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MRO

Management



Key elements

Component maintenance demand grows as parts availability falls

CHANGE AND CHALLENGE

Why the long-term outlook for MRO in North America is promising

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Maintenance planning and scheduling software is constantly evolving

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Editor's Letter

Every component on an aircraft is important. And each is constantly monitored to determine when it is nearing the end of useful operation – or when it might already have done so.

At this point, a decision must be taken to repair or replace the component. With parts availability sometimes an issue, particularly in the current climate, MRO providers are seeing strong growth in demand for component maintenance.

These providers are proving themselves flexible, capable and innovative as they rise to the challenge, keeping aircraft safely in the air doing what airlines want them to do – namely earning revenue. Component maintenance is the subject of our cover story, on page 36.

As the MRO industry gathers in Atlanta for the MRO Americas show in April, we decided the time was right to take a look at the outlook for companies headquartered in North America. As recovery turns to growth, a strong 2023 is expected for MRO companies, with growth continuing beyond that. Nevertheless, as we found from interviewing a range of providers, a unique set of challenges remain,



and these will need the industry to continue to innovate and collaborate to overcome them. See page 28 for the full article.

The regular 'Industry voices' section of *MRO Management* has become a staple of the magazine, giving industry leaders and subject matter experts the chance to share ideas, innovations and information with readers. This issue features a fascinating trio of contributions. The aviation industry in the western Pennsylvania region of the US is soaring to new heights, largely thanks to the Mid-Atlantic Opportunity Park – a nearly 130-acre expansion to the John Murtha Johnstown-Cambria County Airport – which is

anchored by a 100,000sq ft MRO facility, and we get the lowdown on the project on page 18.

At the aforementioned MRO Americas show, many of the world's most skilled aircraft technicians will participate in the Aerospace Maintenance Competition, presented by Snap-on. The competition is explained and previewed on page 22.

And on page 16, Rotable

Repairs' Lionel Fearon details why the company is now on course to increase its global footprint.

There's plenty more to discover, too. I hope you enjoy reading the issue.

Jason Holland

EDITOR

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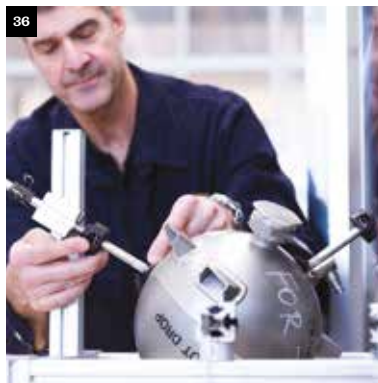
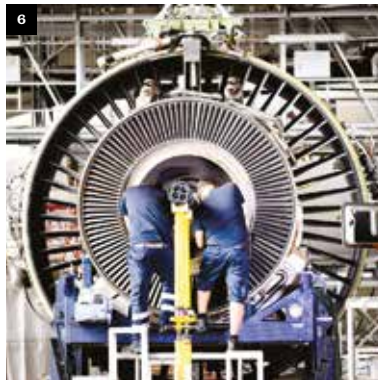
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Aircraft component repair has had to increase at a time when parts availability has been a challenge. How are MROs dealing with this?

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Maintenance planning and scheduling software is constantly evolving, and there has been increased use of real-time data and artificial intelligence

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Will sustainable aviation fuel and carbon pricing be the key factors that ensure the aviation industry meets its net zero emission targets?

Hangar Talk



M & A

AAR acquires software company Trax to create “compelling and unique offering”

➤ AAR has acquired aircraft MRO and fleet management software company Trax USA. Trax offers software applications to a global customer base of airlines, MROs and government aircraft operators supporting approximately 5,000 aircraft. The company was founded in 1999 and is headquartered in Miami, with approximately 110 employees.

Trax's 'eMRO' product is a web-based enterprise MRO software solution for managing aircraft maintenance and fleet management, including materials planning and purchasing, engineering, scheduling, regulatory compliance, work orders and personnel. Its 'eMobility' products provide a suite of

mobile applications, including task cards, digital manuals, electronic log books, fleet status and warehouse management.

AAR said its acquisition of Trax accelerated its strategy “to offer digital solutions focused on its core aviation aftermarket customers”. The company stated: “Trax adds established, higher-margin aviation aftermarket software offerings with recurring revenue to AAR's portfolio, and its complementary customer base provides opportunities to cross-sell products and services”.

AAR's chairman, president and CEO John M Holmes said: “We believe we can support Trax's continued growth by investing in its platforms and by leveraging our global relationships to

help Trax reach additional customers. We also believe that over time this combination will allow more customers to better access AAR's parts and services offerings as Trax is the materials management system used by thousands of buyers and planners at airlines around the world.”

Trax's CEO Jose Almeida commented: “Trax has led the industry in developing next generation maintenance ERP systems for over 20 years. By combining two leading independent aftermarket services providers, we create a compelling and unique offering to support the global aviation industry. We are excited to partner with AAR to further accelerate Trax's growth and development.”



FINANCE

Turkish Technic reports 37 per cent year-on-year revenue growth in 2022

➤ Turkish Technic recorded a 37 per cent growth in revenue in 2022 compared to the previous year, to US \$1.42 billion. The MRO company said this represented the highest growth rate and revenue in its history. Turkish Technic also said it increased its market share to 1.9 per cent.

The company completed base maintenance operations for Boeing 787 Dreamliner and Airbus A350 aircraft for the first time during the year and carried out its first Boeing 777-300ER landing gear overhaul.

“To meet the growing needs of the aviation industry, we continuously increase our capacity and capabilities and continue to provide high-quality maintenance repair services to our local and international customers,” said Turkish Technic’s chairman of the board of directors and executive committee, Prof Dr Ahmet Bolat.

Turkish Technic said it provided base maintenance services to 649 aircraft, completed overhaul operations of 221 landing gears, and serviced over 119,000 components throughout 2022.

PAINTING

MAAS’ first all-women team completes aircraft painting project

➤ An all-women MAAS Aviation team completed the painting of a new A320 aircraft to mark International Women’s Day on 8 March. MAAS said the accomplishment of its first all-female paint team represented “a major milestone for the business”.

The painting work was carried out over a five-day period in late February and early March by the 12-strong team.



“They carried out all stages of the paint job from applications of primer through to basecoat, then finishing with clearcoat, with inspections at every stage to ensure the high standards and perfect finish MAAS Aviation is known for,” said Geoffrey Myrick, MAAS Aviation’s chief operating officer – US.

“The aircraft achieved a 100 per cent customer rating. This is the first time we’ve had an all-female team complete an aircraft painting project, but it’s important to say that female colleagues have worked within our paint teams for many years. In an industry that many still view as male-dominated, we’re pleased to be a positive example of how this is changing.”

Daryl Taylor, head of commercial operations for Airbus in the US, said: “The quality of work performed by this team of women is undeniable proof of their talent and strength.”

BRIEFS



- ExecuJet MRO Services Belgium has been approved by European regulators to provide line maintenance in other European countries. “Following strong demand from customers, there was a need for us to offer line maintenance at locations away from our home base,” said Christophe de Coppel, ExecuJet MRO Services’ regional vice president of Europe. ExecuJet MRO Services’ main base for line maintenance in Belgium is Brussels Airport; it has another MRO facility at Flanders International Airport that performs mainly heavy maintenance.

- Cebu Pacific has awarded Joramco a maintenance contract covering Airbus A330 aircraft C-checks, starting in March. The agreement marks the first time the Amman-based MRO provider and engineering arm of Dubai Aerospace Enterprise (DAE) will be working with the Philippines-headquartered airline.

- SriLankan Airlines is to implement Swiss-AS’s ‘AMOS’ software. The airline will use ‘AMOSmobile/EXEC’, a touch-optimised add-on to AMOS, to perform all line and base maintenance activities paperlessly. This is expected to add value “not only in terms of cost, but also in terms of time, ensuring high productivity whilst maintaining quality, safety and consistency”.

- VAS Aero Services is to acquire two additional Airbus narrowbody airframes from Avolon Aerospace Leasing. These are an Airbus A319-100 (MSN 2362) and an A320-100 (MSN 2299). The USM from both teardowns will augment VAS’ aftermarket parts inventory.

27

MTU Aero Engines increased revenue by 27 per cent to €5.3 billion in 2022

1.9

Turkish Technic said it increased its market share to 1.9 per cent last year

9.6

Lufthansa Technik signed new contracts with a volume of €9.6 billion in 2022



FINANCE

Lufthansa Technik posts robust financial results for 2022

> Lufthansa Technik has reported a record adjusted EBIT result in financial year 2022, while posting its third-best revenue figure. Adjusted EBIT exceeded half a billion for the first time, at €511 million, which was a 41 per cent increase on the previous year. Revenue grew to €5.6 billion, a 39 per cent increase on the previous year.

New contracts with a volume of €9.6 billion were signed in 2022. In total, Lufthansa Technik signed 706 new contracts and gained 28 new customers in the process. As with revenue, the EMEA region (Europe, Middle East and

Africa) accounted for almost two-thirds of this new business, more than twice as much as the Americas region and around five times as much as Asia Pacific, where the company is pursuing “major opportunities for future growth”.

