats also host what the airline describes as “neat-freak-approved” seatback pockets which were designed >>>

## Innovation Round-up

**As well as working to reduce the weight and bulk of aircraft seats, suppliers are finding new and unique ways to boost the passenger experience and improve comfort.**

**Recaro** has installed ‘connected seats’ on a TAP Air Portugal A321 aircraft which will use sensors to gather information on passenger behaviours, such as if the seat is occupied, how many times a passenger uses the tray table, raises the armrests, reclines the seat and if the seatbelt is fastened.

Midlands-based **Pitch Aircraft Seating Systems**, which calls itself the first seating manufacturer to market a fixed-recline economy seat, has developed a ‘**Q Premium**’ concept with industrial design studio, **Design Q**. The concept converts the middle seat of a triple set into a wide centre console, offering airlines with single-aisle fleets “the ultimate in configuration flexibility”.

Having brought the **Hawk** seat to the economy cabin in 2016, **Mirus Aircraft Seating** teased the **Kestrel** seat concept at AIX 2019. Though not much has been revealed about the seat just yet, the company has said it focuses on passenger space in high-density cabins with low weight benefits for airlines.

In response to the advent of longer range narrowbodies (and the interest shown in them from LCCs) **Geven** has announced a new seat: **ELEMENTO** to offer comfort for long-haul economy. The company said the seat is not just about providing “the best possible living space at the not-so-traditional pitches being used in economy”, but about offering “a passenger experience of travel worthy of expectations for long-haul flight”. >>>



**Console yourself: Pitch Aircraft Seating’s Q Premium concept for single-aisle fleets.**

**SEKISUI** and partners went into full dream mode for this seatback concept.

**SEKISUI** and a group of partners including **TrendWorks** revealed a seatback prototype at the RedCabin London event based around an airline executives' wishlist for a "dream economy seat". The prototype includes a split tray table, media easel for personal devices, soft storage for in-flight essentials and an appBar which includes coloured light indicators, allowing passengers to communicate with cabin crew or even check the lavatory availability.

In 2019 **Molon Labe Designs** achieved FAA TSOA 127B Certification for its **Staggered Slimline S1 seat**. The design aims to increase living space for passengers with three economy seats in a staggered layout – moving the middle seat back slightly.

At Passenger Experience Week last year, **Acro Aircraft Seating** launched its **Series 6LC Economy Class seat** aimed at LCC narrowbodies. The seat utilises a curved seatback in a pre-reclined position with an upper literature pocket, sliding table and lightweight armrests.

From the first quarter of 2020, **TSI Seats'** economy class **Skysofa** and **Epianka** will be featured in Airbus's Buyer Furnished Equipment catalogue for A350 XWB, A330 and A320 aircraft families.

And finally, equity management firm **AURELIUS** is set to acquire a majority interest in **ZIM Flugsitz** with the transaction expected to close in January 2020. **AURELIUS** will provide financial and operational support to facilitate continued growth and building on the portfolio of the Markdorf-based supplier of high-quality aircraft seats.



Great expectations for long-haul economy flights: Geven's **ELEMENTO**.



with feedback directly from customers. These pockets are made of a mesh to provide flexible storage for water bottles and a variety of personal items, custom "gadget panels" with elastic straps for phones and other small items and visibility to allow customers to see their items at all times.

The airline says: "While customers may not articulate that they desire features like a custom literature pocket, our immense focus on customer comfort enables us to remove common pain points from the customer experience. This allows us to drive first choice and high customer retention."

Last year, JetBlue revealed plans to go transatlantic with services from New York and Boston to London beginning in 2021. The airline argued that travellers flying across the North Atlantic between the northeast US and London face high fares, "particularly in premium cabins", while in the low-fare field, it argued airlines have "attempted to enter with a no-frills, bare-bones approach to flying, offering little in the way of complementary amenities".

The airline has placed an order for 13 A321LR aircraft for these London-bound services, along with an order for 13 A321XLR (converted from its existing A321neo order book) which JetBlue

intends to use to serve a "variety of European cities".

To ensure comfort on these longer-haul services, the airline says it is working on a new long-haul version of its core experience, and a "reimagined" version of its 'Mint' premium product, featuring more lie-flat seats than available on its A321 aircraft.

Though it is too early for details of these 'longer range' products, an airline spokesperson tells LARA: "We believe a narrowbody aircraft, with fewer customers than widebodies, will allow us to create an exclusive environment where our crewmembers can provide a high level of personalised service."

## WIDEBODY 'FEEL'

JetBlue is also aiming to provide features that will offer a widebody 'feel' on narrowbody aircraft, with the airline commenting: "While the market is currently adjusting to more single-aisle aircraft flying long-haul, we look forward to seeing more widebody features like seats with enhanced comfort features that are designed and certified for the narrowbody market."

For those of us who often fly in the very back of the cabin, this is exciting news, though what this will mean in practice we will have to wait to see. ■

Mint-y fresh: JetBlue is planning an enhanced version of its Mint product for future long-haul services.



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**Necessity is the mother of invention: Qantas's vision for ultra-long-haul flights has driven the development of a ground-breaking flight planning system.**

# Smooth Running

**Preparation and planning ensures passengers get to where they need to be safely and on time, and airlines reap the benefits in terms of revenue. For those responsible for flight planning, new processes and software are constantly being introduced or updated. Michael Doran assesses the impact these developments are making.**

For most travellers, flight planning will not be their most pressing thought on the day of their flight. But if it was it probably wouldn't extend beyond having enough fuel onboard, the right bags loaded and a choice of meal. For pilots and despatchers it is a highly complex and absolutely vital part of every flight that directly impacts safety, profitability and passenger comfort.

With terabytes of data streaming off aircraft these days, flight planning systems seem to be in a constant state of evolution. So, LARA selected three systems from very

different organisations – Qantas, NAVBLUE and AIR SUPPORT – to showcase the best of what is happening with flight planning operations.

Firstly, from an airline perspective, Australia's Qantas set out nearly a decade ago to develop its own unique flight planning system that is now delivering millions of dollars in fuel savings and is a key element in the airline's ultra-long-haul Project Sunrise.

CEO Alan Joyce is relentless in his drive to launch ultra-long-haul flights from the east coast of Australia non-stop to London and

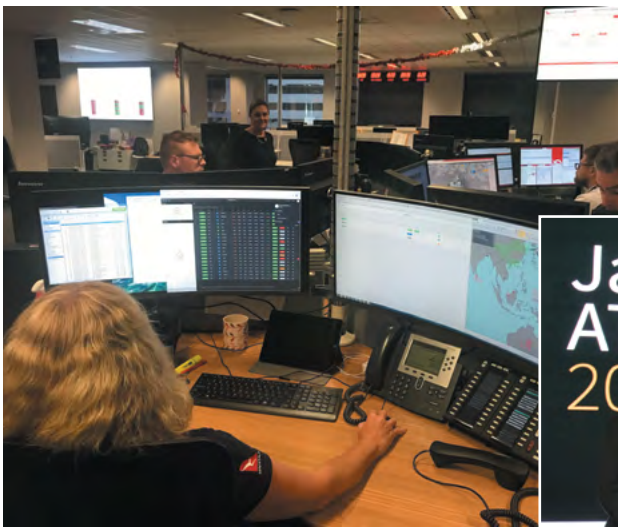
New York. While much of the focus has been on the aircraft choice, Qantas has driven the development of another ground-breaking piece of technology that is vital to making these flights commercially viable, safe and comfortable.

