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LOW COST & REGIONAL

Airline Business

VOLUME 15 • ISSUE 1 • SPRING 2020



ASIA PACIFIC

The greatest
growth does not
bring big profits

FORGING AHEAD

The ATR family is
the leading regional
turboprop

FILLING THE RANKS

More pilot training is
needed to cover shortages

Compensation

Is EU261 a poison chalice
for European airlines?

Technology

AI is appearing in
applications across aviation

Components

AerFin growth business
in recovered material



ATR

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Editor's L E T T E R



IAN HARBISON

ian.harbison@realresponsemedia.com

Welcome to this exciting issue of Low Cost & Regional Airline Business. As you can see, we have

given the magazine a completely new look, with a fresh, contemporary look. Our editorial focus is also changing, to include new regular features as well as our well established in-depth coverage.

That will enable our experienced editorial team to continue to bring you the most comprehensive coverage of the industry but also to expand into new areas, bringing the very latest from experts and industry figureheads. We will be concentrating on training and sustainability – two of the biggest challenges facing the sector today and seeking advice and insight from those in the know.

As well as changes to the magazine, we have relaunched our website – www.aviationbusiness.com – bringing the latest news and views of low cost and regional airlines.

I hope you enjoy the refreshed Low Cost & Regional Airline Business.

In this issue, we take a look at two regional aircraft, one a mature product, the other about to enter service. The ATR 42/72 family (see

page 14) continues to be the best selling turboprop on the market, but is still going through a process of product improvement. The Mitsubishi SpaceJet (see page 18) has had a protracted development programme but should, finally, enter service later this year. We also analyse the Chinese-built COMAC ARJ 121 (see page 32).

For both aircraft, the Asia Pacific region is a key market, as commercial aviation is growing faster here than anywhere else. We take a look at these trends (see page 22).

Needless to say, coronavirus is the dominating factor in all our lives right now (see page 12), involving everyone worldwide. It will have a profound effect on our industry but, more importantly, on individuals and their families. Real Response Media has had to adapt to the new environment already and so we extend our thoughts to you, our readers and advertisers, and offer our support and solidarity. Keep safe, and we hope to meet in happier times in the future when the world can get together again. Of course, the main enabler of those reunions will be commercial aviation.

Ian Harbison

EDITOR



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Airline Business

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Business Briefing

News from across the industry

PHOTO: SOUTHWEST AIRLINES



SAFETY

Southwest reponds to safety inquiry

Southwest Airlines has provided details of its response to a 2018 audit by the Department of Transportation's Office of the Inspector General (OIG). The audit looked at the FAA's safety oversight of the airline.

Southwest Airlines has said that it fully cooperated with the OIG throughout the process, sharing a

common goal of strengthening industry and Southwest safety practices.

Within the audit, the OIG took a closer look at a few operational challenges the airline has focused on during the last year, specifically its Weight and Balance Programme and maintenance records 'conformity' work on pre-owned aircraft.

The OIG data collection for the audit concluded towards the end of last year and, since that time, the airline has reportedly made significant progress on both of the two primary operational items which were mentioned in the report.

With regard to Southwest's Weight and Balance Program, it has implemented automated baggage scanning and tracking in all of its domestic stations as of December 2019,

equipping employees with hand-held scanners to further baggage count accuracy and enhance the integrity of the programme.

As part of this effort, Southwest Airlines invested in more than 3,400 scanners and currently scans more than two million bags per week. Since implementing the scanners, the airline has seen substantial improvement in Weight and Balance Programme accuracy and consistency across the system.

With regard to the conformity issue, the airline's technical operations team has worked to ensure that each of the 88 pre-owned aircraft cited in the report has undergone a comprehensive physical inspection, from nose to tail, to ensure all maintenance records and repairs are documented.

AIRCRAFT

PROFIT HUNTING IN THE UK

The Embraer EMB-195 E2 'Profit Hunter' Demonstrator has paid a visit to the UK, landing at London Oxford Airport on 16 March. It was the largest commercial airliner ever to land at Oxford Airport, showing its abilities to land on shorter runways – Oxford has a 5,092ft runway.

The aircraft arrived non-stop from Larnaca International Airport in Cyprus (taking off just before the country closed the airport for international arrivals) as part of a world tour, having visited prospective airline customers at Hyderabad Airport in India and Dubai World Central Airport, UAE. It then departed, heading on to Cape Verde and across the South Atlantic to home in Brazil.

The twin engined, single aisle, fly by wire, state of the art Embraer E190-E2 with its high-aspect ratio wings, is the largest variant of Embraer's family of upgraded E-Jets, delivering lower operating costs, significantly reduced emissions and noise levels. The Pratt & Whitney PW1900G geared fan powered aircraft features Honeywell Primus Epic avionics and a new flight management system.

This aircraft is configured in its maximum high density 146-seat layout. Embraer also offers a three-class 120-seat version and a 132-seater version with a 31-inch seat pitch.



PHOTO: JAMES OATES



PHOTO: L3HARRIS

TRAINING

New sims for BAA training

BAA Training and L3 Harris Technologies have signed a multimillion-dollar contract to supply nine RealitySeven full flight simulators to the Lithuanian pilot training company.

The simulators will be delivered in a phased manner. The first four are scheduled to be assembled, approved and ready for training in 9-12 months, and will be placed at BAA Training headquarters in Vilnius and BAA's training centre in Barcelona.

The remaining five simulators will be delivered at training centres in Spain, Vietnam and Italy, where BAA has plans to open a new facility.

The simulators will cater for both Boeing and Airbus aircraft families, including the Boeing 737NG, Airbus A320neo, and other types.

Industry analysts predict the share of narrowbody aircraft in the global fleet will increase

from 58% to 66% by 2029, and Boeing and Airbus will present 98% of all narrowbodies deliveries.

L3 Harris says the RealitySeven full flight simulator delivers a high degree of reliability, maintainability and supportability for training centre operators. RealitySeven functionality – including digital electrical control loading and electric motion systems – reduces power consumption and provides high trainer availability for airlines, ensuring minimal through life operational costs.

"BAA Training's selection is testament to the quality of our devices and the skills and expertise of the engineers who develop them," said L3 Harris VP sales and marketing, commercial aviation, Robin Glover-Faure.

"We look forward to supporting BAA Training to expand their capacity by providing these industry-leading devices."



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25 

FLYING INTO TOMORROW

As we complete yet another milestone in our journey, we take a moment to thank all our customers, partners, and employees who supported us in becoming what we are today: the world's most acknowledged MRO provider.



Lufthansa Technik

PHOTO: BOMBARDIER



INDUSTRY

Cf34-8 Durability upgrade programme

GE Aviation has launched a new CF34-8 high-pressure turbine (HPT) durability upgrade programme for CF34-8 engines to improve fleet stability, time on wing and engine's cost of ownership.

The HPT durability upgrade programme is available to all CF34-8 operators, regardless of their maintenance, repair and overhaul provider. The CF34-8C5 powers the Bombardier CRJ700, CRJ900 and

CRJ1000, while the CF34-8E powers Embraer 170/175 aircraft.

Under the CF34-8 HPT durability upgrade programme, GE Aviation will provide customers with upgraded parts that can be incorporated into the engine during its next overhaul. These parts are listed in a series of Service Bulletins that GE issued and include components in the fan, compressor, combustor and HPT modules.

These upgraded parts offered at a significant discount, combined with the improved durability and time on wing, will bring the total cost of ownership in line with customer expectations.

General manager of regional engines and services at GE Aviation, David Kircher, said: "During the last 12 months, we have been focusing on driving durability into the CF34-8 engine through several enhanced design improvements. The HPT durability upgrade programme will stabilise the engine's operation and

Since its service entry in 2001, the CF34-8 engine has accumulated 70 million flight hours and 52 million flight cycles

reduce unscheduled engine removals and significant events, allowing CF34-8 customers to more effectively plan their operations."

Launch customers for the durability upgrade are BeauTech Power Systems (BPS) and Sky Regional Airlines. BPS (based in Dallas, Texas) specialises in the leasing, trading, asset management and sales of aircraft engines. Sky Regional Airlines, based in Etobicoke, Ontario, operates 25 Embraer 175 aircraft under the Air Canada Express banner.

Since its service entry in 2001, the CF34-8 engine has accumulated 70 million flight hours and 52 million flight cycles.



PHOTO: EMBRAER



MAINTENANCE

Kenya Airways loan for engine MRO

Kenya Airways has received a KSh5 billion (\$49 million) loan on commercial terms from the Government of the Republic of Kenya, through the National Treasury, to facilitate the scheduled engine overhaul programmes on its E190 Embraer fleet.

The cash injection will cater for the overhaul of 11 GE Aviation CF34-8E-10 engines, which is required every eight years in order to uphold the highest levels of safety and maintain reliability and planned network schedules.

The announcement has been made to the public pursuant to paragraph A.06 of the Fifth Schedule of the Capital Markets (Securities) (Public Offers, Listing and Disclosures) Regulations, 2002.

"I would like to thank the Government of Kenya for making these funds available to us. As an airline, we need to be efficient across our operations but, more importantly, across our fleet. The Embraer fleet is our largest and is the networks' workhorse," said Kenya Airways' chairman Michael Joseph.

"We also plan on undertaking refurbishments on our two Boeing 737-700 aircraft. The refurbishment will guarantee our passengers a better experience on their flights with us. The airline commits to prudent utilisation of the funds to ensure value for money."

BUSINESS

Flybe goes bust

UK-based carrier Flybe entered administration on 5 March, with the immediate grounding of all flights. While CEO Mark Anderson said coronavirus was a factor, it is clear the real reason was a failure to find further sources of funding. Competitive pricing made air travel from the regions a viable alternative to rail travel, but the business model was unsustainable.

Previous financial trouble led to its acquisition last year by Connect Air, a consortium that included Virgin Atlantic. In January, a bailout was organised with access to loans and the possibility to defer the carrier's £100 million Air Passenger Duty (APD) bill. This led to a complaint to the EU by British Airways.



PHOTO: IAN HARRISON

The UK government asked bus and train operators to accept Flybe tickets, and airlines to offer reduced rescue fares. With 2,000 direct jobs at risk, the Jobcentre Plus Rapid Response Service stands ready to help. However, the trade union GMB pointed out that in addition to the 2,000 direct jobs, a further 1,400 jobs in the supply chain were at risk.

A number of airlines stepped in to resume services on many of the routes, notably Loganair that took over 18 services. Flybe Code share partners Blue Islands and Eastern Airways continue to operate routes as their own services.

Flybe was the world's largest operator of the Dash 8-400. With a sudden glut in the market, it is likely residual values will plummet, especially as there is little demand in Europe for the aircraft.

Also hit is Flybe Aviation Services, the company's MRO facility in Exeter, which had a number of third party contracts.

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Low Cost & Regional Airline Business magazine is dedicated to analysing business strategies in the low-cost and regional airline industries.

Reaching an audience of over 24,000 key decision-makers, globally, we aim to keep you fully informed of the latest news and developments from specific airlines, manufacturers and suppliers.

D I S T A N T T I M E S

Air travel is now a commodity, taken for granted in many developing countries and used as a matter of routine for business and pleasure, but the current emergency could have long-term effects. *Ian Harbison* reports



While commercial aviation has suffered from setbacks in the past, such as an economic crisis, a surge in oil prices, volcanic ash or a health scare like SARS, it has never had to face a challenge like coronavirus.

For major flag carriers with plenty of money in the bank, the current emergency is painful but probably not life threatening for many, with the promise of government assistance. Once free travel resumes, there will probably be an immediate upsurge in

passengers for business reasons as international trade picks up again.

For low cost and leisure carriers, the situation is going to be a lot tougher. Most travel is discretionary and, while visiting friends and relations (VFR) business may see an immediate pick up as families reunite after a potentially long separation (imposed or otherwise), the economic impact of the crisis on disposable income is yet to be determined. That will have a similar effect on holidays – those who can will want to escape from their previously closed-in world, but many others may not be so lucky. Once again, larger carriers have a greater capacity to survive, but

Smart companies will use the downtime to train staff and improve their service

there is surely a high risk of failure among less well-off operators.