Lufthansa Technik said that the “clear” recovery of the aviation industry as a whole drove demand for MRO of commercial aircraft “sharply upward”. The company said its continued systematic pursuit of restructuring, an advantageous US dollar exchange rate, and its “excellent market positioning” also contributed significantly to the financial results.

“Despite numerous operational challenges, Lufthansa Technik has significantly ramped up operations again”

Soeren Stark, Lufthansa Technik’s chief executive officer, said: “The strong dynamics of the industry also shaped our financial year. It has been another year that has demanded everything of us. While we have not quite returned to our former dimensions, we will continue to grow from a position of strength.”

Lufthansa Technik said its ‘RISE’ programme had been an important factor in shaping its positive results, with measures adopted under the programme helping the MRO company “to organise itself more efficiently, simplify processes and reduce expenses in the long term”.

Stark said that the company’s success was “founded on the partnership with our customers”. He added: “These customers, who we often accommodated in partnership during Covid despite our own challenges, are now returning the favour with new business and contract renewals.

“We are the partner of choice for airlines around the world. As a result, we were not only servicing more than 800 customers by the end of 2022, but also again more than 4,200 aircraft, even though we had previously removed hundreds from our order books due to the discontinued business in Russia.”

Looking ahead, Lufthansa Technik expects the global MRO market not only to reach but to surpass its pre-Covid level as early as this year, with a total volume of around €96 billion. The forecast market volume will be distributed evenly across the three sales regions of the Americas, EMEA and APAC, it said.

“We are well prepared for a market that is as attractive again now as it was before the crisis,” concluded Stark.



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ENGINES

StandardAero and ST Engineering sign agreements to support LEAP-1A and LEAP-1B engines

ST Engineering's Commercial Aerospace business and StandardAero have signed long-term CFM branded service agreements (CBSA) to support the CFM International LEAP-1A and LEAP-1B engines.

StandardAero becomes part of CFM's authorised MRO network for the latest generation LEAP-1A and LEAP-1B engines, providing a full range of MRO services to operators worldwide.

It becomes the first independent (non-airline) MRO provider in the Americas to sign a CBSA for both the LEAP-1A, which powers the Airbus A320neo family, and the LEAP-1B, which powers the Boeing 737-MAX series aircraft.

StandardAero will support the LEAP-1A and -1B from its 810,000sq ft facility in San Antonio, US, which has benefitted from significant investment over the past five years.

ST Engineering becomes the first provider in Asia to join the LEAP MRO network under a CBSA agreement, and will also provide the full scope of LEAP MRO services for operators worldwide at its engine MRO facility in Singapore.

ST Engineering has been a LEAP MRO network provider since 2020, providing quick-turn services for the LEAP-1A and LEAP-1B engines. The group will also add test cell capabilities for LEAP-1B engines this year.

“CBSA agreements are part of CFM's strategy to give customers more choice in the market”



MRO

Iberia Maintenance sees increase in engine inductions in 2022

Iberia Maintenance consolidated its position as a centre of excellence for V2500 engines in 2022, as it formed new partnerships with companies such as Qatar Airways and HK Express. The V2500 represents more than 50 per cent of the engines inducted by the company.

The CFM56 represents one third of the total number of repaired engines, encompassing both CFM56-5Bs and CFM56-7Bs. In 2022, Iberia Maintenance reached an agreement with RwandAir for the maintenance and repair of its -7B & -7BE engines, powering the airline's Boeing 737 fleet.

Iberia Maintenance said that new contracts had increased the total number of engines inducted by 14 per cent compared to 2021 levels.

Looking to the future, Iberia Maintenance said it had made a multi-million Euro investment to acquire tooling and machinery so as to adapt its engine shop to be able to cater to demand for newer engines such as the GTF and LEAP, while continuing to serve existing models.

In October 2022, Iberia Maintenance obtained a licence to service Pratt & Whitney GTF engines, which power the Airbus A320neo family. The first GTF will arrive in the second half of 2023.

“The aeronautical maintenance sector is at a turning point and companies have to adapt to it,” said Iberia Maintenance's engine shop director Eylo González. “We have to be able to respond to the current demands of our customers while preparing for the future and that is what we are doing at Iberia Maintenance. In this way, a stable workload is guaranteed for the future.”



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TREND WATCH

New partnerships, solutions and initiatives are driving innovation in the MRO industry



01

A380 expertise

● Emirates has contracted Lufthansa Technik to provide MRO services for its Airbus A380s. Lufthansa Technik will overhaul main landing gears of Emirates' double-deck flagships. It will also provide the airline with "highly flexible extra capacity" for A380 base maintenance such as C-checks. This agreement marks the first outsourcing of heavy checks from Emirates' in-house A380 MRO capacities to an external provider.



05

Changing times

● Direct Maintenance has been rebranded as Magnetic Line. The company is part of the Magnetic Group, which said the rebranding was part of a group strategy to unify all its businesses under single brand Magnetic and streamline products and services "under one easily recognisable name". Direct Maintenance has been part of Magnetic Group since March 2019, offering line maintenance services to clients around the world. The rebranding will not affect the range of services provided or the team's composition. (Pictured: Magnetic Line's head of sales Mandeep Rana.)

02

Digital partners

● Honeywell and Lufthansa Technik are increasing their collaboration in the field of aviation analytics. Honeywell Connected Maintenance analytics are now being fully integrated into the 'Predictive Health Analytics' (PHA) suite of Lufthansa Technik's digital platform Aviator. This will grow to more than 100 predictors for multiple Airbus and Boeing aircraft types. Airlines can take advantage of an integrated single product offering designed to help reduce maintenance costs, technical delays and cancellations in airline operations.



03

Predictive painting

● AkzoNobel Aerospace Coatings is to launch a digital, data-driven service that more accurately advises an operator when an aircraft needs to be repainted. The service, 'Aerofleet Coatings Management', has been designed to help airlines and other large operators to tailor and optimise their coatings' replacement and maintenance schedules for individual aircraft within an airline fleet. Information is analysed and mapped over time, so a more accurate maintenance and repaint schedule can then be calculated.

04

Conversion creation

● Boeing has partnered with GMR Aero Technic to establish a 737 freighter conversion line at the MRO company's facility at Rajiv Gandhi International Airport in Hyderabad, India. GMR Aero Technic will become the first Boeing supplier in India to have the capability to support future conversions of both domestic and foreign aircraft.

"The rebranding shows our commitment to keeping pace with the changing times and catering to the evolving needs of customers"



Trending stats

(All stats from VZM Management Services' 2023 market outlook)

23

The percentage of the 2019 fleet that will still be in service by 2041

5

Narrowbody MRO will grow 4-5 per cent annually this decade thanks to a growing although rejuvenating global fleet

10

The global regional MRO market is expected to decline in the next 10 years, with a shrinking fleet and smaller and older aircraft being phased out

10+5

Pratt & Whitney has 10 GTF engine centres active and nine more are to come, while CFM has five LEAP centres active and has deals for more

06

Japan expansion

● Pratt & Whitney and Mitsubishi Heavy Industries Aero Engines (MHIAEL) have announced a second operational GTF (geared turbofan) MRO facility in Japan. MHIAEL is part of Japanese Aero Engine Corporation, and has been a Pratt & Whitney maintenance partner since the Wasp engine and most recently the PW4000 and V2500 engines. The company has inducted its first PW1100G-JM engine at its facility in Komaki, Japan. This is part of the overall expansion of its facility.

07

Strategic partners

● Etihad Airways Engineering is to become an Acme Aerospace authorised repair station for avionics instruments and batteries in the Middle East, Africa and India. Abdul Khaliq Saeed (below, second from left), CEO at Etihad Airways Engineering, said: "We are pleased to be joining hands with Acme Aerospace - I believe this strategic partnership will help us strengthen our component portfolio to better serve our customers and provide additional opportunities for Acme aftermarket services in the Middle East."



08

Pivotal moment

● AJW Group has committed to participate in the United Nations Global Compact (UNGC), the corporate sustainability initiative. The UNGC's vision is to "mobilise a global movement of sustainable companies and stakeholders to create the world we want". Christopher Whiteside, chairman of AJW Group, commented: "Our participation in the UNGC is a pivotal moment for our company. This heralds a new era of commitment to sustainability as we fly towards our centenary in 2032."



A large industrial jet engine is the central focus on the right side of the image, mounted on a complex assembly structure. In the background, two workers in dark blue shirts are visible; one is seated at a workstation with multiple computer monitors, and the other is standing nearby. The setting is a vast, brightly lit industrial facility with a high ceiling, white structural beams, and yellow overhead cranes. The floor is highly reflective, mirroring the engine and the workers. On the far left, a yellow safety sign is partially visible with the text 'JUST IN CASE' and 'IMMEDIATE FIRE ALARM'.

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ROTABLE REPAIRS REBORN

Rotable Repairs took a variety of innovative steps to ensure it was ready for the travel sector rebound and is now on course to increase its global footprint, says general manager operations and head of technical **Lionel Fearon**



“The volume of work delivered to customers had increased by more than 50 per cent on 2019 levels and this was only predicted to continue to grow year-on-year”



Lionel Fearon is general manager operations and head of technical at Rotable Repairs



For more information on Rotable Repairs, visit rotablerepairs.com

Like the grandiose beauty *amorphophallus titanum*, Rotable Repairs Limited (RRL) is evidence of a rare MRO which is blossoming into something remarkable that is not to be missed. RRL is a part of the global enterprise that is Desser Aerospace, the parent of a group of companies, which is headquartered in Montebello, California.

