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Collapse in air travel is driving down engine values

Recent data from independent aviation consultancy, IBA suggests that the collapse in demand for air travel caused by the COVID-19 pandemic has led to a significant decline in engine values, with a knock-on effect on engine MRO.

In a recent webinar, IBA outlined how trading volumes for new engines have depressed significantly, with maturing assets (used engines) now being offered at discounts of 30% or more given the distressed state of the market.

In the narrowbody engine market, IBA says the values of CFM56 engine variants used for Boeing 737NG and Airbus A320ceo aircraft have dropped up to 12% since the start of the pandemic. A greater drop in value has been avoided due to recovering demand in parts of Asia where this engine type is extensively used. However, the values of LEAP and PW1100 engines for the next generation Boeing 737 MAX and A320neo remain more stable, dropping just 2-4%, and IBA forecasts a longer term complete recovery in values. The LEAP 1B has shown the highest value decline due to the continued groundings of the 737 MAX.

The widebody market was oversupplied leading up to COVID-19, as many operators were replacing ageing fleets. The A380 is the worst casualty as airlines begin to fully retire them. The range of value changes in the widebody engine market is much greater, with the value of the Trent 970 engines that powers the A380 dropping by up to 50%. By comparison, the Trent XWB engines used for the A350 have dropped in value by just 1%.

Speaking of engines, read more about the marketplace for the CFM56 in our interviews with Aero Norway and APOC Aviation in this issue.

Keith Mwanalushi
Editor

The decline in engine values could have a knock-on effect on engine MRO.

Photo: Caerdav



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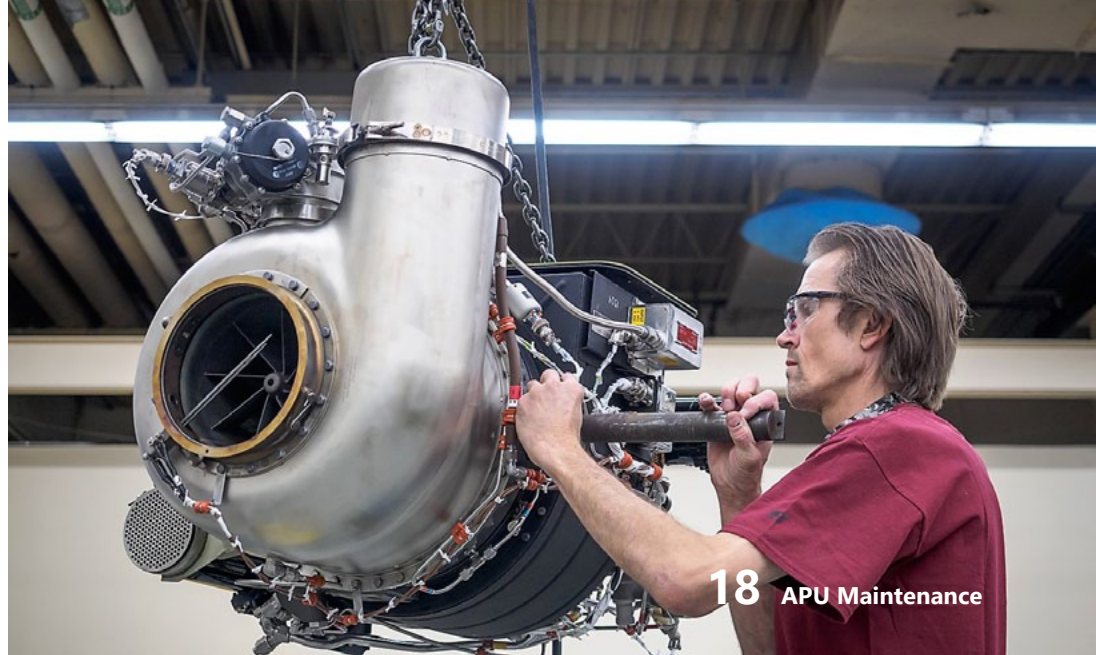
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VALLAIR signs Lol with GlobalX to lease ten converted A321 freighters

Vallair the mature aircraft and asset specialist, and launch lessor for the Airbus A321 freighter conversion (A321F), has signed an Lol (Letter of Intent) with US based Global Crossing Airlines Inc. (GlobalX) to lease ten converted A321 freighter aircraft in the most significant deal in the history of the A321F to take place within the air cargo industry. Vallair has been engaged in cargo conversions since 2015 and this ground-breaking agreement will see the Company take its pioneering A321 freighter programme to the next level. The first GlobalX A321 will be delivered by the third quarter of 2021. GlobalX expects all ten (10) A321F aircraft to be delivered and in revenue operation by the second quarter of 2023. Vallair signed its first Lol for the A321F in August 2019 with Qantas Freight and saw the maiden flight of its prototype A321F take to the skies in February 2020. The partnership with GlobalX will be a testament to Vallair's expertise and experience, as a lessor and within the cargo conversion sector, with GlobalX's commitment to expansion and progression as an ACMI leader especially in the U.S.

South African Airways Technical reaches agreement with customers and reinstates aircraft maintenance services

South African Airways Technical (SAAT) has reached an agreement with its customers and has begun to reinstate aircraft maintenance services. This development follows a decision taken by SAAT to suspend maintenance services to four of its airline customers in September 2020 due to outstanding payments on services already rendered. South African Airways (SAA) is one of the airlines that was impacted by the suspension of the aircraft maintenance service. The airline has made a payment to SAAT and the suspension of services was lifted on Wednesday, September 30. Another customer, Mango Airlines, has reached an agreement with SAAT making it possible to lift the suspension on Mango Airlines to commence work on their fleet as of Friday, October 2. The aircraft affected returned to service on Saturday, October 3.

HAECO Xiamen completes first Airbus A350 C-Check

HAECO Xiamen, a member of the HAECO Group, has completed its first Airbus A350 C-Check for Cathay Pacific Airways. With around 370 Airbus A350 aircraft now in operation, the aircraft type is well received by airlines from around the world. HAECO Xiamen is dedicated to expanding its technical capabilities so it can meet the growing demand for airframe services support for new generation aircraft in the aviation industry. HAECO Xiamen currently holds approval from multiple authorities around the world for all major and new-generation commercial aircraft types, including A320neo and Boeing 787 aircraft.



Photo: HAECO Xiamen completes first A350 C-Check

Czech Airlines Technics expands aircraft parking and maintenance service range

Czech Airlines Technics (CSAT) has decided to join forces with FlyTech Aviation Services and expand the range of aircraft maintenance and parking services at several international airports in the Czech Republic and Slovakia. The new business initiative targets a very interesting market segment, currently most intensively demanded by airlines, aircraft lessors and manufacturers. A package deal combining aircraft parking options with the provision of high-quality maintenance represents a significant competitive advantage. Thanks to an established cooperation and experience, both companies can reach out to more potential customers. For its clients, both companies can secure short-term and long-term parking and additional aircraft maintenance services at Czech or Slovak international airports, which, thanks to their location, represent an ideal choice for European and also non-European customers alike. Alongside Václav Havel Airport Prague, where the headquarters and hangars of Czech Airlines Technics are located, Košice International Airport, Leos Janacek Ostrava Airport, Airport Karlovy Vary and Brno Airport are included in the offer. In the event all parking spaces at the above-listed airports are fully booked, CSAT will negotiate the extension of the service to other airports. Parking will be offered for various types of aircraft, i.e. both narrow-body and wide-body. However, the particular dimensions of the aircraft and the features of parking spaces available at one of the airports at a given moment will always be a decisive factor.

VALLAIR leases two A321-200 freighters to SmartLynx Malta

VALLAIR, the mature aircraft and asset specialist, has signed an agreement with SmartLynx to lease two newly converted A321-200 freighters. The aircraft will be the first cargo planes to be operated by SmartLynx. Vallair has been engaged in cargo conversions since 2015 and is the launching lessor of the Airbus A321 freighter (A321F). "We look forward to seeing the A321Fs flying in Europe," says Alistair Dibisceglia, Chief Leasing and Trading Officer for Vallair. "The aircraft will be operated by SmartLynx on behalf of an international freight forwarder and will be based in Malta. The location is ideal for inter European distribution and will help to also

alleviate the pressure on congested cargo hubs." The A321F is the greenest narrow-body freighter currently available. "Converting younger aircraft into freighters certainly has environmental advantages," continues Dibisceglia. "As the technology used within the aircraft is younger by default, operators of this freighter can expect to see a 20% reduction in fuel burn per payload. With the surge in demand for air cargo as a result of the pandemic, and the availability of feedstock, we believe that the A321F will be the future of e-commerce and satisfy market demands for the next 20 years."



SmartLynx Malta enters the freighter market with two A321's from Vallair
Photo: Vallair

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Liebherr supplies landing gear actuators for Boeing's 777 and 777X aircraft

Since the contract for the power control actuator of the 777 and 777X's main gear steering components was signed in 2018, Liebherr and Boeing have been working diligently to design, manufacture and test the new actuator. The first delivery of two units to Boeing's lab marks a major milestone for this built-to-print project. A dedicated team of manufacturing and qualification engineers has been working meticulously to ensure that this new actuator exceeds all requirements. Liebherr-Aerospace will manufacture (or build) these parts specifically for Boeing's 777 and 777X programs. The power control actuators are part of the main gear steering system. They support taxi maneuvers of the aircraft and reduce tire wear. Together with the main gear steering control unit and the nose gear steering position transducer, Liebherr supplies the complete main gear steering system.



Boeing 777x taxi test
Photo: Boeing



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EngineStands24's recent purchase marks ambitious expansion plans

EngineStands24, a subsidiary of the global provider of Total Technical Care for aircraft operators and lessors, Magnetic MRO, has announced its entering into the wide-body market with the purchase of PW4000-94 engine stands for Boeing B747 and B767 aircraft, manufactured in the U.S.A. by AGSE, as well as Trent 700 engine stands for the Airbus A330, manufactured in the U.S.A. by HYDRO Systems KG. The recently acquired engine stands are the first in its portfolio dedicated to wide-body aircraft. According to EngineStands24, the demand for such engine stands has been increasing for a while now and with the recent pandemic following the growing number of B747 and B767 aircraft being converted for cargo operations, such demand has spiked even more.

