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The World's Leading Aviation MRO Publication

DEPARTMENTS

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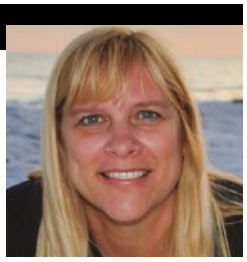

BY JOY FINNEGAN
EDITOR-IN-CHIEF

Aviation maintenance professionals rarely see the spotlight, but your work is the foundation of every safe flight. You are the quiet constant behind the success of global aviation. As we close our final issue of the year, here at Aviation Maintenance magazine we want to pause and recognize you — the professionals who make every safe departure possible. Aviation mechanics and technicians work long hours in environments that are often uncomfortable — under the blazing sun, in freezing winds, in pouring rain and during driving snowstorms. And, more often than not, while the rest of the world is asleep.

Let me touch on a couple of key moments from this year. Our industry experienced amazingly strong post-pandemic recovery which has propelled the aviation industry into what some have called a supercycle — full recovery beyond pre-pandemic revenues, with revenues well above 2019 and continued expansion expected through the decade, according to experts like the Aeronautical Repair Station Association (ARSA) and consultancy Oliver Wyman.

There are some challenges, nevertheless. Persistent supply chain challenges have cost the airline industry billions this year. These costs stem from a mix of delayed aircraft and parts deliveries, older aircraft staying in service longer (increasing maintenance needs), rising leasing costs for engines and the need to stockpile spares due to unpredictability.

IATA says aircraft deliveries remain slower than airline demand — and production backlogs are extremely high — causing carriers to keep older jets flying longer. This directly increases maintenance workloads, parts demand and overall operational complexity.

Another key development is the acceleration of the adoption of technology. I have always pushed back when some have said our industry is not progressive in terms of technology. I believe the industry not only embraces technology, you are hungry for it and even create it whenever you see the need. According to Oliver Wyman's report, "The MRO Demand Challenge," predictive maintenance powered by data analytics, AI and IoT is transforming how maintenance is planned and executed, helping reduce downtime, improve safety and lengthen component life cycles.

Cutting-edge tech like AI-assisted inspection systems and advanced digital tool-tracking solutions are being deployed to help maintainers work more efficiently and safely, especially in traditionally challenging tasks. AI and video systems are helping reduce inspection times and improving remote support for difficult tasks like fuel-tank and other inspections.

Hopefully, this wholehearted embrace of technology will help because this year, our industry continued to grapple with a structural workforce challenge: the supply of qualified maintenance professionals. Reports from the Aviation Technician Education Council (ATEC) and Oliver Wyman show that new certifications and training program enrollment are increasing; however, demand is still outpacing supply. At current trends, the aviation maintenance industry is facing about a 10% shortage of certificated mechanics in 2025, meaning there are thousands fewer qualified technicians than needed just to support commercial aviation alone.

Retirements and attrition will further tighten staffing, the experts say. The industry will need to continue to try to fill seats at training schools, as well as hire for new instructors and examiners. ARSA predicts by 2028, there will be roughly 25,000 fewer certificated mechanics than required, if current trends continue. We must stay vigilant about strengthening the pipeline — through education, mentorship, outreach and broader recognition of the value of aviation maintenance careers. This will continue to be an industry priority. We thank the schools, employers and professionals working to build that future.

I want to remind everyone who flies that the reliability of our aviation world is built one inspection, one repair, one meticulously thought-out decision at a time. It is the resilience, skills and professionalism of the aviation maintenance community that makes that possible. Even with technological advances, it is still the human touch that makes the difference and gives the flying public the certainty that it is safe to fly.

This final issue of the year gives us an opportunity to reflect — not only on the challenges faced by the aviation maintenance industry, but on the professionalism and resolve shown in meeting them. Whether working in extreme conditions, under impossibly tight timelines or in complex technical environments, you continue to demonstrate what excellence looks like in aviation maintenance.

The dedication, precision and commitment to safety of all who work in our community are the invisible forces that keep aircraft flying safely and passengers confident. To each and every one of you who turn wrenches, inspect systems, troubleshoot faults and sign your name in the logbooks: thank you for the work you do and the standards you uphold every day.

As we look ahead to the coming year, we do so with appreciation for you, the people who make this industry strong. Together, we are part of an industry built on safety, reliability and continuous improvement.

We also extend sincere thanks to our advertisers and industry partners. The support of these folks allows us to tell the stories, share the knowledge and highlight the innovations that help move aviation maintenance forward.

Thank you for being part of the aviation maintenance community. We extend our sincere gratitude to all of the professionals like you, who keep aircraft flying safely in every condition imaginable. Wishing you all the best in 2026! AVM

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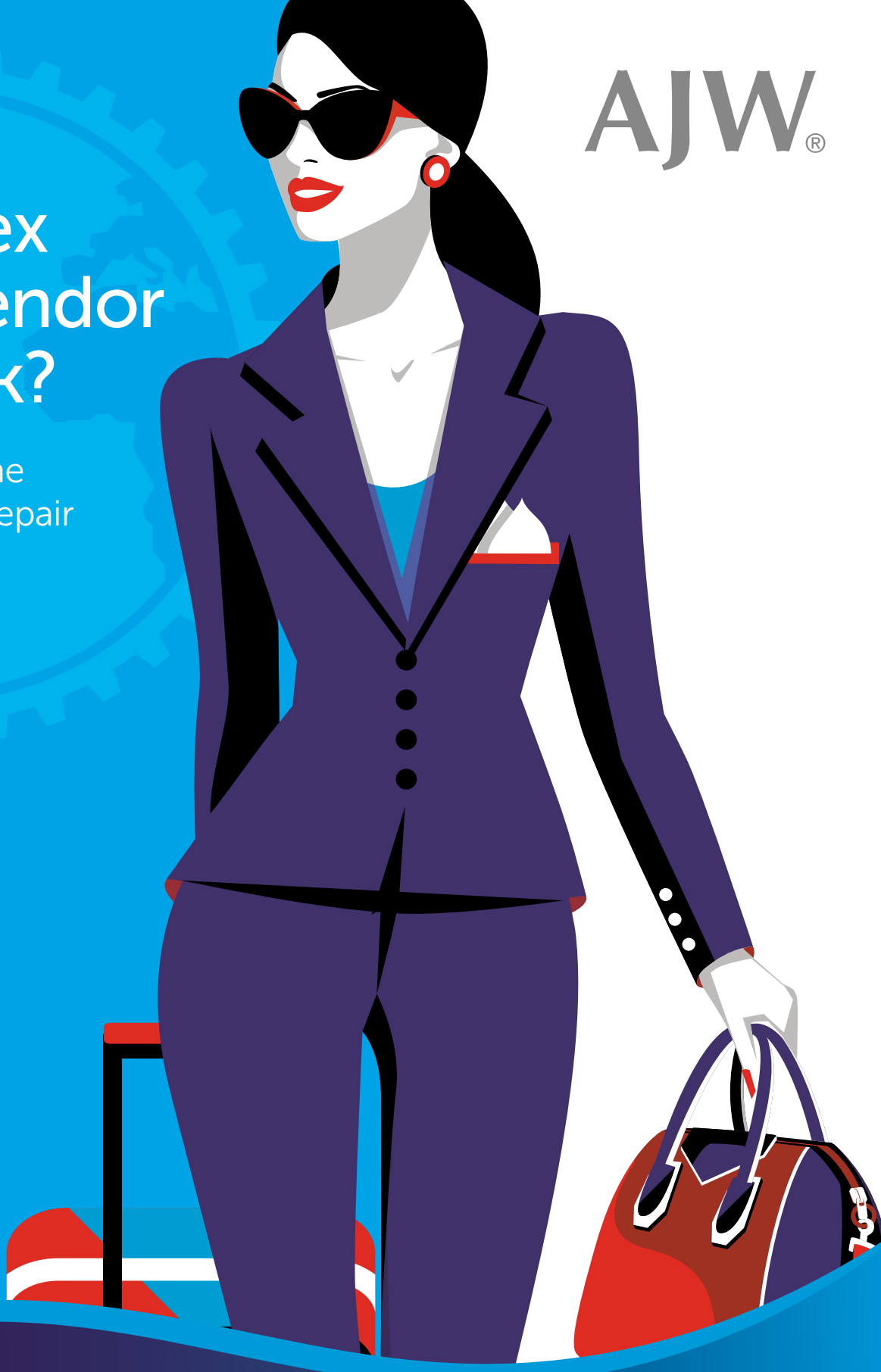

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Delta TechOps Announces its First Third-Party LEAP-1B Maintenance Contract for the Korean Air's 737 MAX Fleet

Delta TechOps announced its first third-party LEAP-1B maintenance contract for the engines powering Korean Air's 737 MAX fleet. Delta TechOps says this milestone demonstrates its status as "the premier provider of advanced maintenance, repair and overhaul (MRO) solutions and a trusted partner to the global LEAP operating community."

"Next-generation engines demand next-generation support, and this is where Delta TechOps excels," said John Laughter, EVP – chief of operations and president of Delta TechOps. "Our LEAP-1B capability is powered by the expertise of the best people in the industry, built on decades of knowledge and a commitment to innovation — delivering the performance and reliability that keep fleets flying."

Delta TechOps is one of only six globally authorized CFM Premier MRO providers for CFM LEAP engines under CFM's Branded Services Agreement. As the first North American MRO to earn this exclusive designation, Delta TechOps sets the pace for next-generation engine support, combining deep technical knowledge with proven operational excellence.

"We have great confidence in Delta TechOps' world-class technical expertise and maintenance quality, and we expect this agreement to further enhance our collaboration across the full spectrum of MRO," said Jongseok Yoo, EVP and chief safety and operating officer at Korean Air. "This LEAP-1B engine agreement is a testament to our mutual focus on achieving the highest standards of operational assurance for our next-generation fleet."

Airbus Update on Deployment of A320 Family Precautionary Fleet Measures

Following the publication of an Alert Operators Transmission (AOT) on November 28, calling for immediate precautionary action on a number of in-service A320 Family aircraft, Airbus is providing an update on the status of the deployment of these measures across the global fleet.

As of early December, out of a total number of around 6,000 aircraft potentially impacted, Airbus says "the vast majority have now received the necessary modifications." Airbus is working with their airline customers to support the modification of less than 100 remaining aircraft to ensure they can be returned to service.

Airbus has apologized for any challenges and delays caused to passengers and airlines by this event. The company issued thanks to "its customers, the authorities, its employees and all relevant stakeholders involved for their support in implementing these measures, and for their understanding of Airbus' decision to put safety above all other considerations," it said in a press release.

SR Technics Spain Celebrates 30-Year Operations Anniversary

This year, SR Technics Spain SAU marks 30 years of successful operations in Spain. As part of the global network of SR Technics, a leading Swiss provider of maintenance, repair and overhaul (MRO) services in the civil aviation industry, the company hosted an anniversary celebration at Purobeach Illetas, Calvià (Mallorca).

The event gathered all local employees and welcomed Owen McClave, CEO of SR Technics, along with the senior leadership team, and partners, demonstrating their strong support for the company's continued growth in the Spanish market.

"This milestone is not only a celebration of three decades of dedication and expertise, but also a recognition of the trust that our customers place in SR Technics. Our presence in Spain plays an important role within the group, and we are committed to supporting its continued growth in the years ahead," said McClave CEO.