## STATE-OF-THE-ART SOLUTION

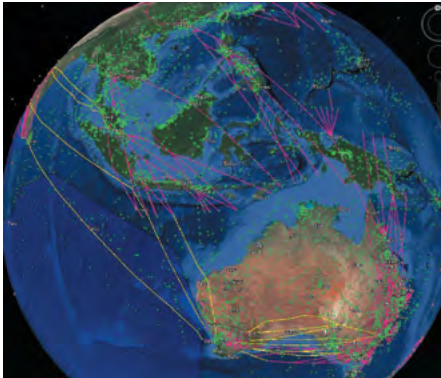
In 2010 the airline launched a project to find a new flight planning system after it became increasingly concerned about its dependence on an ageing mainframe system installed in the 1980s. Rather than adopt an existing off-the-shelf product it decided to develop its own system and in 2012 partnered with the University of Sydney's Australian Centre for Field Robotics to build a new generation flight planning optimisation engine.

Mike Riegler, Manager Innovation and Support, Qantas Flight Operations Systems, says the old system became a "single point





**Up and running, Down Under:** The Constellation flight planning system is now an integral part of the Qantas flight despatching function in Sydney. Photo: Qantas



**Navigation data for Constellation flight planning is supplied by Frequentis in the AIXM 5.1 format.** Photo: Qantas

of failure” and the airline wanted to introduce state-of-the-art technology into its flight planning operations.

To bring the new flight optimisation engine to life, Qantas formed partnerships with aeronautical information management company Frequentis and aviation software and application specialist Smart4Aviation. The resulting flight planning platform, known as Constellation, was first deployed on the long-haul fleet in 2018 and has been in use across the combined fleet since mid-2019.

At the World ATM Congress in 2019, Qantas, Frequentis and Smart4Aviation won the Jane’s Technology Award for their development of Constellation and “enabling flight efficiency and fuel savings”.

“The business case was actually built on fuel benefits, so we wanted to reduce our fuel consumption in the planning and operational stages of flight,” Riegler says. “From a functional and user-interface



**And the winners are:** Mike Riegler (2nd from left), Shane Harney (6th from left) and Dirk Withake (extreme right) receiving the 2019 Jane’s Technology Award. Photo: HISMarkit

perspective our initial prototype was very basic and we just started with inputs and outputs to the engine.”

Frequentis is well established in the air traffic management community focused mainly towards air navigation service providers servicing more than 60 clients around the globe, including Eurocontrol, Europe’s organisation for the safety of air navigation.

Frequentis’s Vice-President Aeronautical Information Management, Dirk Withake, says that working with Qantas has opened Frequentis up to the airline world and applied his organisation’s expertise to an airline situation.

Frequentis technology allows Qantas to take in global aeronautical data, such as weather information and digital NOTAMs, and to manage company navigation data. This solution gives Qantas the capability to manage the navigation data that supports the flight planning engine to optimise flights, taking into account constraints such as company routes and airspace conditions.

Key to this transformation is the push to shift aeronautical data away from paper-based or text message systems towards the collection and provision of digital data under the Aeronautical Information Exchange Model or AIXM.

“This implementation marks the first introduction of AIXM 5.1 for an airline as the model for all navigation data,” says Withake. “By enhancing data management workflows, operational costs can be reduced while the automatic inclusion of Flex Tracks enables precise flight planning and fuel calculation, so reducing the costs for carrying excess fuel.”

“The data from the Frequentis navigation data management system is the lifeblood of the entire solution and critical to both the safety and optimality of flight plans in an ever-changing environment,” Riegler adds.

Based on this data, flight planning and flight-plan optimisation is performed resulting in increased safety through accurate navigation data constraint modelling, better fuel prediction and significant business process improvements.

“We are pleased to be supporting an airline with its goals for route optimisation and fully support Qantas with its next challenge to open direct flights from Sydney to London and Sydney to New York by 2022,” Withake says. “Capacity concerns are challenging the industry across the globe and working together on innovative approaches for collecting dynamic data, and utilising it while en-route, enables Qantas to respond positively to the capacity challenge.”

Having assembled a powerful engine linked to interactive navigational data, Qantas partnered with aviation software specialist Smart4Aviation (S4A) to build the flight planning application. S4A Product Owner, Shane Harney, says S4A had been working with Qantas on other applications when the flight planning project emerged.

“The flight planning domain is new to us but it was a logical next step,” he says. “Qantas wanted to push into these new realms of big data and artificial intelligence and go down the same paths we wanted to go down.”

Qantas has a large network of long-haul destinations and with many flights of more than 10 hours, optimising routes to reduce fuel consumption quickly translates into big savings. Harney says this focus on optimising the flight planning of long-haul routes sets Constellation apart from other systems.

“These ultra-long-haul flights have really changed the dynamics of operations and despatching aircraft,” Harney explains. “If you’re on a two-hour flight it’s not long enough to optimise but with a seven-to eight-hour flight then you can start to do changes that have real impact.”

With the legacy system, the dispatcher would produce a flight plan three hours prior to the departure for the 19-hour flight from Perth to London which meant that by the time the flight landed it was based on a flight plan prepared 22 hours earlier.

“One of things that Qantas really wanted to focus on is the system having the smarts



**Changing view:** The NAVBLUE N-Flight Planning system is constantly being developed to include new technology and features. Photo: NAVBLUE

to incorporate new wind updates, which come every three hours, and look at all the flights that are airborne and re-calculate routes automatically with the most up-to-date data,” S4A’s Harney says.

“This facility is called a dynamic airborne re-route which the system proposes to the dispatcher in terms of ‘I can save you 500 litres of fuel and 10 minutes from the flight. Do you want to proceed?’ The dispatcher sends that to the crew and if they agree, the changes are all done automatically.

“This is the kind of thing we think is important and now we have the technology to do it,” Harney says. “The data is sitting right there and now we have a system that gives all kinds of options for the dispatcher and the pilot to select whatever best fits their situation.”

## JUST ROUTINE FOR NAVBLUE

NAVBLUE has long been at the forefront of flight planning systems and since becoming part of the Airbus family in 2016 it has introduced several new product developments aimed at automating routine tasks and allowing pilots and dispatchers to focus on solutions and situational awareness.

Cunmei Li is NAVBLUE’s Head of Marketing. She says that a strength of NAVBLUE’s N-Flight Planning system is that it is being continually upgraded based on user feedback and its own research efforts.

“With N-Flight Planning, users have a package with system upgrades coming every year as we are constantly adding new features and improving the product,” she says. “Our research means users have a leading product with new features being added based on the community’s feedback.”

NAVBLUE is going beyond single-use functions to integrating flight planning into the airline’s operational efficiency, such as the opportunity for airlines to integrate ADS-B aircraft tracking into their flight planning system so route changes or weather impacts can create automated alerts to all parties involved.

“The way we do Event-Driven Automation (EDA) is to recognise that the flight planning system needs to be integrated with a lot of other systems so you can automate routine work which is

# Selling Constellation

Qantas expects the new system to produce fuel savings around A\$40 million annually and although it will take a few years to pay back the project’s development cost that may be sped up if plans to sell the system to other airlines bear fruit.

Mike Riegler from Qantas says: “The three partners are actively demonstrating the benefits of the solution to other airlines. As the benefits of the new data exchange formats are better understood by airlines, we believe the adoption of this next-generation flight planning solution will soon follow.”

being done manually,” she says. “Airlines are looking at how you can automate these processes so the staff can focus on the complicated and critical tasks.”

