

MRO

Aerospace Magazine

North America

Post-pandemic
recovery takes off



Embraer Component Supplement



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used serviceable materials

CFM56 Overhaul

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North America climbs out of turbulence

This month, we turn our focus to the North American region where a rebound in travel demand is showing strong signs of growth again but as the Oklahoma Governor Kevin Stitt mentioned in a recent interview with this publication, things appear to be moving beyond COVID, but work needs to be done to help the global MRO industry overcome post-pandemic challenges.

In its April 2022 market intelligence report, IBA indicates that seat capacity for Q3 intra-North America was 1% above the 2019 level and the key North Atlantic routes just 9% below.

By all indications, the increase in airline capacity is driving aircraft utilisation rates up with flight frequencies and new routes being constantly launched and added across the board. Just last month Frontier Airlines announced adding 27 nonstop routes, including new destinations Guadalajara and Monterrey, Mexico and United's new Boston-Heathrow service took off on April 15th.

We know that a talent shortage has emerged, which the pandemic made worse. MROs in particular are working strongly within their HR and recruitment based activities in local schools and colleges to make aviation engineering careers more attractive again. There are several programmes across the North American region that are tackling the problem, the consensus is that the aviation workforce shortage is an industry-wide problem and addressing it will be a collective effort.

Also, this issue features our first Embraer component editorial supplement bringing together some of the key solutions for aftermarket parts services for Embraer aircraft. The special supplement is brought to you by Embraer, Spairliners, AVIAN Inventory Management and Fokker Services Group so please check out their solutions for the market.

Keith Mwanalushi
EDITOR



Air Canada passenger loads continue to rebound as travel demand return.

Photo: Air Canada

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Aircraft utilisation rates jump start North American MRO recovery



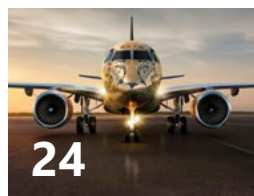
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AviaAM Leasing acquires 737-800 for conversion

AviaAM Leasing, a global aviation holding company engaged in tailored aircraft leasing and trading services, continues its Passenger-to-Freighter (P2F) conversion project, acquiring one more Boeing 737-800.

Since the beginning of AviaAM Leasing's P2F conversion project in March 2021, when the first Boeing 737-800 was acquired, the company has been successfully expanding the list of their assets. Now one more 737-800 aircraft has been purchased with the goal of converting it into a marketable freighter aircraft, taking the business one more step closer to its commitment of having 25 converted aircraft of different types in the upcoming four years.

The aircraft was already ferried to the Taikoo (Shandong) Aircraft Engineering Company Limited (STAECO) facility in Jinan (TNA), China where in the upcoming four months it will undergo passenger-to-freighter conversion works provided by Boeing.

This is the fourth Boeing 737-800 inducted for cargo conversion, with the first two already delivered to the lessee and



This is the fourth Boeing 737-800 inducted to cargo conversion
Photo: AviaAM Leasing

successfully operated by Bluebird Nordic, and one more soon to be delivered for operations.

Joramco signs five-year agreement with Ryanair for heavy maintenance

Joramco, the Amman, Jordan-based independent commercial aircraft maintenance, repair and overhaul (MRO) facility has signed a five-year agreement with low-cost Irish carrier Ryanair which will see the airline using up to six heavy maintenance bay slots at its facility in Amman. While Ryanair uses a wide combination of both internal facilities and external suppliers to conduct its heavy maintenance, this latest agreement will guarantee that the carrier's needs as its fleet grows to in excess of 600 aircraft will be met now and in the future. Ryanair's Director of Operations, Neal McMahon, said: "Our five-year growth plan will grow our fleet to over 600 aircraft and we are pleased to extend and enhance our agreement with Joramco who have been providing ad-hoc maintenance for our fleet for the past three years. This agreement will allow Ryanair to utilise up to six heavy maintenance slots, with aircraft coming in nose to tail for the next five winter seasons. Joramco is a long-established maintenance provider with state-of-the-art facilities and over 50 customers around the world. It has an excellent reputation for a quality service offering in the industry and we are pleased to be announcing this new and enhanced deal. This agreement will ensure that Ryanair has flexibility as to where it places its aircraft for the winter maintenance season." Established over 50 years ago, Joramco is certified by many international regulatory authorities including the European Aviation Safety Agency (EASA), the U.S. Federal Aviation Administration (FAA) and the Jordanian Civil Aviation Regulatory Commission (JCARC).

Muirhead Avionics signs global repair agreement with Honeywell for ERJ cockpit and control displays



Photo: Muirhead Avionics has signed an exclusive global repair agreement with Honeywell for ERJ cockpit and control displays

Muirhead Avionics, a brand of AMETEK MRO and one of the largest independent avionics repair facilities in Europe, will provide repair and on-going support for Honeywell's cockpit displays, control displays and display computers for ERJ 140/145/135/Legacy aircraft. The ten-year agreement is globally exclusive and will commence immediately. Customers will ship all units to Muirhead Avionics' specialist facility near London Heathrow airport and can be reassured of the OEM-quality standards and prompt turnaround-times commensurate with a repair partnership of this calibre. Establishing repair partnerships and representative agreements with leading OEMs is a cornerstone of Muirhead Avionics' business. As part of the AMETEK MRO group, the Company has the investment it needs to underpin innovation and expand its capabilities.

SR Technics joins Pratt & Whitney's GTF MRO network

SR Technics, a leading MRO service provider, has announced that it is joining the global network of providers that maintain the GTF™ engine powering the Airbus A320neo aircraft family. Upon signing with Pratt & Whitney, SR Technics' Zurich-based facility will serve PW1100G-JM engines for the A320neo with full disassembly, assembly and test capabilities. The executed long-term commitment will enable SR Technics to enhance its repair capability and overall competitiveness by securing and expanding its highly skilled workforce in Switzerland by up to 400 new jobs to be created by 2024 to meet the new capacity and related demand. In addition, a high-double-digit million Swiss francs investment will be made in the facilities at the



Photo: SR Technics and Pratt & Whitney management in Bogenhangar at the Zurich Airport

Zurich-Airport site, such as in special tools and dedicated maintenance equipment including a new test cell to accommodate the new maintenance work. The GTF MRO network is part

of Pratt & Whitney's EngineWise® solutions, which provide engine operators with a variety of aftermarket services resulting in long-term sustainable value.

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Liebherr and HAL strengthen ties with signing of MoU

Liebherr-Aerospace & Transportation SAS and state-owned Indian aerospace and defence company Hindustan Aeronautics Limited (HAL) have signed a Memorandum of Understanding (MoU) which will lay the basis for future strategic cooperation in the field of on-board systems for HAL's current and future aircraft programmes. The two companies will combine resources to identify and define the best solutions for HAL's fixed-wing and rotary-wing aircraft in landing gears, actuation, air management and power conversion systems. This is another venture between the two companies who have been collaborating for several decades. Liebherr Aerospace is based in Toulouse, France and is one of eleven divisional control companies within the Liebherr Group and coordinates all activities in the aerospace and transportation systems sectors. The company has been a leading supplier of systems for the aviation industry for more than six decades. HAL began manufacturing aircraft under the name Hindustan Aircraft in the 1940s and was rebranded in 1964 as Hindustan Aeronautics Ltd. Currently HAL has 11 dedicated research and development (R&D) centres and 21 manufacturing divisions under four production units spread across India.

C&L Aviation Group completes teardown of two E170 aircraft

C&L Aerospace, a C&L Aviation Group company, has completed the teardown of two E170 aircraft. All aircraft have now been completely disassembled and the inventory is in the process of being inducted into C&L's global warehouses, with the majority being stored at the company's main headquarters in Bangor, Maine. This is the first of many future teardown projects for C&L as they continue to develop their E170 programmes and offerings. "C&L has been investing in our Embraer programme for many years now," said Martin Cooper, Senior Vice President, C&L Aerospace. "We began by providing full inventory and repair exchange services for ERJ 135/145 operators and are now adding new programmes to include the E170/175."



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FL Technics invests in Hanover-based wheels and brakes business

FL Technics will enter a segment of wheels and brakes maintenance as the group launches a dedicated business line and a specialised shop with a highly experienced team of engineers and technicians in Hanover International Airport, Germany. The dedicated facility for servicing commercial aircraft wheels and brakes, as well as tires and components, started operations under FL Technics name as of April 4 and will serve as a support hub within the global network of the group's MRO markets, ranging from the Americas to Asia-Pacific. The expansion of this business areas is a natural continuity of current FL Technics group operations, including a global integrated supply chain and the largest independent line maintenance network with more than 70 stations in service worldwide. The established infrastructure and pool of partners has created a perfect ecosystem to develop operations that can attract new prospects as well as provide the ability to tailor FL Technics' solutions based on market needs to both lessors and operators.



Photo: FL Technics invests in wheels and brakes business at Hanover International Airport, Germany

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Reliance Aircraft International acquires Suncoast Landing Systems

Reliance Aircraft International (Austin, TX) has released that it has acquired Suncoast Landing Systems Corp. (Suncoast) in Medley, FL and formed Suncoast Landing Systems LLC. Established in 2005, Suncoast has capabilities to overhaul and repair commercial landing gear. The management team of Victor Ortega and Larry Wernath will continue to run the day-to-day operations. "We are excited to partner with the Suncoast team to grow and support both our companies existing customer base," said Terry Hix, President and Co-founder of Reliance Aircraft International. "Our immediate goal is to synchronise our years of experience and vast resources with the Suncoast management to assist with business development and operational support".

SIA Engineering Company signs MOU for hangar facility in Subang, Malaysia

SIA Engineering Company Limited (SIAEC) has signed a non-binding Memorandum of Understanding with Impeccable Vintage Properties Sdn Bhd (IVP), a wholly-owned subsidiary of Malaysia's sovereign wealth fund Khazanah Nasional Berhad (Khazanah), to potentially lease two hangars located at Complex A, Sultan Abdul Aziz Shah Airport, Selangor, Malaysia (Subang). Through this MOU, the parties will now work on the next phase of hangar technical assessment to ensure that the refurbished hangars will be future-ready to support the maintenance, repair and overhaul (MRO) of current and next generation aircraft. Ng Chin Hwee, SIAEC Chief Executive Officer, said: "These hangars will strengthen our network of base maintenance facilities in the region, enabling us to cater to the varying needs and capabilities required by our customers. Along with our recently announced plans to acquire SR Technics Malaysia and POS Aviation Engineering Services, our growth in Malaysia will complement the capabilities of our Singapore hub."

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Photo: Panasonic Avionics Text: Finnair A350 Premium economy-class seat with IFE

Panasonic Avionics Corporation (Panasonic Avionics) has been selected by **Finnair** to upgrade the in-flight entertainment (IFE) systems across the airline's wide-body long-haul fleet. The IFE upgrade is an integral part of the Nordic cabin enhancements being introduced by Finnair across its long-haul fleet, including the introduction of a brand-new Premium Economy cabin. Panasonic Avionics is installing its latest eX3 system in all cabins on Finnair's eight Airbus A330-300 aircraft – upgrading them from its eX2 system. Finnair's 19 A350-900 aircraft, which already carry eX3, will also see their premium cabins upgraded to the latest version of the system. The first upgraded aircraft entered service in February 2022.