The only glimmer of light at the moment is the huge number of people that need to be repatriated, having been stranded abroad when restrictions were imposed either at home or at their location. However, this is only a very short-term measure.

One company that has seen an increase in business is UK-based Air Partner. With huge experience of arranging group charters, which are now being cancelled, it has used that experience to repatriate more than 300 British and EU

citizens from Wuhan, as well as cruise ship passengers from Yokohama. It is reporting a steady stream of enquiries.

Ironically, one sector of the industry that might benefit is air cargo, which has been slowing down. The internet may be the only source of shopping for those confined to their homes by coronavirus restrictions, so e-commerce could see an even greater increase in growth. Korean Air has already taken advantage by using belly capacity on passenger aircraft to operate freight flights.

With the reduction in flying comes a reduction in the need for maintenance, and this will certainly affect a large number of MRO facilities. While there will be plenty of care and maintenance work to be carried out on grounded aircraft, this work does not have the man-hour content or materials requirements of a full overhaul, so revenue will undoubtedly be hit. This applies equally to engines and components with fixed service intervals, as reaching the limit will be deferred by any grounding.

Fortunately, this winter has generally been a good season, with full hangars almost everywhere. This was caused partly by the 737 MAX grounding alongside

problems with advanced engines, keeping older aircraft in service longer than anticipated, and requiring additional work to be carried out. That may provide a financial buffer.

Smart companies will use the downtime to train their staff so they can offer an improved service when customers return.

For manufacturers, there will be a slowdown in production, which could cause financial problems for smaller companies in the supply chain, especially if they are already affected by 737 MAX. Aircraft orders may be cancelled or deferred, depending on whether the airline customers survive and can still afford new fleets, but the order books of all the big players are healthy enough that there is unlikely to be long term damage.

Generally, it is also important to avoid overreaction to news headlines and read the details carefully, even going back to the source.

Looking behind recent headlines along the lines of 'Airbus suspends production' reveals a brief four-day pause in production and assembly activities at its French and Spanish sites while it implemented stringent health and safety conditions in hygiene, cleaning and self-distancing. At the same time, it is looking at how to improve the efficiency of operations under the new working conditions.

Perhaps the most fragile sector of the industry is regional airlines, but this is about more than passenger transport. Often seen as feeding passengers into hub airports to connect to long haul flights, they play an important role in linking smaller cities, while many

markets are served for very specialised purposes – connecting seaports to facilitate crew transfers for shipping companies, for example. This is easier with smaller aircraft with fewer passengers, reducing the breakeven load factor, but that allows them to serve small, remote communities, often with help by subsidies from local and/or national governments.

These essential air services are a lifeline and a perfect example is illustrated by the decision of the Norwegian airport operator Avinor to close nine small airports to all commercial flights from 18 March. This was done to allow specialist personnel and equipment to be deployed to the remaining airports.

One of the nine is Svolvær, on the Lofoten Islands. Avinor suggested Leknes as an alternative airport, but this is about 70km away. Most passengers will be heading for the hub airport at Bodø but, as this is a six-hour drive, possibly including a ferry, it is easy to see why air transport is a preferred option.

Underlining the reliance on aviation, air ambulance flights will still be allowed to operate from the closed airports, while one of the consequences of the Flybe collapse was that the airline had a contract to carry patients from the Isle of Man to hospitals on the mainland for specialist treatment.

We are in uncharted waters, both as a society and as an industry. Just as society needs to look after the vulnerable, so does the industry and regional airlines seem to fit that description. ❶



ATRs are used in 75% of all turboprop operations and 36% of combined turboprop and regional jet operations.
All photos: ABS

Forging Ahead

The ATR family continues to be market leader in the turboprop sector. After decades of service, it is still being improved and finding new markets.

Ian Harbison reports from Toulouse





When regional jets started to appear in the 1990s, some predicted the death of the turboprop. However, ATR has stayed the course and steadily increased its market share as competitors fell by the wayside. The 2019 results are not yet available as they have to follow those from the partners, Airbus and Leonardo, but press releases indicate orders of around 8 aircraft. Of those, 35 were ordered by leasing company NAC, which also took 35 options and 35 purchase rights. That compares to 52 orders in 2018 and 113 in 2017.

The company's marketing plans have also changed as a result, as it is now looking at the replacement market for older ATR models as well as de Havilland Canada

Dash 8s and other 30-seat turboprops. The only serious competition at the moment is the Q400, acquired in September 2018 from Bombardier by De Havilland Aircraft of Canada (note the change in spelling from the original, which dates back to the historical UK manufacturer) and rebranded as the Dash 8-400. In the future, there may be a threat from Embraer, which has been talking about a next-generation project.

In the meantime, ATR is making the most of its current leadership position and Zuzana Hrnkova, Vice President Marketing, says the development of shorter air routes suited to turboprop operations (around 300nm or less) is set to grow. She points out that 58% of the current worldwide regional network did not exist 15 years ago and a further 2,700 routes are predicted in the next 20 years as developing countries improve their domestic networks and a growing middle class can afford to fly.



Clockwise from left: FedEx will utilise the 8.9 tonne payload of the ATR 72-600F; Silver Airways and IndiGo Airlines are some of the airlines deploying the ATR 72-600; The Neo Prestige seat offers more comfort

In addition, she says 30% of the world's 3,800 airports have scheduled services that are provided exclusively by turboprops. As an indicator of the growth trend, she adds that ATR operators added 150 new routes in 2017 and 113 in 2018. Overall, ATRs are used in 75% of all turboprop operations and 36% of combined turboprop and regional jet operations. It is also noteworthy that, of the 200 ATR customers operating in 100 countries, many are smaller carriers in remote areas, especially islands. At the same time, says Laurent Caballe, Vice President Product & Services, many others also operate Airbus A320/Boeing 737 aircraft, using the turboprop on feeder routes into hub airports.

Despite that leadership position, the company has continued to introduce a steady stream of improvements to aircraft performance and passenger comfort.

A good example of this was the first of three ATR 72-600s delivered to Guernsey-based Aurigny in October 2019. This was the first application of the

A further 2,700 worldwide regional network routes are predicted in the next 20 years

ClearVision Enhanced Vision System (EVS) from Elbit Systems. Using a multi-spectral sensor system mounted in the nose of the aircraft, it produces a synthetic view of the outside world in reduced visibility or night operations, overlaid in the pilot's Skylens head wearable display or head-up display with flight information. This has been combined with the Standard 3 avionics suite, which features an Inertial Reference System from Thales that provides RNP-AR 0.3/0.3 (Required Navigation Performance with Authorisation Required). This means the aircraft can be accurately flown inside a flight corridor that is just 0.6nm

wide (0.3nm is the half-width), especially useful in narrow valleys in mountainous areas or tightly controlled airspace in congested areas.

The cabin retains the Armonia design from the Italian design house Giugiaro, development of which started in 2009 along with ATR and seat manufacturer Geven, which supplied its Prestige and Privilege models. In 2017, they were replaced by the Neo Classic and Neo Prestige. As well as offering more comfort – some ATR routes can be several hours long – it also gave airlines an opportunity to introduce a two-class configuration. As the passenger entry door is at the rear of the aircraft, premium seating is usually at the back as well.



NO PAX PLEASE

The freighter market is expected to grow in response to e-commerce expanding at 19% per annum. In addition, second tier cities are not well connected. There are more than 120 converted ATRs and there is plenty of feedstock as the residual values of older aircraft are now decreasing to the point where conversion is economically viable and

attractive but new build freighter aircraft are also possible – this year will see the delivery of the first of 30 ATR 72-600Fs ordered by FedEx in 2017 (It also holds 20 options). These will be the first to be produced in Toulouse with the Large Cargo Door (an STC originally developed by Aeritalia and then acquired by IPR, which was itself recently acquired by ACIA Aero Capital).

With a payload of 8.9 tonnes, it is the largest turboprop freighter on the market.

The fuselage cross section means it can carry seven LD3s or five 88in x 108in pallets or nine 88in x 62in pallets, plus bulk cargo in the rear fuselage. However, the ATR 72-600F makes sense for the big integrators, as using smaller aircraft means smaller airports become available as distribution centres closer to the end customer, ensuring fast delivery times.



Another aspect of the new seats was increased space, with the standard configuration for an ATR 72-600 changing from 70 seats at 30in pitch to 72 seats at 29in pitch. They also offered a 200kg weight reduction per shipset but for airlines seeking even more, there is the option of Expliseat, which has a composite and titanium construction that offers a 300kg reduction. Customers taking the option include Cebu Pacific, Air Tahiti and Air Caledonie.

As noted above, there are some long routes but the average is around

60 minutes, so 2018 saw the introduction of a simple wireless IFE system that fits in an overhead bin. As well as amusing passengers, it can also provide useful ancillary revenue for operators.

The company also takes inclusivity very seriously. Every aircraft has an onboard wheelchair to ease seat access; safety instructions in Braille; and, introduced last year, Audioback, which enables passengers with hearing aids equipped with a Telecoil to hear inflight announcements via a magnetic field signal from a loop embedded in the seat headrest.

Support

The far flung customer also presents challenges for the support side of the business, says Laurent Caballe, Vice President Product & Services. One of the most important offerings by the OEM is the General Maintenance Agreement, which offers a comprehensive support agreement with airlines.

Under a GMA contract, ATR will handle the complete management of equipment, including the repair of line replaceable units (LRUs), the maintenance and availability of propellers, the advanced exchange pool of services, plus an inventory of spare parts on lease at the airline's main operating base. The company has warehouses in Paris, Miami and Singapore.

Caballe says GMA growth is greater than that of the market, which shows no sign of slowing. ATR will be celebrating its 40th anniversary in 2021 and it is likely that the number of aircraft being produced will be the same as it is now. ❶



SHORT & SWEET

ATRs operate into many primitive airfields in remote regions, often where the De Havilland Canada Dash 8 is coming to the end of its service life.

In response, in October last year, the ATR 42-600S was launched, the S representing Short Take-Off and Landing (STOL). The aircraft will be able to use runways as short as 2,625ft with 40 passengers on board in standard flight conditions (15°C airfield temperature, sea level, dry paved runway and a route of 200nm).

The principal modification is a larger rudder, which provides increased control at lower speeds, while symmetrically deployed spoilers and an autobrake system will reduce the landing run. The power rating of the Pratt & Whitney Canada PW127M turboprops can be switched to the higher level of the larger ATR 72-600 version for take-off from short runways, then operated at a lower level for the rest of the flight or operations into larger airports.

To-date, ATR has recorded over 20 commitments from operators and lessors for the ATR 42-600S, including Elix Aviation Capital, Air Tahiti and PNG Air. Certification is expected for the second half of 2022, with first delivery expected immediately afterwards.

ATR says there are close to 500 airports with runways between 2,625-3,280ft, nearly a third of which are in Asia Pacific. This represents a 25% expansion of the market.



Long awaited

The regional jet market has waited a while for the Mitsubishi regional jet family, but as Steve Haro, Vice President, Head of Global Marketing and Strategy, tells *Stan Abbott*, things are now on a roll



Left: Mitsubishi completed the first flight of FTV10 on 18 March. All photos: Mitsubishi



It's been something of a roller-coaster ride for Japanese manufacturer Mitsubishi since it plotted a return to the commercial aviation sector after an absence of half a century.

The MRJ regional jet series was initially intended to be in service in 2013, but the development programme has been dogged by repeated delays and there are now suggestions in the Japanese media, not confirmed by the company, that the newly renamed and redesigned Spacejet may not make its latest programmed date of mid-2020 for entry into service.

However, Steve Haro, interviewed at the European Regions Airline Association General Assembly at Juan Les Pins in October remains upbeat, having just secured a first order for Spacejet in the USA.

"The MRJ programme really started about 10 years ago and, like all the OEMs, such as Embraer and Bombardier, we were thinking there would be some US 'scope clause' change coming," he says.

The presumption was that the major American carriers would do a deal with the flight deck unions that would relax the 76-seat cap on 'outsourced' regional jet operations at 76 seats or 86,000lb maximum take off weight (MTOW).