As with most companies in the aviation sector, in 2020 Rotable Repairs suffered heavily during the pandemic and was forced to downsize its operation. Retaining only a core team on the workshop and the minimum support staff in the offices, the operation continued, supporting its customers across all aviation segments.

As we journeyed through 2021 there were the first shoots of optimism in the market as aircraft began to fly again and the volume of work coming into the business slowly started to rise. New customers appeared on the horizon and the future was again looking prosperous. It was decided that the company would react to this and ensure that it was ready when the travel sector fully sprung back to life.

Looking at the growing customer base and with airlines such as British Airways, TUI Group and Air Malta on board, and working with manufacturers such as Boeing, Safran and Honeywell, RRL embarked on an upgrade to its entire operation.

In parallel, a search for new talent began to ensure the right skills were in the right place within the business to carry out all tasks. The layout of the workshop was reviewed as well as some of the equipment. With these new contracts came some of the latest aircraft types such as the A320neo, A350-1000 and the Boeing 787 variants. The electric brake on the 787 meant the installation of a bespoke test rig for these Safran brake units. The Michelin NZG tyres necessitated an upgrade to the bead breaker to enable the safe removal of the tyre off the wheel assembly, so the Kunz Dynamic Universal Bead Breaker (DUBB) was installed in the disassembly section of the workshop.

An additional Bauer wheel assembly station was installed to increase the capacity for assembly of wheels and there was also the installation of the Kunz Universal Torque Tool (UTT) into the brake shop to facilitate the assembly and torque of the all-aircraft brake units. Prior to this, RRL had already upgraded the hydraulic brake test rig to a new digital test rig from Bauer and replace the old spring tester, a semi-automatic digital one from Mecmesin.

All this was in place going into 2022 as RRL continued to grow the capacity, operation and talent to manage new and existing customers.

As 2022 ended, there was a new management team in place, the team on the workshop had grown close



“As 2022 ended, a new management team was in place, and the team on the workshop had grown close to pre-pandemic levels”

to pre-pandemic levels and all new operational activity was fully under control. The volume of work delivered to customers had increased by more than 50 per cent on 2019 levels and this was only predicted to continue to grow year-on-year. Whilst the operation was flourishing, the senior management team began to look to the future and put in place all that is necessary to ensure the continued growth of the business.

RRL is one of three MRO divisions of the group that services the commercial, general, business and military aviation markets, and is planned to continue its development with the expected growth to increase by a further 30 per cent by the end of 2026. In order to achieve this, the business has a number of projects running simultaneously that look at the operation of the workshop, maximise the use of the assets, and assess the various activities it undertakes as it looks at improve business efficiencies. These include efficient use of the Quantum EWS system, bringing in a new MRP system to manage stock as well as further upgrades to some of the workshop equipment.

Projects coming to fruition in 2023 include the installation of a new dye penetrant line that will simplify the crack detection, reduce manual handling and increase the accuracy of the crack detection process. The system will also minimise waste with an improved filtration system and that will enable us to maximise the use of the penetrant.

There will also be a re-introduction of ultrasonic cleaning into the brake processing, as this will improve the

cleaning of the brake components such as springs and pistons, remove any black aggregate that has accumulated, and therefore make the inspection and assembly of aircraft brake units a much more efficient process. The introduction of automated cleaning is also being developed for wheels to supplement some of the current processing. This too will better enable the removal of rubber deposits from the hub and ensure smoother processing through NDT and into assembly.

Finally, as we continue through 2023, RRL will grow the sales team across the EMEA region and boost the trading arm of the business.

This will only add to the success of the business and help the group to grow and increase its global footprint. 



Images on this page: A look at some of Rotable Repairs' equipment and capabilities as the company seeks to continue its post-pandemic rebound and continue on a growth path in 2023 and beyond

THE WONDER OF WESTERN PENNSYLVANIA

The aviation industry in the western Pennsylvania region of the US is soaring to new heights, says **Larry J Nulton, PhD**, aviation entrepreneur and co-owner of Nulton Aviation Services and Cambrian Hills Development Group, and chair of his new nonprofit, Aerium



“A 100,000sq ft MRO facility will anchor the Mid-Atlantic Opportunity Park... the MRO operator will service narrowbody jet aircraft and more”



Larry J Nulton, PhD is an aviation entrepreneur and chair of new nonprofit Aerium



For more information on the summit, visit AeriumSummit.org. To learn more about the Opportunity Park, visit theopportunitypark.com

As a long-time avid proponent of the aviation community in western Pennsylvania, I'm thrilled to witness all the great work that public and private partnerships are doing to expand and advance the aviation ecosystem in the region.

From announcing our planned Mid-Atlantic Opportunity Park to preparing for the inaugural Aerium Education Summit, dozens of partners are working to transform and evolve the industry. That acceleration stems from the following four major initiatives.

Mid-Atlantic Opportunity Park

In December 2022, the Johnstown-Cambria County Airport Authority and Cambrian Hills Development Group jointly announced plans to develop the Mid-Atlantic Opportunity Park – a nearly 130-acre expansion to the John Murtha Johnstown-Cambria County Airport (JST).

The project will be anchored by a state-of-the-art, 100,000sq ft MRO facility, significantly increasing airport capabilities and ultimately providing a regional destination for routine repair, service and inspection for corporate aircraft. The MRO operator, whom we are actively pursuing, will be able to service narrowbody jet aircraft and more.

The Opportunity Park offers build-to-suit leases and is an ideal location for companies that want access to a highly

mobile population of more than 42 million, as well as a region with a growing industrial base and one of the nation's most active logistics clusters. The site is located within 500 nautical miles of the nation's largest population clusters, and near notable universities and top-level school districts.

We anticipate breaking ground on the Opportunity Park this spring, and look forward to the positive economic growth it will bring to our community and the western Pennsylvania aviation industry.

Growing talent and workforce

Our aviation ecosystem is only as strong as the workforce that supports it and I'm excited about the new initiatives that are launching in the western Pennsylvania/Laurel Highlands region.

In 2022, Saint Francis University expanded its existing relationship with Nulton Aviation Flight Academy to provide students access to SkyWest's elite Pilot Pathway and Aviation Maintenance Training Pathway programmes.

On top of that, Saint Francis was awarded a US\$1 million grant by the Appalachian Regional Commission to launch an aviation maintenance technician school, further adding to the potential talent pipeline for the Opportunity Park and beyond. These initiatives complement the existing strengths in the region from the likes of the Aviation Institute of Maintenance, Pittsburgh Institute of Aeronautics and Pennsylvania College of Technology.



We're also working on infusing the aviation curriculum into local public high schools to foster the industry's growth further and solidify its future.

And there's more to come as our partners work to make western Pennsylvania one of the most attractive destinations in the country for the aviation industry.

Public-private partnerships

None of this would be possible without the engagement of key partners. State and local leaders are joining forces to make our region, the Opportunity Park included, one of the country's most attractive aviation industry destinations. Members of Pennsylvania's congressional delegation have also pledged their support.

The shared goal of promoting the region's economic growth was instrumental in helping us secure a Keystone Opportunity Zone designation for the Mid-Atlantic Opportunity Park. Businesses that find a new home in the Opportunity Park will receive tax abatements, exemptions, reductions or credits in corporate taxes, and more. In addition, most business purchases will be exempt from state and local sales tax for property used, consumed and utilised in the zone.

Thanks to years of partnerships among industry, academic institutions and elected officials, the western Pennsylvania region is well on its way to becoming a hotbed of aviation, drones and maintenance activity.

The Aerium Education Summit

This summer (30 May-1 June), we're excited to host the Aerium Education Summit at the Johnstown Airport. It is designed to serve several purposes. First and foremost, we have placed a priority on providing guidance, connections and real-world context to high school students interested in careers in aviation, aeronautics, drone operation, defence and related maintenance careers.

Hundreds of school administrators, students and industry stakeholders will get a first-hand look at the incredible aviation and associated maintenance career pathways and resources that are now available. If your company is looking to expand operations, we invite you to come and learn more. 



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Julie Dickerson
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CELEBRATION IN COMPETITION

Technicians are set to demonstrate knowledge, skill and integrity at the Aerospace Maintenance Competition, presented by Snap-on. By **Katie Robertson**



“The AMC is a global spectacle that annually attracts more than 80 professional, military, and collegiate maintenance teams from around the world to come together in friendly competition”



Katie Robertson covers aviation as an account executive for LePoidevin Marketing. She can be reached at Katie@lepoidevinmarketing.com



For more information on the AMC, visit aerospacecompetition.com

Many of the world’s most skilled aircraft technicians are ready to shine in the Aerospace Maintenance Competition (AMC), presented by Snap-on. The event coincides with the MRO Americas convention, taking place between 17 and 20 April in Atlanta, US.

Powered by partnerships

The AMC is the brainchild of former National Transportation Safety Board member John Goglia, and Ken MacTiernan, a San Diego-based technician for American Airlines. Under their leadership, the competition has flourished.

