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NOVEMBER/DECEMBER 2024 • VOLUME 26 • ISSUE 8

MRO

Management



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WELCOME...

What a year it's been for *MRO Management*! As 2024 begins its final descent, it's impossible not to reflect on what we've achieved.

In October, we published one of our biggest issues ever, a milestone that underscores the vibrancy and growth of the MRO industry. The edition, as with all our issues, featured in-depth analyses, exclusive interviews and forward-looking sector insights, and the response to that issue been nothing short of phenomenal. It was a pleasure to see how well the magazine was received with our audience when distributing copies at the MRO Europe event in Barcelona.

Then there was our Predictive Aircraft Maintenance (PAM) Conference in Dublin in November. What a fantastic few days! With almost 200 delegates in attendance, it was a hub of activity with great discussions, the sharing of ideas and that all-important face-to-face time with the industry's best and brightest. We've had some excellent feedback about the conference and heard some great stories about the connections made during the networking breaks – proof that conferences are as much about the conversations as the content. Check out our event review on page 28.

We're also delighted with our growing community. This year we attended many of the industry's biggest trade shows and conferences, expanding our network of contacts and deepening our engagement



▲ (L-R): Comedian and PPA Awards host Suzi Ruffell with ABN's editorial director Lee Hayhurst, *MRO Management* group commercial manager David Hirsh and editor Craig Waters.

with readers and online audiences. Your trust and support fuels our mission to be the go-to resource for everything MRO.

And the icing on the cake? *MRO Management* was named 'Business Publication of the Year' at the PPA Independent Publisher Awards. We're thrilled with this recognition, but it wouldn't have been possible without the support of the MRO sector, our contributors and advertisers, and the developments and milestones you bring to the table – stories we love reporting on.

As we celebrate our achievements, we're already setting our sights on growth for 2025 and we're excited for what's to come. Stay tuned!

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Editor

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Winner of Business
Publication of the Year

Independent Publisher
PAWARDS 2024
Winner

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are reborn



Hangar Talk.

News from across the industry



British Airways

FACILITIES

BA TO EXPAND CARDIFF FACILITY, BOOSTING MAINTENANCE CAPACITY

British Airways (BA) has unveiled plans for a significant multi-million-pound investment in its engineering maintenance facility at Cardiff Airport.

The upgrade will expand one of the three existing maintenance bays at British Airways Maintenance Cardiff (BAMC) to accommodate larger, long-haul A350 aircraft. This will transform BAMC from having one to two fully flexible bays, enabling the facility to undertake more complex and varied maintenance tasks.

Currently, BAMC serves Boeing 777 and 787 aircraft, but the expansion will enhance operational efficiency by supporting a wider range of aircraft types.

The upgrade is part of BA's broader £7 billion transformation programme and is scheduled to begin in 2025, with completion anticipated in 2026.

The investment highlights BA's commitment to its Cardiff operations, which employs 480 colleagues and plays a vital role in the Welsh economy.

BA's Andy Best said: "Our Welsh engineering base is an integral part of our maintenance operation, and this investment, as part of our wider maintenance strategy, will ensure that British Airways Engineering Wales continues to play a key role for many years to come."

"The expanded facility provides us with greater flexibility and control over our heavy maintenance activity on both the Boeing and Airbus long-haul fleets, ensuring more efficient planning and execution."



TRAINING & DEVELOPMENT

easyJet encourages young women to pursue engineering dreams

> easyJet has teamed up with social enterprise Stemettes to encourage more young women to become engineers.

With recent data showing that women make up just 15% of engineering apprentices in England, the airline says it wants to inspire more to consider the career and apply for its 2025 Aeronautical Engineering Apprenticeship programme.

With a fleet of over 340 modern Airbus A320 family aircraft, easyJet recruits 40 engineering apprentices a year to become licensed aircraft mechanics.

The fully funded programme offers aspiring engineers a competitive apprenticeship salary and bonus. In two years, apprentices will become licenced mechanics, ready to join the airline's engineering team.

“In two years, apprentices will become licenced mechanics



Cerib/Adobe Stock

ENGINE MRO

Play Airlines chooses StandardAero for A320neo LEAP-1A engine support

> StandardAero has announced it will provide Icelandic low-cost carrier Play Airlines with LEAP-1A Performance Restoration Shop Visit (PRSV) services in support of the airline's fleet of A320neo family aircraft.

The activity will be carried out at StandardAero's LEAP MRO facility in San Antonio, Texas.

Play Airlines' Sindri Rúnar Úlfarsson said: "Operational performance and commercial flexibility were critical factors in our decision-making process and we look forward to experiencing StandardAero's customer service first-hand."



Lufthansa Technik

BRIEFS

- Latin American airline Avianca has awarded Lufthansa Technik a contract to provide maintenance support for the LEAP-1A engines that power its A320neo fleet. The agreement marks Avianca as Lufthansa Technik's first customer in South America to benefit from its LEAP-1A services.

- StandardAero has completed its 4,000th MRO workscope on the GE Aerospace CF34 turbfan engine. Peter Wheatley, vice president and general manager of CF34/CFM56 at StandardAero, said the achievement "is a testament to StandardAero's commitment to meeting the needs of CF34 operators worldwide."

- AMAC Aerospace has completed maintenance checks on a Bombardier Global 5000 for a new customer. The work was completed at its hangars in Basel and included a 15- and 30-month inspection as well as a 4500, 2250, 1500, 1000 flight hour and an 1800 landing inspection including OOP (out of phase) tasks.

- FL Technics has reached the halfway stage of constructing its new MRO hangar at the second busiest airport in the Caribbean, Punta Cana International Airport (PUJ). The facility will include five bays for base maintenance operations including a complex of supporting shops.

IN NUMBERS

45

Smartwings Airlines
operates a fleet of
45 Boeing 737s

14,000

The Christchurch
Engine Centre will get a
14,000 sqm expansion

40

easyJet recruits
40 engineering apprentices
every year



HEAVY MAINTENANCE

AIR ASTANA ACHIEVES MILESTONE WITH ITS FIRST EVER 12-YEAR C-CHECK

Air Astana has become the first Kazakh carrier to carry out a heavy maintenance 12-year C-check, which was conducted on an Air Astana A321.

During the check, in-depth inspections were conducted on all parts, plus the aircraft was stripped down for full inspection of its structure and components, including inside the fuel tanks.

Astana Technical Centre's Robert Dando, said: "Our successful completion of the first heavy maintenance 12-year C-check on an Airbus A321 serves to confirm the sophisticated and growing capability of Air Astana's engineering resource and staff.

"The ongoing commitment to develop in-house maintenance strength has significantly reduced costs previously incurred when heavy maintenance tasks were undertaken outside Kazakhstan."

The A321 that underwent the 12-year C-check has been flying in Air Astana's fleet since 2012. Non-destructive testing methods were used to achieve some of these inspections. Major components such as the engines were removed to inspect their attachments and structure.

After completing these tasks, the aircraft was rebuilt, followed by extensive system tests before being released for passenger operation.



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DIGITALISATION

Vietjet adopts Aviator eTLB

> Vietnamese low-cost airline Vietjet is replacing its paper-based processes of capturing technical issues with Lufthansa Technik's Aviator electronic Technical Logbook (eTLB), making it the first airline in the APAC region to introduce the technology.

The eTLB is designed to simplify communication between cockpit crew and maintenance staff and will be adopted for its growing fleet.

The operator has obtained the Civil Aviation Authority of Vietnam approval for using the eTLB on its fleet of A320/A321 and A330 aircraft.

Real-time data availability, directly connected to the maintenance and engineering system, ensures maintenance on arrival and enables a seamless pilot-to-maintenance collaboration, leading to decreased turnaround times and costs.

“
The eTLB is designed to simplify communication between cockpit crew and maintenance staff
”

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MRO NETWORK

“Our Welsh engineering base is an integral part of our maintenance operation... the expanded facility provides us with greater flexibility and control over our maintenance activity”

Andy Best, chief technical officer, British Airways



FACILITIES

Pratt & Whitney and Air New Zealand to expand Christchurch Engine Centre

Pratt & Whitney (P&W) and Air New Zealand have held a groundbreaking ceremony for a 14,000 sqm expansion of its Christchurch Engine Centre.

The expansion will add MRO capabilities for the P&W GTF engine in New Zealand, with capacity for up to 140 GTF engine overhauls planned annually by 2032.

Construction will soon begin and the first GTF engine overhaul is expected in Q4 of 2026.

The engine centre was founded in 1948 by Air New Zealand. In 2001, the airline and P&W partnered to develop the joint venture, focusing on the MRO of JT8D and then V2500 engines.

More than 400 staff are now employed at the engine centre which has overhauled more than 1,500 IAE V2500 engines.

“The first GTF engine overhaul is expected in Q4 of 2026



HEAVY MAINTENANCE

First Global Airlines A380 enters heavy maintenance at EFW

> The first aircraft to join British start-up Global Airlines' fleet has been moved to the Elbe Flugzeugwerke (EFW) facility in Dresden, Germany to undergo maintenance, required inspections and component replacements. Once completed, the aircraft will be relocated within Europe for an interior overhaul, preparing it for operations beginning in 2025.

In early October, 9H-GLOBL flew from Prestwick, Scotland to Dresden, where it was entrusted to EFW's expert team for a base maintenance inspection, paving the way for its return to commercial service.



Jerry/Adobe Stock

ENGINE MRO

Smartwings chooses AFI KLM E&M for LEAP-1B support

> Air France Industries KLM Engineering & Maintenance (AFI KLM E&M) has signed a new agreement to provide Quick Turn Support for Smartwings Airlines' LEAP-1B engines.

The Czech low-cost carrier says the collaboration with the MRO provider underscores its commitment to providing reliable and efficient services to its passengers, with a strong focus on sustainability and regulatory compliance.

This partnership will harness AFI KLM E&M's technical expertise and state-of-the-art facilities to ensure optimal engine performance, reduce operational costs and enhance safety.

Smartwings Airlines currently operates a fleet of 45 Boeing 737 aircraft, including 35 Boeing 737NG and 10 Boeing 737 MAX. The new agreement marks a significant step in ensuring the continued reliability and efficiency of these aircraft, which serve a diverse network of destinations across Europe, North Africa, the Middle East, and Asia.

“The agreement marks a significant step in ensuring the continued reliability of these aircraft



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In the Spotlight.

The latest partnerships, appointments
and innovations advancing the MRO sector



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< DIGITALISATION

Tata Consultancy Services (TCS) has signed a multi-year deal to help Air France-KLM modernise its data by moving it to the cloud.

Air France-KLM's critical systems and core business data across key areas such as flight operations, aircraft maintenance, and the airline's e-commerce platforms, will migrate to the cloud.



^ PEOPLE NEWS

Sabena technics Group has announced that from 1 January, Hervé Grandjean (pictured) will be its chief executive, succeeding Philippe Rochet who has led the group since 2019.

The company says this change in leadership comes at a time of strong growth for Sabena technics Group.

Grandjean will bring operational and strategic expertise to pursue Sabena technics' development projects.

✓ AIRCRAFT ORDERS

ACMI provider Avia Solutions Group has placed an order with Boeing for 40 737-8s, with the potential to order 40 more at a later date.

Avia Solutions Group has 11 air operator certificates (AOC) including Avion Express, Smartlynx, Klasjet, Air Explore, BBN, Ascend Airways and Skytrans among others.

Avia Solutions Group's Gediminas Ziemelis said: "These 737 MAXs will enhance the fleets of our airlines."



^ PEOPLE NEWS

RH Aero Systems, the new corporate brand created after Rhinestahl acquired Hydro Systems KG in May 2024, has announced Anthony Turner (pictured) has been promoted to president.

Turner, previously chief commercial officer at Rhinestahl, will lead RH Aero Systems and maximise the value it creates for customers within the aviation support equipment and services market.

✓ PARTNERSHIPS

HAECO and Shanghai Aircraft Customer Service Co. Ltd, a subsidiary of Commercial Aircraft Corporation of China (COMAC), are to collaborate on airframe, engine and component services, aiming to address the growing maintenance demands of COMAC platforms such as ARJ21 and C919.



Boeing



TRAINING & DEVELOPMENT

Joramco Academy, the education arm of Joramco, the Amman-based MRO facility, has unveiled its new state-of-the-art facility at Queen Alia International Airport (QAIA) and celebrated the graduation of aircraft maintenance engineers.

The newly constructed 5,000 sqm building represents a major step forward in advancing aviation education. The facility features 10 state-of-the-art classrooms, modern workshops and a dedicated aircraft hangar.



MERGERS & ACQUISITIONS

Semmco Group has been acquired by the international industrial company HAKI Safety.

Semmco Group, which designs and manufactures a range of ground support equipment used by airlines and MROs, says the acquisition will provide further investment in the company so that it can achieve its growth goals.



PEOPLE NEWS

Aero Norway has appointed Kenneth Johnston (pictured) as LEAP Program Manager to oversee LEAP engine repairs.

Johnston, with 28 years of experience in aviation, will lead the promotion of Aero Norway's LEAP services and ensure readiness for these advanced engines, which power popular aircraft including the Boeing 737 MAX and Airbus A320neo.



12

Aircraft hydraulics must be overhauled every 10-12 years
(from Hydraulic Systems feature, p.24)



100%

The flight of Donecle's inspection drone is 100% automated
(from Drone Technology feature, p.44)



1,800

The number of Bombardier aircraft maintenance technicians
(from Business Jet MRO feature, p.56)



85%

TARMAC Aerosave dedicates 85% of its activities to aircraft maintenance, storage and transition
(from Green Sky feature, p.74)

STREAMLINING MAINTENANCE & PAINTING

CTI Systems' Aerial Jib Platform (AJP) and Teleplatform technologies can contribute to more flexible, safer and cost-effective operations in MRO settings

The aviation industry is continuously evolving, and so are the demands for efficiency, safety and precision in aircraft maintenance and painting. As fleets expand and maintenance schedules tighten, the need for advanced tools to streamline processes has never been greater.

In this context, CTI Systems has introduced groundbreaking solutions that significantly enhance the efficiency and safety of aircraft maintenance and painting operations.

Challenges in aircraft maintenance and painting

Aircraft painting and maintenance have traditionally presented numerous challenges, especially for midsize companies. Ensuring safe, ergonomic access to aircraft, reducing setup times and preventing collisions between platforms and the aircraft have all been longstanding issues. Furthermore, the confined nature of hangars, limited space and the need to adhere to stringent local safety regulations, such as ATEX or NPFA, complicate operations.

Standard equipment such as scaffolding and fixed docking stations, while useful, often lack the flexibility required to service a variety of aircraft configurations efficiently. Conventional mobile platforms, while offering some mobility, pose risks in terms of collision safety and are frequently unsuitable for use in potentially explosive environments, which is a common concern during aircraft painting.



1

The Aerial Jib Platform (AJP): A new era in aircraft painting

Recognising these challenges, CTI Systems has developed the Aerial Jib Platform (AJP), a game-changing solution for aircraft painting. Initially designed for narrowbody aircraft, a larger version is also available – the L-AJP – which offers unmatched accessibility and safety on widebody aircraft.

A key feature is its floor-supported design, which makes it ideal for retrofitting into existing hangars or lightweight structures where roof load limits are a concern.

Like CTI Systems' traditional suspended Teleplatforms, the AJP provides the best coverage of an aircraft's body shell using an efficient number of platforms. The limited footprint ensures optimal access without obstructing hangar space or forcing workers to navigate around cumbersome dock structures.