AJW Group purchases a trio of Airbus A330 aircraft for teardown

AJW Group, a world-leading independent specialist in the global management of aircraft spares, has purchased three Airbus A330-200 aircraft for teardown. The three ex-Thomas Cook UK aircraft, which were manufactured in 1999, are all powered by RB211 Trent 700 engines with GTCP331-350 Auxiliary Power Units. The aircraft will be disassembled on-site at Manchester Airport. With nearly 90 years of experience at the forefront of the aircraft component supply industry AJW will manage the disassembly remotely coordinated by an experienced technical team and engine specialists, negating the need to ferry the aircraft to a teardown facility. Once removed from the fuselage the A330 components will be recertified at AJW Group's maintenance hub in Montreal (AJW Technique), OEMs and other

strategic vendors.

The inventory will be held at AJW Group's headquarters in Sussex, England, as well as at strategic global hubs, ready for sale to support AJW Group's ad-hoc and contracted airline customers. Interested parties are now able to make enquiries to their account managers.

Ian Malin, CFO of AJW Group, said: "AJW Group have proven again our agility and ability to pilot complex circumstances. Purchasing aircraft out of a bankruptcy is rarely straightforward however we have also had to navigate our way through during the COVID-19 lockdown period. The challenges AJW have overcome - from resources and the ability to physically inspect the aircraft - we have taken in stride and found solutions to successfully pursue this transaction."

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FL Technics signs CAM services agreement with Wizz Air Abu Dhabi

FL Technics, a global provider of integrated aircraft maintenance, repair, and overhaul services, has signed a long-term contract to support international low-cost carrier Wizz Air Abu Dhabi with complete Continuing Airworthiness Management (CAM) services. FL Technics will perform continuous airworthiness management for Airbus A320neo-

and A320ceo-family aircraft and will provide full CAM services in accordance with the requirements of the General Civil Aviation Authority (GCAA) ensuring a proper control in the AMOS system. The scope of work is not limited to full CAM services. It will also cover other engineering services, which Wizz Air requires on a regular and ad hoc basis.



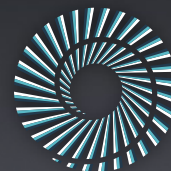
Wizz Air aircraft at Abu Dhabi International Airport
Photo: FL Technics

Farsound Aviation expands U.K. headquarters as part of longer-term growth plans

Farsound Aviation has purchased the building adjacent to its U.K. headquarters in Romford, Essex. The acquisition, which was finalized earlier this month, comes as part of the aero engine MRO supplier's wider ambitions to develop the company in a carefully laid out expansion plan that will culminate in 2021. Despite continued challenges in the aviation sector, Farsound Aviation has committed fully to a comprehensive growth plan that will see the company expand its facilities for supplying C-Class, B-Class and other fast-moving consumable parts and kitted solutions for the global aero-engine MRO sector.

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STS Mod Center kicks off Thales Wi-Fi installation program

STS Mod Center, a division of STS Aviation Group, kicks off a major aircraft connectivity project in Melbourne, Florida, that will call upon the team to install Thales Wi-Fi systems on more than 100 commercial aircraft over the next 12 months. "The first aircraft to be a part of this program, an A321, arrived a few days ago and installation work is already underway," said Mark Smith, President of STS Aviation Group. "In the coming months, the STS Mod Center team in Melbourne will install Thales Wi-Fi systems on more than 100 aircraft; aircraft that includes models from both Boeing and Airbus." It takes the STS Mod Center team about three days to complete the nose-to-tail installation of a Thales Wi-Fi system on narrow-body aircraft and about four-to-six days when working on wide-body aircraft.

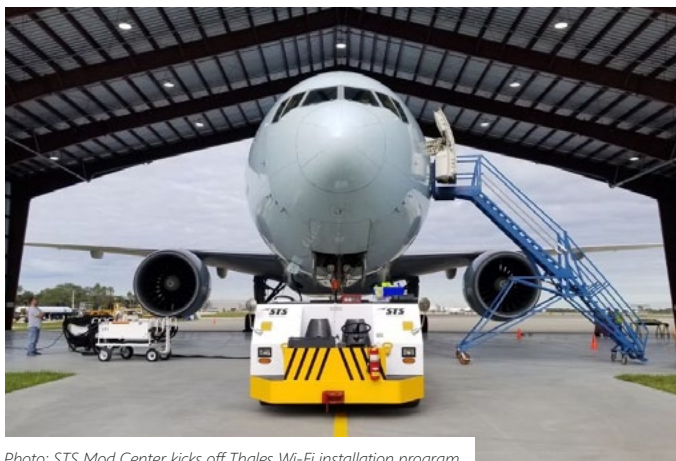


Photo: STS Mod Center kicks off Thales Wi-Fi installation program

TP Aerospace goes into distribution and continues to expand wheel and brake business

TP Aerospace has added a third commercial division to the company and officially entered the distribution business with the inauguration of TP Aerospace Distribution. This is another step in TP Aerospace's plan to offer fully comprehensive wheel and brake solutions for aircraft operators worldwide and is a continued testimony to the company's expansion strategy: the Green Sunrise. With TP Aerospace Distribution, together with the existing businesses TP Aerospace PRO and TP Aerospace Trading, the company now extends its portfolio to not only include aftermarket wheels and brakes, but also piece parts, rotatables and OEM-supported brake MRO services. The main objective of TP Aerospace Distribution will be to simplify supply chain and logistics operations for the customers, by providing aircraft operators and maintenance providers with easy and immediate access to parts and components, anytime, anywhere. TP Aerospace's distribution division will be headed by Anne Kalman, Global Distribution Director, who has been with the company since 2019 and brings vast experience dealing with aircraft operators as well as suppliers and OEMs.



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S7 Technics carries out complex work on dismantling the keel of a cargo Boeing 737

S7 Technics has carried out complex work on dismantling the keel of a cargo Boeing 737 aircraft in the framework of a C-check. Until 2012, the aircraft flew as a passenger aircraft and was then converted into a cargo aircraft and transferred to ATRAN airlines. Aeronautical Engineering (AEI) developed the STC (Supplemental Type Certificate), an additional type certificate that confirms that a modification of a typical aircraft design meets aviation requirements. During the C-check maintenance of the cargo Boeing 737, part of the elements of the power structure of the aircraft was replaced – the longitudinal and transverse floor beams of the main cargo deck. S7 Technics logistics specialists were tasked with finding and delivering elements in a special modification for the converted aircraft on time. S7 Technics specialists carried out complex work on dismantling the aircraft's keel to replace the front left attachment point. Four specialists of the



S7 Technics specialists dismantling the aircraft's keel
Photo: S7 Technics

engineering center, 18 aircraft technicians, two lifts and a special crane were involved in the process. Upon completion

of all work, pilots from ATRAN airlines performed a test flight from Domodedovo airport to Vnukovo.



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Will Dew, VP Customer Support at Commercial Liebherr Aerospace Saline, Inc.

Happy landings, for Austral

Liebherr-Aerospace were recently selected by Argentinian operator Austral for E190 landing gear services. **Keith Mwanalushi** speaks to Will Dew, VP Customer Support and Commercial about the full scope of the work.

In September, Liebherr-Aerospace announced the first major contract for Liebherr in Argentina. The overhaul of landing gears for Austral's Embraer E-Jet E190 fleet started in July 2020 and are performed at Liebherr-Aerospace's customer service facility in Saline, Michigan, in the United States.

Will Dew, VP Customer Support at Commercial Liebherr Aerospace Saline, Inc. explains to *AviTrader MRO* that landing gear restorations, commonly referred to as "overhauls", are scheduled events, which occur throughout the life cycle of landing gear components. The airframer and regulatory authorities have collaborated to establish maintenance review boards, which set a defined interval known as "Time Between Overhaul" (TBO) which is driven by a combination of utilisation including flight cycles (take-offs/landings) and calendar time. TBO criteria are adopted based on the design specifications as well as repetitive fleet wide sampling programmes, which assess and confirm the airworthiness of the landing gear as it progresses in its life cycle as

well as the thoroughness of associated maintenance and inspection programmes. For the E190/195 E1 aircraft for example, the TBO has been set at 144 months or 25,000 flight cycles under the current Embraer maintenance review board report.