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Inauguration of the joint 'Aerospace Engineering and Digital Innovation Centre' in Bengaluru, India
Photo: Rolls-Royce

Infosys, a global leader in next-generation digital services and consulting, and **Rolls-Royce** have inaugurated their joint 'Aerospace Engineering and Digital Innovation Centre' in Bengaluru, India. This centre has been established to provide high-end research and development (R&D) services integrated with advanced digital capabilities to Rolls-Royce's engineering and group business services from India. Infosys' and Rolls-Royce's collaboration has been reinforced through strategic deals, aimed at yielding mutual benefits to both organisations over the next seven years. As part of this collaboration, Infosys and Rolls-Royce will combine their aerospace, engineering and digital services capabilities to explore opportunities for driving digital and engineering innovation and associated cost optimisation strategies. By expanding the local talent

pool in the country, the two companies will also deliver manufacturing engineering services for the global civil aerospace ecosystem. Speaking about the new centre, Kishore Jayaraman, President – India and South Asia, Rolls-Royce, said, "Our strategic partnership with Infosys presents an exciting opportunity for both companies to leverage combined strengths in engineering and digital innovation to accelerate growth in the civil aerospace market. Given the aerospace sector is poised for revival and growth in India and across the world, this joint innovation centre will strengthen Rolls-Royce's global engineering ecosystem and position us well for the future."



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Aventure's latest 737NG, awaiting teardown in Marana, Arizona.
Photo: Aventure Aviation

Teardown activity magnifies growing USM demands

A rise in demand for serviceable materials has seen a spike in teardown activity recently, **Keith Mwanalushi** looks at some recent opportunities to purchase aircraft part-outs.

Airlines are currently making critical decisions about the future of their fleets. The COVID pandemic saw a considerable number of aircraft placed in storage but not all are coming back to service. And with the demand for air travel now accelerating to almost pre-pandemic levels, demand for USM and cost-effective parts solutions are back up on the agenda.

Aventure Aviation, a parts supplier headquartered in Atlanta, Georgia is constantly purchasing end-of-life aircraft for harvesting parts. During the pandemic, the company acquired several 757s, E190s, 737NGs and CRJs when some players in the market were struggling to survive. "Our 2022 plans call for acquiring additional 737NGs including our first 737-900," Talha Faruqi, President of Aventure Aviation tells *AviTrader MRO*.

"We are progressing well, we have already closed on our first two aircraft, and we have three more in the works. We continue to look for additional retired aircraft to add to our teardown portfolio and we remain bullish for 2022 and beyond," says Faruqi.

In early April, Aventure announced the acquisition of a 737NG, MSN 32713, recently retired by Canadian operator WestJet and the salvaged parts will be relocated to Aventure's Atlanta warehouse, making it the company's third 737NG acquired in 2022.

Over at TDA, an independent specialist in aircraft acquisitions for part-out, they have seen more teardown projects especially in the U.S. and have even expanded warehousing capacity with a new storage facility in Tulsa, Oklahoma.

Over the past year, TDA reports

securing five A320s from Aircastle under a longstanding asset management programme and some of the aircraft are currently undergoing teardown at AerSale in Goodyear, Arizona. It is currently the biggest teardown project conducted by TDA. "All five A320s have an age of 21 years on average and will go for the aftermarket supply. With this harvest we will give a major boost to our A320 stock supply on demand," the company stated.

The first of five A320 (ex-Interjet) teardowns started last year and TDA reports that the programme is progressing well with MSN1259 currently in full progress and MSN1308 will follow directly afterwards. All five aircraft come with some interesting units. For example, TDA have indicated that MSN1162 was equipped with a ram air turbine which had been installed in an A321NEO. MSN1244

carries a recently overhauled landing gear and all assets have Automatic Dependent Surveillance–Broadcast ADSB-OUT installed and a cargo rail system for container freight in the belly.

Meanwhile at Aventure Aviation, the shopping spree for 737NG units continues. During the pandemic, Aventure outsourced over U\$7 million in component repairs to MRO shops and this amount is expected to rise significantly as flights ramp up globally, Aventure plans to purchase even more aircraft.

“With the 737-800 conversions explosive growth, we have seen a more rapid stabilising of parts in the 737NG market, versus the Airbus narrowbodies which continue to diminish in value.”

Talha Faruqi, Aventure Aviation

Faruqi feels that while there is no doubt that there are more aircraft currently in storage, there is still quite a bit of disconnect between the sellers (lessors/airlines) and parts companies. “Towards the end of 2019, these



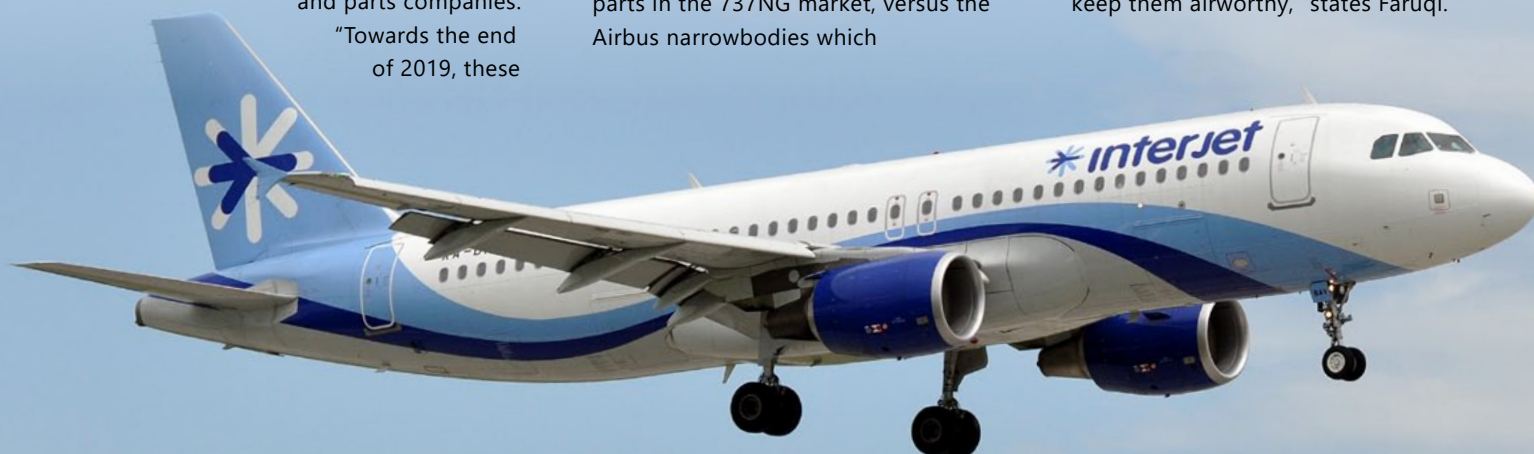
Cost-effective solutions for aircraft parts are back on the agenda.

Photo: Aventure Aviation

financial institutions were loading so much value on the airframe compared to right after the financial crisis, that they are having to take massive write-downs to sell these assets.” Faruqi adds that while some have been quicker than others, there is still a tremendous amount of hesitation – “This has led to less aircraft hitting the market for teardown than expected but we should see that tick up in the next 12 months. It is also aircraft specific as to which product is faring better. With the 737-800 conversions explosive growth, we have seen a more rapid stabilising of parts in the 737NG market, versus the Airbus narrowbodies which

continue to diminish in value.”

And as the Russian/Ukrainian conflict ravages on, complications and difficulties with aftermarket supplies in that region are only getting worse, Aventure has indicated that they are not interested in any aircraft coming out of Russia for teardown. “Aviation is a global industry where we all must play by the same rules, especially when it comes to safety. With these recent developments by the Russian government, there are doubts and no guarantees that these aircraft will be maintained with the required standards to keep them airworthy,” states Faruqi.



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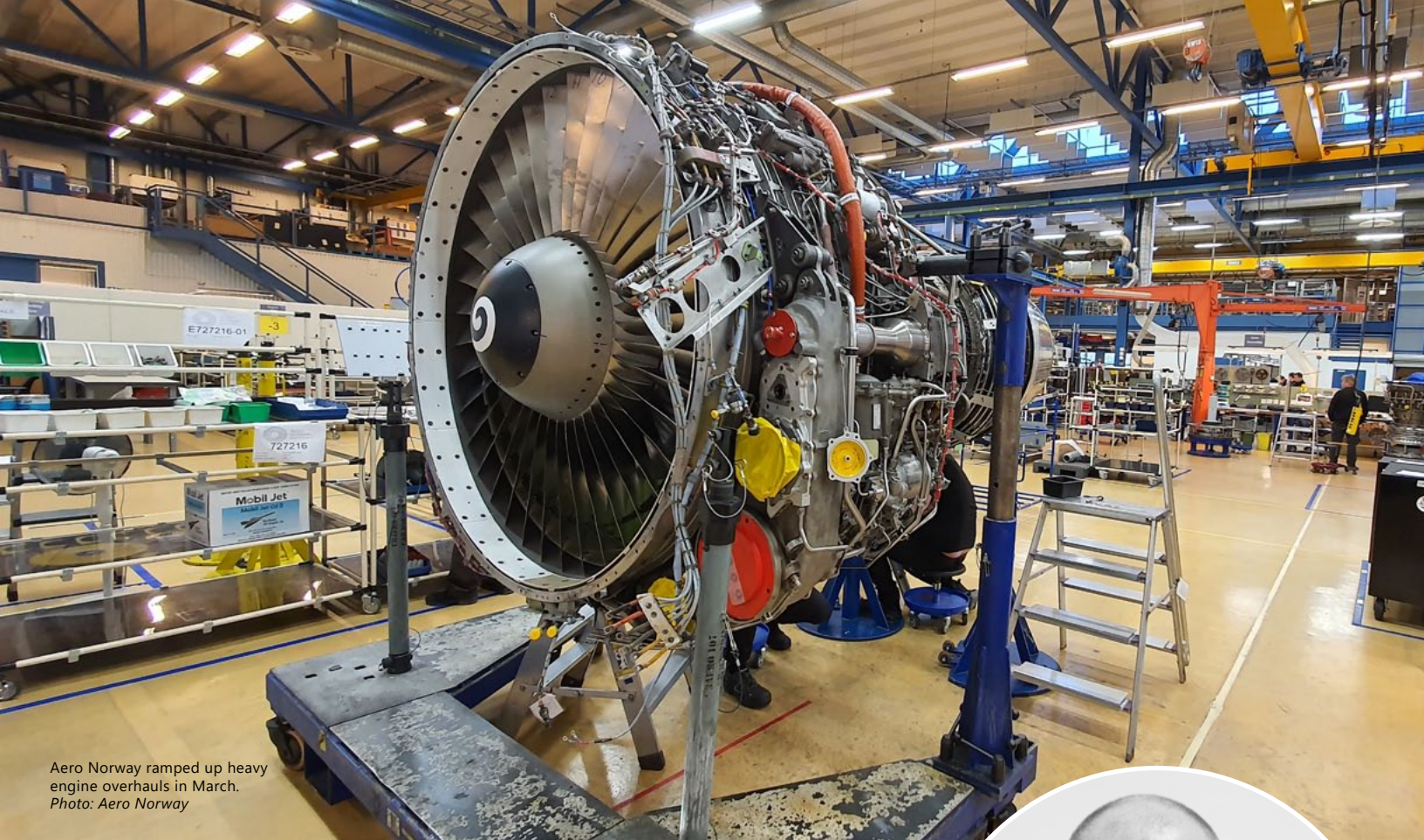
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Aero Norway ramped up heavy engine overhauls in March.
Photo: Aero Norway

CFM56: Engine **maintenance** ramps up while material costs rise

Keith Mwanalushi examines the post-pandemic recovery of the popular CFM56 platform, the trends in costs and supply for engine materials and the key considerations for upgrading to a full shop visit.