In order to meet this automated approach, NAVBLUE is developing a new feature, Event Bus, a component that will sit alongside the flight planning system to handle all of the messages to and from systems that the airline has defined for event occurring.

“For example, if a diversion is required, the automation will trigger a train of actions and will also send messages to all of the systems that are prescribed by the Event Bus, such as the diversion airport or out-station,” she says. “You don’t have to make numerous phone calls to initiate action as

all the other systems that need to receive information on what is needed are triggered automatically.”

A key element is defining individual events and what the ensuing procedures are and that is something NAVBLUE plan to do in consultation with their airline partners. The vision is that by automating routine tasks nothing will be forgotten and trained people are able to focus their attention on managing the event.

“We are going to build this together which means airlines will be able to define their own events to fit their own operational context. We will define a list of generic events and then the users can add on top of that their own individual requirements,” says Cunnei.

Another new development is what NAVBLUE call Tail Centric Performance, which is a system where rather than rely on nominal fleet-wide aircraft performance, the optimisation data is based on how each individual aircraft performs in the climb, cruise and descent phases and its impact of fuel consumption.

Flight Planning systems have typically used standard tables for each aircraft type but this new feature utilises the Point Mass Model to take in actual aircraft performance data, meaning more accurate fuel calculations can be made for each of the three phases of flight.

“As an aircraft ages its performance changes and even a new aircraft may perform slightly differently to other new



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aircraft of the same type,” she explains. “So this concept is to make the flight planning calculations closer to the actual performance of that aircraft.”

On the weather side, NAVBLUE partners with forecaster DTN and this partnership allows NAVBLUE users to tailor flight plans to specific aircraft types, better reflecting the impact of weather on actual flights.

“When you compare an A320 and an A380, the effect of turbulence is different for these two aircraft due to their size,” she says. “With the granular data from DTN, we can define how much impact it will have on each type so you take care of the hazard and make sure your route is safe but also efficient by avoiding unnecessary detours.”

The use of the DTN weather data enables airlines to optimise their fuel use and to incorporate extremely accurate information about the impact of turbulence, thunderstorms and icing conditions and monitor routes accordingly.

Cunnei says that these developments are a sign of NAVBLUE always looking ahead to see what else it can do in terms of optimisation, automation and user experience.

“With user experience we are looking to apply the Airbus dark cockpit concept which means if you don’t have anything that needs attention you have a dark cockpit,” she says.

**Flight Watch integrates with multiple flight tracking data sources, including Eurocontrol, ACARS, SatcomDirect, AirNav RadarBox, ADS-B Exchange and more.**



## Silver takes a shine to NAVBLUE N-RAIDO

In July 2019 Florida-based regional airline Silver Airways became the first US customer for the NAVBLUE N-RAIDO suite of products for its Operational Control Centre. N-RAIDO is a single solution for Ops Control and all aspects of crew management, including crew scheduling, planning and payroll.

At its core, N-RAIDO is an event-engine coupled with a rules-engine interacting with a single database that will allow the airline to handle both day-of-ops management as well as long-term planning requirements. Part of the suite of products selected by Silver Airways is N-Flight Planning and followed the selection of the system by Canadian regional operator Porter Airlines in March.

“When you have a light on that means you have something that needs attention and this helps pilots focus on what is really important at that time.

“We have launched the project and it’s part of our philosophy to adapt the user experience to a way that we can use the human mind better and let the machine do the automated tasks that it is better at.”

### THE BENEFITS OF EXPERIENCE

With more than 30 years in the global aviation industry, Danish company AIR SUPPORT A/S – creator of the well-known PPS Flight Planning System (PPS) – is on a quest to fill the market gap for advanced flight tracking solutions and ultimately

enhance operators’ daily flight operations.

With the company’s launch of the innovative premium flight tracking solution Flight Watch, which complies with the GADSS regulation, aircraft operators can now reap the benefits of experience-based flight planning. More specifically, dispatchers and other OCC staff members

can now plan their flights based on actual knowledge and statistics instead of relying fully on theoretical data models.

Based on its seamless integration with PPS, Flight Watch provides users with full situational awareness and easy monitoring of the flight in real time. Users can continuously monitor the planned flight vs. the actual (live) flight and extract necessary tracking data for postflight analysis. Other relevant features include a warning/alert message system with different notification settings (also for weather), MVT messaging, gate-to-gate coverage, precise take-off/landing times and more. The ability to optimise future flights based on big data may help aircraft operators decrease operational costs significantly through continuous route optimisation.

Combined with upcoming high-quality space-based ADS-B tracking data through its partnership with Aerial & Maritime Ltd., the company’s own unique professional grade terrestrial ADS-B network solution for aviation use makes up the primary data foundation for Flight Watch. Moreover, Flight Watch already now integrates with an array of other well-known flight tracking data sources including Eurocontrol, ACARS, SatcomDirect, AirNav RadarBox, ADS-B Exchange etc. ■





Horses for courses: AAR is renowned for its experience and expertise in inventory optimisation based on decades of supply chain management.

# Maintaining strong links

**Waiting for a spare part costs money. Airlines, MRO providers and logistics companies are working together to prevent such occurrences without having to keep large amounts of expensive stock on site, as Bernie Baldwin reports.**

Airline bankruptcies are no longer like a badly run bus service – none for a while, then three come along at once. Sadly, they have become a regular occurrence.

In such a business environment, cash flow can make all the difference. Therefore, airlines do not want to have large amounts of money tied up in too many spare parts sat on a shelf. As a remedy many carriers have signed up to parts pools where stock is managed by a third party and kept until it is needed. And thus, the supply chain gets to work. But should the airline be the organisation running it?

AAR's Vice-President of Marketing, Pascal Parant, sets out the advantages he sees for an airline to outsource its supply chain activities. "An airline's focus should be operations, routes and ticket sales. The supply chain is purely technical and a specialty that requires more and more modern technologies – software, network, repair management, optimised inventory," he declares. "It is labour intensive, and if the supply chain isn't done properly, it can impact an airline's finance through EU261 charges, AOGs, inflated inventory and so on."

## A BUSINESS OF TRUST

Kaarle Karp, Logistics Manager at Magnetic MRO, concurs with Parant. "We have seen different methods of how airlines are controlling their supply chain activities, and there has been a lot of changes compared with activities five-to-eight years ago," he states. "Many Magnetic MRO customers have trusted us to do more in supply chain activities, because an airline's main business is flying, and they simply need to focus on their primary business."

"To integrate an airline's systems with MRO is not an easy task, but there are many advantages. Nowadays, for most of our customers, we are updating their maintenance and supply chain data, so their hands are 'freed up,'" he continues. "Also, logistical questions have been delegated to Magnetic MRO, and our professional



“It is labour intensive, and if the supply chain isn’t done properly, it can impact an airline’s finance through EU261 charges, AOGs, inflated inventory and so on.”

**Pascal Parant , AAR’s Vice-President of Marketing**

team is controlling and organising most of the inbound and outgoing shipments and looking after irregularities happening during transit. We can react fast, and we are dedicated to offering the best service.”

Karp’s colleague, Marijus Milašius, who heads up Magnetic MRO’s PBH [power-by-

the-hour] Unit, believes that because overseeing the supply chain is a B2B solution, the most important advantages are cost management and cost effectiveness. “Outsourcing supply chain activities allows costs associated with components to be reduced, whether it’s



## There’s a Reason Why Leading OEMs, Airlines and Armed Forces Trust Aircraft Propeller Service (APS) with Their Propeller MRO Needs.