Given the TBO, Dew says the removal and reinstallation planning evolution becomes a critical consideration for both the operator and the services supplier. "For the operator, ensuring the scheduling of gear removals, whether tied to an airframe check line or stand-alone gear

line, such that all aircraft move through the overhaul programme ahead of TBO to maintain regulatory compliance and prevent an out of service event." For the supplier, there is need to ensure transparent integration of the operators removal schedule with the slot capacity plan for the appropriate forecasting of labour and material availability. He says suppliers typically provide incentives such as advance exchange "seed" landing gear shipsets to rationalise the removal planning process, which allows for maximum utilisation of flight cycle/calendar



Austral operates a fleet of E-190 jets in Argentina.
Photo: Jetstreamer

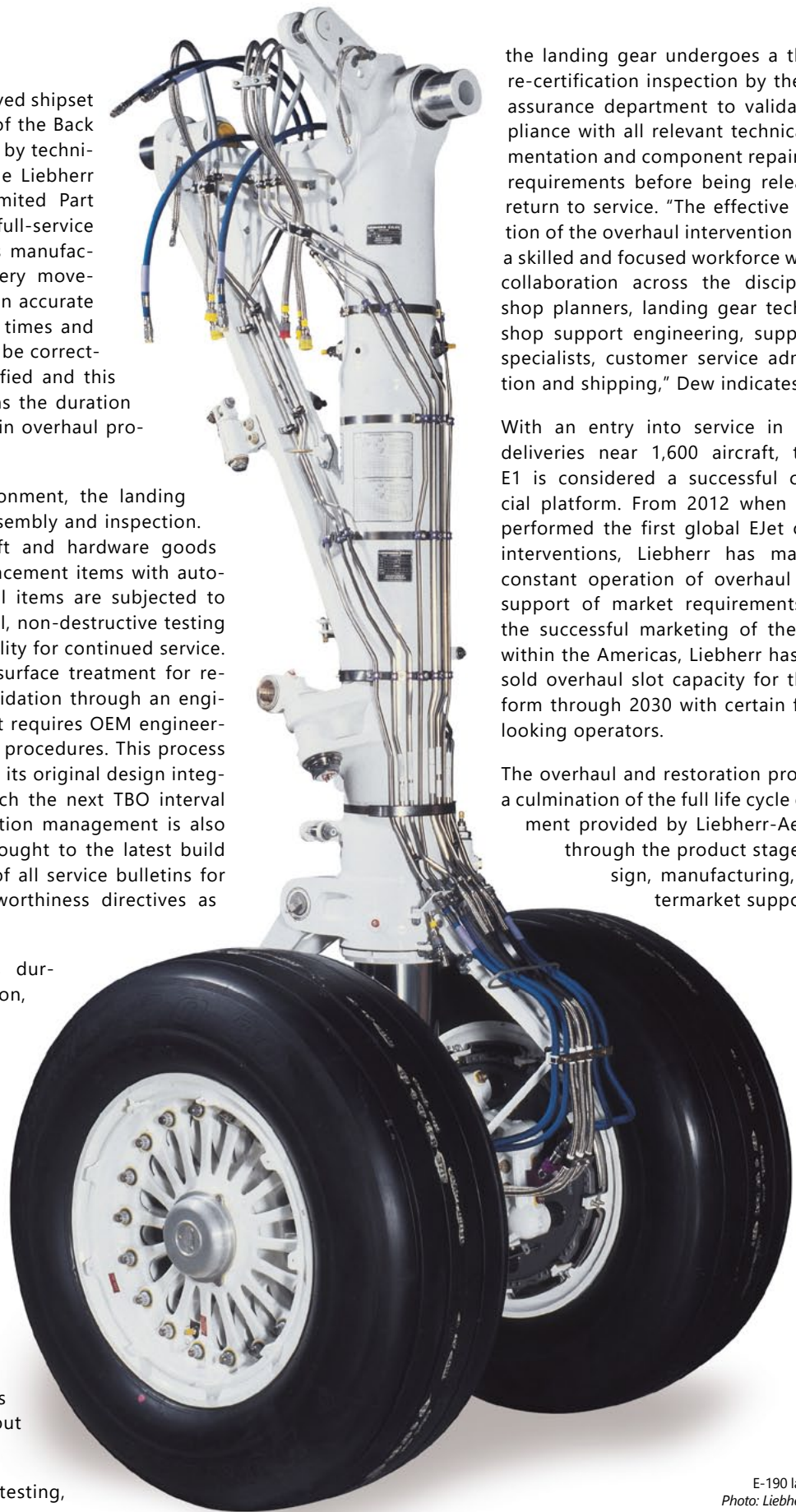
yield remaining to TBO.

In parallel to receiving the removed shipset for overhaul, a thorough audit of the Back to Birth (BtB) records is initiated by technical records specialists within the Liebherr network. "As with any Life Limited Part (LLP), this requires validating full-service life traceability from the OEM's manufacturing certification through every movement of the landing gear with an accurate accounting of the accumulated times and cycles. Errors or omissions must be corrected before the shipset is recertified and this exhaustive process typically runs the duration of the time the landing gear is in overhaul process with the supplier."

Upon entering the shop environment, the landing gear undergoes complete disassembly and inspection. Dew continues: "Peripheral soft and hardware goods are considered mandatory replacement items with automatic discard. Critical structural items are subjected to machining for corrosion removal, non-destructive testing (NDT) and assessment of suitability for continued service. Re-work procedures including surface treatment for replating typically will require validation through an engineering disposition process that requires OEM engineering concurrence with requested procedures. This process ensures the landing gear retains its original design integrity and can be assured to reach the next TBO interval without interruption. Configuration management is also addressed with components brought to the latest build specification by incorporation of all service bulletins for product enhancement and airworthiness directives as applicable."

To mitigate exceptional costs during the overhaul intervention, Dew highlights that operator's compliance with the MRBR guidance for the continuous airworthiness maintenance programme is key. This includes established intervals for various visual inspections, lubrication, functional tests, and servicing which are then translated via task cards to the operator through the aircraft maintenance manual. He says performing these tasks allows thorough monitoring of landing gear health and detection of issues such as leakage, which could drive an out of service event.

Following reassembly and final testing,



the landing gear undergoes a thorough re-certification inspection by the quality assurance department to validate compliance with all relevant technical documentation and component repair manual requirements before being released for return to service. "The effective completion of the overhaul intervention requires a skilled and focused workforce with tight collaboration across the disciplines of shop planners, landing gear technicians, shop support engineering, supply chain specialists, customer service administration and shipping," Dew indicates.

With an entry into service in 2004 to deliveries near 1,600 aircraft, the EJet E1 is considered a successful commercial platform. From 2012 when Liebherr performed the first global EJet overhaul interventions, Liebherr has maintained constant operation of overhaul lines in support of market requirements. Given the successful marketing of the E175E1 within the Americas, Liebherr has already sold overhaul slot capacity for this platform through 2030 with certain forward-looking operators.

The overhaul and restoration process are a culmination of the full life cycle commitment provided by Liebherr-Aerospace through the product stages of design, manufacturing, and aftermarket support.

E-190 landing gear.
Photo: Liebherr Aerospace



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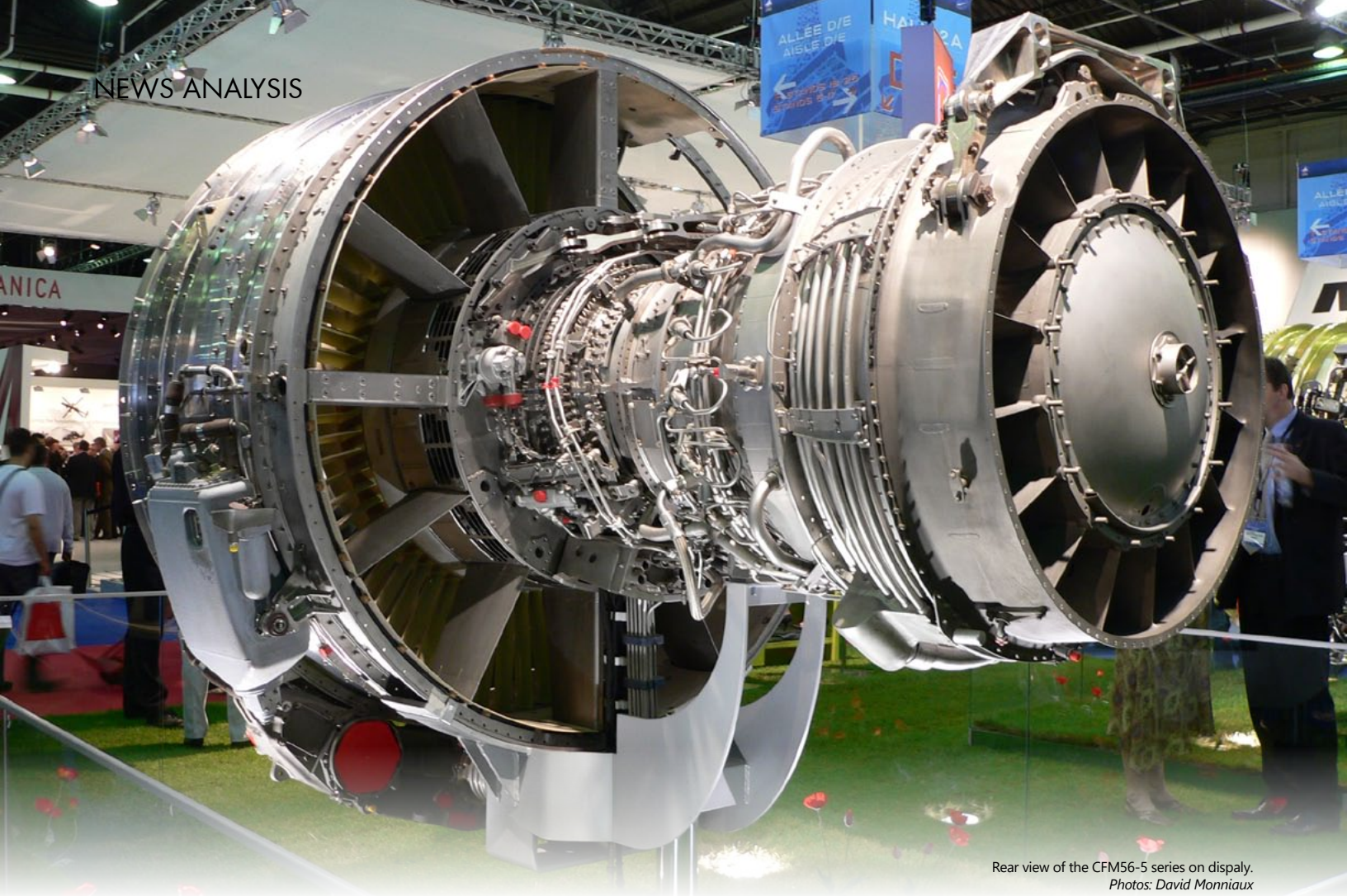
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Rear view of the CFM56-5 series on display.
Photos: David Monniaux

Engines by trade

APOC Aviation, the aircraft part-out company recently acquired three CFM56-5A powerplants. Anca Mihalache, VP Engine Trading explains to **Keith Mwanalushi** about the engine marketplace in the current environment

In early October, Rotterdam-based APOC Aviation announced the acquisition of three CFM56-5A's that have been inducted into the company's engine division launched a year ago. The engine type powers the Airbus A320-family platform.