AJP operational efficiency and economic viability

The AJP system offers fast setup and breakdown times, significantly reducing the overall turnaround time for aircraft painting projects. Once the aircraft enters the hangar, the AJP is quickly positioned for operation, offering workers unhindered access to elevated areas while allowing them to carry their tools with ease. The absence of structural parts in the platform design ensures unobstructed airflow, essential for maintaining the quality of the paint finish. Furthermore, the system prevents the dripping of fluids from scaffolding onto freshly painted surfaces.

For companies operating in earthquake-prone zones, the AJP offers additional safety benefits. Its ground-supported design adds stability, making it a suitable option for hangars



2

1. Roof-suspended Teleplatforms can serve multiple aircraft simultaneously
2. An AJP provides best coverage of an aircraft's body shell
3. The mobility of Teleplatforms ensures that hangar space is used efficiently

and control systems to prevent contact with the aircraft or the building. This not only safeguards the aircraft but also protects personnel from accidents.

One of the most significant benefits of Teleplatforms is their ability to drastically reduce setup times. Traditional fixed docks often require manual adjustments or time-consuming reconfigurations, especially when servicing different aircraft types. In contrast, Teleplatforms can be quickly repositioned, allowing MRO facilities to maximise their operational efficiency and reduce downtime.

A paradigm shift in MRO operations

The AJP and Teleplatform technologies represent a major leap forward in the world of aircraft maintenance and painting. By offering flexible, mobile and safe access to aircraft, these innovations address the key challenges that have long hindered efficiency in MRO operations.

The combination of advanced control systems, such as RMC and CAAS, with the versatile design of both the AJP and Teleplatforms, ensures faster turnaround times (TATs), reduced operational risks and improved cost-efficiency for MRO service providers.

As the aviation industry continues to grow, the need for adaptable, high-performance solutions like those from CTI Systems will only become more pressing. With these technologies, MRO facilities can meet the demands of an expanding global fleet while ensuring the highest standards of safety and quality. 📍

For more information about CTI Systems, please visit ctisystems.com or contact Gerhard Reichert, sales director – MRO at g.reichert@ctisystems.com

“TELEPLATFORMS ARE ESPECIALLY ADVANTAGEOUS IN LINE MAINTENANCE FACILITIES, WHERE QUICK TURNAROUNDS AND OPERATIONAL FLEXIBILITY ARE ESSENTIAL”

in such areas. This not only makes the AJP a safer solution but also a more versatile one, suitable for diverse operational environments.

Advanced safety features: RMC and CAAS

CTI Systems has prioritised safety with its innovative control technologies integrated into the AJP. The Relative Motion Control (RMC) system offers intuitive, user-friendly operation by allowing simultaneous control of both horizontal and longitudinal movements. This feature minimises the risk of collisions with the aircraft during platform operation.

In addition to RMC, the AJP is equipped with CTI Systems' advanced Collision Avoidance Assistance System (CAAS). This software-based solution ensures the platform maintains a safe distance from the aircraft by controlling the speed of the boom lift's approach. CAAS uses LiDAR technology to create multiple virtual safety shells around the aircraft, further enhancing collision prevention. This level of precision not only prevents accidents but also speeds up the painting process by allowing operators to work closer to the aircraft with confidence.

Teleplatforms: Versatility and mobility in maintenance

While the AJP shines in painting applications, CTI Systems' Teleplatform has been tried and applied for decades, and not just in this area. In MRO hangars, it also covers more comprehensive maintenance requirements. These platforms provide flexible, safe access for a variety of aircraft maintenance tasks, from inspection to structural repairs. Teleplatforms are especially advantageous in line maintenance facilities, where quick turnarounds and operational flexibility are essential.

CTI Systems' roof-suspended Teleplatforms can serve multiple aircraft simultaneously, regardless of their parking configuration, especially in a multi-bay hangar. This versatility is crucial in MRO settings that service a mix of narrowbody and widebody aircraft. The mobility of Teleplatforms ensures that hangar space is used efficiently, with platforms rotating or adjusting their positioning based on the aircraft's location.

Enhancing safety and efficiency

Teleplatforms also come with advanced safety features similar to those found in the AJP. They are equipped with sensors

Is your company in the clear?

Jason Dickstein explores Beneficial Ownership Information (BOI) reporting and what aviation businesses need to know

Does the US federal government know who owns your company? If your answer is “no” then you may need to file information with the government to make sure they do!

The Corporate Transparency Act (CTA) was passed in 2021 as part of the US efforts to better manage corporate shells. The CTA requires many businesses in the US to disclose information about their beneficial owners to the Financial Crimes Enforcement Network (FinCEN).

This article explores the implications of the CTA for aviation businesses, highlights key exemptions and delves into the government’s intended use of the collected data.

SUMMARY OF OBLIGATIONS

To comply with the CTA, you simply need to go online (<https://boiefiling.fincen.gov/fileboir>) and answer some questions about your business.



“THE PRIMARY PURPOSE OF THE CTA IS TO COMBAT FINANCIAL CRIMES”

JASON DICKSTEIN

president, Washington Aviation Group

The information requested is focused on the beneficial ownership of the business, so make sure you are clear on this before you file the information. If you are not sure, you can download a PDF Beneficial Ownership Information Reporting Form from the website and complete the report at your own pace. This must be filed by the end of 2024 for existing businesses.

CORPORATE TRANSPARENCY ACT: WHAT’S IT FOR?

The primary purpose of the CTA is to combat financial crimes such as money laundering, fraud and the financing of terrorism. By requiring businesses to disclose their beneficial owners – defined as individuals who either exert substantial control or own at least 25% of a business – Congress aims to enhance the ability of law enforcement agencies to track illicit financial activities.

The law addresses a longstanding issue: individuals with malicious intent often hide behind a corporate structure to obscure their identity, complicating efforts to identify and prosecute wrongdoing.

THE GOVERNMENT’S INTENDED USE OF BOI

The government says that the data collected through the Beneficial Ownership Information (BOI) database will primarily be used by law enforcement agencies to bolster national security and prevent illegal activities. The information will be accessible to federal, state and tribal law enforcement agencies, as well as certain regulatory authorities, enabling them to conduct investigations more efficiently.



Importantly, the beneficial ownership information will not be publicly available, protecting the privacy of business owners while still ensuring that authorities have access to crucial data when needed. This balance is designed to prevent the misuse of information while empowering law enforcement to combat financial crimes effectively.

The US government (as well as the G-7) has identified aircraft parts as one of the goods subject to significant risk of diversion in violation of sanctions against countries like Russia. The government will likely use the BOI database to support its export investigations.

AVIATION BUSINESSES THAT ARE REQUIRED TO REPORT

There are two types of reporting companies: 'domestic reporting companies' and 'foreign reporting companies'. If your company does not fall into either category – meaning it does not meet the definitions or qualifies for an exemption – it is not required to submit a BOI report to FinCEN.

The company may be a domestic reporting company if it is a corporation or limited liability company (LLC) that was created or formed under the laws of the US. This includes business structures created under state law and also under Native American tribal law.

The business may be a foreign reporting company if the business has registered to conduct business in any US State or Tribal jurisdiction by filing a document with a secretary of state or similar office of the State or Tribe. For example, if the business was registered in the Bahamas but it filed as a foreign corporation doing business in Florida, then it could be considered a foreign reporting company.

A statutory trust, business trust or foundation may be a reporting company if it was created by the filing of a document with a secretary of state or similar office. State laws vary on whether certain entity types, such as trusts, require the filing of a document with the secretary of state or similar office to be created or registered. If you control a

trust that was created in a jurisdiction that required such filing, then your trust is a reporting company, unless some other exemption applies (for example, a charitable trust may be exempt under 26 USC 4947 because it is treated under the non-profit tax exemptions found in section 501(c) of the tax code).

KEY EXEMPTIONS

While the BOI imposes broad reporting requirements, it also includes 23 specific types of entities that are eligible for an exemption. Typically, these exemptions relate to businesses that are more likely to be 'known' to the US government, such as those that already have other information reporting obligations.

One of the most relevant exemptions for aviation businesses is the large business exemption. This applies to companies that have: (1) more than 20 full-time employees in the US; and (2) domestic gross receipts or sales exceeding \$5 million; and (3) an operating presence at a physical office within the US. This is the opposite of

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“ IF YOUR COMPANY FAILS TO REPORT BOI WITHIN THE REQUIRED TIMEFRAME, SEVERAL CONSEQUENCES MAY ARISE ”

most laws, where there may be a small business exception. For BOI reporting, there is no small business exception.

Tax-exempt entities may also qualify for an exemption. These entities file a Form 990 with the US government, so the government already has sufficient information on the entity.

If you control an inactive entity, then your inactive entity might be exempt from reporting. An entity may qualify for the inactive entity exemption if it meets all six of the following criteria. First, the entity must have been in existence on or before 1 January 2020. Second, it should not be engaged in any active business operations.

Third, the entity cannot be owned, either wholly or partially, by a foreign person, which is defined as anyone who is not a US citizen or domestic corporation. Fourth, the entity must not have experienced any change in ownership in the past 12 months. Fifth, it should not have sent or received any funds greater than \$1,000, either directly or through any financial account in which it or any of its affiliates has an interest, during the

preceding 12-month period.

Lastly, the entity must not hold any kind of assets, whether in the US or abroad, including any ownership interests in other corporations, limited liability companies, or similar entities. So, a purpose-built LLC that holds an aircraft would not be inactive (because it holds an asset) but a shell corporation that has been inactive since 2019 would be an example of an inactive entity.

FAILURE TO REPORT: CONSEQUENCES

If your company fails to report BOI within the required timeframe, several consequences may arise.

Willful failure to comply with reporting requirements can lead to serious civil and criminal penalties. Civil penalties may reach up to \$500 for each day the violation continues, while criminal penalties could include imprisonment for up to two years and/or fines of up to \$10,000. Additionally, senior officers of a company that fails to file the required BOI report may be held accountable for that oversight.

Providing false or fraudulent information in a BOI report can also lead to severe consequences. This includes submitting inaccurate identifying information about individuals listed in the report, such as using a fraudulent identification document.

Individuals may also face civil or criminal penalties for willfully causing a company to fail to file a required BOI report or to submit incomplete or false information. For instance, if a beneficial owner or company applicant refuses to provide necessary information, thereby preventing the company from submitting complete BOI data, or if an individual provides false information knowing it will be reported to FinCEN, they could be subject to penalties.

If a company believes that a report submitted to FinCEN contains inaccuracies, the company can voluntarily submit a corrected report within 90 days of the original deadline. The CTA provides a safe harbor from penalties in such cases. However, if a person willfully neglects to report complete ownership information or neglects to file correct updated beneficial ownership information, FinCEN will assess the situation and determine the appropriate enforcement response based on its established enforcement mechanisms. ●



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NAVIGATING FERRY FLIGHTS

Vanguard Air Services' Patrick Ng'Andu explains how the current ferry flights landscape is weathering unprecedented challenges

The current climate for aircraft transitions and redeliveries has experienced an unprecedented slowdown. Contributing factors include massive delays in new aircraft deliveries from OEMs, particularly Boeing – due to well-publicised safety and quality control issues – and Airbus, facing challenges with engine supplies.

Additionally, a shortage of spare parts, as supply and production have yet to recover to pre-pandemic levels, has further compounded these delays.

The knock-on-effect of this is that we are seeing lessees extending their aircraft lease terms with their respective lessors for an additional number of years.

Depending on who you speak to, a definitive timeline of when all should get back to normal is unclear. However, as the global demand for travel continues to grow, solutions will need to be found soon.

Nevertheless, aircraft are still being ferried across the globe in numbers, for purposes such as paint shop visits, maintenance, storage, teardown or, in some cases, repossession.

The types of aircraft on the move are diverse. Recently, we've been approached by several customers to ferry B737 classics – highly sought after by aircraft trading companies – as well as some rarer models. However, our core work remains focused on staples such as the B737NGs, B777s, A320s, A330s, ATRs and Q400s.

Like every other aviation service provider, we have had to adapt and overcome whatever has been thrown



“PLANNING A FERRY FLIGHT NOW DEMANDS GREATER ATTENTION TO DETAIL”

PATRICK NG'ANDU
founder and owner,
Vanguard Air Services

our way. This has included diversifying our service offerings and looking at more than one way to be useful to our customers.

To stay at the top of our game, we have taken significant steps to meet the highest standards. One of our recent achievements was being approved as an aircraft ferry operator under the 2-REG (Guernsey) aircraft registry. We also ensure that we are fully Part-NCC compliant in all our operations.

Typically, an aircraft ferry operator is commissioned by a lessor, lessee or MRO to provide ferry, demonstration or maintenance check flights. It involves coordinating with the crews and their schedules, planning the route, fuel uplift,

ground handling, overflight permits, crew hotels and transportation.

An aircraft cannot depart on a ferry flight unless all the right aircraft documents have been presented by the aircraft owner to the ferry operator. The required documents include the ferry permit or certificate of airworthiness, the certificate of registration, noise certificate, radio licence and insurance.

These documents are generally submitted to the various civil aviation authorities of each country the aircraft will overfly to reach its intended destination. Prior approval is needed from each CAA before a flight can commence.

Planning a ferry flight now demands greater attention to detail. Rising global conflicts and tensions are narrowing flight corridors, and insurance requirements are adding more no-fly countries to the list.

Despite the challenging landscape, Vanguard Air Services continues to rise above, adapting to meet the needs of a dynamic industry. ●



▲ Vanguard Air Services is one of only a handful of aircraft ferry companies fully approved and Part-NCC compliant



For more information about Vanguard Air Services, visit: vanguardairservices.com

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1

AVIATION'S MUSCLES CAN SOMETIMES GET FATIGUED

Hydraulics are at the heart of many aircraft systems and while their power and endurance are taken for granted, things can go wrong. **Kevin Rozario** reports

Safety may well be the first word that springs to mind when thinking about hydraulics on aircraft. These systems provide the power and precision needed to operate critical components, from landing gear and braking activation to flight control surfaces (ailerons, elevators, and rudder) and flaps. Maintaining hydraulic systems is therefore critical.

In October, an Air India Express flight to Sharjah in the UAE with 141 passengers on board had to land shortly

after take-off from Tiruchirappalli Airport in Tamil Nadu. India's NDTV said the reason was a hydraulic failure, but an investigation had yet to report at the time of writing.

Two years earlier in April 2022, another incident involved a DHL Boeing 757-200F cargo flight from San José in Costa Rica to Guatemala City in Guatemala had to return to its origin for an emergency landing after a left-side hydraulics failure. According to ICAO's archive website SKYbrary, the aircraft suddenly veered to the right with landing

gear collapse and major fuselage damage. The investigation showed there had been an alert advising low hydraulic pressure.

From an MRO standpoint all hydraulic systems need examination, but some service arrangements must have fixed schedules and/or take priority. Andy Wheeler, divisional vice president and managing director of AEM/Ametek MRO explains: "Hydraulics are essential in aircraft systems and, from AEM/Ametek MRO's point of view, landing gear is the most important. Depending on the type of

1. Hydraulic systems provide the power and precision needed to operate critical components such as flaps 2. An AEM/Ametek MRO technician at a testing unit



Astrang/Adobe Stock

aircraft, they must be overhauled every 10 to 12 years. Flight controls also have firm time-between-overhaul (TBO) periods.”

Outside of this, AEM normally only receives units if they develop a fault on-wing or are shelf-life expired; in other words sitting in storage. “However, some airlines have reliability programmes in place and demand overhaul rather than test, to ensure optimum performance,” Wheeler adds.

