AviTrader
AVIATION NEWS PUBLICATIONS

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September 2024

# MRO 360°

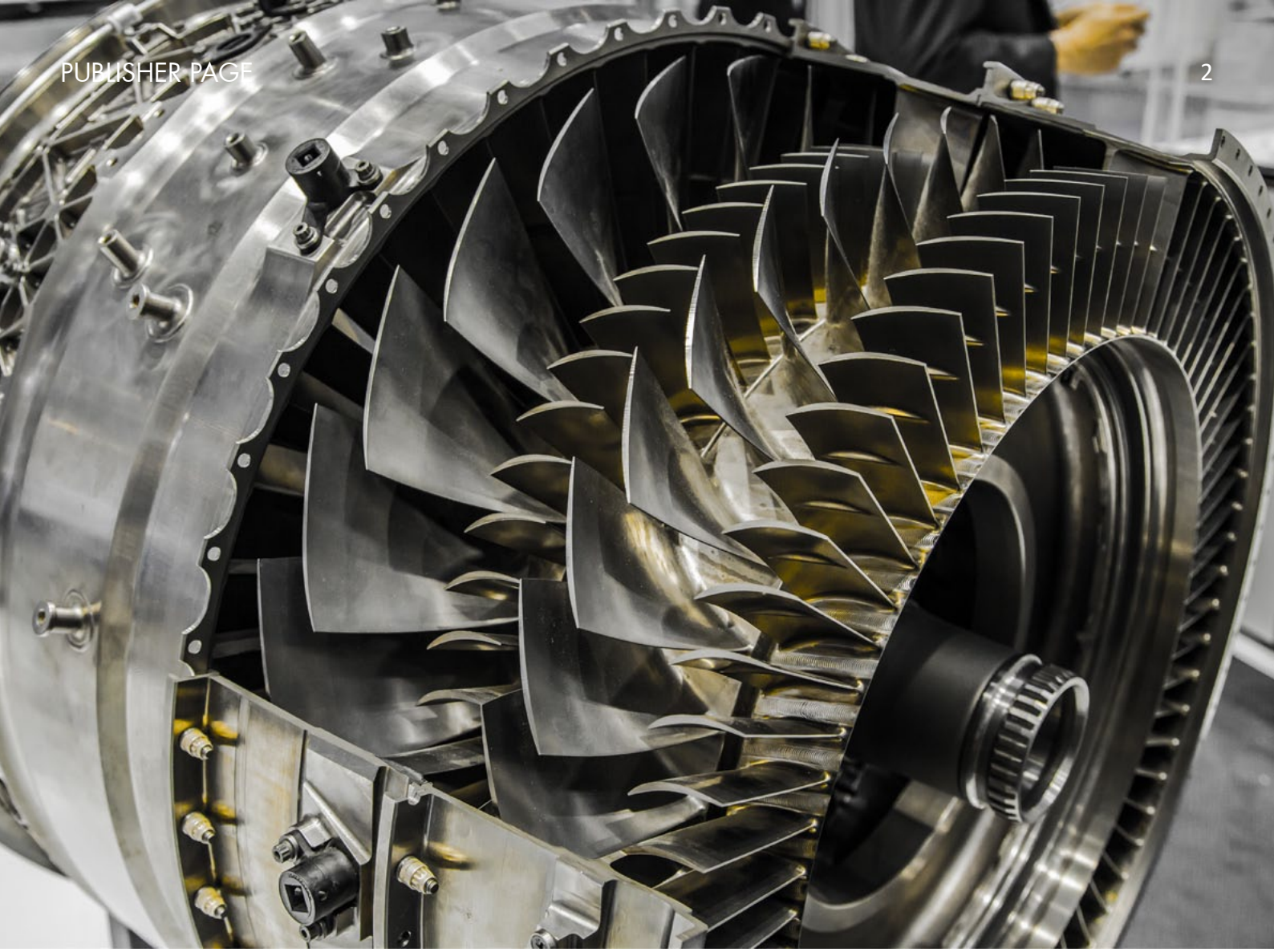

## Turning Surplus Parts Into Cash

### Managing inventories effectively

**Aircraft Records**
An insight into the world of digital solutions

**Safety Management Systems**
A pillar of modern aviation safety

**Staff Shortages**
Attracting the next generation of aviation professionals



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Dear Colleagues,

It's been a good month for providing what we hope you will find interesting content where our two feature articles are concerned. It seems we hit on two topics that our contributors enjoyed contributing valuable insights into and we are extremely grateful to them all for their input. Thank you.

The phrase "surplus inventory" is one many of you may be all too familiar with. We decided to see what efforts were being made to mitigate the problem now that digital technology is having such a remarkable effect on changing the MRO landscape as a whole.

Continuing the theme of digital technology, we also wanted to understand how transitioning from analogue to digital record keeping for aircraft maintenance records and the management of such data has improved efficiency and safety in a critical element of the MRO industry sector, plus understanding the challenges faced during such a transition.

To round off we have a couple of 'insight articles' on Safety Management Systems (SMSs) in the aviation industry and the challenges facing MROs in attracting and retaining high-quality aircraft technicians.

As always, we hope you enjoy this edition of AviTrader's MRO 360°.

**Peter Jorssen**
**Publisher**


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AviTrader
AVIATION NEWS PUBLICATIONS
MRO 360°


**Managing inventories effectively**

## EDITORIAL

**Peter Jorssen**
Publisher
peter.jorssen@avitrader.com

**Heike Tamm**
Editor-in-Chief
heike.tamm@avitrader.com

**David Dundas**
Content Writer
david.dundas@avitrader.com

**Volker Dannenmann**
Graphic Designer
volker.dannenmann@gmail.com

## ADVERTISING & CONTRIBUTION ENQUIRIES

**Tamar Jorssen**
The Americas
tamar.jorssen@avitrader.com
Phone: +1 (778) 213 8543

**Malte Tamm**
International
malte.tamm@avitrader.com
Phone: +49 (0)162 8263049



AviTrader Publications Corp.
Suite 305, South Tower
5811 Cooney Road
Richmond, British Columbia
V6X 3M1, Canada
Phone: +1 (778) 213 8543

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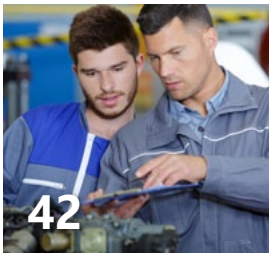


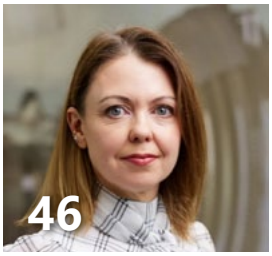


## Setna iO announces new UK headquarters


Image of Setna iO's and Setnix's new UK headquarters *© Setna iO*

Setna iO has confirmed the contract exchange for its new 100,000 ft² UK headquarters, which will house both Setna iO and Setnix. The custom-designed facility is currently under construction and is scheduled for completion in Q2/ Q3 2025. This significant investment aims to enhance Setna iO's ability to support its customers across Europe, the Middle East, and Africa (EMEA) by increasing stock material capacity. Additionally, the new headquarters will bolster Setnix's maintenance, repair and overhaul (MRO) services. Tom Boulcott, President of Trading and UK Managing Director, expressed pride in this achievement, attributing the milestone to the hard work and dedication of the Setna iO and Setnix teams. He noted that the acquisition represents a crucial development for both the UK-based staff and the company globally. The acquisition was managed by Rybull Group, whose early involvement allowed Setna iO to influence the design and specifications of the facility. Co-founder Ian Bullimore highlighted the extensive search for a suitable location, which began over a year ago and praised the collaborative effort between all parties involved. The facility marks a major step in Setna iO's global expansion and promises to enhance its service offerings significantly.

## Global Airlines teams up with EFW for A380 maintenance deal


Airbus A380 in Global Airlines livery *© Global Airlines*

Global Airlines, the new all-A380 airline, has announced a multi-million-euro partnership with global MRO specialist Elbe Flugzeugwerke (EFW) to carry out the base maintenance inspection for its first fully acquired aircraft, 9H-GLOBL. The A380 will soon fly to Dresden for necessary maintenance, including mandatory inspections and component replacements, before being repositioned in Europe for an interior overhaul. The airline aims to begin operations in 2025. The aircraft, which flew from the Mojave Desert in California to Prestwick International Airport on May 1, is now progressing towards operational readiness. Extensive return-to-service work has already been completed, with Global Airlines and EFW working closely with Airbus on flight conditions and maintenance tasks as part of a comprehensive deal. James Asquith, CEO and Founder of Global Airlines, commented: "Joining forces with EFW is the next significant step in our quest to seeing our first A380 in the sky. 9H-GLOBL's journey back to the skies has taken yet another significant step forward, and I am excited to see our first aircraft fly to Dresden for this work to progress. We have overcome significant hurdles over the past 12 months, and we are now very much advancing our proposition, partnerships, team and operational readiness and our partnership with EFW is the latest giant leap forward. I am looking forward to being in Dresden and seeing the work underway." Global Airlines is currently collaborating with Airbus and other partners to prepare 9H-GLOBL for its flight to Dresden in the coming weeks. After maintenance is completed, the aircraft will be repositioned within Europe for an extensive cabin refurbishment ahead of its first commercial flight in 2025. Founded in 2023 and headquartered in London, Global Airlines, led by CEO James Asquith, has begun its fleet development programme with the acquisition of one A380, with more to follow. The airline aims to deliver an unparalleled customer experience inspired by the golden age of travel, using the A380 to provide the best way to fly.

## airBaltic and P&W sign long-term GTF engine maintenance agreement


P&W will provide maintenance services for airBaltic's GTF engines *© Airbus*

Mammoth Freighters has announced a significant achievement in its Boeing 777 passenger-to-freighter (P2F) conversion programme, with the completion of the door cutting on AviaAM Leasing's first B777-300ER (MSN 35299). AviaAM Leasing, part of the Avia Solutions Group, is the launch customer for the 777-300ERMF type, with six conversions ordered. Mammoth currently has two of AviaAM Leasing's B777-300ER aircraft at its modification partner facility, Aspire MRO, in Fort Worth, Texas. Brian McCarthy, Mammoth's Vice President of Marketing and Sales, expressed excitement about the milestone and the upcoming operation of the aircraft via Avia Solutions Group's BBN Airlines in Latvian national airline airBaltic has signed a long-term EngineWise™ comprehensive maintenance services agreement with Pratt & Whitney (P&W) for its fleet of geared turbofan (GTF) engines. The agreement operates on a power-by-the-hour model, linking airBaltic's maintenance costs to the actual use of its engines, providing the airline with greater transparency and predictability in maintenance planning. Martin Gauss, President and CEO of airBaltic, highlighted the airline's strong relationship with Pratt & Whitney, which began when airBaltic became the global launch operator of the Airbus A220-300 in 2016. The GTF engines powering these aircraft have led to a 25% reduction in fuel burn per seat, delivering substantial cost savings. Gauss noted that this agreement would support airBaltic's growth plans, as it aims to operate a fleet of 100 Airbus A220-300 aircraft by 2030. The 17-year agreement ensures long-term support for airBaltic, enabling the airline to optimise fleet performance and maintain cost control as it continues to grow.

## LATAM Airlines to retrofit Boeing 787 fleet with RECARO's premium R7 mini suites

RECARO Aircraft Seating (RECARO) has been chosen by LATAM Airlines to retrofit its Boeing 787 fleet with the R7 premium mini suite. The upgrade will feature 20 suites in LATAM's B787-8 aircraft and 30 in its B787-9s, across a total of 24 shipsets. The collaboration between RECARO and LATAM aims to elevate the in-flight experience, with seats designed to offer enhanced privacy through increased shell height and suite doors. LATAM will become the first South American airline to provide this level of luxury to its passengers. The lightweight R7 suites contribute to sustainability efforts by optimising weight, and the seats will be outfitted with recycled antimicrobial faux leather in customised colours. "Both RECARO and LATAM teams have worked in close collaboration to enhance passenger comfort and privacy with this bespoke R7 design," said Mark Hiller, CEO of RECARO Aircraft Seating and RECARO Holding. "Knowing that LATAM will be the first South American based airline to fly our R7 is an outstanding milestone for all involved." Paulo Miranda, VP of Customers at LATAM Airlines Group, added, "The new Premium Business seats mark a significant leap forward, combining comfort, privacy, and elegance. These renovations position LATAM as a leader in the industry, providing our passengers with an unprecedented level of comfort and an exclusive flying experience."

R7 mini suite

*© RECARO Aircraft Seating*

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## General Atomics begins final assembly of Do228 NXT series wing

Final assembly of Do228 NXT wing © *GA-ATS*

General Atomics AeroTec Systems GmbH (GA-ATS) has successfully commenced the final assembly of the first wing for its new Do228 NXT series aircraft, marking a major milestone in the production process and showcasing GA-ATS' dedication to aerospace innovation and quality. In a strategic move, GA-ATS has relocated the final assembly of control surfaces and wing structures back to its facilities in Oberpfaffenhofen, Germany. This decision ensures that the highest level of expertise and quality control is applied throughout the production process, helping to stabilise the supply chain and maintain excellence in the delivery of the Do228 NXT aircraft and its components. Earlier this year, GA-ATS successfully completed and measured a prototype wing panel, clearing the path for full-scale production. The original panels, now in Oberpfaffenhofen, will be expertly shaped and assembled into wings at the upgraded final assembly line. This in-house process guarantees wings of exceptional precision and quality. "The relocation of production back to Oberpfaffenhofen is a significant step for us," said Florian Rohe, Managing Director of GA-ATS. "With our in-house expertise and unwavering commitment to quality and precision, we are capable of producing components that meet the highest standards of the industry, ensuring reliable and timely deliveries of the Do228 NXT to our customers." The Do228 NXT wing design, refined over nearly 50 years, is known for its aerodynamic efficiency and low fuel consumption. The supercritical wing profile allows for a broad speed range, optimised performance, and superior handling during short take-off and landing (STOL) operations. The spar boxes at the core of the wing structure are made from machined aluminium panels, with the material carefully removed to ensure a lightweight yet robust design. This achievement highlights GA-ATS's commitment to innovation, reinforcing its leadership in aerospace manufacturing with the continued development of the Do228 NXT series.

## SR Technics opens new facility for P&W GTF engine maintenance

SR Technics has inaugurated a state-of-the-art engine maintenance facility in Zurich, Switzerland, dedicated to servicing Pratt & Whitney GTF™ engines, along with the successful reconstruction of a second test cell. This facility marks the 17th active location within the global GTF MRO network and will provide full disassembly, assembly and testing for PW1100G-JM engines used in the A320neo-family of aircraft. An official opening ceremony was held in Zurich, featuring an exclusive tour of the new shop floor and Test Cell 2. Attendees included representatives from Pratt & Whitney, FOCA, local authorities, business partners, shareholders, and SR Technics employees. The event showcased the cutting-edge infrastructure, reflecting SR Technics' commitment to innovation and growth within the aviation sector. SR Technics joined Pratt & Whitney's GTF MRO network in April 2022, bolstering its repair capabilities and competitiveness by expanding its highly skilled workforce in Switzerland. The company has invested double-digit-millions of Swiss francs into its Zurich-Airport site, equipping it with special tools and dedicated maintenance equipment. SR Technics expects to service over 1,000 GTF engines throughout the agreement's lifespan, having begun work on its first engine in July 2024. "During the last 18 months, the SR Technics' team has put great work into setting up new teams and new infrastructure. We are grateful for all the support received from our partners involved in this complex project. This investment paves a new chapter for future business in our company," said Owen McClave, Chief Executive Officer at SR Technics. "SR Technics will play an integral role in supporting the growing GTF fleet around the world," said Rob Griffiths, Senior Vice President, Commercial Engines Operations at Pratt & Whitney. "With their extensive experience over more than nine decades, we are confident they will deliver the industry-leading services our customers expect.