In a market hit hard by the COVID -19 crisis, Anca Mihalache, VP Engine Trading at APOC Aviation tells AviTrader MRO that prior to March 2020, there was almost no availability of CFM56-5A engines. "We are now seeing some of these assets coming on to the market, and I am aware of a few that are currently in shops being overhauled. However, there is still only a small number of these engines available right now."

APOC Aviation expect the current levels of

availability to remain fairly static in the near future and expect to see some increases through operator sales of A320s and A319s, and when the few engines that are in shops right now are released. But Mihalache reckons this will be balanced by increased demand due to the growing number of flights operating.

According to APOC, currently there are only a few established airlines flying A320 family aircraft equipped with CFM56-5A engines, but there are also some new, small airlines

entering the market. "It's a very specialised sector, there are only a handful of companies trading and leasing 5A engines and we all know each other – and the airlines

know exactly who to talk to when they have a need. But it is the crisis generated by the pandemic which has impacted lease rates more than the current availability of the engines. Increasingly, we are seeing operators asking for reduced levels of rent, payment holidays and, most commonly, power-by-the hour contracts."



Anca Mihalache, VP Engine and trading,
APOC Aviation

At APOC Aviation they believe it is essential to have synergy between lessors and operators. "We are working with our customers to find ways to support them during these difficult times, it's all about collaboration and working together to find solutions that will benefit everyone."

The engines were acquired from PTS Aviation Inc. in Florida through a multi-million-dollar transaction. One of the engines was acquired with a lease attached to German charter airline, Condor and the other two will be integrated into APOC's portfolio.

APOC's engine programme allows for another five inductions before year end and these will soon come on-stream, not only feeding the lease pool, but also supplementing the new engine parts division which will complement APOC's broader narrow body aircraft component sales, exchange and consignment facility.

In the current environment, investors are scrambling to buy engine parts for trading and seemingly this will have an impact on engine part prices. Mihalache says despite that we are entering what is normally 'MRO season', there could be a reduction in shop visits of between 30-70% in the coming months. "That said, there are still good levels of transactions for engine parts. Some shops and distributors are buying for stock right now, whereas others are buying for AOG and some are of course still buying for their shop visits."

“It's a very specialised sector, there are only a handful of companies trading and leasing 5A engines and we all know each other.”

Anca Mihalache, APOC Aviation

"Naturally, there is still a high demand for hard to find parts, such as LLPs, blades etc., which already had long lead times prior to COVID-19 hitting."

Mihalache points to another interesting trend being an increase in on-wing repairs, which require the exchange of parts, rather than replacement. She says on-wing repairs were not common previously as most MRO capacity was fully committed to in-shop repairs. But with reductions in shop bookings, many MROs can now comfortably deploy their teams to work on-site. She foresees this trend continuing soon.

Mihalache however, sees a slight decrease in engine part prices, but this will not be significant, and will presumably not drop further. "With the very real possibility of Coronavirus vaccines, and better medication, just around the corner, I believe the aviation industry will start recovering towards the end of this year, when we will start to see demand slowly returning."

As for the return to pre-COVID price levels, Mihalache feels this will depend on how quickly a vaccine is found. But the predictions are that it will take between two and

five years for the industry to fully recover and get back to 2019 price and activity levels. "Of course, the engines are the most expensive part of an aircraft but the expectation from operators is that the lessors will work with the airlines to accommodate a lower utilisation programme. But if a vaccine treatment becomes available at the beginning of next year, I do think the market recovery will start before the end of 2020."

An issue often discussed with engine MROs and traders is unequivocal pursuit of industry recognised EGT margins. Exhaust Gas Temperature - EGT is a measure of the temperature of the gas as it leaves the turbine unit. Engines are certified with temperature limits enforced via a limit on maximum take-off EGT, referred to as the redline EGT. EGT Margin is the difference between the peak EGT incurred during take-off and the certified redline EGT. It is used to evaluate and track engine time on-wing and health. EGT margins are at their highest levels when the engines are new or just following refurbishment.

Mihalache says APOC currently have three CFM56-5A engines with between 2,000 and 3,000 cycles and part of the TRU-engine programme (engines that have been maintained to GE or CFM manuals and recommendations). The engines acquired by APOC Aviation each have between 20 to 35 degrees EGT margin on them.





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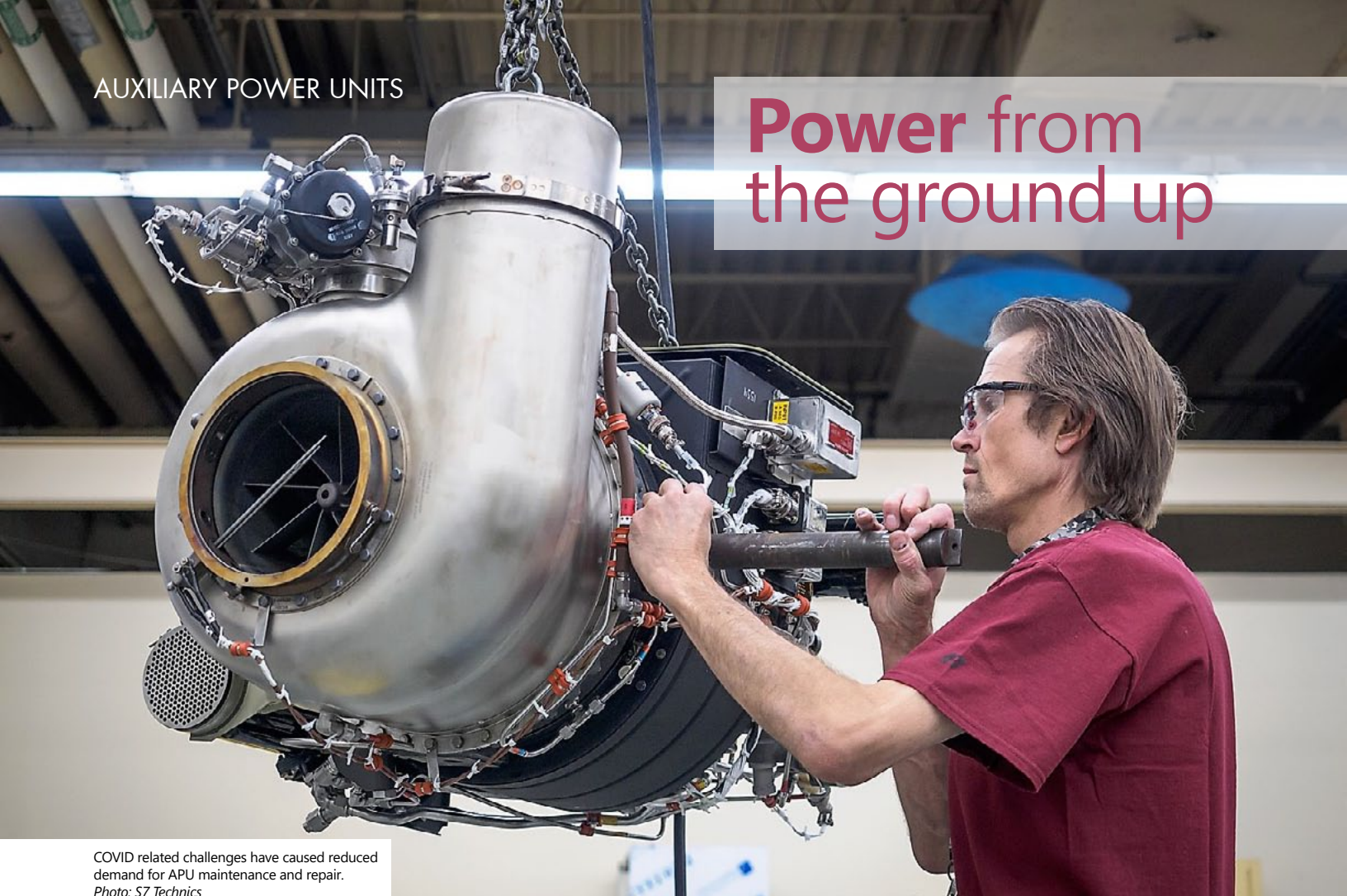
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Power from the ground up



COVID related challenges have caused reduced demand for APU maintenance and repair.
Photo: S7 Technics

Auxiliary Power Units or just APU's are important technical components of the aircraft. **Keith Mwanalushi** investigates the various considerations for maintenance and repair

Just prior to the onset of the COVID pandemic, industry data showed that the projected global aircraft APU

market will grow at a compound annual growth rate of 5.3% to reach almost 1.5bn U.S. dollars by 2023. "Given the COVID-19 situation, the market appears to be at a standstill," observes Mike Cazaz, President and CEO at Werner Aero Services. "There are APUs that are stuck at MROs since airlines don't approve the repair costs due to their high value and cashflow issues."

Hence, Cazaz sees that MROs are experiencing a decline in work and are reducing staff. Also, airlines, when possible are swapping APUs from parked aircraft and deferring maintenance of unserviceable APUs. Eventually, he reckons this will cause a spike in demand for APUs. "If we believe that the market will come back at some point, airlines will have to send APUs to the shops and will face long lead-time due to backlog and shortage of manpower at the MROs. Werner Aero Services carries APUs for E-Jet 170's and 190's, B737NG and A320 aircraft. We generally offer those

for short term loans or exchanges but from time to time will sell them outright as well."