The AMC is a global spectacle that annually attracts more than 80 professional, military, and collegiate maintenance teams from around the world to come together in friendly competition, test their skills against each other, and give a loud shout-out of their presence in the industry.

Events include a wide range of skills that technicians face every day on the job, including safety wiring, composite repair, electrical troubleshooting, turbine engine and others. Each event has a 15-minute time limit; the action is exciting, fast-paced and great drama for fans to watch.

The competition is presented by Snap-on (www.snapon.com/Aviation), which supplies the tools used during

the events and presents prizes for winning teams. The top prize, The William F ‘Bill’ O’Brien Award for Excellence in Aircraft Maintenance, is presented to the team with the best overall winning score. That team receives the five-foot-tall trophy to display in their facility that year. In addition to the trophy, Snap-on is awarding tools and equipment as prizes to the top finishers.

What has made the AMC such a success over the years is its partnership with Snap-on, which shares the founders’ reverent view of technicians. Snap-on is a strong believer in the dignity of aircraft technician work and that of professionals in all skilled trades.

“What the AMC stands for is something we deeply believe in, and that’s celebrating the critical nature of these jobs,” says Bill Willetts, vice president of Snap-on Industrial and AMC board member. “Through our partnerships with technical education institutions, we play an active role in promoting aviation careers and all skilled trades. This partnership with the AMC has moved the industry forward, and we will do our part to continue making it a success.”

Building knowledge

One of the tenets of the AMC is the incredible knowledge required to maintain an aircraft. The importance of knowledge on the job is perhaps best demonstrated by the teams competing in the school division.



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“Through our partnerships with technical education institutions, we actively promote aviation careers and all skilled trades”

The AMC provides a venue for students to build their knowledge through the hands-on events, some of which they may not see in a classroom, but they are also able to expand their knowledge of the industry.

Liberty University in Lynchburg, Virginia, US, has sent a team to the AMC for the past few years. Coaches Matt Youngs and Jake Harvey work to develop a strong knowledge base in the next generation of technicians, both in and out of the classroom.

“Some students come in pigeon-holed in what they want to do in their career. Maybe that’s all they’ve been exposed to,” says Youngs. “They get to the AMC and they can see the whole spectrum of the industry under one roof.”

Harvey adds: “There are thousands of vendors there who are willing to talk to anybody. Any area of the industry that you want to be plugged into has a representative there for you. It’s a great networking opportunity for the team.”

Demonstrating skill

Networking and knowledge-building play a huge role in what keeps teams coming back, but the competition and its ability to highlight skills are also important attributes of the AMC. The competitive edge, while friendly, is definitely sharp in teams like the group from Delta Airlines, who have their eyes squarely on the prize.

“We want to win,” says team member Peter Adzema. “The competition is at our home base, so we’re hoping to have a lot of support from Delta to give us the winning edge.”

Industry of integrity

Ensuring that an airplane is properly maintained requires the highest level of integrity. Teams understand the responsibility to represent the industry and their programmes with members who exemplify this value. Harvey says that the decision for who is taken to represent Liberty depends almost equally on technical ability and character.

“We set up four events for them to simulate what we’re looking for: their character, mechanical skill and how thoughtful they are in addressing each issue. From there, we convert those things into a time score to determine where they rank,” he said. “Those who make it are ready to shine in Atlanta.”

Admission to the Aerospace Maintenance Competition, presented by Snap-on, is free with your MRO Americas convention credentials. If you’re at the show, be sure to stop by and cheer on the contending men and women working to keep air travel safe and secure. 

1. The importance of knowledge on the job is perhaps best demonstrated by the teams competing in the school division

2. Teams must show the highest level of integrity to represent their programmes

3. The top prize is The William F ‘Bill’ O’Brien Award for Excellence in Aircraft Maintenance



Ryan Aggergaard

is an attorney-at-law at
Washington Aviation Group

Managing the queue

Washington Aviation Group attorney-at-law

Ryan Aggergaard looks at strategies for addressing long delays in repair station certification



Visit washingtonaviation.com for more information on the law firm, which supports the aviation community

It is no secret that obtaining a repair station certificate takes time. As air travel continues to increase, it seems from our vantage point that more and more companies are seeing the opportunity owning a repair station represents. That means (anecdotally, at least) more applications are being submitted for repair station certificates. That means that the queue for obtaining a repair station certificate is getting longer.

How much longer? From our conversations with the Federal Aviation

Administration (FAA) and industry, it can take up to 15 months just to get assigned resources to *begin* the review of a repair station applicant's submittal. For a business that has to develop manuals, lease facilities, buy or contract for the proper tooling and equipment, and employ at least a skeleton staff until fully operational (all necessary to the completion of the application), a wait of more than a year to receive a certificate and get to work can be extremely draining of resources – often fatally so. What, then, is a prospective repair station to do?

Although we have not yet found a reliable way to speed up or jump to the top of the queue, there are a few paths that can help avoid unnecessary delays and even short circuit the process in certain circumstances.

First, be ready. While this does not speed up the process, it is critical to avoiding unnecessary delay. At a recent industry event, the FAA stated that one of the causes of delay in drawing down the queue is the failure of applicants to be fully ready for review. This means that FAA personnel are forced to spend extra time with the applicant, ensuring that the application is properly completed and that the facility, equipment, tooling, data and personnel are in place for demonstration and inspection. This necessarily diverts resources from other, properly prepared applicants.

To address these delays, the FAA has considered a system by which an applicant who is not yet ready for approval when their application comes to the top of the queue could be put back to the end of the queue.

Imagine waiting 15 months for a review and then being told you have to go to the end of the line because you didn't have your ducks in a row!

The best way to avoid this – for those who are just going the direct

◀ As more applications are being submitted for repair station certificates, the queue for obtaining them is getting longer



new application route – is to make sure everything is in place prior to submitting the application.

If that is too costly, make sure you stay in close contact with the FAA so that as your position in the queue gets nearer to having resources allocated, you can get in place the things you need prior to your application being assigned for review.

Another route for those with the means and the contacts is to purchase an existing repair station and modify it to your own needs. As a general rule, this is frowned upon and discouraged by the regulators because the regulations don't really contemplate a transfer of a repair station certificate. What they do contemplate is either a transfer of repair station assets (which can necessitate a new or amended certificate), or certificate change due to a change in repair station name or location or a request to add or amend ratings.

However, recognising the challenge presented by the aforementioned queue delays, the FAA has shown itself willing to work with applicants and holders to be flexible in making use of existing

“With a bit of planning and patience, you can smooth your way more rapidly to an operational repair station”

repair station resources that may be under-utilised. FAA employees have been willing to facilitate the purchase of a repair station by a new business, even when it involves a facility transfer from one flight standards district office (FSDO) to another.

If you are seeking to start a repair station and have identified a certificate holder willing to sell, our recommendation is to file your application as you ordinarily would and pursue the transfer of the certificate in parallel. The benefits of this approach are: 1) if the transfer is refused by the FAA you are still in the queue and have lost no time; and 2) if you do consummate the transfer, you can still pursue the certificate and upon issue, you will have another repair station certificate ready to use.

This leads to a corollary: if you are the holder of a repair station certificate and

are contemplating shutting down the business and surrendering that certificate, we recommend holding on to it! It is a valuable piece of property that you may be able to market and sell to someone in need.

Because this transfer process is not a preferred method, the window of availability of this solution is one that could close at any time, so if you are considering this option, it is best to act expeditiously.

One other option, albeit a limited one, is to establish a satellite of your existing repair station. This, of course, assumes you already operate a certificated repair station and are seeking to expand operations. This bit of advice will unfortunately be of no help to a new company. The regulations contemplate the creation of satellite repair stations under the managerial control of the certificated repair station.



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“Be ready – while this does not speed up the process, it is critical to avoiding unnecessary delay”

There are several limitations to this strategy, but it does allow a new site to get up and running. First, it is geographically limited. A satellite may only be located in the same country as the certificated repair station with managerial control.

However, the availability of this option remains a good route for repair stations abroad seeking to open additional locations, as we have been told that the FAA is diverting international resources to assist in drawing down the domestic application queue.

Second, the satellite repair station is limited to the scope of the ratings already held by the certificated repair station exercising managerial control. This means that a satellite is not a great option for starting a separate facility with a completely different menu of ratings. However, as long as the certificated repair station holds the rating, the satellite may hold it as well. It is therefore possible for the managerial repair station to amend its certificate to add ratings to

encompass the ratings that the satellite repair station is intended to perform. Amending the certificate in coordination with the repair station's principal maintenance inspector (PMI) is (usually) a much faster process than the current 15-month queue.

One additional consideration for the satellite repair station route is that both the managerial and satellite repair stations must meet the requirements for each rating. This means having appropriate equipment and tooling. It may be cost-prohibitive or impractical to have two sets of identical tooling, especially when you do not intend to perform a particular rating at the managerial facility.

A solution for this is to act after the rating is issued to the managerial facility to place the equipment and tooling at the satellite facility to satisfy the rating requirements at that location, with a signed license agreement stating that the equipment and tooling will be transferred

▲ Every path to obtaining a repair station certificate takes time, planning and money

to the managerial facility when necessary to perform the work there. You will effectively have the equipment and tooling to satisfy the requirements at both locations, but for practical purposes will not have to move the equipment to the managerial facility because such maintenance will not be performed there.