"Reaching 30 years is the result of the dedication and commitment of our people. Our journey from a small team in 1995 to an organization of more than 90 employees today demonstrates what can be achieved with innovation, passion, and a strong customer focus. We look forward to further expanding our capabilities and strengthening our presence in Spain and beyond," said Antonio Colella, general manager of SR Technics Spain SAU.

Boeing Completes Acquisition of Spirit AeroSystems

Boeing recently completed its acquisition of Spirit AeroSystems. "This is a pivotal moment in Boeing's history and future success as we begin to integrate Spirit AeroSystems' commercial and aftermarket operations and establish Spirit Defense," said Kelly Ortberg, president and chief executive officer of The Boeing Company. "As we welcome our new teammates and bring our two companies together, our focus is on maintaining stability so we can continue delivering high quality airplanes, differentiated services, and advanced defense capabilities for our customers and the industry."

Boeing's acquisition includes all of Spirit's Boeing-related commercial operations, including fuselages for the 737 program and major structures for the 767, 777 and 787 Dreamliner. It also includes commercially procured fuselages for the P-8 and KC-46.

The transaction also brings Boeing's largest supplier of spare parts in house, expands Boeing's global maintenance, repair and overhaul services footprint and adds to Boeing's rotable, lease, and exchange portfolio with Spirit's aftermarket businesses.

Spirit Defense will continue to support its customers as an independent supplier to the defense industry to ensure uninterrupted support for its customers. It will align to Boeing Defense, Space & Security for financial reporting and select enterprise functional and site support but maintain independent governance and operations.

In addition, portions of Spirit AeroSystems' operations in Belfast, Northern Ireland, have been acquired by Boeing, and the Belfast site will operate as an independent subsidiary branded as Short Brothers, a Boeing Company.

Spirit AeroSystems' commercial and aftermarket operations in Wichita, Kansas; Dallas, Texas; and Tulsa, Oklahoma, as well as Spirit's Aerospace Innovation Center in Prestwick, Scotland, will begin to integrate into Boeing. Approximately 15,000 teammates across the five sites are becoming a part of Boeing.

"Kansas' aviation expertise reaches far beyond our borders," said Kansas Governor Laura Kelly. "We help manufacture the aircraft the world relies on. Boeing's acquisition of Spirit AeroSystems underscores the global significance of the work happening in our state and positions Kansas to continue shaping the future of aerospace innovation for decades to come."

"Wichita would not be the Air Capital of the World without the extraordinary engineers, designers and manufacturers who have invested in our aerospace industry and made Kansas their home," said U.S. Senator Jerry Moran. "Boeing's acquisition of Spirit AeroSystems will help build bridges between Seattle and Wichita and bring new opportunities to the Air Capital of the World. I welcome Boeing back to Wichita and look forward to working with them to build a lasting relationship with the community and its workforce, as well as current and future suppliers, to continue building on the growth we have seen in recent years."

"Today's announcement is a great recognition of the world-class talent we have in Wichita," said U.S. Senator Roger Marshall. "Our workers and the unions that represent them have kept America as the gold standard in aerospace, and they deserve to be at the center of any future investment. I'm grateful that this agreement further solidifies Wichita's prestige in the industry."

"Kansas has a rich aviation history, and our region continues to lead the way in designing, developing and manufacturing world-class aircraft that serve the world," said U.S. Congressman Ron Estes. "Boeing's acquisition of Spirit AeroSystems continues to build on the successes of a century of U.S. flight. As the flags change at the manufacturing facility in southeast Wichita, I will remain a steadfast advocate for the skilled workforce and communities that make up the Air Capital of the World."

AAR and Air France Industries KLM Engineering & Maintenance Complete Formation of xCelle Asia Joint Venture

AAR and Air France Industries KLM Engineering & Maintenance (AFI KLM E&M) announced the completion of the formation of xCelle Asia, which included the receipt of regulatory approval. This previously announced joint venture, located in Chonburi, Thailand, will overhaul nacelles for new generation aircraft.

Building on the success of AAR and AFI KLM E&M's existing joint venture in the Americas, xCelle Asia will provide unparalleled service and support for operators in the APAC region. Licensed by multiple OEMs, xCelle Asia can perform nacelle maintenance, repair, and overhaul services, including on-wing / on-site inspections, and rotable support for next-generation aircraft nacelles, including GEnx, Trent1000, LEAP-1A/1B engine types. Other new generation aircraft and engine types will follow.

"This joint venture markedly expands our service offerings in the Asia-Pacific region and furthers our ability to deliver high quality, industry leading solutions to our customers," said Jim Berberet, senior vice president of component services at AAR. "We are looking forward to replicating our current success in the Americas by combining the experience of AAR's highly regarded component services team in Thailand with AFI KLM E&M's global network."

"The creation of xCelle Asia represents a major step forward in strengthening our global MRO network. By expanding our nacelle capabilities into the Asia-Pacific region, we are positioning ourselves to deliver world-class, next-generation support closer to our customers. This new venture reflects our commitment to innovation, sustainability, and operational excellence, and we are proud to bring our expertise to one of the world's most dynamic aviation markets," stated Benjamin Moreau, senior vice president of strategy and business development at AFI KLM E&M.

SWISS Continues with Lufthansa Technik's Component Support for Boeing 777 fleet

Swiss International Air Lines (SWISS) and Lufthansa Technik have renewed their long-standing collaboration on component support for the airline's Boeing 777 fleet. An exclusive ten-year contract, covering all twelve Boeing 777-300ER aircraft, will commence in January. This new agreement seamlessly extends the total component support (TCS) that the world's leading provider of technical aircraft services has been providing to SWISS for this aircraft type over the past ten years.

For SWISS, the contract continues to ensure component MRO, access to Lufthansa Technik's global spare parts pool, and logistical support through a dedicated homebase stock located on SWISS' premises in Zurich. In addition to the Boeing 777 fleet, Lufthansa Technik already provides these services for the airline's Airbus A320ceo, A320neo, A330, A340, as well as the growing A350 fleet.

"Based on our very positive experience with Lufthansa Technik's reliable component support across a large part of our fleet, we are confident that we have again chosen the best possible partner to meet our high standards in this area," said Claus Bauer, head of technical fleet management at SWISS. "We're pleased to extend this trusted cooperation, especially amid ongoing global supply chain challenges, where Lufthansa Technik's support plays a key role in ensuring component availability and securing our long-term operational performance."

Lea Degner, head of sales Lufthansa Group Airlines at Lufthansa Technik, added: "It's a great vote of confidence that SWISS is once again placing its trust in our component support. After ten years of successful cooperation for the airline's Boeing 777 fleet, we're proud to continue our partnership and to support SWISS in keeping its operations smooth, reliable, and ready for the future."

Beyond the TCS, Lufthansa Technik also contributes to enhancing the efficiency of SWISS' Boeing 777 operations. All twelve aircraft are equipped with the company's innovative AeroSHARK surface technology, developed in collaboration with BASF Coatings. This sharkskin-inspired modification reduces aerodynamic drag and improves fuel efficiency by around one percent. SWISS was among the first airlines to use this technology.

GE Aerospace to Invest $25 Million to Modernize Wales Site

GE Aerospace has announced a $25 million (£19 million) investment over the next three years to refurbish its Wales site, a world-class center for commercial engine maintenance, repair, and overhaul (MRO) operations. This major project will enhance critical infrastructure, improve operational efficiency, and advance sustainability initiatives, ensuring the site remains a leader in supporting global commercial fleets.

The refurbishment will include upgrades to more than 70,000 square feet of roof space, as well as improvements to building cladding, insulation, and glazing installations. These enhancements will modernize the site's infrastructure, reduce energy consumption, and create opportunities for renewable energy projects. This investment represents the single largest at the Wales site in over two decades, following the construction of the widebody Test Cell facility in 1999.

"This investment reflects GE Aerospace's commitment to operational excellence and sustainability," said Stephen Edwards, managing director and executive plant leader at GE Aerospace Wales. "By modernizing our infrastructure, we are not only enhancing our capabilities but also creating opportunities to support the next generation of engines and renewable energy projects. This investment secures the future of global operations right here in Wales, the gateway to the European aerospace market."

The Rt Hon Eluned Morgan MS, the First Minister of Wales, added: "I'm delighted that GE Aerospace has made this long-term commitment to its Nantgarw site and announced it at the Welsh Government's Wales Investment Summit today. The plant has been a central part of the economy of South Wales for years, providing high quality jobs for generations of Welsh workers. This investment by GE Aerospace is a major vote of confidence in Wales and is great news for the local community, the local supply chain and especially the staff — not just the current workforce, but the workforce of the future."

As one of Wales' anchor companies, GE Aerospace plays a vital role in driving employment, skills development, and economic growth in the region. The site employs more than 1,350 highly skilled engineers and technical specialists, serving a global customer base with industry-leading MRO services. GE Aerospace Wales is also home to an award-winning apprenticeship program, which currently has 43 apprentices on roll who are all supported by Coleg y Cymoedd, a local further education provider.

This investment is part of GE Aerospace's larger strategy to advance infrastructure, skills, and operational excellence across Europe. In October 2024, GE Aerospace announced plans to invest over £107 million into MRO and component repair facilities across Europe through 2026. These investments demonstrate the company's dedication to building a skilled workforce and supporting the evolving needs of the aerospace industry.

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FEAM Aero Expands Partnership Network with New Line Maintenance Agreement for Global Crossing Airlines in Miami

FEAM Aero, the largest leading provider of aircraft line maintenance services in the United States, is proud to announce a new strategic partnership with Global Crossing Airlines (GlobalX). Beginning December 1, 2025, FEAM Aero will provide full line maintenance support for GlobalX at Miami International Airport (MIA), further expanding FEAM's footprint and capabilities at one of its premier locations.

This partnership emphasizes FEAM Aero's continued investment in MIA, following the recent opening of its second narrowbody hangar, which has significantly enhanced the company's ability to support growing airline operations in South Florida. The expanded facilities enable FEAM Aero to provide comprehensive maintenance solutions for a wide range of aircraft types, ensuring operational reliability and efficiency for its airline partners.

"We're excited to partner with GlobalX as they continue to grow their network and fleet," said Dan Allawat, chief strategy officer of FEAM Aero. "Our expanded presence at MIA allows us to deliver the scale, expertise, and responsiveness that carriers like GlobalX require to maintain schedule reliability and meet the highest safety standards."

The agreement with GlobalX reinforces FEAM Aero's long-standing reputation as a trusted maintenance partner for both domestic and international airlines. With 50 line maintenance stations worldwide, FEAM Aero continues to invest in infrastructure, technology, and workforce development to support the evolving needs of its customers.

"This collaboration highlights the strength of our expansion strategy," said Scott Diaz, vice president of business development and marketing at FEAM Aero. "As we continue to grow our capabilities at MIA and across our network, we remain focused on providing world-class maintenance solutions that support our partners' operational goals."

The new partnership at MIA marks another milestone in FEAM Aero's mission to deliver safe, efficient, and high-quality maintenance services backed by decades of technical expertise and a commitment to excellence.