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**Off-the-shelf solution:** Kuehne + Nagel's state-of-the-art digitised inventory means parts are instantly visible anywhere in the world and ready for dispatch to where they are needed.

expenses related to stock, maintenance or management.

"When outsourcing, businesses do not need to invest in an extensive pool of components but to have access to required items when needed, with a guarantee these components will be of required modification and good condition," Milašius emphasises. "Additionally, outsourcing and turning to PBH programme providers minimises the financial and operational risks which are also significant advantages for businesses."

### CERTIFIED AEROSPACE LOGISTICS

Coming at the issue as a logistics specialist is Kuehne + Nagel, whose Senior Vice-President Aerospace, Erik Goedhart, says the biggest benefit of outsourcing supply chain work comes from using the core competencies of parties in that chain. "Supply chain management is a competence as such, with rapid digitisation, innovation and overall developments. Such a competence requires investments especially for the aerospace industry," he posits.

"Kuehne+Nagel is investing significantly in 'certified aerospace logistics' which results in solutions like KN EngineChain for engines, KN InteriorChain for refurbishment projects and KN SparesChain for spare part management. These digitised solutions require close co-operation with aerospace/airline customers and millions of dollars in investments to develop the solution," he adds. "Usually airlines focus on increasing passenger

loyalty and comfort and invest in that core. Some global leading airlines which have a maintenance and engineering organisation as a separate business unit – and supporting third parties – might have a different view.

"For regional airlines especially, the regional business dynamics and focus will lead to outsourcing supply chain management (and often significant parts of maintenance too). For low-fare carriers, the focus will be on core [elements] because of the business model. Here you see outsourcing of non-core functions to leading innovative parties in that specific competence," Goedhart observes.

As Goedhart notes, managing a supply chain is a competence, but that will be up against the challenging aspects of helping airlines keep an optimum inventory (just-in-time) level, often at different locations. As well as dealing with these, every company wants to ensure its customer offerings deliver a differentiated service to airlines.

"Nowadays the biggest challenge is: 'What inventory?' Even with fleets of a specific model, the part-sub numbers differ per aircraft, so how do we know what inventory to manage?" the K+N SVP queries. "I used to work for an aircraft OEM where not one aircraft was the same in specification. If you see what is happening nowadays with new aircraft and engines entering the market, there are so many changes, with differences which are a real challenge when managing fleet inventory. For logistics and supply



"When outsourcing, businesses do not need to invest in an extensive pool of components but to have access to required items when needed, with a guarantee these components will be of required modification and good condition."

**Marijus Milašius, Head of Magnetic MRO's PBH Unit**

chain specialists, it might be best to see every aircraft as a prototype.

“Based on network analysis and locations of daily checks, light maintenance checks and heavy maintenance, a network stocking solution can be advised,” he continues. “Our view is that the logistics/supply chain provider can take responsibility for stocking levels and adjustments for the airline. That will happen more and more as the global landscape for managing inventory for airlines is changing. With the digitised global backbone, a part can be visible anywhere in the world and be available anywhere within the required time. Because of the mentioned differences in part (sub) numbers and the available digitisation, the stocks of airlines will be more and more centralised and managed.

“For maintenance checks, preloads of parts will be based on known meantime between repair (MBR) predictive analysis and these will be shipped to the maintenance location well in advance (and therefore with significant reduction of transportation costs). For daily AOG management, one significant airline in the USA believes having charters from the main hub to the AOG location is a more cost- and service-effective model than putting stock at all the stations which is hardly used,” Goedhart reports.

Defining the most challenging aspects in helping airlines keep an optimum inventory isn't a simple question to answer, according to AAR's Parant. “There are many variables that enter into that subtle and complex equation, such as type of operation (schedule, charter), hubs, regional/short/medium/long-haul operation, cargo or passengers, own/leased inventory, PBH, pooling and more. Inventory optimisation will be defined by these parameters first. And the only way to reach set goals will be to manage the repair cycle and ensure turnaround time (TAT) will be respected,” he remarks.

“This is one of the key reasons why AAR developed Airvolution, our cloud-based platform for repair-cycle management. It is



“Our view is that the logistics/supply chain provider can take responsibility for stocking levels and adjustments for the airline. That will happen more and more as the global landscape for managing inventory for airlines is changing.”

**Erik Goedhart, Senior Vice-President  
Aerospace, Kuehne + Nagel**

based on the tools we already use through Airinmar and was recently released as a SaaS (Software as a Service) product,” Parant reports. “We are very excited to already have a launch customer, Alaska Airlines, plus several others in the process of signing for this incredible tool. We're excited about the next few chapters of our roadmap for Airvolution as well, including a greater degree of rules-driven automation and the infusion of AI and machine-learning capabilities, which allow the system to get better with each order it manages.

“Given the breadth of our customer base and depth of experience in the space, we've found that we have some really nice economies of scale to invest in a common platform, so any and all of our customers can benefit in their own operations,” Parant advises.

#### STAYING ALERT

For Magnetic MRO's Karp, the hardest part in maintaining optimum inventory is when an airline has unusual items and components. “Some of them are hard to get from the market and cause pressure to have them in place on time; in this case, fast communication with customers is a must,” he confirms. “For various line maintenance and base maintenance customers, we send reports about usage with information about soon-to-be expired spares and the materials we need to replenish their stock. To control spares at different locations is not an issue, as our IT tools are monitoring and sending alerts if something is urgently required.”

In Magnetic MRO's PBH department, Milašius and his team give “utmost attention” and work closely with the clients assessing the needs of airlines to form the optimum inventory pool depending on the size of each airline, the locations of hubs, and other factors. “The challenges come when there's little data from the airlines regarding the required components as we have to predict the needs,” he comments. “However, we have a lot of experience in this field. We're able to provide the suitable





**Open for business:** Estonia-based Magnetic MRO is hopeful that the European Commission will improve the rules governing the clearance of shipments into Europe from non-EU countries.

packages for the airlines depending on their individual needs. Logistics support plays an important role here as we also must provide customers with prompt deliveries of the components wherever they are. That's where the logistics department with its solutions contributes to the tailor-made offering for each client."

As well as companies like Magnetic MRO working closely with airlines, smart use of IT applications for risk assessment can help to ensure there is no overstocking. "For minimum on-site stock, we have different control mechanisms and also close communication with an airline's procurement specialist is important," Karp confirms. "Nowadays there is no way that IT is not supporting the task. That's the same with us; we have outstanding IT support. And when new ideas come along, our customer's IT and Magnetic's IT can always be integrated.

"In our case, we always share the list of materials that Magnetic MRO has in its stock and with this our customers do not have to spend their valuable time replenishing materials which are low-value items and add administrative costs," says Karp.

Close co-operation with airlines to assess and define the minimum on-site stock within a parts-pooling programme is a task which Kuehne + Nagel undertakes. "As logistic providers we have data on

transportation and storage of parts. Some airlines are open for partnership and share stock value data," Goedhart notes. "From there starts the understanding of where the real win is in flexibility and cost reduction. Based on sharing that data, the logistic provider can be the 'catalyst' in the data network of the airline and related MROs (parts-pooling provider). In integrating data from the airline, the MRO and the transportation cost, a real analysis of the total supply chain cost and ways to reduce it can be completed. Once that is there, the positive surprise will be in the cost saving opportunity in total.