In October, AEM/Ametek MRO signed an agreement with Liebherr-Aerospace for the provision of landing gear MRO services to Embraer E-Jet E1 operators across the EMEA region for the E190 platform. This underscored AEM/Ametek MRO’s capabilities in the hydraulics field.

EXTREME ENVIRONMENTS

Hydraulic systems typically comprise hydraulic fluid plus the three mechanical components of pressure generators or hydraulic pumps; hydraulically powered ‘motors’ for specific components; and the channels through which the fluid flows around the aircraft. They are subject to extreme wear, but designed to be highly reliable in harsh environments.

Moreover, these systems are very energy-efficient, transmitting power over long distances with minimal energy loss. In addition, ‘redundant’ hydraulics are often used to ensure flight safety with multiple systems providing backup in case of failure. All this comes at a cost.

For example, fluids operate at pressures of 3,000 to 5,000 psi and,

for aviation, they therefore consist of phosphate esters rather than being mineral oil-based. This ensures a high flash point to avoid ignition in case of a leak. The auto-ignition temperature of most aviation hydraulic fluids is about 475°C. They also need to be viscous over a wide temperature spectrum to retain good lubricating properties and have thermal capacity/conductivity to act as a system coolant.

Due to the constant up-and-down demands from a typical aircraft, hydraulic systems are subject to three major threats that MROs must watch for, according to ICAO, the specialised agency of the United Nations that coordinates global civil aviation regulations and policy. They are:

- Overheating – where the system exceeds its allowable operating temperature and must be deenergised;
- Loss of pressure – which can occur through loss of fluid or failure of a hydraulic pump; and
- Fluid contamination – either chemical or particulate in nature and can be caused by improper servicing or a component failure.

Robust maintenance practices are required to avoid all of the aforementioned. As the OEM for pumps and other hydraulic components, Eaton is a design authority on hydraulics so the company is well positioned to maintain these systems. Mike Nemeti, director of commercial aftermarket at Eaton’s Aerospace Group, says: “The pump acts as the heart of all the hydraulics systems. To ensure high reliability and safe functioning, operators must conduct inspections and maintenance as defined by the OEM.”

Unlike independent MROs, Eaton – which designs the product, repair procedures, and writes the Component Maintenance Manual (CMM) – benefits

from having its design and repair teams co-located, enabling proactive fault-finding and repair.

On the issues of wear, Nemeti says: “Hydraulic components have a lot of wearable surfaces that can degrade over time which is why aircraft-level maintenance in accordance with the Aircraft Maintenance Manual (AMM) is critical. The AMM will identify the actions to take on an aircraft level on an ‘as-needed’ basis.

“One of the benefits of having MRO activities performed by the OEM is that all serviceable units are guaranteed to be repaired to the latest approved CMM, with new OEM components to extend the life of the pump and increase time on wing.”

Wheeler adds: “Due to their nature and design, hydraulic systems can be subject to intense wear. For example, the main landing gear dampers from B737NG aircraft are a part that requires additional inspection for deterioration. Other items that experience a lot of wear include spool and sleeves (matched items) and working valves.”



2



◀ An AEM/Ametek MRO technician pushing a unit

“THE INDUSTRY IS ALWAYS STRIVING TO EVOLVE THE PERFORMANCE AND RELIABILITY OF HYDRAULICS”

FLEXIBILITY IN SERVICE APPROACH

Eaton collaborates with operators to identify the most valuable service packages for their needs. Various support arrangements are offered including cost-per-flight-hour agreements, which convert maintenance costs into predictable periodic charges.

For operators aiming beyond AMM targets, Eaton collaborates to develop additional service actions or in-service modifications..

With OEMs tending to set their own criteria for hydraulic checks and TBO periods, MROs must fall in line with those and conduct overhauls in accordance with the CMMs. AEM/Ametek MRO's Wheeler says: “This includes measurement inspection, visual inspection and, if applicable, non-destructive test (NDT) inspection. NDTs detect internal cracks, weak points and other hidden wear. Fluid is replaced as standard when a unit is stripped and inspected, for example landing gear shock struts are cycled and the fluid is replenished as part of an inspection and test.”

As for the overarching AMM requirements, Nemeti comments: “The AMM typically organises major pre-planned activities into A-, B- and C-level maintenance events, while some pre-planned activities are based on flight cycles or hours. Because there are multiple redundancies, Eaton's hydraulic products are generally designed to be ‘on condition’, meaning they are used until an issue arises and then repaired, without a specified service interval.”

Evolving technologies also continue to be an enabler for providing and analysing data from product returns to identify areas of improvements for future enhancements or possible changes to work scopes.

Components manufacturer Liebherr has experience in flight control and landing gear systems. The company's Liebherr-Aerospace business says it is “aware that the aviation MRO is undergoing major transformations towards digitalisation” and that it is “investing heavily in smart, integrated technologies”.

In the case of business aviation MRO, the company is taking a data-centric,

modular approach to address business jets, helicopters and specifically the emerging advanced air mobility (AAM) sector using what Liebherr describes as “small installation envelopes”.

As well as the recent deal with AEM/Ametek MRO, in November Liebherr-Aerospace and Air France Industries KLM Engineering & Maintenance (AFI KLM E&M) signed a five-year heat exchanger maintenance services agreement. It covers Air France KLM Group's A320ceo/neo and A220 fleet as well as the aircraft fleet supported by the French/Dutch MRO provider.

Heat exchangers transfer heat between fluids and are commonly used in hydraulic systems to cool the fluid and prevent overheating, optimising performance.

REGULATORY STANDARDS

The industry is always striving to evolve the performance and reliability of hydraulics. In Eaton's case, this is especially true for newer-generation pumps that are coming to market. The company also introduces product improvements through service bulletins and work scope recommendations.

Next-gen pumps can provide higher performance while reducing weight and footprint within an aircraft thanks to new material and manufacturing capabilities which can minimise failure rates to improve a product's on-wing performance, efficiency and reliability.

MROs enable airlines to comply with regulations in terms of their hydraulic systems performance and efficiency. However, Wheeler cautions: “While MRO companies play a crucial role in helping airlines meet regulatory standards, it is ultimately the airline's responsibility to make sure they remove items in line with OEM requirements.

“AEM/Ametek MRO advises of any airworthiness directives, service bulletins or service letters that are applicable when components are received. We also liaise with the OEM if we find any discrepancies with the technical data (which) can then lead to a CMM revision.” ●



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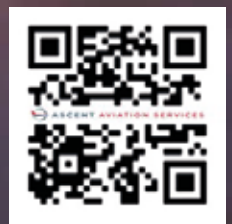
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INSIGHTS FROM THE EXPERTS

From industry collaboration to understanding more about data, PAM 2024 showcased the trends shaping aircraft maintenance

MRO Management's third annual Predictive Aircraft Maintenance (PAM) Conference took place in Dublin in November and brought together 200 experts from airlines, OEMs, MROs, asset traders and data experts.

The agenda packed in 22 sessions with 39 speakers for keynote addresses, sponsor presentations and panel debates. There was no shortage of topics to cover including some of the world's largest airlines sharing how they are adopting new predictive technologies, case studies in engine MRO activity, and understanding more about big data and data ownership.

In this review, we highlight five key lessons learned from the event, showcasing the transformative ideas driving predictive aircraft maintenance.

1. COLLABORATION IS CRUCIAL FOR SUCCESS

Predictive aircraft maintenance is proving to be a game-changer that's revolutionising how we keep our planes in the sky. But for it to truly soar, the entire aviation industry must learn from each other, with many of the speakers citing that collaboration is vital for success.

Javier Jimenez, chief technology officer of Aer Lingus, emphasised in his opening

address that "industry success relies on a commitment towards a shared vision for the future."

Lars Kindler, head of digital solutions, AVIATAR at Lufthansa Technik said during his presentation: "We can have all the data in the world and the best engineers to work with that data, but without collaboration in the industry, what do we really have?"

David Harper, fleet support director at GE Aerospace, said during his presentation: "Predictive aircraft maintenance will only be successful if collaboration happens."

When Fabrice Villaumé, head of digital business at Airbus Customer Services, took to the stage he not only explained the history and core principles that define the Digital Alliance – a partnership formed in 2019 between Airbus, Delta TechOps and GE Aerospace that uses artificial intelligence (AI) to develop predictive maintenance models for aircraft – but also highlighted that the alliance now serves 40 customers, including major carriers like Delta Air Lines and easyJet, through its Skywise Fleet Performance+ platform.

"Over the next two decades, we will see more than 48,000 aircraft in service. This growth demands not only new technologies but also innovative

approaches to scalability, efficiency and resilience," Villaumé said. "I truly believe that the industry recognises the need for collaboration and for putting the right frameworks in place. Only then can we address the challenges of unlocking the full potential of aircraft data."

Equipment manufacturer Liebherr-Aerospace is the latest industry partner to join the Digital Alliance. After his presentation, Villaumé invited Pierre Escudier-Donnadieu from Liebherr-Aerospace to join him on stage for a panel discussion alongside Delta Air Lines' Alice Belcher and GE Aerospace's Alex Haines.

The panellists agreed on the exciting prospects for the industry's future. Haines said: "Collaboration is key. By working together, we can achieve more. Our goal is to bring more organisations onto the Digital Alliance's journey."

2. DATA IS KEY

Utilising data was a key message, with many speakers stressing its centrality to effective predictive maintenance.

Rob Stolk, project manager for predictive maintenance at Air France Industries KLM Engineering & Maintenance (AFI KLM E&M) took to the stage to explain that by leveraging the firm's end-to-end expertise as an



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1. PAM 2024 chairman, NAVEO Consultancy's Richard Brown 2. Javier Jimenez, chief technology officer, Aer Lingus 3. Networking during one of the breaks 4. A panel discussion on global market trends 5. Airline predictive technology specialists share details about their progress during a panel discussion



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“I TRULY BELIEVE THAT THE INDUSTRY RECOGNISES THE NEED FOR COLLABORATION AND FOR PUTTING THE RIGHT FRAMEWORKS IN PLACE”



airline and MRO organisation, many predictive maintenance models have been successfully adopted.

“Aircraft maintenance has evolved significantly with the integration of big data analytics,” said Stolk. “By examining billions of data points, engineers can uncover previously hidden trends and make informed decisions to enhance system reliability.”

Stolk’s presentation highlighted PROGNOS for Aircraft, the predictive maintenance suite developed in-house by AFI KLM E&M which is possible to predict a future breakdown or to schedule a maintenance operation beforehand.

Stolk gave a compelling example of data-driven problem-solving through the case of an Air Cycle Machine (ACM) that was underperforming due to water ingestion.

“Detailed fleet analysis supported this theory, revealing recurring patterns of ACM speed drops,” he explained. “By sharing the data from these findings, collaborative investigations pinpointed

the issue and a solution was implemented yielding remarkable results.”

The case study highlighted the importance of teamwork between data analysts, maintenance experts and manufacturers. “Our ‘Data + People Together’ mantra encapsulates the spirit of this initiative, emphasising that human collaboration is as critical as the data behind the technology,” concluded Stolk.

3. THE IMPORTANCE OF AI AND ML

Artificial intelligence (AI) and machine learning (ML) are no longer just buzzwords in the industry – they are integral to the development of predictive maintenance systems.

Revima and StandardAero both demonstrated how advanced analytics, powered by AI, are helping airlines not only predict maintenance needs but also optimise the entire lifecycle of aircraft components.

Revima’s digital platform, for example, uses ML to enhance algorithms for monitoring APU conditions and recommending maintenance actions.

For StandardAero, Guillaume Limouzy, regional sales and service manager for airlines and fleets, told the PAM 2024 audience how a shift in new technologies is helping to navigate

data-driven solutions that maximise engine performance and lifespan. He said: “Through ML and predictive analysis, AI can anticipate in detail the workscopes required by engines which have been taken off-wing, and assess the availability of the required material. Supported by data analysis, operators and StandardAero experts can validate workscopes during the repair process, which is enabling operators to minimise time off-wing.”

Several speakers highlighted that in this rapidly changing environment of aircraft maintenance, AI and ML can process vast amounts of data to detect patterns, predict failures and help technicians prioritise repairs, ultimately transforming maintenance strategies and shifting from reactive to predictive approaches.

4. EMPOWERING ENGINEERS

As airlines move toward predictive maintenance, the need for decision-support tools to aid crews becomes more apparent. Several speakers highlighted how predictive tools can empower technicians with actionable insights.

Mike Roemer, United Airlines’ senior manager of digital fleet management, outlined how the airline’s TechOps



“COLLABORATION IS KEY. BY WORKING TOGETHER, WE CAN ACHIEVE MORE”

1. At the Jameson Distillery evening networking event 2. Fabrice Villaumé, head of digital business, Airbus Customer Services 3. PAM chairman Richard Brown talks to Christopher Dixon and Kak Wong from Delta TechOps

division leverages advanced digital tools and analytics to ensure the reliability of its 970 mainline aircraft which fly over three million hours annually. He said: "Operating one of the world's largest networks creates unique opportunities, and challenges. Predictive maintenance has become a proven and trusted tool for our engineers to address fleet reliability."

This empowerment not only enhances the efficiency of maintenance activities but also reduces the risk of human error by ensuring that personnel have access to the right information at the right time. By equipping technicians with predictive insights, airlines can improve both the effectiveness of their maintenance operations and aircraft availability.

5. FINANCIAL BENEFITS

Several speakers said that predictive maintenance offers significant financial advantages for airlines and MROs as systems can detect potential issues before they escalate into critical failures. This proactive approach helps prevent costly unscheduled repairs, minimises the need for emergency parts and labour and reduces aircraft on ground (AOG) situations. Given that AOG events can cost airlines up to six figures per hour in lost revenue and passenger compensation, avoiding these scenarios is a major financial win.

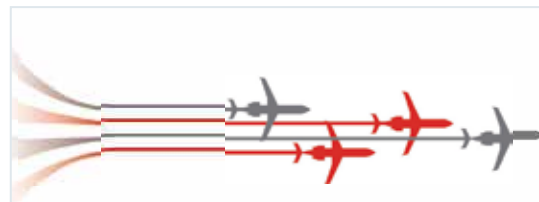
"Unscheduled parts removals cause disruption, increased costs and passenger dissatisfaction," said Boris Wolstenholme, CEO of Sentry Aerospares during his presentation. "A data-driven strategy can revolutionise inventory management, minimise disruptions to operators and support AOG spare parts with innovative solutions and play a part in that all important goal to drive down costs."

By minimising unplanned downtime, airlines can reduce flight delays and cancellations, improving on-time performance and passenger satisfaction.

During a panel discussion that focused on preventing AOG, Bram D'haene, TUI Airlines' fleet performance manager, said: "As a leisure airline we cannot ground our flights. We leverage AVIATAR's technology for aircraft health analytics to boost our maintenance strategies. We of course try to avoid AOG at all costs, and predictive maintenance is helping us."

WHAT'S NEXT FOR PAM?

A big thank you to all speakers, sponsors, exhibitors and delegates for making PAM 2024 a fantastic event. PAM will return to Dublin in 2025, and we're also excited to announce an edition to be held in Singapore in September 2025 – look out for more information soon. ●



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A hurdle with a yellow top bar and blue legs stands on a blue running track with white lane markings. The hurdle is positioned in the foreground, slightly to the right of the center.