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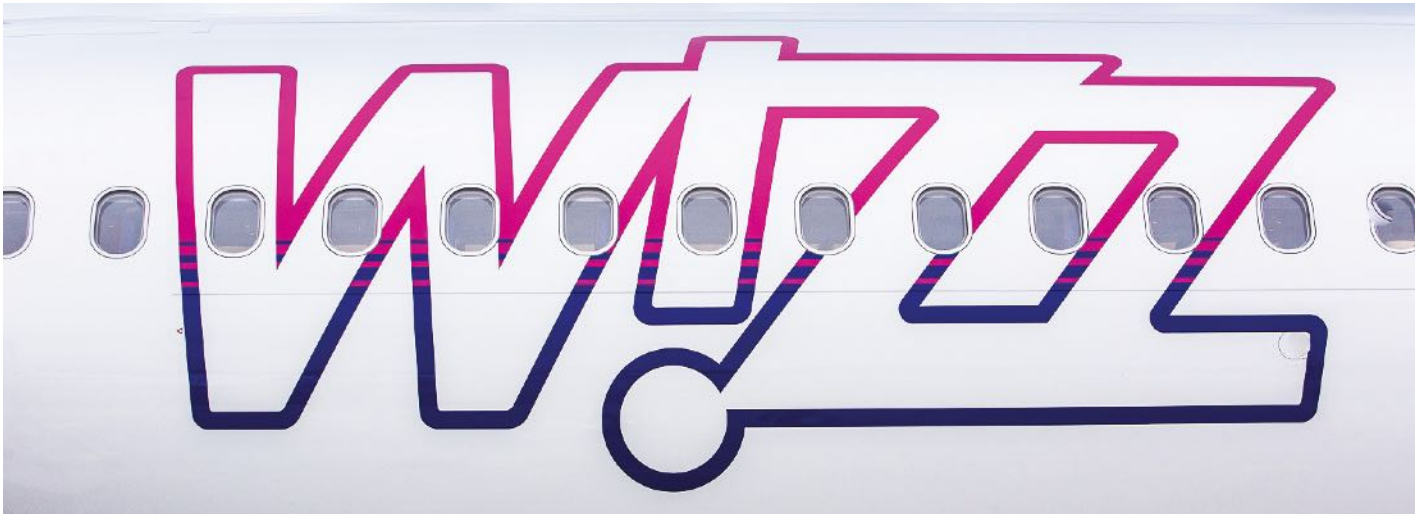
Wizz Air Extends Long-Term Agreement with FL Technics in Romania

Wizz Air, one of Europe's leading carriers, has renewed its long-term cooperation with FL Technics, further strengthening a partnership built on trust, reliability, and shared ambition. The extended agreement covers line maintenance services at Wizz Air's bases in Bucharest (OTP) and Cluj-Napoca (CLJ). These two bases are at the heart of the airline's network in the region.

This continued partnership is a signal of long-term alignment between Wizz Air's growth strategy and FL Technics' expanding footprint across Europe. Building on more than a decade of cooperation, both companies are looking ahead to a deeper integration of services and stronger operational ties.

"We have been working with Wizz Air for over a decade now. During this time, we have built a very deep understanding of their needs and always support the airline anywhere we can," said Saulius Bajarũnas, chief operating officer of FL Technics. "Our goals in Romania fully align with Wizz Air's vision — both of us recognize this region as of strategic importance and plan to invest heavily into future development."

The extension strengthens FL Technics' position as a trusted long-term partner for Europe's most dynamic airlines — combining proximity, flexibility, and a proven record of operational excellence.



Wizz Air and Aeroplex Extend Long-Term Line Maintenance Cooperation Budapest

Wizz Air and Aeroplex have signed a new long-term agreement to continue the airline's line maintenance support in Budapest. Under the 3+2-year contract, Aeroplex will provide ongoing line maintenance services for the Wizz Air fleet based at Budapest Ferenc Liszt International Airport until February 2031.

Aeroplex's dedicated team delivers daytime technical support and performs nightly inspections up to high-level maintenance tasks to ensure aircraft readiness for early-morning departures. From December 2025, twenty Wizz Air aircraft will be based in Budapest, requiring continuous and coordinated maintenance operations.

In addition to line maintenance, Aeroplex will continue providing material and component logistics support for the airline's full European fleet. The renewed agreement gives both companies a stable operational framework while allowing room for further cooperation as fleet size and operational needs grow.

"We are pleased to announce the extension of our contract with Aeroplex, our trusted long-term maintenance partner in Budapest," said Julia Brix, supply chain officer at Wizz Air. "We greatly value the team's professionalism in providing technical support and inspections, and we look forward to continuing our successful collaboration in the years ahead."

Árpád Demény, CEO of Aeroplex added: "We are proud to remain Wizz Air's maintenance partner in Budapest. This renewed agreement reinforces our commitment to providing reliable technical support for the airline's daily operations, and we are prepared to expand our cooperation."

AAR Extends Exclusive Global Distribution Agreement with Collins Aerospace for Goodrich De-Icing and Specialty Systems Products

AAR has signed a multi-year extension of its exclusive global distribution agreement with Collins Aerospace. The agreement includes the company's Goodrich de-icing and specialty systems product line.

The collaboration supports Collins Aerospace's strategy to streamline aftermarket distribution by leveraging AAR's global logistics network to serve customers across the general aviation, commercial, and defense markets.

"AAR is proud to continue delivering availability, responsiveness, and technical support to the wide range of customers who rely on Collins Aerospace Goodrich de-icing solutions," said Frank Landrio, AAR's senior vice president of distribution. "Our execution and ability to gain market share have resulted in tremendous growth of this product line."

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Teledyne Controls, a leading provider of avionics and aircraft data management solutions, built its name on innovative solutions that collect, manage and deliver aircraft data more efficiently. Teledyne's proven technology and collaborative customer relationships have revolutionized the way aircraft operators can access, distribute, and utilize their data to improve flight safety, compliance, operational efficiency, and passenger experience.

The company offers an adaptable suite of products that includes solutions for aircraft data acquisition and recording, wireless data transfer, cabin air quality monitoring, secure software parts loading and distribution, onboard networking, along with cloud-based data analysis services. Combined together, these products provide comprehensive data management solutions that leverage aircraft data intelligence and create value for the operators.

Simplifying data distribution, while meeting today's secure dataloading requirements

One of Teledyne Controls' standout offerings is their suite of dataloading solutions, which are designed to streamline and automate the distribution, storage, and management of Loadable Software Parts (LSP) and databases across an airline's operation, while meeting today's secure dataloading OEM requirements.

As aircraft continue to integrate powerful new systems and networks into their design and the amount of software parts increases, the software distribution process becomes more complex. With more software parts being loaded, more often, the opportunities for cyber-attacks multiply.

Built from the ground up with security in mind, Teledyne Controls' latest dataloading products, the PMAT XS portable loader and the eADL XS onboard data loader represent a new generation of dataloading technology that meets the stringent ARINC 645-1 requirements for OEM secure dataloading. With advanced features, such as built-in wireless connectivity, comprehensive validation of digital signature, and secure boot, they ensure the integrity of software parts and protects against unauthorized access at every stage.

Teledyne's eADL XS is certified for use on the Boeing 737NG aircraft series and the Airbus A320 family, including the A318, A319, A320, and 321models. It is in the process of being certified for other aircraft platforms.

Teledyne's eADL XS offers several key benefits:

- **Advanced Security:** Fully compliant with ARINC 645-1 security standards, ensuring data integrity and robust protection against cyber threats.
- **Wireless Connectivity:** Built-in cellular and Wi-Fi connectivity, for fully autonomous software part distribution with or without Teledyne's GroundLink® Wireless Quick Access Recorder.
- **Ease of Integration:** Designed as a plug-and-play replacement for existing data loaders, simplifying the upgrade process for operators.
- **Enhanced Fleet Management:** Integrates with Teledyne's ground distribution systems to automate software configuration control and load reporting.
- **Increased Onboard Storage:** Expanded internal mass storage for onboard retention of software parts, facilitating reloading at any location and reducing risks of delays and cancellations.

In addition to these dataloading hardware solutions, Teledyne Controls provides the LoadStar® Server Enterprise 3 (LSE 3), a comprehensive software parts management system that offers configuration control and load reporting capabilities, further enhancing the efficiency and reliability of the dataloading process.

Teledyne Controls' commitment to innovation and customer collaboration has positioned it as a leader in the aviation industry. By providing advanced dataloading solutions, the company helps airlines and aircraft operators to enhance the safety and efficiency of their operations.

With a global network of offices and field representatives, Teledyne Controls is dedicated to supporting its clients worldwide and providing them with the personal service and attention they deserve.

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Headquartered in Southern California, Teledyne Controls LLC is a wholly owned subsidiary of Teledyne Technologies Incorporated (NYSE: TDY).

Maximize aircraft systems' health and performance with easy access to full series flight data

Teledyne's Data Delivery Solutions (DDS) empowers aircraft operators to securely share selected flight data with third-party consumers, such as equipment OEMs, while retaining full control. The data is redacted and decoded locally, ensuring privacy and security. In return, OEMs gain access to a larger set of airline-owned data points that allow them to maximize aircraft system health and performance and deliver better efficiencies to their airline customers.

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TELEDYNE

HAECO Extends Heavy Maintenance Contract with Emirates for A380 Aircraft

HAECO, a leading global provider of comprehensive MRO solutions, is pleased to announce the extension of its base maintenance contract with Emirates for its A380 aircraft through 2030. Under this extended agreement, HAECO will continue to provide heavy maintenance services, including 6Y, 9Y and 12Y checks, at its state-of-the-art facility in Xiamen.

The base maintenance partnership between HAECO and Emirates began in 2024 with the induction of Emirates' first A380 for its 6Y check in Xiamen. This September, HAECO successfully completed its first 12Y check of an A380 for Emirates on schedule, highlighting HAECO's technical expertise, and ability to meet the highest industry standards.

Gerald Steinhoff, chief commercial officer of HAECO, said, "We are delighted to continue delivering industry-leading base maintenance services to Emirates, the world's largest international airline operating the world's largest A380 fleet. This long-term contract extension underscores the exceptional quality of our service and our proven ability to meet the operational demands of top-tier customers, including those in the Middle East."

HAECO provides base maintenance services for most aircraft types through its facilities in Hong Kong and the Chinese Mainland. Recently, it was honored "Asia MRO of the Year - Airframe" at the sixth MRO Asia-Pacific Awards, recognizing its cutting-edge technologies, commitment to sustainable development, and strategic OEM partnerships that enhance reliability and efficiency across its global network.

Boeing Distribution Launches Unified Ecommerce Platform

Boeing announced a key milestone in its ongoing journey to modernize and integrate its distribution businesses with the launch of a new, unified ecommerce website. The new platform brings together Boeing Distribution's portfolio of products and services into one streamlined digital destination, simplifying how customers and suppliers connect, transact and grow with the company.

Over the past year, Boeing Distribution has implemented several key initiatives to strengthen operations and elevate the customer experience. These include enhanced AOG access for faster response times, an improved customer support model that streamlines communication and resolution, and implementation of a new state-of-the-art enterprise resource planning system to unify data, improve visibility and support more efficient service.

"We want to simplify distribution services, maximize customer performance and be the preferred choice for customers and suppliers in the global distribution marketplace," said William Ampofo, senior vice president, parts & distribution and supply chain, Boeing Global Services. "The new ecommerce website — along with system and service enhancements — represents a significant step forward in that vision. Together, these investments strengthen our foundation and position us for continued growth."

The new Boeing Distribution ecommerce website offers full product catalog and services offerings for commercial, business and general aviation, vertical lift and defense customers; smart search, powered by AI, to help customers find products faster and one single login.

Airbus Completes Acquisition of Spirit AeroSystems Sites

Airbus recently closed a transaction with Spirit AeroSystems for the acquisition of industrial assets dedicated to its commercial aircraft programs.

"This milestone marks a special moment for all of us at Airbus. We are proud to welcome over 4,000 new colleagues, with whom we will embark on a new chapter in our industrial operations by taking on activities of critical importance to our commercial aircraft programs," said Florent Massou, executive vice president operations for the commercial aircraft business of Airbus.