"We have assessed airlines with billions of dollars' worth of inventory – some owned, some parts-pooled, some delivered with the aircraft purchase," he adds. "In the coming decade, the reduction of total supply chain cost will make the difference. Based on data sharing, Kuehne+Nagel is already working on different business models with airlines, such as 'logistics by the hour' and in the case of refurbishment programmes, a fixed logistic cost per aircraft in refurbishment. Integrating business models in the supply chain will be the new way to significant cost savings."

AAR is renowned for its experience and expertise in inventory optimisation, based on decades of supply chain services and thousands of aircraft served. "At the time we started, IT wasn't as efficient as it is today," >>>



"We have seen different methods of how airlines are controlling their supply chain activities, and there has been a lot of changes compared with activities five-to-eight years ago."

**Kaarle Karp, Logistics Manager  
at Magnetic MRO**



Parant recalls. “Based on our experience, AAR always developed its own IT tools.

“Whenever we partner with an airline to assist them with their supply chain, we bring expertise and IT solutions. We analyse the current operation, the repair management processing, and based on this audit, we can bring high-performance solutions and optimise the inventory. It generates cash for the airlines as they can sell surplus material.

“We are familiar with all types of operations, and our recommendations are tailor-made to the need of the customer and our experience. You need both to be successful – knowledge based on experience, and a great software,” emphasises Parant.

Obviously, suppliers deliver to operators right across the world, both inside and outside trading blocs such as the EU. Some though, have predominantly delivered within the EU, so they may experience differences in the fluidity of the supply chain – as might the receiving MRO provider/airline maintenance department – when delivering to the UK after that country’s exit from the EU.

“At this stage, we don’t know what type of Brexit will come out of the negotiation. If customs are getting a new hurdle, the supply chain will be affected for sure,”

Parant admits. “To overcome that issue, AAR has several warehouses in Europe, for example in Brussels and Hannover and one in the UK. We are getting ready for any type of new rules. However, the reactivity of customs will be key. It will be a major task for the UK and EU to ensure there will be enough staff and proper procedures to avoid a bottleneck situation affecting the trading volume between EU and UK.”

### CHANGING CUSTOMS

Although declining to comment on Brexit as it is a “too long-lasting subject”, Kaarle Karp remarks, “Through a logistics manager’s eye I can say that inbound shipments from non-EU countries are always more time consuming and affect our customers and ourselves as well. But there are also simplified procedures in Estonia we have created in co-operation with local freight forwarding and cargo companies in order to avoid delays and release customs shipments from cargo terminals. Materials can be taken from a bonded warehouse, and all the bureaucracy can be done during the week.

“Of course, there is also a huge role for customs and tax border people,” Karp continues. “For example, exporting to the US, there is a chance to clear shipments

before they land in the US by the consignee or their agent. Unfortunately, the same method is not possible when we import goods from third countries into the EU – at least it’s not possible in Estonia.

“We hope the European Commission – in co-operation with the representatives from customs authorities of all EU countries – will change this and soon we will be able to accept goods from non-EU countries as fast as if they are coming from [within the EU],” he yearns.

“Aerospace has been global since the beginning, with a small number of suppliers for complex aircraft assembly and integration,” comes the reminder from Erik Goedhart. “The reason for the difference with, for instance, consumer and automotive is the volumes. Aerospace is low volume and high value – Boeing and Airbus produce around 1,600 aircraft a year, but an automotive manufacturer produces thousands of cars a day. Therefore, aerospace is used to trade blocking and trade restrictions and sanctions.

“Kuehne+Nagel, and in fact most players in the logistics industry, will support free trade. The fewer bottlenecks, the better. However, in the past few years we’ve needed to deal with more new bottlenecks than ever. Also, changes in the regulations on those bottlenecks are more frequent than ever before.

“The ‘EU trading bloc’ is a discussion on its own,” Goedhart acknowledges. “The UK Brexit developments over the past few years and recent decisions cause challenges in the supply chain with customs processes and specific requirements per country or new legislation, especially for UK-based airlines operating regionally or globally – and for parts in and out of the UK.

“Kuehne+Nagel is closely involved in steering groups and in mitigating the risks through close co-operation with customers and parties involved. It’s the same as we do for any new development in this respect, as we never know what tomorrow will bring,” Goedhart wisely concludes. ■

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dnata completed a 'green turnaround' of a flydubai flight at Dubai International Airport in December using only zero-emission ramp ground support equipment.



# The passenger plane pit-stop

**Time costs money, and time on the ground means an aircraft isn't earning money. Michael Doran examines the multitude of support facilities that ensure turnaround times are kept to a minimum.**

**A**s an aircraft approaches the gate it is common to see a squadron of vehicles arriving around the moving aircraft and ground crews lined-up ready to turn it around.

Ground handling is another part of the aviation ecosystem that operates 'quietly' in the background but, as we see in times of industrial unrest, it's very difficult to keep the system running and passengers happy without it.

The industry is composed of airlines performing their own support operations and a bevy of independent ground handling operators and agents around the globe. That world is dominated by three large operators, Swissport, dnata and Menzies Aviation.

With many airlines now outsourcing ground handling services, it is interesting that Swissport was acquired in 2015 by a

group that runs an airline, Chinese conglomerate HNA Group, owners of Hainan Airlines. The acquisition must have been a happy experience because in 2016 HNA extended further into ground handling services by acquiring another Swiss company, Gategroup, the operators of Gate Gourmet aviation catering services.

## **PULLING THE APRON STRINGS**

This combination of Swissport and Gategroup makes HNA the major ground services provider globally, with more than 100,000 employees serving close to one billion passengers annually. It boasts an impressive array of support activities: ramp services, aircraft fuelling, catering, check-in, gate services and security to name a few.

Swissport performed some 2.2 million aircraft turns in 2018, equalling one flight

every 15 seconds and its customer agents served 282 million airline passengers at more than 300 airports in 48 countries for 850 clients.

In its 2018 Company Profile, Swissport predicts that the market for ground handling services will grow by 4.1% between 2017–2022 and that by the end of the period around 40% of ground handling services will be outsourced by airlines. It says that an airline can potentially save between 10–25% on ground services and cargo handling costs by outsourcing and that the growth in low-cost carriers is fuelling the growth of outsourced services.

Swissport also says that the top four players in the industry only account for 29% of the global market "making it a highly fragmented market which supports a natural trend to consolidate". It points to significant consolidation over recent years driven by the economies of scale achieved by larger players and the opportunity to exploit the synergies of multi-airport contracts across regions.





Reach for the skies: Swissport operates at more than 300 airports providing ground handling services in 48 countries. Photo: Swissport

## SUSTAINABILITY STRATEGY

Based in Dubai and part of the Emirates Group, dnata has ground handling operations in 37 countries located at 127 airports with more than 45,000 employees. In 2018/19 this network worked on 698,000 flights, supplied 71 million meals and helped more than 120 million passengers along their journey.

dnata grew revenue by 10% and it invested £145.7 million into its operations, particularly in Australia, Canada, Ireland, Pakistan, Switzerland, UAE, USA and the UK. It also made business acquisitions in Australia, Germany, Italy, USA and the UAE at a cost of more than £124.8 million.

Like many in aviation, dnata is focused on reducing its carbon footprint and it is working towards replacing its ground service equipment with green or hybrid options. At its two Dubai hubs it has introduced 150 eco-friendly vehicles and replaced most of its diesel-powered forklifts with electric alternatives.