MROs are seeing demand for CFM56 maintenance progressively return following the COVID downturn. Since the start of the year, Aero Norway saw much more shop visits for heavy engine overhauls, and as such, ramped up production in March. Neil Russell, Chief Operating Officer says these are all -5 and -7 heavy slots with an increased production rate compared to a year ago when they mostly had -3 heavy engines with less production rate.

"This has shown us a good start to recovery but still tentative in the market." Aero Norway is seeing fewer builds to put new, full life LLPs into the engines. Russell says several operators and lessors are looking for half-life (or less) engines

or modules. "This demand covers all models and all configurations; this leads to different costs and supply scenarios." For example, he indicates that currently, there are issues to find some used LLPs on the -3 engines, there is availability for non-tech and tech insertion engines on the -5B/-7B, at the same time there are less available used -7BE/5B PIP materials to meet half-life demands.

Much of the recovery is coming from the U.S and Europe where MROs are increasing their activity and flying schedules. "However, there is still limited activity from Asia due to the lack of aircraft utilisation and still lack of widespread maintenance plan visibility due to the prolonged COVID recovery," observes Simon Walker, VP Asset



Neil Russell, COO at Aero Norway Photo: Siv Sivertsen

Management at AerFin.

In general, however, MROs and aftermarket specialists are seeing a significant increase in USM demand as flying schedules return and airlines have the confidence to prepare long-term maintenance events for their fleets. "Additionally, as operators bring aircraft out of long-term storage, we are seeing instances where engines are failing inspections due to corrosion and therefore heading into shop for overhaul," states Walker.

As the appetite grows for teardown assets so does the purchasing price,

CFM56 OVERHAUL

creating an increasingly competitive purchasing environment, Walker indicates. "However, that being said, we are seeing that the pricing for USM and tech insertion material is steadily returning to pre-pandemic levels, driven by both demand and the delays in the global repair network."

At AerFin, they have noticed significant increases in the cost to repair material, especially when compared against the catalogue prices – "It is believed that OEM material shortages and price increases are driving this up-turn."

Meanwhile, MROs are experiencing extensive turn-around-times (TAT) on parts sent for repair, with many repairs exceeding 75 days on average. AerFin is working with a wide network of vendors to try and mitigate these turn-around times for operators, but it is undoubtedly a trend felt across the industry.

At Magnetic MRO, they see the market slowly recovering on CFM56-7B and -5B engines. The -7B is recovering faster due to higher utilisation on the 737NG family and the -5B engine on A320 family is still quite depressed, according to Alexey Ivanov, Magnetic Engines Sales Director.

"The number of overhauls and heavy repairs are still less than before COVID, says Ivanov. "The number of airlines and asset owners are still choosing the option of using green time engines or partial



Alexey Ivanov, Magnetic Engines Sales Director



Simon Walker VP Asset Management at AerFin

hospital repairs and modules change instead of overhauls. Many engines are going to disassembly and it feeds the stock of spare serviceable modules which supports the concept of modular changes instead of repair of original engines."

For example, Ivanov explains that there is absolutely no sense to perform the repair of fan module or LPT module on the engine unless the defect is minor there – "If a defect is major or LLPs require replacement it is cheaper and way faster to install spare serviceable module instead of overhauling original modules."

Ivanov points to some that were mostly neglecting hospital repairs or modular changes – "airlines and engine owners are more often considering hospital repairs to return the engine to service for another year or two or replace the affected module with expired LLPs with the module coming from the donor engine or from teardown. It allows you to return the engine to service much quicker and with much lower cost."

Magnetic MRO has observed the OEMs

“As operators bring aircraft out of long-term storage, we are seeing instances where engines are failing inspections due to corrosion and therefore heading into shop for overhaul.”

Simon Walker, AerFin

following the market to support hospital repairs. "CFMI has recently introduced Special Procedure 20 in addition to Special Procedure 10 which makes certain hospital repairs even easier as it is possible to apply AMM limits instead of EMM limits more often for hospital repairs.



Russ Shelton, President, Engine Strategy Group

CFM56 OVERHAUL

“Repair vendors, in particular, are struggling. Turn times are multiples of what they should be for specific parts, and the availability of substitute parts is limited. These factors have created engine TATs that are way beyond acceptable.”

Russ Shelton, GA Telesis

“As the main focus of Magnetic Engines is mostly hospital repairs and modular changes, we welcome such change considering we are a small engine shop, we do not perform full repairs and overhauls,” Ivanov adds.

Regarding access to materials to support CFM56 maintenance programmes Russ Shelton, President, Engine Strategy Group at GA Telesis reckons the demand is high, the supply is unpredictable, and the costs are escalating – “Repair vendors, in particular, are struggling. Turn times are multiples of what they should be for specific parts, and the availability of substitute parts is limited. These factors have created engine TATs that are way beyond acceptable,” he notes.

As the CFM56 engine matures, Shelton believes engine builds need to be



John McKirdy – SVP, Technical Services, Kellstrom Aerospace and Vortex Aviation.



The market is slowly recovering on CFM56-7B platform.

Photo: GA Telesis

targeted to achieve return conditions for leased aircraft and end of life for all others – “absolutely nothing more,” he stresses.

John McKirdy, SVP Technical Services at Kellstrom Aerospace / Vortex Aviation feels the recovery is mixed. The Group sees a robust level of activity on field service requirements and hospital shop visits across the board on the CFM56 models. “Demand is high for services that save engines in the field as well as surgical strike light visit management driving both the length of time the engine is on the ground and the cost of the maintenance events itself downward.”

McKirdy says operators are very demanding of Vortex Aviation to manage the quality requirements while effectively outlining cost saving strategies to produce an engine that meets the mission of its next service interval. “Although the Ukraine – Russia crisis and the recent spike in the cost of fuel have added an extra element of complexity to the immediate forecasting of the demand for maintenance, the clear signals from the market are the concerns over cost management for the lift each asset owner is responsible to fulfil. All the CFM56 engine models have robust hospital shop and field service demand at this time

keeping our four facilities highly engaged with our customers.”

At this time, in terms of materials, the CFM56 model appears to be behaving in a stable fashion relative to some other engine types (namely the CF6-80) in that price and availability have not dramatically changed, McKirdy reckons. He says for the quick-turn field service and hospital shop visit maintenance that Vortex Aviation performs, USM is available at reasonable fair market value and new materials such as expendables and consumables are also readily available and fairly priced given today's market conditions. “The focus for MRO supply chain is on parts that are sent for repair. In most cases, the TAT for repair orders have essentially doubled [from 25 to 50 days], causing shops like Vortex to be very diligent on the front end with suppliers in determining such things as real TAT versus marketing TAT, and collaborating with suppliers that have available exchanges. Further, where appropriate, Vortex Aviation has secured some of our own rotatable materials to support our CFM56 maintenance lines and we work with our customers to secure customer furnished parts that can help drive down TAT and cost.”



Anca Mihalache, VP Engine Trading & Leasing at APOC

Anca Mihalache, VP Engine Trading and Leasing at APOC Aviation adds that materials are currently available in the market and there are offers from buyers and sellers alike – “but we are also seeing some distributors and MROs stockpiling parts to ensure their accessibility in the near future.”

Speaking on engine maturity and how operators can best optimise the engine's life, APOC offers green time leases, as Mihalache explains, this means that operators can use APOC's engines for a monthly fee, until they become unserviceable, or they reach their life limit. “This is a very attractive proposition for some operators as it allows them to delay shop visits of their own engines until they are in a stronger position as they continue their post-pandemic recovery.”

Identifying defects and the key considerations for upgrading to a full shop visit

One of the main considerations for evaluating when an engine needs a full shop visit is whether it has reached its first overhaul time or not. “Other factors that also need to be considered are the availability of materials on the market, the specific engine shop that is working on the asset and of course the value or financial state of the engine in question,” Mihalache highlights.

Russell from Aero Norway feels it is entirely dependent on what the significant defect is – “for the CFM56 engine, the modular design makes it easier to rectify

significant defects while also reducing the need for a full shop visit.” He points out that SP10 and SP20 also allows more flexibility to fix those defects, without impacting the required maintenance. “There is also the cost impact that is a consideration when the thought of a full shop visit may be there if a significant defect is found, but this depends on what the operator or owner of the engine wants to do with the engine next; SP10 and SP20 can limit the cost, swapping modules can reduce this too by getting some value out of remaining modules.”

Ivanov from Magnetic argues that there is no generic approach as every engine is unique and every engine owner has different plans for his asset. “Usually there are certain plans over the engine lifecycle. If the defect is so called expected and discovered at the segment of engine life when the engine is ready for repair then the owner makes the decision if it is economical to invest cash into the engine repair and operate it further or if it is more efficient to tear it down and sell the parts. Or perhaps the whole engine can be sold to liquidators if the owner does not have the resources to spend on teardown projects.”

More complicated scenarios unfold when an unplanned defect is discovered in the middle of the engine life between repairs and that defect leads to serious engine repair. Ivanov says if the defect is minor, and repair is not costly compared to future cash flow from the engine operation then the

engine just goes to minor repair and returns to service. An example is when you have a CFM56-7B engine with good life remaining and find defects on the HPC blades which leads to a top case repair or VSV bushings replacement. “The owner will just perform the repair and return the engine back to service. It will decrease profitability on the whole engine lifecycle but does not change it drastically.” Another example is the replacement of LPT stg 1 NGVs on -7B or -5B engines.

“This is always a risk,” comments Shelton from GA Telesis. He says fortunately, the pre-induction workscope does a fairly good job of mitigating this potential and the primary consideration is the cost. “This might drive the choice between a teardown and a heavier ESV in a stable market. Today, customers are more likely to opt for the ESV due to a general lack of alternatives for this engine. Operators with larger fleets have more options since the scenario plays out within their overall fleet plan,” says Shelton.