Airbus has taken ownership of the following former Spirit AeroSystems assets:

- the site of Kinston, North Carolina, U.S. (A350 fuselage sections), joining as Airbus Aerosystems Kinston.
- the site of Saint-Nazaire, France (A350 fuselage sections), joining as Airbus Atlantic Cadréan.
- the site of Casablanca, Morocco (A321 and A220 components), joining as Airbus Atlantic Maroc Aero.
- the production of A220 wings and A220 mid-fuselage in Belfast, Northern Ireland, becoming Airbus Belfast.
- the production of wing components for A320 and A350 in Prestwick, Scotland, becoming an affiliate named Prestwick Aerosystems.
- the production of A220 pylons, which will be transferred out of Wichita, Kansas, U.S., to the site of Saint-Eloi, Toulouse, France.

Airbus receives compensation of $439 million, with the typical purchase price adjustments and subject to customary post-closing review. In addition, Airbus receives certain amounts to settle liabilities under the provision of the purchase agreements.

MK Test Systems

MK Test Systems designs and manufactures automatic electrical test equipment used by aviation MROs around the world to support safe, efficient aircraft and engine maintenance. Established in 1992, the company has built a strong reputation for delivering reliable, proven test solutions for demanding aerospace environments.

Within the MRO sector, MK Test Systems is particularly well known for its expertise in **engine electrical testing and External Loop Resistance Testing (ExLRT**). Its ExLRT equipment is designed for use in hazardous areas and enables accurate measurement of loop resistance in aircraft electrical systems, supporting compliance with safety and airworthiness requirements during engine and aircraft maintenance.

MK Test Systems' portfolio supports a wide range of MRO activities, including:

- Electrical testing of aircraft engines and associated wiring
- Loop, bond, joint and slip ring resistance testing
- Harness and functional testing for engine and airframe systems
- Automated test equipment supported by clear, auditable results

All systems are designed to simplify complex test procedures, reduce manual intervention and help engineers work efficiently within tight maintenance schedules.

MK Test Systems operates globally, with international offices and a network of trained representatives providing local sales, service and technical support. This global coverage ensures MRO customers receive responsive assistance throughout the lifecycle of their test equipment, wherever they operate.

By combining specialist electrical test expertise with long-term industry experience, MK Test Systems continues to support aviation MROs in maintaining electrical integrity, improving test consistency and meeting the highest standards of operational safety.

MK TEST SYSTEMS

For more information

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Rolls-Royce Celebrates the Official Opening of BAESL, its MRO Joint Venture in Beijing, China

Rolls-Royce celebrated the official opening of Beijing Aero Engine Services Limited (BAESL), its new joint-venture maintenance, repair and overhaul (MRO) facility with Air China in early December. The facility complements Rolls-Royce's existing MRO footprint and addresses growing long-term demand for new civil large engines.

Located in Beijing, BAESL is the first dedicated Trent engine overhaul facility in the Chinese mainland and a significant addition to Rolls-Royce's global MRO network. The opening of the new facility marks an important step Rolls-Royce is taking in expanding its worldwide widebody engine maintenance capacity and providing more localized support to its customers in China and beyond.

At the opening ceremony, the Civil Aviation Administration of China granted BAESL its maintenance organization certificate (MOC), confirming the facility's readiness to deliver professional, reliable and high-quality overhaul services on Trent engines. The reveal of the first customer engine entering the shop — witnessed by representatives from Rolls-Royce, along with representatives from the Beijing Municipal Government, the British Embassy, Air China, industry partners, suppliers and customers — marked a brand-new chapter of this state-of-the-art facility.

"The opening of BAESL not only supports our long-term growth in the Chinese market but also contributes to our ambition to significantly increase our global MRO capacity by 2030," said Paul Keenan, director – commercial aviation aftermarket operations, Rolls-Royce. "China is one of the largest and fastest growing widebody markets in the world and is also key to Rolls-Royce. We power more than 500 of China's in-service commercial aircraft; nearly 20% of our global Trent engines were delivered to China. Increasing flying hours, new orders and existing fleet upgrades all lead to growing demand for shop visits, both in China and around the world. Therefore, we're making bold investments in our global Trent aftermarket network, including BAESL, to remain resilient and keep our customers flying."

Air China, as China's sole national flag carrier, is a long-term strategic customer for Rolls-Royce. By establishing BAESL jointly, the two companies have deepened their cooperation. In the meantime, it further enhances Air China's strategic layout in the aircraft maintenance industry chain, improving its overall fleet operational support capabilities.

As one of four authorized joint-venture overhaul facilities within the Rolls-Royce global services network, BAESL will be an integral part of its worldwide Trent MRO ecosystem, which also consists of two Rolls-Royce maintenance facilities, seven joint-venture or independent authorized maintenance centers, and customer-owned shops.

Starting from 2026, BAESL will begin introducing overhaul capability for Trent 700, Trent XWB-84 and Trent 1000 engines, with capacity expected to ramp up to 250 overhauls per year by 2034.

Buffalo Shrink Wrap

As an industrial quality shrink wrap supplier, we understand the importance of protecting company assets from harm. Therefore, we provide a wide array of wraps and tools to preserve your equipment and give it as much longevity as possible. With the right tools and the proper application, you can protect your company assets from sustaining damage and make sure your equipment will see future use.

Depending on where you store your machinery, your assets may be exposed to several threats that can damage it, causing lasting harm and making expensive repairs or replacements necessary. However, there are ways to add an extra layer of protection to safeguard your machinery from environmental hazards and keep it safe during storage. Heavy-duty industrial shrink wrap is a great way to protect your industrial machinery and keep it safe for extended periods of time.

Heavy-duty shrink wrap offers a cost-effective way of protecting your machinery without requiring more expensive alternatives. With a durable seal, shrink wrap provides long-lasting protection and is simple to repair when the need arises after a tear. You can save your company money with an investment in industrial shrink wrap not only because it will preserve your equipment but also because of the low cost and minimal maintenance involved. Equipment preservation doesn't need to put a huge dent in your budget.

Do everything you can to protect your equipment; preserving it now is significantly cheaper than purchasing replacements down the line. Allow us to be your industrial quality shrink wrap supplier and provide your equipment with the protection it needs to ensure future functionality. For any further questions or business inquiries, don't hesitate to give us a call or send us an email. We're happy to help you with whatever your company needs when it comes to shrink wrapping systems.

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EASA Certifies ExecuJet MRO Services Malaysia for Falcon 7X/8X Heavy Maintenance

ExecuJet MRO Services Malaysia, a wholly owned subsidiary of Dassault Aviation, has further expanded its maintenance capabilities with the additional regulatory approvals from the European Union Aviation Safety Agency (EASA) and U.S. FAA.

EASA has approved the Subang Airport facility to perform line and base maintenance on the Falcon 7X/8X aircraft. The agency has also authorized the organization to conduct a range of non-destructive testing (NDT) techniques, including ultrasonic, eddy current, magnetic particle and penetrant testing.

In addition, the U.S. FAA has granted approval for two further NDT methods: ultrasonic and penetrant inspections.

"The Falcon 7X/8X base maintenance approval is significant as there is growing demand from European-registered aircraft operating in or transiting through Asia. EASA certification, widely recognized by civil aviation authorities worldwide, demonstrates we meet the regulator's rigorous standards," says Ivan Lim, regional VP Asia, ExecuJet MRO Services.

"The expanded NDT capability is equally important, as it supports heavy base maintenance checks, helping us to identify structural issues efficiently and reduce disruptive unscheduled downtime," he adds.

RTX's Collins Aerospace and the Royal Netherlands Air and Space Force Establish New Military Avionics Service Center

Collins Aerospace, and the Royal Netherlands Air and Space Force (RNLASF) have signed a contract to build a new military avionics service center in the Netherlands to support European F-35 and CH-47F fleets.

Under the multi-decade government-owned, contractor-operated partnership, Collins will bring repair expertise and depot technology for the F-35 and the CH-47F. They will also manage the repair supply chain as part of its global military services network.

"Bringing our avionics repair capabilities to the RNLASF Air Support Command (ASC) military base will create substantial operational, logistical and sustainment improvement for our European customers," said Brian Barta, vice president and general manager for avionics aftermarket services and support in Avionics at Collins Aerospace. "This new center will complement Pratt & Whitney's already established F135 engine depot at the ASC, further expanding RTX's presence in the Netherlands."

The new center will also complement Collins' F-35 pilot readiness center in Soesterberg, the Netherlands, establishing a full regional lifecycle sustainment solution for customers in Europe. Additionally, the repair capability will support Collins' performance based contract with RNLASF to ensure the readiness of the Dutch CH 47F fleet.

"In an increasingly contested logistics environment, 'Fight tonight, Fight tomorrow, Fight together,' means positioning the RNLASF for the highest possible mission readiness," said Lieutenant General André 'Jabba' Steur of the Royal Netherlands Air and Space Force. "As we transition to modernized and increasingly complex weapon systems, we will require preparing for the necessary support, infrastructure and maintenance at our military depot facilities. Collaborating with trusted OEMs like Collins Aerospace has proven to be very valuable to our overall mission readiness."

"Together with Collins Aerospace we will be increasing skills and advancing technical knowhow, in the Netherlands," said Secretary of Defense Gijs Tuinman. "This partnership is an example of a strategic collaboration that supports our defense and technological base as we continue to contribute to NATO and its partners."

Initial depot capability for Collins Aerospace's avionics military service center is expected in 2026.

Joe "Ski" Suszczynski Earns the FAA's Charles Taylor Master Mechanic Award

StandardAero recognized Joe "Ski" Suszczynski, training manager at its Dallas-Fort Worth Service Center, as a recipient of the FAA Charles Taylor Master Mechanic Award. His journey began at age 14 at Aviation High School in Queens, New York, a public, FAA-accredited program. "It's in your DNA," Suszczynski shared. "Aviation has been in my DNA since I was 14. If you don't love it, it's work."

After four and a half years of classroom training and hands-on shop time — including maintaining the school's own aircraft — he graduated with both his diploma and his FAA certification at just 17 years old. He returned for six additional months of extended training to obtain his Powerplant certificate.

Suszczynski went on to serve 21 years in the United States Air Force as a jet engine technician. He later transitioned to civil aviation roles at Kelly Air Force Base in San Antonio, eventually joining Raytheon as a site supervisor where he was responsible for hiring and developing a team of more than 50 technicians. During his Air Force career, he also taught Airframe & Powerplant (A&P) students as an adjunct instructor with Embry-Riddle in Germany.

Suszczynski joined StandardAero in 1999, continuing in a similar role, bringing his leadership, technical knowledge and growth mindset.

In 2022, Suszczynski transferred to StandardAero's DFW facility to lead training initiatives, a natural fit given his long history of developing emerging aviation talent. "What really excites me is when I'm training somebody," he said. "Whether it's one, five, or ten years later, you see them grow and expand — and then they come back to tell you how much it meant to learn to do things the correct way."

Suszczynski said his leadership philosophy centers on integrity, clarity, and accountability. His personal motto — "Do what's right when nobody is looking" — guides how he works, teaches and leads. As he puts it, "Do my actions mimic what I say? Do I walk the walk?" Whether he is delivering technical instruction, reinforcing safety practices, or picking up FOD on the shop floor, Suszczynski led by example.

"Aviation has helped me get to where I am today," he shared. "It's given me financial security, and it's also taken sweat and tears. But the greatest reward is passing the baton on to others and watching them grow."