It has also paved the digital apron by introducing a new resource management system that supports artificial intelligence, advanced analytics and autonomous vehicles at both Dubai International and Dubai World airports.

Some notable achievements in the year were adding four new airlines in Amsterdam, the re-awarding of the ground handling licence at Zurich airport, launching ground services at Los Angeles and passenger services at New York JFK and a doubling of operations at Toronto Pearson International.

## ECOSYSTEM OF EXCELLENCE

The corporate motto for Menzies Aviation is 'excellence from touchdown to take-off' and with operations covering ground handling, passenger services, aircraft fuelling, executive lounges, line maintenance and cargo handling they are a key player in the global aviation ecosystem.

The group provides services at more than 200 airports located in 36 countries, utilising its 32,000 employees to keep more than 500 airline customers in the air. All of this involves handling 1.3 million ground handling turns, 1.6 million tonnes of cargo and fuelling four million turnarounds for customers including IAG, Lufthansa, Cathay Pacific, Air France-KLM, easyJet, Emirates and Norwegian.

In the first half of 2019, the company reported it was facing weaker markets across the aviation sector and that it was taking steps to 'right-size' the business but that its outlook going forward remains positive.

It appears no one in aviation is untouched by the 737 MAX issue and CEO Giles Wilson

said: "During the first half of 2019 cargo volumes and yields have been weak and we are seeing a number of airlines failing to fly their stated schedules, further compounded by the grounding of the Boeing 737 MAX aircraft. These issues have disproportionately impacted our first half trading, which is traditionally lower than the second half due to the impact of flight seasonality."

On a brighter note, Menzies has secured major contracts across all regions, including with easyJet at London Luton, Singapore Airlines in Australia, Air Canada and LOT Polish Airlines at London Heathrow, Norwegian Air Shuttle and Alaska Airlines in the US and a network-wide agreement with Cathay Pacific.

## MOTORTOK'S BIG PUSH

In 2018, Menzies invested £29.1 million in infrastructure and innovation and was an early adopter of the Mototok electric remote-controlled tug vehicle used for pushback at its Edinburgh Airport station. In sustainability terms, Menzies says that for similar work a diesel-powered tug produces around 29 tonnes of CO2e emissions annually compared to just over 2.5 tonnes of CO2e from the Mototok tug.

By July 2019, Menzies had completed its first live Mototok pushback at London Heathrow on an Aer Lingus aircraft and in the first three days of operation used the device for 20 pushbacks.





**Mototok milestone:** Mandeep Johal pushed out the 100,000th British Airways aircraft using a remote-controlled Mototok device. Photo: BA

As with most labour-intensive operations, ground handlers, airlines and airports are actively looking for innovative technology and solutions with the popular buzzwords being electric and autonomous.

Leading the charge to electric tugs is British Airways which has 25 Mototok units at London Heathrow Terminal 5 doing the pushbacks and tows to the runway for the airline's 140-aircraft short-haul fleet.

In August 2019 the airline performed its 100,000th departure since first making the switch to the remote-controlled device in 2017. The operator who pushed back this flight was Mandeep Johal who says that he still finds it exciting to use the new technology.

"One of the best parts of my job is getting to use these new tugs and it still amazes me that this machine can push back an aircraft so easily and smoothly," he says. "This little device has become really important in helping us make sure that our customers get away on their holidays on time and safely."

Before the Mototok, BA used diesel tugs that were shared between aircraft stands which did slow down departures at times but now with an electric tug positioned at each of its short-haul stands on-time departures are more readily assured.

BA's Head of Airports Operations, Tom Stevens, says: "I'm delighted that we've hit

this momentous Mototok milestone. We are the most punctual of the major short-haul airlines flying out of London and this technology helps us stay at the top."

When looking at outcomes, BA has doubled up by reducing emissions and diesel fuel consumption and used the Mototok technology to top the punctuality ladder – both extremely valuable positions to be in.

### A 'CASE' STUDY FOR BA

Moving luggage between aircraft and terminals is a major part of ground handling operations and a process that has barely changed for decades. Innovation arrived in March 2019 when British Airways teamed up with UK-based autonomous vehicle specialist Aurigo to commence a trial of driverless baggage vehicles at Heathrow.

Miles Garner, Aurigo Sales and Marketing Director, says that IAG contacted them early in 2019 and asked if they could convert a traditional airside cargo dolly into an autonomous vehicle.

"A dolly was never intended to work on its own as it's a trailer that gets towed around by a tug," he says. "Technically it was a big task, so we took a lot of the parts like the steering and batteries from our original pods and converted two of them into autonomous dollies."



**The shape of things to come:** Autonomous baggage dollies from UK firm Aurigo have been trialled by British Airways at Heathrow. Photo: BA



**Food for thought:** Catering giant Gate Gourmet provides meals for more than 700 million passengers annually.

Photo: BA

The first step was to take those to Heathrow and operate them autonomously in the airside environment and the second stage was to collect empty ULDs and transport them to the baggage loading area, both successfully completed.

Garner says Aurigo is in discussions with Heathrow, IAG and BA about a third phase which will happen early in 2020. "This will be a much larger trial with more than two autonomous dollies in a real-world environment collecting luggage off an aircraft," he says.

Baggage handling is a fast-paced environment and often a tug, which usually tows three dollies, will head to an aircraft with one empty because it has been forced out of the baggage hall before all are loaded.

"So there is a lot of inefficiency but, with an autonomous dolly, once it is loaded up it is independent as it knows which aircraft and how to get there, so it can head off to the aircraft on its own," Garner says.

He is quick to point out that automation is a way of helping ease the problem and not necessarily a 'silver-bullet' solution and that what they are doing now is establishing a proof-of-concept that moving luggage out to the aircraft can be done with autonomous vehicles.

An important element in getting aircraft departing on time is having all the passengers at the right gate at the right

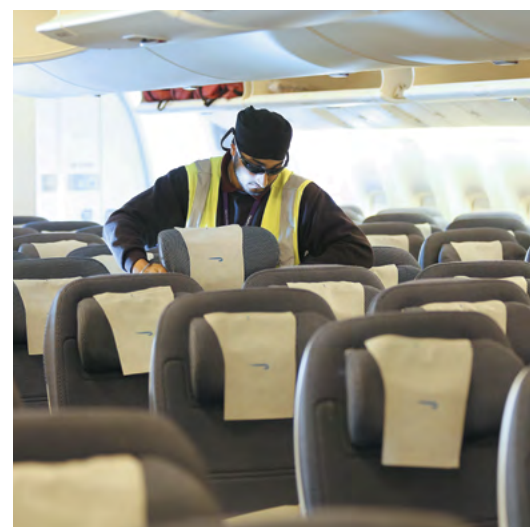
time. For some passengers finding their way around large or unfamiliar airports is a challenge while for others personal mobility difficulties mean they enlist the services of airport staff and buggies to get them to the gate.

### GET ME TO THE GATE

In December 2019, a trial of autonomous wheelchairs saw more than 60 passengers at Abu Dhabi airport make solo journeys on the self-navigating units, passing through crowded lounges and terminal areas before arriving at their designated gate. Once at the gate, the rider pushed the 'return' button and the unit took itself back to its docking station ready for the next user.

The technology comes from US innovator WHILL, which describes the units as Personal Electric Vehicles (PEVs) that form part of its mobility-as-a-service programme. The PEVs are fitted with sensors that can detect any obstructions and navigate around them and are fitted with an automatic stop function when that's not possible.