"The largest market for regional jets is North America, at 45% of the total, and the US represents the largest portion of that," says Haro. "The three mainline carriers had union agreements with pilot unions that limit the size of aircraft, essentially meaning that there's more money for flying bigger planes," explains Haro.

"If you exceed either one of the limits, your pilot's pay ups into another category and you are in the same pay



Left: Mitsubishi have secured a first order for Spacejet in the USA. **Right:** The FTV10 first flight carried out tests for two hours over the Pacific Ocean

band as a 737. Under capacity purchase agreements, the mainline carriers must fly to the same rules, so, effectively, 45% of the global RJ market is impacted.

“At the inception of the MRJ 90 version and the Embraer E190 it seemed there might be some relief, but it’s still in place to this day and there’s no indication it’s going to change any time in the near future.

“So Mitsubishi took another look at its strategy and decided to relaunch with a new product category called the Mitsubishi Space Jet.”

Haro indicates the MRJ90, now called the M90t, will be delivered to ANA in 2020. However, the MRJ70 has been completely redesigned into a new aircraft, called the M100, and aligned to the scope clause requirements in North America.

“Although it is scope clause compliant, it is not scope clause limited. There are

multiple configurations and flexibility in the M100 that allow it to be profitable from 65 to 88 seats, for example, in Canada and Europe.”

In the light of Mitsubishi’s recent acquisition of the Bombardier regional jet programme, Haro continues: “In the process of getting 76 seats to be efficient at 86,000lbs MTOW, we made significant changes to the design of the aeroplane.

“We shrank the cargo area to accommodate more seats and to do that we had to create the all new cabin interior – fully developed by Mitsubishi Heavy Industries and Zodiac (now owned by Safran) – that’s a generation beyond the Bombardier C Series.

“What this new interior does is allow every passenger to bring a roller bag into the aircraft, even on an 88-seat configuration.”

The design philosophy was driven by two major objectives, explains Haro:

“The first objective was to deliver a significant step change in performance over current generation regional jets, which are really victims of very much older designs, and by starting with a clean sheet design we were able to deliver double digit economic performance improvements over today’s regional jets.

“This is significant: it helps enable many routes that were deemed unprofitable to become profitable, returning a travel service to communities that were ignored and no longer serviced, thereby bringing economic opportunity and growth to these communities.

He says the second objective was to change the industry paradigm: “When it comes to regional air travel, the passenger experience has not improved. Mitsubishi wanted to return respect to the passenger, and therefore the design led to the largest cabin of any regional jet. It is the widest cabin, and offers more personal space than

45%

THE LARGEST MARKET FOR REGIONAL JETS IS NORTH AMERICA, AT 45% OF THE TOTAL, AND THE US REPRESENTS THE LARGEST PORTION OF THAT

FIRST FLIGHT

On 18 March, Mitsubishi Aircraft Corporation completed the first flight of Flight Test Vehicle 10 (FTV10), the first Mitsubishi SpaceJet M90 in final, certifiable baseline configuration. FTV10 took off from the Prefectural Nagoya Airport and carried out basic aircraft performance tests in normal operating conditions over the Pacific Ocean over approximately two hours of flight.

With the completion of FTV10’s first flight, Mitsubishi Aircraft Corporation is prepared

to enter the final phase of certification flight testing for the SpaceJet M90, the first commercial jet manufactured in Japan. In coming weeks it plans to continue flight tests on FTV10 in Nagoya, as well as prepare for the ferry flight to Moses Lake Flight Test Center (MFC) to join the remainder of the Mitsubishi SpaceJet M90 test fleet for the final phase of type certification flight test.

Hisakazu Mizutani, President of Mitsubishi Aircraft, said: “I am very pleased that FTV10, which was handed over from Mitsubishi Heavy Industries in January this year, successfully conducted its first flight today. I would like to express my deepest gratitude to all those who are continuously

supporting the program. We are excited for this latest step in the certification of the Mitsubishi SpaceJet M90.”

Alex Bellamy, Mitsubishi Aircraft’s Chief Development Officer, added: “Today’s announcement is especially encouraging, as it marks the start of certification flight testing for the first SpaceJet M90 in final, certifiable configuration. We are all proud of this accomplishment, which reflects the hard work of a dedicated team, the culmination of an organisational transformation and all of the engineering changes made since 2016. We look forward to continuing progress toward commercial certification of the M90 program.”



“The market timing and entry of these Spacejets is ideal”

STEVE HARO

VICE PRESIDENT, HEAD OF GLOBAL MARKETING AND STRATEGY

any regional, and wider seats than any mainline aircraft, including single-aisles, like the 737 and A320.”

Haro says that the 18.5in seats in the Spacejet’s economy class are a demonstration of this respect and points to early sales successes, including an MOU with an unnamed north American carrier for 15 M100s, signed at the Paris Air Show, and an order for up to 100 aircraft, signed by Mesa Airlines at the RAA North America in Nashville, which would see the Spacejet flying for American Airlines or United.

“So, we just got started in June and we are seeing tremendous industry response to the products – we are in talks with airlines in Europe, North America and Asia-Pacific.”

The company is also hopeful of converting Trans States Holdings’ cancelled order for 100 M90s – 50 firm and 50 options – into a new order for the scope clause-compliant M100. The original order was cancelled at the end of October, but Mitsubishi was confident that discussions would continue regarding a potential order for the M100 product.

Haro continues: “We are also looking at ways to fine tune some of the final design elements, based on customer feedback and market research, targeted at 2023.

“We think that the 2023-24 timeframe is going to see the beginning of replacement of older regional jets, as somewhere around 600 of these are going to reach the age of 20 years, so the market timing and entry of these Spacejets is ideal.”

Turning to the acquisition of the Bombardier CRJ programme, Haro says this will significantly enhance the global network infrastructure and capabilities. “This is incredibly important, because airlines live and die by the reliability of the aircraft they are flying and what makes an aircraft valuable to an airline is not just operational efficiency – it’s important to have the highest reliability, which directly impacts utilisation.

“Regional jets typically have between eight and ten flights a day compared to single aisle mainline aircraft, which typically operate four to six flights a day. Higher utilisation means it’s ever more critical that the aircraft is ready to go and depart on time.”

In summary, he believes Mitsubishi is bringing the only clean sheet all new design to the regional market and, as a result, airlines are going to experience enhanced profitability from digit economic advantage over today’s jets, as well as higher utilisation and an improved passenger cabin experience. ❶



Asia Pacific

The aviation industry in Asia Pacific is rapidly expanding but airlines in the region are seeing low profits. What is causing this? *Satu Dahl* examines the market in the region

Analysis by Lufthansa Consulting shows that the overall market average yield has dropped by 30% in the last 10 years on all segments in and to/from Asia Pacific region. Talking to Lufthansa Consulting's Managing Director and Head of Market Asia-Pacific Dr Andreas Jahnke, Managing Consultant Karel Sucha, and Associate Consultant Wasiq Khurshid, some of the reasons behind this become

clearer – the market is facing an increase of capacity deployment and new aggressive low-cost competition.

The declining yields create pressure on profitability, as legacy carriers are not able to optimise their cost on the same scale. “On the commercial side, legacy carriers are experiencing challenges to adapt their commercial practice to the new market conditions. On the contrary, the local LCCs are still in the process of improving and trying to master their commercial strategies and more sophisticated commercial processes.”

There are other factors too. In May, AAPA, a trade association for scheduled international airlines based in the Asia-Pacific region, revealed that the aggregated net earnings of Asia Pacific airlines halved in 2018 to a combined US\$4.7 billion from the US\$9.6 billion recorded in the previous year. According to AAPA, continued expansion in the global economy underpinned further growth in air passenger and air cargo markets, but airlines faced an increasingly challenging operating environment, marked by significantly higher jet fuel prices, adverse currency movements and rising pressures on non-fuel cost items.

The low-cost sector

So, while the Asia Pacific region has seen strong growth in passenger demand, Lufthansa Consulting says the main challenge airlines face is ‘being ready’ to make use of the growing demand which is particularly relevant to LCCs given the comparatively lower margins of the model, the importance of cost discipline and the reliance on higher volumes. The company also sees infrastructure constraints and issues on the supplier side among key challenges that LCCs are likely to face in the coming years. “Many airports in the region will be pushed towards their capacity limits in the next few years, which calls for significant additional investments.” While a few countries and major airports in the region are investing into additional capacity, many are still lagging behind. This implies that airlines, may not be efficient in making the most of the additional air

Inefficient facilities at secondary airports in the region limit Asia Pacific's LCCs flying to them

Manufacturers' view

Aircraft manufacturers are naturally very active in the region, with Airbus recently introducing its A220 single-aisle aircraft to a wider segment of the air transport markets in Asia Pacific.

Embraer also recently completed touring the region. "Over the last 13 months, we had three demo tours in the Asia Pacific region for the E190-E2 and the E195-E2, taking us across almost 20 countries in the region. Our aim was to give our customers and prospects a closer look at the features of the E2 that make it the world's most efficient single-aisle jet," Cesar Pereira, VP Asia Pacific, Commercial Aviation at Embraer explains.

Air Kiribati will be the region's first E190-E2 customer, and this aircraft will enable the airline to fly longer domestic and international routes than it currently does with its turboprop fleet, Pereira says. "Market dynamics in each country in Asia Pacific are different. However, we believe that there is a strong relevance for the E-Jet in many markets given its

handlers in the region. "A few LCCs and regional carriers have already had to push back on their expansion. Malindo Air, for instance, stated in 2018 it had to push out some of its growth plans due to insufficient resources on the supplier side." Apart from restricting expansion, insufficient resources also affect the ability of LCCs to have quick aircraft turnarounds, which is important to maintain the desired production levels.

Similarly, pilot shortages are going to be more of a problem in Asia Pacific, Jahnke, Sucha and Khurshid explain. Many airlines in the region have been ambitious with their fleet expansion, leading to a high requirement for crew in the region. "A shortage of crew could lead to ineffective utilisation of resources in the near future, and may choke the growing demand in the market. For example, one of the biggest budget airlines in the region, IndiGo, has had difficulties in crewing their fleet in the past couple of years leading to several flight cancellations."

traffic demand in the region over the next years, Jahnke, Sucha and Khurshid note.

Another infrastructure issue they see is the development of secondary airports which have been key in successful LCCs around the world. Inefficient facilities at many of the secondary airports in the region limit Asia Pacific LCCs flying to these airports, and restrict the development of a stronger cost base while expanding their networks.

On the supply side, issues with fuel prices have had a strong impact on the balance sheet of LCCs and, while this is a global concern, airlines in Asia Pacific that have seen comparatively lower profit margins are particularly affected, Jahnke, Sucha and Khurshid state. Also, the concern is more relevant to LCCs with long-haul ambitions, of which there are a few in the Asia Pacific region. Furthermore, there are reported shortages of resources for ground



Embraer's E195-E2 TechLion on a demo tour of Asia Pacific

PHOTO: EMBRAER



Left: ATR-32950MD has had great success with regional airlines including Air New Zealand

PHOTO: ATR

exceptional economics and efficiency, greater operational flexibility and unmatched passenger comfort.”

ATR’s Vice President of Marketing Zuzana Hrnkova says that ATR’s sales in the Asia Pacific region are going strong. The region represents ATR’s largest market and accounts for more than a third of the entire ATR fleet. “The ATR has been shown to be the right turboprop aircraft for regional airlines in Asia Pacific with great success at Lion Group, Cebu Pacific, Air New Zealand, Bangkok Airways, Japan Air Commuter, Mandarin Airlines and many others.”

However, there are challenges in the market. Hrnkova says that there is some disruption from ongoing trade discussions as well as correction in currency exchange rates. To enhance economics for its customers, Hrnkova says ATR continuously evolves its product to introduce key innovations that deliver real value to customers.

“Naturally, over such a large and diverse region, we have airlines with a wide variety of needs and we need to make sure we deliver them the most comprehensive support,” Hrnkova explains, naming some examples such as state-of-the-art avionics and the ClearVision™ system that uses an external camera to display an augmented outside-view in real-time to a head-mounted visor.