Magnetic Engines Marks 10 Years of Service

When Magnetic Engines opened its doors on October 5, 2015, the workshop measured just 100 square meters. There was no ribbon-cutting, only benches and tools. Ten years later, that conviction has driven the business to a 1,300-sqm facility, more than 319 client engagement events, and 67 customers served by early 2025, with the same philosophy still at its core.

"We didn't chase scale, we chased standards," said Risto Mäeots, CEO of Magnetic Group. "From the very beginning, Magnetic Engines built its reputation on precision and predictability. Growth was the consequence, not the goal."

The team's first client inspections took place just days after launch, two CFM56-7B engines in Ponta Delgada, Portugal. Through 2016, the shop focused on its own engines, refining procedures before opening to external clients in 2017.

By 2020, heavier repairs and combustion chamber replacements were routine; by 2023, the first Core Performance Restoration (CFM56-3) validated the team's control over the most complex modules. "Every milestone came from the same loop — learn, validate, scale," explained Filip Stanisic, managing director of Magnetic Engines. "Our first heavy repair in 2020 proved we could deliver under pressure. Later, DAC to SAC conversion work in 2024 showed we weren't just adding volume — we were adding depth."

By James Careless

The Evolution of Line Maintenance

How technician shortages and new technology are reshaping aviation line maintenance.

In aviation, line maintenance (LM) is the name for the routine maintenance work and inspections performed on aircraft to keep them airworthy and ready for flight. Typically, this work is done between flights or overnight, to minimize aircraft downtime and keep them flying on schedule.

So, what is the state of line maintenance in 2026, both good and bad, and what are its prospects going forward? To find out, *Aviation Maintenance* spoke with three MRO experts:

Augustinas Pajeda is FL Technics' line maintenance control center manager. "Our LM team supports airlines with full line maintenance services, including fast, precise AOG assistance," he said. "When an aircraft goes AOG, our team moves immediately to assess the issue, diagnose the problem, and deliver a safe, efficient solution. We operate under multiple international approvals, including EASA Part-145, FAA, GCAA (UAE), Transport Canada, QCAA, and Bermuda DCA, covering a wide range of aircraft types."

Augustinas Pajeda, FL Technics

Marcel van Sitteren is maintenance manager at SR Technics Line Maintenance AG. "We deliver comprehensive line maintenance services across Switzerland's major airport hubs, supporting a diverse range of international airlines," said van Sitteren. "Our teams in Basel, Geneva and Zurich carry out transit checks, daily and weekly inspections, defect rectifications, AOG support and specialized on-wing

Marcel van Sitteren, SR Technics

engine services."

Gary Pratt is STS Line Maintenance's senior vice president and general manager. "STS Line Maintenance supports more than 80 domestic and international passenger, cargo, and charter airlines with a full range of on-wing services," he said. "This includes on-demand defect rectification, scheduled checks up to and including A checks, AOG recovery and return to service, and specialized projects like airframe modifications."

Gary Pratt, STS Line Maintenance

Here's what they told us.

Line Maintenance Shops Are Busy

According to the experts, line maintenance is experiencing strong demand as global air traffic continues to grow. As this happens, "the industry is adapting to higher aircraft utilization, rising regulatory expectations, and increasingly advanced technology, at a time when safety, reliability, and operational continuity are more critical than ever," said van Sitteren. "We also see a significant increase in demand for on-wing engine support, from engine changes to LEAP-1 RBS modifications and fuel nozzle replacements." To meet this need, SR Technics fields a dedicated mobile team able to support customers at the MRO's own stations and at the customers' home bases.

Times have certainly improved for the MRO industry since the dark days of Covid-19. "Commercial aviation has come back and now exceeded pre-pandemic levels," Pajeda told *Aviation Maintenance*. "This means that the workload has increased for line maintenance stations as well."

At the same time that demand is going up, the fundamental nature of line maintenance has not changed. "Line maintenance technicians are still responsible for safe, compliant, efficient work that keeps the flying public moving," said Pratt. "They're essential to the health of our national transportation system, but the recognition they receive doesn't always match the responsibilities they carry or the conditions they work in."

This being said, customers' expectations have changed. "Airlines are constantly adjusting fleets, routes, and resource allocation based on economic shifts and operational priorities," noted Pratt. Whenever this happens, airlines expect service providers like STS Line Maintenance to keep up. "Wherever the aircraft go, we go," he said. "That means realigning people, tooling and processes in a way that keeps pace with the operation while maintaining quality and safety."

Technician Shortages Still Biggest Issue

Aviation Maintenance magazine asked the experts which issues the line maintenance sector is facing these days. Based on their answers, an ongoing shortage of skilled technicians is still the Number One problem.

"The technician shortage is here, and it isn't going anywhere for a while," Pratt said. "Retirements are accelerating, and trade schools aren't graduating enough new talent to replace them. Third-party maintenance providers face an additional challenge because airline benefit packages are hard to match, which keeps attrition higher than anyone would like."

Line maintenance prioritizes discovering any issues and addressing them immediately, preventing small problems from becoming serious failures. It helps keep aircraft available for daily service, minimizing flight delays or cancellations. Airlines rely on quick interventions during short turnaround times. STS image.

FL Technics says it strives to deliver on-time line maintenance and rapid AOG solutions worldwide. FL Technics image.

"Even before the pandemic the aviation industry was already feeling the shortage of aviation specialists," Pajeda observed. "During the pandemic, a lot of aviation specialists were laid off due to reduced capacity in flights and operations. Some of these people found new jobs in other fields. Meanwhile, training programs for new specialists were put on hold to some extent. Today, when we have exceeded pre-pandemic levels of operations, the aforementioned factors have created an even bigger worker shortage."

According to Pajeda, FL Technics is implementing various measures to attract new talent and is seeing success in its efforts. "Although there is a wider manpower challenge in the market, FL Technics is managing the situation well," he noted. "With the strong commitment to supporting our line maintenance specialists, we are not only able to sustain current operations but are also planning further expansion."

Retirement isn't just thinning the ranks of baby boomer technicians. There's also a growing shortage of experienced maintenance controllers. Unfortunately, since third-party technicians cannot act until they receive direction from an airline's maintenance control center, delays are inevitable. "Waiting 15 to 30 minutes to speak with a controller isn't unusual, and simple deferrals can snowball into operational delays," said Pratt.

As the boomers retire, line main maintenance providers struggle to replace them with new blood. "In fact, that's our most significant challenge, attracting licensed engineers to support our growing business," van Sitteren said. "In parallel to this problem, airlines are operating older aircraft for longer, thus increasing the complexity and scale of required maintenance. At the same time, new-generation engines and advanced aircraft systems demand continuous upskilling and rapid adaptation by maintenance organizations. Regulatory expectations are also evolving. After the implementation of SMS (safety management systems), the introduction of EASA Part-IS will be the next major safety standard shaping our industry."

There are further issues affecting the line maintenance sector. One of these issues is parts shortages, especially when it comes to wheels and brakes. "What is more, due to the issue with PW1100G engines where a big number of engines had to be returned to shops, operators have had to ground a part of their fleet and wait until the engines are released from repair," said Pajeda. "Due to this issue, some operators do not expect to return the grounded aircraft to service until 2027."

Another further issue affecting line maintenance is the airlines' tendency to alter their flight schedules on a seasonal basis, to align their traffic with passenger demands. "Seasonal flying

One challenge for line maintenance providers is scaling staff requirements to fit the peak and off-peak seasonal changes of the airlines. STS Line Maintenance image.

Sonic: Tools for Aviation Technicians

Sonic is the only tool company in North America that has developed comprehensive tool kits for every professional technician's skill level in the aviation market. Sonic tools are designed for one thing: Efficiency.

Our customers choose Sonic because of the quality and durability of our tools, the increase in productivity and positive tool control technicians experience when using our tool kits and our Sonic Foam System for organization. Using Sonic tools greatly enhances FOD prevention, tool accountability and inventory control through our innovative contrasting foam inlays, inventory control sheets, and tool serialization.

Technicians using the Sonic Foam System can audit a drawer in seconds. With a quick scan of a drawer, a technician knows immediately if a tool is missing — virtually eliminating FOD occurrences. Technicians also work 20% more productively when using Sonic's Foam System. Each tool's precise location is clearly shadowed in durable, chemical-resistant foam, with numerical identifiers for effortless organization and inventory — meaning a work area for technicians that is efficient.

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Sonic's Intermediate 263-pc Aviation Toolset: Sonic created this comprehensive 263-piece tool set with direction from aviation industry experts and is one of our most popular tool sets with A&P technicians and MROs. This tool set is available with or without a toolbox. This set comes standard with a serialized tool ID laser etched on each tool.

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STS Line Maintenance supports 80 domestic and international passenger, cargo and charter airlines with a full range of on-wing services including on-demand defect rectification, scheduled checks up to and including A-checks, AOG recovery and return to service, and specialized projects like airframe modifications. STS image.

patterns add another layer of complexity," Pratt told *Aviation Maintenance*. "As airlines optimize for profit, their schedules swing harder from peak to off peak. This forces providers to scale staffing up and down throughout the year. It creates uncertainty for technicians and puts financial pressure on maintenance operations. Hold on to everyone through the slow season and you're likely looking at an annual loss. Reduce headcount and you're scrambling when demand spikes."

Digitization to the Rescue

Faced with the challenges discussed above, airlines and their line maintenance providers are turning to digital technology to make their operations run smoothly and get more done using fewer people.

"The digital tools that matter most are the ones that make information easier to access and eliminate unnecessary steps," said Pratt. "Digital task cards, mobile tech pubs, and real-time communication tools have been the standouts.

"Airlines are on a trend to implement paperless documentation," Pajeda added. "For instance, they are moving from paper-based logbooks to electronic logbooks, which are accessed via tablets that are placed on board of the aircraft. This reduces the amount of paper used to record maintenance activities and reduces the time to fill all the documentation when a maintenance task is performed. Additionally, the technician is able to access the necessary maintenance documentation on a tablet without needing to return to the office and check it on a desktop computer. As a result, the time for defect rectification is reduced, which reduces the overall flight delays."

To push the aviation industry further along the road to digitization, STS Line Maintenance is promoting the broader adoption of MRO management platforms like AireXpert, which can streamline the full line maintenance cycle from start to finish. "With AireXpert, technicians can verify an AMM reference instantly, collaborate with MCC without leaving the aircraft, and complete documentation on the spot," said Pratt. "When you remove dead time, everything moves faster. Troubleshooting improves. Return to service improves. And you can measure the difference not in theory, but in minutes saved and delays avoided."

Artificial intelligence (AI) is making its way into line maintenance, serving as a tool that speeds up the detection and analysis of problems found by in-flight data management systems. "What is more, EASA has released an AI Roadmap, which describes the plan and steps that need to be taken to implement AI in aviation," Pajeda said. "I expect that AI will be initially implemented in areas that require dealing with big amounts of data like maintenance documentation, part/component control, and production planning. Eventually, we may see AI-based solutions that might help reduce the manpower needed to carry out certain tasks, which would help mitigate the specialists shortage in aviation."

All told, digitization is delivering measurable benefits to the line maintenance sector. "Digital workflows are reducing paperwork, speeding up troubleshooting, and improving communication between operations, engineering, and logistics," said van Sitteren "These tools contribute directly to fewer delays, higher productivity, and more consistent training. However, the lack of common standards and full interoperability between different digital systems remains a challenge. Integrating and sharing large volumes of operational data more effectively will be an important step for the industry in the coming years."

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The Future of Line Maintenance

What does the future of line maintenance look like, given the current balance of issues and innovations? Again, here's what the experts had to say.