None of the above solutions is perfect. Each takes time, planning and money. They also involve engaging the FAA in dialogue early in the process to make sure that everyone is on the same page every step of the way. Because this can be complicated and involve some delicate conversations, we recommend consulting qualified legal counsel as you prepare to go down the repair station path. With a bit of planning and patience, you can smooth your way more rapidly to an operational repair station. **M**

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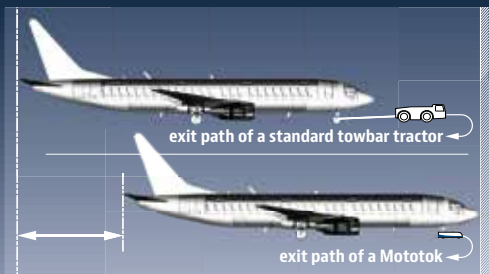
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◀ The North American MRO market is mature but full of innovative companies, many of whom are prepared to collaborate to ensure future success

MRO FOCUS:

North America

The outlook for North America's MRO industry is strong for 2023 and beyond, but a unique set of challenges remain. *Jason Holland* reports

1.8%

The North American market will recover to its pre-pandemic size in 2023, and over the next 10 years will grow at a "modest" 1.8 per cent annual rate, reports Oliver Wyman

North America is a mature MRO market with growth rates largely dependent on the expansion rate of the aircraft fleet. According to Oliver Wyman's *Global Fleet and MRO Market Forecast 2023-2033*, the North American market will recover to its pre-pandemic size in 2023, and over the next 10 years will grow at a "modest" 1.8 per cent annual rate.

"In 2023, MRO growth in North America will be suppressed as the region undergoes a significant re-fleeting – bringing in new aircraft that initially will require less maintenance, with major checks that fall outside the forecast," the consultancy reported. "The average age of the fleet in North America is expected to drop from 14.9 in 2023 to 12.3 by 2033. While its regional jet fleet will shrink during the forecast period, the North American narrowbody fleet will grow."

What, then, is the current situation at MRO companies across North America? What challenges are they facing? And how do they see the future? We asked leaders at five of them for their thoughts.

Recovery to growth

"The MRO industry has already experienced a strong recovery in demand, driven by the deferment of maintenance work during the pandemic, and by the long-awaited bow wave of CFM56-5/7 and V2500 events," says Jay Aiken, VP sales, turbfans for StandardAero Airlines & Fleets. "While the fact remains that the industry has lost several years of growth due to the pandemic, the current outlook is certainly one of growth."

That means business is booming in many areas. Brian Sartain, SVP repair & engineering at AAR, says his company's hangar network is completely booked for the next year. "AAR expects the demand for our services to continue to be high for the rest of 2023," he adds. "Our component shops as well as our USM business continue to grow; we expect that by the end of 2023 rates will be fully recovered and 2024 and 2025 represent opportunities for growth above pre-Covid rates."

Another way to track growth is to look at total engine hours flown across wide and narrowbodies, according to GA Telesis' president and CEO Abdol Moabery. "The indications are we are flying at roughly 80 per cent of 2019,



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“Our extensive in-house component repair and overhaul capabilities allow us to pursue a ‘repair not replace’ philosophy”

so we are almost there. However, there is a lot of catch-up maintenance still going on, so it feels like growth,” he reports.

“Regardless, from our perspective, we grew year-on-year in 2022 and are forecasting even more growth in 2023. That said, China is lagging significantly. Once that picks up, I think we will start to see systemic MRO growth globally.”

Ascent Aviation Services’ chief commercial officer Scott Butler echoes the sentiment that the improved outlook for MRO activities in North America has already begun. “We’re starting to see the backlog of aircraft in storage stabilise and now traditional airframe MRO activity increase,” he comments.

“This is skewed towards narrowbody aircraft currently, but widebodies are increasing. Growth here is also due to on-shoring of maintenance activity in the post-Covid market. Also, component services are in strong demand and this area is seeing rapid growth as the backlog is growing at all shops.”

Paul Dolan, CEO at ATS, also sees a strong outlook for the MRO industry in

the Americas in 2023 and beyond, but says it faces “a unique set of challenges”. He explains: “The demand for MRO services has increased drastically since the recovery from Covid took place. Airlines in the Americas have increased their preference to utilise vendors for heavy maintenance within its national borders when possible.

“The MRO industry in the Americas has a workforce shortage of technicians and specialists. This workforce shortage has been a challenge in the industry for decades, but gained speed due to Covid-induced early retirements and workers shifting to industries considered less volatile. Recruitment efforts are in high gear for all MROs, which has led to increased costs to keep skilled labour in-house.”

Growth is available now, he says, but is “highly dependent” on the ability to increase and keep skilled talent as well as attract new candidates into the industry.

StandardAero’s Aiken says another big issue facing the industry currently is supply chain concerns and material supply. “We work to offset these concerns through our in-house manufacturing capabilities, via our dedicated StandardAero Component Services business, whose portfolio includes blades, vanes, stators, seals, shrouds and cases; through our in-house asset management specialist PTS Aviation (whose

capabilities include USM); and through our extensive in-house component repair and overhaul capabilities, which allow us to pursue a ‘repair not replace’ philosophy,” he says.

AAR’s Sartain agrees with others that “experienced labour continues to be the biggest issue facing any MRO right now closely followed by the pricing and delivery behaviour of many OEMs”.

To address the first factor, the company has teamed with both public and private entities to bring more workers into the aviation industry. “For instance, we were the founding member of Choose Aerospace, a non-profit organisation whose charter is to get aviation curriculums into high schools across the nation,” he says.

On the second issue, Sartain says that as an independent aftermarket provider AAR must “rely on our OEM partners to deliver at reasonable prices to ensure on-time delivery for our customers”.

There are considerable macro-economic issues currently impacting the day-to-day operations of companies, and GA Telesis’ Moabery admits these can be a “struggle”, in that they are

1. Several initiatives are under way at AAR

2. Ascent has been expanding in many areas. All Ascent photos by Annette Feasel, on behalf of Ascent

3. Brian Sartain, AAR SVP repair & engineering



3

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impossible to control. “Outside of the geo-political conflicts, we are seeing some troubling indicators around wage-inflation, labour shortages, higher cost of capital, and now some banking strife in the US and the EU. This adds to the difficulties Chinese banks have had over the past year and will most certainly impact global markets,” he notes.



3

Focus and future

Being headquartered and working in North America offers many benefits for companies involved in the MRO industry. According to Dolan from ATS, among them is a continued commitment to safety and quality, “the highest talent in the MRO industry”; and “a continued pool of skilled technicians” [despite the concerns raised about labour shortages]. Additionally, he cites a stable political environment “that focuses on aviation business support through certified programmes and financial assistance”; a strong infrastructure of support through technology; the movement of goods, and other supporting sectors; and programmes that are in place to protect intellectual property rights.

StandardAero’s Aiken adds that MROs are in close proximity to a large proportion of the world’s major aero engine manufacturers, which “brings benefits in terms of communication, sourcing



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and access to trained labour”. They are also close to one of the world’s largest and active aircraft fleets. He adds: “The inherent service culture and work ethic of the Americas, which is reflected in the local labour pool and closely aligned with StandardAero’s DNA, [is another benefit, as is] the currency benefits of doing business in the dollar zone, with a lack of foreign exchange risk.”

Moabery says that while GA Telesis is focused on being a global organisation, “the USA provides us with the most optimal supply-chain resources available, and we use that to be a more valuable resource to our customers worldwide”.

With all these advantages available to them, the companies interviewed for this article can all guarantee a timely and innovative service. So what sets them apart from their competitors, and what are the latest developments at each of them?

In answer to the first part of the question, AAR’s Sartain thinks it is his company’s willingness to invest in leading edge technology and in its employees, along with the breadth of what it can offer. “AAR is unique in that we are the only truly independent third-party maintenance provider that not only provides MRO services across the board, but develops STCs for aircraft modifications, provides USM for engine overhaul, trades in whole assets, and distributes parts across the aftermarket,” he says. “That allows us to bring offerings to the market that are tailored to our customers’ needs. As we grow our offerings, like digital products, we will bring those to our existing customers

1. 737-8 transition work done recently by ATS

2. Ascent is able to handle the full life cycle of the aircraft in one stop

3. Ascent Aviation Services’ CCO Scott Butler

to improve their efficiency. In addition, we are investing in repair development capabilities across our MROs.”

The company has long seen the digitisation of the business as a key initiative, Sartain reports. “We’ve developed several offerings, such as AARvolution and PAARTS Store, and continued to work towards our own paperless solution, Concourse. Concourse is a paperless hangar solution that will seamlessly integrate with all of our customers’ systems to deliver a paperless solution for airframe heavy maintenance.

“As a third party independent, we need the ability to work with Maintenix, Trax, and any other solution that our customers choose to implement [AAR recently completed the acquisition of Trax, one of the leading providers of fleet management and MRO software for its common customers]. We see significant efficiency improvements post-implementation. Other innovations include drone inspections, lidar-based collision avoidance, augmented reality training, RFID tagging and camera-based activity tracking and we are utilising these to change the way we work.”