Unlike engines that are limited to time and cycles between shop visits, some APUs are being utilised on "on-condition" programme as-supposed to hard-time programme and Cazaz says that usually depends on the type of APU and the airline's operations. But like engines, airlines like to have their original APU back on the aircraft, sometimes due to aircraft lease restrictions. "That is not the same as components, for example. This reason leads airlines to lease APUs for the duration of the shop visit. Airlines typically do not like to invest in a spare APU due to the cost of the unit. When an APU experiences a shop visit airlines must consider the repair cost versus a replacement unit from the open market. That is usually a major consideration and some airlines look at exchanging an APU and not to deal with repair cost and future loan fees."



Mike Cazaz ,CEO at Werner Aero Services

AUXILIARY POWER UNITS



EPCOR use data driven insights on APU performance.
Photo: Patrick Delapierre

“Airlines typically do not like to invest in a spare APU due to the cost of the unit.”

*Mike Cazaz, President and CEO
at Werner Aero Services*

Eigirdas Keblikas, VP Asset Trading at Leasing at Magnetic MRO echoes similar sentiments saying because of the pandemic and implicated travel restrictions, airlines are struggling to reach sales targets – which results in a significant drop in the overall aircraft market. He states reduced revenues have had a negative effect on airlines balance sheets and more airlines are exhausting their own recourses in terms of aircraft cannibalising, hence, causing reduced demand in APU maintenance and repair.

“In the current market, the price has become the most significant variable for choosing MRO services,” Keblikas mentions. However, he believes that this could be a key advantage because they are closely working with several maintenance and repair providers which allows Magnetic to choose any capability and lowest price options, hence, continuing to maintain already established long-term partnerships with MRO clients. “We believe that the lowest price range and strong partnerships are the main factors that are protecting our APU maintenance and repair services in the current market situation.”

Due to the significant amount of the global aircraft fleet either in storage or in very low

utilisation, Nick Filce, Director - Asset Sales and MRO at AerFin says this means that there is very little demand for APU maintenance support at present as most APUs are on-condition components, rather than driven by the calendar – which is the case for components such as landing gears, for example.

AerFin has a significant level of APU and APU LRU inventory across the Airbus, Boeing and Embraer product lines. “This breadth of stock, coupled with our level of customer integration, means that we are able to offer a wide-range of completely bespoke, supply-chain solutions that meet the operational and budgetary requirements of our global customer-base. These range of solutions include APU trading, leasing, pooling as well as a range of purchase lease options,” Filce explains.

AerFin have APU inventory located across multiple regions, with inventory positioned with MRO partners in North America, Europe as well as Asia.

AerFin’s now well established Beyond-Pool™ programme offers specifically tailored nose to tail component support and the APU forms part of this package with the

accessories and LRU’s being covered under a comprehensive exchange and repair programme. Filce continues: “The solution provides airlines with a range of options in



Eigirdas Keblikas, VP Asset Trading and Leasing at Magnetic MRO

“There is very little demand for APU maintenance support at present as most APUs are on-condition components.”

Nick Filce, Director - Asset Sales and MRO at AerFin

Innovation in technology is critical for APU repairs.
Photo: Patrick Delapierre

terms of component supply and maintenance coverage, which are tailored to the requirements of the operator. We have typically found that operators prefer to have APU LRUs covered in the programme, with a number of solutions to support the full APU dependent on the operator's budgetary and operational requirements.”

Building expertise and innovation

At EPCOR – part of the AFI KLM E&M network – they have developed algorithms and are now able to have the best possible data driven insights on APU performance. In this predictive maintenance fleet management solution ‘Prognos for APU’ almost 1000 APUs are monitored constantly, states Kaj Rook, Prognos APU Engineer.

With Prognos for APU the aircraft operator gets valuable insights in the performance of their APU fleet, for instance, when a high time or LLP limit is reached – “Besides scheduling according to high time and LLPs, we also calculate the health of every APU. This means you will be notified when an APU reaches its health-limit before high time is reached, preventing an unscheduled

removal. We also help customers plan and see if multiple APUs reach their life status limit at the same time which can result in low spare level situations or even AOG. Together we look at the APU removal schedule and help the customer plan some APUs earlier than needed, or even later than needed to prevent these situations,” Rook elaborates.

At Lufthansa Technik, the APU capabilities are well established. In fact, the introduction of the HGT1700 (optimised for the Airbus A350 XWB) and increase in the Lufthansa Technik APU shop capacity were successfully completed before the corona crisis hit.

Ole Gosau, Senior Director APU Services at Lufthansa Technik says as a rough estimate a full refurbishment of an APU is recommended, “if the APU's times and cycles

are higher than the average time in tail of this specific APU type.” Exemption to this rule is of course a mature fleet.

APUs on the A350 for instance are lighter than previous models with fewer parts but what impact does this have on the maintainability of APUs? Gosau points to the HGT1700 saying Honeywell engineers were successful with the APU for the Airbus A350 – “For example, they equipped the new APU with a starter generator. Its one component that has two tasks, namely starting the APU and generating electrical energy during the operation of the APU. In previous APU types two components were necessary and for us at Lufthansa Technik, it means that for new designed components new repair developments become necessary.”



Nick Filce,
Director - Asset Sales and MRO, AerFin

AUXILIARY POWER UNITS



APU component work by EPCOR.
Photo: Patrick Delapierre

Gosau also adds that reducing the weight of an APU is not the only aspect design engineering has to focus on. One other benefit of the HGT1700 is an improvement of the FOD resistance of the Impellers.

Casper Klerk Senior APU data engineer and APS5000 specialist at EPCOR reminds that newer aircraft like the Boeing 787 using Pratt & Whitney APS5000 APUs are no longer generating bleed air but produce solely electrical power. "The load compressor is replaced with electric powered Cabin Air Compressors (CAC). This results in a different way of using, operating and maintaining the APU."

With the introduction of new APUs, Klerk says the component has become a more integrated and critical part of the aircraft systems, where operational issues with the APU will directly result in bigger impact on the operational performance of the aircraft – "Therefore, it is of even higher importance to be more in control of the APU engine."

Advanced data analytics, in house developed algorithms and close supervision of our Prognos engineers helps to realise that control. Klerk notes that his team monitors the health of over 250 APS5000 APUs. "We prevented many APUs from failures by removing them just in time, we prevented excessive damage in the turbine resulting in less rejected parts and more repaired parts.

Because of the knowledge we gained on this type, we've achieved similar results on other APU types realising significant cost savings for our customers."

The newest APU's include e-taxi, an application which allows the aircraft to taxi without using main engines and that would save around 4% of fuel, according to Keblikas from Magnetic MRO. "Also, installed fuel cells provide significant efficiency and reduce polluting emissions. All these innovations should be followed by MRO providers to offer the best possible service and support to customers."

Like any other system, the APU keeps going through the evolution cycle and becomes more efficient reliable and easier to restore. "Even newer units are created more effective and simpler to maintain, however, currently, most of the MRO providers should agree that it's way easier to work with a unit which is already well known in the market with most of the parts available in the aftermarket," Keblikas further comments.

As for the older models, he says several MRO's have their own units which were parted-out and spares are available in their own warehouses or with close partner stocks. "This makes sourcing required parts way easier comparably with the newest APUs that are recently released and parts are available

only through OEMs." Keblikas cautions that in most cases spares can come with long lead times and high prices. "This can have a significant impact when talking about the newest model's maintainability and repairs, however, Magnetic MRO is always ready to provide the best possible service to airlines and other MRO's no matter the market circumstances or conditions.



Ole Gosau, Senior Director APU Services, Lufthansa Technik AG



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Route to Europe

The biggest impact for MROs has been the slow-down in heavy maintenance contracts.
Photo: Caerdav

Keith Mwanalushi speaks to industry experts about the European MRO market and the challenges caused by COVID 19, the recovery strategies and any opportunities that still exist.

Europe is one of the most affected regions by COVID-19 and subsequently due to government travel restrictions a large chunk of the region's fleet has been largely grounded over the last several months. The region has seen a slow restart of short- and mid-haul flight activity, but long-haul commercial operations are still a way off. Benoît Rollier, Managing Director and Chief Financial Officer at Spairliners sees that in order to safeguard their cash position, airlines are trying to avoid cash outs and therefore limit maintenance spends as much as possible – "Instead of purchasing or loaning new spare parts, several airlines started to utilise parts from their grounded aircraft first, since a large portion of their fleet was not in service. This resulted in a hibernation of the MRO business as well, especially for the first few months of the pandemic."

Now that the return to previous years' activity will be slower than initially hoped

for, Rollier sees a dramatic lifecycle acceleration for some aircraft types. "The four-engine aircraft are being phased out much sooner than planned and many operators are streamlining or downsizing their fleets."

Moving forward, Rollier projects that regional jets, such as the Embraer E-Jet family which Spairliners provides component support for, will be the aircraft type best suited for the post-crisis aviation demand. "The appetite for leisure travel will return eventually, but there is clearly a share of business travel that will be gone forever. We still expect the recovery to be a long process because of continuing border and quarantine restrictions in Europe and the volatility of the infection numbers as well as the situation overall.

"We anticipate seeing a short-term peak in terms of component spend which will be necessary to re-activate the fleets after their extended periods spent on the ground."



Benoît Rollier, Managing Director and CFO at Spairliners

“We anticipate seeing a short-term peak in terms of component spend which will be necessary to reactivate the fleets.”

Benoît Rollier, Managing Director and CFO at Spairliners



Caerlav are expanding the skillset of engineers, starting with a new A320 type course.
Photo: Caerlav



Martin Friis-Petersen, SVP MRO Programmes, MTU Aero Engines

Rollier says the long-term impact is difficult to predict, but he assumes that USM (used serviceable parts) will become increasingly available on the market as operators are downsizing their fleets and some aircraft will be torn down in the next years. He reckons this should offer a good leverage for airlines and MROs to contain a possible increase in repair costs.