"The future of our business will combine skilled human expertise with intelligent technology," van Sitteren replied. "Predictive maintenance and digital tools will become standard, training will increasingly rely on immersive and modern methods, and integrated data systems will streamline operations."

"I would like to say 'robots', but we are far from that at the current stage of evolution," said Pajeda. "I believe the AI implementation will help to reduce maintenance time even further; however, we will not be able to replace maintenance technicians or pilots in the near future, for sure. As a first step, I think we will have AI systems that will help to manage areas where it is required to work with big amounts of data. Later on, we might see more and more automated processes, where a person's oversight will be required to make sure that an AI system is compliant and is working according to the necessary standards. As a result, people in the aviation field will need to improve their knowledge in the IT field to be able to work with these systems."

Pratt took a big picture view of this question. "Commercial aviation supports more than ten million jobs and contributes roughly $1.45 trillion to the U.S. economy," he said. "With that kind of demand, the future of line maintenance is growth. If the U.S. modernizes its air traffic control system, flight volumes will rise even higher, and the need for qualified maintenance personnel will only increase."

If these predictions prove to be correct, "the industry has to prepare now," said Pratt. "As aircraft become more complex, new technicians will need real-world experience to bridge the gap between the A&P curriculum and the realities of modern fleets. That will require structured on-the-job training, strong mentorship, and leaders who understand that the baseline curriculum isn't enough on its own. As well, compensation has to be part of the conversation. If wages for aircraft maintenance technicians don't keep pace with other skilled trades, the industry risks losing the next generation of mechanical talent."

Gary Pratt then summed up the big picture challenge facing not just line maintenance, but the entire aviation industry. "We maintain the safest transportation system in the world," he said. "Staying there takes investment. Meanwhile, the horizon is getting more crowded. EVTOL aircraft and air taxis are approaching commercial viability, which will lead to new regulations, new maintenance requirements, and new expectations. When they do, line maintenance will be at the center of keeping those systems safe and reliable. So, the work in our sector is only going to get bigger going forward, not smaller."

Ultimately, the experts agree that the future success of line maintenance hinges on a critical dual strategy. It requires this sector to aggressively adopt AI and digital platforms to maximize efficiency, while simultaneously making a profound and immediate investment in human capital. The future of safe, efficient global air travel depends on successfully integrating the power of the digital revolution with the irreplaceable expertise of the people who keep the world flying. AVM

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Managing Spare Parts Inventory

Efficiently managing aircraft parts and inventory aids seamless maintenance operations.

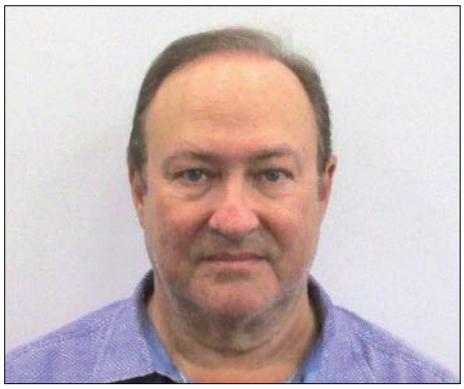
By Mark Robins

Effective aviation spare parts inventory management is fundamental to maintaining operational readiness in any MRO or fleet environment. Without precise visibility into parts availability, location, condition and trace documentation, organizations face avoidable delays, excess cost and higher aircraft on ground (AOG) risk.

Aircraft spare parts inventory management software benefits operational precision. "Technicians know exactly what's available, schedulers can plan with confidence and maintenance leaders gain tighter control over cost, service levels and turnaround times," says Kris Volrath, chief product officer at Veryon, San Francisco. "By reducing surprises and eliminating manual workarounds, organizations can avoid preventable AOG events and deliver a more predictable, high-performance maintenance operation."

Gerry Merar, president of AvPro Software/Decision Software Systems Inc., West Palm Beach, Florida, agrees that aircraft parts and supplies management software is "essential to running any type of aircraft maintenance facility efficiently. Whether it's serialized/lot-tracked parts or consumable supplies, there are so many items that it would be almost impossible to track manually." Merar explains a full inventory application will

Kris Volrath, Veryon



Gerry Merar, AvPro Software

Micheál Armstrong, Armac Systems

benefit an organization by tracking:

- Purchases of parts and consumable supplies (purchase orders)
- Parts sent out for repair, overhaul, calibration or any other maintenance service (repair orders)
- Receiving items into stock, managing packing slips and reconciling vendor invoices to receiving batch reports
- Recording parts that are rejected and/or returned to vendors
- Reporting on-hand inventory stock and in/out activity
- Financial reporting on inventory valuation and costing
- Providing a physical count check system to prevent theft and loss due to item expirations
- Barcode labeling
- Helping to organize your stockrooms with bin location management
- Providing traceability for parts sources and parts issued to aircraft and work orders/technicians

Inventory and materials planning is the airline function with the ultimate responsibility for the on-time supply of material and the associated costs. Inventory planning provides the framework for all other supply-chain activities to operate efficiently and coherently. "Given the complexity, scale and uncertainty of aviation maintenance, inventory planning is a strategic necessity," says Micheál Armstrong, CEO, Armac Systems, Dublin, Ireland. "Effective planning can only be accomplished with the support of well-defined processes and systems specifically adapted to the requirements of airlines and MROs. The role of inventory planning is more than calculating stock levels. Inventory planning determines how parts will be supplied and the priority of activities. It is distinct from execution functions such as purchasing, logistics and repair management, which deliver to the plan, just as line or base maintenance engineers work to the maintenance plan. Given the uncertainty and scale of MRO and airline maintenance, inventory planning is an indispensable strategic and tactical function."

Evolution

Aviation inventory planning traditionally relied on expert users and spreadsheets. Armstrong explains with the development of modern software tools leveraging AI/ML, grid computing has revolutionized how material planning is accomplished. "As data science is becoming more established, acceptance of data-led decision-making has increased, resulting in greater adoption and consequential honing of the solution landscape."

Merar explains inventory management software has evolved so it is easier to use and more affordable for smaller facilities. "Having it as a separate standalone module, such as AvPro's Inventory Module, makes it less intrusive so having it won't interfere with other applications vital to the operations of the company."

A few years ago, most inventory systems functioned as little more than digital ledgers. Valrath explains, "They stored part numbers, bin locations and quantities, but they couldn't validate accuracy, anticipate demand or reflect the operational realities happening on the hangar floor. Data quickly went stale, and teams relied heavily on tribal knowledge or spreadsheets to bridge the gaps."

Today, modern solutions, such as Veryon Tracking+ paired with the Veryon Stock mobile app, deliver improved operational intelligence. Instead of simply recording information, they capture real-time activity directly from the stockroom; receipts, issues, relocations, counts and Air Waybill processing all update the system instantly. This creates a live, continuous picture of inventory health rather than a snapshot.

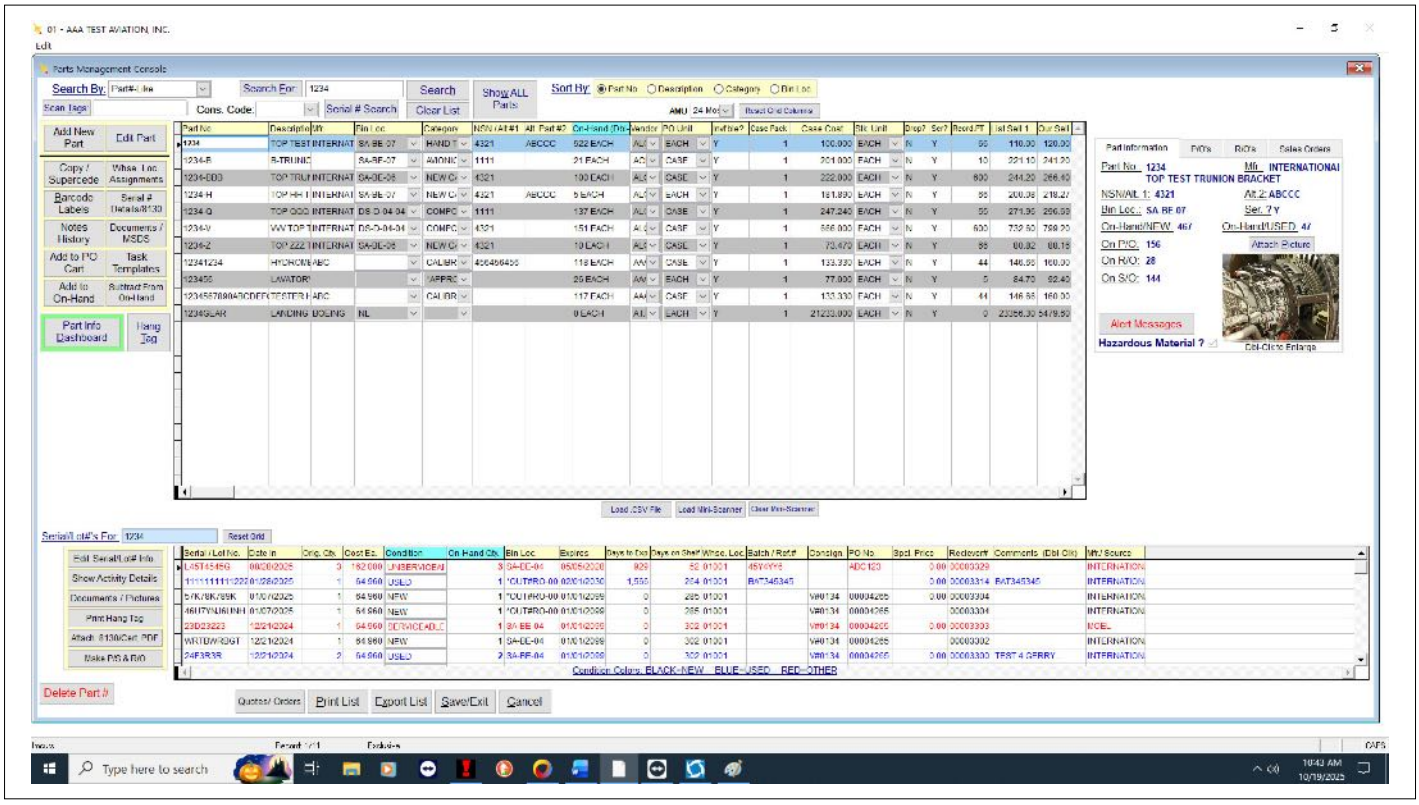
Inventory is no longer managed in isolation. Maintenance plans, component usage history, compliance requirements, and upcoming scheduled tasks are all connected. Valrath says teams can see which parts are committed, which components are cycling toward removal, and what demand is on the horizon — giving them a significantly more accurate basis for planning. "The result is a shift from reactive to proactive. Instead of hoping the data is correct or making decisions based on assumptions, material managers operate with clear, reliable insight tied directly to clear behavior. It's a far more strategic, proactive approach to inventory management."