John McKirdy concludes and says the decision to upgrade to a full shop visit mostly relies on the assessment of the value of that asset and revenue generating possibilities after the cost of the upgraded maintenance event, versus the value of that asset if it were to be torn down and sold for parts. He notes that considerations for the availability and utilisation of USM and, or customer furnished parts reduce cost and often reduce TAT.



Shop visits for the CFM56 are on the up following the COVID downturn.

Photo: Aero Norway



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“By following Oklahoma’s example, communities across the U.S. with a strong MRO presence can ensure that companies have the right support needed to thrive in this new post pandemic world.”

Kevin Stitt, Governor of Oklahoma

Aircraft utilisation rates jump start **North American** MRO recovery

The MRO market is seeing a rebound in the region.
Photo: American

North America is reporting a rebound in domestic and intraregional travel but also recovery of MRO activity, but filling the skills shortfall continues to be of significant concern, as **Keith Mwanalushi** finds.

Pent-up travel demand is driving the recovery in one of the world’s most mature aviation markets; North American carrier capacity is now within 14% of pre-COVID levels [OAG], and while TSA throughput numbers remain 16% down when compared to the same timeframe in 2019, load factors at almost 86% exceed 2019 levels – [Airlines4America].

In the U.S specifically, although the country and economy finally appears to be moving beyond COVID, Kevin Stitt, the Governor of Oklahoma tells *AviTrader MRO* that work needs to be done to help the global MRO industry overcome post-pandemic challenges – “These include the slow return to pre-pandemic business and tourism travel levels, global supply chain gaps that prevent the timely order of parts for aircraft repairs, and a lack of



Oklahoma Governor Kevin Stitt

talent with sought-after technical skills,” he says.

Governor Stitt reports that Oklahoma is on track to become the most business-friendly state in the nation. He indicates that the state offers incentives designed to help industries grow – including the Aerospace Industry Engineer Workforce Tax Credits which provides a tax credit of up to 10% to aerospace companies that hire engineers and it also allows for an annual tax credit of \$5,000 to the employee – “Additionally, the state’s Oklahoma Innovation Expansion Programme (OEIP) incentive is entering its second year and provides funding to Oklahoma companies with new and innovative projects that lead to diversification, market expansion or supply chain resiliency,” he adds.

An industry survey in 2020 shows that

40% of MRO suppliers sourced materials directly from China, and only 60% had identified alternate sources for those materials. Oklahoma state is keen to help MROs identify more U.S. suppliers and connect with local companies capable of fulfilling in-demand parts via the portal 'Connex Oklahoma.' The Oklahoma Manufacturing Alliance (OMA) developed the site, in partnership with the Oklahoma Department of Commerce, to provide critical resources to state manufacturers. Governor Stitt says the platform is also designed to incorporate the "Manufacturing Marketplace" developed by the National Association of Manufacturers, comprised of more than 165,000 manufacturers across the U.S. To date, over 500 Oklahoma-based companies use the platform to help mitigate supply chain issues, according to the Governor's office.

The recovery in North American domestic travel and improvement in international travel has driven aircraft utilisation rates up across the board meaning that as utilisation rates recover, demand for aircraft, engine and component MRO is also strengthening. "As we continue to see recovery in other regions in addition to the North American sector, global demand for airframe and engine component material will continue



Pastor Lopez, President,
MRO Services Group, GA Telesis

to improve," anticipates Daniel Adamski, Executive Vice President of Distribution for Kellstrom Aerospace. Adamski reckons the global supply chain may face continuing challenges in addressing that demand quickly due to raw material shortages, cold start production of parts leading to lead time challenges, MRO TAT challenges due to late delivery of repair details, the shortage of skilled labour in some areas and a surge in demand for specific services relative to capacity.

In the North American market, Kellstrom has seen strong demand for larger regional jet material relative to other aircraft categories. "We carefully monitor the recovery demand trend with customer supplied forecast data and trend analysis with predictive analytics capability designed to ensure that we have the right mix of material on the shelf to address the demand of operators ahead of demand," Adamski states.

Since 2019, GA Telesis began placing more emphasis on the regional side of the business. "Today, we are happy to report we count the largest North American regional operators among our customers," tells Pastor Lopez, President, MRO Services Group at GA Telesis.

This segment accounted for 15% of GA Telesis' revenue in 2021 – "We can now support our regional customers with component, composite, and landing gear

work. Our first regional customer began with gear work, and it is now sending us component and composite work," Lopez indicates.

The shortage of skilled labour in the MRO sector was an already deteriorating situation before the pandemic but Lopez, reports that the MRO group at GA Telesis did not lay off a single individual in 2020. "In fact, we hired technicians with specific skill sets to augment our team and some of the employees that left before 2020 have now returned to our group. GA Telesis also provides excellent benefits that are very attractive to the new generation of technicians. Therefore, building and maintaining a pipeline of employees is one of our key priorities."

AAR Corp has a strong presence in the North American MRO market with four domestic aircraft MRO locations and two in Canada alongside a New York component shop and a Miami landing gear and wheel and brake facility. Carl Glover, Vice President, Sales and Marketing for the Americas, states that these facilities have seen an improving position with regards to the workloads that they are seeing and the strong sentiment from operators.

In the regional context, AAR has an active presence with regional airlines with some of the largest outsourced flight hour



Daniel Adamski, Executive Vice President
of Distribution for Kellstrom Aerospace



Carl Glover, AAR Vice President Sales & Marketing
for the Americas.

programmes supporting regional aircraft. "We see positive trends in the regional jet space through our parts trading and OEM distribution business which are focused upon the regional jet platforms including Bombardier, Embraer and ATR aircraft," says Glover.

Recently, AAR announced a multiyear agreement with UTAS / Goodrich to support their de-ice products in this space and Glover says AAR's component repair shops are seeing an uptick in activities from regional operators who are looking for "OEM friendly" repair partners who



Taco Stouten, Head of Sales and Marketing at Spairliners.

can track and assist with performance reliability as components mature out of their OEM warranty phase.

At Spairliners, they are optimistic about the MRO recovery especially for E-jet component solutions where the North American market is the strongest. "Regional air traffic has been recovering so quickly in North America that the demand for MRO activity is almost back at the pre-COVID level," reveals Taco Stouten, Head of Sales and Marketing at Spairliners. "The big opportunity that we see in North America is to get airlines to cooperate for the MRO work on the fleet they have in common. However, the challenge could be the lack of skilled labour to fulfil the demand in a timely manner," Stouten notes.

"The big opportunity that we see in North America is to get airlines to cooperate for the MRO work on the fleet they have in common. However, the challenge could be the lack of skilled labour to fulfil the demand in a timely manner."

Taco Stouten, Spairliners

Stouten places emphasis on the importance of integrating the MRO supply chain and managing the related assets in the most cost-efficient way for operators to save cash. "To give you an idea, our business model can help airlines to free up 80% of the cash that is traditionally locked in their spare parts stock and considering we have built up knowledge and skills on the A380s, which is the largest passenger aircraft in the world, and one of the most complex to manage for the spare parts."

Spairliners is now in its tenth year of supporting E-Jets, following the same model in Europe, and Stouten is certain the formula has worked for the airlines, for the MROs, and for the company. "Our operators are happy that we have taken this out of their hands and out of their minds and they do not want to go back to managing their spare parts by themselves. The MROs are happy to work with a company like Spairliners, because it reduces the contact points needed for the amount of work that we bundle and can bring to them."

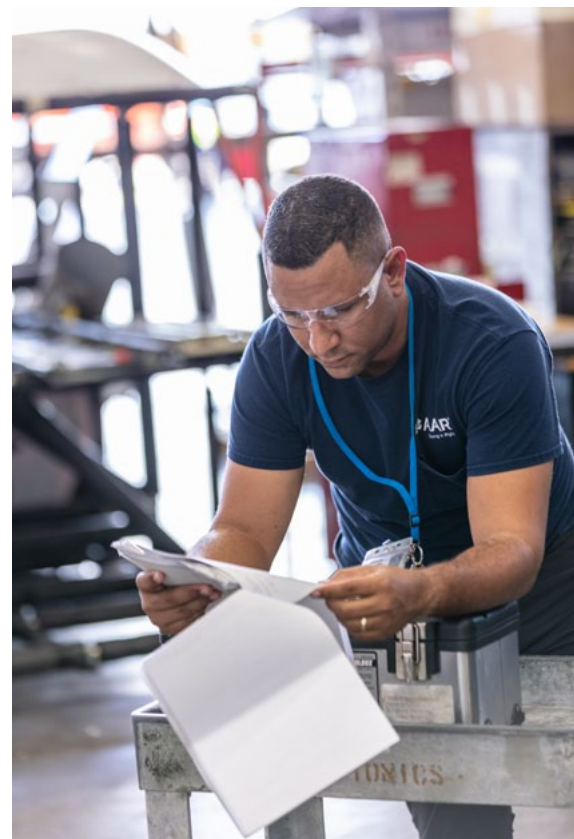
Dealing with the technical skills problem

Experts at industry conferences have debated the labour shortfall issue at length in recent months and the situation is starting to be of significant concern to major MROs and approved component repairs organisations and is beginning to impact their business, driving delays in turnaround time.

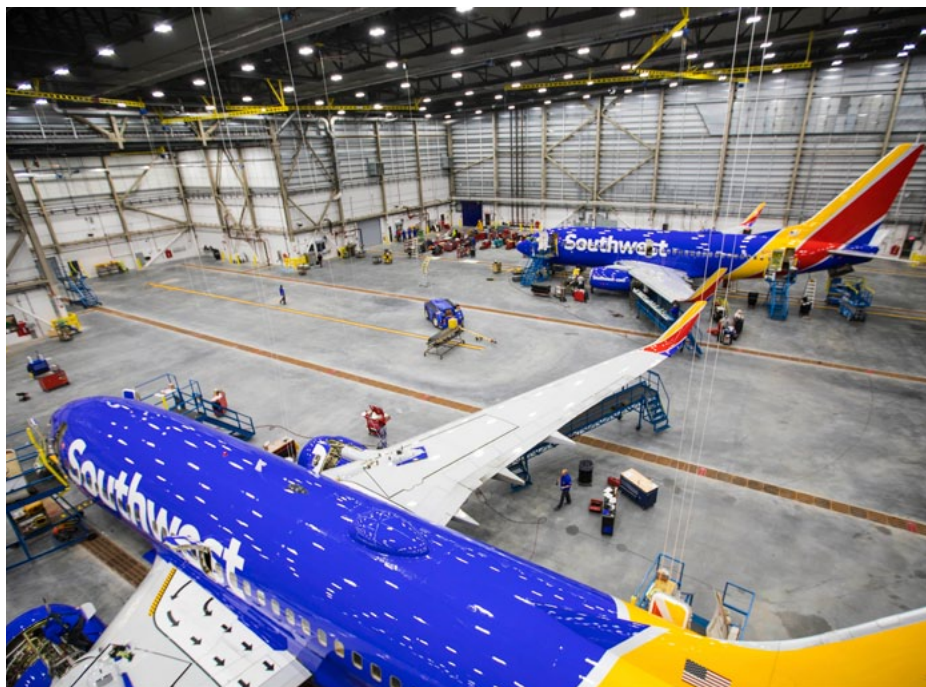
A speaker from ACC Aviation told this publication recently that the industry can mitigate this by bringing qualified people from overseas or creating incentives for

new apprentices.