“Our network of capabilities allows us to collaborate across business units, always seeking out the best solution for the customer”

StandardAero’s Aiken sees his company’s competitive advantage in its position “as one of the world’s largest independent providers of aerospace MRO services, but operating strictly as an OEM-authorised service provider, which means that customers are able to rely on the quality of our support while benefitting from our inherent leanness and responsiveness”. He also notes StandardAero’s “extensive in-house component repair and overhaul capabilities, which allows us to pursue a ‘repair rather than replace’ philosophy wherever possible, minimising costs and turnaround times for our customers” along with the breadth of its engine MRO capabilities and range of supporting service capabilities.

StandardAero recently signed a long-term CFM Branded Service Agreement (CBSA) to support the CFM International LEAP-1A and LEAP-1B

engines powering the Airbus A320neo and Boeing 737 MAX families, becoming the first independent (non-airline) MRO provider in the Americas to sign a CBSA for both the LEAP-1A and LEAP-1B. “As such, a key current focus for us is establishing our new LEAP MRO capabilities at our 810,000sq ft facility in San Antonio, including engine test, as well as developing new engine component repairs,” says Aiken.

Over the past several years, StandardAero has made significant investments in digitisation, focused on increasing employee productivity, reducing cycle times and delivering cost optimisation. “These efforts span all aspects of the business, including sales, logistics, operations and support, thereby delivering integrated and harmonised results,” Aiken reports.

Ascent’s Butler notes that his company is “in a niche area combining airframe

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MRO, storage, transition, component and reclamation". So the differentiating factor for Ascent comes in the fact that while "some competitors focus on one or the other, we offer great value to our customers by being able to handle the full life cycle of the aircraft in one stop".

Ascent has been expanding in many areas during and post-Covid. On the airframe side, Butler reports heavy investment in newer generation aircraft like the 777, 787 and A330. "We also launched our landing gear and component shop in Q4 2022, and we're already shipping 737NG & A320 LG overhauls and expanding into other components like wheels, hydraulic actuation and composite," he says. But while Ascent is expanding MRO activity into different areas of the aircraft, "performance right now is the number one priority". He adds, "Hitting our targets and turnaround times is the key to securing our repeat customers."

At ATS, Dolan notes the company's ecosystem of offerings as differentiating it from competitors.



3

"We all play a role, and our goal is to make sure that the airlines are offered all that they need to successfully execute their business plan"

"Our network of capabilities allows us to collaborate across business units, always seeking out the best solution for the customer," he says. "ATS has grown its capabilities and capacity with the end goal of reducing cost for customers. We leverage our 50+ years of experience providing MRO services and support across all of our businesses, providing a multi-faceted solution for the customer."

ATS' PMA portfolio recently celebrated a significant milestone, adding its 200th part in December. The portfolio continues to grow, projecting to reach at least 250 parts by year end, according to Dolan. "We will continue to invest in our PMA programme, which targets our customers pain points during aircraft heavy maintenance visits, such as high usage of increased failure rate or hard to get parts while offering more affordable solutions," he reports.

For GA Telesis' Moabery, the differentiator is also an ecosystem – the 'GA Telesis Ecosystem' – in that the company doesn't "view others in the sector as our competitors but as participants and contributors to our Ecosystem". He explains: "GA Telesis is firmly focused on expanding the goods and services offering of that ecosystem. Our strategy is to invite airlines, OEMs, banks, MROs, suppliers and service providers into our Ecosystem and work collectively to ensure the longevity and

fortitude of our industry. We all play a role, and it is our goal to make sure that the airlines are offered all that they need to successfully execute their business plan. We are taking this one step further with our digitisation of the GA Telesis Ecosystem that, once implemented and successful, we will offer to all in the Ecosystem in an open-network design structure, giving all industry participants access, which will ultimately lead to the greatest level of innovation the sector has ever experienced."

Moabery's digitisation plans are ambitious. "We are not attempting to digitise the current landscape; we intend to revolutionise it. We want to develop and deliver a new system of operations in the aftermarket, ultimately leading to greater efficiencies and cost savings for airlines. Thus far, we have brought on a group of data scientists and strategists focused on this transformation."

It is this kind of innovative and collaborative spirit that will continue to see the North American MRO market develop, overcoming the challenges to meet both present and future demand for maintenance, repair and overhaul. 

1. GA Telesis can be the conduit for successful execution of delivering an active ecosystem

2. An RB211-535 on test at a StandardAero shop

3. GA Telesis president and CEO Abdol Moabery



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WHEN YOU CALL MENTION MRO MANAGEMENT



1

Maintaining the key elements

Aircraft component repair has had to increase at a time when parts availability has been a challenge. *Bernie Baldwin* discovers how some major MRO players have been dealing with that



2

1. New technologies have allowed companies like Lufthansa Technik to make certain new repairs economical for customers [All Lufthansa Technik photos, photographer: Sonja Brueggemann]
2 and 3. AAR has brought in technologies over the past 12-18 months such as cold spray technology and nano fusion

includes over-pressure testing, vibration testing and environmental testing.”

The process is similar for electrical and electronic components. “Here, we look to measure the electrical/electronic characteristics to assess whether the component meets the required operational specifications,” says Mallette. “Once again, stress testing is key, as this can help identify latent failure in printed circuit boards and more. It is worth noting that components may operate perfectly well and pass all tests in the workshop environment at a steady 20°C, but we also need to replicate the actual aircraft operational environment as closely as possible to identify any latent and intermittent failures.”

Alexander Nebauer, component and production engineer at Lufthansa Technik, says the spectrum of test requirements is almost as broad as the number of aircraft components inspected and repaired throughout the company’s international network of component shops. “The employed tests range from very minor manual procedures, such as quick visual inspections, to comprehensive test rigs or robotic setups that fill entire workshops,” he explains.

You are the weakest link, goodbye.” This well-known catchphrase from a TV elimination quiz has driven its way into the everyday lexicon, often as a jovial put-down between friends.

The concept of a weak link does, of course, have a literal meaning which applies in many settings. And it certainly applies across the many thousands of components with mission-critical attributes which go to make up an aircraft.

Just as in every walk of life, when some components reach the end of useful operation they are replaced. Others receive attention to keep them operable. The first thing to be done is to determine defects which are causing a component to underperform, remembering that aircraft components can be mechanical or electrical.

“Tests can vary depending on the type of unit and the function the unit is intended to perform,” notes

Salim Khamze, director of operations and engineering at AAR. “Generally speaking, once a unit is received, the reason for removal is noted and a pre-test is performed. The technician will determine if the reason for removal/failure can be duplicated. If a defect is found, the technician follows the manufacturer’s component maintenance manual (CMM) to perform troubleshooting and isolate the problem.”

From there, any defective parts within the component are replaced or repaired. The component is then assembled, tested and inspected.

“When dealing with mechanical components, we ensure we have a thorough understanding of the component’s operation,” remarks Louis Mallette, SVP operations for AJW Technique. “This helps in the troubleshooting process where we identify potential wear or failure areas that could cause the reported problem. Visual and physical inspection and measurement play a key role, along with dynamic and stress testing, which



3

Test areas	For what type of component?	Problems test detects?	Plant? DFW, PAE or both*
Air cycle machine testing	Air cycle machines	Balance Performance	DFW
Fan testing	Electrical fan ventilation	Balance Flow performance Electrical current draw	DFW
Fuel shop testing	Fuel control boost pumps Thermal heating	Pressure control Fuel control Temperature control and performance	DFW
Heat exchanger testing	Heat exchangers	Flow Temperature control	DFW
Non-destructive testing	Applies to many types of parts Mag particle Dye penetrant Eddy current Composite Radome performance	Part flaws and cracks	DFW PAE
Drive unit testing	Inclusive of pneumatic and electrical parts PDU Thrust reverser Center drive unit Linear actuators Alternate flap drives	Stroke measurement Speed of actuation Load performance	DFW PAE
Pneumatic starter testing	Pneumatic starters	Load performance RPM variations	DFW

Table 1 *Test centre codes: DFW = Dallas/Fort Worth, Texas; PAE = Everett, Washington

“It makes sense to distinguish between off-the-shelf procedures in the OEM’s CMM and more sophisticated test set-ups developed by our engineers and certified by the aviation authorities. One striking example of an in-house developed test procedure for mechanical components is our unique approach to check the structural integrity of Halon-filled onboard fire extinguishers.”

Nebauer notes that this advance is an example of being able to make reductions in turnaround times with a new procedure. “Our innovative test procedure for these bottles was developed under a project aptly named ‘EFFECT’ (Extreme Fast Fire Extinguisher Check and Test) and introduced into daily operations in 2020,” he adds. “Interestingly, this new test method drew inspiration from techniques usually employed to localised earthquakes in the crust of the Earth. “Now, used on a much smaller scale, it enables our experts to detect even the smallest cracks in the ball-shaped metal pressure bottles filled with the environmentally harmful Halon extinguishing agent. Using the new procedure, the Halon stays inside the bottle at all times. This advantage not only significantly reduces the turnaround times – due to no longer necessary removing, handling and storing of the hazardous agent – it

brings vast improvements with regard to sustainability.” Margus Graf, workshop manager at Magnetic MRO, reports that most of the tests carried out at their Component Maintenance Workshop relate to mechanical components to determine pressure loss or functionality. “For example, pressure tests are carried out for wheel and tyre assemblies and also escape slide inflatables to detect any leakages,” he comments. “Besides leakage tests, functionality tests for brakes are carried out to make sure all pistons are moving freely and retracting to their original position. Batteries need to pass capacity tests in order to determine cells for which capacity is under limits and thus require replacement.” For the tests at ATS (Aviation Technical Services) to determine the cause of a problem on different component types, Trey Bryson, the company’s SVP operations, points to the listing in Table 1 (above).