Richard Pitts-Robinson, Business Development Manager at Caerlav in Wales has noticed that the biggest impact for MROs has been the slow-down in heavy maintenance contracts, like C-Checks – “Because of the pandemic and the number of aircraft subsequently grounded, airlines are looking to delay required heavy maintenance for as long as possible. If feasible, they will look to complete smaller checks, with an eye on the larger jobs to be carried out when aircraft are likely to re-enter service.”

The knock-on effect of this could very well be a bottle neck of heavy maintenance requirements in the future, specifically when airlines and lessors look to get their planes back in the skies, Pitts-Robinson adds. “We need to be prepared for all types of work, from simple hand backs, to bridging checks or full C-Checks – but exactly when this work will be required is still a huge unknown, the goalposts are continually shifting.”

Parking and storage capacity at Caerlav are in high demand currently, and the associated maintenance requirements of those aircraft can rapidly change if they are called back into service. “The unpredictable nature of the industry has meant we’ve had to place a great emphasis on flexibility, ensuring we’re in a position to offer our customers exactly what they need,” Pitts-Robinson continues.

Obviously, in the current COVID environ-

ment, the situation is continually evolving, so planning and forecasting is somewhat limited. Looking back at the last six months or so Martin Friis-Petersen, SVP MRO Programmes at MTU Aero Engines has seen that airlines have been in crisis mode and most MRO decisions are exclusively budget driven. "We have seen some flight data stabilisation on regional and intra-European flights, supported largely by an increase in domestic travel.

"From an MTU standpoint, it is hard to identify any regional trends in our shops as our customers come from all over the world. Some regions continue to be affected by the crisis, for instance with a second wave of cases, while others become new hotspots."

Irrespective of the duration of the crisis and the industry's recovery, MTU expect to see a continued trend away from traditional planning with fixed maintenance intervals to more customised and individually tailored solutions, as Friis-Petersen states. "Some airlines are concentrating on short-term savings with cash preservation as the main objective, while others are focusing on long-term planning. MRO providers must flexibly meet both these goals to provide the best solution for customers in today's market. Further, we are



Aerostar has opened a second MRO facility in Romania.
Photo: AEROSTAR

seeing more of a focus on on-wing/near-wing repairs, smart repairs, smaller work scopes and an increased usage of used serviceable material."

Preparing for a post-pandemic rebound

A crisis of this dimension forces MRO providers to continuously innovate with new service solutions to suit the evolving market environment, Friis-Petersen

thinks. "We strongly believe that digital services will support an effective post COVID-19 industry restart. MTU's tool provides operators with real-time insight into how the crisis affects their operations and which engine to reactivate first. It enables them to unlimitedly tweak variables in their planning scenarios and see how this would affect MRO and in turn, significantly reduce cost. We see great demand for such a tool both now and in the future."

Furthermore, in times of such uncertainty regarding market recovery there is a strong need for flexibility in MRO processes, for instance, as Friis-Petersen mentions, to adjust shops and lines to short term shifting trends in demand, for instance for the recovery of narrowbody fleets, which is expected to occur faster than for widebodies. "This also applies to adjusting to smaller and budget-driven shop visits. MTU has a broad and predominantly narrowbody portfolio. A number of programmes are served at multiple locations and employees are trained across engine types, enabling us to work flexibly and adapt to customer needs quickly."

In an environment with little visibility and prediction potential, at Spairliners, they are focusing on building the close relationship with customers to fully understand their needs. Rollier says the key is flexibility, in terms of payment models as



Richard Pitts-Robinson, Business Development Manager at Caerdav

well as operations as the company and customers need to control fixed costs in a context of lower and uncertain revenues.

Rollier continues: "We anticipate that the components sector will return faster than the engine sector. So as we prepare for our airline customers to restart their activities, we ensure that we also ramp up the capacity on our side by utilising less short-time work and closely monitoring our supply chain to match capacities and parts availability to the demand.

"We have never stopped our IT and digital investments and we don't plan to slow down in this regard as the utilisation of new technologies is key to adapt to the post-crisis market environment and will help us to develop innovative products for our customers, as we aim to achieve higher flexibility at lower costs."

At Caerdav, the pandemic has given them an opportunity to analyse the business strategy, allowing the MRO to single out what they are doing well and any areas that require a little more focus and adjusting business model accordingly. "We

want to ensure that Caerdav is in a position to take advantage of the resurgence in the industry that will undoubtedly come when the skies fully reopen," Pitts-Robinson notes.

That considering, Caerdav have been looking at ways of expanding the skillset of engineers, starting with a new Airbus A320 type course. He adds: "As a business, we are also investing heavily in our tooling capabilities, again with a focus on ensuring Caerdav remains at the forefront of the industry. "In addition to this, we are in the process of finalising a new apprenticeship scheme that should see an initial intake starting in the new year. This is very much about building our skill base from the ground up, helping local young people get a foothold in the industry."

It is expected that major scheduled maintenance on aircraft parked for the long-term will likely be pushed back as long as possible, it is expected that a significant uptick will occur when they are required back into service. In the meantime, at Caerdav, they are ensuring they have the staff, processes and capabilities in place

to manage the additional workloads.

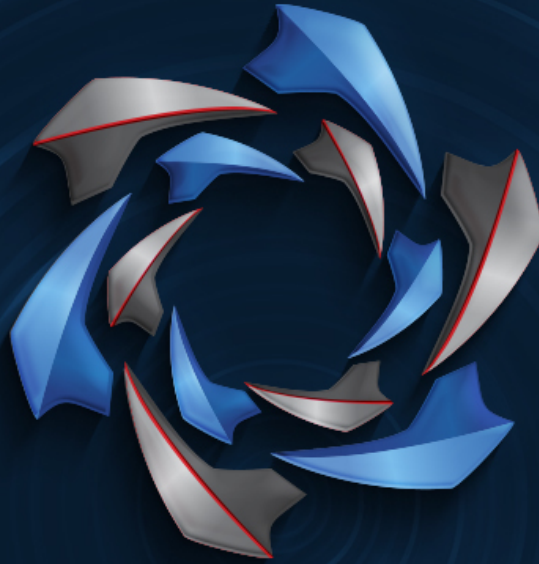
A rise in demand for used serviceable materials

Industry experts have said there is a strong likelihood that operators and MROs will look to USM to help keep MRO check costs down as the market picks up. At MTU, like most other MROs, they are expecting an increased availability of assets being offered because of reduced fleet sizes and related retirements. "The USM market is driven by supply and demand, and current developments will certainly influence price in the long-run. We also anticipate that green-time engines or modules will become an increasingly attractive option as part of a creative MRO solution for operators.

"We have always used USM as an alternative solution to reduce shop visit costs for operators and do not expect this to change. We purchase material, salvage material from customers fleets and repair parts ourselves," Martin Friis-Petersen concludes.

“Some airlines are concentrating on short-term savings with cash preservation as the main objective, while others are focusing on long-term planning.”

Martin Friis-Petersen, SVP MRO Programmes at MTU Aero Engines



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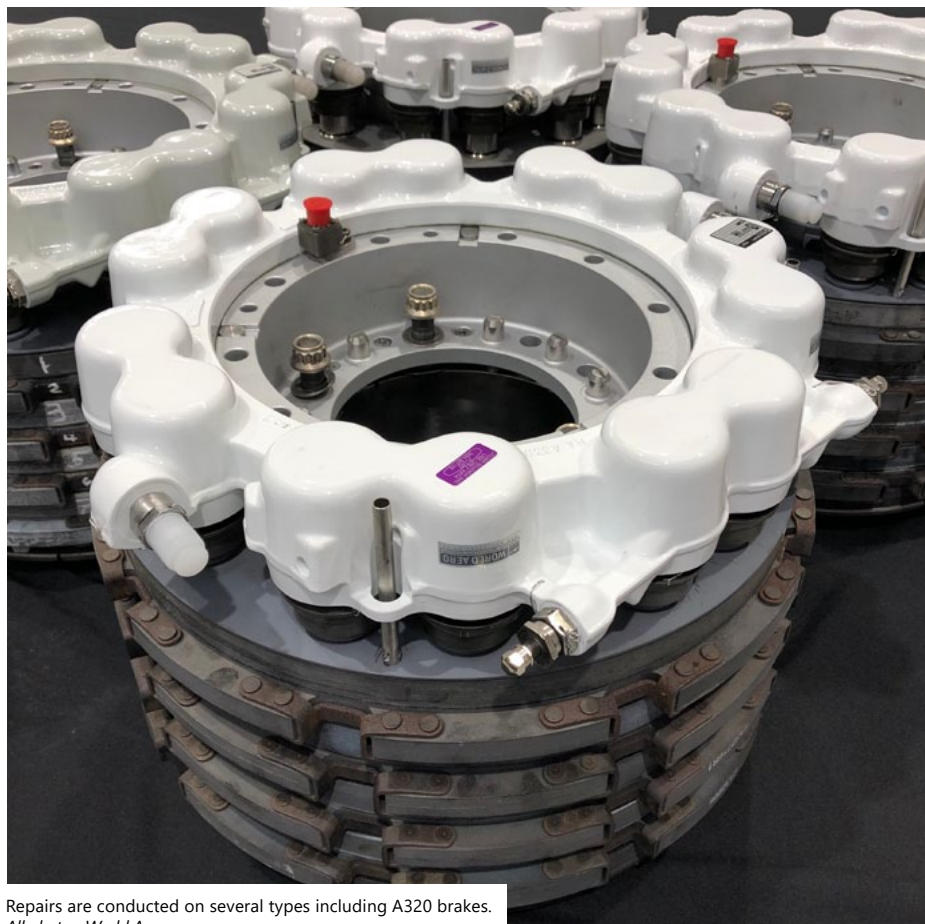
World Aero is an aircraft wheel and brake MRO based in West Sussex, England, close to London Gatwick airport. Founded in 1999, the company spent its formative years providing a range of technical services to support commercial aviation before settling into component MRO in 2008.