Official opening ceremony of the new state-of-the-art engine maintenance facility in Zurich, Switzerland © *SR Technics*

## ADE and GMF announce strategic joint investment to revolutionise landing gear services


The signing ceremony between ADE and GMF was held at the inaugural Bali International Airshow 2024 (BIAS) *© ADE*

Asia Digital Engineering (ADE), the maintenance, repair and overhaul (MRO) subsidiary of Capital A, and PT Garuda Maintenance Facility Aero Asia Tbk (GMF), an Indonesian MRO provider, have announced their strategic joint investment. This partnership represents a significant milestone for both companies as they combine expertise to transform landing gear services across the region and set new industry standards. The signing ceremony was held at the inaugural Bali International Airshow 2024 (BIAS), highlighting the importance of this joint investment in the aviation sector. GMF provides comprehensive landing gear overhaul and maintenance services, including disassembly, inspection, repair, and reassembly of components. With state-of-the-art facilities and advanced technology certified by international aviation authorities, GMF guarantees the highest quality service. This joint investment allows ADE and GMF to expand their offerings and tap into the thriving landing gear market in Southeast Asia. By merging ADE's innovative engineering skills with GMF's established expertise, the partnership aims to deliver world-class landing gear solutions to airlines across the region. Mahesh Kumar, CEO of ADE, stated, "Our investment in GMF's landing gear business is a strategic leap forward, designed to accelerate our growth and strengthen ADE's position as a leader in the aviation MRO sector. With our 14-line MRO hangar now fully operational and our digital products gaining international recognition, this partnership with GMF comes at the perfect time. By combining GMF's expertise in landing gear services with our cutting-edge efficiencies, we are set to transform the industry and establish new benchmarks. The potential of this partnership is truly transformative, and we are excited about the remarkable advancements it will bring." Andi Fahrurrozi, CEO of GMF, added, "This joint investment aligns perfectly with our vision to expand GMF's footprint in the global MRO market. ADE's forward-thinking approach and commitment to innovation complement our established experience in landing gear services. Together, we aim to elevate the quality, efficiency, and range of services we offer, making Southeast Asia a leader in aviation maintenance. We look forward to unlocking new opportunities and delivering exceptional value to our airline customers." This partnership not only enhances the service capabilities of both companies but also underscores Southeast Asia's growing significance as a hub for aviation innovation and maintenance excellence.

## Kellstrom Aerospace and ANA partner on inventory management

Kellstrom Aerospace has signed a significant agreement with All Nippon Airways (ANA), one of the world's leading airlines. This collaboration aims to enhance ANA's operations by utilising Kellstrom Aerospace's advanced inventory management solutions. The partnership will allow ANA to maximise the value of its inventory by working with Kellstrom's innovative, service-led supply chain programmes. With Kellstrom's expertise in aviation lifecycle solutions, ANA plans to streamline its operations and bolster its management capabilities. Michael Garcia, VP of Commercial at Kellstrom Aerospace, expressed his enthusiasm about the partnership, stating: "We are excited about this agreement with ANA, one of the most respected airlines in the world, as we leverage our inventory management expertise to the mutual benefit of both companies. This initiative aligns with our mission to provide tailored solutions that meet the unique needs of global airlines and MROs, and we look forward to working with ANA and continuing to build our business relationship." Kellstrom Aerospace, known for its lifecycle cost management and extensive inventory of OEM and aftermarket parts, will collaborate closely with ANA to optimise inventory value. This agreement underscores Kellstrom's ongoing commitment to partnering with world-class airlines and MROs to deliver innovative, integrated supply chain solutions that drive improvements in working capital management and operational performance.

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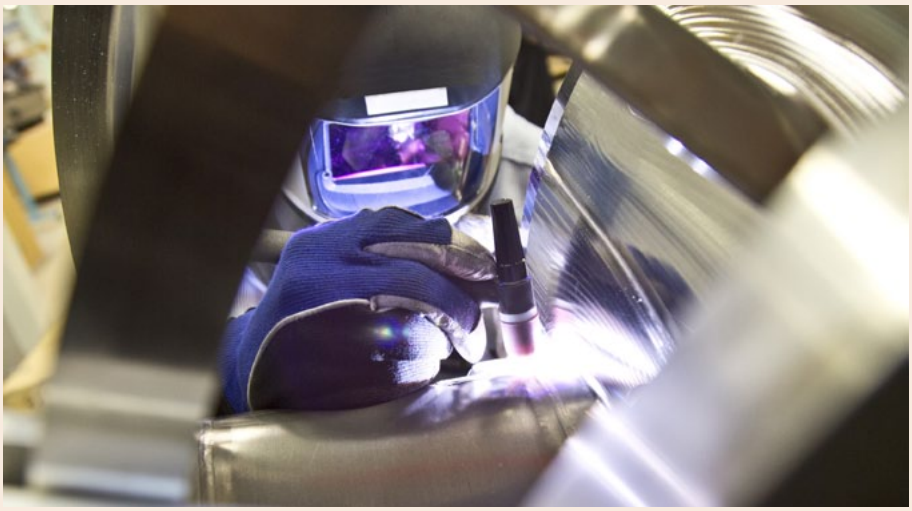
## GKN Aerospace expands Swedish facility to meet industry growth

GKN Aerospace has strengthened its leadership in the aero-engine sector by announcing plans to expand the capacity and efficiency of its advanced manufacturing facility in Trollhättan, Sweden. The new production area, set to be fully operational by 2026, will incorporate the latest digital factory processes to support the global aerospace industry's increasing demand. The investment will introduce cutting-edge automation, robotics and digital technologies, enabling GKN Aerospace to boost productivity, enhance quality, and reduce lead times for its leading engine systems and major structural components. With aero-engine backlogs reaching up to nine years, this expansion will allow GKN Aerospace to meet rising demand for leading engines like the GEnX, GTF and Trent XWB. Joakim Andersson, President of GKN Aerospace's Engines business, commented: "We are seeing record order backlogs and strong growth potential across the industry, and this expansion enables us to support our customers and seize that opportunity. Our engines business is already an industry leader today, and this investment will not only underpin our future growth but also support the industry's shift to more efficient and sustainable aircraft engines." This expansion follows the announcement in January of GKN Aerospace's plans to establish an additive fabrication centre of excellence at the Trollhättan facility, further positioning the engines business for continued growth."



Welding at Trollhättan facility © *GKN Aerospace*

## Bird Aviation expands operations with new hangar at Larnaca Airport

Image of the new hangar at the old Larnaca Airport © *Bird Aviation*

Bird Aviation has announced the construction of a new hangar at the old Larnaca Airport, marking a significant expansion of its operations with the addition of a narrow-body aircraft bay.

The project, which is being built adjacent to the company's existing hangar, has already commenced and is scheduled for completion in the coming months. The decision to expand follows increasing demand for Bird Aviation's services and the steady growth of its client base. This development highlights the company's strong reputation, built on consistent and reliable performance. The additional bay will enhance Bird Aviation's capacity to meet rising demand, capitalising on Cyprus's strategic location as a hub that connects Europe, Asia and Africa. This positioning allows the company to serve airlines across the EMEA region more effectively. Frederic Pralus, CEO of Bird Aviation, expressed confidence in the project, stating: "This expansion is a natural step for us as we continue to grow and adapt to the needs of our customers. The new hangar will significantly increase our capacity and help us better serve the evolving needs of the aviation industry." With the new facility, Bird Aviation is set to further strengthen its operational capabilities and solidify its role as a key player in aircraft maintenance and services within the region.

## StandardAero secures agreement with Corendon Airlines for LEAP-1B engine maintenance

StandardAero has signed a non-exclusive agreement with Turkish airline Corendon Airlines to provide maintenance, repair and overhaul (MRO) services for the CFM International LEAP-1B engines powering the carrier's Boeing 737 MAX 8 aircraft. This agreement marks the extension of the two companies' existing relationship, as Corendon also operates Boeing 737-800 aircraft with CFM56-7B engines, which StandardAero already services. Corendon joins a growing number of operators utilising StandardAero's LEAP-1A and LEAP-1B MRO services, which are provided at its San Antonio facility in Texas. Corendon's first LEAP-1B engine has already been inducted for a Continued Time Engine Maintenance (CTEM) shop visit, marking the beginning of the collaboration under the new agreement. Will Pitcher, Senior Vice President of Sales, Marketing, and Customers at StandardAero's Airlines & Fleets division, expressed satisfaction with the partnership, stating: "StandardAero is proud to have been entrusted by Corendon Airlines to provide LEAP-1B MRO services, adding Türkiye to our growing list of LEAP-1A and LEAP-1B customer nations. We value the confidence shown by Corendon in our San Antonio-based LEAP team and look forward to meeting their service expectations for many years to come." StandardAero's San Antonio facility has recently gained LEAP-1B correlation approval for its first test cell, further solidifying its capabilities in servicing these advanced engines. The company continues to expand its engine repair capabilities through its Component Repair Services (CRS) division, which has developed over 230 component repairs for the LEAP-1A and LEAP-1B engines. In addition to its MRO services, StandardAero is investing in the future by growing its team of LEAP-certified technicians through its in-house Aviation Mechanic Training Program, housed at its Training Academy in San Antonio.

LEAP-1B engine *© CFM International*

## HAECO to support Philippine Airlines' A321 maintenance


Philippine Airlines maintenance support agreement *© HAECO*

HAECO has announce that in August this year it commenced providing heavy maintenance services, including D-Checks, for Philippine Airlines' Airbus A321 aircraft at its Xiamen facility,. The initial maintenance agreement was first established in 1999, and since then, HAECO has performed over 40 maintenance inputs for the Philippines' flag carrier at its well-equipped hangar based at Xiamen Gaoqi International Airport. Gerald Steinhoff, Chief Commercial Officer of HAECO Group, expressed that the company is pleased to welcome Philippine Airlines back to its hangars, where HAECO's skilled maintenance team will continue to provide top-quality services, ensuring the airline's fleet operates at the highest levels of safety and efficiency. He highlighted HAECO's broad capabilities in delivering world-class maintenance, repair, and overhaul services for airframes, components, and engines across its global locations, and looked forward to supporting the continued growth of Philippine Airlines' wide-body and narrow-body fleets in the future. Philippine Airlines is equally enthusiastic about the partnership. "Philippine Airlines is pleased to engage with HAECO for the maintenance of our Airbus A321 fleet. We look forward to a continuous collaboration that will help us maintain high operational standards. This partnership guarantees that our aircraft remain safe, reliable, and compliant with regulatory requirements, and ultimately signifies our commitment to offer only the best service for our passengers," said Alvin Limqueco, PAL Senior Vice President & Chief Supply Chain Officer.

## FIGEAC AÉRO signs €65 million contracts to support Airbus A320 production ramp-up

© FIGEAC AÉRO

FIGEAC AÉRO, a prominent partner for major aerospace manufacturers, has secured three new agreements with Airbus and another top-tier customer, collectively valued at €65 million. These contracts are designed to support the increased production rates of Airbus's A320-family aircraft, aligning with the aerospace giant's plans to ramp up output in the coming years. Two of the agreements have been signed directly with Airbus and cover a wide range of structural titanium components. These parts are integral to the engine pylons of the A320-family aircraft, where their strength and light weight are crucial. The third contract primarily involves large aluminium parts, also destined for the A320 aircraft. The manufacturing of these components will rely heavily on FIGEAC AÉRO's long-standing expertise in machining both hard metals and light alloys. This specialised knowledge, honed over years, is concentrated at the company's flagship facilities in Figeac, France, where the majority of the contracted parts will be produced. These agreements come at a pivotal time for Airbus, which aims to increase its A320 production rate to 75 aircraft per month by 2027, up from an average of nearly 48 deliveries per month in 2023. In response to these ambitious targets, Airbus has been reinforcing its supply chain capabilities, and FIGEAC AÉRO's industrial performance has returned to near-normal levels following post-COVID challenges that affected the wider aerospace sector. Additionally, FIGEAC AÉRO's strategic investment in expanding its production capacity over the past decade has enabled the company to meet this growing demand effectively. The newly awarded contracts are a result of various factors, including capacity offloading, first-time outsourcing, and a change of suppliers, underscoring FIGEAC AÉRO's growing strategic importance within the A320 supply chain. The agreements also highlight the opportunities available to high-performing partners in the aerospace industry, as manufacturers like Airbus seek to meet rising demand while maintaining rigorous quality standards. With a five-year duration, the contracts are expected to generate annual revenue of approximately €12.5 million once full-scale production begins, contributing to FIGEAC AÉRO's longer-term financial targets. The first deliveries under these agreements are anticipated in the fourth quarter of the current financial year, with the bulk of serial production scheduled to commence in the first quarter of the 2025/26 financial year. These new wins represent a major step forward for FIGEAC AÉRO in its pursuit of a business objective to achieve between €80 to €100 million in annual revenue by the financial year 2027/28. Notably, the company has already secured about one-third of this target, just nine months into its ambitious four-year PILOT 28 plan, further solidifying its position as a key player in the aerospace manufacturing sector. (€1.00 = US$1.12 at time of publication).

## First Aviation Services acquires Saint Technologies

First Aviation Services Inc., a provider of aircraft parts manufacturing, aircraft component maintenance and related engineering services, has announced its acquisition of Saint Technologies Inc., based in Shannon, Illinois. Founded in 1999, Saint Technologies Inc. specialises in manufacturing advanced lock washers designed to secure critical hardware assemblies in high-vibration and shock environments, marketed under the brand name REALLOCK®. Jim Blair, the founder of Saint Technologies and the inventor of the REALLOCK product line, developed this unique locking technology as an innovative, efficient, and time-saving alternative to traditional safety wire. REALLOCK offers various advantages, including weight savings, reduced assembly time and enhanced safety, making it ideal for applications in next-generation fighter aircraft, missiles and satellites. For over 20 years, REALLOCK self-locking washers have consistently met the most stringent requirements in aviation design. "We are very pleased to announce that Saint Technologies is joining First Aviation's engineering-driven group of companies. REALLOCK has tremendous growth potential in the aerospace and defence industry, as engineers seek products that save weight, reduce costs and improve reliability. We welcome the Saint Technologies team into the First Aviation family," said Paul Bolton, President and COO of First Aviation Services Inc.