Advances and Updates

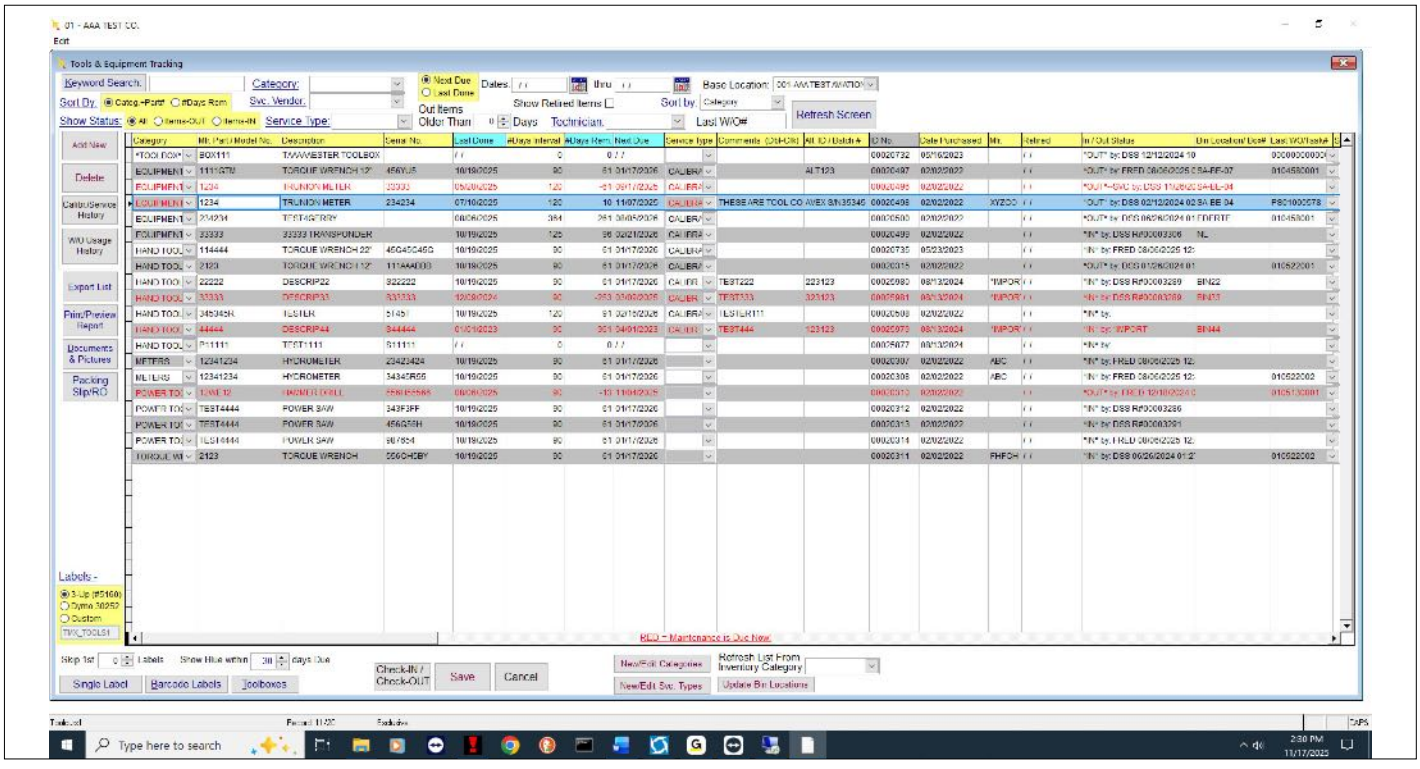
Some of the biggest advances in aviation spare parts inventory management center around mobility, automation and predictive intelligence. Mobile tools like the app have changed how teams work. Counts, receipts, moves and AWBs happen right where the work happens, which eliminates lag and keeps data accurate.

Another major shift is the deeper integration between inventory control, maintenance planning and operational scheduling. "Veryon Tracking+ now allows teams to see exactly which parts are available, what's already committed to work orders and what upcoming tasks will require," Volrath says. "With real-time synchronization between stock movements and maintenance demand, operators can plan with greater certainty and avoid avoidable shortages or rework."

Merar explains another advancement is that barcoding and RFID technologies, "help to greatly reduce data entry errors and speed up the process of recording in/out activity of inventory items. Robust reporting options make managing on-hand stock and costing of items much more efficient."



AvPro's Gerry Merar says inventory management software has evolved to be easier to use and more affordable for smaller facilities. AvPro image.



AvPro says their products can help keep track of the specialized tools to handle compliance, maintenance and inventory simultaneously. AvPro image.

Applying the latest artificial intelligence, machine learning, advanced mathematical models, and cloud computing architecture, Armac's RIOsys software enables airlines and MROs to leverage their data to optimize inventory planning. Predictive maintenance is an emerging tool that can support this objective; it's a data-driven strategy that uses real-time data, advanced analytics and machine learning to anticipate failures.

"Its positive supply chain consequence is that it converts some short-term probabilistic demand into deterministic, planned events," Armstrong says. "Predictive maintenance offers aviation operators significant benefits by reducing unscheduled downtime, when implemented as part of an integrated decision-making process. To be effective, predictive maintenance solutions must be incorporated into the wider processes and systems of the operation. In response to a predictive maintenance alert, inventory planning must assess supply chain options to optimize the supply. This can be integrated into an inventory optimization solution as a new demand signal to

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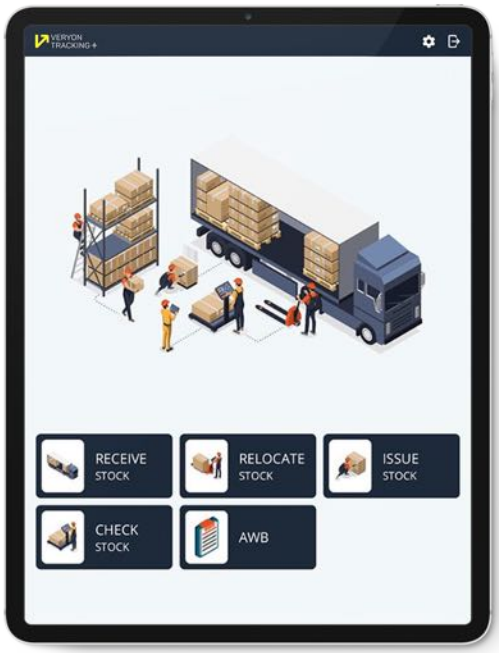
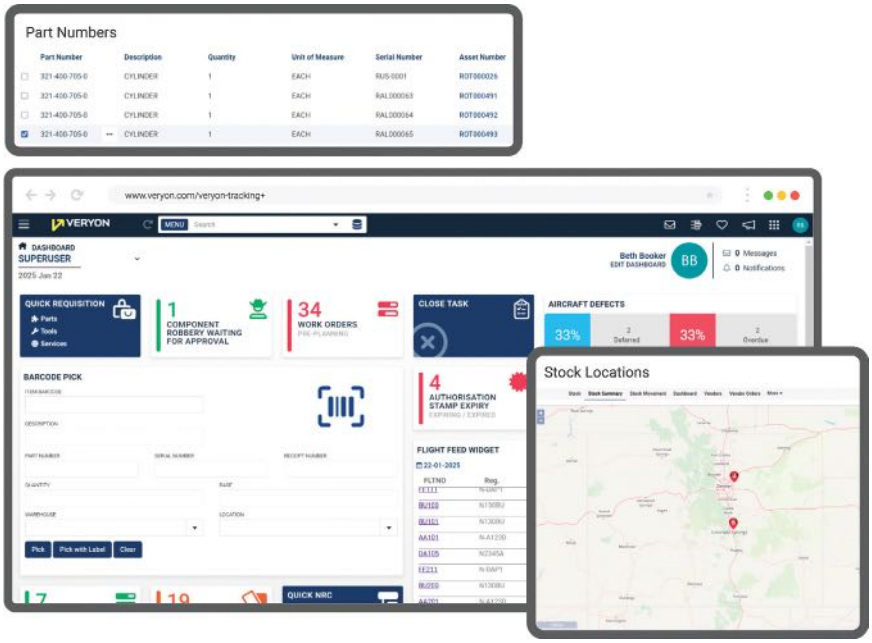


Veryon Tracking+ and Veryon Stock mobile app capture real-time activity directly from the stockroom; receipts, issues, relocations, counts and Air Waybill processing all update the system instantly. Veryon image.



Veryon Tracking+ allows users to see exactly which parts are available, what's already committed to work orders and what parts upcoming tasks will require, the company says. Veryon image.

further optimize the supply chain response. Armac is working with our customers to integrate the predictive demand signal, with other forecast demand types, into our holistic optimization of inventory planning."

What's Unique about Aviation?

What's unique to the aviation industry in regards to spare parts inventory management? The level of traceability required is very high. Every serialized part must have a complete history, documentation and compliance proof. If the trace isn't perfect, the part can't be used.

Merar explains, "Having the traceability factor from source to end use on an aircraft is essential to track problems that can occur and prevent issues before they happen. For example, being able to track serial and manufacturer lot numbers is very important if there is a recall or some problem has been identified by the manufacturer. When there is a failure the root cause must be identified so future events are prevented."

Valrath cautions the cost of a missing aircraft part is immediate. "If you don't have what you need, you can ground an aircraft. Most industries don't feel that kind of pressure from inventory." Also, Valrath explains that fleets vary widely. "[There are] older aircraft, newer aircraft, different operating environments and different histories. Teams can now use software to understand how those differences affect part usage, enabling smarter stock management."

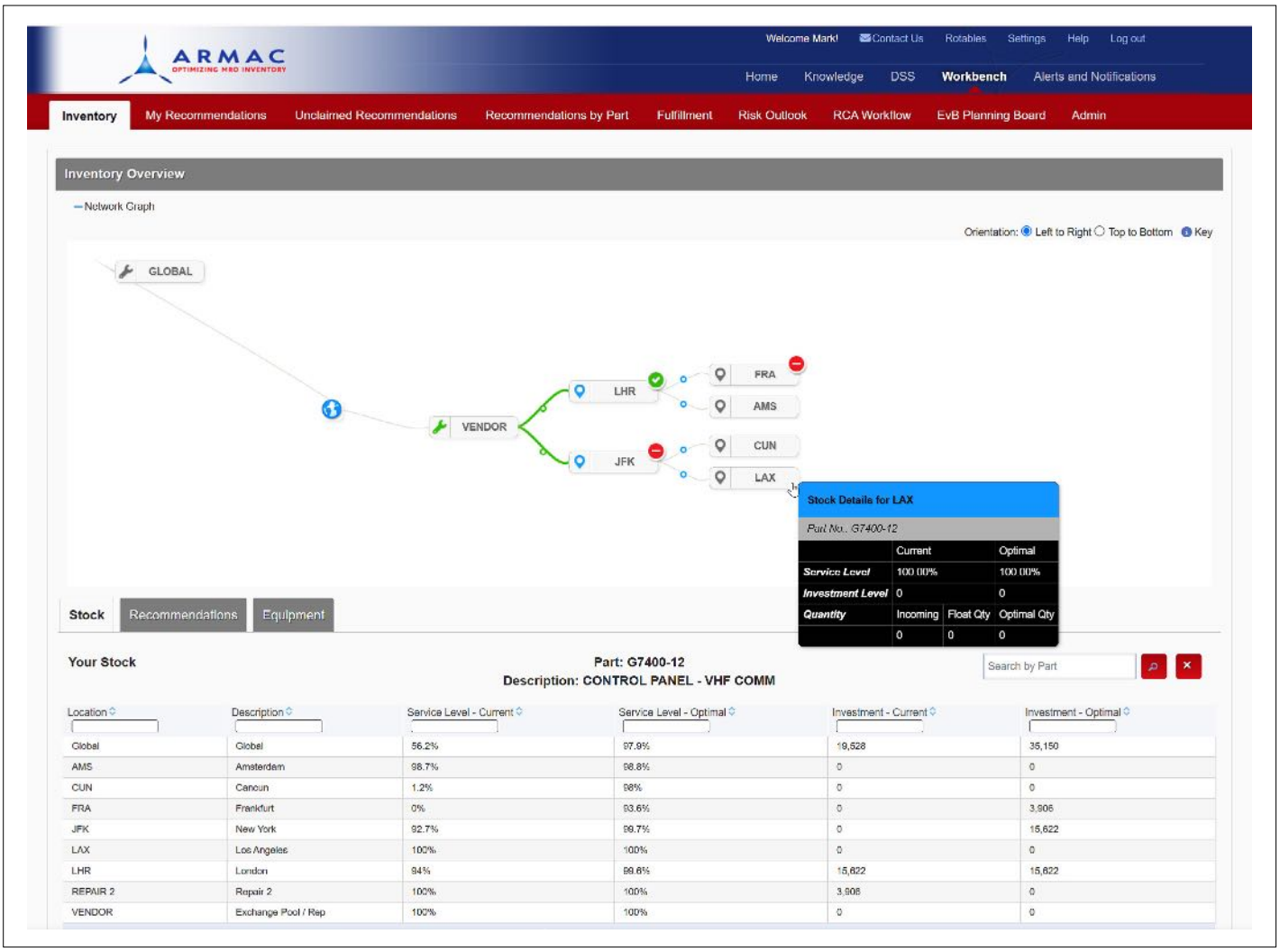
Armstrong believes that MRO or airline maintenance differs from the classic manufacturing model in its uncertainty of demand and the bi-directional flow of material. Even if tasks or work packages are scheduled, "We cannot know with certainty which components on which aircraft will need replacement, or parts will be required. Findings related material demand on a scheduled check represents significantly highest proportion of overall demand. Because many components are repairable and reused, standard replenishment models like ROL or MRP don't apply. Planners must prioritize repairs and maintain sufficient serviceable parts in rotation within the repair and reuse cycle to meet demand."