World Aero quickly established itself as the preferred wheel and brake MRO vendor for the world-renowned aircraft spares dealers based locally in West Sussex, as well as smaller airlines operating at London Gatwick. Considerable expansion came just a few years later, as the company geared up its capacity to meet the volumes required by a major low-cost carrier, overhauling in excess of 100 units a week during the peak season. More recently, World Aero have extended the capability list to include more types, whilst being mindful to ensure service levels are maintained across the wider range. Frequently supported aircraft types range in size from Learjet 45 to Boeing 747-8, with a constantly varied list of wheels and brakes being processed at any one time.

The company are EASA Part-145 approved and are authorised by the Federal Aviation Administration and Transport Canada to offer triple EASA/FAA/TCCA release where possible on its repairs.



Phil Randell, World Aero CEO



Repairs are conducted on several types including A320 brakes.
All photos: World Aero

In line with many successful aviation companies in West Sussex, World Aero has remained privately owned throughout its journey of expansion. "Retaining control and leading with a hands-on attitude has enabled us to stay dynamic as the company has grown", says World Aero's owner and CEO Phil Randell. Never more has this been so important now during 2020, where the sudden impact of COVID-19 has been managed head-on, and for now at least, the company retains its strong market position. Conservative growth plans, modest overheads and extremely low gearing have enabled this. "Without a complex structure of shareholders and investors with differing needs and demands, there really are only two parties that need to be kept happy, and one of them is the customer" adds Randell with a smile.

Randell's background is total aviation. From his first flying lesson aged eleven, he later went onto study aircraft and powerplant during a lengthy apprenticeship with the UK Ministry of Defence. Later,

as a licensed aircraft engineer, he worked with airlines and business aircraft before moving on to a maintenance management role. It was at this point Randell gained a passion for the commercial side of aircraft maintenance. "I saw a lot of opportunity for improvement in the efficiency and performance of the MRO business, especially component maintenance, which always seemed so remote from operations. I was frustrated by the lack of awareness of what was needed from an airline operation perspective, and felt there was a need for better integration in order to tap into the knowledge of the component MRO, to really enhance the reliability and efficiency of the aircraft".

Randell's hands-on experience and knowledge is prevalent throughout the entire process at World Aero. "Great emphasis is placed on product knowledge, and my team like to demonstrate this first-hand to our customers by suggestion of enhancements to their repairs, perhaps by way of Service Bulletins, alternate build configu-

rations and many other improvements learned from our dedication to wheels and brakes. There will always be customers who just want their units to be cheap, fast and with a Form One, but I get enormous satisfaction from building lasting relationships with customers who see my long-term vision. That's success for me". The same goes for World Aero's staff, with a considerable number of the team having been employed from the start and themselves grown with the company. "I've got a truly exceptional team and the COVID situation has proved even further their dedication and determination to succeed. I'm immensely proud of them".

As well as enjoying single ownership, World Aero also remains a truly independent MRO, free from the control of any one particular wheel and brake equipment manufacturer or OEM. "We have always put our customers first and, without the influence of a powerful manufacturer partner, we can act in the best interests of the end-user. We see a lot of frustration from

operators who feel forced to use a particular MRO because that MRO is partnered with the equipment manufacturer. Not surprisingly, out-of-contract costs soon escalate, and it becomes apparent that the MRO is acting in the best interests of their partner and not the operator. It happens a lot and World Aero are poised to pick up, take over and develop a long-term, trustworthy relationship with the operator. And of course, most operators have a mixed fleet so diversity and flexibility are key. Nonetheless, we do have close ties with most manufacturers who respect the part we play in the supply chain; its sometimes not efficient for them to service the smaller customers".

World Aero's expansion plans involve enhancement of the existing facility to improve efficiencies rather than upsizing. "Floor space and extra buildings cost money when they're under-utilised, which is evident worldwide now during the pandemic" says Randell. "By being smart we can realise a lot more capacity

before we need to think about adding additional space. That was our strategy pre-COVID, and despite no visible end to the pandemic, we're sticking to our plan to ensure we're ready to build again". The company occupies a large, modern modular industrial unit in semi-rural West Sussex, which benefits from excellent transport links without the high costs of more central facilities. Rather than expand into other components, the company remains focused on wheels and brakes. "There are some strong wheel and brake MRO vendors in the market, so despite healthy competition, each vendor has a niche which appeals to a certain type of customer" summarises Randell.

It seems World Aero have certainly found their niche and the strategy is working well, despite unprecedented times. Strong foundations, support from a great team and the foresight to plan for every eventuality are crucial to ensure the future success of the business.



World Aero's wheel and brake MRO facility in West Sussex, England.



In the hot seat.....

Glenford Marston

Chief Executive Officer, Aero Norway

What attracted you to this business?

Marston: I have always loved aircraft, and that was and still is the attraction. I started my career in the military where I enrolled in the RAF and spent many years as an aircraft engineer. Having moved from Jamaica, where I was born, to England, I then made the move to Norway to be with my partner. People generally move for two reasons: love or money. I'm still in love but a poor man!

During my time at Aero Norway in its various incarnations, I have seen the business go through a significant evolutionary period. I first joined when it was owned by Pratt & Whitney in 2001 and was part of the later transition to Aero Gulf. I joined Aero Gulf in 2014 and was appointed to CEO in 2015. I remained CEO when the company became Aero Norway and I am particularly proud of the work that has been done in this facility over the last five years.

The team at Aero Norway has always been renowned for the good reputation it has built in the engine MRO marketplace because of the quality product it delivers - this even goes back as far as the Braathens'

days. Pratt & Whitney further evolved working practices by introducing the Lean processes which are very much part of our every breath now. When you combine this ethos with our support offering, customers find working with Aero Norway very attractive.

What does a typical day's work entail in your job?

Marston: Typically, I will start the day by speaking to my right-hand man, Chief Operating Officer - Neil Russell, as well as my Chief Financial Officer - Gunnar Johan Eriksson. We aim to meet every morning whether it is for ten or thirty minutes. This is our established routine to find out what is required and what has been done. This was in place even pre COVID. I also interact daily with our HR people to ensure that everything is good and balanced on a personal level with employees, as well as talking with our quality team to ensure our standards are being met. We have established management meetings which we aim to hold twice a week liaising with individual managers to ascertain our position in the market and any additional requirements.



Aero Norway is adapting to changes quickly in response to issues related to COVID.

As a direct result of COVID-19, and more specifically the cancellation of meetings and events combined with the difficulties surrounding travel, I am focusing more of my time on instigating and maintaining telephone contact with customers. Keeping in touch is vital for any business – now more than ever; this typically results in a long business day spanning all time zones as I'm speaking to operators and lessors worldwide.

What is the most challenging part of your job?

Marston: Now, it is ensuring that enough quality engines are entering our facility. As a result of COVID-19 customers are reluctant to commit as it is impossible for them to assess demand when they do not know if their aircraft will be flying. This has presented challenges with schedule planning, strategic placement of parts, and manpower. But we are adapting quickly and endeavouring to be as flexible as possible.

How has Covid-19 affected the business for CFM56 MRO and how are you coping?

Marston: Widebody engine shops are suffering more than Aero Norway as there are currently less long-haul aircraft in operation. As a CFM56 specialist repair station, all the engines we repair and overhaul are deployed on narrowbody aircraft: we have the CFM56-5b on Airbus, the -7B on the Boeing NG and the -3 on the Classics. Due to the high demand for air cargo, it is the Classic freighter engines that are currently coming into the shop – although these rewards may be limited in the short term, in the long run business will perpetuate as these carriers will fly the NGs in the future so we can undertake the -7B work.

Did the storage of aircraft fleets around the world affect the supply of CFM 56 inductions?

Marston: Aircraft storage has impacted significantly on engine inductions in the short-term, however demand will rise as maintenance

which has been postponed will need to be carried out. Carriers cannot delay shop visits indefinitely if they wish to continue to utilise their assets – those assets will eventually need to come for maintenance or teardown. I anticipate that after COVID-19, when things start moving in the right direction, the demand will rise – it will either be shop visits or teardown. I think there will be a growing trend towards teardowns as operators and lessors will need to restructure their businesses, assets will be rationalised and we will see a reduction in fleet size everywhere.

There will certainly be an influx of torn down material. Most operators are now very cash conscious, those who used to buy new, will be looking for used material to save money. Operators will also be looking to generate revenue tied up in grounded assets and may find that teardown is the easiest option.

All parked aircraft will have some form of ongoing preservation system in place and will not deteriorate if looked after correctly and certain parts will be operated periodically to ensure they do not lose functionality.



Classic freighter engines are currently coming into the shop.

How is the unequivocal pursuit of industry recognised EGT margins progressing?

Marston: EGT is a recognised measurement for operators because everything they do technically is based around EGT. When receiving a quality engine, Aero Norway can then deliver a 40° EGTHD margin for a CFM56-3C1 engine whereas the market can generally give them 25°. They can deduce from that they will get another two to three years' operation from an engine that goes to Aero Norway, that's just our industry standard. It is important to emphasise that there is not just one measurement of quality at Aero Norway. We pride ourselves on providing a consistently superior product, and it's not just the EGT margin that drives our quality. When an operator decides they would like to fly an engine for eight or ten years, they need something to measure the eight or ten years against – EGT lends itself

to that. The chances are that an engine with 25° EGT will not fly 8,000 cycles, but with 40° they can expect more than eight years' worth of flying.

Some lessors are under immense pressure to be ready to re-position serviceable aircraft and engines when the COVID situation passes. Do you anticipate a surge in engines from this segment?

Marston: Lessors like nothing better than securing a long-term lease. Although the responsibility of the maintenance of the aircraft and engines lies with the operator for the duration of the lease itself, in the first instance, lessors consider that supplying an aircraft with engines that have come from the Aero Norway shop as supplying operators with a quality product at the outset of the relationship, therefore enhancing their offering. This is advantageous for the

lessor as their engines will not cause issues during the lease, as well as for the reputation of Aero Norway.