## Avolon to acquire Castlelake Aviation in strategic growth move


*© Avolon acquires Castlelake Aviation*

Avolon, a prominent global aviation finance company, has announced its agreement to acquire Castlelake Aviation limited (CA Ltd), an entity managed by global alternative investment manager Castlelake L.P. This strategic acquisition is set to boost Avolon's growth by expanding its aircraft portfolio and enhancing its financial position. As of March 31, 2024, CA Ltd held total assets valued at US$5 billion, including 105 aircraft on lease, commitments for 13 new-technology aircraft, two leased engines, and nine loans. The portfolio is notably composed of 68% narrow-body aircraft, 70% new-technology planes, with an average aircraft age of 4.7 years and a remaining lease term of 8.4 years. These assets align well with Avolon's current fleet, which will benefit from the added scale and technological upgrades. This acquisition is expected to accelerate Avolon's earnings and fleet growth, with attractive yields bolstered by the company's robust financial standing. As of June 30, 2024, Avolon reported US$8.2 billion in available liquidity. Post-acquisition, the company's key financial metrics are projected to remain within its target investment-grade ranges, including a net debt-to-equity ratio of 2.8x and next 12-month liquidity coverage of 1.5x. Avolon CEO Andy Cronin expressed confidence in the deal, highlighting its contribution to the company's growth strategy. He emphasised that the acquisition would strengthen Avolon's cash flow and earnings, supported by the company's liquidity and capital markets access. Joe McConnell, Castlelake Partner and Deputy Co-Chief Investment Officer, remarked that the transaction benefits all parties involved. It ensures a return of capital to Castlelake's investors, continued high-quality management services for lessees, and Avolon's acquisition of high-quality aircraft assets. The transaction, which involves US$3.3 billion in transferable debt, is expected to close in Q1 2025, pending customary regulatory approvals.

## FTAI Aviation completes acquisition of LMCES

FTAI Aviation has successfully finalised the acquisition of Lockheed Martin Commercial Engine Solutions (LMCES), a 526,000 ft² aircraft engine maintenance and repair facility based in Montréal, Québec. This acquisition from Lockheed Martin Canada bolsters FTAI Aviation's maintenance, repair, and exchange (MRE) business, enhancing its ability to deliver comprehensive maintenance services to airline customers. The integration of LMCES's maintenance capabilities with FTAI's existing facilities at QuickTurn in Miami, Florida, will significantly expand FTAI's service capacity. The combined operations will now be able to conduct up to 1,350 CFM56 module overhauls and more than 500 engine tests each year. Following the acquisition, both facilities will be rebranded as FTAI Aviation Canada and FTAI Aviation USA. Joe Adams, CEO of FTAI, commented on the acquisition, stating, "Completing the acquisition of LMCES is a major step towards FTAI Aviation becoming the unrivalled leader in MRE. We look forward to continuing to serve our global customer base by providing readily available, flexible, high-quality power while saving owners and operators time and money." FTAI Aviation focuses on the maintenance, repair, and exchange of commercial jet engines, specialising in CFM56 and V2500 engines. The company's proprietary products, including its Module Factory and a joint venture for manufacturing engine PMA, aim to simplify and accelerate engine maintenance while improving cost-effectiveness and environmental sustainability. Additionally, FTAI owns and leases jet aircraft, often acquiring engines at advantageous prices. The company invests in aviation assets and aerospace products to generate robust cash flows with growth and asset appreciation potential.

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## Safran to boost MRO network with CRT acquisition

Safran Aircraft Engines has announced its intention to acquire Component Repair Technologies (CRT), an American firm based in Mentor, Ohio, renowned for its expertise in aircraft engine part repairs. This move will bolster Safran's maintenance, repair, and overhaul (MRO) capabilities across the Americas. CRT, employing over 450 people, specialises in repairing large components such as cases and rotating parts for CFM56, LEAP, and large turbofan engines.

Jean-Paul Alary, CEO of Safran Aircraft Engines, highlighted that this acquisition aligns with the company's strategy to expand its global MRO network. He expressed enthusiasm about leveraging CRT's proven expertise to support the growing fleet of LEAP-powered aircraft. "Our strategy includes major investments at all our current facilities, plus the construction of new facilities. With this ambitious ramp-up, Safran Aircraft Engines will proactively support the rapidly growing global fleet of LEAP-powered airplanes."

Once integrated, CRT will contribute to Safran Aircraft Engines' shop visits provided under CFM Services agreements, catering to airlines and other OEM and third-party MRO providers. CRT will become part of Safran's extensive network of repair facilities, which includes locations in Châtellerault, France; Ceramic Coating Center, France; Airfoils Advanced Solutions, France; PTI, Florida; and Safran Aircraft Engine Services Americas in Querétaro, Mexico. This acquisition complements the recent announcement of a new LEAP engine maintenance facility in Querétaro and supports Safran's goal of optimising its industrial organisation amid strong growth in LEAP support services.


Safran to acquire Component Repair Technologies *© CRT*

"As a long-standing partner to Safran Aircraft Engines, CRT has proven its ability to develop innovative new repair processes," noted Nicolas Potier, Vice President, Support, Services & MRO at Safran Aircraft Engines. "Adding their capabilities to our network provides a major asset to support our customers' operations worldwide. It also reflects our industrial strategy of providing a world-class MRO source on each continent."

The acquisition is subject to regulatory approvals and is anticipated to be finalised by the end of 2024. The LEAP engine, a major commercial success, has over 7,500 units delivered and 10,600 on order, reducing CO2 emissions by 15% to 20% compared to previous generations while also cutting noise levels.

## ITOCHU enters aircraft aftermarket with Killick investment

ITOCHU Corporation (ITOCHU) has made a strategic investment in Killick Aerospace (Killick) a global provider of aftermarket solutions for airlines, maintenance, repair, and overhaul organisations (MROs), lessors, and asset managers. Killick specialises in delivering commercial aircraft and engine solutions for Airbus and Boeing platforms. This investment signifies ITOCHU's entry into the aircraft aftermarket sector, complementing its existing aircraft leasing operations. The aircraft aftermarket industry is set for substantial growth, driven by a strong recovery following the COVID-19 pandemic. In the commercial aircraft maintenance sector, the use of re-certified parts from approved repair facilities, known as Used Serviceable Material (USM), has been rising steadily. The demand for USM is forecast to grow to around $US11 billion by 2032, which is approximately 1.5 times the current market size. With air passenger numbers reaching record highs, the demand for Killick's USM solutions has never been more critical. Utilising USM not only helps airlines reduce costs but also shortens lead times for parts procurement and supports environmental sustainability. Killick has been in the aircraft aftermarket sector for nearly two decades; headquartered in Ireland, Killick operates across key global markets, including the United States, the United Kingdom, Singapore, and Australia. In recent years, Killick has expanded its offerings beyond USM to include the distribution of Nitrogen Generation System (NGS) components and other essential equipment manufactured by Honeywell for Boeing aircraft. With distribution centres in North America, Europe, and the Asia-Pacific region, Killick maintains a comprehensive inventory of readily available equipment, ensuring world-class service for its clients worldwide. ITOCHU has a well-established presence in the commercial aerospace industry, primarily through its aircraft leasing and management services. By leveraging synergies between ITOCHU's expertise and Killick's aftermarket capabilities, the partnership aims to deliver high-quality, customer-focused solutions that cater to the evolving needs of the aviation industry. As part of its management policy, "The Brand-New Deal: Profit Opportunities are Shifting Downstream," ITOCHU is accelerating growth investments, starting downstream and expanding into new business areas. Through its collaboration with Killick, ITOCHU plans to broaden its involvement in the commercial aviation sector and contribute to the sustainable growth of the aviation industry.

**Swiss Aviation Software** (Swiss-AS) has entered into a cooperation agreement with **QOCO Systems** to integrate its advanced tool management solution with AMOS. The integration of QOCO Systems' SaaS solution, MROTools.io, will enhance tooling management efficiency for AMOS users, providing better access to tools when needed through its connection to the AMOS M&E system. Tool availability issues are a significant cause of delays, often leading to substantial operational costs for airlines. This complementary solution aims to reduce these issues, boosting overall operational efficiency, with the target launch set for the end of 2024. MROTools.io is among the first products, along with Lufthansa Technik's Digital Tech Ops Ecosystem offerings from Aviatar and Flydocs, to be integrated using the new AMOS framework, AMOShub, for secure message exchange. This implementation showcases the flexibility and functionality of AMOS in improving collaboration and interoperability within the aviation maintenance industry. QOCO Systems is a Finnish software company specialising in the aviation industry. Its clients include notable names such as Rolls-Royce, Finnair, and several other airlines worldwide. With over 50 professionals in aviation and software, QOCO is experiencing significant business growth.


American Airlines adds nearly 500 aviation maintenance jobs © *AA*

**American Airlines** has unveiled plans to create nearly 500 new aviation maintenance positions and expand heavy maintenance operations at its bases in Charlotte, North Carolina; Pittsburgh; and Tulsa, Oklahoma. This increase in headcount will enable the airline to undertake more heavy maintenance work at these sites. "This growth enhances our maintenance capacity and ensures long-term stability by developing a pipeline of future team members, which is crucial for our ongoing efforts." said Greg Emerson, Vice President of Base Maintenance and Facilities at American Airlines. This announcement follows the recent addition of over 300 jobs at American's Tech Ops – Tulsa maintenance base, supported by a US$22 million grant from the State of Oklahoma's Business Expansion Incentive Program in 2023. The grant is aiding the expansion and enhancement of the world's largest commercial aircraft maintenance base, including the engine repair and overhaul facility. "We are very thankful to the State of Oklahoma Department of Commerce for this grant," Emerson noted. "Thanks to this funding, we have already created hundreds of high-paying, skilled jobs in the Tulsa area and are continuing to upgrade our state-of-the-art maintenance facility." The new aviation maintenance positions include: 133 roles in Charlotte (including 122 Aircraft Maintenance Technicians (AMTs)), 44 in Pittsburgh (including 40 AMTs), and 321 in Tulsa (including 227 AMTs). The recruitment often starts while candidates are still studying. The airline partners with aviation maintenance schools nationwide, such as Tulsa Tech, West Los Angeles College, and the Aviation Institute of Maintenance, to inspire and prepare future mechanics. These students benefit from regular interactions with American's Technical Operations team, gaining valuable guidance and experience during their training. Top-performing students are assured interviews with American Airlines upon graduation and obtaining their FAA Airframe and Powerplant licences. The airline collaborates closely with aviation maintenance schools nationwide, offering hangar visits, participating in campus events, and donating aircraft parts to facilitate a practical, hands-on learning experience for students.

**AerFin** has announced the opening of a new office in Singapore, further extending its global footprint. This new location adds to AerFin's existing offices in London Gatwick, Cardiff, Dublin, and Miami, establishing a local presence in some of the world's premier aviation and aerospace hubs. The Singapore office, located in Raffles Place, will be led by AerFin's newly appointed Senior Vice President (SVP) for Asia Pacific, Paul Ashcroft. With extensive commercial and technical expertise from previous leadership roles at Cathay Pacific, General Electric, and Rolls-Royce. Ashcroft also serves as President of The Royal Aeronautical Society's Singapore branch. Since 2016, AerFin has managed inventory in the Asia-Pacific region. Given the expected fleet growth and the need for strategic management of fleet retirements and transitions in the region, the company aims to build on its success and better serve its customers in the area. Earlier this month, AerFin launched its new brand, reflecting its core values and commitment to innovative aviation solutions. The refreshed logo and colour scheme emphasise its purpose to "breathe new life into aviation" and its vision to be the most trusted partner in the aviation aftermarket.

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# Turning Surplus Parts Into Cash

## Managing inventories effectively

By David Dundas

For many businesses, inventory management can be critical to overall success. However, unlike MROs, demand for products can usually be easily managed and future demand accurately forecasted. Beyond that, inventory levels are not usually based on 'worst-case scenarios' and it is not usually a financial catastrophe if a part or product has to be put on back order with delivery due somewhere between two days and a week. How many times have we been told that before we can get our car back from the garage or our washing machine working again, we have to wait for a part to be ordered? However, our car is different to a Boeing 737 MAX or Airbus A320 with upwards of 5,000 passengers in numerous destinations who are depending on us to be there for them over the next few days! Those MROs contracted to keep airplanes in the sky and not on the ground don't have the luxury of obtaining parts on an 'as and when needed' basis. If you are contracted to keep an aircraft fully operational, you need to hold sufficient inventory to cover pretty much every eventuality for the need to replace a worn-out or failing / failed part. And aircraft parts' inventory is frighteningly costly to maintain and ties up so much working capital. However, as we will discover, this is a very simplistic overview of the situation and there are many other factors which have to be taken into account when managing inventory, and especially surplus inventory. After all, how did that surplus occur in the first place – poor management or customers changing their requirements?


Lindsay Cooper, Head of Asset Management, AJW Group

### So, what are the most common reasons for excess inventory in the first place?

The aviation industry is unpredictable, which is why having an effective inventory strategy is vital. Managing surplus inventory with precision is a balancing act that requires a careful evaluation of demand patterns, historical data, and lead times. MROs can overestimate demand and

> ***"As an MRO, AJW Group continuously develops its stock management and logistics solutions."***
>
> *Lindsay Cooper, Head of Asset Management, AJW Group*


experience unexpected supply chain issues or unscheduled disruptions all of which could lead to excess stock. Low inventory turnover or older aircraft being retired can leave an MRO with a stock of obsolete parts, which may lead to excess stock of certain lines. In other instances, a business may make the decision to bulk purchase inventory items either for financial reasons or to accumulate safety stockpiles at a time when the industry is thriving only to later experience a shift in the status of the industry leaving them with a surplus.

Some choose to invest in certain application types with long lifespans as their components are going to be trading for years to come and are likely to hold their value. Conversely, other application types hold more risk for investment, where retirements and teardowns are more frequent, and hence the market is likely to be flooded with an additional supply of components. Managing inventory requires careful forecasting so MROs must have a strong inventory strategy and thoroughly research their customers' needs to maintain healthy inventory levels, while avoiding a surplus. It is a balancing act.

Nigel Christie, Sr. Vice President and Managing Director, GA Telesis

Lindsay Cooper, Head of Asset Management, AJW Group explains further. "As an MRO, AJW Group continuously develops its stock management and logistics solutions. By utilising advanced data analytics, we can accurately forecast demand, monitor turnaround times, and adjust inventory levels, accordingly, ensuring that the right products are available when and where they are needed thereby avoiding a surplus, or shortage. Digital transformation has been the most significant development brought about by supply chain disruptions, as it has allowed us to streamline our procurement processes and operational efficiency."

"Surplus inventory for an airline is a common subject at board meetings. There are a number of good reasons for and airline to accumulate spares, to name a few we could say: stocking of critical spares to avoid AOG situations, redundancy due to obsolescence and the most common, over stocking due to over forecasting upon initial provisioning on a new aircraft type to the fleet. However, surplus can also result from aircraft fleet changes, example when an aircraft type is no longer operated by an airline," says Carlos Garofalo, Manager of Asset Life Cycle and Components at AMROS Global, feelings shared by Barry W Startz, Sr. Director TAT Trading and Leasing, TAT Piedmont Aviation Component Services. And still there are more reasons, as highlighted by Nigel Christie, Sr. Vice President and Managing Director, GA Telesis as he advises that: "when airlines acquire new-generation aircraft early in their life, there is no data available regarding previous reliability. Parts

> ***"When airlines acquire new-generation aircraft early in their life, there is no data available regarding previous reliability."***
>
> *Nigel Christie, Sr. Vice President and Managing Director, GA Telesis*

Ray Kane, Head of General Aviation and Aftermarket, IBA

provisioning will be based on the OEM's MEL, and they will often overprovision. In addition, issues in the supply chain or a longer repair process may cause the operators to buy additional components to cover these delays, resulting in future excess."