Stouten feels the MRO sector still needs help attracting qualified personnel as several technical schools have had lower enrolment levels over the last couple of years. "There seems to be a loss of interest in aviation from the younger generation and waves of experienced skilled labour leaving the industry and this trend was of course made worse by the pandemic and its direct consequences." He feels the industry needs to do more to become more attractive again to increase the number



The challenge might be a lack of skilled labour to fulfil the demand in a timely manner. Photo: AAR



There are concerns of global supply chain gaps that prevent the timely order of parts for aircraft repairs.
Photo: Southwest

of certified personnel and cover the shortage of workers – “As an example, some companies are teaming up with technical schools to offer jobs right after graduation. This skills shortage, in addition to the crisis and procurement difficulties will continue to contribute to a steep price rise for MRO services.”

In order to spark greater interest in aviation, AAR for instance collaborates with various educational partners, including youth centres, high schools, community colleges, private colleges, and universities near AAR’s four U.S.-based aircraft repair stations in Miami, Oklahoma City, Indianapolis, and Rockford, Illinois, and the global headquarters near Chicago’s O’Hare International Airport.

In October 2019, through a partnership at Western Michigan University, AAR launched the EAGLE career pathway programme, which focuses on ethics, airworthiness, greatness, leadership, and engagement (EAGLE). Glover explains: “Students selected into this programme benefit from hands-on work experience, job shadowing, and assigned mentors. This programme creates clear pathways to career advancement for college students across the country and to fill the

predicted skill gaps in aviation with multi-levelled certified aircraft mechanics.”

Prior to the onset of the pandemic, the average age of an FAA-licensed mechanic was 51, and 27% are over 64, according to a 2017 study by the Aviation Technician Education Council (ATEC). Recognising this trend, Governor Stitt says Oklahoma state has made strides at establishing a strong pipeline of qualified workers for aviation and MRO companies by investing heavily in education and STEM programmes to get the youth excited about careers in aviation.

Oklahoma is home to twelve public and private universities that offer aerospace degrees, including the nation’s only PhD programme that caters to unmanned aerial systems along with private technical training programmes such as the Metro Technology Centre at Will Rogers Airport and the Moore Norman Technology Centre. The Governor highlights that over the next five years, the Oklahoma CareerTech, a network of six vocational-tech schools with 59 Oklahoma locations throughout the state, expects that an additional 10,000 students will graduate with aerospace-related degrees.

“In short, by following Oklahoma’s

example, communities across the U.S. with a strong MRO presence can ensure that companies have the right support needed to thrive in this new post pandemic world,” Governor Stitt adds.

Comments from Adamski at Kellstrom echo similar points of view that prior to the pandemic, the industry in North America suffered a shortage of skilled personnel due to a vast number of technicians reaching retiring age, while educational programmes were not able to induct enough qualified personnel to cover the vacancies. “The current post-pandemic conditions continue to be challenging and will remain challenging for the foreseeable future. The recent years of high cyclical demand in the industry have caused maintenance organisations to react by drastically adjusting personnel levels, negatively impacting the lives of their technical skilled employees,” Adamski highlights.

And he advises that providing employees with the ability to build on their own potential by exposing them to new opportunities that will allow them constant growth, providing a safe working environment, a competitive salary and benefits are some of the main strategies for retaining technical personnel.



Growing aircraft utilisation has led to a spike in MRO work.
Photo: American

Embraer Component Support

Editorial Supplement
By Keith Mwanalushi



In Association With



Flexible package of services for a **simplified** aftermarket



In 2021, the E-175 flew 35% more flight hours than the previous year.
Photo: Embraer

Embraer's commercial aircraft portfolio spans a broad range of support solutions for operators. AviTrader MRO editor **Keith Mwanalushi** caught up with Johann Bordais to get an overview of the current aftermarket landscape.

Regional jet operations have seen the fastest recovery from the COVID crisis and as industry analysts have observed, secondary market trading volumes for regional aircraft have also made a strong come back.

At Embraer's services and support division, solutions available to operators range from product enhancements to material services, airframe and component MRO, consultancy and efficiency services, and pilot and maintenance training among others.

In terms of services, Embraer has a network of owned and authorised service centres that span the globe to support its commercial aviation operators in several regions. In North America, the two centres are in Nashville (TN) and Macon (GA);

collectively known as Embraer Aircraft Maintenance Services (EAMS). In South America, there is a centre of excellence to support all three business sectors: Executive, Defence and Commercial, located in Sorocaba, Brazil.

In March 2022, Embraer celebrated the 20th anniversary of the EAMS facility. Opened in 2002, EAMS provides comprehensive airframe services for all heavy maintenance, unscheduled maintenance, checks and structural repairs, modifications, supplement type certificates (STCs), aircraft bridging and lease returns.

EAMS handles component and AOG requests from around the world and in a typical year, processes more than 10,000 repair orders, completes 180,000

maintenance tasks, and collects 10 million service data points that help to continually improve Embraer's technical knowledge.

OGMA is located close to Lisbon, Portugal to support the European, Middle East and Africa region.

"Those facilities have extensive product experience and can provide significant peace of mind to customers that may want to rely on a one-stop-shop solution," states Johann Bordais, President and CEO at Embraer Services and Support.

Embraer has established a series of affiliated MROs around the globe that complement the owned service centres – "These strategically placed facilities allow Embraer to divide work to support our customers in regions which they desire to

Johann Bordais, President and CEO,
Embraer Services & Support.



“
As we move into 2022, we are initiating a global project within the Embraer materials organisation to enhance our online order system.
Johann Bordais, Embraer
”

of flight hours and 33% more in flight cycles in comparison to 2020, confirming that the recovery of aviation was stronger in the market segments that the E-Jets fly. Embraer has sold over 800 E175s to operators globally with North American airlines accounting for more than 85% of those orders.

As ERJs reach their golden years, Embraer's material support agreements are paramount in maintaining the operational readiness of the fleet, says Bordais. “We remain committed to supporting the ERJ fleet as it matures, and in conjunction with that we have recently announced a multi-year pool programme with Commutair, one of the largest fleet operators of the ERJ platform in the United States. This new programme is in addition to other ERJ operators such as AirLink, Western Air and GMJ, who

have the aircraft. In specific regions, such as Africa, Embraer can offer flight and cabin crew training through its training centre in Johannesburg and from pilot's initial training, to transition and dry FFS hours lease. We are always working on being the option of choice to the E-Jets customers,” Bordais adds.

To enable operators focus on their core business, Bordais explains that Embraer offers a comprehensive and flexible package of services capable of simplifying operations, reducing risks and improving cash flow predictability: Embraer Total Support Programme (TSP) features a tip-to-tail parts pool, heavy maintenance checks and landing gear overhaul, and a comprehensive package of technical services – “TSP is comprised of a standard package along with a menu of optional services, which can be added depending on the needs of the operator, bringing tangible savings to E2 operators. One example is the contract signed with Porter Airlines, in 2021, to support the E195-E2s fleet.”

Supporting growing E175s as ERJs reach maturity

In February American Airlines announced an order for three more

E175s bringing its network fleet total to over 100 aircraft. The new arrivals are operated by regional subsidiary Envoy Air and this recent order continues to prove the popularity of the E-Jets with North American carriers. And this will likely spark greater recovery in demand for aftermarket services post-pandemic.

Data from Embraer indicates that in 2021, the E-175 flew 35% more in terms



The E-175 continues to be popular with North American carriers.
Photo: Embraer



Embraer has a network of owned and authorised service centres

Photo: Pratt & Whitney

currently have active material support programmes with Embraer,”

In 2021, even with the global supply chain still in recovery, Bordais reports that Embraer was able to achieve a 92% on shelf availability for its commercial pool programmes. “Embraer remains active with new investments in our spares and pool programmes, increasing over 10 percent in inventory levels for this year.

“As we move into 2022, we are initiating a global project within the Embraer materials organisation to enhance our online order system. This new platform will allow for improved purchasing, returns and supply chain visibility, further increasing the performance level with our customers,” he adds.

Using predictive maintenance to reduce inventory levels

Embraer recognises its central role in the maintenance eco-system by promoting frequent best practices

exchange workshops among its operators, collecting airframe and powerplant issues and managing the suppliers to deliver required product improvements.

In terms of using predictive maintenance technology to reduce inventory levels, Embraer is focused on the main source: data quality and pursuing the continuous improvement of the next most crucial step: converting all data in true value to the operators and to the company. Bordais indicates that for new aircraft developments, Embraer is establishing a high number of design requirements to capture, transfer and process as much data as possible. He highlights those new products are prone to have more structural health monitoring (SHM) and prognostics and health management (PHM).

Bordais continues: “For current aircraft, all processes to obtain data are being reassessed, logics are being redesigned or even created to possibly

manage more data, to process, analyse and diagnose failures that will be a source for maintenance programme improvements, maintenance controls and consequently impacting on inventory levels reassessment for reductions or optimisation.”

Bordais points to the AHEAD-PRO (Aircraft Health Analysis and Diagnosis – PROgnosis) system, as an example, which constantly links the back-office staff with the aircraft data to allow for predictive maintenance actions. “Our operators can take full advantage of this system and work with their own teams or ask Embraer to support the review of their aircraft. The outcomes of this workforce have resulted in a maintenance cost reduction of three-digits for the E190/195 family and two-digits for E170/175 family so far.”

Support services for the new E2 series

Embraer reports it is progressing well in the support and services structure

following the entry-in-service of the E2 with operators, by growing the already in place infrastructure. In terms of support, the company has warehouses around the globe and there is the TSP designed for the E2 operators. There is also the physical presence of technical representatives at the operator base and the support of the return-to-service team in Brazil.

"Embraer is committed to the successful life of the E2 series aircraft and will adjust our support as the aircraft enters service in other regions of the globe. Since the aircraft has a fully optimised and extended maintenance interval over the E1 aircraft series, Embraer will be ready for full support," Bordais assures.

Nigerian operator Air Peace recently signed up to a services agreement to support the airline's E195-E2 and ERJ 145 fleets. The contract includes access to the pool programme, which includes component exchanges and repair services for hundreds of reparable items for Air Peace's Embraer aircraft, and the installation of the AHEAD PRO in the airline's E195-E2 fleet.