GLOBAL MARKET TO GATHER PACE IN 2025, BUT WITH HURDLES

As another calendar year end approaches, **Bernie Baldwin** reports on the state in which 2024 has left the MRO industry and gets some pointers about what can be expected in 2025

If the motto for the real estate industry is “Location, location, location!”, it could well be argued that for aviation’s MRO sector, the phrase might be, “Turn-times, turn-times, turn-times!”. Meeting the goal of optimum turn-times on each and every job is a challenge. So how has the global MRO industry performed in 2024 and what have been the key achievements and developments?

Busy facilities

Jorge Abando, head of aviation industry services at AviaPro Consulting, offers his assessment. “In 2024, the global MRO industry experienced significant demand, continuing its post-pandemic recovery while facing notable challenges,” he remarks. “The sector operated under capacity constraints, largely due to a backlog of maintenance tasks and supply chain disruptions that persisted, though there were improvements compared to previous years.

“MRO facilities have been fully booked well into 2025, creating scheduling pressures for operators. To address this, both MRO providers and aircraft owners have placed an increased emphasis on proactive

planning, with operators encouraged to communicate maintenance needs months in advance,” Abando notes.

“As for key achievements, these would include the wider adoption of advanced technologies like predictive maintenance, artificial intelligence (AI), and the Internet of Things (IoT), which have significantly improved operational efficiency. Predictive maintenance, in particular, allows for early identification of issues, reducing downtime and minimising unexpected repairs. Furthermore, MRO providers have expanded their global networks to serve operators across regions better, increasing service capacity through strategic partnerships, especially in emerging markets.”

Abando continues: “Sustainability has also been a major focus in 2024. Many MRO providers have begun integrating eco-friendly practices, such as material recycling and waste reduction, as part of the industry’s commitment to achieving net-zero emissions by 2050. However, the transition to more sustainable practices has led to increased costs and, in some cases, longer turnaround times, as MROs adapt to new regulatory requirements and operational practices.”



“THE TRANSITION TO MORE SUSTAINABLE PRACTICES HAS LED TO INCREASED COSTS AND, IN SOME CASES, LONGER TURNAROUND TIMES”

Jorge Abando, head of aviation industry services, AviaPro Consulting

Balancing workforce challenges and MRO demand

For David Bentley, division vice-president and business unit manager of Muirhead Avionics and Avtech – both Ametek MRO group companies – one of the major issues affecting the industry is getting people trained with the right skills. “Over the past five years, many technicians decided to leave the industry or retire, so we have to become increasingly innovative and focused to find the right calibre workforce. Our work with the armed forces is one initiative that is really paying dividends,” he comments.

“Another trend that we are seeing is that repair vendors are still struggling to hit delivery times. The impact of this is a change in business model. Rather than stretch their resources and performance to meet unrealistic targets, they are re-setting the parameters of what they offer customers,” Bentley observes. “These new services are structured to look at world demands and analyse the head count needed, the inventory required, the technologies expected, and so on. This re-setting takes a long time to achieve but we do see businesses presenting a more defined – and in some cases more limited – offer, combining the right people, with the right capacity and the right materials.”

VAS Aero Services’ senior director of business development Kevin Ferreiro asserts that the MRO industry is continuing to rebound. “It is in a much better position than just one and two years ago. This is a vital sector of the industry since passenger traffic continues to accelerate and is expected to exceed 2019 levels by the end of this year (aircraft utilisation has also recovered to 2019 levels). Higher aircraft utilisation rates drive higher maintenance and repair requirements,” he says.

“The MRO sector’s tireless efforts at maintaining active fleets are a major contributor towards the strong financial returns and profitability that operators are experiencing

Mike Audus, divisional vice-president and business unit manager of aerospace Europe for Ametek MRO also believes that the industry as a whole is busy. “There are still challenges to consider of course, which filter down the supply chain from unreliable airframe deliveries,” he states. “We note that many tier one MROs are repositioning themselves through acquisitions and mergers – and this re-alignment is also evident amongst the smaller repair facilities worldwide.

“The supply chain is improving, but it has not reached pre-Covid-19 levels. This is good and bad for the industry, but for those MROs and trading partners in the USM sector it continues to deliver benefits,” Audus continues. “Aside from this, the return of air travel sees activity right across the industry and for Ametek MRO we are experiencing a very good year. The investments we have made in our portfolio of capabilities, the established relationships that we have nurtured, and the flexibility that underpins what we do for customers are all positively impacting the success and growth of the business.

“Globally the main issue affecting the industry is one of repair capacity. There is increasing evidence of OEMs looking to offload work to reliable partners,” Audus reports.



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in 2024. As operators await long lead-time deliveries of new aircraft, they are turning to their MRO partners to help extend the life of current assets,” Ferreiro adds. “With this increased demand, MROs have experienced significant maintenance activity backlogs in 2024, and demand has not softened. As a result, many MROs are already selling capacity years into the future.

“The supply chain continues to struggle to deliver new parts and that has resulted in much greater demand for, and reliance upon, used serviceable material (USM) to keep aircraft and engines serviced; however, USM availability, too, remains limited due to continued record low retirement volumes of current generation aircraft.

“The MRO sector continues to suffer from a global shortage of qualified technicians, which impacts the industry’s ability to meet the market’s maintenance and repair demands,” Ferreiro emphasises, echoing Bentley’s opinion.

2025 expectations

Assessments of the past year obviously enable both analysts and practitioners to provide hints at what the MRO market might bring in 2025 – from how full the shops are likely to be to regulatory challenges on the horizon, sustainability efforts, technological developments affecting MRO processes and the training needed to ensure enough personnel to meet demand.

“Looking at capacity and demand, the global MRO market is expected to face continued high demand throughout 2025,” declares Abando. “The backlog experienced in 2024 will likely carry over, particularly for specialised services, as the fleet size continues to grow and more aircraft age into maintenance-heavy phases of their lifecycle. With many MRO shops already booked into 2025, operators may still struggle to secure timely appointments unless either new capacities are added, existing processes are optimised, or both. Flexibility and early scheduling will be critical for operators.

“Regulatory pressures surrounding sustainability will intensify in 2025, especially with the aviation industry’s focus on net-zero carbon emissions by 2050,” he continues. “MRO providers will need to adopt further eco-friendly materials, waste management protocols and energy-efficient processes.

“Compliance with these new regulations could introduce complexities, potentially increasing costs and extending turnaround times. It will be essential for providers to invest in sustainable technologies and processes, as well as for operators to align their maintenance schedules with these changes to minimise disruption,” Abando advises.

“In the area of technological developments, innovation will continue to shape the MRO industry in 2025,” he continues. “The integration of AI, IoT and predictive maintenance systems will become even more prevalent, enabling



▲ Mike Audus, divisional vice-president and business unit manager of aerospace Europe, Ametek MRO

1. Maintenance training is an ongoing process that encompasses all levels and age groups
2. Ametek MRO calibration equipment

“THE SUPPLY CHAIN IS IMPROVING, BUT IT HAS NOT REACHED PRE-COVID-19 LEVELS. THIS IS GOOD AND BAD FOR THE INDUSTRY”

Mike Audus, divisional vice-president and business unit manager of aerospace Europe, AMETEK MRO



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real-time monitoring of aircraft systems and data-driven maintenance decision-making. Additionally, the use of robotics and automation in maintenance processes is expected to grow, further streamlining repetitive tasks and freeing up skilled technicians for more complex work. These innovations will enhance overall maintenance efficiency and safety, but will require significant investment in infrastructure and training.

"In training and workforce development, the MRO sector will also face a growing challenge in 2025. As experienced technicians retire, the industry must address a widening skills gap," Abando notes. "While some training programmes have been initiated to cultivate new talent, they may not be enough to meet the increasing demand. MRO providers will need to strengthen partnerships with educational institutions and invest in continuous training to ensure a steady pipeline of skilled technicians. Without sufficient training and recruitment efforts, the shortage of personnel could hinder the industry's ability to meet growing maintenance demands."

While Ferreiro is confident of the sector's increased vibrancy, he too is cautious about how it might be achieved. "Success often creates new challenges, and as the MRO industry continues its upward trajectory from the pandemic-induced contraction we will likely continue to feel some growing pains," he predicts. "Shortages of skilled labour, raw materials, and maintenance capacity will result in extended maintenance lead times for customers in 2025. That means operators must plan maintenance schedules well in advance to ensure a slot in the queue."

Ferreiro adds: "Sustainability regulations are vital to evolving industry best practices

for the future. Recycling and reclamation will play an important role, helping reduce waste, lower energy consumption and create a more environmentally responsible business model. As a leader in end-of-life aircraft transition management and USM parts re-distribution, VAS is already doing its part to extend the life of vital components and assemblies, while at the same time assuring the availability of critically needed parts to operators worldwide. That said, global dynamics and current headwinds may interfere with realising strong progress in some of these initiatives in the near future."

Ferreiro anticipates more MRO expansions and partnerships in 2025 to serve the market better, similar to the many examples seen in 2024. "These collaborations are crucial for increasing capacity and producing the innovative and sustainable solutions that help keep assets flying and generating revenue for our MRO customers," he asserts.

"Addressing the current skilled workforce shortage is vital to the industry being able to meet the growing demand for maintenance and repair services. Training levels are gradually improving, but still remain far behind the required growth rates to satisfy anticipated future market demands," Ferreiro emphasises.

The Ametek MRO pair of Audus and Bentley also have their predictions for 2025. And when it comes to considering capacity, Audus is straight and to the point. "The shops will be full. There is not enough capacity. There will be more opportunities for strategic partnerships and more acquisitions," he declares.

Bentley adds: "These moves will need a great understanding of all the data available. But Ametek is a well-known acquirer of MRO



▲ David Bentley, division vice-president and business unit manager, Muirhead Avionics and Avtech



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businesses, so we actively seek out opportunities and look for the right fit within the group.”

“As an organisation, Ametek MRO is aligned to providing MRO services to the OEMs and end users, so we understand their imperatives of pursuing the very best in terms of cost and performance,” Audus adds. “All shops, like ourselves, need to ensure that turn-times are where the industry wants them to be; we need to deliver what the market needs to operate at maximum efficiency. This means that we too are focused on costs and the coming year will see us asking, is this the new normal for freight, for parts, and so forth? Ultimately, we are measured on four things: quality, safety, turnaround time and price. That will never change.”

Addressing regulatory challenges, Audus highlights that Ametek MRO is always conscious of improving processes and procedures for maximum benefit to its people, its customers and the planet. “This affects

all areas of the business from a corporate social responsibility, safety and governance perspective,” he says.

Bentley adds: “We are also aware of other initiatives at a component level such as the movement away from certain coatings on landing gears, for example. As an organisation we ensure we position ourselves to be ready for change when new rules kick in. And we will make whatever investments are necessary in terms of equipment and training.”

Moving on to technological developments, Audus reports that the company has already moved to cloud-based systems and is closely looking at the digital supply chain using AI to “help forecast, manage risk and embed resilience in a volatile global industry”.

According to Bentley, predictive data “needs to be very carefully managed in the dynamic and flexible world of MRO. We need end-to-end visibility up and down the supply chain to ensure we have the big picture and can make the best informed decisions,” he comments.

Bentley goes on to address the thorny issue of having enough personnel to meet the demand and how Ametek is approaching the challenge. “Training is a continuous process and embraces all levels and all ages. We start with apprenticeships that are supported by various governmental funding allowances, then at the other end of the spectrum we have older people up-skilling or returning to the workplace as technicians and experienced engineers.

“We also look beyond traditional sources of recruitment and have a highly pro-active initiative to recruit ex-military avionics personnel who train in new techniques. These people have the perfect training and mindset to enhance our team,” Bentley confirms.

If the personnel challenge can be met, MRO companies are clearly in a position to grow in 2025. Elsewhere though, even with the labour relations problems at Boeing – including strike action – now seemingly settled with a pay offer accepted by the unions, their effect is likely to continue to add anxiety to the market.

Intelligent planning, by both the MROs and the airlines, will therefore be crucial to meet the maxim of optimum turn-times. ●



▲ Kevin Ferreiro, senior director of business development, VAS Aero Services



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1. Ametek MRO is always conscious of improving processes and procedures

“TRAINING LEVELS ARE GRADUALLY IMPROVING, BUT STILL REMAIN FAR BEHIND THE REQUIRED GROWTH RATES TO SATISFY ANTICIPATED FUTURE MARKET DEMANDS”

Kevin Ferreiro, senior director of business development, VAS Aero Services



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▲ Air Astana achieves milestone with its first ever 12-year C-check

WIND OF CHANGE

Kazakhstan's Air Astana has made the decision to bring maintenance and training in house.

Greg Whitaker reports from a site visit

Runways are very often windswept places, but that is even more so here in Nursultan Nazarbayev International Airport on the edge of the Ural Plains, outside Astana, Kazakhstan. The outside temperature when we stepped off the plane was a fresh -8°C, which we're assured is positively balmy when compared to the depths of winter to come.

We've come a way off the beaten track to look at EI-KDB, an A321 undergoing

a heavy maintenance C-Check by Air Astana. What makes this particular C-Check special is that it is the first 12-year maintenance check to be carried out on an aircraft by a Kazakh carrier.

On arrival at the hangar, we are greeted by Robert Dando, director of the Astana Technical Centre and C-Check maintenance.

"This heavy maintenance check will take about 48 days," he explains, adding that they are already 30 days into the process at the time of our visit.

"At any one time there are around 35 people working on it. We do everything ourselves, and, apart from me, all the personnel are Kazakh."

Our first look at the EI-KDB, which was delivered brand new to the airline in 2012, comes as it is approximately two-thirds of the way through the C-Check and still in a state of disassembly.

The seats and cabin equipment have been removed and lined up alongside the airliner, while much of the vehicle is covered in scaffolding to allow access.



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Climbing into the aircraft, the first point to note is that much of the floor is missing. This is partly to allow access, and partly because some of it is being replaced due to corrosion, notably around the lavatory areas where the floor has been subjected to damp.

TRAINING

Although this is the first 12-year check to be carried out by the airline, it is by no means the first MRO operation,

as the airline has been able to offer C-Checks and line maintenance for years. However, Dando admits that finding qualified technicians and engineers has been a challenge. This led the airline to introduce an apprenticeship programme.

“We started [the apprenticeship scheme] two years ago. Before that, there was a cadetship where we’d take people from university, but the problem was that they wanted to be managers, not technicians,” explains Dando.

“As I’d come from British Airways, I recalled how we would take school leavers. So we went into schools to tell the pupils about becoming maintenance technicians. The issue there was that locally the education system is geared towards sending students to university, so people would want to come and do the apprenticeship, but their parents would be focused on them continuing on into higher education.”

Dando’s team overcame this concern by setting up introductory sessions that explained the benefits of an

1. Robert Dando, director of the Astana Technical Centre and C-Check maintenance 2. Comprehensive in-depth inspections and tests are conducted on all parts 3. The A321 that underwent the 12-year C-check has been flying in Air Astana’s fleet since 2012 4. The heavy maintenance check is expected to take approximately 48 days

apprenticeship, as well as the prestige of becoming a qualified engineer.

“We would talk to them about the value of the Engineer’s licence and explain how it was valid outside of Kazakhstan and was equivalent to a university degree,” he explains.

Training people to become engineers with responsibility for critical systems isn’t something that can be done overnight. “The process takes five years,” clarifies Dando.

“There’s only one aviation college in the country, which is in Almaty [approximately 750 miles from Astana, where the MRO operations are]. We are working closely with the college, as it wants to gain its own 147 approval and be able to teach the Part 66.

“Some of the guys are doing a day release for Part 66, so when they finish our programme they end up as engineers. Once they finish, they apply to the Irish Authority (as that is the authority that we operate under).”