Ray Kane, Head of General Aviation and Aftermarket at IBA is very much in agreement with much of what has been said above, but identifies a couple of other key points, questioning whether the MRO has a strategy to scrap, sell or repair parts, whether there is excessive storage space that has simply become "holding stations" or whether the inventory itself is / can be used as loan security to leverage financing for other assets? Once again, Sarah Klein Vice President, Operations at Setna iO and Armando Filho, Director of Trading and Material Management at Vallair are very much in agreement concerning a mismatch between forecasted and actual demand for parts as a source of excess inventory, thought ultimately, Klein identifies one main 'culprit', stating that "poor inventory management practices are often at the heart of the issue. This can occur when Airlines and MROs buy excess materials, misjudge market prices, or fail to accurately track inventory levels across multiple locations. This problem ultimately comes down to accurate and agile data management. Not only do systems need to be in place to reduce data silos, but extreme attention to detail is required to stay agile in an ever-changing market." Meanwhile, Filho warns: "Companies need to consider OEM/supplier lead time, transit time, customs and other factors. If they don't have the right tools to consolidate this information and control minimum/maximum stock and restocking levels, they are likely to experience shortages or excess inventory. While some deviations can be expected in any process these must be managed to minimise impact."

At ILS (Inventory Locator Service), Greg Creekmore Regional Sales Manager – Americas has neatly divided the problem with excess inventory as one faced by both airlines and also MROs. For airlines, he sees that the causes of excess inventory can be traced back to fleet adjustments, aircraft lease returns, sales of fleet types and overstocking for operational needs. From the MRO's perspective, he has identified the expiry of support contracts, the shifting to an alternative MRO, or hedging for spare parts also being to blame.

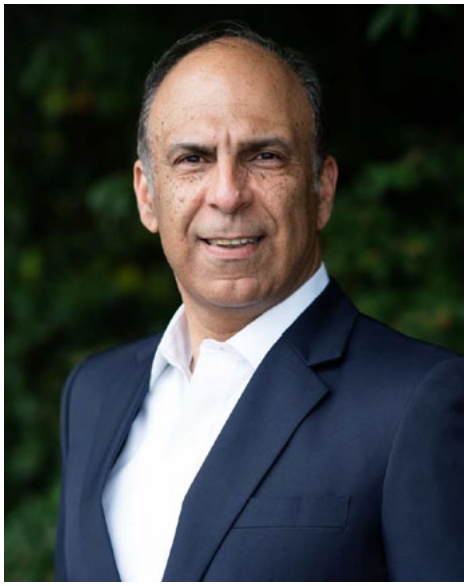
Randal Richey, the company VP Programs at VAS Aero Services, sees one of the problems as being 'caught between the Devil and the deep, blue sea' whereby it costs money to maintain a substantial inventory, yet there are financial penalties for failing to complete a maintenance event. "This need, coupled with complex fleets, high aircraft utilisation and supply challenges, make optimising inventory a constant challenge. Improved management systems, AI forecasting, on-time delivery and real-time visibility via RFID can help, there will always be surplus materials that need to be disposed of and monetised," he points out. While Mike Cazaz, CEO Werner Aero, LLC touches on most of the points highlighted above, he does highlight one other aspect that can create excess inventory, as in the case of bankruptcy, whether an MRO or carrier.

> ***"Poor inventory management practices are often at the heart of the issue."***
>
> *Sarah Klein, Vice President Operations, Setna iO*

## Who is best placed to sell surplus inventory?

There are no legal restrictions regarding who is allowed to sell aircraft parts, whether new or used. Where the law and regulations come into force is with the authentication of such parts, and the qualifications required in order to fit those parts. However, selling aircraft parts requires knowledge, skills and an understanding of the market to a level that is unique to aircraft parts. As a result, unless you are a major carrier with your own in-house MRO set-up that is capable of successfully buying and selling inventory, it is generally accepted that even when fees or commissions are paid, experienced traders can still achieve far better prices for their clients than were the clients to sell inventory themselves. As Nigel Christie points out: "Airlines' core business is flying passengers; they do not have the resources

Sarah Klein, Vice President Operations, Setna iO



Mike Cazaz, CEO Werner Aero

> ***"There will always be surplus materials that need to be disposed of and monetised."***
>
> *Mike Cazaz, CEO Werner Aero*

of an aftermarket specialist like GA Telesis, with a global presence and hundreds of employees dedicated to USM sales. We also have uniquely developed data systems designed to optimize sales of this material."

When it comes to selling surplus inventory, Carlos Garofalo points out that it all depends on the quantity, quality, market value (as opposed to NBV) of the surplus inventory on hand, and most importantly, availability of in-house expertise to process and liquidate in a cost-effective fashion to result in a benefit. This is backed up by Armando Filho, who advises that: "airlines and MROs may not have an experienced team to manage such sales. If this is the case, it is better to have a consignment agreement with a specialist organisation like Vallair to manage such sales for you. This approach avoids diverting your team from their primary responsibilities for something that is already causing storage costs, instead of wasting time and money trying to manage the surplus inventory yourself. A specialist can manage the process on your behalf in a professional way."

When it comes to who is best to sell surplus inventory, it is difficult to avoid the obvious facts that we touched on earlier. USM (Used Serviceable Material) sellers have extensive knowledge and resources for selling and shipping aftermarket parts and established sellers already have a network of potential buyers, making the sales process quicker and more efficient. Consequently, companies can focus on their core operations while the USM seller manages the excess inventory. As ILS specialises in such a service, Greg Creekmore is well placed to come to the following conclusion: "While companies can sell their surplus inventory directly, it is often more effective and efficient to consign it to established USM sellers who have the expertise and resources to maximise returns." In addition, Sarah Klein makes a strong case for different reasons as to why selling surplus inventory in-house makes little sense. "Each company has a different level of market knowledge and varying capabilities for handling the entire sales process from procurement to warehouse management and quality control standards as well as repairs, shipping, and managing payments. Companies without these organisational pillars likely do not have the processes for effective individual sales."

While not in disagreement with the above, there are those companies who have the resources and scope to create in-house sales capabilities for surplus inventory. Barry W Startz comments that: "I have had great success selling surplus inventory with Piedmont and Turbine Aero. We developed our own Trading Department. I have also used other companies to help move the surplus inventory. Most of the time the offer is too low, and we have scrapped the surplus to get the tax credit. Consignment is also a good option." In turn, Ray Kane asks a very pertinent question. "End user relationships are key here - are there established sales channels?" He also points out that inventory sales is not part of a carrier's core business, whereas an MRO at least will be more focused with modification standards and maintenance orders, adding that there is greater crossover with an MRO to manage its inventory. While many companies attempt to enter the USM marketplace, their efforts are often short lived and underperforming. Simply owning the materials and having the desire to generate USM sales are poor reasons to adopt the "go it alone" approach. Those who do find sales are difficult, growth is slow and revenue production marginal, at best. Surplus and excess stock sales and marketing require expertise and resources that many operators and owners just do not have, such as accurate parts valuation and pricing, and a distribution network and customer base ready to accept the materials. Randal Richey makes a valid case for specialists. "While airlines and MROs are experienced consumers of product, there is a dramatic difference when it comes to selling USM. Smart airlines and MROs focus on their core business and leave the business of USM parts redistribution and aftermarket sales to trusted USM supply partners like VAS Aero Services." This is further backed up by Mike Cazaz who comments that: "Selling surplus inventory in large quantities does require an infrastructure to include salespeople,

Greg Creekmore, Regional Sales Manager – Americas, ILS

> ***"It is often more effective and efficient to consign it to established USM sellers who have the expertise and resources to maximise returns."***
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> *Greg Creekmore, Regional Sales Manager – Americas, ILS*

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> ***"While airlines and MROs are experienced consumers of product, there is a dramatic difference when it comes to selling USM."***
>
> *Randal Richey, VP Programs, VAS Aero Services*

Randal Richey, VP Programs, VAS Aero Services

sophisticated software and technology, warehouse space and understanding of the market. Usually these are not the strong areas of airlines or MROs."

To close, Lindsay Cooper advises that "selling surplus inventory item by item can be time consuming, especially if the items are for near obsolete aircraft. It may not be worth the effort... Whether a company has the resources and knowledge to do this is entirely dependent on its internal capabilities, sales network, and established industry relationships." To further make her point, she tells us that: "AJW has been around for 92 years, building relationships and collaborating with key players across the industry."

## So, what options are available to MROs and airlines to monetise surplus inventory?

Airlines and MROs have several effective options for monetising their surplus inventory. Aftermarket aircraft part suppliers offer avenues like direct sales and consignment to help convert excess parts into cash. One can develop an in-house trading department as suggested by Barry W Startz, or team up with a consignment company. Alternatively, Airlines and MROs could share stocks to generate more stock rotation/consumption, as suggested by Armando Filho. Carlos Garofalo is keen to point out that irrespective of any choice regarding the disposal of excess inventory, "The main idea is to maximize a return in trade of resources and time, because surplus can be non-working capital, which we all want to avoid." Randal Richey also provides sound advice. "Airlines and MROs have several options, but not all are equal. The best solution is tailored to individual corporate goals. One company may seek a quick cash infusion via package sales and turn to a trusted USM marketing partner that becomes their routine, established outlet for their surplus inventory. Additionally, the inventory owner may issue an RFP and invite customers to bid on a package of excess parts, or even whole assets. Others may have a longer-term approach that seeks to maximise returns via a consignment and re-distribution model."

Meanwhile, Mike Cazaz sees a clear choice. "There are usually two common options: outright sale as a package or consignment sale. Each option has its own advantages and disadvantages. The main difference between the two is, get your money upfront vs. betting on getting possibly more money over a longer period of time. It is up to the owner of the inventory to prioritise their preferences and decide which option to choose." Lindsay Cooper expands further on this: "As mentioned, one approach is to sell the surplus on a consignment basis, where the inventory is handed over to a third party who specialises in selling aviation parts. This is particularly useful when the third party can access markets or regions where the original owner does not have a strong presence. For example, AJW Group has extensive market reach and specialist knowledge, but generally we don't consign our inventory unless it offers access to a different market sector. However, other MROs might choose to consign their inventory to us if they lack the expertise or market access to sell the parts themselves."

When it comes to choosing which method to dispose of excess inventory, James Grey, Director of Sales & Purchasing at EirTrade Aviation advises that: "There are several options, but in our opinion the best is to work with a strategic partner in the USM market, such as EirTrade. Selling surplus spare parts outright is often the most lucrative and efficient option for airlines looking to monetise their inventory. The resale of high-value components like core engine parts, LRUs and avionics can quickly free up capital and reduce storage / maintenance costs." There are a number of companies with a very strong history of working with partners through consignment programmes, where the airline or lessor continues to hold ownership while those companies market and sell the excess stock on their behalf. This approach is something of a slower burn compared to an immediate outright sale, but it allows the companies to maximise the owner's returns by leveraging their market expertise and network. By

Carlos Garofalo, Manager of Asset Life Cycle and Components, AMROS Global

> ***"The main idea is to maximize a return in trade of resources and time, because surplus can be non-working capital, which we all want to avoid."***
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James Grey, Director of Sales & Purchasing, EirTrade Aviation

> ***"There are several options, but in our opinion the best is to work with a strategic partner in the USM market."***
>
> *James Grey, Director of Sales & Purchasing, EirTrade Aviation*

using a specific third party to handle the entire sales process, airlines/MROs/ Lessors can continue to focus on their core operations while benefiting from optimised sales and higher returns.

Ray Kane is very much in favour of one particular option for monetising surplus inventory, and that is a consignment partner. "Consignment partners are ideal as storage cost is eliminated whilst payment for the service is proportionate at the point of component sale. They also take care of the entire handling and sales process, from packaging, marketing, and shipping," he advocates. This is backed up by Nigel Christie as he explains: "GA Telesis has developed consignment programs over the years that have generated over US$1 billion of dollars returned to the airlines/MROs/ lessors for their surplus inventory. We provide a single solution for all current and future surplus, be it components, engine material, or through the disassembly of whole assets. GA Telesis takes responsibility for moving all the inventory to our global distribution centres, investing in repairs where needed, and marketing and selling the material while having minimal impact on the airline's resources."

Greg Creekmore touches on most of the common solutions, but also comes up with some interesting options, identifying direct selling, consignment, online marketplaces, auctioning, trade-in deals, scrap and recycling, and finally leasing, saying that "a combination of these methods can optimise returns while efficiently managing surplus inventory." However, Sarah Klein has identified another critical element which is essential for positive results when choosing to work with an outside agency. "A strong partnership fosters a deeper understanding of each party's needs, enhances collaboration, and leads to more effective inventory management and mutually beneficial relationships," she says, adding that: "At Setna iO, for example, we provide a direct pipeline to a broad network, enabling airlines and MROs to quickly turn surplus inventory into revenue."

## Which parts have no value in the surplus inventory market

It is accepted that usually, pre-modified or obsolete parts are the hardest to sell, either with targeted sales campaigns or through consignments. If you don't have any kind of buyback programme with OEM/ distributors, those parts are the ones that will be scrapped in the end. Armando Filho recommends: "It's worthwhile talking to an expert about this, at Vallair we have a strong focus on extending the file and value of aircraft assets, including parts." Randal Richey at VAS Aero Services is extremely positive and believes that all parts have a value. "The good news is there is a market for most materials. In some cases, this may be a rather small market with niche players or creative recycling for sustainability, but the world of USM aftermarket marketing and sales can assist with most material types. The key to value recovery is addressing the market's need for quality and regulatory compliance with all materials." Along the same lines, though approaching the 'problem' from two different angles, Mike Cazaz at Werner Aero sees that if you think beyond the obvious, there's always a demand for all aircraft parts. "There are parts that have been obsolete, like some avionics and some parts that support aircraft that are no longer in service. That is assuming we are talking about use for aircraft operations because there are ways to monetise some parts outside of aviation, like using them as furniture for example." Along the same resourceful lines, Nigel Christie at GA Telesis sees every aircraft part that has been manufactured as being of value save for BFE Chapter 25 material.

In truth the answer to the question lies within as the question relates to the surplus inventory market, not 'a marketplace' in general. Consequently, as Lindsay Cooper at AJW Group points out, "if older aircraft are no longer flying, the demand for their parts is no longer there, making the inventory for these aircraft obsolete with no market value," while Carlos Garofalo at AMROS Global makes reference to aircraft parts which have a 'shelf life' and which become obsolete if they can't be offered back to the OEMs. He is backed up by James Grey at EirTrade Aviation who explains that "Expired or outdated components such as batteries, oxygen generators, or emergency slides lose their value once they reach the end of their service life. Even if these parts are physically intact, once they hit their expiration date they are deemed essentially scrap." He explains further that: "Unserviceable, scrap or beyond economic repair (BER) parts often have little to no value, unless they can be cannibalised for usable subcomponents. However, there is a growing acceptance of PMA and DER repairs on certain material, usually where there is a problem with supply. In these cases, EirTrade has managed to salvage many potentially BER parts with outside of OEM repairs. This only works in certain cases though, and we are extremely careful to discuss with our partners/customers on which units are suitable for such repairs." Barry W Startz at TAT Trading and Leasing also makes a very valid point in saying that if there is an overabundance of certain parts, then consequently they have little to no value.