As part of the agreement Embraer emphasised that its pool programme will provide the most efficient and reliable

solutions to Air Peace's fleet. Embraer also suggests the airline will benefit from the availability of spare parts, and achieve significant savings on repair and service costs, and maintain a profitable operation. The Embraer pool programme is designed to allow airlines to minimise their upfront investment in high-value repairable inventories and

resources and to take advantage of Embraer's technical expertise and its vast component repair service provider network. Currently, the programme supports more than 50 airlines worldwide.

Regarding the E175-E2, Embraer decided in February 2022 to place a three-year pause in its development programme. As in previous years, Bordais explains that this is associated with the ongoing U.S. mainline scope clause discussions with the pilot unions regarding the maximum take-off weight (MTOW) limitation for aircraft with up to 76 seats, together with current global market conditions for commercial aviation and the continuing interest in the current E175 jet in the U.S. market – "We expect to resume the programme development activities following this period, which will result in a re-programming of the aircraft entry into service between 2027 and 2028," Bordais concludes.

A man with a beard and glasses, wearing a green flight suit and yellow earplugs, stands in front of a large aircraft engine. The engine is a large, orange-brown turbofan with visible compressor and turbine sections. The man is smiling and looking towards the camera. The background is slightly blurred, showing the aircraft's structure and the tarmac.

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High tech. *Very human.*





E-Jet operators are flying varying fleet sizes in very different locations.
Photo: Shutterstock

Spairliners amplifies Embraer support solutions post-pandemic

Thies Möller, Managing Director and Chief Executive at Spairliners talks about the broad range of component services for Embraer aircraft and the company's growing ambitions in the market.

Spairliners is an independent component aftermarket service provider specialising in the E-Jet aircraft family with a wide variety of services from ad hoc loans, exchanges and AOG services to full PBH solutions. We also provide component care for the A380, but this platform has taken a backseat since the pandemic. So, we are now in the unique position to fully focus on the Embraer E-Jet family.

“ We have been leveraging the USM market and have established a dedicated team a few years ago to manage the component procurement and trading business to realise cost savings. ”

Thies Möller, Spairliners

Our E-Jet customers are operating varying fleet sizes in vastly different locations and climates across the globe and we always ensure that our solutions are fully tailored to each customers' individual needs and requirements.

As an integrator, we are a one-stop-shop offering asset management, procurement, home base stock, as well as access to our component pool to enable our customers to service their fleet with short turnaround times all around the world.

As we have seen in the past two years, cost and cash flow optimisation are still key priorities for airlines as they are slowly recovering from the COVID pandemic. We expect air traffic to be back to the level of 2019 within the next two years.

Spairliners is emerging stronger from the turbulent times and is now setting the course towards growth again. We have

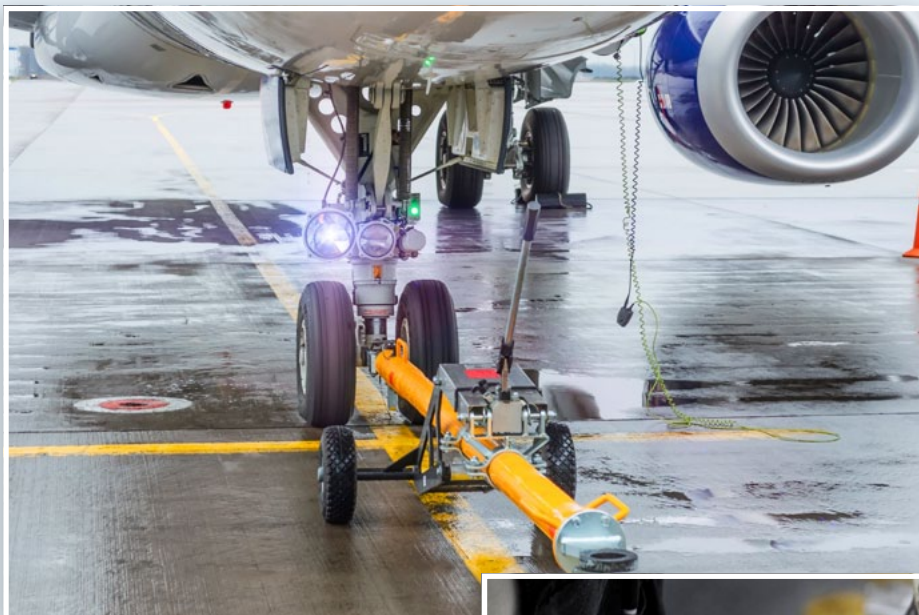


Thies Möller, Managing Director and CEO of Spairliners.

reinforced our sales team and are now in good position to build on our success in the EMEA region and continue our expansion into other regions.

Partnerships and innovative technologies will drive efficiencies in component MRO

Spairliners is always aiming to find the most cost-effective and efficient solutions for its customers on the market. We have been leveraging the USM market and have established a dedicated team a few years ago to manage the component procurement and trading business to realise cost savings and benefit from the higher availability.



Spairliners found custom solutions for operators during the pandemic. Photo: Shutterstock

While our shareholders are still our first address for MRO services, expanding our network through direct relationships with supplementary service providers within the MRO ecosystem provides us with an additional level of flexibility and autonomy. Over the past few years, we have forged industry partnerships with several providers that we trust to reliably deliver to the high-quality standards we adhere to in order to ensure the timely supply of critical parts. Combined with our unique expertise in supply chain, engineering, and smart inventory management our partners' agility and experience will result in higher availability of parts, faster turnaround times, and a better service for our customers.

Furthermore, we can strategically grow our international network especially in the regions we are looking to expand to, such as the Americas. This is adding a geographical advantage to the operational benefits we are gaining through these partnerships.

Lastly, we see that DER and PMA solutions are becoming more attractive recently and gain importance in times of financial strain. They help to strike the right balance between delivering high quality parts and service and lower costs for our



New technologies will drive efficiencies in component MRO.

Photo: Spairliners

customers. Together with some of our partners who have been implementing DER and PMA solutions successfully for years, we are overcoming some of the caveats surrounding these solutions to offer our customers the same, sometimes even better quality at improved cost.

Flight hour programmes and supporting airlines as they rebuild their flying schedules

Power by the hour (PBH) programmes provide a sense of security and full ownership of cost, which allow the operators to make reliable and predictable calculations for their operations. Airlines

still prefer these programmes because they require much less in-house management. So, the airlines can focus their time and energy on what matters most, flying their passengers! In addition, our services are scalable and flexible to move with the fleet and network development of the airlines.

During the height of the COVID pandemic, most operators grounded their entire fleet and could not reach the minimum flight hours that are the baseline for any PBH contract and an integral part for the cost calculation. This turned the "safe haven" of a predictable PBH agreement into a burden for the operators because they would be obliged to pay for

component support and repairs at a flat rate, even though they did not fly.

While Spairliners was also severely suffering as a company due to the pandemic, we did realise that the only way to get through the crisis was to share the pain of our customers. We made it our priority to work with our customers to find custom solutions for them to fit their current situation instead of insisting on their contractual obligations. Ultimately, we were able to find agreements that were taking the actual flight and maintenance activity more into consideration for the period of very low activity for a limited time. We received incredibly positive

EMBRAER COMPONENT SUPPORT

feedback from our customers who really appreciated that we accommodated their needs and found a common ground to overcome this turbulent period.

Forecasting parts supply demand

To start with, there are life limited parts that will need to be replaced after a certain amount of time or number of flight hours. The forecasting for those items is fairly simple and straight forward. For anything else, we use our Spairliners Asset Control Enterprise (SPACE) solution to optimise our inventory in real time while increasing service level, component availability, and simultaneously reducing costs.

We developed this tool in collaboration with our technology partner LOKAD, they are experts in data analytics. SPACE combines probabilistic forecasting with engineering recommendations and provides tailored investment decisions suitable for specific component assets. Our methodology takes a wide range of possible supply chain scenarios into account to deliver a holistic assessment of parts supply and demand. We are using this approach to size our own inventory pools across the globe and to determine the optimal home base stock for our customers. Considering that we have been relying on data analysis for our asset optimisation for a while, we are now also assessing the possibilities of predictive

maintenance and we strongly believe this will be another game changer in our industry. Predictive maintenance will have a significant impact on how we manage component support in the future.

Growth opportunities in the Americas

The Americas, and North America in particular, is by far the largest E-Jet market. No other region has a greater active E-Jet fleet, and we are now focusing on the E-Jet family as our main aircraft type. We expect to achieve our goals for growth on this platform.

We see that many E-Jet operators in the Americas are handling their component support themselves on a stand-alone basis. We also see that there are many MRO suppliers in the region, making it potentially more difficult for the operators to identify the best suppliers for every single component. This is where Spairliners comes in to close the gap as an expert in integrated component care and to make the life of operators easier through our expertise. We have direct access to an extensive MRO network and being a one-stop-shop is our company's core strength.

Another aspect worth considering is asset availability and the surplus market. Regional air traffic in the Americas is very active, and so is the MRO landscape. This requires extensive attention from procurement and supply chain experts to

SPONSORED EDITORIAL

balance inventory on shelf and operators' cash flow, as already stated. Outsourcing this part of the airline's operation to a dedicated integrator such as Spairliners can result in significant benefits for operators. It will reduce inventory, reduce stress levels at the airline, and it will free up cash as well as manpower so that the operator can focus on flying.

Any plans to extend support solutions to the new E2s?

The short answer is not now. There is too limited commonality between the E1 and the E2 and building up capabilities to support this aircraft type would require a significant investment. We are continuously monitoring the development but as of now, the market is not attractive enough for Spairliners to take this step. The recent announcement by Embraer to pause the development of the E175-E2 – the most popular E-Jet size – for at least the next three years is further proof that we were right to not take this decision yet.

The E1 family is still incredibly successful, and a substantial portion of the fleet is fairly young. We therefore expect it to fly beyond 2035, so we have a lot of potential to grow with the E1 family over the next few years.



Many E-Jet operators in the Americas are handling their own component support.
Photo: Embraer

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AVIAN is providing a one-stop, go-to access point for Embraer aircraft parts.
All photos: AVIAN

AVIAN, bringing
accessibility
and speed to the
Embraer parts
market.

AVIAN Inventory Management signed an inventory deal with Embraer back in January. Chief Executive, **Ian Gurekian**, talks about the significance of the agreement and the long-term spare parts strategy of the business.

AVIAN was established in 2019 to become a trusted partner to aviation OEMs, MROs and airlines. By design, AVIAN is focused on purchasing material from the OEMs and collaborating with them to create the best distribution strategy for their material. The notion of relationship is important, because AVIAN never approaches the table as a competitor, but as a trusted distribution partner.

We work with the OEMs to put in place the best possible solution to their needs and bring the capital to do it. In some cases, that is a simple inventory acquisition; in other cases, it involves establishing a brick-and-mortar operation designed to meet an OEM's requirements, as we have done for Embraer. We are creative, and do not mind rolling up our sleeves and getting dirty. We now literally have our fingerprints on each part!