▲ Pneumatic valve bench testing at ATS



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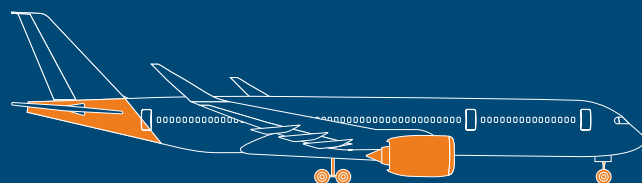


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1. If a defect is found, the technician follows the manufacturer's component maintenance manual to perform troubleshooting and isolate the problem
2. Louis Mallette is SVP operations at AJW Technique

“Customers are more willing to accept repairs on piece parts due to the greatly reduced availability of new spare parts”



2

Addressing elements in current processes which could reduce turnaround times, Bryson reports that ATS invested during the pandemic to consolidate three component repair facilities and machine shops at its existing 138,000 sq ft location in Fort Worth, Texas, completing this activity in March 2022. “This investment included both the physical relocation as well as a commitment to invest in our employees, such as individuals being cross-trained on different component part product lines (accessories, structures, composites, machine shop) to best utilise labour resources and provide variety to workers.

“[The investment included] physical resources such as machine shop, heat treatment and autoclave ovens, which previously required outsourcing for some shops, now being available to all operations. ERP systems were consolidated to provide better visibility of customer repair orders and associated material planning.

“This includes internal detail on manufactured parts, use of DERs for out-of-scope repairs, defining minimum/maximum order parameters for purchasing, stocking USM (used serviceable material) for hard-to-find items required for exchanges and repairs, and utilising PMAs where customer programmes allow.”

Bryson observes that shops such as ATS, which have direct control over most of their processes, will likely be “more successful in bringing lower turnaround times to customers. This is especially true as supply chain turmoil continues worldwide.”

He continues: “Our other example relates to the ATS Machine Shop adopting 3D printing to manufacture two types of aids which have contributed to process improvements, including 3D printed shipping aids for shipping select component accessory parts.

“Parts targeted have a history of being damaged during return transit to the customer. The printed shipping aids are durable and lightweight, reducing the risk of shipping damage with negligible impact on shipping costs.”

Other process improvements include 3D printed shop aids for quick and versatile small efficiency gains throughout the shop.

“Examples include 3D printing of specifically sized grids to allow for quicker damage/wear mapping, 3D printing alignment tools or small fixtures that speed the process of assembly, and combining 3D printing with our internal machining abilities,” comments Bryson. “This allows us to proof out ideas more effectively for our PMA development team and interested customers.”

For AAR's Khamze, the shortage of piece parts from OEMs has a very high impact on TAT (turnaround time) and OTD (on-time delivery). “Solutions to overcome long delays include creating more repair solutions for sub-assemblies, using alternative PMA parts when allowed by the customer, and using serviceable piece parts that meet CMM specifications,” says Khamze.

Taco Vingerhoed, who is AAR's director commercial and business development, adds: “An effective and experienced sourcing team can make the difference in finding solutions for our customers. Our experience is that in most cases solutions are found to meet customers' needs.”

AJW Technique's Mallette echoes Khamze's view that the main impact on turnaround time is spare part availability, primarily driven by the global supply chain fracture.

“As such, this has been one of our key focus areas,” he says. “Using digital tools to better understand demand variation to predict future requirements enables us to allocate parts for those requirements well in advance, allowing us to mitigate the increase in lead times.

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“An effective and experienced sourcing team can make the difference in finding solutions for our customers”

“This dynamic forecasting using AI-supported digital tools captures our historical parts usage information at the lowest level and allows a detailed forecast to be constructed using a macro-level demand forecast at a component level. This is then fed to our supply chain team to ensure parts are provisioned as early as possible in the process. The information is updated on a real-time basis and, as a result, we have achieved fill rates of 90 per cent-plus, giving the team more time to focus on finding solutions for the remaining issues.”

Magnetic MRO's Graf believes there is always room for improvement in processes to make reductions in turnaround times.

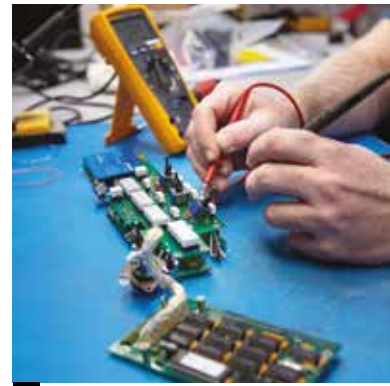
“Even if most of the improvements like automation or working in shifts are done, the fine tuning can be done by analysing the procedure to find possible bottlenecks or idle time, and the root causes behind them,” he emphasises.

When aiming to develop new repairs in process areas such as welding, machining, coating and so on, new technologies come along which enable certain repairs to become economical, allowing them to be added to a company's portfolio.

Lufthansa Technik spokesperson Michael Lagemann provides an example. “Recently, we succeeded in making repairs economical in a field where many parts are usually deemed unsalvageable, namely our scarfing robot system. Having been thwarted a good bit by the Covid-related aviation crisis and a lack in demand, it is now in the process of introduction to daily service,” he says. “Among other capabilities, the robot has already demonstrated its ability to repair certain types of damage to composite parts where most manual repair processes failed. One such example is the repair of damaged fan cowl doors.”

AAR has brought in technologies over the past 12-18 months such as cold spray technology and nano fusion. “These are technologies that have enabled us to repair, rather than replace, expensive piece parts and sub-assemblies. These types of repair are growing rapidly and are improving,” Vingerhoed remarks. “By using these new technologies, we can offer solutions to the customer on a lower price level.”

At ATS, a Boeing 787 operator contacted ATS with a slat track repair requirement for the roller/wear surfaces



2

as nothing was defined in the CMM for an allowable repair. While Bryson admits that the answer did not come from a new technology, he notes that ATS “utilised its decades of experience to develop our own repair which was approved by the OEM and airline. We did this in approximately two months and, combined with inventory support from Boeing, we stayed out ahead of the operator's maintenance check requirements and not delay aircraft.”

In a similar vein, AJW Technique's Mallette believes that the processes used in the repair of components and their piece parts have not fundamentally changed in the past 12-18 months. “Essentially, we are still using the same techniques we have been for many years – welding, plating, machining and so on,” he comments. “What has changed is the willingness of customers to accept repairs on piece parts due to the greatly reduced availability of new spare parts. To avoid excessively long turnaround times and the lead time for new spare parts, AJW Technique works with parts repair specialist vendors and the surplus market to offer our customers alternative solutions to component repair.”

New technologies or not, MRO providers are proving themselves incredibly flexible and capable as they seek to ensure their airline customers can safely keep their aircraft in the air, earning revenue. In fact, in that aim for airworthiness they might arguably be considered the strongest link. 

1. A scarfing robot system has demonstrated its ability to repair certain types of damage to composite parts where most manual repair processes failed

2. The ability to repair rather than replace is vital for MROs and customers

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In the know

Maintenance planning and scheduling software is constantly evolving, with increased use of real-time data and artificial intelligence alerting users of upcoming maintenance events and advising when and where maintenance should be scheduled.

Mario Pierobon reports

“The word ‘optimisation’ is quite tricky, given that optimum for one organisation might not necessarily mean optimum for another”

Continuous improvement is necessary for the upgrade of maintenance planning and scheduling software. The incorporation of feedback from customers and users

is achieved in various ways by aircraft maintenance software developers. This relationship with customers allows these companies to keep on top of emerging needs and understand where to focus research and development.

Customer relationship management

Indeed, there are multiple ways to feed ideas into product roadmaps, but the most important is feedback from customers. That's according to David Purfurst, global pre-sales director at Rusada, the creator of MRO software platform Envision.

“Sometimes it may just be a case of re-configuring the system or adapting its workflows, but if new functionality is needed our development teams will fully investigate the requirement and the proposed solution to ensure that any

change to one area of the system does not negatively affect others,” he says.

“Another key avenue for us is new advancements in technology, which can allow us to build functionality that was not possible or practical before. This includes new methods of integrating with third party systems, allowing us to bring data from different sources into Envision and manipulate it new ways”.

Ana Malešević, product owner at Swiss AviationSoftware (Swiss-AS), now a 100 per cent subsidiary of Lufthansa Technik and the developer of MRO software solution AMOS, says the Swiss-AS team consists of experienced individuals in both maintenance management and information technology.

“Despite extensive in-house knowledge, we believe that close collaboration with customers makes a huge difference in bringing a solution that will support our customer base in reducing costs and increasing efficiency while still maintaining the highest standards of reliability and safety,” she says.