Apart from the MRO engineer training, the airline (along with the Fly Arystan subsidiary) has also invested a substantial amount in developing its training programmes for both flight

“THE ONGOING COMMITMENT TO DEVELOP IN-HOUSE MAINTENANCE STRENGTH HAS SIGNIFICANTLY REDUCED COSTS”

“TRAINING PEOPLE TO BECOME ENGINEERS WITH RESPONSIBILITY FOR CRITICAL SYSTEMS ISN’T SOMETHING THAT CAN BE DONE OVERNIGHT”

deck and cabin crews. In an adjacent building, a brand-new L3Harris full flight simulator works around the clock to train pilots, while two cabin simulators allow flight attendants to train on any number of emergency procedures. These include full-size emergency evacuation slides and life rafts as well as how to deal with a fire onboard (one of the simulators blazes fires in random locations for the trainees to deal with). As with the MRO training, keeping such a facility in-house enables the company to hire locally, retain staff and ultimately save costs.

Plans are afoot to develop the training facilities still further, with the possible addition of a second full flight simulator and more on-the-ground training.

FACILITIES

The hangar itself is relatively new and can accommodate three A320 family aircraft at any time. The airline (again, with the Fly Arystan subsidiary) has invested in a substantial number of tools and equipment for MRO. This investment allows for the possibility to offer MRO services to other airlines in the future, if capacity and demand allows.

Back at the aircraft, Dando points out some issues that had been uncovered during the check, the most notable of which were the ‘pylon’ pins that hold the engines in place. “When we took the pin out of the pylon it was discoloured, which shows there has been some interference and heat transfer,” explains Dando. “We reported it to Airbus and they reported back for us to change the pins.”

Another repair being made that we witnessed during our visit concerned parts of the fuselage skin panels. As we understood it, plates larger than the removed areas are cut to fill holes in the skin. The doublers will possibly be on both sides or at least thicker than the surrounding skin. This follows the practice outlined in the structural repair manual.

In addition, one of the fuel tanks was being refitted after an internal inspection. This aircraft will retain the tanks in the same configuration, but several other long-range A321s on the Air Astana fleet are being converted with an extra tank to give them yet further range. Having been given the go-ahead by Airbus, the modified planes will be able to fly a useful amount of extra distance. For example, a flight from

Almaty to London Heathrow will now be able to fly directly without refuelling.

Overall, the aircraft had a clean bill of health, and reassembly was on schedule, thanks to the in-house MRO team.

“The ongoing commitment to develop in-house maintenance strength has significantly reduced costs previously incurred when heavy maintenance tasks were undertaken outside Kazakhstan,” concludes Dando. ●



BRIDGING ORGANISATIONAL SILOS

Sensus Aero's **Paulius Cegis** shares how breaking down barriers between departments in MRO is key to creating a path toward integrated efficiency



“
**MROS MUST
EMBARK ON A
JOURNEY OF DIGITAL
TRANSFORMATION**
”

PAULIUS CEGIS

chief executive, Sensus Aero

In the dynamic landscape of MRO operations, efficiency and precision are paramount. However, many MRO organisations grapple with entrenched organisational silos, fragmented legacy systems and manual, paper-based processes. These challenges disrupt smooth operations and hold back the industry's progress toward modernisation.

The challenge of organisational silos

Organisational silos emerge when departments operate in isolation, each with their own processes and objectives. In MRO settings, this often results in disjointed workflows between maintenance, engineering, procurement and quality assurance teams. Such fragmentation can lead to miscommunication, redundant tasks and delays, ultimately affecting turnaround times and operational efficiency.

Fragmented legacy systems:

A barrier to integration

Many MROs rely on legacy systems that were implemented decades ago. These systems, while once state-of-the-art, now struggle to keep pace with the demands of modern aviation maintenance. The lack of integration between these systems means that data is often siloed, making it challenging to obtain a holistic view of operations. This fragmentation can lead to errors, inefficiencies and increased operational costs.



The burden of manual processes

Despite advancements in technology, manual, paper-based processes remain prevalent in many MRO organisations. Reliance on physical documents for work orders, maintenance logs and compliance records not only consumes time but also increases the risk of errors and data loss. Moreover, manual processes make it difficult to track real-time progress and generate actionable insights, limiting an organisation's ability to respond swiftly to emerging issues.

1. Software solutions can automate routine tasks and reduce human error
2. Sensus Aero's solutions are designed to streamline every aspect of MRO

The path forward: Embracing digital transformation

To overcome these challenges, MROs must embark on a journey of digital transformation. This involves adopting integrated, modular ERP systems designed specifically for the aviation industry.

Such systems unify various functions – maintenance planning, inventory management, labour tracking, and compliance – into a cohesive platform. By doing so, organisations can break down silos, streamline workflows and enhance data visibility across all departments.

For instance, implementing a comprehensive MRO software solution can automate routine tasks, reduce human error and provide real-time insights into operations. This not only improves efficiency but also enables better decision-making and resource allocation.

Furthermore, digital tools can facilitate compliance with industry regulations by maintaining accurate, up-to-date records and generating necessary reports with ease.

Case in point:

Sensus Aero's approach

Sensus Aero was built by MRO professionals, directly from the day-to-day demands of the hangar. With years of hands-on testing and industry expertise, this platform addresses the core needs of maintenance teams by covering every step of the MRO process – from quoting and planning to inventory management and billing.



2

Unlike rigid, outdated systems, Sensus Aero's flexible, modular design allows MROs to adapt quickly, reduce errors and keep operations running smoothly with clear oversight.

Conclusion

The aviation maintenance industry stands at a crossroads. To remain competitive and meet the evolving demands of the market, MRO organisations must address the challenges posed by organisational silos, fragmented legacy systems and manual processes. Embracing digital transformation through integrated ERP solutions offers a viable path forward, leading to streamlined operations, improved efficiency and a stronger position in the global aviation landscape. ●

About Sensus Aero

Sensus Aero is a new-gen software expert for the aviation industry that provides an integrated Enterprise Resource Planning (ERP) optimisation platform, designed to increase and streamline every aspect of the MRO, ground handling and fuelling processes. As an integrated one-system platform, Sensus Aero excels in automation, user experience and process design, and is fully client-focused and can be tailored to match the customer's unique and specific needs.

Sensus Aero is part of Avia Solutions Group, the world's largest ACMI provider, with a fleet of 214 aircraft and over 100 subsidiaries, including SmartLynx Airlines, Avion Express and KlasJet. Supported by 12,000 professionals, the group offers aviation services such as MRO, training and ground handling, operating in 68 countries.

“
IMPLEMENTING A COMPREHENSIVE MRO SOFTWARE SOLUTION CAN AUTOMATE ROUTINE TASKS, REDUCE HUMAN ERROR AND PROVIDE REAL-TIME INSIGHTS INTO OPERATIONS
 ”



RETHINKING INSPECTIONS

Could drones make their way into the everyday domain of aircraft visual inspections?

Drones and drone technology are being tested in aircraft MRO operations due to their ability to enhance efficiency, safety and precision. However, the regulatory background to make such solutions implementable at an industry-wide level is not yet fully developed.

TESTING EXPERIENCE

Lufthansa Technik has tested drone-based visual inspections of aircraft surfaces on various occasions during which the company was able to gain comprehensive in-depth insights, according to a spokesperson for Lufthansa Technik. “However, due to various regulatory and practical aspects, as of now we still do not consider drone-based inspections ready for entry into our daily MRO routine yet,” the spokesperson said. “This might change with further advancements of the technology; hence we will surely keep on closely monitoring future developments of this technology.”

Donecle offers an automated drone combined with advanced image analysis software and cloud-based digital history for aircraft inspections. “This solution inspects aircraft from nose to tail,

indoors or outdoors, 10 times faster than manual methods,” explains Adélaïde Poisson, marketing and communication manager at Donecle.

She adds: “It is applicable on a wide range of inspections, such as lightning strike inspections, general visual inspections (GVI), paint, markings and decals, dent detection, etc. The solution can perform automatic input/output comparison for engines and landing gears, catch top quality escape and perform configuration control.

“The solution works in three steps, including scanning the aircraft or component with the Iris GVI drone and the Iris Scan ground software station, reporting all findings with advanced artificial intelligence (AI) on Iris Report software and tracking past inspections on a secured cloud named Iris Track.”

EVOLVING INSPECTIONS METHODS

An aviation source speaking to *MRO Management* claims that aircraft inspection methods have been evolving in the past years. “Drone technology is grabbing the attention of many maintenance organisations due to its potential,” they point out. “Such initiatives have been in the radar for the past



Lufthansa Technik



Lufthansa Technik

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several years and they look promising to replace the current GVIs using the technicians' sight with a drone that can collect images and treat them by making use of software."

GVIs seem to be the obvious use case as they can be used after a lightning strike, for which a complete GVI to the external surfaces is required, according to the aviation source. "These include areas that are more difficult to reach like the upper fuselage and the wings' top skin, which requires the use of equipment to reach these heights," they explain. "So, there are potential benefits such as increasing technicians' safety by not exposing them to work at the highest parts of the aircraft for external surfaces inspection and increasing the inspection speed as a drone's flight time for inspection is expected to be less than, for example, the time that a technician would need by using a cherry-picker."

The aviation source adds: "Additional potential benefits include improving damage assessment quality – if the software is developed to a point that could automatically assess damage, improving the readiness of damage reports and reducing the risk of impact damage caused by the ground support equipment used to reach high areas of the aircraft for inspection."

The flight of Donecle's drone is 100% automated with no pilot and the unmanned aerial vehicle (UAV) is equipped with a patent laser positioning technology, explains Poisson. "The drone is flying around the external aircraft body, following a pre-defined path on a digital mock-up of the aircraft, thus inspecting all hard-to-reach areas," she says. "The system does not use global positioning system (GPS), beacons or other external installations. All sensors are on-board which eliminates the need for cherry pickers or

scaffolding, reducing manual work at height and increasing safety."

Post-flight, images are analysed on a tablet, allowing parallel tasks and reducing overall inspection time, improving aircraft availability, affirms Poisson. "Data acquired by the drone enables quick identification of issues, allowing parallel tasks. This reduces aircraft downtime, helping aircraft return to service faster," she says.

LOOKING FURTHER AHEAD

According to the aviation source, there are not only use cases for line maintenance operations. "Another possible use case could be related to automatic damage/repair mapping which is an airworthiness requirement," they explain. "This is commonly known as 'dent & buckle chart', and it is deeply revised during heavy maintenance checks."

The aviation source adds: "Using a drone to map repairs and damage would lead to more accurate records during the whole lifetime of the aircraft, which could also speed up processes such as airworthiness inspections, or lease transitions."

Despite being a promising technology, the use of drones in aircraft MRO operations must go through all the regulatory and safety requirements and show that it is more accurate than the human eye, according to the aviation source. "Currently, the technology is not yet mature enough to be widely used. Any technology that reaches this potential will become an achievement for the aircraft maintenance industry."

The Donecle drone is listed in the Airbus aircraft maintenance manual (AMM) for the A320 family with EASA acceptance, and it has recently been included in Boeing's AMM for the B737, observes Poisson. "More OEMs and regulators are reviewing and approving solutions like ours," she concludes. ●



100%

*The flight of
Donecle's drone is
100% automated*

1&2. A trial of drone-based inspections, not yet fully implemented



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NIJL's offerings encompass a full spectrum of tools and equipment, creating a comprehensive, reliable 'one-stop shop' for MRO needs across ground handling, apron, engine shops and hangar environments.

ENGINE ACCESS SOLUTIONS

At the heart of NIJL's product line are state-of-the-art engine access solutions designed to simplify inspection, repair and servicing of engines either on- or

DESIGNING ACCESS EQUIPMENT WITH THE TECHNICIAN IN MIND

off-wing. NIJL's access platforms and docking systems provide technicians with optimal positioning, ensuring both safety and precision.

"Our platforms are built with the technician in mind," says Chris Emmink, sales director. "By focusing on ease of use, reliability and safety, we're able to deliver equipment that meets the exact needs of today's MRO industry, making maintenance faster and more precise."

MULTIFUNCTIONAL SYSTEMS

NIJL's systems add flexibility to MRO environments. Adaptable equipment can shift easily to different functions, reducing multiple tool requirements,

NIJL's access platforms and docking systems provide technicians with optimal positioning

streamlining operations and maximising workspace efficiency.

"Our multifunctional designs allow MROs to reduce downtime by having everything they need on hand," explains Jonathan Attfield, sales manager. "The adaptability of our equipment means technicians can focus on maintenance, not logistics."

SPACE-SAVING INNOVATION

NIJL's folding and adjustable technology demonstrates its commitment to minimising operational footprints. These space-saving solutions meet hangar and workshop demands for efficiency, freeing up room for critical tasks without compromising access to reliable maintenance equipment.

REDUCING TAT

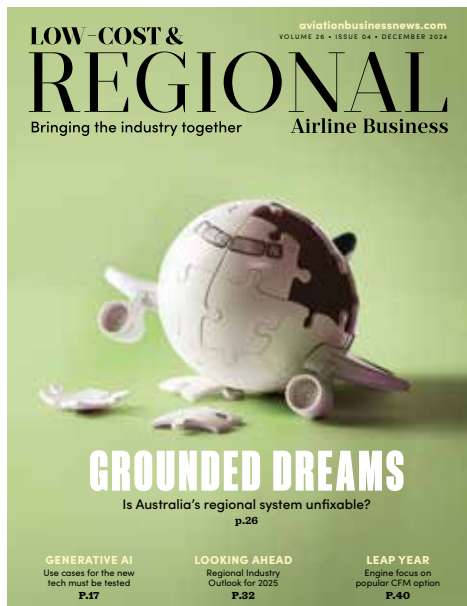
Reducing TAT is key to MRO efficiency. NIJL supports this with equipment utilising electrical movers for fast positioning and sliding platforms for safety. This also allows quick setup, enabling maintenance teams to work more efficiently, return aircraft to service faster and achieve cost savings and optimised resources for MROs.

MORE THAN A SUPPLIER

With a product line that covers every aspect of ground handling and maintenance, NIJL is more than a supplier – it is a trusted partner for MRO operations worldwide. NIJL's range of high-quality, adaptable and efficient access solutions is designed to support the aviation industry's highest standards. ●



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SHIFTING FOCUS: MAINTENANCE HEADS IN-HOUSE

The aviation sector is rebounding, with 2024 passenger numbers nearing pre-Covid-19 levels. As demand for maintenance grows, Caerdav's Chris Coleman explores how airlines and MROs are adapting



“
**THE DEMAND
FOR MAINTENANCE
CONTINUES TO
FAR OUTSTRIP THE
AVAILABLE SUPPLY**
”

CHRIS COLEMAN

managing director, Caerdav

The Covid-19 pandemic acted as a catalyst for change throughout the maintenance sector. With global travel grinding to a halt, many airlines and MROs were forced to furlough staff or, worse still, make cuts that led to widespread job losses and, tellingly, a glut of early retirements.

Its impact was also keenly felt within the global supply chain, with the production, transportation and delivery of key components, parts and materials hugely affected.

The challenges of a shrinking pool of talented engineers, an unreliable supply chain and a rapidly growing need for available maintenance slots has meant a shift in focus for many businesses.

For airlines, this has come in the form of opening (or returning to) their own maintenance operations. Recent examples include easyJet, which has brought line maintenance back in-house in seven UK airports, or Air India which is planning to open its own maintenance facilities in 2025.