Etihad Aviation Group COO, Mohammad Al Bulooki, says of the



**Tidy minds:** Keeping aircraft interiors clean and fresh is another vital part of the ground handling operations ecosystem. Photo: BA

PEV trial at Abu Dhabi: "The feedback we received from guests who participated in these trials was overwhelmingly positive and I look forward to the possibility of offering our guests the choice of autonomous wheelchairs in the future."

The technology has so far been trialled at Amsterdam Schiphol, Tokyo Haneda, Dallas-Fort Worth and Winnipeg Richardson airports. ■

**Where there's a WHILL:** Etihad's recent trial of Personal Electric Vehicles at Abu Dhabi International delivered efficiency gains and passenger satisfaction.





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## ... Gary Vickers, CEO at Aerogility

**Aerogility, a cloud-based enterprise-level simulation system, has become the go-to system for LCCs such as easyJet. The system helps to forecast workloads and aircraft maintenance schedules. CEO Gary Vickers explains what the system has and will bring, to the airline industry.**

### **Since the company formed what have you seen as the biggest changes and challenges within Aerogility's sector?**

Airline operators are realising that whilst their massive investment in transactional ERP and MRO systems has been very necessary, it hasn't really solved the problem of managers and planners having to process very challenging multi-million-pound decisions using multiple disconnected spreadsheets.

Our experience is that fleet managers and maintenance and engineering teams are highly receptive to the idea of our holistic software agent model – representing the whole of their operation – and running simulations that automatically generate the plans and analytics needed to develop maintenance policies or run a programme. This is a radical breakthrough for people that have struggled for a long time with solving hard problems using labour-intensive spreadsheets and constantly having to play catch-up in a dynamically changing environment.

### **What has been the most requested 'item' in terms of software for low-cost airlines?**

Maximise yield, minimise cost and maximise aircraft availability!

Most airlines run on tight margins and it is essential that they maximise aircraft yield and minimise costs and ensure that they have optimal aircraft and seats available during their peak season. The fundamental request is to replace traditional spreadsheets and planning tools with more automated and optimised software technology. This is

the only way that maintenance and engineering teams can handle the increasing levels of complexity required to schedule aircraft maintenance events.

The capability to react quickly to AOGs and maintenance overruns and analyse the impact is paramount. Aerogility's solution looks at the big picture and enables the operator to respond dynamically to inevitably complex situations. Software automatically gives you the ability to maximise yield and resolve constraints optimally, such as MRO capabilities, capacities and seasonal calendars.

### **How long does it take to integrate one of your systems into a company's network, following the initial consultation meeting and outline of what they want?**

We can get an initial version of Aerogility up and running in six weeks, but then we would expect to go through several iterations to customise the solution to the customer's exact requirements. We recommend a test and verification phase, often parallel running and comparing the results with the customer's existing method. Typically, a customer is happy to go live after 16 – 20 weeks from the start of the project.

### **What technology would you like to see being developed in the future to assist the commercial aviation industry in particular with AI?**

We are very interested in the development of AI and we are sure that it has a critical future role to play in decision-making and forecasting for any complex asset, especially

the aviation industry. The early work into intelligent software agents – which we use in Aerogility – was driven by research into AI architectures and autonomous systems. In recent years, this approach has been less fashionable and there has been a high-profile focus on big data and machine learning – and certainly, we have incorporated some machine learning into the Aerogility product.

Thinking about what will happen next in 2020 and beyond, we are certain there will be a convergence process between data-driven and model-driven approaches to AI.

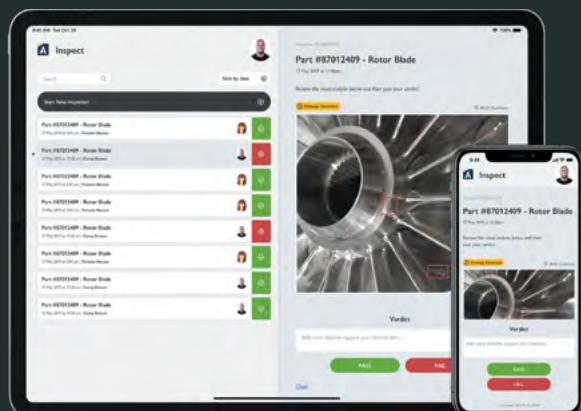
### **How do you feel you have assisted an airline client such as easyJet for example and what has been their feedback?**

Since deploying a fleet maintenance planning platform with easyJet, we are working with the fleet planners to improve its aircraft utilisation and drive out cost efficiencies from its maintenance activities.

The carrier has been very supportive of Aerogility following the implementation and has given us very positive and encouraging support. We are pleased to quote easyJet's Swaran Sidhu, Head of Fleet Technical Management, who when we first launched said: "Aerogility has delivered an innovative and cost-effective maintenance planning solution for us. It's given us the ability to look into the long-term maintenance planning of our fleet with the capability to not only make a late change to the plan but at the same time understand the impact of that decision operationally and economically." ■

# Accelerating AI with Anomalous

Matthew Davies, Co-founder and Chief Product Officer, explains how



Scottish start-up Anomalous has been selected for the inaugural Boeing and Aerospace Technology Institute (ATI) programme, enabling the company to establish industry relationships, win investment and engage with the wider sector.

Anomalous has developed artificial intelligence (AI) software that detects defective aircraft parts, helping inspection and maintenance teams find problems in parts from fan blades to other engine components.

The start-up will receive a £100,000 equity investment from Boeing HorizonX Ventures, along with access to ATI, Boeing and GKN Aerospace strategists and technical experts. The programme will culminate in a demo day in April where Anomalous will pitch its business to customers, key industry stakeholders and investors to achieve commercial and equity outcomes.



## Q: Could you give us a background on Anomalous?

A: Anomalous was founded in October 2018 and launched in March 2019. Since then we've moved quickly, securing Proof-of-Concept projects with Rolls-Royce, Collins Aerospace, and BAE Systems. The software is commercially available today and will soon be in production at Rolls-Royce.

## Q: How does it work?

A: We train an AI to be able to comprehend what defects look like by showing the AI thousands of images of defective parts. To speed up this process, we use "synthetic data" which is created by using CAD files to render photorealistic images of parts and then applying virtual damage that is modelled on real-life scenarios. Once the synthetic data is created, we are then able to train our AI on this data. The AI is then able to detect parts and damage in real life.

## Q: What might the benefits of this solution mean for regional and low-fare operators?

A: Regional and low-fare airlines are under particular pressure to ensure that aircraft downtime is kept to a minimum. Our software makes the inspection process faster and more accurate, reducing the amount of time planes are unavailable for service. Ultimately, AI is a key enabler to a more sustainable and efficient airline industry.

## Q: Who is the solution targeted towards and is it scalable?

A: An individual inspection cell is cost-effective to implement. Our software increases the efficiency of inspection teams, allowing cost savings and greater throughput. Initially we're focusing on MRO companies and OEMs. However, operators could make use of our tools.

## Q: AI is becoming a key topic in MRO; how do you think this might develop in the future and what makes Anomalous stand out?

A: Inspection is the most frequent touchpoint for gathering data during the lifecycle of a given part and our vision is that each part will have a "digital passport" that tracks its journey throughout its life. Once we can actively track parts, we can start to understand their provenance. When a failure does occur, we'll be able to trace that fail back through the part's life to understand the origin of a defect.