Pereira says that the main challenge for airlines in Asia Pacific is to achieve

3.0%

INCREASE

AAPA’S TRAFFIC FIGURES FOR SEPTEMBER SHOWED THAT THE REGION’S AIRLINES CARRIED 29.1 MILLION INTERNATIONAL PASSENGERS IN SEPTEMBER, AN INCREASE OF 3.0%

sustainable growth while opening new routes. Many airline players are competing on the same routes, leading them to compromise yields in order to fill the capacity on their large narrowbody aircraft. “We believe that incorporating aircraft of up to 150 seats will enable airlines to exercise flexibility across their network, adding new routes and frequency especially to secondary or tertiary cities.

“In addition, these are routes that can potentially bypass the major metro airports such as Manila, Jakarta, Bangkok, New Delhi and Mumbai which are heavily congested. This enables airlines to achieve sustainable growth without being constrained by infrastructure bottlenecks, while offering passengers improved services with more non-stop flights,” Pereira adds.

Potential for growth

AAPA’s traffic figures for September showed that the region’s airlines carried 29.1 million international passengers in September, an increase of 3.0% compared to the same month last year. AAPA’s Director General Andrew Herdman noted that the moderation in growth compared to the higher rates sustained over recent years reflects an increasingly challenging economic environment. “Operating conditions are challenging for Asian carriers, which face intense competitive pressures against a backdrop of moderating economic sentiment. Nevertheless, airlines are carefully managing capacity expansion, exercising cost discipline and streamlining operations in a bid to maintain profitability.”

Hrnkova says there is still significant growth potential in Asia Pacific. “Our forecasts predict that this market will need nearly 750 aircraft before 2038. These new aircraft will primarily be used to support more than 400 new routes which will be created in the region during this time. ATR aircraft are proven route openers, opening, on average, more than 100 new routes a year. A significant percentage of these new routes tend to be in Asia Pacific.”

Meeting demand

Lufthansa Consulting’s Jahnke, Sucha and Khurshid note that more than 50% of the 4.5 billion additional travellers in the coming 20 years will come from Asia Pacific with a dominance of countries such as China, India, Indonesia and Thailand. “We expect this will mainly be driven by LCCs, increasing the pressure on the legacy carriers. Some of them may need to re-evaluate their business model fit to the market and come up with LCC defense strategies. New long-range narrowbody aircraft will open up new niche routes and, finally, the regulatory environment and traffic rights restrictions may be loosened to allow even more competition.”

Embraer’s Cesar Pereira encourages airlines to act differently: “Incorporating aircraft of up to 150 seats, such as our E-Jets and E-Jets E2, to their fleet mix will enhance capacity discipline, enabling a better match of capacity to demand, higher revenue per available seat kilometre and lower operating costs.”



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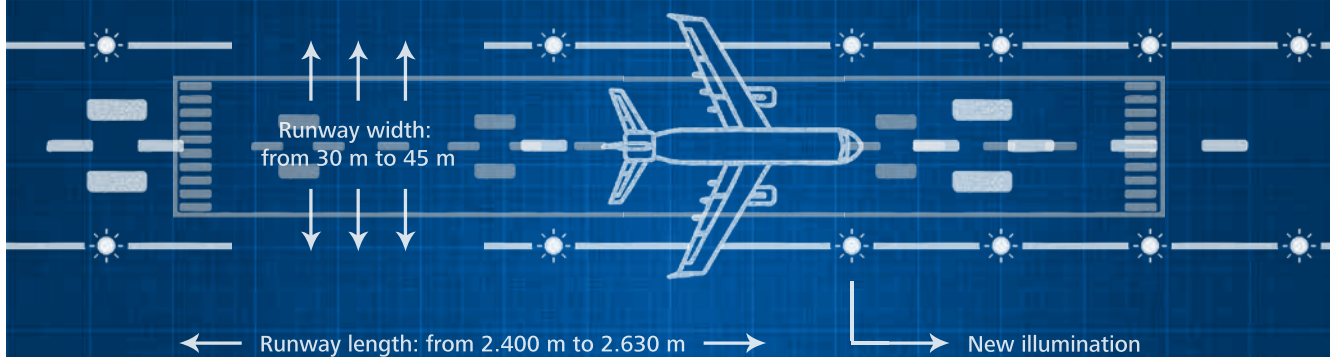


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Ground handling BLUEPRINT

Airlines are increasingly outsourcing logistics expertise for ground handling at major hubs, and it looks likely that these partnerships will extend even further

Fast turnaround times and on-time performance are crucial elements of ground handling operations – none more so than for low-cost carriers, where competition is intense and customer satisfaction levels are highly sought-after. Therefore, finding the right ground handling partner can make all the difference in achieving the best operational performance.

OmniServ, part of ABM, provides a range of airline and airport assistance services to airports across the UK. In addition to passenger services, portering, bussing and coaching solutions, security, check-in and baggage handling, aircraft services and cleaning, the company has spread its wings over the last few years to deliver a combined above- and below-wing service approach by setting up a dedicated Blue Handling team in partnership with low-cost airline Ryanair.

Blue Handling at Stansted

Ryanair is the largest carrier at London Stansted, with a team of more than 13,000 aviation professionals. In 2017, it became the first European airline to have carried over 1 billion customers.

In 2018, Ryanair identified an opportunity to improve its ground handling operations and service at Stansted. After putting the contract out to tender, the airline selected OmniServ to replicate this same model and work together to deliver a bold new vision.

In just three months, OmniServ worked with the local Ryanair team, headed up by Chris Hughes, to develop and implement the new 'Blue Handling' operation, with nearly 1,000 staff. Just over half came over from the previous supplier under TUPE regulations, while OmniServ recruited another 450.

Rob Stefanovic, OmniServ's Senior Commercial Manager, and Kate Newcombe, Head of Aviation for OmniServ at Stansted, were tasked with launching Blue Handling. Newcombe observes: "We had to retrain everyone, and recruit a new management team for OmniServ's operations at Stansted.

Stefanovic adds: "We drew up the plans for the new company and how we

13

T H O U S A N D

WFS HAS PROVIDED
PASSENGER AND BAGGAGE
HANDLING SERVICES AS WELL
AS RAMP HANDLING FOR 13,000
EASYJET FLIGHTS A YEAR

were going to get it up and running in just three months, and then organised all the welcome sessions, the uniforms, the training, the equipment and everything.”

Working hand-in-hand with both companies’ teams stationed out of the same offices at Stansted, OmniServ developed a new brand identity, logos and uniforms – previously, there had been no single corporate identity for Ryanair’s Stansted ground handling operations.

At the same time, Ryanair invested significantly in equipment including vehicles and technologies that improved the employee and passenger experience.

Despite only launching in February 2019, the operation is already delivering service levels with a 90% improvement on performance and satisfaction levels compared with a year ago. It has also had a significant impact on staff engagement.

“We wanted to win the hearts and minds of all employees, old and new, by delivering an extensive staff engagement programme that really sold them on the brand and got them feeling pride and passion again,” says Chris Hughes, Base Manager Stansted for Ryanair.

The significant investment Ryanair put in to the training included putting two trainers on both front and back of house on every shift, more resources for on-line training, ramp staff receiving refreshers on new equipment, and cross-training between OmniServ and Ryanair.

Rising to the challenge

Running such a large-scale operation doesn’t come without its challenges. External factors beyond the control of the

airline mean that often ground handlers need to react quickly and adapt to ensure as little customer disruption as possible. Ryanair’s Operations Director Adrian Dunne cites one instance where severe weather disruption with thunderstorms over England saw many cancellations and aircraft and crews usually based elsewhere stuck in Stansted.

“I was delighted at how Blue Handling rose to this challenge with 18 ticket desks opened to assist passengers. Team members from all areas pitched in, and all the bags were delivered on time,” says Dunne. “These efforts helped keep the level of cancellations to a minimum, with compliments from Stansted airport on how well Blue Handling had performed in such challenging circumstances.

“Blue Handling has been a major success, up and running very quickly, delivering above and beyond what we would have expected,” adds Dunne. An example of this included the dispatching of a dedicated ramp team to support the Gatwick operation over the summer.

Working as partners

OmniServ’s Rob Stefanovic says a range of factors is behind these huge improvements, including better working conditions, new equipment, increased staff morale, higher-quality management and training. But he also cites the closeness of the partnership.

“We used the model from a project we had undertaken with an airline in Gatwick to establish a totally transparent operation. People generally don’t mind bad news; it’s surprises they don’t like. You shouldn’t find out tomorrow that you’re short-staffed, you should know

**Blue Handling is
already delivering
service levels with
a 90% improvement
on performance and
satisfaction levels**

Left: Ryanair and OmniServ have teamed up to create Blue Handling
Right: Ryanair is the largest carrier at London Stansted.
All photos: Omni8serv



two or three weeks in advance and you should be planning together. This has been the ethos throughout this contract – partnership and trust and transparency.”

He says setting up Blue Handling for Ryanair has been one of the greatest successes for the business and, while it’s still early days, Stefanovic looks forward to further increased improvement levels.

Antony Marke, Group Managing Director for OmniServ comments: “We aren’t just stopping here – so we will be looking to duplicate this model at other locations with similarly minded low-cost and regional airline carriers.”

Growing trend

Ryanair’s partnership with OmniServ is one of just one of a handful of similar alliances in recent years. In 2017, easyJet signed a five-year agreement with DHL to provide ground handling services for the airline, and the scope of the operation is colossal. Over 900 DHL employees cover services from business support and baggage services to airside ramp and front of house. Also, some 480 pieces of ground handling equipment were brought in by DHL to cater to the airline’s needs including 30 electric pushback tugs.

DHL also announced the management of easyJet’s ground handling operations at Manchester and Bristol airports in addition to London-Gatwick.

Around the same time, Worldwide Flight Services (WFS) was awarded a five-year ground handling contract by easyJet for its operations at Edinburgh Airport. Since November 2018, WFS has provided passenger and baggage handling services as well as ramp handling for 13,000 easyJet flights a year. **✎**



Counting the cost

ERA Director General Montserrat Barriga speaks exclusively to *Satu Dahl* about the impact the EU261 passenger rights regulation is having on the European regional airline scene

EU261, a controversial EU law which sets out the rules for compensation and assistance to passengers affected by cancellations and delays of more than three hours, represents a considerable burden for carriers. To highlight the negative impact of the regulation, ERA (European Regions Airline Association) has published a study on how EU261 has affected its airline members. The study also raises concerns for aviation safety.

ERA's Director General Montserrat Barriga begins by explaining how smaller airlines especially have felt the impact. "ERA has long recognised that regulation EU261 bears significantly more heavily on our members – small and medium-sized operators offering regional connectivity – than on larger airlines. Compensation of as much as 10 times the paid fare is clearly unbalanced and unfair.

"This constitutes an essential risk of airline failures at a time when they face highly volatile cost positions, such as fuel," Barriga continues, adding that the regulation has already put airlines out of business and had a massive impact on regional economies.

Left: Passengers may find regional routes disappearing **Right:** Monsterrat Barriga champions the rights of small and medium-sized operators



Biased results

Reducing competition does indeed have an effect on airline customers, and Barriga says EU261 is causing direct and tangible damage to the range of services available to consumers. "Our members have reported cancelling or reducing services with a high probability of flight delays, whether due to a potential long taxi at the airport, air traffic control strikes, heavy traffic routes or overloaded airports – basically, any instance where the disruption on a route outweighs any economic return.

"Flights are also being cancelled more readily to protect subsequent flights from delays to mitigate overall exposure to compensation claims." Regional air fares are being forced up and, in some cases, the number of airline employees has been dramatically reduced, Barriga explains.

The European Commission proposed a revision of EU261 in 2013, including proposals to reduce the more costly aspects for carriers. However, it has languished, so the European Commission commissioned a further report by the Steer Group consultancy. However, this report did not include any regional carriers as part of the in-depth case study. "There is influence from those with interests in maximising short-term compensation rather than long-term European cohesion and regional connectivity, therefore the outcome would be biased," Barriga adds.