The agreement with Embraer covers purchasing, marketing and distribution rights of surplus Embraer commercial and business jet aircraft parts. It is designed to promote accessibility and speed to market. AVIAN's focused distribution centre will deliver unparalleled product availability to all aircraft operators and maintenance and repair stations around the world providing a one-stop, go-to access point.

Embraer embraced the relationship, and the spirit of what AVIAN offers from day one. Together we have been working for more than two years on an exciting strategic re-direction for their surplus spare parts distribution. They will sell to AVIAN and allow us to manage the distribution of the surplus inventory across both the commercial and business jet segments. Embraer is not only technically excellent, but also intensely proud of and focused

on their customer base. Selling what has become surplus material to them is more of a distraction from their core focus than it is ultimately a benefit. Doubling down on their customer focus while allowing AVIAN to create a tailored strategic alternative just made sense. More importantly, Embraer's partnership with AVIAN keeps them close to the action and provides accessibility and transparency in a manner they would never be able to achieve with established competitors in the market.

I do not want to speak for Embraer, but consolidating all of their worldwide surplus spare parts with one partner is a major strategic departure for them. They are embracing the disruption and partnership with the longer-term goal in mind. It is a 'big deal' in all senses of the word, and a very calculated attempt by Embraer to try something new and jump in

EMBRAER COMPONENT SUPPORT

with both feet. That kind of commitment level is a result of the elements that we have put together at AVIAN to meet Embraer's demands.

From a logistics perspective, we did not want to re-invent the wheel or bump up against some of the best names in the business, so we co-opted them and brought them in-house. We selected DASI, RASG and UNICAL to act as embedded sales channel partners in our facility to sell AVIAN's inventory, and they use the full scope and reach of their own sales teams to bring our Embraer inventory to customers worldwide. Whether it is AOG or daily business, we are on track for same day picking and shipping from AVIAN's Orlando facility via our sales channel partners.

Forecasting parts supply demand especially as airlines return aircraft to service

Lately, in the regional and narrowbody segments, there is a clear reversion to pre-pandemic levels of activity, so the trend is our friend and historical usage data (and failure rates, etc.) start to become more relevant again as we look across the worldwide fleet. COVID taught us all to be humble (and conservative!) in our forecasting and the current "geopolitical situation" in Europe is a further reminder of that, but the rebound in activity, especially



Ian Gurekian,
CEO AVIAN Inventory Management

“The long-term strategy is to build and expand alongside Embraer and continue to provide them with a trusted source that facilitates the growth of their business model.”

Ian Gurekian, AVIAN

at the intra-country and regional level, is very strong again, so we feel confident in the reversion to the mean.

Furthermore, we cover spares for Embraer business jets as well, and as I am sure we are all aware, that market segment has done particularly well during and emerging from Covid, with hours and cycles up significantly in the smaller to mid-size jets, both of which are Embraer's mainstay.

Building capacity from the

ground up

Our facility in Orlando is a brand new 75,000 square foot Class A space that gives us ample room to grow and that we have been able to design from the ground up. The layout is intended to provide the sales channel partners with their own offices and areas from which they can efficiently receive inventory from AVIAN, as well as inspect and ship same-day.

We are also now completing a fully climate-controlled 12,000 square foot "cool room" to ensure that any parts that require a humidity and temperature-controlled environment are properly stored in adherence with manufacturer guidelines and the industry's highest standards. It is a world-class facility, and I am immensely proud of how the team has brought it together in short order.

The long-term strategy is to build and expand alongside Embraer and continue to provide them with a trusted source that facilitates the growth of their business model. Without taking my eyes off the task at hand, I would like to think that other OEMs might see value in exploring similar arrangements with AVIAN, which would allow us to expand the platform, replicate the structure, and leverage the team.



Ian Gurekian (L) and Johann Bordais of Embraer Services and Support

For additional information, visit:
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Leveraging expertise to **support** Embraer fleets worldwide



Support on Embraer aircraft is constantly evolving.
Photo: Embraer



Leon Kouters, Sales & Marketing VP at Fokker Services Group

Leon Kouters, Sales and Marketing VP at Fokker Services Group explains the current capabilities for Embraer support services and what operators can look forward to in the future, especially as aircraft return back to service.

Fokker Services Group's support on Embraer aircraft is constantly evolving. With focus now on component repairs, we cover avionics, instruments, hydraulics and pneumatics across ERJ135, ERJ145, E170 and E190 aircraft types. For our portfolio of capabilities, we have strong ties with major OEMs.

Last year we entered a seven-year overhaul and repair offload agreement

with Collins Aerospace for pneumatic capabilities including bleed air valves. For Integrated Drive Generators (IDGs), we are a Hamilton Sundstrand warranty repair station, supported by an on-site stock agreement. When it comes to engine accessories and line replaceable units (LRUs), we are a Honeywell Aerospace authorised service centre. These partnerships allow our teams in the U.S. and the Netherlands to provide all our customers worldwide with an elevated level of MRO expertise.

In addition, we develop innovative engineering solutions in-house. With our OEM heritage, we leverage our deep understanding of the total aircraft design and operation to create quality STCs. Modifications for Embraer aircraft include

the Underwater Locator Device (ULD) and Electronic Flight Bag (EFB) with a USB-C power supply option. Our sister company, Fokker Techniek, can step in to upgrade aircraft with new modifications for end-to-end upgrade support.

“ We are constantly expanding our repairs portfolio. With every new capability we develop, operators can enjoy the benefits of our continuous optimisation loop.

*Leon Kouters,
Fokker Services Group*

”



Modifications for Embraer aircraft include Electronic Flight Bags

Photo: Embraer

Tell us about the MoU you signed with Embraer last year.

Fokker Services and Fokker Techniek, known together as Fokker Services Group, signed a Memorandum of Understanding (MoU) with Embraer last year. We intend to explore a wide range of opportunities across engineering, component, and airframe services with the intention to commit to win-win opportunities with a focus on the following main areas: Defence, Commercial, Services and Development. We see different ways that Fokker Services and Fokker Techniek capabilities can fuse together, creating impactful tailor-made solutions for Embraer and its customers, developed

with the full support from Embraer.

How are you supporting aircraft returning to service?

For aircraft returning to service, we know which components may have been damaged while in storage. The pneumatic bleed air system, for example, may have been impacted if stored outside with varying temperatures or humidity and valves can get stuck due to corrosion. We have addressed these challenges before and can provide the right solutions to get these components back in top condition.

We also collaborate with other Embraer integrators, allowing us to extend our MRO expertise through new avenues. Covering a variety of critical components

related to power generation, engine accessories, bleed air valves, starters and avionics, with these partnerships we offer highly reliable aftermarket services to more Embraer E-Jet operators worldwide.

What can operators look forward to in the future?

We are constantly expanding our repairs portfolio. With every new capability we develop, operators can enjoy the benefits of our continuous optimisation loop. During this process, we actively explore ways to enhance our new capabilities and implement new learnings to our pre-existing solutions.

Take engine accessories, for example, we have supported CFM56 engine accessories for many years. When we expanded our portfolio to include the CF34, we transferred our engineering experience and key learnings from the CFM56 to design new capabilities. This flow of information works both ways. With any learnings we gain while developing new component capabilities, we evaluate whether we can also enhance our pre-existing solutions. This process is also applied for components that share design similarities, such as IDGs and bleed valves on Dash8 Q400, Fokker 50 and CRJ aircraft.

Our continuous optimisation loop means customers can enjoy cost-effective and reliable solutions that maintain a high level of quality.

For more information, contact:
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Specialised solutions for the aviation aftermarket



Current Engineered Solution products include AerSafe, AerTrack and AerAware.

All photos: AerSale

AerSale is an independent aviation industry leader specialising in aftermarket products and services supporting commercial and government aircraft operators, owners, and maintenance providers. Founded in 2009, by veteran commercial aviation aftermarket professionals Nicolas Finazzo and Robert Nichols, the vision was to form a purpose-built company focused on maximising flight equipment value for its customers. Through the past decade and several economic cycles later, AerSale, now a public company (NASDAQ: ASLE) has built a breadth of services and infrastructure serving the global aviation market, while maintaining its focus on serving individual customer's needs and circumstances.

AerSale provides comprehensive flight equipment support through two divisions: Asset Management Solutions "AMS" and Technical Operations "TechOps". Together, AMS and TechOps differentiate AerSale by offering our

customers a broad range of integrated products and services which provide cost-effective and efficient 'turn-key' flight equipment support tailored to that customer's specific needs.

Our AMS division acquires flight equipment in the aftermarket as feedstock to support AerSale's business activities. These include the sale and lease of aircraft and engines, in addition to the disassembly of aircraft and engines to provide a steady, low-cost source of component parts (Used Serviceable Material "USM") to support our TechOps Maintenance, Repair and Overhaul ("MRO") business units, as well as third-party USM sales. Our leasing activities focus on aircraft leases that require rapid or complex aircraft customisation, as well as urgent and short-term engine lease requirements. AerSale's ability to leverage in-house MRO capabilities, engineering expertise, and USM support provides unique advantages in responding to customer's

needs. AerSale also leverages AMS' valuation acumen and diversified infrastructure to maximise the value of aircraft and engines on behalf of third-party clients, who lack the expertise and/or infrastructure to optimise the value of their flight equipment investments.

Our TechOps division specialises in the nose-to-tail MRO of the most popular commercial aircraft and components operated within the passenger, cargo, and government sectors. Through our MRO facilities, we provide technical engineering and professional MRO services that are required to optimally maintain and modify flight equipment. Our aircraft MRO facilities located in Goodyear, AZ and Roswell, NM feature 650,000 square feet of hangar space, in addition to long-term storage capacity for up to 650 aircraft. These facilities provide high-skilled aircraft MRO services, airframe structural modifications, cargo conversions, and advanced flight system

upgrades. Additionally, their dry-desert conditions and large capacity storage facilities are ideally suited for long-term storage of aircraft to be returned to service in the future. For retiring aircraft these same facilities also provide aircraft disassembly, asset management, parts distribution, and materials recycling services designed to maximise aircraft residual value with minimal environmental impact.

Our TechOps component MRO operations are located in Miami, FL, Rio Rancho, NM, and Memphis, TN. These facilities provide wide-ranging repair, overhaul and modification services for transport category aircraft components. TechOps' component capabilities include dedicated component engineers, technicians, and mechanics with specialisations spanning composites, pneumatics, fuel systems, electro-mechanical assemblies, interiors, painting, flight-control surfaces, nacelles, and landing gear.

TechOps benefits from knowledge gained through decades of providing adept engineering and technical support to foremost flight equipment owners and operators. This knowledge combined with the breadth of our aircraft and component MRO capabilities, provides TechOps with a significance advantage in the development of advanced technical repairs, modifications, and products,



AerSale undertaking work on a 757 cargo door.

which we market under the tradename "Engineered Solutions." Our Engineered Solutions division focuses on integrating emerging technologies in the upgrade of post-production aircraft. This process encompasses the design, manufacture, and installation of new products, systems, and services that can enhance aircraft operations and maintenance.