Back in 2018 you mentioned that Aero Norway had sights set on the LEAP engine. Is there a set timeline for this?

Marston: LEAP has been pushed back during COVID-19 and we are still in the evaluation stage, but our sights remain set on bringing LEAP in. Given the situation, our current focus remains on supporting our customers to help them to get through this time. There is still a lot of demand on the shop with current engine inductions, so the LEAP is not our priority now.

We are continually trying to find innovative ways to try and keep aircraft flying with decent engines whilst demonstrating our flexibility and reducing the operational costs and supporting our customers where possible. For example, we are accommodating special payment terms and strategic placement of materials. LEAP will certainly be the next model at Aero Norway – there is some delay to the programme, but all the preparatory processes are still underway.

What is your key priority now as some airlines resume limited operations?

Marston: COVID-19 has put a delay on everything. I think the CFM56-3 will retain its presence, and the life of the Classics will be extended somewhat. I anticipate that we will be engaged with the CFM56 -3 until 2028 in order to support operators. Some of our customers have already asked whether we'll be supporting the CFM56-3 on their Classics up to 2026, and we have agreed to do that.

We're not turning our backs on CFM56-3s, but our business model requires us to work on more CFM56-5bs and 7bs than -3s. Before COVID, our forecast was that 70% of our inductions would be 5s and 7s over the coming year, and 30% CFM56-3s. But with COVID-19 that forecast has been turned on its head and the divide will be 50% -CFM56-3s and 50% 5s and 7s. The customers that we are supporting with the -3s, will be our future -5, -7 and LEAP customers, so we are constantly looking at ways to satisfy our customers and keep our business agile. We are fortunate however, that we are small enough, but also big enough, to be flexible.

SIMPLICITY **FOR THE WIN**

WHEELS AND BRAKES
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American was a major operator of the RB211-powered Boeing 757.
Photo: Bill Abbott

RB211-535 Package holidays, to package carriers

David Williams, Global RB211 Engine Specialist at StandardAero looks back at one of the most popular aircraft engine series and the continued opportunities with the 757 freighter.

When StandardAero was selected as Rolls-Royce's end-of-life engine maintenance service partner for the RB211-535 engine in January 2018, it represented the latest milestone for an engine family which this year celebrated the 50th anniversary of its first flight.

The RB211 family was launched in March 1968 with its selection for the Lockheed L-1011 TriStar trijet. The launch order covered 150 aircraft, the first of which entered service with Eastern Airlines in 1972, but Lockheed would go on to build a total of 250 RB211-22-powered TriStars, one of which still remains in service with satellite launch services provider Orbital Sciences.

Rolls-Royce subsequently re-fanned the RB211 to create the RB211-524, which became an engine option on both the Boeing 747 and the Boeing 767.

In the mid-1970s, Rolls designed a third variant of the RB211 family to meet the needs of Boeing's new 757 airliner, developed to replace the 727. The RB211-535 was ordered by both launch customers of the 757 and would go on to power nearly 60% of all 757s delivered.

Eastern Airlines began operations of its RB211-535C-powered 757s in 1983, and one year later Rolls-Royce introduced the improved -535E4 variant, which featured

hollow wide-chord fan blades. The RB211-535E4 represented the bulk of -535 production and is expected to remain in service until the year 2040.

The Boeing 757 found success in a broad number of markets, including transatlantic and transcontinental mainline operations, cargo and combi service, and – perhaps most famously in Europe – tour package flights. The final RB211-535 was delivered in 2009, by which time Rolls-Royce had refocussed on production of its successful RB211-derived Trent engine family.

Major customers for the RB211-powered Boeing 757 included American Airlines, which operated a total of 177. Between 1998 and 2015, the RB211-535 was supported by Texas Aero Engine Service LLC (TAESL), a 50:50 partnership between American and Rolls-Royce based in Fort Worth, Texas.

After this partnership was dissolved in 2015, Rolls-Royce reverted to supporting the engine from its Engine Overhaul Services location in Derby, UK. However, Rolls' success with the follow-on Trent engine family led the company to seek a dedicated partner capable of

supporting the RB211-535 operator base for the remainder of its operational life, which is how the 2018 deal with StandardAero came about.

StandardAero established a new dedicated overhaul line for the RB211-535 at its facility in San Antonio, TX, achieving full FAA approval in October 2019. The company supports both programme and transactional RB211-535 customers from San Antonio and expects to induct 50 to 60 engines in 2020 (up from 31 in 2019).

While the 757 is gradually being retired from passenger service, replaced by models such as the Airbus A321XLR, the type continues to enjoy strong demand in the cargo market, where its payload capabilities and economies of scale – the latter a direct consequence of the RB211-535's famed reliability – have made freight conversions a popular choice. As such, the 757's story – and that of the RB211 – looks certain to continue for at least another two decades.

David Williams was formerly Sales and Marketing Manager at Texas Aero Engine Services LLC (TAESL), with 27 years' prior experience at Rolls-Royce Canada.



David Williams,
Global RB211 Engine Specialist,
StandardAero

Giving aviation a new **LEASE** on life

Willis Lease Finance Corporation has been a true pioneer in the aviation industry for nearly 40 years providing solutions to global customers including all major airlines, lessors, MROs, and OEMs in over 120 countries. Willis has continuously expanded its services to meet the growing needs of the aviation community, building the Willis Platform™ to include material support, technical consultancy, CAMO, and Part 145 engine repair capabilities. In 2019, Willis further broadened its capabilities and entered the aircraft maintenance, storage and disassembly space. To meet the current market conditions needs of airlines and lessors for increased aircraft parking, storage and disassembly, Willis launched operational facilities at Teesside International Airport (UK) and Ciudad Real International Airport (Spain). Willis Aircraft Maintenance & Storage (WAMS) is poised to offer an entire new suite of services to its ever-growing customer base via aircraft storage, line maintenance, and disassembly with base maintenance expected to follow in 2021.

Located in NE England, Willis' facility at Teesside International Airport provides an ideal location for aircraft maintenance, storage and disassembly. The facility features a 45,000 square foot hangar that can accommodate up to three narrow-body aircraft (up to B757 wingspan), ample outdoor storage and a runway capable of accepting A380s. WAMS at Teesside has

welcomed the arrival of its first aircraft for storage and is preparing for increased traffic due to significant customer interest. The UK facility is ideal for short-term narrow-body storage and aircraft which may become "end-of-life". Teesside is easily accessible to the UK with daily international routes via Amsterdam and London.

Recognizing the growing demand for storage needs of the industry, Willis opened a second WAMS facility at Ciudad Real International Airport in south-central Spain in mid-2020. Located less than an hour from Madrid, and with optimal climate conditions, Willis' Ciudad Real facility gives WAMS the ability to store and perform line maintenance on dozens of narrow-body and wide-body aircraft. Customer interest indicates that lessors and airlines are favoring Ciudad Real for long-term storage for newer aircraft and the severely impacted wide-body long-haul market. With ongoing construction to expand parking capabilities, Willis has the potential space for the largest storage facility in Europe.

Both facilities currently have immediate space available and line maintenance approvals covering all Boeing, Airbus, E-Jet and regional types.

With the addition of the two aircraft storage facilities in Europe, the Willis Platform™ continues to provide solutions tailored to its customers' needs. Willis also offers the following services across a broad spectrum of aircraft and engine types:

- Engine & Aircraft Leasing & Trading
- Part 145 Engine & Aircraft Maintenance
- Engine & Aircraft Storage
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- Engine & Aircraft Teardown
- Asset Management
- Material Support
- CAMO Services

By leveraging its diverse asset base, capital resources, and deep understanding of aviation assets, Willis delivers comprehensive, innovative, and dependable solutions to aviation customers around the world.



PEOPLE

»»»»→ *on the move*



Greg Azzara

BBAM, a leading provider of asset origination and management services in the aircraft leasing industry, has reported the retirement of Chief Operating Officer **Greg Azzara**, and the appointment of Vincent Cannon to the role of General Counsel and Chief Operating Officer. Azzara will remain with BBAM as an advisor to the company's Executive Committee through March 31, 2021, to ensure a smooth transition. Cannon is currently Senior Vice President, Corporate Legal, a position he has held since joining BBAM in 2014. Prior to joining BBAM, he practiced law at Davis Polk & Wardwell LLP.



Ian Foster

Bii.aero, a provider of aircraft parts, repairs, and services for the commercial, governmental/military and rotary aviation sector, has appointed **Ian Foster** as MRO Director. Foster will focus his significant global network of closely audited repair vendors and knowledge of contracted programs, to broaden Bii's reach and compete effectively in a highly cost-sensitive marketplace.



Alexis Dufermont

APOC Aviation, the innovative leasing, trading, aircraft component and part-out specialist, has appointed industry professional **Alexis Dufermont**, as Director of Business Development. He will be responsible for expanding and diversifying APOC's global customer network and the development of new routes to market for the organization's rapidly growing A320 and B737 inventory of parts. In his previous position as Sales Director – Contract Services at AJW Aviation, Dufermont was accustomed to developing integrated component solutions for a wide range of customers of all sizes and global locations, and he sees this a core strength.



Steve Pike

Vallair, the mature aircraft asset specialist and launch customer of the A321P2F freighter conversion, has appointed **Steve Pike** as Aerostructures & MRO Services Sales Manager. He will be based in Vallair's EASA- and FAA-approved repair facility in Châteauroux, France. Pike's role will be to act as the main interface with operators, lessors, aviation parts stockists and suppliers of aviation parts for all Vallair's MRO services, but also specifically for Vallair's Aerostructures workshop. Vallair's Châteauroux facility specializes in a wide range of composite and sheet metal repairs on a variety of aircraft structures and components. All specialist work meets regulatory standards and fulfils the requirements of the various airworthiness bodies. A dedicated field service team is on hand for support with any aircraft inspections or onsite repairs and modifications.