On the issue of safety

In addition to the financial impact, EU261 regulation is causing safety issues. "Aviation accidents and incidents are extremely rare; however, if they do occur,

investigators find contributing factors, conditions, decisions or behaviours, each individually innocuous, lead to bad outcomes when combined," Barriga says. "Humans respond to pressure, make judgments based on their perceptions, are immersed in cultures and will take risks if they perceive the rewards or penalties outweigh the risks, so behaviour and strategies of the crew can be influenced, consciously or subconsciously.

"This pressure on airline finances directly and indirectly on pilots and crew members has only increased with EU261, and therefore we believe Regulation EU261 has eroded safety standards, causing a safety threat," Barriga explains.

Threat to connectivity

Then, of course, there is the issue of reduced connectivity. "Connecting Europe's citizens with remote regions and cultures is what aviation does best, especially in the case of ERA airline members that reach even the most distant and remote locations. There has been strong growth in direct connectivity in the last decade with an increase of 29.7% and the connectivity provided by aviation not only supports Europe's local economies in a quick and efficient manner; it spurs investment and growth among the businesses and communities along the way."

Barriga says the regulation is not looking out for passengers' best interests in the long run. "Some ERA members are already abandoning routes that are not profitable, including subsidised public service obligation (PSO) routes, so customers will begin to see routes they depend on decreasing or disappearing altogether," Barriga explains. As a sensible route going forward with the regulation, Barriga recommends that the Commission should consider if EU261, as

"Some ERA members are already abandoning routes that are not profitable, including subsidised PSO routes"

PHOTO: ERAA



it stands, is really fit for purpose.

"Reflecting on cohesion, competition, connectivity and safety, for ERA's members it would appear not. EU261 threatens to decimate the regional airline industry; it is anti-competitive, unfair to regional carriers, and is not fit for the purposes for which it was intended."

To achieve those purposes, and to preserve regional aviation, ERA has included recommendations within its study for the Commission to consider as part of their review. This includes operators with an annual passenger load of 2.5 million or less in the preceding year being subject to reduced compensation of 50%, and that there should be a complete exoneration from compensation on PSO routes, subsidised or regulated, to avoid reduction in connectivity.

Also, a cap on the liability towards passengers limited to the proportion of the airfare that the operator bears – that is, compensation per flight and not per journey – is recommended, as is extraordinary circumstances accounting for the whole flight programme for the day to acknowledge the knock-on effect on subsequent flights. ERA also recommends that there should be a complete exoneration if delays or cancellations arise for any safety-related reason and says that, to allow an airline enough time to perform all the necessary operational checks, the time threshold should be extended from three to five hours. Finally, ERA notes that an airline incurring costs and expenses as a result of the application of the regulation should not be prevented from recovering such costs and expenses by any contractual provision excluding or limiting liability. **●**





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Going places

Angus Mackay and Stuart Rubin from ICF analyse the Chinese-built COMAC ARJ21 in the increasingly crowded regional jet market

The Advanced Regional Jet ARJ21 is a twin-engine regional jet intended for the Chinese market, developed by AVIC I Commercial Aircraft (ACAC), now Commercial Aircraft Corporation of China (COMAC), based in Shanghai. The ARJ21 is intended to satisfy the growing demands of the Chinese aviation market with a seating capacity ranging from 70 to 105 passengers in two variants, the baseline ARJ21-700 seating 70-95, and the stretched ARJ21-900 accommodating 95 to 105.

The ARJ21-700 is offered in two variants, a baseline model and an extended range (ER) variant with increased operating weights and a range extended by 800nm. Other variants include the ARJ21F 10-tonne freighter carrying seven LD7 containers and an ARJ21B 20-passenger VIP version, developed in association with Fokker Services.

PHOTO: COMAC



PHOTO: AJM

Left: The ARJ21 made its first commercial flight in 2016 **Below:** The ARJ undergoes a crosswind test.

The aircraft performance design criteria are intended to meet the diverse and demanding conditions in China and, while superficially resembling the McDonnell Douglas MD90 with which it shares manufacturing tooling, the aircraft features a new Antonov-designed supercritical wing with winglets and General Electric CF34-10A turbofan engines which also power the Embraer E190/195 aircraft families.

Other components from Western manufacturers include Rockwell Collins Pro Line 21 avionics, Honeywell fly-by-wire systems, Liebherr Aerospace landing gear, and Parker Aerospace flight controls.

A launch order was received for 35 aircraft from Shandong Airlines (10), Shanghai Airlines (5) and Shenzhen Financial Leasing (20). GE Commercial Aviation Services (GECAS) has placed a firm order for five ARJ21-700 regional jets and 20 options.

Initial deliveries were expected by the end of 2011, but significant flight test delays occurred, delaying Chinese certification with initial deliveries not occurring until 2015 and the first commercial flight following in 2016.

Although Western certification has been sought and a sales and leasing presence is planned for Europe and the USA, significant orders and fleet establishment are not expected outside of China as the aircraft was already dated when it entered service, especially compared to newer types such as the Bombardier CRJ900, the Mitsubishi M100 SpaceJet regional aircraft, and

Embraer's E175 E2 re-winged and re-engined jet. There is an active programme to cut drag and lighten the ARJ21-700, which is reputedly 15% heavier on a per-seat basis than its competitors, and to incorporate several design improvements as the ARJ21-700+ relaunching around 2021. Further development of the mooted ARJ21-900 stretched variant is not anticipated until 2021.

COMAC has delivered 16 aircraft to two Chinese operators – Chengdu Airlines (13), a COMAC subsidiary, and Genghis Khan Airlines (3). At this point, COMAC reports 596 ARJ21-700 orders from 22 customers, the most recent being 35 ARJ21-700 orders

each from Air China, China Eastern Airlines and China Southern Airlines in 2019 at a catalogue price of \$38 million per aircraft, although the carriers noted large price concessions on their orders. Deliveries are to take place from 2020 through 2024.

To date, there have been no orders for the proposed larger ARJ21-900 variant. Orders are dominated by Chinese operators and lessors, although Congo and Lao Airlines prove the exception. Production capacity is expected to reach 30 aircraft in 2020 following completion of a second assembly line at Shanghai Pudong. Its widely reported that Ghana-based carrier Africa World Airlines may take up an order.

COMAC forecasts a Chinese market requirement of 6,119 aircraft in the 120-200 seat range over the next 20 years, of which 950 regional jets will be of a similar size to that of the ARJ21. The current regional jet manufacturing base is largely restricted to Embraer and Bombardier, which are jointly responsible for over 86% of the regional jets operating in the world today. Further competition for the ARJ21 as a potential entrant in those markets is likely to stem from the Russian Sukhoi Superjet 100, and the Japanese Mitsubishi MRJ SpaceJet which is also offered in 70 and 90-seat variants.

These factors will militate against the widespread Western orders necessary for overall global programme success, and until COMAC can demonstrate reliable and economic in-service performance as well as the robust global service/support networks and availability of asset-based financing that Western airlines have come to expect.

Indeed, some industry observers suggest that the ARJ21 programme is merely a learning bridge for COMAC, particularly in automated production systems, to its larger COMAC C919 which will compete with the Airbus A320neo and Boeing 737 MAX aircraft, and to the CR92, formerly known as COMAC C929, a planned long-

range 250-320-seat widebody twin-engine aircraft family. The CR92 is to be developed by CRAIC, a joint-venture between COMAC and United Aircraft Corporation (UAC) of Russia. With three aircraft programmes to manage, COMAC may well choose to foreshorten the ARJ21, prioritising the C919 in the medium term. **1**

**COMAC forecasts
a Chinese market
requirement of 6,119
aircraft in the 120-200
seat range over the
next 20 years**



FLYING FREE

The introduction of mandatory ADS-B Out next-generation is here.

Stan Abbott looks at the compliance process so far

The USA's Federal Aviation Administration (FAA) from January 2020 heralds a new era in air traffic management.

From 1 January 2020, an FAA mandate came into effect, requiring all aircraft operating in controlled airspace to be fitted with Automatic Dependent Surveillance – Broadcast Out (ADS-B Out) equipment.

In a nutshell, this means that each aircraft must constantly and automatically transmit its position, speed and altitude, bringing a quantum leap in safety in the skies and comprising the first brick in the building of next generation air traffic management.

The FAA explains: “ADS-B Out works by broadcasting information about an aircraft's GPS location, altitude, ground speed and other data to ground stations and other aircraft, once per second. Air traffic controllers and aircraft equipped with ADS-B In can immediately receive this information. This offers more precise tracking of aircraft compared to radar technology, which sweeps for position information every 5 to 12 seconds.

“Radio waves are limited to line of sight, meaning radar signals cannot travel long distances or penetrate mountains and other solid objects. ADS-B ground stations are smaller and more adaptable than radar towers, and can be placed in locations not possible with radar. With ground stations in place throughout the country, even in hard to reach areas, ADS-B provides better visibility regardless of the terrain or other obstacles.”

But as the countdown to the deadlines looms, is everyone prepared? Not so, says Michael McDowell, Marketing Manager for ComNav and Surveillance

for Commercial Aviation at Collins Aerospace, based in Iowa.

McDowell says that Collins Aerospace is responsible for the communications and navigation equipment on board about 35% of the commercial aircraft flying in the USA; about 30% of those flying in Europe; and 40 to 45% of those in Asia-Pacific.

“In air transport, there are about 20,000 aircraft flying at any one time and we have probably supported ADS-B Out on maybe 8,000 of these aircraft,” he says. “I would say that, from a US perspective, I would expect about 80% equipage by 1 January,” he continues.

He says most of the large operators have been very proactive in equipping, but a lot of small operators have been reluctant to move forward and are now scrambling for compliance: “I fully expect that we will see continued equipage throughout 2020.”

McDowell has only limited sympathy for operators that have failed to get up to speed with the mandate. “The FAA position has been pretty firm for a long

time. They feel like they announced this mandate 20 years ago and they feel like they gave the industry more than enough advance notice and, on top of that, they have accomplished everything that they promised – all the ground and associated infrastructure has been done. They feel they have done their part.”

Furthermore, similar requirements will follow in Europe (EASA) later in 2020, while many more jurisdictions are expected to follow suit in the coming months.

That does not mean to say that operators who have failed to comply will be grounded on 1 January. “I think the FAA is going to have to be somewhat flexible. But I think they also won’t be reluctant to contact these operators, and rightly so.”

Collins Aerospace offers a number of different transponders for both the main line and regional sectors, and for both OEMs and Supplemental Type Certificated aircraft (STCs.)

“It all comes down to aircraft level certification and we essentially have two product lines – for larger commercial aircraft like Boeing and Airbus, and for regional and business jets and turboprops,” explains McDowell.

McDowell is not the only person to identify a last-minute panic among operators. At British Aerospace, which supports types including the Avro RJ series, George Wadrope, Regional Aircraft (External), says: “Due to the mandated dates (January 2020 for the

ADS-B provides better visibility regardless of the terrain or other obstacles

FAA and June 2020 for EASA), 2018 and 2019 have been challenging from a timeframe viewpoint.

“Additionally, pursuing some aircraft operators to ensure that their related requests are submitted within the necessary timeframe to ensure availability of equipment and associated design and service bulletin instructions has brought about some challenges.”

And Ronald Moyer, Director of Technical Acquisitions at AerSale, the US-based global used aircraft leasing, maintenance and support company, adds: “AerSale is one of several companies that offer a solution to the ADS-B Out mandate. There is a very important note of understanding concerning ADS-B Out, which is that the FAA is not the only aviation authority in the world that has mandates for ADS-B Out capabilities, so yes, AerSale has seen additional requests from customers as the deadline of the FAA comes closer.

“Additionally, since AerSale is an STC holder of an ADS-B Out solution on various transport category aircraft, which have been validated by various other aviation authorities around the world, we also are experiencing higher levels of requests from operators outside of the FAA.”

Installation of the new equipment needs not be complex or too time consuming. “Most of these aircraft already have a multi-media receiver and they all are required to have a transponder, so really the installation is as simple as replacing the transponder with a compliant one and ensuring it receives position data from GPS by wire,” says McDowell. “The installation on aircraft without a multi-mode receiver is a little more complex.”