Engineered Solutions serve to bring down the ultimate cost of flight equipment ownership by providing our clients with cost-efficient alternatives to the traditional OEM offerings, while frequently reducing installation lead times. We primarily focus on the development of Engineered Solutions designed to comply with mandatory

aircraft maintenance requirements, as well as to address evolving market-driven demand for flight equipment upgrades.

Prior to commercialisation, all of our Engineered Solutions products and processes are approved by the Federal Aviation Administration ("FAA") under Supplemental Type Certificates ("STC"s) and/or Parts Manufacturing Authority ("PMA"s) certifications. As needed, we are routinely able to extend our STC and PMA authorisations for use by customers outside of the United States, by obtaining approval from respective foreign regulatory authorities as required.

Our current Engineered Solution products include AerSafe, AerTrack and AerAware. As an example, our AerSafe product was designed and approved by the FAA as a solution for compliance with an FAA mandate to mitigate aircraft fuel tank flammability on Boeing and Airbus aircraft. AerSafe has also been approved for installation on certain aircraft models that are regulated by the European Aviation Safety Agency ("EASA") and the National Civil Aviation Agency of Brazil.

In summary, everything AerSale does is built around providing comprehensive care of aftermarket flight equipment to drive value for our customers with specialised best-in-class products and services developed to enhance aircraft safety, performance, and service life.



AerSale aircraft component work.



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Q & A

In the hot seat...

Julian Aldana
Vice President
Technical Services
ACC Aviation

What attracted you to this industry?

When I was very young, I used to go with my father on Sundays to watch aircraft taking off and landing at El Dorado airport in Bogota. I was fascinated with the entire aircraft operation on every family trip, from the ground handling and maintenance to the flight operations. No one in my family worked in aviation. Still, I developed a keen interest in commercial airliners, especially the widebodies such as the Boeing 777, which I consider one of the best aircraft ever built. I had a clear goal in my mind to be part of this industry, particularly engineering and maintenance.

What does a typical day involve in your role?

ACC Aviation is a global organisation with offices on four continents, enabling me to leverage an office network that spans Europe, the Middle East, Africa and Asia. Now that the industry is ramping up again and airlines are returning to service, being traded or needing inspection, there is much work to be done. I speak with clients daily, including airlines, lessors, and financiers. My role oversees technical projects, and I liaise closely with our consulting team and our aviation finance advisory.

On a typical day, I review and manage all ongoing technical projects, including oversight of technical inspections, engaging with existing and prospective clients, reviewing business development activity, and approving new technical projects. It's essential to understand the challenges that our clients face, and we see a lot of pressure on MRO companies to offer early slots now that so much of the world's fleet is back flying. We will typically have internal and external meetings during the week where we share the progress of projects and discussions with potential new clients. Currently, we are working on projects in North America, Africa, and the Middle East, which means close liaison with our colleagues and



Several airlines have faced talent constraints.
Photo: FL Technics



Record digitalisation will be a generational development.
Photo: TRAX

associates all over the globe.

Outside of my work, I travel frequently and enjoy speaking at various aviation events such as Airline Economics. Recently, I attended MRO Middle East in Dubai and ISTAT Americas.

Briefly give us an overview of the key services at ACC Aviation?

ACC Aviation is a global provider of aviation services, and we celebrate 20 years of successful business activity later this year. ACC sits at the crossroads of any market movement within aviation – customers looking to grow their fleets,

acquire aircraft, divest or reduce their fleet, arrange debt financing, valuations, appraisals, inspections, through to charter and ACMI over short to long term periods. Our consultancy and asset management division, headed by Rob Watts, complements our aviation finance advisory and knits together comprehensive industry experience and global market awareness.

What are the reasons behind the creation of a new technical division last year?

ACC Aviation's consulting business has

positioned itself to offer the whole of the lifecycle asset management services to our airline, financier, lessor, and investor clients. Technical services play a critical role in ACC's global consulting product right through to aircraft transaction services and we're seeing growing demand for this area of the business, which additively benefits the wider consulting division and provides further value for our clients. Our asset management team is involved in dozens of transactions annually, each with a technical services requirement.

The timing is interesting, are you seeing a rebound in aircraft inspection services?

Indeed. Our airline clients are starting to re-emerge from the pandemic, ramping up their fleets and accepting new aircraft. However, many airlines face talent constraints and have turned to ACC to bolster their global technical teams. We can rapidly deploy technical resources and perform pre-purchase and pre-lease inspections globally. Lessors and lenders are looking for more optimal deployment of their assets and ACC has been active in supporting them to redeliver, transition, and remarket aircraft to their future owners and operators.



ACC Aviation can perform pre-purchase and pre-lease inspections globally.

Photo: Vallair

Looking at the aircraft technical services market, what do you think is currently the biggest challenge?

Generally, travel restrictions have made it logistically challenging and costly to deploy resources vs pre-pandemic. This has been particularly difficult for traditional providers with higher fixed bench strength. We've taken a hybrid bench approach, offering our clients the choice between in-house technical managers or the deployment of local subcontractors within our network. The versatility and flexibility of this model have served us well throughout the pandemic.

How is the shortage in aviation technical expertise playing out, especially in the U.S.?

I discussed this topic at length on my recent trip to ISTAT Americas. The situation is starting to be of significant concern to major MROs and approved component repairs organisations and is beginning to impact their business, driving delays in turnaround time. The industry can mitigate this by bringing qualified people from overseas or creating incentives for new apprentices. It's a great way to enter the industry, learn skills, and get paid. Ninety percent

of engineers and technicians come into aviation this way, versus university, and it's encouraging to see companies restart such schemes.

What is your opinion on the pace of industry transformation to digital aircraft records management?

Quite positive. The goal to have all

the airlines with 100% of their records digitalised will save time, money and help the environment. It is a win-win for all parties. However, it's a significant undertaking for airlines and aircraft with several years of physical copy records are not yet digitalised. I don't expect they can justify the cost of digitalisation for older aircraft. Therefore, I expect record digitalisation will be a generational development, applying first to new aircraft and working its way through the global fleet until non-digitalised aircraft are retired.

What is your key priority in your new role as VP of Technical Services?

I am leading the growth of this new business unit for ACC. As a technical services provider, ACC Aviation is a new player. However, we're backed by two decades of supplementary expertise and a global network of aviation experts. My main priority is to ensure that we're set up for significant growth in this area while continuing to provide unmatched technical services to our existing clients. This month, we're welcoming a dedicated technical services business development manager, Faizal Gara, based in London, highlighting our keen expectations for this area of the business.



The shortage in aviation technical expertise is a concern for major MROs.

Photo: ATR

»»»»→ *on the move*



Jordi Boto

Jordi Boto has been appointed CEO of Elbe Flugzeugwerke GmbH (EFW) and started in his new role on April 1. Boto is the successor of **Dr Andreas Sperl**, who left the company after more than 15 years of growth. Prior to the appointment, Boto was COO, responsible for driving the ramp-up of the conversion from passenger-to-cargo aircraft at EFW since November 2020. He brings more than two decades of global experience in the aviation industry to EFW, including key positions at Airbus. Under his leadership, key milestones have been achieved, both at Airbus as well as at subsidiaries and supplier companies. This included the success story of ATR, now one of the world's leading manufacturers of regional turboprop aircraft.



Faizal Gara

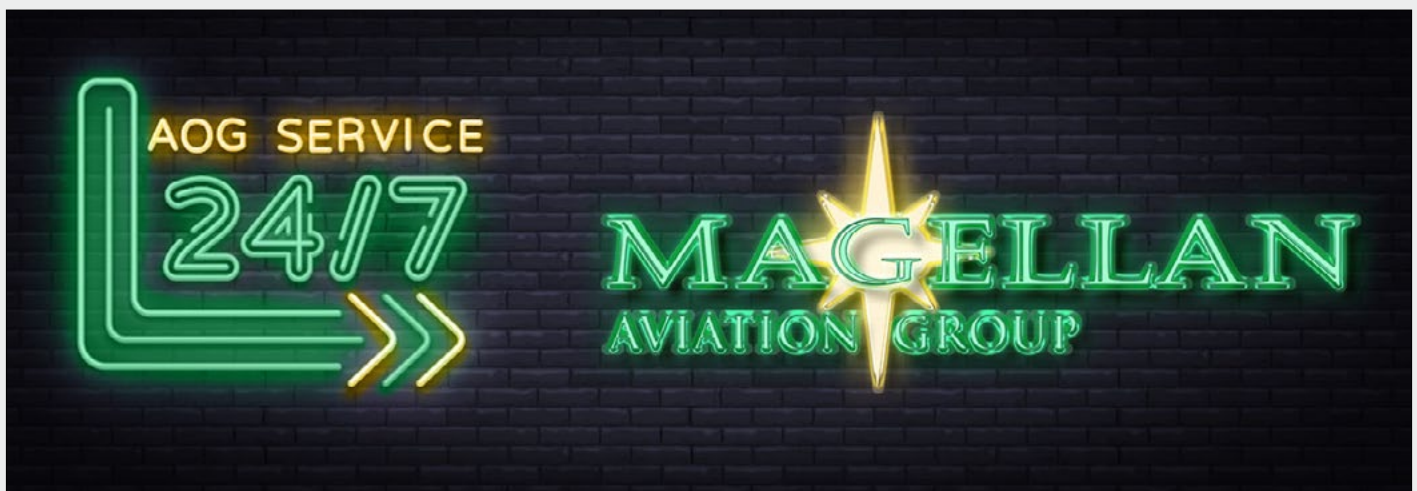
ACC Aviation, the global aviation services group, is expanding its technical services and asset management division with the appointment of **Faizal Gara** as Business Development Manager, effective immediately. Reporting to **Julian Aldana**, Vice President of Technical Services, he will be responsible for advancing the business' technical and asset management services to the aircraft financing and

leasing communities. Gara will be strategically based at ACC's HQ near Gatwick Airport, close to aircraft lessors and financiers in Dublin and London. His appointment coincides with a rebound in commercial aviation post-pandemic as more and more airliners return to the skies and demand for independent technical advisory builds. Gara brings nine years of relevant experience in aviation business development. Most recently, he held the position of Commercial Manager, Technical Services at IBA Group, responsible for sourcing, originating and managing new contracts.



Greg Watson

Greg Watson has joined King Aerospace as Chief Operating Officer. The company is experiencing dynamic-but-controlled growth with the expansion of its modification services. It announced the addition of two hangars at the Northwest Arkansas Regional Airport in addition to robust maintenance, repair and overhaul business at its facility at the Ardmore (Oklahoma) Industrial Airpark. As COO of King Aerospace Companies, Watson oversees the operations of King Aerospace, Inc. (KAI), a global operation that serves the US Military and Government; and King Aerospace Commercial Corporation (KACC), a leading provider of VVIP and corporate aircraft services with facilities in Ardmore, OK, and Rogers, AR.





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