Of course, for airlines the potential to save on costs by managing their maintenance themselves is a big draw – but what does that mean for independent MROs like Caerdav?

AMPLE OPPORTUNITY FOR ALL

You could see this as a death knell for any organisation not affiliated to an airline or aircraft OEM. If they



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are seemingly taking more of the pie themselves, surely there won't be much left? But that isn't the case at all. The continued recovery of the industry means there is plenty of pie to go around. The demand for maintenance continues to far outstrip the available supply, something that isn't likely to change any time soon.

In fact, according to Oliver Wyman's latest *Global Fleet and MRO Market Forecast 2024-2034*, the size of the global aviation fleet is set to increase by 28% over the next 10 years, expanding to 36,400 aircraft by 2034.

Looking further ahead, Airbus forecasts a demand for 42,000 new aircraft by 2044, with Boeing upping that projected figure to 43,975. Both cite that new technologies and aircraft types will be required to help reduce carbon emissions and improve sustainability across the industry.



1. Caerdav carries out non-destructive testing capabilities in-house
2. Caerdav is based in St. Athan, South Wales

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“ LOOKING INTERNALLY IS ALSO A WAY FOR THE MRO INDUSTRY TO ADDRESS THE DWINDLING RESERVES OF SKILLED ENGINEERS ”

INCREASING IN-HOUSE CAPABILITIES

Does that mean that independent MROs can rest on their laurels, safe in the knowledge they will always be required? Not at all. Many, including Caerdav, have also shifted their focus internally, looking at their operation and the services they can provide to improve efficiencies, reduce costs and deliver quicker aircraft turnaround times.

By increasing in-house capabilities, for example, MROs can deliver additional work, such as non-destructive testing (NDT), component maintenance, heat treatments, machining, parts supply or providing on-site paint. This allows MROs like Caerdav to deliver more rounded maintenance packages to their customers.

Of course, MROs, airlines or OEMs still often opt to outsource this work, so the same pool of third-party suppliers are regularly vying for the business, which means this competition can

result in scheduling conflicts or delays in parts delivery, for example, slowing the completion of work on the aircraft in the hangar.

The ‘in-house’ ethos helps to alleviate this issue, meaning more of the work can be handled when required, ensuring quicker turnaround times and, in turn, opening up more available maintenance slots.

Cutting down on the use of outsourced suppliers also helps to deliver improved sustainability benefits. By reducing parts, tools or component transfers – whether by road or air – the associated carbon emissions are removed. For an industry that is consistently faced with questions on how it intends to lessen its environmental impact, this approach offers a small, but no less valid, response.

THE WORKFORCE

Looking internally is also a way for the MRO industry to address the dwindling reserves of skilled engineers. To put

it bluntly, Boeing’s *2024 Pilot and Technician Outlook* estimates that globally, the aviation industry will need to find 716,000 new technicians by 2044 – up from 640,000 quoted in the same report just 12 months prior – with 167,000 required in Europe alone.

One way for businesses to counter this is with their own apprenticeship schemes, working with local colleges to find and nurture the next generation of aircraft mechanics, technicians and engineers.

Caerdav’s award-winning apprenticeship programme is a testament to what can be achieved if businesses find the right partners to work with. Tapping into an enthusiastic pool of local talent in South Wales, graduates of the scheme have already been welcomed into permanent roles, helping to increase maintenance output and offer the expanded in-house capabilities that are driving the business forwards. ●



THE SKY-HIGH CONSEQUENCES OF STICKING TO THE STATUS QUO

Alitheon's **Roei Ganzarski** calls on the industry to take firm, lasting action to identify and prevent counterfeit aircraft parts

◀ Just as biometrics irrefutably identify a person, aviation must apply similar methods for parts authentication and traceability

“THE DIFFERENCE BETWEEN REAL AND FRAUDULENT PARTS CAN BE THE DIFFERENCE BETWEEN LIFE AND DEATH”

The Federal Aviation Administration (FAA) estimates that 2% of the 26 million parts installed each year on aircraft are counterfeit. That is a staggering 520,000 parts! Surprising? Unfortunately not.

Suspected unapproved parts (SUPs) have been a long-standing issue in aviation, endangering passenger safety. Look no further than the last 12 months where multiple instances of fraudulent parts have been installed on aircraft in the US, including fake titanium on new aircraft; used engine parts with fake paperwork installed as new on US airliners; and counterfeit computer boards on military aircraft. Despite the industry's awareness of it being susceptible to fraud and misidentification, little has been done to solve the problem, putting lives at risk every day.

After the most recent issue in which AOG Technics was caught selling used engine parts as if they were new, some of the world's largest aviation-related manufacturers formed the Aviation Supply Chain Integrity Coalition. They studied the problem for months with the goal of recommending how to prevent such issues from happening. The 13 resulting recommendations that were released address vendor accreditation, document traceability and verification, and non-serialised parts traceability.

While these recommendations raise awareness for a real and dangerous problem, they ultimately fail to truly set the course for safer aviation. There are critical shortcomings that simply reinforce the industry status quo that

has continued to allow unapproved parts to infiltrate the supply chain – a problem of which the highest consequences fall on the unknowing passengers.

PROXY-BASED APPROACHES ARE INHERENTLY VULNERABLE TO FRAUD

A key issue with these recommendations is a continued focus on paperwork and proxies (such as labels, etchings or data plates) as the ‘source of truth’ for identifying, authenticating and tracing aircraft parts. The recommendations purport that “documentation plays a critical role in tracking parts in the aviation supply chain, and maintaining the industry's commitment and focus on safety requires a robust process by companies to correctly track, inventory and validate paperwork to follow manufacturing and maintenance procedures”.

Paperwork and documents are used for data collection. They don't provide any reliable way to identify the actual physical parts nor trace them through the value chain. They have proven to not be enough to stop fraud as they will always be subject to manipulation and vulnerable to forgery. Even legitimate protected documents, at best, only mean the documents themselves are legitimate – not the physical parts they have the data for. It is this disconnect between physical parts and data that opens the door for the introduction of fraudulent parts into the ecosystem. Just as worrisome, that same gap also enables unintentional human error, which can lead to the same devastating consequences.



▲ Roei Ganzarski, chief executive, Alitheon

Although the coalition suggests a shift towards digital paperwork as a solution to enhance the “security, efficiency, and traceability of the supply chain”, even digital paperwork is subject to the same fallacy as physical paperwork – it protects the data but not the actual part itself, and it's just as easy for bad actors to manipulate digital documents.

All of this is to say that documentation, while a critical part of collecting data, will not stop fraudulent parts from entering the supply chain and being installed on aircraft. This over-reliance on paperwork (physical or digital) is why the aviation industry has struggled to fight fraudulent parts for decades. The coalition's focus on various documentation approaches will only serve to further exacerbate the issue. What the industry needs are solutions that inextricably link a physical part to its protected data, enabling a part to be used as its own identifier and connecting it to digitally protected provenance and use data.

'OPTIONAL' GUIDELINES CONTINUE TO REINFORCE THE STATUS QUO

Another major shortfall of these recommendations is that they are presented as “optional”, failing to mandate concrete action even for the members of the coalition presenting them. The recommendations “constitute actions that industry members can undertake as voluntary measures, and are intended to supplement any efforts by regulatory bodies”.

Without clear incentive for the industry to change, progress cannot be expected with any sense of urgency. For example, the FAA has authorised the optional use of certain electronic forms since 2009. However, the adoption of digital ARCs across the industry remains sluggish, with the norm still being physical paper. This is a telling example of what happens when things are voluntary – the path of least resistance is easier, and therefore favoured, even at the risk of the flying public. Why should we expect these new recommendations will be any different?

Given the tremendous risk to lives involved, not to mention the financial and reputational harms to airlines and manufacturers, it would be reasonable for the coalition and industry at large to mandate actions to improve aviation value chain integrity and security. As long as these guidelines remain entirely voluntary or require the government to intervene, the industry maintains the option of not having to change at all.

“THE AVIATION INDUSTRY MUST MOVE TO A ZERO-TRUST PARTS PHILOSOPHY, ESPECIALLY WHEN DEALING WITH SAFETY-RELATED OR HIGH CONSEQUENCE PARTS”

Yakobchuk Olena/Adobe Stock



▲ Documentation plays a critical role in tracking parts in the aviation supply chain

With that said, it would behoove national regulatory agencies such as the FAA and EASA, as well as global organisations like ICAO and IATA, to set the tone of safety for the industry and establish policies requiring change. When it comes to safety at such a large scale, this is exactly where it makes sense for government and regulatory bodies to step in and mandate forward-looking action. Set policy, and industry will find a way to meet it. Set optional action, and industry will find a way to do the minimum required to check the proverbial box.

THE TECHNOLOGIES TO SOLVE THESE CHALLENGES EXIST TODAY

Although the recommendations note that “no single recommended action will solve the challenge” of unapproved parts, new technological solutions can in fact comprehensively address the issue. Moreover, setting a goal of having technologies to identify physical items to

be met five or more years into the future is disappointing given such technologies, both to protect data, and irrefutably identify physical parts without the need of proxies, exist and are available today.

Blockchain and web3 solutions are used regularly to protect the integrity of digital data. Similarly, solutions that make an item its own identifier, and eliminate the reliance on proxies, are already being employed in other industries to address the identification of non-serialised as well as serialised items. These technologies also eliminate fraudulent, counterfeit and gray-market items, as well as enable complete transparency and traceability from manufacturing through reuse, recycle and end-of-life.

In the same way a human can have a fake ID or passport, but their biometrics irrefutably identify them, the aviation industry can and must adopt a similar approach to parts identification, authentication and traceability. Human-related systems have moved to a zero-trust philosophy that enhances and increases security. The aviation industry must move to a zero-trust parts philosophy, especially when dealing with safety-related or high consequence parts.

The aviation industry requires one-in-a-billion as the highest probability of a catastrophic failure per hour of operation. We should not accept that this very same industry continues to allow a 2% counterfeit parts rate for years to come. The difference between real and fraudulent parts can be the difference between life and death; and the time for the industry to truly commit to change and take concrete action is now. ●



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FEATURING

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P.64 LONDON BIGGIN HILL AIRPORT: A THRIVING HUB FOR MRO

BOMBARDIER'S MRO ADVANTAGE

Business aviation has seen a structural shift in demand over the past few years, opening the door to new opportunities for growth across the industry – and Bombardier has grown with it, writes *Paul Sislian*

Bombardier focuses on designing, building and maintaining the world's best-performing aircraft. Over the past few years, the expansion of our service network and footprint in key markets across the globe helped position us for growth. With more than 5,000 aircraft in service, ramping up our service capabilities has been an important step in highlighting our commitment to delivering the highest standard of service and support. Bombardier's competitive advantage lies in our commitment to make things easy for our customers. By leveraging our unique OEM-expertise, enhancing customer care with our leading service and support network, and using digital tools to help streamline the customer experience, we are creating confidence in both our brand and our global offerings.

CREATING CONFIDENCE IN OUR BRAND THROUGH CONVENIENCE AND CONNECTIVITY

We build confidence in our service and support system through our customer care teams and are focused

on enhancing our connectivity and easy service solutions. When it comes to convenience, we provide tailored programmes that allow our aircraft to move efficiently through our service facilities.

For example, our Smart Services Elite programme offers customers an efficient one-stop billing approach that covers a range of essential services, such as parts, labour and landing gear. More than 1,700 Bombardier aircraft are currently enrolled in these programmes, representing over 11 million combined flight hours.

The Bombardier team is always looking for ways to leverage technology and create tools that will streamline processes. For instance, our Smart Link Plus aircraft health monitoring system is a technological game changer, providing a range of in-flight and ground-based features to create a truly connected aircraft. It delivers digital 'back to birth' traceability of an aircraft's history and was recently recognised as a key factor contributing to aircraft value by aircraft provider VREF.



1

Another key digital innovation is the myBombardier platform, a new web portal designed to streamline customer experience. This user-friendly, digital ecosystem integrates our products and services into one central hub, as well as providing customers access to resources to enhance their ownership experience.

Over the past few years, my team and I have observed how digital tools are redefining MRO activities, not only for Bombardier, but for others in the industry. Therefore, embracing these innovations isn't just a choice, but rather a strategic imperative that puts us ahead of the curve.

ENHANCING CUSTOMER CARE THROUGH OPERATIONAL EXCELLENCE

Bombardier's customer-centric mindset is at the core of everything we do and is backed by our longstanding commitment to operational excellence. We encourage our teams to be dynamic

“My team and I have observed how digital tools are redefining MRO activities, not only for Bombardier, but for others in the industry”



Guillaume Plisson

2

and innovative in how they solve problems. This enables us to create a culture of resilience where each member of our service and support team feels empowered to make choices that will, ultimately, make the service journey easier for our customers.

This guiding principle enables our team members to build strong, lasting relationships with our customers so we can be their first choice for maintenance, modifications and spare parts, and support them wherever a need arises. Whether it's for scheduled maintenance at one of our 10 service centres, or an unplanned event, every customer interaction is an opportunity to build confidence in our service and support ecosystem. Being available – and accountable – to our customers is one of the ways we maintain their business.

LEVERAGING OUR OEM EXPERTISE

As the manufacturer, Bombardier knows its aircraft the best. Our more than 1,800 aircraft maintenance technicians are our boots on the ground, and have the knowledge required to provide solutions that match our customers' needs.

The expertise of our employees is the foundation for everything we do, and their talent is further amplified by our modern, state-of-the-art facilities around the world. With the addition of our service centre in Abu Dhabi, set to break ground in 2025, our service and support network will surpass three million square feet. As the backbone of our global offering, our service centres serve to connect us directly with our customers, providing the perfect venue to showcase the experience of our dedicated teams.

Bombardier's Mobile Response Teams are also available in key locations around the world to fulfil any maintenance request. Our teams are always ready to assist customers by finding the most efficient and timely solutions; as the OEM, we have the added advantage of knowing their jets inside and out.

Supporting innovation, fostering collaboration among our teams and prioritising operational excellence not only helps us respond to our customers' needs, it unlocks opportunities for growth across our MRO operations. ●

1. Paul Sislian, executive vice president, Bombardier Aftermarket Services & Strategy, Bombardier 2. Bombardier's London Biggin Hill Service Centre

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THE POWER OF THREE

Jet Linx's *Curtis Seagondollar* explains that the company's commitment to maintenance excellence is built on a three-pronged approach: emphasising local teams, leveraging national infrastructure and maintaining strong vendor relationships

Jet Linx is a private aviation company founded in 1999, offering local aircraft management and jet card membership programmes through 22 private terminals across the US.

With a nationwide fleet of over 100 aircraft and industry-leading safety ratings, we understand the crucial role of maintenance in delivering value and ensuring best-in-class safety for our clients.

At Jet Linx, safety is paramount in every decision, and our comprehensive maintenance programme is a cornerstone of our industry-leading Safety Management System (SMS).

We have earned and maintain Argus Platinum Elite and Wyvern Wingman PRO safety ratings and are an International Business Aviation Council (IS-BAO) Stage 3 registered operator, a distinction held by less than 1% of operators globally.

In conjunction with our SMS, our maintenance programme ensures that every aircraft in our fleet operates at peak performance and meets the highest levels of airworthiness standards.

To better support our local technicians, we leverage a national

backbone of dedicated teams at our National Operations Center in Omaha, Nebraska, and we also rely on longstanding relationships with some of the most trusted and experienced vendors in aviation maintenance.

Skillful stewardship and proactive maintenance are critical for upholding aircraft value, managing costs and ensuring client safety.