“Regular collaboration with different stakeholders through workshops and webinars, as well as up-to-date knowledge of industry trends, allows us to create a product vision that will not

only reflect our customer needs and meet their expectations but also anticipate future needs on the market.”

India-headquartered enterprise software company Ramco Systems has its own platform for planning and scheduling, which leverages its own set of logics and algorithms. This gives customers the opportunity to configure the number of maintenance tracks and manage individual maintenance visits for the specific business objectives of cost and yield optimisation, points out Saravanan Rajarajan, director of aviation solution consulting at the company.

“Our platform has the ability to create multiple ‘what-if’ scenarios and comparison representations based on variable parameters like aircraft utilisation, capacity constraints, alternate schedules, Hr/Cy per day and span by set of requirements,” he reports.

“Comparative output representations of the impact on the desired objectives and impact to the merging with running production plans help the user in firming up the final plan. Any observations or deviations inputted by users are then leveraged for correction in the plan and used for future iterations by our artificial intelligence and machine learning (AI/ML) capabilities.”



Emerging needs

According to Malešević, like in many other sectors, digitisation is also transforming the aviation industry, therefore increasing the need for modern technologies that will support organisations on their way to digital transformation. “In addition to our AMOS software and our mobile solution, we are also extending our product portfolio with ‘AMOSeTL’, which brings AMOS to the flight deck by digitising the paper tech log as well as ‘AMOSmobile/STORES’, which allow storemen to carry out daily tasks within a store through a mobile device,” she says.

Together with digital transformation comes an increased need for more efficient, seamless exchange of information between different customer types, with a goal of improving efficiency, cutting costs and minimising human errors by simplifying administrative

tasks and supporting the exchange of best practices and solutions, observes Malešević.

“To support this, we are currently working on the realisation of ‘AMOScentral’ which, by spanning a virtual cloud over all AMOS instances, will allow each AMOS customer to individually open its platform and collaborate to the desired extent with other members of the AMOS community and beyond – all with the guarantee of privacy due to the end-to-end encryption of data,” she affirms.

Digitisation not only impacted the aviation business by bringing efficiency and different opportunities to manage information, but also to process it for more advanced purposes such as optimisation and automation of different maintenance processes – from events and resource planning to material management, highlights Malešević.

“In aviation, the word ‘optimisation’

is quite tricky, given that optimum for one organisation might not necessarily mean optimum for another,” she states. Even though the basic principles remain the same, the solution in her opinion needs to be scalable to reflect different organisational needs as well as easily maintainable for any additional change that needs to be considered.

“However, what is certain is that process automation is a growing business imperative for increase in efficiency and improvement of accuracy,” she says. “In addition to the existing ‘Line Maintenance Automation’ solution, our ‘Planning Automation’ project will

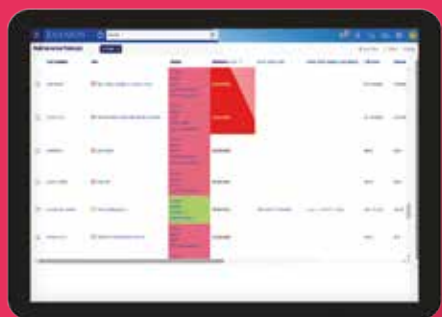
1. Ramco Systems’ platform leverages its own set of logics and algorithms

2. There is an increased need for more efficient, seamless exchange of information

3. Rusada’s software enables operators to adopt a predictive approach to maintenance



“Software has to dynamically adjust to the production floor realities for monitor flow and trace tracking”





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bring to the user advanced technology for handling of different processes, considering ultimately the constraints of the whole ecosystem.”

Connected aircraft are driving the development of new functionality in maintenance planning and scheduling software, observes Purfurst. “These are the onboard systems in place on new generation aircraft that capture real-time data and seamlessly send that information to maintenance planning and schedule solutions such as Envision,” explains. “Our system can then combine real-time data with that of the operator’s past, enabling them to adopt a predictive approach to maintenance.”

As to emerging maintenance planning and scheduling software needs, Rajarajan affirms that Ramco expects to have an uptake of intelligent automation and reduction in manual intervention for planning and scheduling functions.

“We will be seeing extensive automation on task and access panels sequencing, automatic assignments of the rostered staff with right skills to tasks and non-routines, as well as proactive identification and mitigation of bottlenecks due to capacity, labour, parts and tools,” he says. “We are seeing that the maintenance planning and scheduling software has to dynamically adjust to the production floor realities for monitor flow and trace tracking.”

In the aviation domain, the information flow between the execution and scheduling system has to be timely and precise. This calls for the maintenance planning system to work with multiple input feeds from other systems such as the actual availability of the mechanics available on a particular shift, or the actual backlog and wait times in a particular shop feed from RFID-based readers, points out Rajarajan.

“Our planning and scheduling platform has the necessary API to receive inputs from external databases like maintenance and engineering project requirements, maintenance execution data for ongoing checks, aircraft and component time and cycle data, station requirements, capacity and limitations,” he says. “The data is processed through the platform to derive the optimised results.”

Future upgrades

Rajarajan says the effectiveness of planning and scheduling software is in its ability to leverage data and the right algorithms to produce quality output. “This is aided by the latest developments in processing the high volume of dynamic data feeds and analysing the data with sophisticated statistical tools,” he says.

“The scope of planning is also stretched for life cycle optimisation that minimises the total cost of ownership for particular asset or at the sub fleet level

“Process automation is a growing business imperative for increase in efficiency and improvement of accuracy”

– there is opportunity for improvement by leveraging the ML platforms with continuous closed loop feedback from the planners.”

Swiss-AS is working on bringing predictive maintenance data as well as more advanced constraints such as weather conditions to be considered during the automation process, according to Malešević. “In the long run, we can expect simple, efficient digital processes where the user will be not only relieved of the strain by repetitive well-known tasks but also guided in making the best possible solution based on the latest operational changes,” she says.

The inclusion of real-time data into maintenance planning and scheduling software, coupled with the use of AI, will allow aircraft maintenance software not only to alert of upcoming maintenance events but also to advise when and where maintenance should be scheduled, according to Purfurst. “This is done by taking a whole host of supporting information into account, such as periods of high aircraft utilisation, maintenance events of other aircraft in the fleet, and even the terms of the aircraft’s lease agreement,” he concludes. 

1. Close collaboration with customers makes a huge difference to the success of scheduling and planning software
2. Envision currently helps manage more than 2,000 aircraft



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◀ The aviation industry is relying on the progress of SAF to meet environmental targets

10bn

Global SAF production is forecast to more than double by 2026, reaching 10 billion litres per year

Where SAF stands

Will sustainable aviation fuel and carbon pricing be the key factors that ensure the aviation industry meets its net zero emission targets? That's the question posed by VZM Management Services in its 2023 market outlook

The aviation industry is betting on sustainable aviation fuel (SAF) to meet its emission targets, in no small part due to a lack of alternatives.

That's the opinion of VZM Management Services, as it ponders whether SAF and carbon pricing are "the be-all and end-all" in the 2023 edition of its annual market outlook.

Technology breakthroughs are far off as they are still in the waiting room, the consultancy reports. Technologies such as battery capacity, lighter fuel cell systems and tanks for hydrogen are still far from mature; even once new technologies are introduced, it will take a long time before they will have a global impact, VZM says.

This means that "there will be a path full of challenges" to meet the International Air Transport Association's (IATA) target of six per cent of jet fuel being SAF by 2030.

Based on publicly announced intentions, global SAF production will get a boost in 2023, with global SAF production then forecast to more than double by 2026, reaching 10 billion litres per year.

VZM thinks that SAF derived from biomass and solid waste is most mature, but synthetic SAF is the most likely to be used in future.

"IATA expects passenger journeys will more than double by 2050"

The company also asks whether carbon pricing and restrictions will be needed to meet the net zero emission target. The aviation industry is still far off the net zero target as emissions will continue to grow in the coming decade, VZM notes. IATA expects that passenger journeys will more than double by 2050 compared with 2019.

Worryingly, the World Economic Forum considers IATA's 2030 SAF target of six per cent insufficient to achieve net zero by 2050. Many countries have already introduced carbon pricing, but only a few for aviation, VZM notes, while emission trading systems have no worldwide coverage "with only Europe and Canada as frontrunners". IATA is pledging to use incentives instead of taxes to stimulate emission reductions.

Significant progress is, however, being made with SAF. An A321neo recently took off from Airbus's headquarters in Toulouse, France with both of its engines powered by 100 per cent unblended SAF.

Since the end of February, the aircraft has been closely followed by a data-collecting, highly modified Dassault jet with the mission to gather information on the non-CO₂ emissions and the creation of contrails. The A321neo's flights are the latest demonstration in the VOLCAN project, the acronym of VOL avec Carburants Alternatifs Nouveaux, French for 'flight with new alternative fuels'.

This A321neo is the first Airbus single-aisle aircraft and the latest Airbus aircraft overall – following the A350 and A330MRTT – to test 100 per cent sustainable aviation fuel on both engines. The VOLCAN evaluations are focused on

the emissions of unblended SAF, which – unlike SAF blends that are increasingly being used in aviation today – is not mixed with any fossil fuels. **W**



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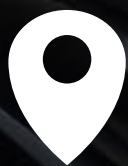
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