## FAA orders Collins Aerospace HUD VR training device

The Federal Aviation Administration (FAA) has ordered a Head-Up Display (HUD) Virtual-Reality (VR) training device from Collins Aerospace Systems for use in scientific research in areas such as pilot-HUD interface, pilot performance and crew workload.

The training device provides a view of what a pilot would see when flying with a HUD that uses Collins Aerospace's Head-Up Guidance System (HGS) and Enhanced Vision System (EVS).

Collins Aerospace suggests the design of the VR device will provide FAA scientists flexibility, efficiency and effectiveness in conducting research in the areas of advanced vision systems on HUDs.

## Norwegian selects Boxever to support personalisation goals

Norwegian has entered into a five-year contract with Boxever, the AI-driven personalisation platform, for solutions to form the backbone of the airline's long-term personalisation strategy.

The airline plans to deliver a more personalised customer experience, with Boxever's Personalisation platform acting as the "brain" behind its customer-facing channels.

Norwegian's personalisation strategy aims to utilise the range of data collected by an airline in order to deliver a more customer-centric experience, from prospecting to customer care and retention. The companies said the CDP [customer data platform] will also create a leaner marketing tech stack, reducing IT costs and streamlining marketing processes.

Jon Williams, Chief Revenue Officer at Boxever, said: "The fact that the airline has a dedicated personalisation strategy and team is proof of its intention to put the customer experience first, but is also indicative of the value that companies are witnessing in terms of the solid ROIs that personalisation does deliver."

## UK invests in green fuel plants

The UK Department for Transport (DfT) has announced new funding to support four UK-based plants to produce green fuel.

Two of the projects, KEW Projects and Rika Biogas, have been awarded a share of a £6.5 million fund under the government's £20 million Future Fuels for Flight and Freight Competition, to build plants which aim to provide fuel for heavy goods vehicles. The project at KEW will also begin research which the DfT said could pave the way for low-carbon aviation fuel.

Transport Secretary Grant Shapps said: "This funding will help encourage innovative technology using today's waste to power tomorrow's green transport revolution, helping us reach a cleaner and greener future."

## Meggitt invests in HiETA Technologies to advance thermal systems

Meggitt has announced its investment in metal additive manufacturing company HiETA Technologies, aiming to accelerate the development of the next generation of thermal systems for aerospace and energy applications.

The company said this investment "enables a new generation of high performance and light weight thermal systems to be brought to the market at a critical time for sustainable aviation and lower carbon power generation solutions."

Commenting on the collaboration, Hugh Clayton, Group Director of Engineering and Strategy at Meggitt, said the company was proud to partner with HiETA to "push the

frontiers of innovation," adding: "We look forward to a productive partnership which will shape our future: collaborating on additive manufacturing and thermal system technology to enable the next generation of more sustainable aircraft propulsion systems and greener energy systems."

Through the agreement, the companies will complement capabilities, with Meggitt's experience in designing and manufacturing advanced heat exchanger technologies for mission-critical aerospace and industrial applications, and HiETA Technologies' experience in designing and using additive manufacturing to build high-

performance components for industry sectors, including aerospace.

Mike Adams, CEO and Co-founder of HiETA Technologies, said the investment enables the company to bring "exciting new products to new markets".

He continued: "It also shows the potential for additive manufacture of our world-class designs, when supported by outstanding industrial knowledge, experience and capability."





**Patrick Hannigan** has been named **CDB Aviation's** new Chief Executive Officer, promoted from his current position of President and Chief Commercial Officer. He succeeds Peter Chang who retires following three years of leading the company.

**Spirit Airlines** has promoted **Matt Klein** to the position of Executive Vice-President and Chief Commercial Officer. Klein joined Spirit in August 2016 as Senior Vice-President and CCO. Meanwhile, **Bobby Schroeter** was promoted to Senior Vice-President and Chief Marketing Officer. Schroeter began his career with Spirit as Director of Interactive Marketing more than 14 years ago, and was promoted to Vice-President of Marketing in 2012.

The **Regional Airline Association (RAA)** has promoted **Drew Jacoby Lemos** to Senior Director, Government Affairs. He joined the RAA in 2017 as Director of Government Affairs and prior to this he served as Associate Director, Federal Affairs for New York Governor Andrew Cuomo.



**Norwegian's** Board of Directors has appointed **Jacob Schram** as CEO of Norwegian, starting 1 January 2020. Schram has spent the last year working with private investments, start-ups and presentations relating to his book 'The Essence of business', as well as holding the position of senior advisor at McKinsey. **Geir Karlsen**, who has held the interim position, will continue as CFO and deputy CEO.



**Fredrik Palm** has been named Chief Technology Officer at **Infare**, bringing more than 23 years' experience. His previous roles include Vice-President of Research and Development at data analytics and business intelligence provider, Qlik, and CTO at mobile keys provider Zaplox.



**Burrana** has appointed **Scott Richardson** as Chief Financial Officer effective 1 January 2020. Richardson brings cross-industry experience and will succeed Andrew Mullis, who served as Burrana (formerly digEcor) CFO for six years.

**FLYdocs** has made **Carl Davis** Chief Technology Innovation Officer. Davis has previous experience in digitisation of leasing and lending platforms and delivering data-driven process automation. He also ran the risk and fraud programme at Santander Bank, was CTO of Bibby Financial Services (Verus360 division) and CTO for analytics company DC-Storm.

**Pattonair** has welcomed **Kieran Murphy** and **Martin Cole** to the newly-created positions of Innovation Manager. Murphy brings more than 20 years' experience including in a previous role at Rolls-Royce's R2 Data Labs while Cole brings more than ten years' experience from his years as a consultant and system integrator, and also a previous role as a managing consultant at Deloitte.



**AirAsia** has appointed **Jun Aida** as Representative Director and COO to lead **AirAsia Japan Co.** effective 1 January 2020, taking over from Jenny Mayuko Wakana. Aida joined AirAsia Group as Senior Advisor in 2017, and prior to joining the airline, he was Managing Director for Phoenix Resort Co.

The **Association of Asia Pacific Airlines** has announced **Subhas Menon** will take up the position of AAPA Director-General from 1 March 2020. Menon has over 35 years of experience in international aviation with the Singapore Airlines Group, most recently as Regional Vice-President Europe. He will succeed the current Director-General Andrew Herdman who will step down having successfully led the Association since 2004.

# Aviation calendar 2020

## FEBRUARY

4-6

**Routes Americas, Indianapolis, USA**  
<https://www.routesonline.com/events/208/routes-americas-2020/>

11-16

**Singapore Airshow, Changi Exhibition Centre, Singapore**  
<https://singaporeairshow.com/>

18-19

**Aviation Festival Asia, Suntec, Singapore**  
<https://www.terrapinn.com/exhibition/aviation-festival-asia/index.stm>

24-26

**MRO Middle East, Dubai, UAE\***  
<https://mromiddleeast.aviationweek.com/en/home.html>

25-26

**Aircraft Interiors Middle East, Dubai, UAE**  
<https://www.aime.aero/>

## MARCH

4-5

**Aviation Africa, Addis Ababa, Ethiopia\***  
<http://www.aviationafrica.aero/home>

8-10

**Routes Asia, Chiang Mai, Thailand**  
<https://www.routesonline.com/events/211/routes-asia-2020/>

25-26

**ERA Regional Airline Conference, Malta**  
<https://eraa.org/events/era-regional-airline-conference-2020>

\*LARA is a proud media partner of these events.



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