By leveraging our expertise and industry relationships, we bring unmatched value to aircraft owners, minimising costs on everything from fuel to maintenance to pilot training.

Our maintenance programme is built upon multiple pillars: local service backed by national infrastructure, exclusive vendor relationships, efficiency and transparency.

LOCAL SERVICE POWERED BY NATIONAL INFRASTRUCTURE

Our three-pronged approach to maintenance utilises our local in-house technicians, our national support team and our trusted vendors to offer more reliable and powerful maintenance that minimises downtime and maximises aircraft availability.



1

Our dedicated on-site technicians provide dependable and cost-effective support for quicker return-to-service. All our local technicians must have an airframe and powerplant licence prior to employment, and receive formal aircraft training in human factors, suspected unapproved parts, the Jet Linx SMS, fatigue management and hazardous materials.

If local Jet Linx teams cannot perform maintenance in-house, or if extra parts or services are required, we have Jet Linx authorised vendors available to perform maintenance properly in a timely and cost-effective fashion.

Many of these partners provide support on-site at Jet Linx facilities, working side-by-side with our in-house technicians. With a large national fleet, we are also eligible for volume discounts and as advocates for our clients, we always negotiate faster turnaround times.

“Our partnerships are built on a foundation of trust, transparency and close collaboration”

EXCLUSIVE RELATIONSHIPS WITH VETTED VENDORS

With the third-largest Part 135 fleet in the nation, our business volume compels industry partners to offer us the most competitive prices for parts, labour, repairs and inspections.

For specialised maintenance that cannot be performed in our facilities, we have cultivated exclusive relationships with some of the most respected names in aviation maintenance.

These strategic partnerships grant us access to specialised expertise, cutting-edge resources, and a vast network of support, ensuring best-in-class maintenance capabilities.

Jet Linx teams and management from each vendor meet on a scheduled basis to discuss process improvements and strategies to reduce owner costs while improving downtime.

FOCUS ON SAVINGS AND EFFICIENCY

Whenever possible, we schedule maintenance together as a batch to maximise efficiency and safety while minimising costs for our clients.

We leverage historical data to deliver accurate 24-month maintenance forecasting for each aircraft, and we also have a dedicated team focused on identifying cost savings opportunities.

For each maintenance request, Jet Linx teams will source multiple options available to offer the best selection to owners, and a logistical review ensures an efficient delivery method.

By analysing fleet purchasing power, individual client usage patterns and local service coordination, we advocate for our clients to receive the best prices on parts, labour, repairs, and inspections. These layers ensure parts are not only safe and effective but also priced fairly.

TRANSPARENCY, TRUST AND COLLABORATION

Our partnerships are built on a foundation of trust, transparency and close collaboration.



“Our dedicated on-site technicians provide dependable and cost-effective support for quicker return-to-service”

We regularly conduct audits of all external vendors, adhering to FAA-approved standards, to ensure the highest level of safety and compliance.

This cooperative approach ensures that our maintenance programme remains agile, adapting to the ever-evolving needs of our clients and the industry – all while preserving productive and efficient relationships with our partners.

Beyond the moving parts and logistical complexities involved in aircraft maintenance, we are careful to remember the intrinsic value that our working relationships provide.

By forging and sustaining strong relationships between our local technicians, our national support teams, and our trusted vendors, we offer consistent and reliable maintenance that can be suited to the unique needs of our clients and the way that they prefer their assets to be managed. ●

1. Curtis Seagondollar, director of maintenance, Jet Linx

2. Proactive maintenance is critical for upholding aircraft value





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A THRIVING MRO HUB

By prioritising strategic investments, job creation and industry collaboration, London Biggin Hill Airport has created a thriving MRO hub that attracts global industry leaders, writes *David Winstanley*

MRO operations are fundamental to the business aviation sector, ensuring that aircraft remain safe, fully operational and able to meet the increasing demands of global markets. As an already complex industry evolves, for regional and business airports to be successful, they must find innovative and efficient ways to support MRO businesses. This requires cultivating environments that not only facilitate MRO operations but also foster collaboration, drive innovation and create long-term economic benefits.

Home to more MRO-related businesses than any other airport in Europe, London Biggin Hill Airport is an excellent example of how a thriving aviation hub can create a virtuous cycle. As more businesses base themselves at the airport, employment opportunities increase, attracting further inward investment. Over the past decade, we have secured significant funding, enabling resident MRO businesses to expand and offer high-skilled jobs that benefit both the aviation sector and local economy.

Proving the benefits of creating and working within a pre-eminent

full-service MRO hub is key to attracting leading companies seeking a strategic base. London Biggin Hill Airport is constantly developing, but our success so far has some critical central tenets.

ONGOING INVESTMENTS

Strategic investment in infrastructure is the foundation of a thriving MRO ecosystem. Airports that provide modern facilities, skilled labour access, proximity to major flight routes and a supportive environment will not only attract MRO companies but also retain them. In a competitive global market, those that are slow to meet the needs of their customers and enhance their estates risk losing out.

As a leading centre of aerospace innovation in the UK, London Biggin Hill Airport has enabled companies like international business jet manufacturer Bombardier and helicopter specialist Castle Air to expand and improve operational efficiency. For example, since Castle Air's arrival a decade ago, it has significantly expanded its hangar space. More recently, Castle Air added a 20,000 sq ft facility to accommodate 23 additional helicopters, plus VIP lounges and office spaces.



1

Ross Bunyard, managing director at Castle Air Group, says: "London Biggin Hill Airport has proven to be an ideal location for Castle Air's operations. Its strong network of interrelated aviation and engineering businesses provides us with the resources needed to consistently meet the high standards expected by our clients.

"Over the past decade we have been able to enhance Castle Air's services, from helicopter maintenance to charters, and more, while supporting our expanding customer base."

Bombardier's presence reflects London Biggin Hill Airport's role in supporting MRO operations. With a 250,000 sq ft state-of-the-art facility, Bombardier can accommodate up to 14 Global 7500 aircraft simultaneously, offering a full range of maintenance and refurbishment services.

By understanding and addressing the needs of MROs, we have attracted

"By understanding and addressing the needs of MROs, we have attracted major industry players"

“We’re inspiring and nurturing the next generation of MRO workers”

airport now supports 88 jobs for every 1,000 air traffic movements (ATMs).

If future plans are implemented, London Biggin Hill Airport is projected to generate up to 7,649 jobs nationally. When factoring in the supply chain and wider labour market, this would translate to 5,796 jobs in Bromley – representing 5.1% of the borough’s workforce.

For MROs, the importance of job creation goes hand in hand with the development of a skilled workforce. The technical nature of MRO operations demands highly trained engineers and technicians, creating a pipeline of specialised talent. Working alongside our MROs and local schools, we’re inspiring and nurturing the next generation of MRO workers through outreach programmes and apprenticeships, creating opportunities for both our businesses and the community.

A BLUEPRINT FOR SUCCESS

Sustained investment in airport facilities and services benefits the aviation sector, employees, local communities, the economy and MRO businesses. These firms provide essential support for aircraft operators, owners and manufacturers, covering both scheduled and unscheduled maintenance. This ecosystem drives success. By creating jobs, supporting local businesses and investing in infrastructure, airports strengthen their role as key economic drivers, ensuring long-term competitiveness and shaping the future of aviation and MRO operations. ●

1. David Winstanley, chief executive, London Biggin Hill Airport

2. London Biggin Hill Airport has enabled MRO businesses to expand

major industry players and supported them as they have developed and thrived. Their success not only strengthens the aviation ecosystem but drives significant economic benefits, from job creation to long-term investment.

ECONOMIC VALUE

The economic contribution of MRO activities at airports cannot be overstated. In 2023, London Biggin Hill Airport generated £200 million Gross Value Added (GVA) for the UK economy, with the potential to deliver more than £630 million in the future.

While MRO operations play a significant role here, this impact includes the indirect and induced supply chain effects from all of the airport’s resident businesses, translating to £142.9 million (72%) captured within the London Borough of Bromley, directly benefiting local residents.

For MROs, this economic value is crucial as they are key enablers of the aviation sector’s success. Their contribution ripples beyond direct maintenance work, as they create

demand for an array of supporting industries, from parts manufacturing to specialised services. This interconnectedness strengthens the entire supply chain, allowing airports like London Biggin Hill Airport to become economic engines, driving success not just for aviation but also for the local and national economy.

JOB CREATION

Airports like London Biggin Hill Airport are also a significant source of employment, providing a wide range of high-quality, well-paid jobs, from aircraft maintenance to customer service, logistics and administration. This diversity supports local economies by offering employment across various skill levels and sectors.

Businesses within the London Biggin Hill Strategic Outer London Development Centre (SOLDC) employ over 1,700 people. We are one of the largest employers in the London borough of Bromley. Our diverse ecosystem strengthens the aviation sector and offers valuable career opportunities: the

MRO EUROPE 2024 ROUND-UP

MRO Europe took place in Barcelona in October. Here's a round-up of just some of the news announcements to come from the show

DIGITALISATION

Transavia France chooses ROAM for advanced digital fleet management

GAMIT signed a multi-year agreement to digitise and manage Transavia France's technical records using its advanced ROAM (Records Online Asset Management) solution.

The ROAM platform will enable Transavia France to streamline the management of its fleet's technical documentation, improving operational efficiency and ensuring airworthiness compliance with greater ease.

With ROAM's features and seamless integrations, the low-cost airline of the Air France-KLM Group will be able to optimise manpower and

support continuous improvement initiatives, taking another step towards modernising its operations.

ENGINE MRO

Lufthansa Technik secures LEAP-1A MRO contract with KM Malta Airlines

Under a long-term agreement spanning the next 9.5 years, Lufthansa Technik announced it will provide repair and overhaul services for the LEAP-1A engines powering KM Malta Airlines' Airbus A320neo fleet.

KM Malta Airlines' Zeljko Pejovic said: "Together, we look forward to building a strong and lasting relationship that will help us maintain the highest standards of safety for our passengers."



COMPONENT SUPPORT

Airmaster signs as first cargo operator to join FSG's Boeing 737NG NTT programme

Aerospace solutions provider Fokker Services Group (FSG) signed a component support programme for cargo operator Airmaster's Boeing 737-800Fs.

FSG will service a wide range of components for the Egypt-based cargo operator, including IDGs, engine accessories, hydraulic actuators, valves, cockpit controls, instruments and more.

Airmaster's Ibrahim Abdelaziz said: "This strategic partnership marks a significant step forward in our commitment to operational excellence and ensuring the highest standards of safety and reliability across our aircraft."

PREDICTIVE MAINTENANCE

ADE and Revima collaborate to boost predictive maintenance capabilities

Asia Digital Engineering (ADE) and Revima have entered into a strategic collaboration to further enhance ADE's cutting-edge digital fleet management platform, Elevade, by integrating Revima's advanced APU predictive maintenance tool, Predicare.



Vincenzo Pace (aerovincenzo.com)



OlektAdobe/Adobe Stock

KM Malta Airlines

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APU MRO provider Revima currently supports over 250 aircraft worldwide through Predicare. This real-time predictive maintenance system enables proactive troubleshooting and solutions to reduce aircraft downtime while improving overall fleet reliability.

The partnership aims to seamlessly integrate Revima's Predicare system into ADE's Elevade platform, creating an all-in-one solution that enables airlines to manage predictive maintenance across multiple aircraft systems. The enhanced platform will significantly boost operational efficiency and offer improved oversight for airline operators.

ENGINE MRO

AFI KLM E&M to provide LOT Polish Airlines with LEAP-1B QT support

LOT Polish Airlines awarded a contract to Air France Industries KLM Engineering & Maintenance (AFI KLM E&M) for Quick Turn (QT) support of its LEAP-1B engines.

AFI KLM E&M, which has long provided component support for LOT's 787 and 737 aircraft, strengthens its partnership with the airline through this new agreement.

LOT Polish Airlines' Krzysztof Krolak said: "This engine plays an important role in our ambition to reduce our environmental impact and we're confident that AFI KLM E&M has the knowledge and experience to maintain it to the highest standards."

PEOPLE NEWS

MAAS Aviation promotes Hakker to CEO

Aircraft painting and exterior coatings company MAAS Aviation has named Danny Hakker as its new chief executive officer.

Hakker joined MAAS Aviation in 2023 as chief financial officer and has more than 20 years of international experience in the transport and

"FSG will service a wide range of components for Egypt-based cargo operator Airmaster"

distribution, media and telecoms, and service industries.

Hakker said: "I am enthusiastic to embark on the next stage of my journey with MAAS Aviation and look forward to meeting our customers as well as supporting the excellent people across our business. We collectively strive to deliver superior quality and enhanced value to our customers."

1. Transavia France is the low-cost airline of the Air France-KLM Group

2. KM Malta Airlines Ltd is the flag carrier of Malta headquartered in Luqa

3. LOT Polish Airlines is the flag carrier of Poland

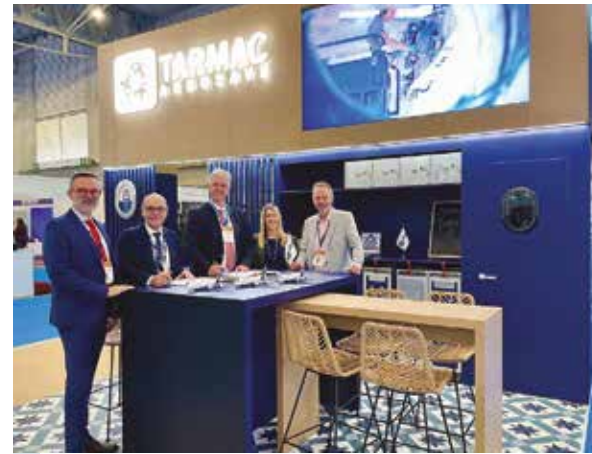
4. L-R: Vikram Singh, director of new services, Revima; Olivier Legrand, president and CEO of Revima; Adnan Mansur, head of digital & innovation services, Asia Digital Engineering (ADE)



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AIRCRAFT RECYCLING

Three A380s set for recycling as Tarmac Aerosave and EastMerchant sign deal

Tarmac Aerosave and EastMerchant, an aviation services provider and partner in widebody lessor Crianza Aviation Ltd, have signed an agreement to recycle three Airbus A380 aircraft. The process of dismantling and parts removal for these widebody aircraft will take place in the coming months at Tarmac Aerosave's Tarbes facility in France.

The collaboration aims to provide valuable spare parts from the dismantled aircraft to the secondary market. AMS Aircraft Services Ltd will serve as EastMerchant's technical consultant throughout the project.



1

“Reliability is key in the ACMI sector and choosing the right partner is crucial”

The three A380s in question, stored by Tarmac Aerosave, are not slated for return to service. Instead, their parts will be sold, meeting the growing demand in the secondary market.

FACILITIES

Etihad Engineering to explore use of 5G network to enhance MRO operations

Etihad Engineering signed a Memorandum of Understanding (MoU) with e& UAE, the telecommunications arm of global technology group e&, to explore implementing a private 5G network within its 550,000 sqm MRO facility adjacent to Abu Dhabi International Airport.

Etihad Engineering says that the deployment of a private 5G network will provide it with high-speed, low-latency connectivity that will enable seamless real-time data sharing and communication across its operations.

Etihad Engineering says this collaboration is part of its ongoing efforts to embrace the future of aviation technology and set new benchmarks for efficiency, safety and digital transformation in aircraft maintenance.

HEAVY MAINTENANCE

SmartLynx and Joramco renew maintenance partnership

Joramco extended its partnership with ACMI provider SmartLynx Airlines for the upcoming winter season, covering multiple service lines with a total of 28 scheduled checks.