Beyond what has been mentioned above, Ray Kane at IBA has identified low-life, zero-life, life-limited and hard time parts, as well as certain aerostructure components such as flight control surfaces which are often in abundance as having no real value. Meanwhile, Greg Creekmore at ILS accepts that there are parts with no value in the surplus market but is keen to focus more on alternatives for recouping value such as recycling, where metals and other raw materials can be recycled to


Barry W Startz, Sr. Director, TAT Trading and Leasing TAT Piedmont Aviation Component Services

recover some of their intrinsic value. Then there are tax write-offs, where declaring the surplus inventory as a loss in financial reports can provide tax benefits. Finally, there is donations or repurposing, where there is the opportunity to donate parts for educational purposes or repurposing them for non-aeronautical uses—such as furniture, art, jewellery, and other creative applications. "Utilizing these methods can help recoup some value from an otherwise non-marketable surplus inventory," he comments.

## What can be done to adjust supply chain or inventory management practices to minimise surplus inventory in the future?

The key element of inventory management is to predict a change in demand rather than having to react to it; in other words, be proactive as opposed to reactive. Companies should perhaps adopt a strategic, data-driven approach to supply chain and inventory management. This involves maintaining a careful balance between stock availability and market demand, ensuring inventory levels are optimised to prevent overstocking while still being prepared for unexpected disruptions. By continuously monitoring aging stock and streamlining decisions on what to monetise and when, companies can ultimately reduce surplus inventory. A further element is maintaining a robust technical record system.

The aviation industry depends on precise documentation to maintain safety, compliance, and financial value so it is essential to have accurate trace records to ensure parts are traceable, airworthy, and marketable. Without proper records, it becomes impossible to sell parts in this highly regulated and safety-conscious sector. For sellers, maintaining detailed records is not only about complying with regulations but also about protecting the value of their inventory and ensuring the safety of the entire aviation ecosystem. Lindsay Cooper explains further: "AJW is strategic about its inventory investment and as a result are better positioned to weather inevitable supply chain uncertainties. We proactively and continuously source products from teardowns to replenish inventory helping to meet our customer's needs and maintain steady parts supply. Maintenance and repair are crucial to operators to avoid AOG situations, so we try to gain a thorough understanding of our customer's needs to best plan our inventory levels." On top of this, Carlos Garofalo has identified two key areas – visibility and communication. "Visibility of the current and future stock, making sure there is an efficient and effective parts life cycle management; this can be achieved by digitalizing processes within the internal warehouse and planning functions. Communication with OEMs and vendors, to know first had how and when products are to evolve and what is really the reason and needs to have spares sitting on the shelf or contracted to pool providers," he explains.

Nigel Christie advises that through component inventory leasing of parts, "the airline or MRO can lease material from us anywhere from three to 12 years, knowing they can renew or return the inventory at the end of the term. The residual value risk remains with GA Telesis and protects the airline from a future surplus situation. It also helps with cash flow as the initial upfront investment in the components lies with us." Ray Kane is a proponent of "Access to parts rather than ownership is preferred, but this must be balanced with guaranteed availability of "No Go" items to avoid disruption." He adds that demand analysis to classify the importance of a component and its exchange frequency is key, while preventative maintenance programmes can address known issues and extend component lives, with the aim being to limit excess stockholding.

Greg Creekmore delves deep into the options available to help with minimising surplus inventory, including leveraging operational experiences, data analysis of past operational experiences to understand supply and demand trends by using internal sources, and external market intelligence from ILS, then adjusting inventory levels according to these insights. Like Mike Cazaz who believes that: "With AI technology coming into the global market, we will soon see airlines utilizing AI to predict their inventory usage which will provide better inventory management and significant cost reduction. AI technology is the future of our industry," Creekmore advises utilising advancements in AI, such as AI-driven predictive analytics to forecast demand more accurately and adjust inventory levels in real time. He also touches on supplier performance guarantees, a collaborative supply chain, just-in-time inventory and strategic overstocking. "By combining these practices, companies can create a more efficient and responsive supply chain, reducing the likelihood of surplus inventory and optimizing operational efficiency," he concludes.

In a similar vein, improving forecasting is crucial to inventory management—paying close attention to data patterns that signal shifts in demand and being agile in adjusting supply before these shifts have a significant impact. You cannot manage inventory on a macro-level. Details matter and inventory management requires daily attention. Additionally, centralising decision-making and implementing a comprehensive data strategy can provide a better path for demand planning. This approach helps in understanding fleet utilization, current inventory levels and locations, and maintenance trends, leading to more informed and strategic decisions that can prevent excess stock.

As Sarah Klein puts it: "Even with the best forecasts, some level of excess inventory is inevitable. This is why having an effective outlet for disposing of this surplus is imperative. This could involve partnering with aftermarket suppliers, like Setna iO, engaging in consignment programmes, or exploring other sales channels. By building partnerships within these channels, companies can ensure that surplus inventory is managed efficiently, reducing bottlenecks and freeing up space for more strategic and applicable inventory use."

Putting theory into practice is sometimes not so easy, but Barry W Startz presents two interesting ideas. "The best way I have found to minimise surplus inventory is to develop a supermarket strategy that is on the shop floor with the inventory levels needed to support the product just like the Produce section of a grocery store. This will keep the inventory from having any surplus," he explains. "Another good way to minimise surplus is to have a great ERP System that only allows inventory to be purchased based on the forecast and demand. An Analysis will also need to keep up on the customer demand based on the retirement schedule of the product," he adds. As an alternative suggestion, Armando Filho looks more towards a good stock management tool which "must be aligned with your enterprise resource planning (ERP). This can then consolidate your forecasted needs versus historical consumption, lead time, transit time, and actual stock to generate more reliable requests for purchasing and so on. Such data must be evaluated to eliminate wrong inputs/information because if you do not set up stringent filters before implementing the tool, you can still keep generating surplus. Inevitably a surplus will still occur, but this needs to be controlled and minimised through regular revisions to your ERP, inventory auditing, and so forth, to generate reliable information and improve efficiency to save costs."

Armando Filho, Director of Trading and Material Management, Vallair

Over the last decade there has been a cultural shift from the old norm of stocking everything that could possibly be needed, to having on-hand (or at your immediate disposal) only the most critical parts. Aircraft and engine manufacturers, along with their OEM partners, are doing their part at reducing excess and improving fleet reliability, thanks in some measure to aircraft CMS (Central Aircraft Maintenance Computer) systems. The CMS constantly monitors aircraft and engine systems in real time and provides maintenance data that is optimised and connected to the airlines' inventory management systems. Randal Richey points out that: "It is this full connectivity and advanced analytics that provide the optimal level of materials forecasting. While no single recipe exists, many common elements shape successful inventory management. This suite of solutions used to reduce inventory needs often includes Power by Hour (PBH) or other flight hour/component services programs, an onsite managed hardware and expendable materials solution and driven predictive analytics."

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It would seem that the landscape for effective parts inventory management is changing and, as a consequence, one of the greatest problems facing MROs and carriers, excess inventory, may soon be less of a problem. It is unlikely that it will disappear completely owing to the requirements to avoid AOG incidents through lack of provision for 'unforeseen circumstances or events', but it can be mitigated. Thanks to more effective strategies, the adoption of AI to streamline inventory management practices, and advancements in technology that provide more valuable data and real-time monitoring results, a more 'informed' approach can be taken when it comes to managing inventory, enabling businesses to operate in a more proactive as opposed to reactive manner.


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# An Insight into the World of Digital Management Solutions For Maintaining Aircraft Records

By David Dundas

There is no clear moment in time when the Digital Age began, but around the beginning of the 1980s, a time when the world wide web coincidentally appeared, we entered a new era of digitisation. According to Dr Martin Hilbert PhD., "We estimate the beginning of the "digital age" to be in 2002, when the world was first able to store more digital than analogue information in its technological tools. In the late 1980s, still less than 1% was in digital format, whereas in 2012, 99% of the world's stored information was digital. During these decades, the world's technological capacity to communicate and store information has grown 25% to 35% per year (doubling every 2.5-3 years)."

While the emergence of the digital era saw the development of many new businesses, it also presented the opportunity for many other existing businesses to streamline and improve the efficiency of their operations. This was especially so in the aerospace sector, and in particular the MRO environment. However there have been many challenges faced during this transitional period, primarily those involving the transition to paperless operations.

We were keen to understand how one particular aspect of MRO operations has transformed itself to embrace digital technology, the maintenance of aircraft records, and in particular how easy the transition from paper to paper-less operations has been. The following is tremendously inciteful information kindly provided by eight highly respected companies who operate within the field of digital management of aircraft maintenance records, whether as an MRO operator, or as a software developer.

Kris Volrath, SVP of Product, Veryon

## Aircraft records. What they are and why they are so important

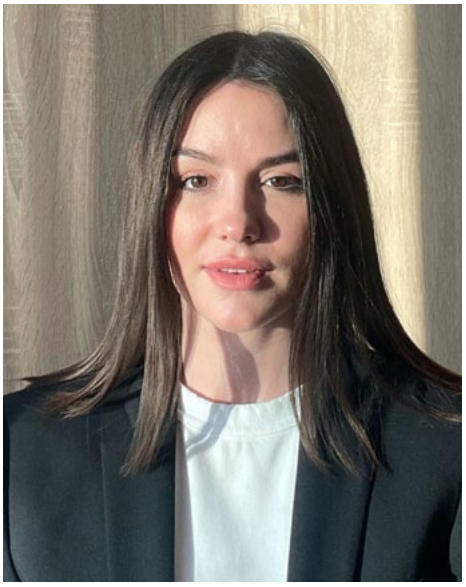
To begin with, we felt it would be useful to establish what was included in aircraft records and why these records were so crucial to the aviation industry. However, one fascinating comment was made by one of our contributors that highlights just how far the latest technology has influenced the creation of digital aircraft records. Records are no longer produced just by humans. Stephan Erben, Senior Portfolio Manager, Dassault Systèmes points out that there are also "Systems of records" which are "digital systems that primarily store data generated by various equipment embedded in aircraft, as well as produced by devices used during maintenance and inspection activities."

In general terms, we have been told that aircraft records are a comprehensive and continuously generated record of all operations and maintenance relevant to a specific aircraft, including maintenance, repairs, and inspections. Giovanni Renga, Chief Technical Officer at AMROS Global describes these records as being "similar

Joshua Sebastiampillai , Digitalization Manager, MTU Maintenance Lease Services

to a history book with all evidence of anything that was ever done on an aircraft," while Kris Volrath, SVP of Product, Veryon describes them as "the lifeblood of an aircraft."

However, these records are not just there for the MRO company's benefit. These records are also needed for proof of compliance with regulations, the aviation industry being one of the most heavily regulated of industries by the likes of the Federal Aviation Administration (FAA) in the U.S. and the European Union Aviation Safety Agency (EASA) in Europe, as examples. Even from the engine point of view, Joshua Sebastiampillai, Digitalization Manager, MTU Maintenance Lease Services points out that: "we can only talk about engine records. They either certify or build the basis of the certification that an entire engine, and each installed component, part and piece of hardware, is airworthy and can be used for flight. No engine or aircraft is allowed to be put into operation without them."



Kate Katrachenko, Customer Success Manager and Account Executive at Fluix

Kate Katrachenko, Customer Success Manager and Account Executive at Fluix is keen to point out one of the financial costs of failure to maintain accurate aircraft records: "Failing to maintain accurate records can lead to different consequences. For example, the FAA can impose civil penalties of up to US$400,000 per safety violation, while the EASA can issue fines based on the severity of non-compliance." Looking at the financial cost as well, but from the sales aspect, Navi Maharaj, VP, Head of Technical, The Aircraft Group, part of Kellstrom Aerospace Group makes it clear that: "These records are vital not only for ensuring the airworthiness of the aircraft but also essential for facilitating its sale and transfer by documenting its operational and maintenance history," while Jack Clancy, Product Specialist, REDiFly adds a further warning: "Inadequate records can lead to financial penalties, decreased aircraft value, and increased maintenance costs, directly impacting operational efficiency and financial health."

## How the management of aircraft records has evolved over time

All our respondents talked about the transition from paper to paperless aircraft records, and this helped highlight three major improvements. With digital records, there is now less chance of records getting lost or damaged. Beyond this, there is far greater efficiency in the transfer of information and the speed in which it can be acted upon. The third point relates to how the records are produced as today, many elements within the latest aircraft have their own individual sensors that relay real-time data not only to those on board the plane, but maintenance teams on the ground who are responsible for keeping the plane airworthy.

Giovanni Renga, Chief Technical Officer, AMROS Global

> **"This evolution has been driven by technological advancement and the need for improved efficiency, accuracy, and compliance with regulations."**
>
> *Giovanni Renga, Chief Technical Officer, AMROS Global*

Giovanni Renga points out that: "This evolution has been driven by technological advancement and the need for improved efficiency, accuracy, and compliance with regulations," while Kris Volrath highlights a key moment in the transition from paper to digital record keeping. "In 2016, the FAA published Advisory Circular 120-78A, which outlines the requirements that must be met for an organisation to adopt a paperless maintenance compliance programme. The fact that the FAA has adopted and promoted maintenance tracking programmes and paperless compliance is the indicator of an industry shift toward a more functional and streamlined approach to maintenance and the compliance required." Of course

> **"Failing to maintain accurate records can lead to different consequences."**
>
> *Kate Katrachenko, Customer Success Manager and Account Executive at Fluix*

> **"At The Aircraft Group, we offer consultative services to support both digital and paper record-keeping."**
>
> *Navi Maharaj, VP, Head of Technical, The Aircraft Group, part of Kellstrom Aerospace Group*

there is much more beyond the above. For example, "Computing power and artificial intelligence makes it possible to analyse massive amount of information, helping to transform unstructured content into structured information as well as to detect patterns or weak signals in gigabytes or terabytes of sensor data," says Stephan Erben.

There is, however, one thing that we shouldn't ignore when it comes to this digital transformation. Chris Kubinski, VP Worldwide Sales at CORRIDOR Aviation Service Software, a CAMP Systems Company reminds us of one important aspect: "I feel the human element will always be part of our processes, but the more we move forward with tools enabling us to work smarter, the better service we will be able to provide industry wide." Meanwhile Kate Katrachenko highlights a key element of this digital transformation at a time when carriers are doing all they can to minimise the overall weight of an aircraft to increase it's efficiency. "Traditionally, pilots carried 30-45 kg of paper manuals, checklists, and logs, which added unnecessary weight and clutter to the cockpit. By transitioning to digital records managed using lightweight tablets or mobile devices, airlines can reduce this number, which is always linked to cutting fuel consumption," she advises. We did some simple calculations as 45kg is roughly half the weight of an average male passenger requiring four litres of fuel to travel 100km. Thus, it would require two litres of fuel for the old paper logbooks and files to fly 100km. Now, if a commercial jet were to fly, say, 80 million kilometres in its lifetime of 30 years, those paper logbooks would have accounted for 1.6 million litres of fuel, the equivalent of 53,000 litres of fuel a year. And if you happen to be a carrier with a fleet of 100 aircraft, that's a lot of fuel!