Moyer adds: “Our AerTrak solution is classified as a simple installation and can be accomplished in four to six days, depending on the airframe type. It can be performed in the hangar or on the ramp with standard aircraft tooling, ladders, access stands and test equipment. We offer a fully FAA-approved installation kit, installation data package and, if requested, a highly experienced installation team to perform the modification at the customer’s location.”



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An unprecedented view of aircraft traffic allows users to better understand and view congestion and patterns

BAE's Wadrobe says: "On our OEM aircraft types, the installation and testing is fairly straightforward for a suitably competent organisation – as is always the case, this is highly dependent on suitably detailed technical instructions, including service bulletins, wiring diagrams and so on."

At GKN Fokker Services, Erik Lous, Product Manager Modifications sees that, not surprisingly, their products vary per aircraft type. "For example, if a newer aircraft is already compliant concerning its GNSS (Global Navigation Satellite System) source, as well as elementary and enhanced surveillance, the modification could be limited to the installation of some wiring and new, or updated, ATC transponders. Older types may lack all of this, making the installation more complex and more expensive."

And Adam Moya, Senior Marketing and Product Management Director, at Honeywell Aerospace, says: "Most of our solutions are designed around a simple and integrative solution that in some cases can be plug and play, or may require a unit update with some minor wiring updates."

All ADS-B suppliers see the FAA mandate as no more than a first step on the road towards next generation air traffic management, bringing improved safety, alongside greater efficiency and reduced environmental impact.

McDowell at Collins Aerospace concedes that nation state borders in Europe have made it more difficult to implement the infrastructure there, but he nonetheless sees an unstoppable trend across the world.

"Once these aircraft are doing ADS-B Out, there is an opportunity for aircraft to get equipped with ADS-B In and receive information from all the aircraft around them, and use that to provide a more complete spatial awareness picture," he says. "So I hope the industry will move quickly to ADS-B In to take full advantage, probably in the next five to ten years. It would take that long for the infrastructure to be put in place and then the equipment. I know that the FAA has turned a lot of its attention from Out to In recently."



Unlike radar technology, which sweeps for position information every 5 to 12 seconds, ADS-B constantly receives data

20,000

IN AIR TRANSPORT, THERE ARE ABOUT 20,000
AIRCRAFT FLYING AT ANY ONE TIME

Moyer at AerSale adds: “As United States airspace becomes more saturated, solutions for direct routing, and solving the failing and ageing infrastructure of the old radar contact environment, are paramount to safer and cost-effective navigation within our airspace.

“As with any system, when safety is a fundamental building block and built in from the beginning, the result will be a system that operates in an economical fashion, while functioning at peak efficiencies and providing a safer environment for the traveling public.”

It’s a sentiment echoed by Wadrobe,

at BAE: “I believe that the industry-wide thoughts are that ADS-B Out will undoubtedly improve aviation safety as a whole, not just in the regional and narrowbody sector, due to the improvement to situational awareness provided by broadcasting your aircraft’s position, altitude, velocity and identity, along with other relevant information, not only to air traffic control, but also directly to other aircraft.”

Erik Lous, at GKN Fokker Services, also sees ADS-B In as an imminent next step: “It is essential that all

aviation operating in the same airspace use ADS-B Out in due course – not only regional and narrowbody aeroplanes, but also all airspace users. It also opens the road to ADS-B In.”

Honeywell’s Moya sums it all up: “The ADS-B mandate implementation is all about increasing the safety of the network. By enabling the situational awareness of the network, especially in congested areas, ADS-B means an unprecedented view of aircraft traffic at all times, and this in turn allows all users to better understand and view congestion and patterns.” **1**

Jörg Troester

Head of Corporate Strategy,
Industry and Government
Affairs, *Hahn Air*

Jörg Troester is Head of Corporate Strategy, Industry and Government Affairs at Hahn Air. With more than 20 years of experience in the aviation industry, he is an expert in the field of airline distribution and represents Hahn Air on the Board of Directors OF Universal Air Travel Plan as well as on the Board of the ERA. Jörg Troester holds an LL M in Commercial Law, an MBA in tourism and hospitality, and an MA in linguistics and media science.

Tell us about your job function at Hahn Air?

Working 13 years with Hahn Air, today I am the Head of Corporate Strategy and responsible for Hahn Air's strategic development as well as industry and government affairs. The strategy part of this role includes analysis and development of new business opportunities in all corporate divisions. Liaising with government and industry organisations requires me to travel a lot. I am also representing Hahn Air on various industry committees and at conferences and symposiums.

What is the best part of the job?

I enjoy working at Hahn Air. We have an experienced, motivated and diverse team in place with 300 colleagues from 30 different nationalities spread across the world. Their level of dedication is unique and inspiring. I am proud that Hahn Air this year has been awarded sixth place in an audit determining the best employers in Germany. The company never ceases to challenge and excite me, and I am looking forward to more challenges and excitements in the future.

What is the most challenging aspect of your role?

The airline industry is constantly evolving and changing. It is sometimes challenging to stay on top of all the developments happening, especially in airline distribution. There are so many new technologies, players and opportunities emerging. I believe this is challenging for everyone in the industry and that's why

PHOTO: HAHN AIR



our airline partners appreciate that we support them with our team of experts and analysis and explore trends and opportunities for them.

Hahn Air recently issued the first ticket on blockchain. What is the significance of this?

We are extremely proud that we were the first airline in the world to issue tickets via a blockchain-based channel. We were also the first to transport passengers holding blockchain-generated air tickets. We found an enormously savvy partner with the open-source travel distribution platform Winding Tree. Our goal at Hahn Air is to investigate and monitor the opportunities this technology holds for travel distribution, even if widespread acceptance is still a vision of the future.

Briefly, can you explain how blockchain works in airline ticketing?

As with NDC, there is no difference in the ticket itself, but in the processes that are used to create and issue the ticket. In short, blockchain technology is the basis for new distribution channels that connect an airlines' inventory (CRS) on one side with a travel agency, aggregator or distribution system on the other side. Winding Tree is currently the only blockchain-based travel distribution platform in the market.

With blockchain, the data is stored in a block that is added to a chain of data blocks, hence the name. All of these blocks are linked which makes it impossible to tamper with the data. To change the data, you need to

create a completely new block which documents the change forever. Before a block can be created, a complicated verification process validates the data and confirms that the sources can be trusted.

In addition, the blockchain is not owned by a specific player, it is spread across millions of networks, like a decentralised ledger. Due to these mechanisms, blockchain technology holds many benefits. It is open-source, so all market participants such as airlines, travel companies, hospitality distribution systems can easily connect and exchange transactions. The technology is also 100% secure. Another main benefit is that the blockchain creates security and trust, so it is easier for various types of companies to connect with each other.

In your view, what opportunities does this technology hold for travel distribution in the future?

All market participants, including the consumers, will ultimately benefit from a reduction in costs. Due to more companies being able to connect more easily, transaction fees are likely to be lower. And, as more companies can partner with each other more easily, there will be more travel options and more possible combinations for the passengers. Consumers can also book more travel services of different types through one single source.

Like NDC, blockchain technology holds the power to fundamentally change the face of airline distribution. Other applications are, for example, the distribution of ancillary services such as luggage, meals, and so on. And, as blockchain technology helps to connect different players and enables them to interact easily in a secure environment, it will ultimately foster the notion of seamless and ticketless travel.

With the ongoing research and development of blockchain in airline distribution, we will see many more use cases in terms of passenger experience and along the distribution chain in the future.



Hahn Air was the first to transport passengers using blockchain-generated air tickets.

PHOTO: ANDI WERNER



Hahn Air was recently awarded sixth place in an audit of Germany's best employers.

PHOTO: HAHN AIR

“Blockchain will ultimately foster the notion of seamless and ticketless travel”

When do you expect to see mass implementation of blockchain in ticketing, and will Hahn Air roll out the technology on the H1 network?

While we see the bigger picture and believe that blockchain will have a massive impact in the long run, we do not see a commercial perspective for Hahn Air for the immediate future. Our core business is, and will remain, supporting airlines to optimise and expand indirect distribution through the GDSs.

With the first blockchain-based ticket, we've established that we are ready to apply the new technology and that we have the technical capability to generate Hahn Air tickets through blockchain-based channels. We'll need to do further testing and will monitor the development of blockchain before we can offer this distribution channel to our partner airlines.

Do you foresee any challenges with blockchain implantation at Hahn Air or across the industry in general?

As with any emerging technology that promises great opportunities ahead, the challenge is not to be left behind. Airlines today are on a tight budget in a highly competitive environment, and it is almost impossible to assign resources to monitor every new development that is happening. That's why we at Hahn Air are constantly exploring new technologies, assessing their relevance for our partners and make sure that we can offer them solutions when the time is right. ❶



GETTING

SMART

Artificial Intelligence is set to become a standard part of operations across a wide spectrum of aviation applications.

Ian Harbison reports

Aviation is becoming ever more data driven, or, rather, it is collecting ever larger amounts of data as automatic recording becomes more and more common. As the data lake grows ever deeper, it is clear that analysing the numbers and turning them into useful information is beyond the scope of simple human intervention. Instead, engineers are turning to artificial intelligence (AI) and machine learning (ML) to help.

One of the leading applications is preventative maintenance, with systems such as Skywise from Airbus and AVIATAR from Lufthansa Technik. Early adopters like easyJet and Etihad Airways have made significant cost savings as components showing a deterioration in performance are removed and sent for repair, rather than waiting for a hard failure that is not only expensive to fix but also puts an aircraft at risk of grounding, with greater financial penalties.

The use of intelligent software agents, a series of modules containing data on a particular function, can be connected, which allows the running of 'what if' scenarios. The Aerogility system is being used by easyJet to forecast hangar and engine maintenance

ILLUSTRATION PHIL COUZENS

slots, but it also uses Amadeus SkySYM in its Operational Resilience Programme, which is designed to help the airline recover quickly from schedule disruptions. This covers every aspect of the operation, from crew rostering, aircraft allocation and even a compensation claims forecaster.

The same techniques can be applied to other parts of the industry, including airports. Knowing when an aircraft is due to arrive and at which stand means alerts can be sent to ground handling, line maintenance, cleaning and catering teams. As all the teams become connected, they can be selected by location, reducing the distance travelled.

In the air, there is an urgent need to develop more streamlined air traffic control environments, allowing aircraft to make more direct routings to reduce fuel burn and, hence, emissions.

The FLY AI Report has just been published by the European Aviation/ATM AI High Level Group (EAAI HLG), composed of key representatives from all aviation sectors. The aims of the report include bringing the concept of AI in aviation to a wider audience in the industry; identifying gaps and limitations to a broader implementation of AI; and accelerating and intensifying AI development and promoting its use in aviation, especially in air traffic management (ATM).

European airspace is dense, with 11.1 million flights handled in 2019, up 0.9% for the full year against 2018, but en route delays actually declined over the period by 8% to 17.5 million minutes of delay, generating an average delay per flight of 1.57 minutes. However, with average delays per flight 88% worse than in 2017, and with traffic forecast to increase steadily, the report says there is a real 'capacity crunch' facing Europe's crowded skies and congested airports.

AI can help by enabling better use of data, leading to more accurate predictions and more sophisticated tools, increased productivity and enhanced use of airspace and airports. By better understanding the extent of the challenges, AI will develop innovative responses based on non-straightforward correlations of parameters.

Of course, protecting the environment is high on the agenda as the European Commission aims for Europe to become the world's first climate-neutral continent by 2050. In the European Civil Aviation Conference (ECAC) area, in 2019 versus 2017, the number of flights grew by 4.54%. Aviation CO₂ emissions have grown by 9%, but excess emissions due to ATM inefficiency is roughly stable at 6%.

To reach the EU's carbon neutral goal by 2050, a disruptive, innovative and fundamentally different approach is needed. AI could make a real difference.

Given the number of aircraft flying at any one time, and with congested terminal airspace at major airports, one application for AI is conflict resolution, predicting where aircraft are at risk of collision. As for the aircraft, flying to

The 2019 ecoDemonstrator programme also included trials of an electronic flight bag application that uses next-generation communications to automatically provide rerouting information to pilots when weather conditions warrant, either to avoid storms or take advantage of favourable winds.