This expanded collaboration will now include heavy maintenance for A330, A320, and B737 aircraft.

SmartLynx Airlines' chief executive officer Edvinas Demenius said: “Reliability is key in the ACMI sector, and choosing the right partners is crucial for our success. Joramco has proven to be a dependable partner, and we have high expectations for our future collaboration.”

1. Joramco's Fraser Currie and SmartLynx Airlines' Edvinas Demenius

2. In the photo: Etihad Engineering's Daniel Hoffmann, Abdulmohsen Ahmed Al Sayegh, Bookie Ghauri, Santhosh Nair and Abdelrahman Aliess with e& UAE's Haitham Abdulrazzak, Mohannad Samara, Fadi Shannah, Waleed Mortaja and Ashok William
3. L-R: Tarmac Aerosave's Lionel G. Roques and Alexandre Brun; EastMerchant's Baldur Vander; Skyline Aero's Victoria Hall and Peter Vielvoye

MRO

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WE DELIVER

SXI's Stef Have explains that with aircraft ferry services, CAMO and MRO expertise, the company's solutions ensure safety, compliance and efficiency - any type, any place, anytime



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**SXI MAINTAINS THE
HIGHEST STANDARDS
ON EVERY FLIGHT,
REGARDLESS OF
THE CHALLENGES**
”

STEF HAVE

owner and director, Southern Cross International (SXI)

Southern Cross International (SXI) is a leading international service provider within the aviation industry with more than 30 years of experience.

We have a strong market position as one of the most price-competitive and time-efficient service providers in aviation. We are known for our expertise in aircraft ferry services, which extend beyond transportation.

We are also involved in verification and transfer of title flights, ensuring that all procedures and legal requirements are met. Our extensive experience with Continuing Airworthiness Management Organisation (CAMO) and MRO processes allows SXI to provide a comprehensive range of aviation services. This experience is essential in a field where compliance and safety are of the highest importance.

A PLAN OF ACTION

In the aviation industry, where time is of the essence and precision is key, it is necessary to ask the right questions in order to ensure that every aspect of a project is given due consideration.

Each flight, regardless of its routine nature, presents a unique set of challenges. The process begins with the incoming request, which is then put through a thorough assessment. The following essential information is gathered: aircraft registration, the type of service required, the MSN number,



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the planned route, the scheduled timeframe for the service and the aircraft's status. This initial data is key to creating an effective plan of action that is tailored to the specific needs of each customer.

A COMPLEX NETWORK

While some flights may appear to be routine, unique challenges always arise. Each project requires collaboration with several different parties, including ferry companies, MROs, CAMOs, clients and Civil Aviation Authorities (CAAs). This complex network of collaboration is essential for the successful execution of each project, ensuring that all parties are aligned and that potential issues are addressed proactively.

SXI is typically engaged at the conclusion of a process, when the CAMO and MRO teams are finalising their work. At this stage, both the client and the technical representatives may feel

1. SXI is a well-established provider of worldwide ferry flight services across a broad range of aircraft types
2. SXI is involved in verification and transfer of title flights

the need to meet significant deadlines. It is of the essence that the representatives are given the assurance that the work meets all the standards.

Open and transparent communication is essential to create an environment where all stakeholders feel comfortable asking questions and providing feedback. By maintaining clear lines of communication, trust and understanding can be established between all parties involved.

Once the initial information has been gathered, a detailed plan is developed by SXI. The planning phase includes the preparation of a quotation based on standard questions and the initial assessment. SXI's back-office team plays a critical role in this process, working to outline the routes and consider any limitations that could affect the aircraft's range. This includes gear down flights or malfunctioning systems. The next step is to determine fuel requirements and navigate air traffic control (ATC) restrictions. This includes weather conditions and political situations. The selection of airports for technical stops requires careful evaluation of fuel prices, handling fees, and entry restrictions. This is to ensure flight efficiency and minimise operational costs.

One of the most significant aspects of SXI's operation is the selection of a suitable crew. The selection process is based on several factors, including the type of aircraft, its registration and the pilot's location in relation to the departure or arrival point. It is necessary that our pilots are not only technically proficient, but also demonstrate proficiency in troubleshooting and adapting to challenges that may arise during the flight, such as navigation issues, non-standard routes and system malfunctions. Their ability to think on



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**AT SXI, WE BELIEVE IN A PERSONAL
 AND TAILOR-MADE APPROACH IN ALL THE
 SERVICES WE PROVIDE TO FIT THE NEEDS
 AND REQUIREMENTS OF OUR CUSTOMERS**
 ”

their own initiative allows them to adapt to changing conditions seamlessly.

During the course of project execution, a number of specific challenges may arise, including last-minute changes due to unforeseen circumstances. It is essential to pay close attention to detail in order to ensure that permits and other regulatory requirements remain valid in the event of changes. It is therefore fundamental to establish a robust schedule that allows flexibility to accommodate challenges without compromising safety.

Furthermore, we believe that building positive relationships with local authorities are vital to helping streamline the approval process and facilitate more efficient operations. By engaging with the relevant authorities to gain an understanding of their expectations, a more collaborative approach to safety and compliance can be achieved, which in turn enhances the overall quality of the services.

ONGOING DEDICATION

SXI's motto, 'Any type, Any place, Anytime, We deliver!', reflects our ongoing dedication to the aviation industry. It enables us to serve each client's specific requirements with expertise and personalised attention. By asking the right questions and working closely with our partners, SXI maintains the highest standards on every flight, regardless of the challenges.

Aviation requires not only technical expertise but also precision, teamwork and a comprehensive understanding of complex operations. At SXI, we adopt a systematic approach to every project. Our dedication to quality and proactive problem-solving enables us to confidently and expertly navigate challenges. Our strong commitment to safety and quality ensures the success of each mission, reinforcing our reputation as a trusted aviation partner. ●



SHARING THE LOAD

As aviation tackles the challenge of reducing its carbon footprint, what role can ACMI leasing play in making air travel more sustainable?

As the aviation industry addresses its responsibility for 2.5% of global carbon emissions, airlines are looking for ways of making operations more sustainable. Aircraft, Crew, Maintenance and Insurance (ACMI) leasing is emerging as a key strategy, enabling airlines to scale operations while minimising the long-term financial and environmental burdens that come with operating a large fleet.

According to Martin Stulajter, chief executive of AirExplore, Slovakia's largest airline (which belongs to Avia Solutions Group, the world largest ACMI provider), the growing prevalence of this business model can help the industry reach its green goals.

Environmental advantages of ACMI leasing

Aircraft production is one of the most resource-intensive processes in aviation, with each new plane potentially generating up to 120,000 tonnes of CO₂

emissions. ACMI leasing maximises the potential of each newly produced aircraft by enabling airlines to effectively share the same units for fixed periods depending on demand and season.

In other words, an aircraft leased to a European airline during summer's peak travel season can be redeployed to Africa or South America during their high-demand periods. This approach ensures higher utilisation rates, reduces idle time, and ultimately might lead to airlines purchasing fewer aircraft in the long run. Such operational efficiency can ultimately play a significant role in the industry's road to net-zero emissions by 2050, as outlined in the Fly Net Zero commitment passed by IATA member airlines in 2021.

"In other sectors, the sharing economy is seen as one of the strongest drivers for reducing environmental impact," explains Stulajter. "The ACMI model is a perfect example of that, as it is in the best interest of both airlines and ACMI operators to ensure that each asset is used to its full potential."



Markus Minko/Adobe Stock

Andrii Tolonskyi/Adobe Stock

The importance of leading by example

Fuel efficiency is a critical part of any sustainability efforts an airline might undertake, and ACMI providers can grant access to the more efficient aircraft models, like the Boeing 737-800 Next Generation. This narrowbody jet, which forms the backbone of AirExplore's passenger and cargo fleets, emits 10-15% less CO₂ than its predecessors and meets stringent noise abatement standards.

Stulajter says: "By operating modern, fuel-efficient aircraft, we help our clients minimise their carbon footprint while meeting their passengers' growing demands for travel and connectivity. In a market where airlines are scrambling for capacity solutions, and major manufacturers have a backlog numbering over 8,000 aircraft, on-demand access to best-in-class models is a major benefit that ACMI providers can offer."

With established expertise and operations spanning several continents, AirExplore can move its aircraft where demand is highest, avoiding regional overcapacity. Currently providing services in Europe and Africa, the airline is also

preparing to expand into the United States, with the recently received approval from the Department of Transportation.

Operational benefits of ACMI leasing

Beyond sustainability, ACMI leasing offers airlines the flexibility to test new markets and routes with minimal risk. By deploying leased aircraft, airlines can evaluate demand without committing to permanent fleet expansions. This prevents overcapacity, reduces unnecessary flights and lowers overall emissions.

AirExplore's operations in Africa exemplify this approach. Supporting regional airlines in a market with annual growth rates of 7.4% – well above the global average of 6.1% – AirExplore provides efficient capacity solutions while minimising environmental impact.

A sustainable future for aviation

As aviation moves towards decarbonisation, ACMI leasing is poised to play a pivotal role in aligning growth with sustainability. The integration of sustainable aviation fuels, fleet modernisation and optimised operational strategies will further enhance ACMI's environmental benefits.

"By optimising fleet usage, reducing new aircraft production and embracing modern technology, ACMI providers like AirExplore are setting a benchmark for responsible aviation practices," says Stulajter. "This model ensures that as the industry grows, it does so with minimal environmental impact, paving the way for a greener future in global air travel." ●



▲ Martin Stulajter, chief executive, AirExplore

1. AirExplore is Slovakia's largest airline and belongs to Avia Solutions Group

Sustainability is in our DNA

Lionel G Roques shares that the journey of an aircraft doesn't end at its retirement – it's just the beginning of a new, sustainable chapter



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**AT TARMAC AEROSAVE, AN
AIRCRAFT NEVER TRULY
DIES – IT IS REBORN**
”

LIONEL G ROQUES

vice president sales,
Tarmac Aerosave

Since its creation in 2007 by Airbus, Safran Aircraft Engines and Suez, Tarmac Aerosave has placed sustainability at the heart of its operations. Anticipating aircraft end-of-life challenges, our founders established a unique deconstruction centre focused on environmentally responsible parts removal and material recycling.

Today, we've evolved into a one-stop-shop expert in the lifecycle of aircraft and engines, with 85% of our activities focused on maintenance, storage and transition before aircraft return to service. We are also one of the very few companies worldwide to hold dual AFRA accreditation for both dismantling and recycling.

Maintenance and storage

We conduct aircraft storage and maintenance using strict environmental best practices. During storage, aircraft 'live' with systems and engines regularly tested under protocols to minimise ecological impact, including optimised energy use and eco-friendly products.

Our hangars in Tarbes (France) and Teruel (Spain) are state-of-the-art, built to the latest insulation standards. They help conserve resources while ensuring maximum safety for all operations, from routine checks to the most complex maintenance projects.

Recycling: Deconstruction for a sustainable future

Unlike traditional approaches, we don't break down aircraft – we deconstruct them. Every part and material is meticulously removed, sorted and repurposed. From fluids to wiring, metals and plastics, everything is sent to specialised recycling channels.

Our patented cutting gantry, the only one of its kind in the world, sections aircraft with precision, using water spraying to reduce dust emissions, and the water is collected and recycled.

As a key player in the circular economy, we collaborate with the International Aerospace Environmental Group (IAEG) to develop sustainable solutions throughout an aircraft's lifecycle.

Beyond recycling, each project offers

crucial insights into aircraft aging, information which is then shared with manufacturers to enhance the eco-design of future aircraft.

Aircraft reborn: Circular economy

At Tarmac Aerosave, an aircraft never truly dies – it is reborn.

Reusable parts find new life in other planes, while recycled materials are integrated into various industries. Even the remaining 8% of non-recyclable materials, primarily composites, are on the brink of being fully repurposed, thanks to our partnership with Suez, which continues to innovate in this field.

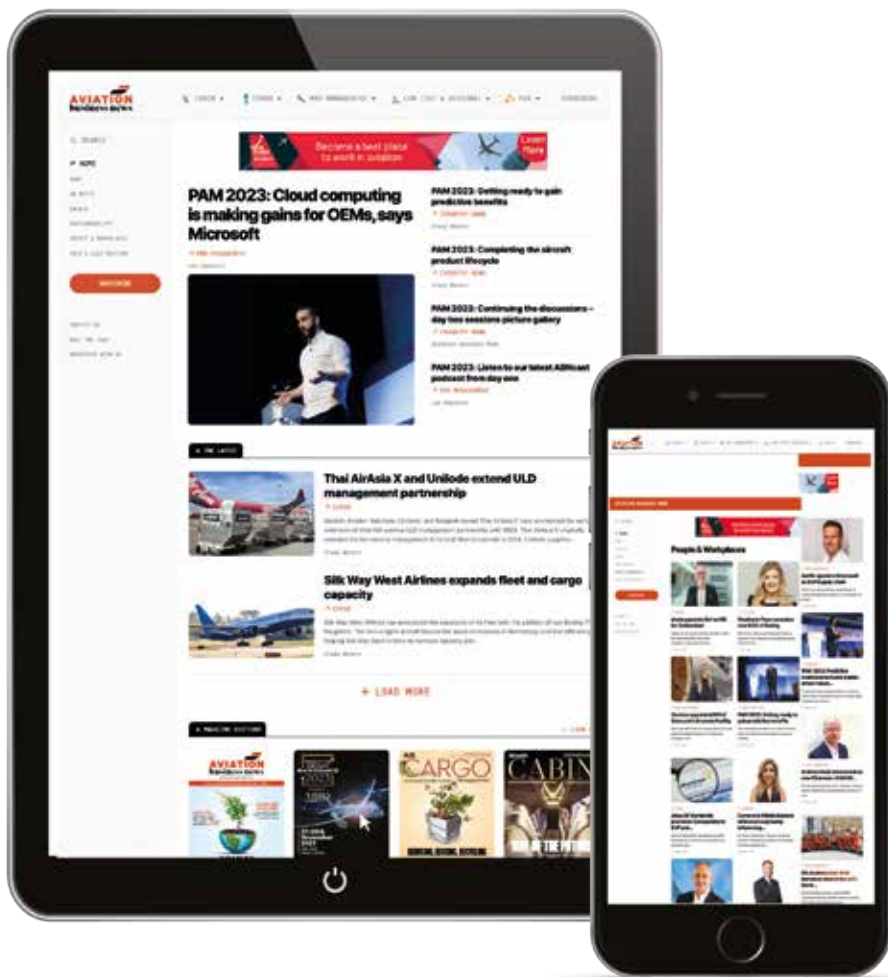
A shining example of our philosophy is the A380. While its production has ended, parts recovered by our services are helping maintain the global fleet.

Green leadership

Combining technical expertise with sustainable innovation, we lead in responsible aviation, redefining green practices with every aircraft deconstructed, part reused and material recycled. ●



▲ Tarmac Aerosave continues to develop advanced dismantling and recycling techniques



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and low cost & regional airline industry



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The New Era of Secure Dataloading



Meet today's OEM requirements and regulatory guidance for secure dataloading

Fully compliant with ARINC 645-1 security standards, Teledyne's PMAT XS® and eADL XS™ new generation data loaders facilitate the distribution, onboard storage, and management of software parts and databases across an airline's operation. Built from the ground up with secure dataloading in mind, both loaders ensure the total integrity and authenticity of software parts during transfers, and protect against unauthorized access at every stage.