Stephan Erben, Senior Portfolio Manager, Dassault Systèmes

Of course, not everyone has converted totally to keeping digital-only records, with Navi Maharaj pointing out that "At The Aircraft Group, we offer consultative services to support both digital and paper record-keeping. Our team of technical experts works closely with operators to ensure that critical details are accurately documented, including the management of aircraft and engine records, maintenance reviews, compliance with maintenance programmes, aircraft modifications and repairs, component tracking, and continuous record improvement." Giovanni Renga is also keen to highlight a couple of additional benefits of digital aircraft records, such as "enhanced data accessibility and transparency, and the reduction of many risks associated with transferring aircraft ownership and operator."

Jack Clancy sums up the current situation in a nutshell: "The evolution to digital records began with basic digitisation (scanning of paper records), and now encompasses advanced digital logbooks (eTechlogs) and maintenance software integrated with real-time data systems. For example, modern aircraft like the Boeing 787 and Airbus A350 utilise fully digital maintenance systems from inception, reflecting significant advancements in digital record-keeping."

Navi Maharaj, VP, Head of Technical, The Aircraft Group, part of Kellstrom Aerospace Group

## A little about the technology used for digital management

This was perhaps where we had the most interesting replies as the technology is so new, relatively, that there is no single system or form of technology that dominates the space, save perhaps for eTechlogs or techlogs. So, this is very much an element of MRO that is still very much in the developmental stage, and it will likely be a good few years yet before the technology used for the digital management of aircraft records looks anything like standardised.

Stephan Erben talks about the time it has taken to shift from on-premises solutions to an SaaS model, stating that "More and more MRO companies are adopting integrated platform technologies that operate in an SaaS model, utilising private or dedicated cloud-based solutions as Software as a Service," adding that "This technology is well suited to work in an extended enterprise mode enabling operators to share in a controlled way the information between maintenance teams, regulatory authorities, and within their own organisation."

> **"More and more MRO companies are adopting integrated platform technologies that operate in an SaaS model."**
>
> *Stephan Erben, Senior Portfolio Manager, Dassault Systèmes*

Paper documents are history © *Shutterstock*

Navi Maharaj makes a very valid point regarding the abundance of tracking systems and MRO IT software, but that simple PDF depository sites also play a significant role in storing these records. He adds that: "At The Aircraft Group for instance, we developed an in-house digital records archiving and tracking platform called Tag Fleet Online. This platform, which we introduced several years ago, streamlines the management of digital records and significantly reduces the costs associated with aircraft re-deliveries and transitions." Giovanni Renga also points out a couple of additional benefits of digital aircraft records, such as "enhanced data accessibility and transparency, and the reduction of many risks associated with transferring aircraft ownership and operator."

Not so long ago 'blockchain' technology was flavour of the month, and you could rarely pick up any 'tech news' without reading about numerous doors being opened by this new technology. That technology is too recent to be confined to the history books, yet it has been completely overshadowed by developments in the field of Artificial Intelligence (AI). Jack Clancy appears not to have taken his eye off the ball as he includes blockchain technology in his list of key technologies used in digital aircraft record management, including "cloud computing, which allows for scalable storage and global accessibility; blockchain for secure and immutable record-keeping; and Optical Character Recognition (OCR) technology to digitise manual entries with high accuracy. Additionally, software platforms provide comprehensive maintenance tracking and inventory management, which are integral to modern MRO operations. Digital solutions like the eTechlog can also be connected to push and pull data from those systems. Leading to digital records from day one and an integrated seamless workflow."

Meanwhile, while Kris Volrath lists 'the usual suspects' among the latest technologies used for creating digital records, he also touches on a real game-changer resulting from the use of these technologies. "Veryon Tracking provides a fully integrated solution for real-time visibility into data across departments. It enables seamless capture and updating of maintenance records from any location—whether in the hangar, on the flight line, or at the office. Maintenance issues can be tracked, and fleet health can be monitored in real time. The platform offers instant visibility into total aircraft times, upcoming maintenance items, discrepancies, logbooks, and work orders, all accessible from a single, user-friendly dashboard."

When looking at these technologies as a whole, it is clear there are other unmistakable benefits, as mentioned by Giovanni Renga. "These technologies help in digitising, indexing, and archiving maintenance records, ensuring seamless integration with existing systems and data analytics for predictive maintenance."

## So how does digital record keeping enhance operational efficiency?

Where do you start? The transformation of record keeping is almost as dramatic as the introduction of the world wide web to the dissemination of information across the globe. However, Navi Maharaj hits the nail squarely on the head with one crucial improvement when he comments that: "The significant operational efficiency I see is the ability to never lose a document again, as everything is stored in digital format rather than in filing cabinets, from

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Jack Clancy, Product Specialist, REDiFLY

> **"We have seen how implementing an eTechlog system can significantly enhance operational efficiency for air operators and MRO providers."**
>
> *Jack Clancy, Product Specialist, REDiFLY*

ensuring full transparency and accuracy to instant access to vital data related to the airworthiness of the aircraft, reducing human error and mitigating the risk of non-compliance disruptions."

It is clear that digital record keeping is capable of reducing the time and effort needed to maintain essential data. It has also streamlined and massively reduced the amount of time required to analyse all that data and as Kate Katrachenko points out, "pilots can [now] submit completed maintenance forms before they leave the cockpit, allowing engineers to start their work right away. This can minimise aircraft downtime, speed up maintenance tasks, and cut out repetitive manual work, which can delay flights or extend maintenance times."

Giovanni Renga is one of a number who have pointed out that 'managing' is something that many operators have struggled to do with aircraft records. "Currently with the analogue means, aircraft records are actually barely "managed" in the industry, creating a long chain of reaction of critical issues related to airworthiness and asset value. Digital aircraft records keeping finally gives us the tool at hand to deal with the vast amount of aircraft records in an efficient and effective way, facilitating quicker decision-making, reducing aircraft downtime, avoiding redelivery delays, track records issues and streamlining compliance processes." Chris Kubinski also touches on a new facet of digital management solutions which one could describe as akin to 'multitasking', as he comments that: "When managing records digitally, you have the ability to easily manage multiple items at once. This leads to efficiency gains throughout the process, from initial planning and staging of work to be performed, to capturing electronic signatures of technicians and inspectors during the job, to an expedited return to service for the aircraft."

The ability to map operational information from the aircraft and in-service activities ("real") to the specifications, failure modes, and reliability studies defined for each system and subsystem in the context of each aircraft ("virtual") enhances operational efficiency in the three key areas of improving asset reliability, supply chain availability, and reducing mean time to recovery. Stephan Erben also states that these improvements benefit Maintenance, Repair & Overhaul (MRO) Providers and Original Equipment Manufacturers (OEMs), operator owners and airlines. In addition to the above, Kris Volrath sees improvements in operational efficiency through improved access and operational visibility, enhanced data accuracy and integrity, streamlined workflows, improved decision making, enhanced compliance and cost reduction.

"One big advantage of using digital record keeping is that the documentation is readily available in our archives on short notice, whereas traditional filing systems using binders and stacks of paper is a much slower retrieval process. This is especially true during engine transition processes, when it is costly to keep assets on the ground while documents are being exchanged. Amos and Trax are examples of maintenance and engineering systems that airlines use to digitally track their documents," commented Joshua Sebastiampillai, while also bemoaning the problems encountered by many where analogue records are concerned.

In addition to increasing efficiency, Jack Clancy also touches on the cost of storing paperwork associated with analogue records: "At REDiFly we have seen how implementing an eTechlog system can significantly enhance operational efficiency for air operators and MRO providers. This approach promotes digital record keeping and reduces the time required for retrieving maintenance records while eliminating the costs associated with storing physical documents. Furthermore, the accuracy of maintenance logs is greatly improved, allowing for quicker access to an aircraft's maintenance history. This streamlining leads to more effective planning of preventative maintenance, reduction in aircraft downtime, and overall operational cost savings while ensuring higher availability and reliability of aircraft for operations."

## Challenges faced when transitioning from analogue to digital platforms

It goes without saying that training has to come close to the top, if not at the top, of the list as paper record keeping is appreciably different to the system of maintaining digital records. Trying to break 'the habit of a lifetime' for many who have worked in the industry for thirty-plus years has to have been a huge challenge, and vestiges of this problem may still remain. However, there is also the problem of converting mountains of analogue data into digital formats, primarily through scanning. CORRIDOR Software's Chris Kubinski adopts a positive stance, pointing out that "for legacy and especially smaller aircraft, many of those owner-operators rely on their paper documents. Many companies now provide this as a service to help facilitate the industry digitalisation effort."

At Dassault Systèmes Stephan Erben concurs with the problem of long-term employees who are used to the paper trail of an analogue system struggling to adapt but feels that a sufficient number of younger-generation employees are coming into the business, and they will naturally adopt the newer digital way of doing things. "As businesses move toward digital transformation, paper-based processes become less appealing, especially for the new generation of employees who are accustomed to digital tools and expect

more streamlined, adaptable, and eco-friendly solutions," he says.

Fluix' Kate Katrachenko also picks up on companies' 'resistance to change', together with the complexities and risks involved with transitioning from one system to another, particularly when "they need to ensure that their new digital system complies with regulations for record keeping and audits, or they risk penalties and fines," she says, adding that "digital solutions can require a significant initial investment. This includes purchasing new equipment like tablets or mobile devices for flight crews, acquiring the necessary software, and dedicating resources for onboarding and training. It can be a significant decision-making blocker particularly for small airlines." Joshua Sebastiampillai at MTU Maintenance has the same concerns with regard to compliance, advising that: "When an engine goes through a shop visit, all procedures that have been conducted on it have to be recorded and signed off by the technicians, line inspectors and certifying staff, so it will be necessary to digitalise the tasks within workscopes in such a way that they adhere to official airworthiness requirements."

While agreeing with much that we have already covered here, Jack Clancy at REDiFly also points out the security implications of transforming from analogue to digital records, advising that: "integrating new digital systems with legacy platforms without disrupting existing operations can be complex. Businesses also face data security concerns, ensuring that digital records are protected against unauthorised access and cyber threats." For those businesses looking to make the transition, Kris Volrath at Veryon offers sound advice to opt for "a company that provides both the digital platform as well as resources dedicated to managing the extraction, migration, and review of all the aircraft's data. Another challenge is the mobility and accessibility of digital records and software – technicians need the ability to access in remote areas, on their mobile device – anytime, anywhere." He then points out that: "For example, at Veryon we provide both the underlying software platform, as well as the necessary services, personnel, and tools to expedite the transition for our customers and make both onboarding to the software platform as well as the transition from paper to digital as seamless as possible." Giovanni Renga at AMROS Global puts it very succinctly when it comes to transitioning to a digital records system. "Digital records tools should be plug & play, easy to use and companies onboarded with ease."

## The integration of existing systems with digital management solutions

It is not so much a problem, but more a change in operational procedures as the transformation to digital aircraft records opens up a whole range of additional opportunities for digital tools to monitor the 'health' of an aircraft and its engines that were not an option with analogue record keeping. Unfortunately, there is a current stumbling block to the level of success achieved with transitioning from analogue to digital aircraft records. "There is a specification (SPEC2500) that the industry is supposed to use to transfer data between one company and another. However, a pain point is the lack of adherence to that," comments Joshua Sebastiampillai.

Potentially, digital management solutions can integrate with MRO software and aviation safety systems, depending on the solution itself while technically, there are two main types of integration. Kate Katrachenko expands on this: "Firstly, in-house integrations that are built directly into the software by the vendor. These integrations are pre-configured and don't require additional setup. Secondly, there are Webhook or API integrations which are more flexible and customisable options. Through APIs, digital management solutions can integrate with a range of other tools, like inventory management, compliance systems, or even scheduling software. Webhooks are event-driven connections. When something happens in the digital management system (e.g., a pilot submits a journey log), the webhook triggers a notification or action in another system."

Stephan Erben explains one of the key factors relevant to the integration of analogue and digital systems: "Today, digital management systems primarily utilise knowledge graph technologies, where information from existing systems (referred to as legacy systems) is mapped onto an ontology." He points out that these new architectures offer several benefits: "Each legacy system remains the sole source of truth and the place where changes are made, data integration

Chris Kubinski, VP Worldwide Sales, CORRIDOR Aviation Service Software, a CAMP Systems Company (CORRIDOR Software)

frameworks manage the communication and exchange of massive amounts of data, bridging the gap between different data sources to create a cohesive, up-to-date knowledge graph view, information from all siloed legacy systems is consolidated into a single view, enabling seamless data exploitation while masking the complexity of the underlying technology, and data is projected onto ontologies, facilitating analysis by accounting for variations in meanings across siloed systems."

Meanwhile Navi Mahataj adopts a more cautious tone: "MRO IT software / Maintenance tracking systems today can be easily adapted, as programming languages have changed over the years to mitigate the gatekeeping associated with proprietary software. However, integrating with older legacy software can be troublesome, thus creating errors." However, Chris Kubinski is slightly more pragmatic on the subject. "A good digital management solution will work in concert with the common platforms in use by that aircraft's service network. Ideally, a series of bi-directional interfaces should be available among systems so that users throughout the process are able to see the relevant information required for their specific actions - without jumping from one system to another. A spreadsheet exchange doesn't cut it."

Jack Clancy concentrates more on the integration of two digital records systems, advising that: "Digital management solutions typically integrate through APIs that allow different software systems to communicate and share data effectively. For instance, an eTechlog might integrate

with an air operator's existing MRO software, ensuring that data about maintenance activities is automatically updated and available across systems, enhancing the efficiency and reliability of data used for making operational decisions." In turn. Kris Volrath points out that companies can unlock seamless workflows and amplify productivity by integrating their aircraft maintenance records with other systems in their operating ecosystem. "For example, integrating real-time maintenance records with flight planning and scheduling systems provides a comprehensive view of an operation. Veryon ensures a smooth transition with our dedicated implementation team, advanced data extraction, and import tools."

Finally, Giovanni Renga advises us that: "Today, digital management solutions integrate with existing aviation systems such as Maintenance & Engineering or electronic maintenance logging systems through APIs, creating workflows and automation that is sheer impossible to perform with current analogue processes. These solutions are designed to work seamlessly with maintenance tracking software, flight operations systems, and regulatory compliance tools, ensuring cohesive records management and minimising risks of non-compliance vs contracts, manufacturers and authorities."

## How companies can ensure the security and integrity of their digital aircraft records

For many businesses, the corruption of data can be an inconvenience. It can briefly disrupt operations, but rarely does it result in any real risk to life. While there are legal requirement for the protection of data, seldom are companies fined for any form of data breach. Beyond that, it is more inconvenience that anything else and within a few days, if not hours, the business can be fully operational again with nominal repercussions. Nothing could be further from this scenario than a data breach involving aircraft records. The consequences are at best described as a ripple effect similar to throwing a pebble into a millpond, though in this instance it might be more appropriate to describe it as a rock!