SITA is also heavily involved in AI at airports and predicts that passengers will eventually simply walk through the airport to the gate, being recognised by automated checkpoints and sensor corridors, making physical document checks obsolete. Their digital identity will be used by specialist AI functions to assess risk, and airlines will no longer be responsible for processing passenger data for border security purposes.

It also says everything will have tags – people, bags and cargo – with continuous tracking throughout the journey. This means travel authorisation and customs

As the data lake grows deeper, engineers are turning to artificial intelligence and machine learning to help

arrive at a waypoint at a precise time opens up the possibility of a smaller separation distance to other aircraft.

This will also expand the use of continuous descent approaches, where aircraft leave their cruise altitude on a trajectory bringing them to the airport at a reduced throttle setting, reducing not only fuel burn and emissions but reducing the noise footprint.

SITA has been working in collaboration with Honeywell to optimise the transmission of digital information between pilots, ATC and airline operations centres using Internet Protocol Suites (IPS). A series of trials have been carried out on Boeing's ecoDemonstrator, a 777 fitted out as a flying test bed. IPS could replace ACARS in the future, offering airlines commonality across mainstream communications channels, as well as next-generation network compatibility and enhanced security.

checks can be made in advance of the flight, saving time at the airport, while remote bag drop-off and collection could be offered wherever convenient.

A softer and increasingly common application of AI at airlines and airports is the use of virtual agents and chatbots, to provide a fast and personal service to customers. British Airways has gone a step further and is trialling fully autonomous robots from BotsAndUs in Heathrow Terminal 5.

They are programmed to interact with passengers in different languages using the latest translation technology to answer thousands of questions, including real-time flight information. Using geo-location technology and dozens of advanced sensors to constantly monitor a 360° radius, the robots will move around the airport terminal freely and safely, escorting customers to specific locations such as the airline's dedicated Special Assistance and Family Check-In zones. **1**

Sky is the limit

Airlines and training organisations are working closer to address the global shortage of pilots. **Keith Mwanalushi** looks at the extent to which these alliances are meeting airline needs

The race to train pilot cadets has shifted up a gear. In recent months, various training organisations and academies have announced new partnerships with airlines to counter the ongoing pilot crisis.

Experts at CAE say over the next decade, the civil aviation industry will need over 300,000 new pilots to support the increasing worldwide demand. CAE trains over 1,500 new pilots every year and works with airlines to come up with innovative solutions to develop and train better pilots more efficiently.

In October, CAE opened a handful of training facilities, initially at London Gatwick and Manchester in the UK and soon followed by another opening in Milan – all in partnership with easyJet.

Nick Leontidis, CAE's Group President Civil Aviation Training Solutions tells this publication that the new Gatwick, Manchester and Milan facilities are now ready for training.

CAE signed a long-term training contract with easyJet valued at more than C\$170 million over the next 10 years, a deal announced in November 2018.

50% of the pilots who will fly the world's commercial aircraft in 10 years have not yet started to train

"All of easyJet's pilots will train at CAE, resulting in the expansion of its training network to provide the airline with three new European pilot training locations, equipped with a fleet of CAE's latest XR Series flight simulators," Leontidis reports.

CAE will, in total, deploy 10 Airbus A320-family full-flight simulators (FFSs) and three flight training devices (FTDs) at these training locations: five A320 FFS and one FTD at Gatwick, four A320 FFS and two FTD in Milan and one A320 FFS in Manchester.

"We doubled the size of CAE Barcelona and added additional Airbus A320 and Boeing 737NG simulators, as well as classrooms and cabin equipment to support Vueling, Volotea and Norwegian," he continues. "We are investing more than £30 million pounds

to support our long-term agreement with easyJet."

Elsewhere, Turkish low-cost carrier Pegasus Airlines is also taking steps to ensure that its cockpits are filled. In November 2019, the airline signed an agreement with Ireland headquartered international flight school Atlantic Flight Training Academy (AFTA), which is based in Cork, to train cadets for their future careers as commercial pilots in 2019/2020.

The new pilot training partnership between Pegasus and AFTA will see successful student cadets fly AFTA's next generation Glass cockpit Cessna 172s for the initial phase of the flight training, followed by the Diamond Twin star DA42s for the advanced phases.

Speaking at the AFTA – Pegasus partnership announcement in Cork, Mehmet T Nane, the Pegasus CEO, said: "Generating employment in the sector has been among our main goals at Pegasus Airlines in recent years. In this context, pilot training programmes are of vital importance to us.

"As part of the pilot training agreement we signed with AFTA, an academy which has an impressive track record in training international pilots to the highest standards, our Turkish pilot

All of easyJet's pilots will undergo their training at CAE. Photo: CAE



candidates will be trained in Cork for around 18 months, which is a source of great pride for us.”

Back in the UK, L3Harris Airline Academy teamed up with regional operator Flybe to open applications for the 2020 Flybe cadet pilot programme. Flybe was seeking aspiring pilots to join their ambitious team and now L3Harris, in partnership with Flybe, will train cadets via a Multi-Crew Pilot Licence (MPL) route directly to the role of First Officer. The airline says the programme provides a fantastic opportunity for applicants to launch their airline pilot career.

The MPL is designed to develop the abilities needed to fly multi-crew airline aircraft. As the UK Civil Aviation Authority states, the aim of the integrated MPL training course is to obtain a multi-pilot licence and be trained to the level necessary to operate as co-pilot in a multi-engine, multi-pilot, turbine-powered commercial air transport aeroplane under

visual flight rules (VFR) and instrument flight rules (IFR).

Flybe has partnered with L3Harris for cadet pilot training over the past eight years. Successful applicants benefit from L3Harris's extensive experience in commercial pilot training. They are trained at L3Harris's global network of training centres utilising the latest generation of aircraft and flight simulators. Successful applicants also qualify for L3Harris's unique training Standard, which covers the cost of additional training, if required, to meet the high standards of the course. This offers cadets peace of mind, enabling them to focus on their training.

In October, IndiGo, India's largest LCC, announced a major fleet expansion and placed a firm order for 300 A320neo family aircraft, which according to Airbus, marked one of their largest aircraft orders ever with a single airline operator.

Not surprisingly, the Indian carrier is now ramping up training capacity. In November, Skyborne Airline Academy revealed that it had selected Asia Pacific Flight Training Academy Limited (APFTAL) India to conduct the US FAA to India DGCA Flight Licence Conversion (FLC) part of its IndiGo Cadet Pilot Programme.

Taking between four and six weeks to complete, this phase provides cadets with India airspace familiarisation training and a formal DGCA [India] flight training and tests curriculum in a Garmin G1000-equipped DA42 aircraft. Cadets are trained at APFTAL's facility in Hyderabad.

Lee Woodward, Chief Executive Officer at Skyborne, said: “We believe that APFTAL delivers a service which is akin to the high standards we are committed to at Skyborne. We have met with various institutions provide this type of training, but chose APFTAL for the quality of its facilities, its reputation



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MILLION

CAE IS INVESTING MORE THAN
£30 MILLION POUNDS TO SUPPORT
ITS LONG-TERM AGREEMENT
WITH EASYJET

and expertise. Furthermore, Hyderabad has a favourable climate for flight training, presenting cadets with optimal weather conditions. We are looking forward to welcoming our IndiGo cadets to APFTAL, taking them one step closer to realising their dreams of flying with India's premier airline."

CAE say they have led the industry in the creation of competency-based MPL programmes for more than 10 years. CAE's MPL, or competency-based programmes, are designed specifically for an airline and an aircraft.

"An aspiring pilot will be selected and mentored by the airline from the start of the programme," says Leontidis. He adds that the courses include aircraft-type-specific training on a full-flight simulator, and are followed by line training with the airline. "When the cadet successfully completes the course, he will then join easyJet as a co-pilot flying an Airbus A320 across Europe."

Meanwhile, Scottish carrier Loganair is another carrier that recently announced a pilot cadet training programme with CAE. This covers the Embraer ERJ145, SAAB 340 and SAAB 2000 and ATR 42/72 platforms. The new three-year pilot training contract with Loganair was announced during the 2019 European Aviation Training Symposium (EATS).

Leontidis reckons there is some element of truth that smaller regional airlines may be the most exposed to pilot shortages: "Sometimes it's true. Intuitively you might think that pilots would want to move from smaller airlines to bigger airlines, but these airlines have created environments that pilots enjoy, they are closer to their home and the pay is competitive.

"Typically, we see that when national flag carriers are recruiting, it impacts the surrounding airlines such as smaller regional airlines, but they aren't always impacted."

CAE and Loganair share a long-standing relationship of more than 15 years, with the provision of pilot training on SAAB 340, SAAB 2000, Dornier 328TP FFSs and most recently on the ERJ145 full-flight simulator. Under the terms of the new pilot training agreement, Loganair's pilots will train at various CAE European training centres including CAE Amsterdam, CAE Copenhagen, CAE London Burgess Hill, CAE Madrid and CAE Stockholm. "The demand for pilots has never been so high," Leontidis declares.

CAE trains aspiring pilots through its global network of aviation academies. Depending on the location, a range of training programmes are available. Interestingly, CAE also sources cadets and pilots from other academies. "We have a dedicated team that provides pre-employment support, guidance and advice to enable our graduates to gain their first professional flying job." CAE works with each student on an individual basis, matching their competencies with the needs of the airline. Leontidis says CAE addresses the staffing needs of airlines by matching the best pilots with the world's leading airlines. "Our aviation resourcing services support airlines during steady state operations and during phases of fleet expansion, or in seasonal peak



"The demand for
pilots has never
been so high"

NICK LEONTIDIS

CAE'S GROUP PRESIDENT CIVIL
AVIATION TRAINING SOLUTIONS

demands, and include the sourcing, contracting and recruitment of pilots. CAE offers training to experienced pilots sometimes and then contracts them to an airline. In other cases, the airlines can train the pilots. A good example of sourcing and providing training is with SAS Ireland. We offer type rating training, or an operator conversion course."

Going by CAE's figures, which state that 50% of the pilots who will fly the world's commercial aircraft in 10 years have not yet started to train, pilot cadets today really need a flying start. ❶

CAE and easyJet launch their training centre in Milan, one of a handful of new facilities Photo: CAE





Breaking Good

AerFin is generating good revenues from the sale of used serviceable material. *Ian Harbison* reports from Cardiff

AerFin has developed bespoke services ranging from whole aircraft and engine sale or lease, through to tailored flight-hour component support solutions covering Airbus A320 Family, A330/340, Boeing 737NG and Embraer E-Jet as well as CFM56-5B/5C/7B, RB211-524 and V2500-A5 engines.

BeyondAircraft offers complete aircraft services including end-of-life asset management for fleet transition, including fleet acquisition, sale and leaseback as well as aircraft consignment solutions to provide flexibility for airlines going through a fleet renewal programme.

Asset acquisitions also provide inventory for the company's Cost Per Flying Hour (CPFH) contracts. BeyondEngine includes purchasing and trading of commercial engines, with a focus on narrowbody and regional aircraft types. It also involves short to

medium-term engine leasing packages. BeyondComponents is run by the AerFin Airframe Service solutions unit located close to London-Gatwick Airport, offering the sale, exchange or loan of airframe rotatable components on a 24/7 AOG basis. These components are primarily sourced from AerFin's own tear-down activity, but inventory is also purchased from the market. The final service, BeyondPool, is based on fixed price component support contracts, either Cost Per Flying Hour (CPFH) or, for wheels & brakes, Cost Per Aircraft Landing (CPAL).