As a consequence, safety and integrity of digital aircraft records are paramount, and Stephan Erben goes into considerable depth to explain how that can be achieved: "Security of digital records is ensured through different ways: For critical data, records are stored on devices equipped with encryption capabilities. In sectors like Aerospace & Defence, where operational data or highly sensitive information is involved, these devices are kept offline and are not connected to any network. Access to this information is tightly regulated, undergoing a process of anonymisation, filtering, and thorough checks before being transmitted to a digital platform utilised at the corporate level. For sensitive data, information is "flagged" with different levels to ensure proper handling." He advises that the following list is not exhaustive but that it is commonly used in the Aerospace & Defence sector: "ITAR (International Traffic in Arms Regulations), which governs the export, import, and handling of defence-related articles and services, including technical data that is considered critical to national defence, EAR (Export Administration Regulations), which regulates the export of commercial and dual-use items, including technology and software. It applies to items not covered by ITAR but still sensitive for national security, foreign policy, or economic reasons, CUI (Controlled Unclassified Information) is tagged to information that is not classified but still requires safeguarding or dissemination controls in accordance with laws, regulations, or government policies, and Classified Information (Confidential, Secret, Top Secret) is for data that is considered vital to national security."

Joshua Sebastiampillai advises: "Safe storage of engine records is, of course, paramount, so beyond using protected servers and proper permission-based handling of digital files, companies need to have redundancy measures in place. Back-ups of digital data are extremely important if a company uses cloud-based technologies to store data, for example," and Jack Clancy further elaborates: "To protect digital records, companies should implement robust cybersecurity measures, including encryption, secure user authentication protocols, regular security audits and compliance with standards like AC120-78A. Compliance with international standards like ISO 27001 for information security management is also crucial. The recently introduced EASA Part IS (Information Security) regulatory framework also places a focus on cybersecurity for operators in Europe and beyond. Regular backups and the use of redundant systems can ensure that data is preserved and accessible even in the event of a system failure."

"Companies should work with organisations that have a multi-faceted strategy and commitment to safeguarding the security and integrity of digital aircraft maintenance records. For example, adherence to ISO standards, such as ISO 9001:2015 for Quality Management and ISO 27001:2013 for Information Security, ensures compliance with industry best practices. Additionally, the organisation should continually invest in security practices, including regular updates to security measures, such as multi-factor authentication and optional single sign-on, to enhance access control. Furthermore, redundancy and resilience in case of data loss or system failures are paramount," says Kris Volrath. By combining these elements, this demonstrates a strong commitment to safeguarding sensitive data, contributing to a secure and reliable environment for managing digital aircraft maintenance records.

## The role of AI in maintaining digital aircraft records

AI plays an increasingly significant role in enhancing data analytics and interpretation, as well as automation. For aircraft records, this means things like automated document type recognition, automated sorting into specific standards or the analysis of document contents for data accessibility and compliance, which can provide unmatched time savings and accuracy increase, which with analogue processes cannot be obtained. As Giovanni Renga puts it, "we are just at the start with AI, so it can be generally recommended to adopt digital records systems sooner rather than later," with Navi Maharaj concurring on the ability for AI to speed up processes as he advises: "AI plays a significant role in maintaining digital aircraft records by enabling companies to search records faster and the ability to recognise and digitise historical handwritten data. Its integration will streamline processes, reduce human error, and significantly reduce manpower."

AI has significantly evolved in the last few years with the introduction of Large Language Models (LLMs), demonstrating

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their ability to transform semantics into numerical vectors and generate content in natural language. One of the initial limitations, due to the cost overhead of retraining the models, was quickly addressed with the development of Retrieval Augmented Generators, allowing content to be leveraged without the need for model retraining. The second limitation, which makes it more challenging to use LLMs for industrial purposes, is the risk of generating hallucinations. The recent concept of agentic workflows is helping users interact with LLMs and instruct them in executing complex tasks, thereby improving accuracy and reducing the generation of factually incorrect information.

Stephan Erben explains further: "Although the use of AI has not yet reached the expected level of maturity for full industrialisation, there are several use cases where it already provides significant value. It is important to focus on scenarios where humans remain in the loop. LLMs will be instrumental in analysing the unstructured content of most aircraft record information sources, transforming it into model-based structures. The usage of Machine Learning and Deep Learning models is supporting experts in detecting outliers and weak signals within large volumes of data."

Joshua Sebastiampillai takes a more cautious and pragmatic approach to the role of AI. "As in other parts of MRO, artificial intelligence has a huge potential to simplify processes, including the creation and keeping of records. However, the MRO industry still has to develop much of the technology that would be able to scan, assess and assign the information from a non-incident statement, or back-to-birth history, or other records that may have or may not have standard formats. And they likely have to be developed in-house," he comments.

AI can enhance the management of digital aircraft records by automating data entry, predictive analysis for maintenance scheduling, and anomaly detection in record entries which might indicate potential issues. AI can also analyse historical data to optimise maintenance cycles and parts inventory, reducing costs and improving operational efficiency and Jack Clancy provides an excellent example. "AI algorithms can predict when specific components will require maintenance well before traditional methods would flag them, enabling proactive maintenance and reducing unscheduled downtime."

To end the topic, Kris Volrath looks at the current role and future potential of AI in maintaining aircraft records. "Veryon fundamentally believes that AI will continue to play an important role in the transformation of aviation maintenance across the industry, but also must be leveraged carefully to ensure safe and reliable operations. We see AI already playing important roles in assisting mechanics with troubleshooting and maintenance of aircraft while in strict compliance with the technical publications of the manufacturer, but we also envision a future where AI and machine learning can better assist, direct, and predict maintenance in the future."

In conclusion, it would seem that technological advancements in the way aircraft records are created and recorded, transforming systems from analogue to digital operations (paper to paperless) has many clear advantages, but such advancements clearly still come at a cost. New skillsets are required and those who have operated under the old analogue systems are always going to be reluctant to adopt a far-from-subtle change in the way they have to record events and obtain their instructions/work programmes. Beyond that we have the logistical challenge of converting much of the original analogue content into digital format as with a lifespan of roughly 30 years, how do you present the records of a 25-year-old jet to a prospective buyer? Do you provide both paperless and paper documentation? Finally, among other things, there is the question of security and how you successfully protect the integrity of aircraft records, without which any plane's value and safety profile will be severely and perhaps irreparably damaged.

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# A Shortage of Aircraft Technicians

## Attracting and Retaining the Next Generation of Aviation Professionals

By David Dundas

The aviation industry will always have a tremendous thirst for and reliance on the most highly skilled and capable technicians. However, even before the problems of staff shortages created by the COVID-19 pandemic, there was a growing problem with both attracting and retaining skilled labour. Today that problem is perhaps greater than ever, and it appears to be growing—there are simply not enough aircraft technicians to meet demand. With global fleets expanding and the increasing pace of technological advancements in the aviation industry, this shortage of qualified technicians is placing an unavoidable strain on airlines, maintenance repair organisations (MROs), and regulatory bodies alike.

Part of the problem is being caused by the retirement of experienced technicians and a lack of younger technicians stepping in to replace them. As a direct consequence, this shortage is threatening to undermine operational efficiency, safety, and growth in the industry. The big question remains: how can we attract and retain the next generation of aviation maintenance professionals?

### The Root Causes of the Shortage

Several factors have contributed to the current shortage of technicians.

As mentioned above, the technical workforce is ageing. A significant portion of the existing base is nearing retirement or has just retired, having entered the field during the aviation boom of the 1980s and 1990s. This has resulted in a noticeable gap in the workforce that is not being filled sufficiently fast by new entrants, and the situation has the potential to get a lot worse because up to 30% of the workforce could retire within the next decade.

Next, the aviation sector is struggling to compete with other industries in attracting young, talented technicians. Sectors such as IT, engineering, and even the automotive industry are currently seen to offer more dynamic and lucrative career paths. The traditional image of aircraft maintenance, with its demanding physical work and sometimes unsociable hours, can be a deterrent for members of the younger generation who place greater value on a beneficial work-life balance and flexible career options.

Lastly, the pipeline of future technicians undergoing training and education is grossly insufficient. Schools for aviation technicians are producing graduates, but insufficient numbers to keep up with, let alone come close to meeting the ever-growing demand. Additionally, unless fortunate enough to obtain sponsorship, a paid apprenticeship or other forms of financial assistance, the high cost of training and certification can be prohibitive for many potential students to join the industry.

### Strategies for Attracting New Talent

In order to successfully address the problem of a shortage of skilled technicians, a multi-faceted approach

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involving changes in perception, education, and industry practices is necessary. We have identified five key areas where improvements can be made.

1. Changing Perceptions of the Industry

One of the first steps to attracting the next generation of aviation professionals is to reshape the image of technicians across all sectors of the industry. For too long, the profession has been seen as blue-collar, with a limited albeit high-value skill set. However, modern aircraft maintenance is hugely technical and as a consequence there are opportunities to specialise in highly technical, cutting-edge areas such as avionics, composites, and digital diagnostics.

We believe that if greater emphasis were placed on the types of advanced technology involved—such as predictive maintenance, augmented reality (AR) tools, and drones for inspections—this has the potential to make the opportunity to become a technician in the aviation industry more appealing and attractive to tech-savvy individuals who are looking for a challenging and rewarding career and who might otherwise pursue a future in software or engineering in another industry.

Additionally, the aviation sector should emphasise the crucial role technicians play in ensuring the safety and reliability of the global air transportation system. This is a career where attention to detail and problem-solving can have a direct impact on lives, and that being employed in a role where there is a distinct sense of purpose can be a powerful draw.

2. Improving Training and Education Pathways

A good educational environment with attractive incentives such as a guaranteed job on completion of a course could well be key to building the next generation of technicians. While there are many excellent aviation maintenance schools who can train technicians, more needs to be done to attract students to take the first step in a very rewarding career in this sector of the aviation industry.

One solution could be to expand apprenticeship and mentorship programmes. By offering paid apprenticeships, where students can learn while earning, the industry can alleviate the financial barriers that may frustrate potential technicians. Moreover, practical real-life hands-on experience is one of the most exciting and rewarding forms of training, especially when combined with the guidance of veteran technicians who can pass on decades of invaluable experience and wisdom.

Beyond the above, there is also the potential for partnerships between airlines, MROs, and educational institutions through tailoring curricula to the real-world demands of the industry. Developing more specialised programmes in digital diagnostics, electric propulsion systems, or composite materials could equip newly qualified technicians with unique skills that are in high demand as aircraft technology is constantly evolving.

3. Diversity and Inclusion Initiatives

There is no escaping the fact that technicians in the aviation sector is a traditionally male-dominated field. Consequently, technical maintenance is underrepresented in terms of gender and also ethnic diversity. Efforts to attract women and underrepresented minorities into the roles of technicians need to be ramped up to attract increased numbers in order to successfully fill the current workforce gap.

It makes a lot of sense for industry stakeholders to collaborate further with schools and community organisations to promote STEM (Science, Technology, Engineering, and Mathematics) programmes to a wider demographic, placing much greater emphasis on the fact that the aviation industry as an exciting and rewarding career option. Offering scholarships, mentorship, and internships specifically targeted at women and minorities will also help tremendously to overcome the perception of this being a male-dominated sphere.

4. Improving Work-Life Balance and Career Development


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To both attract and retain new technicians, the industry must adapt to and better meet the expectations of younger workers. Because aircraft maintenance is, by nature, a physically and mentally demanding field with long hours at times, offering more flexible working hours and clearly defined career progression opportunities can improve the attractiveness of being an aircraft technician as a solid career move.

Career progression is another key factor. Younger technicians should be able to instantly recognise a clear and defined path to advancement, whether that be through supervisory roles, specialisations, or even transitioning to engineering and management positions. Continuous professional development opportunities, such as training in new technologies or certifications for more advanced systems, should also be openly available to all new recruits as well as existing employees in order to retain their skills.

5. Competitive Compensation and Benefits

Financial compensation and overall employment packages will always be a major factor in attracting and retaining talent. Although aircraft maintenance can be a well-paid profession, it's crucial that wages and benefits keep pace with the demands of the job and the competition from other industries. Offering competitive salaries, benefits packages, financial incentives such as retention bonuses, health insurance, ongoing training support or education reimbursement can make aviation maintenance a more attractive long-term career choice.

## The Role of State-of the-Art Technology in Bridging the Gap

While attracting new talent is crucial, there is another approach to mitigating the effects of the technician shortage, and this is through the adoption of the very latest technology that is helping to reduce the need for human input and reducing the physical workload. Predictive maintenance, data analytics, drone-based external fuselage inspections, and automation can reduce the time and labour required for many usually labour-intensive tasks.

For example, AI-driven maintenance systems can diagnose potential issues before they arise, cutting down on unplanned maintenance events and allowing technicians to focus on more critical repairs. Similarly, the use of augmented reality (AR) for remote inspections or real-time troubleshooting can improve productivity and accuracy, thus fewer technicians are needed to effectively manage larger fleets.

## Conclusion

There is no question that the current shortage for aircraft technicians is a serious problem, but it is far from insurmountable. By giving a 'facelift' to the current the image of the profession, investing in education, promoting diversity, and adopting new technologies, the aviation industry can not only attract the next generation of skilled workers, but it can also ensure their long-term retention. For an industry with a reputation for precision and safety, investing in the future workforce is essential for maintaining the high standards that aviation demands.

In the race to keep the skies safe and the planes flying, the future of aircraft maintenance depends on finding, nurturing, and retaining the very best talent that will shoulder the considerable responsibility of a very technically demanding industry.

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# Engine Lease Finance Corporation

Talking to Aoife Fennell, Chief Technical Officer, elfc

Headquartered in Shannon, Ireland with offices in Boston, London, and Singapore Engine Lease Finance Corporation (elfc) is an engine financing and leasing company. elfc was founded in 1989 by aviation industry veteran Jon Sharp who recognised that while the primary focus on leasing within the aviation industry was on aircraft, there was a gap in the market for an innovative leasing option for engines.

Aoife Fennell, Chief Technical Officer, elfc

Consequently, elfc provided a viable solution that allowed carriers to maintain operational flexibility and manage their fleets more efficiently.

As elfc grew and engine leasing became a more popular option, the company expanded operations in 2007 after BTMU Capital Corporation obtained a major stake in elfc which by then had a portfolio of around 150 engines. This change provided the company with increased financial strength and helped to expand its global reach. Today, elfc is a group company of Mitsubishi HC Capital Inc., a renowned global leasing company based in Japan and publicly listed on the Tokyo Stock Exchange. elfc works with airlines, operators, OEMs, and MROs to meet the commercial challenges presented by today's dynamic world markets with a current portfolio of 350 owned and leased engines from CFM International, Pratt & Whitney, International Aero Engines, GE Aerospace and Rolls-Royce.

We wanted to delve deeper into the world of aircraft engine leasing, and elfc´s Chief Technical Officer, Aoife Fennell was more than happy to share her knowledge with us through a recent interview we had with the company, kindly allowing us to ask some searching questions to which they were able to provide comprehensive and revealing answers.

**AviTrader MRO: What are some of the primary factors that contribute to the high cost of aircraft engine maintenance?**

**Aoife Fennell:** The largest proportion of engine heavy maintenance costs have always been the material element, and this has been climbing over the years. Engine parts are high-cost items, due to the complexity of the technology and the high regulatory compliance requirements. For all engines, the increase in the cost of source metals and bottlenecks

> "This is a very exciting time in aircraft engine technology developments and engine maintenance management."

> “Reusing serviceable parts promotes efficiency and sustainability by reducing waste and the need for new materials.”

in production has hugely contributed to the increase in the cost of new material. Repairs and used serviceable material (USM) are practical ways to reduce the cost of the material element, however on the newer-generation engines neither are readily available in a way that can address the high cost of maintenance.

**How do advancements in technology and innovation impact the cost-effectiveness of aircraft engine maintenance practices?**

This is a very exciting time in aircraft engine technology developments and engine maintenance management and we can see a number of innovative and technological approaches all designed to get the maximum operation out of engines.

1. Predictive maintenance and enhanced diagnostics: Innovations in data analytics and sensors can quickly and accurately identify issues, reducing the time and cost associated with troubleshooting and repairs, this can also allow for maintenance workscopes to accurately reflect the engine condition, identifying potential issues before they become critical and reducing unscheduled downtime.

2. Along the same lines, creating digital replicas (Digital Twins) of engines allows for more precise monitoring and maintenance planning, enhancing efficiency, etc.

3. Advances in materials science have led to the development of more durable and heat-resistant materials, extending the life of engine components.

4. Robotics and automated inspection tools can perform tasks more quickly and accurately than before, reducing labour costs and time.

5. 3-D Printing: Additive manufacturing allows for the production of complex parts at convenient locations, for example MROs, reducing inventory costs and lead times.

**How do you leverage data analytics and predictive modelling to forecast maintenance needs and optimise spending on aircraft engine maintenance?**

Data can be collected in real-time from engine sensors and record operational parameters during flights. This data in turn can use predictive analytics algorithms to analyse data trends and identify potential maintenance needs before they arise. Together with historical data, patterns and trends can be identified to predict future maintenance requirements. From an MRO’s point of view, having more foresight of the workscopes can assist in the parts and materials requirements to ensure timely availability and reduce inventory holding costs.

**How important is smart work-scoping and proactive LLP planning in order to reduce maintenance costs in the long term?**

Smart work-scoping ensures that maintenance activities are precisely targeted, avoiding unnecessary work and focusing resources on critical areas. Properly scoped work reduces unnecessary interventions and optimises labour and parts’ usage, leading to significant cost savings. Regular and planned maintenance based on accurate work-scoping ensures high operational reliability, reducing the likelihood of in-service failures. Proactive planning allows for better allocation of maintenance resources, ensuring availability of skilled labour and necessary parts when needed.

**How can used serviceable material help reduce the maintenance cost of mature engine types?**

Reusing serviceable parts promotes efficiency and sustainability by reducing waste and the need for new materials. For mature engines nearing the end of their lifecycle, USM offers a cost-effective way to balance maintenance expenses with the residual value of the engine. USM is significantly cheaper than new parts, providing substantial cost savings on mature engine types that may not justify the expense of new components. Depending on the engine type, USM can be more readily available than new parts, reducing lead times and minimizing engine downtime. By using USM, operators can continue to maintain and operate older engines that might otherwise be retired due to high maintenance costs. The availability of USM from retired or parted-out aircraft increases supply and keeps maintenance costs competitive.

**What advice would you give on how to reduce the cost of aircraft engine maintenance without compromising safety or performance standards?**

1. **Leverage Used Serviceable Material**: Use certified USM to reduce parts costs while maintaining safety and performance standards.

2. **Collaborate with OEMs and MROs**: Build strong relationships with OEMs and MRO providers to access technical support and favourable pricing.

3. **Optimise Maintenance Schedules**: If possible within a fleet, develop optimized maintenance schedules based on data analysis and operational needs to ensure balance if achieved maintenance is performed efficiently and effectively.

4. **Invest in Training**: Ensure that maintenance personnel are well-trained and up to date with the latest maintenance techniques and technologies to improve efficiency and reduce errors.

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# Safety Management Systems in Aviation

## A pillar of modern aviation safety

By David Dundas

In aviation, safety is paramount. From aircraft design, production and operation to maintenance and ground handling, every aspect of aviation is governed by strict safety standards. Digging deeper, it becomes clear that one of the most important frameworks for ensuring safety in aviation are Safety Management Systems (SMSs). An SMS provides a structured approach to managing safety risks, ensuring that all aviation-related organisations operate at the highest safety levels. In this article, we want to explore what, specifically, SMSs are, why they are crucial in the aviation industry, and how they are successfully implemented to enhance safety across the industry.

### What is a Safety Management System?

A Safety Management System (SMS) is an organised, systemic approach to managing safety, including any necessary organisational structures, accountabilities, policies, and procedures. SMSs are proactive preventive tools that help identify potential safety risks before they lead to minor, major or even fatal incidents or accidents. They are responsible for integrating safety into the everyday operations of aviation organisations, based primarily on a continuous and constant cycle of monitoring, feedback, and improvement.

The key goals of an SMS are as follows:

- To identify potential safety risks.
- To mitigate these risks before they cause harm.
- To create a culture of safety within the relevant organisation.
- To ensure continuous improvement in safety management.

### Why are SMSs so important in the aviation industry?

The aviation industry as a whole is remarkable complex with multiple different spheres of operation. There are those involved in designing aircraft who rely on highly technical data to guide them when looking to alter existing designs in order to build safer aircraft that are more economic to fly. There are those who are responsible for maintaining those aircraft in an airworthy condition, and others who skilfully operate ground handling duties. Beyond that you have air traffic control, airport meteorologists to ensure weather conditions are safe for flying, and then we come to pilots and cabin crew. That is not forgetting a whole host of other operatives, many of whom work behind the scenes to ensure that flying is the safest form of travel today. Managing these variables requires a system that is both thorough and adaptable to new risks. SMSs ensure that aviation organisations not only comply with regulatory safety standards but also actively seek to go beyond compliance by identifying and mitigating risks unique to their operations.

And the result? The implementation of SMS's which The International Civil Aviation Organization (ICAO) formally introduced the concept of in the 1980s and 1990s and which became mandatory for certain


airlines in 2006 saw fatality number for flying fall dramatically. To put this into contact, in the period 1968-19 1977 the risk of dying was one death every 350,000 boardings. By 2008-2017, that number had fallen to one in 7.9 million, while most recently that number has fallen even further to one in 13.4 million. In simple terms, there's a greater chance of being killed in a shark attack than in a plane crash!

## The Key Benefits of SMSs in Aviation

• **Proactive Risk Management**: SMSs enable organizations to move beyond reactive safety measures (responding to accidents) toward proactive and predictive safety management. This proactive approach reduces the likelihood of incidents.

• **Improved Communication**: A well-functioning SMS fosters open communication among all stakeholders and encouraging reporting of hazards without fear of reprisal. This openness leads to more effective risk identification and resolution.

• **Enhanced Safety Culture**: SMSs promote a strong safety culture where safety is a core value. Employees at all levels become accountable for safety, and leadership fosters an environment where safety concerns are addressed with urgency.

• **Regulatory Compliance**: An SMS is now a mandatory requirement for many sectors in the aviation industry, including airlines, maintenance organizations, and air traffic control services. Implementing SMS helps companies stay compliant with International Civil Aviation Organization (ICAO) standards and national regulations.

• **Cost Efficiency**: By preventing accidents and incidents, an effective SMS reduces the financial costs associated with safety failures, for example required repairs to an aircraft after a minor accident, legal penalties, and reputational damage.

## The Four Pillars of Safety Management Systems

It is believed that the "Four Pillars" of an SMS can be attributed to P Stewart, Director General of System Safety for Transport Canada, at the turn of the millennium. An effective SMS is built around four key components, or pillars.

• **Safety Policy**: The safety policy outlines an organisation's commitment to safety. It defines the responsibilities and accountabilities of management and staff concerning safety, ensuring that everyone understands their role in maintaining and improving safety standards. Leadership must be fully committed to the policy and provide the necessary resources to meet safety objectives.

• **Safety Risk Management (SRM)**: SRM is the process of identifying hazards, assessing risks, and developing strategies to mitigate those risks. This involves regularly analysing operational data, incident reports, and employee feedback to uncover potential safety issues. Once risks are identified, organisations must decide how to control or eliminate them, whether through process changes, technology improvements, or staff training.

• **Safety Assurance**: Safety assurance all but guarantees that safety measures are effective and continuously improving. This involves monitoring and measuring the performance of safety controls and processes. Organizations use audits, inspections, and internal evaluations to verify that safety procedures are working as intended and to identify areas for improvement.

• **Safety Promotion**: Safety promotion encompasses training, education, and communication efforts aimed at fostering a safety-first mindset among all employees. This pillar ensures that everyone, from frontline workers to top management, understands the importance of safety and is equipped with the knowledge and skills to contribute to a safer workplace environment.

## Implementing an SMS in Aviation Operations

Implementing an SMS requires a phased approach and a 'buy in' from all levels of an organisation. After all, there is little point in an SMS if everyone ignores it or fails to understand why it has been introduced. It is often the lack of understanding that can prove to be a hurdle to its organisation-wide adoption, so explaining the reasons for the SMS and what it is hoping to achieve. The following is a brief outline of the key steps involved in the implementation of an SMS:

• **Establish a Safety Policy**: This requires the development of a comprehensive safety policy that outlines the organisation's safety objectives, roles, and responsibilities.

Aircraft inspection © *Shutterstock*

• **Hazard Identification and Risk Assessment**: Here one needs to develop processes for identifying hazards and assessing associated risks. This can be done through regular safety assessments, operational data analysis, and encouraging employees to report potential hazards.

• **Risk Mitigation Strategies**: In this instance there is a need to develop strategies to manage or eliminate identified risks. These may include changes to operational procedures, enhanced employee training, or the implementation of new technology.

• **Continuous Monitoring**: This is easily achieved through establishing a system for ongoing monitoring of safety performance, including data collection, safety reporting, and routine audits.

• Training and Communication: It is essential that employees are trained in safety management principles and that it is communicated to them the importance of reporting hazards. One must also ensure that safety information is shared and disseminated regularly through meetings, bulletins, or digital platforms.

• **Management Review and Continuous Improvement**: It is important that where safety is concerned, there is never any sense of complacency and that you can afford to stand still. Safety performance data needs to be regularly reviewed and used to make improvements to any SMS. Management must play an active role in these reviews to ensure resources and policies align with the organisation's safety goals.

## Challenges and Best Practices for SMS Implementation

It is easy extol the virtues of SMSs; it is far more difficult to successfully implement them. The following is concise list of some of the more prevalent challenges faced:

• **Resistance to (cultural) change**: One of the problems in any organisation is resistance to change. Humans are creatures of habit and there is a natural bias towards an environment of familiarity at work. Anything that challenges that situation requires commitment and a clear explanation so that employees understand the reasons and benefits for any change, especially where SMSs are concerned.

• **Data Overload**: Collecting large amounts of safety data and its subsequent processing can consume considerable resources. Prioritising high-risk areas and filtering the most critical and easily actionable insights is essential.

• **Balancing Costs**: Implementing safety measures invariably requires financial investment, and some organizations may struggle to immediately justify the cost. However, the long-term cost savings from preventing accidents and incidents will always outweigh the initial expenditure and creating a strong safety culture at work requires investment.

## Best Practices for successful SMS implementation:

Leadership Commitment: SMS success begins with top management, who must lead by example and allocate sufficient resources for safety initiatives.

Employee Involvement: Engage employees at all levels in safety efforts, ensuring they feel comfortable reporting hazards and contributing to the safety dialogue.

Continuous Training: Regularly update employees on the latest safety procedures, risks, and best practices through ongoing training and education.

## Conclusion

Safety Management Systems are the backbone of today's aviation safety culture. By fostering a proactive as opposed to reactive approach to identifying and mitigating risks, SMSs ensure that aviation-related organisations can maintain high safety standards in an increasingly complex and ever-changing industry. A n appropriate and well-implemented SMS will not only improve overall safety, but it will also enhance operational efficiency, build a positive safety culture, and ensures compliance with global aviation regulations. As aviation continues to evolve, SMSs will remain a key tool for safeguarding people, aircraft, and the industry as a whole.

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# PEOPLE

## on the move

Bénédicte Bonnet

CFM International has named Bénédicte Bonnet as its new Executive Vice President (EVP), succeeding Jérôme Morhet. As part of the CFM executive team, Bonnet will oversee the CFM56 and LEAP programmes in close partnership with her counterparts at GE Aerospace. Her responsibilities will span engineering, development, production and support activities. Bonnet began her career at Safran Aircraft Engines in 2005 as a mechanical engineer. By 2008, she led Safran Group's cross-functional team focused on ceramic matrix composites, before joining the Safran Materials and Processes Division in 2010. She progressed within the CFM56 technical team, first as deputy in 2015, then as CFM56 technical product manager for Boeing applications. In 2019, Bonnet became responsible for the Customer Support Product Engineering department at Safran Aircraft Engines, managing civil aircraft applications. Most recently, Bonnet held the position of vice president for Quality, Improvement & Digital Transformation at Safran Aircraft Engines. In her new role, Bonnet will leverage her extensive experience in customer relationships, product leadership and cross-functional project management.

Jennifer Creevey

Nordic Aviation Capital (NAC) has announced the promotion of Jennifer Creevey to Deputy CEO, effective September 9. Creevey, who has served as NAC's Chief Financial Officer (CFO) since May 2023, will continue to oversee Finance and IT, while reporting directly to the CEO. Her promotion comes as part of NAC's strategic efforts to bolster its leadership team. Nordic Aviation Capital (NAC) has announced the promotion of Jennifer Creevey to Deputy CEO, effective September 9. Creevey, who has served as NAC's Chief Financial Officer (CFO) since May 2023, will continue to oversee Finance and IT, while reporting directly to the CEO. Her promotion comes as part of NAC's strategic efforts to bolster its leadership team.

(L-R) Michael Grootenboer, Jean-Louis Forest, Bruno Tricoire and Derk Nieuwenhuijze *© AFI KLM E&M*

Air France Industries KLM Engineering & Maintenance (AFI KLM E&M) has announced key leadership appointments aimed at strengthening the group's organisation and maintaining its industry-leading standards in aviation maintenance, repair, and overhaul (MRO). From September 1, 2024, Michael Grootenboer will take on the role of Senior Vice President (SVP) Procurement for the Air France-KLM Group, following six years as SVP Group Engine Product at AFI KLM E&M. He will be succeeded by Jean-Louis Forest, previously SVP Engines at Air France Industries. With extensive experience in engine maintenance, Forest is well-positioned to lead the engine division at AFI KLM E&M. Bruno Tricoire, former SVP Group Components Product, will replace Jean-Louis Forest. Tricoire's strong expertise in component and airframe maintenance, as well as his experience as CEO of iGO, will be valuable as he returns to the engine sector, having previously served as Product Sales Director. A successor for Tricoire's current position will be announced soon. In addition, Derk Nieuwenhuijze has been appointed Vice President (VP) Technical Sales & Commercial Performance within the E&M Commercial Organisation (EMCO). He will manage the team responsible for creating proposals and contracts with customers globally, while further developing the company's commercial operations.

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