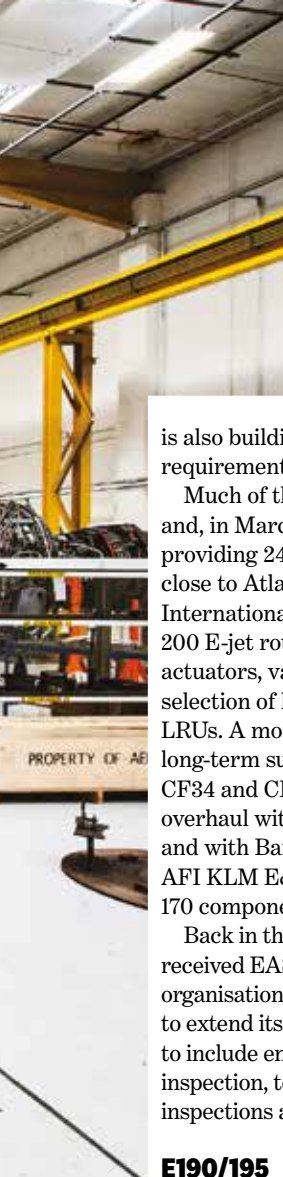
BeyondPool was launched after AerFin purchased the entire fleet of 15 Embraer E170-LRs from Saudi Arabian Airlines in May 2017. In addition, it acquired 10 spare GE Aviation CF34-8E engines, a spares inventory with some 24,000 line items, tooling and equipment from the airline's engine shop and line maintenance equipment.

For the CF34-8E, Bob James, CEO of AerFin, says it is very popular and engine

shop visits are beginning to ramp up. On the airframe side, the company has won several long-term Flight-Hour contracts, branded as BeyondPool. Perhaps the most significant was a 2018 award from BA CityFlyer to support its fleet of six E175s and 18 E190s.

Other factors driving demand for used serviceable material (USM) for the engine have included an SB on HPT turbine blades and some 'juggling' on engine shop visits. The engine is due a shop visit after 15,000 flight cycles (FC) but that leaves only a further 10,000FC, as some life limited parts are limited to 25,000FC. Instead, some airlines are removing an engine at 12,000FC, retaining the LLPs and carrying out a full performance restoration, maximising the 25,000 LLP lives.

Of the 40 engines, 10 were sold to support an OEM program, eight have been parted out, nine are in the lease pool and the rest are in AerFin pending disassembly and sale. AerFin



Left: Aerfin is capitalising on demand for used serviceable material with its bespoke services. **Right:** The business got a kick start from the purchase of 15 Embraer E170-LRs from Saudi Arabian Airlines, plus engines, spares and tools. All photos: Aerfin

is also building engines tailored to meet requirements of their lease pool.

Much of the fleet is in North America and, in March 2019, AerFin commenced providing 24/7 logistics from facilities close to Atlanta Hartsfield-Jackson International Airport, with more than 200 E-jet rotatable part numbers including actuators, valves, avionics and a large selection of high demand component LRUs. A month later, it announced a long-term support contract for both CF34 and CFM56 engine parts overhaul with BP Aero in Irving, Texas and with Barfield, a subsidiary of AFI KLM E&M, for approximately 170 component part numbers.

Back in the UK, in June, the company received EASA Part-145 maintenance organisation approval, which allowed it to extend its CF34 engine capabilities to include engine piece part component inspection, testing, certification, borescope inspections and engine module swaps.

E190/195

In contrast to the smaller models, James sees the E190/195 market as much more challenging. These aircraft are both powered by the CF34-10E engine, which

incorporates CFM56-7B architecture. This engine has the resulting higher engine maintenance cost at levels similar to the Airbus A319. On the airframe side, he points out that there is 70% commonality between the E170/175 and E190/195.

A significant number of E190/195 fleet transitions are expected over the next three years, which will see increasing demand for spare engine support and a lowering of the operating costs necessary for effective remarketing and continued operation of the aircraft. Sales and deliveries of the replacement E195-E2, powered by the Pratt & Whitney PW1900G, have been slow, and it remains to be seen how the airline and lessor market will succeed in placing the aircraft and the extent to which the Boeing acquisition of Embraer commercial aircraft will support the placement of new aircraft. Embraer's 3Q19 results, published at the end of October, showed a single E195-E2 delivery for the year (to Azul in Brazil) and just three E190-E2s, compared to 45 E175-E1s.

Recognising the number of E190 fleet transitions, AerFin has only a single E190 for part out. James says the company will wait to see how the lessors develop the second-hand market before increasing exposure to E190 inventory. One sign of successful transitions has been the recent decision by Azul to sublease its entire fleet of 53 Embraer E195 E1 aircraft to LOT Polish Airlines and Breeze Aviation Group as part a strategy to accelerate

COMPONENTS



E190/195 fleet transitions will see growing demand for spare engine support

their replacement by the E195 E2. LOT, which previously acquired seven E195s from Azul, has signed an LOI for 18 firm aircraft and up to 14 options. Breeze, a US start-up founded by Azul's controlling shareholder, David Neeleman, is expected to sublease up to 28 aircraft. All the E195sE1s are expected to be phased out by the end of 2022 and will be subleased at least until the end of the original operating lease term.

The final engine model is the CF34-3, which powers Bombardier CRJ200 but, says James, this a declining market as retirements increase. ①

SUSTAINABILITY

James says AerFin is committed to delivering environmentally friendly and sustainable aircraft and engine recycling solutions and has joined the Aircraft Fleet Recycling Association (AFRA). This is a collective of manufacturers, disassemblers/parts distributors, recyclers, financiers/lessors and MRO facilities that have created a Best Management Practices (BMP) Guide for aircraft materials recycling. Members work to very high standards and one, TARMAC Aerosave, with facilities at Tarbes in France and Teruel in Spain was selected to break two of the E170s for that reason.



He adds that AerFin now segregates all scrap from engines by metal type. This not only makes recycling easier, but also generates more money than mixed metals.

In October 2019, Danish private equity firm CataCap acquired a majority shareholding in AerFin from US-based CarVal Investors in partnership. CataCap also has an investment in TP Aerospace, which has launched its Green Sunrise project to develop a paperless network across its facilities. He says AerFin's environmental policies was one reason for CataCap's interest, but it is too early to say whether any joint initiatives will be developed.

ALL THAT JAZZ

Keith Mwanalushi speaks to the CEO of Jazeera Airways Rohit Ramachandran about launching the first low cost services from the Middle East to the UK

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The market is leaning towards smaller and more fuel-efficient aircraft. The arrival of the Airbus A320neo Family, for instance, is clear evidence of the new possibilities for longer nonstop services.

In October, Jazeera Airways become the first low-cost carrier from the Middle East to fly from the UK with the launch of services from London-Gatwick to Kuwait. The flights marked the first new service between the UK and Kuwait for 55 years and the longest route to be operated by the Airbus A320neo.

Kuwait Airways took delivery of its first A320neo in September, with a further three to follow this year and four in 2020. These are part of a 15-aircraft order signed in 2014, with deliveries extending until 2026. The Kuwait Airways aircraft are powered by CFM International LEAP-1A engines and are configured in a two-class layout, including 12 business class and 122 economy class seats.

Initially, the Kuwait to Gatwick service was launched with a three-class product; business class, premium economy and the standard economy. This raised some doubts on the extent of the low-cost operation.

The airline has since confirmed to this publication that, following a review of the first few weeks of operation, the Gatwick-Kuwait City route will now operate with a premium economy and economy class offering.

Chief Executive Rohit Ramachandran responds saying it's very much a low-cost operation: "Our fares are considerably below full-service carriers operating between the Middle East and the UK. Our fares in premium economy and

50%

AIRBUS SAYS NEW GENERATION ENGINES AND SHARKLETS TOGETHER DELIVER 20% REDUCED FUEL BURN AS WELL AS 50% LESS NOISE COMPARED TO PREVIOUS-GENERATION AIRCRAFT

business class are also well under the full-service carriers. Our product is in keeping with a low-cost model, such as food and beverages which are sold on board."

Ramachandran refutes the notion that having premium products was a necessity in order to obtain traffic permissions for the route. "Obtaining traffic rights for the route was principally based on the fact that this was an unserved route pairing, with no other airline flying between Kuwait and Gatwick," he clarifies.

Left: CEO Rohit Ramachandran celebrates launching the first low-cost carrier from Kuwait to London-Gatwick **Below:** The Jazeera team prepare for the first flight to the UK. Photos: Jazeera Airways



The range and operating efficiency of this A320neo aircraft will enable us to serve other long sectors from Kuwait

ROHIT RAMACHANDRAN
CEO OF JAZEERA AIRWAYS

In addition to serving Kuwait, Ramachandran says travellers will benefit from seamless connections to the airline's onward destinations such as Dubai, Bahrain, Jeddah, Doha and Delhi, using its owned and operated Terminal 5 at Kuwait Airport.

He said going forward, UK travellers would have more choice and greater value than ever before when travelling to the Middle East and beyond. "For 15 years, Jazeera Airways has provided excellent service and low fares to customers from across the Middle East and beyond, and we're thrilled to be

bringing this to the UK for the first time.

"The range and operating efficiency of this aircraft will enable us to serve other long sectors from Kuwait. These already include other new destinations such as Kathmandu (commenced November 2019), and we will fly to Chittagong in Bangladesh in January."

Clearly, the advantages on the new engine option on the A320 come into play. Airbus says that new generation engines and Sharklets together deliver 20% reduced fuel burn as well as 50% less noise compared to previous-generation aircraft.

After a year in service, launch customer Lufthansa confirmed the 20% efficiency gain per passenger with up to 180 seats, along with reduced noise and CO² emissions.

Jazeera Airways has seen passenger figures and revenues jump recently. The airline reported KD16.1 million (\$53 million) in net profit for the first nine months of 2019, up 90.2% compared to the same period in 2018 and an 18.1% growth in number of passengers.

The company's operating revenue increased by 30.0% to KD82.8 million, while operating profit increased by 90.5% to KD17.0 million.

"Our expansion is giving customers access to new destinations through direct or short one-stop flights across the Middle East, Europe and Asia. That is complemented with our continued focus on providing our customers with very affordable prices while ensuring we maintain our operational excellence.

"We're investing in new cost saving initiatives and continue to target new destinations that serve the growing segments of passengers within our network," Ramachandran states.

He says the airline is proud to be the first airline in over 50 years to offer a new service between Kuwait and the UK, helping to reinforce the strong bonds between the two nations that is marked this year by the 120th anniversary of the Kuwaiti-British Treaty of Friendship. **1**



Help wanted

Regional subsidiaries will need help from their larger owners if they want to develop sustainable policies, says **Ian Harbison**

Last year, Braathens Regional Airlines carried out 'the perfect flight' of an ATR 72-600 between Halmstad City Airport and Bromma Stockholm Airport in Sweden. By optimising every aspect of the operation, from a 50/50 blend of aviation fuel and biofuel to a very precise flight path, carbon emissions were reduced by 46% compared to the same flight with fossil fuel. The flight was a collaboration between the airlines, the aircraft manufacturer and

Above: Biofuel suppliers Neste and Air BP collaborated on an ATR 72-600 flight in Sweden that reduced carbon emissions by 46%.

Below: The costs of biofuel are not yet comparable to those of fossil fuel, so it carries a premium. All photos: BRA



The barriers to entry into the sustainable aviation fuel market are high for regional carriers as economies of scale are difficult to achieve

bio fuel suppliers Air BP and Neste, but it remains a one-off experience.

The barriers to entry into the sustainable aviation fuel (SAF) market are high for regional carriers. Biofuel production has not yet reached the level where costs are comparable to fossil fuel, and so it carries a premium. As they use smaller, less thirsty aircraft, that means their annual demand will be relatively low and so economies of scale become more difficult to achieve.

As a perfect illustration of the challenges that have to be faced, Shell Aviation and World Energy are to provide a million US gallons to Lufthansa at San Francisco International Airport over several years for aircraft on routes to Frankfurt, Munich and Zurich. Described by the partners as one of the most significant SAF supply contracts globally, that figure

represents just 22 flights on the Munich route for an Airbus A340-600, which has a fuel capacity of 45,000 US gallons. Of course, it can be eked out as there will be a blend with fossil fuel, but it is still only a small amount.

For subsidiaries with regional aircraft like Lufthansa CityLine and Air Dolomiti, they will only be able to adopt SAF on the back of their parent's buying power.

Finnair, another airline with a strong environmental record, is also working with Neste on SAF. It has also announced a sweeping range of green initiatives, including weight reduction, getting rid of single use plastics and reducing food waste. Again, its regional subsidiary Norra, will have to rely on the mother company for support.

The irony is that regional aircraft are much greener anyway, but environmental economics work against them. **1**

AVIATION

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