In the aviation industry, many of the inventory planning and procurement systems and processes have been developed based on standard manufacturing models. Armstrong cautions these standard systems are unsuitable for the idiosyncratic nature of aviation. "This mismatch has resulted in off-system workarounds, a lack of standardization, sub-optimal processes, and a high dependency on experts, with poor controls."

Often, because MRO IT systems are unable to adapt to the nuances of the industry, the stock picture provided by the system does not reflect true stock levels; airlines frequently have the automatic reorder level functionality switched off in their MRO IT System as a result. It is important that the inventory optimization system understands the supply model and reflects the stock picture correctly, to ensure that the correct recommendations are generated and in the correct priority. Smart algorithms are required, and are embodied in the RIOsys software. However, to maximize value, it is necessary to ensure that the model applied to the input data accurately reflects the operation. RIOsys has been designed, and is proven, to address the maintenance operating model of airlines from both a demand and supply perspective.

Learning Inventory Management

Inventory planning is complex and dynamic. It requires an expert system to take millions of changing variables and holistically optimize decision-making. However, modern aviation inventory tools are more intuitive and far easier to learn than legacy systems. The Veryon Stock app functions like a familiar mobile application, which helps new users come up to speed quickly.



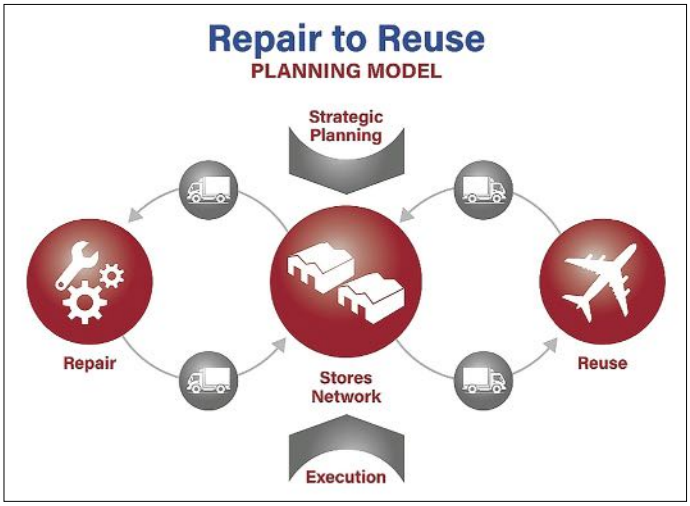
Armac says its RIOsys software enables airlines and MROs to leverage their data to optimize inventory planning. Armac image.

"Scanning a barcode, issuing a part, taking a photo for trace … it all feels intuitive," Valrath says. "Veryon Tracking+ also follows the same logic as real maintenance and stockroom workflows. There's no hunting around the system for what to do next. And because mobile and desktop follow the same structure, users pick it up fast. Role-based training and guided prompts go a long way, too. People see exactly the steps they need without being overwhelmed."

AvPro has a standard interface which allows novice computer users to learn it. Merar believes this makes it faster and streamlined for the advanced users. "Efficient screen layouts and clearly marked clickable buttons enable a short learning curve and will provide on-screen help tips for functions that are not used frequently."

Armac's RIOsys inventory optimization takes all of the complexity and presents the planner, for material within their scope of responsibility a set of prioritized actions, with all of the salient supporting information to allow the planner to confidently execute the action.

Ultimately, the aircraft industry is learning that parts management is now a core driver of reliability — not just an administrative function. When inventory data ties directly into maintenance history, component usage and upcoming scheduled work, teams gain a far more accurate view of future demand.



Planners must prioritize repairs and maintain sufficient serviceable parts in rotation within the repair and reuse cycle to meet demand, Armac says. Armac image.

That means fewer shortages, less overstock, and better alignment between materials and maintenance. Smarter parts management keeps aircraft available, keeps operations moving and keeps costs under control. It's becoming one of the strongest levers operators have to improve reliability and efficiency. AVM

Connectivity Capabilities and Practicality Reflected in Avionics Upgrades

By Mario Pierobon

The aviation industry continues to evolve its approach to in-flight connectivity as satellite technology advances and operator requirements become increasingly sophisticated. What began as a luxury amenity for business aircraft has become a standard expectation across commercial and private aviation, with passengers and crew demanding the same level of connectivity they experience on the ground. This shift has created technical and operational considerations for maintenance organizations, MRO facilities, and aircraft operators who must integrate these systems while managing costs, weight and aircraft availability.

The transition from Ku-band to Ka-band systems represents one aspect of this evolution, but the connectivity landscape has grown more complex with the introduction of low earth orbit (LEO) satellite constellations, hybrid multi-orbit architectures, and air-to-ground networks. Each approach offers distinct advantages in terms of latency, bandwidth, coverage and operational flexibility. For maintenance professionals, these developments raise practical questions about installation procedures, hardware compatibility and long-term system support.

Aircraft operators must balance performance requirements with operational realities. Installation modifications affect weight and drag, influencing fuel consumption and operating costs. Downtime for system installation or upgrades impacts aircraft availability and revenue generation. The rapid pace of technological advancement creates concerns about obsolescence and the need for frequent hardware replacements. Industry providers have responded by developing solutions that address these practical concerns while delivering improved connectivity performance. This article examines current technical approaches, focusing on system architecture, installation considerations,

maintenance requirements, and strategies for future-proofing these investments.

Transforming In-Flight Connectivity

Although the in-flight connectivity market has generally shifted from Ku-band to Ka-band, current satellite networks use both Ku- and Ka-band frequencies in various orbital configurations, including geostationary (GEO) and Telesat low earth orbit (LEO) satellites, according to Karthik Bharathan, director of product management for aviation terminals at Viasat. "The choice between Ku- or Ka-band is determined by the satellite's onboard technology," he says. "From a maintenance perspective, aircraft line maintenance procedures remain the same regardless of whether the system operates in Ku-, Ka-, GEO, or LEO, and no additional specialized training is required. For example, Viasat's main in-flight connectivity terminal works with satellites in both GEO and LEO orbit, and maintenance personnel will not require any new training."

Karthik Bharathan, Viasat

Viasat has unveiled an advancement in its multi-orbit strategy for business aviation, with plans to integrate LEO satellite capacity into its JetXP in-flight broadband service. "The combination of Viasat's ultra-high-speed GEO capabilities, including the advanced ViaSat-3 satellites, with flexible and resilient LEO capacity, will further enhance JetXP's reliable, consistent, high-performance connectivity, offering even greater redundancy and global coverage," Viasat reports. "JetXP is designed to deliver the best available performance between GEO and LEO satellites, intelligently routing data in real time. This optimizes the connectivity experience to meet varying levels of customer demand, including the most latency- and jitter-sensitive applications, such as interactive gaming, high-definition video conferencing, and real-time cloud collaboration across multiple devices simultaneously."

Multi-orbit capabilities will be available as a single offering on select JetXP plans, eliminating the need for multiple subscriptions, affirms Viasat. "Customers will require an additional flat-panel electronically steered antenna (ESA), designed to seamlessly integrate with JetXP's existing tail antennas and featuring fewer line-replaceable units (LRU) for ease of installation," Viasat states. "Performance across all JetXP service plans, including future multi-orbit options, will be measured using Viasat's in-flight quality of experience (iQe) concept, which will be available next year and will use artificial intelligence and advanced analytics to continuously monitor a wide range of network parameters in real time. The results are translated into a single quality of experience (QoE) score that reflects the overall connectivity experience for executives, operators and flight crew."

While JetXP serves the business aviation market, Viasat has also announced a parallel next-generation in-flight-connectivity (IFC) solution for commercial aviation, Viasat Amara. "The new IFC solution is powered by innovations in core satellite network design, hardware advancements, and a suite of digital products. Along with additional features, including intelligent network enhancements and application-level data linking to satellites in multiple orbits, Viasat Amara is designed for high scalability, enabling airlines to offer a future-proof onboard experience for passengers," the company states. "Viasat Amara is designed to meet the specific needs of each airline and each individual user, in real time on an intelligent multi-orbit network. Our pioneering mission remains to help our airline customers maximize the enormous potential of connectivity for branding, loyalty, and growth."

Viasat Amara's roadmap includes innovations that open new opportunities, with compatibility for GEO, HEO, and LEO satellites, complementing a robust high-capacity ecosystem from Viasat and its partners, according to Viasat. "This includes the recently announced Ka-band LEO capacity from Telesat Lightspeed. Viasat Amara will offer high-capacity, high-quality service with truly global coverage, connectivity designed to adapt to the growing needs of commercial airlines and support rapid multi-network, multi-orbit evolution," the company states.

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Avionics Upgrades and In-Flight Connectivity

Elliott Aviation specializes in advanced Garmin avionics installations, including the G5000, G1000 NXi, and G600 TXi. Each installation begins with a detailed assessment of your aircraft, ensuring the system is tailored to your operational needs. From planning and installation to testing and post-installation support, Elliott Aviation manages the entire process under one roof, minimizing downtime and delivering reliable, seamless performance.

Beyond Garmin flight decks, Elliott Aviation also installs and supports Starlink Aviation and other in-flight Wi-Fi solutions. These systems provide fast, global connectivity with low latency and no data caps, enabling passengers to stream, video conference, and access real-time information throughout the flight. Combined with modern avionics, these upgrades enhance situational awareness, operational efficiency, and passenger experience.

Paint Services

Elliott Aviation's paint team helps aircraft owners protect and enhance their exterior appearance, delivering results that combine aesthetics and long-term durability. Their state-of-the-art paint facility is equipped with downdraft airflow and climate- and humidity-controlled conditions, which are critical for achieving a flawless, high-quality finish. Downdraft airflow removes overspray and dust particles during painting, preventing imperfections and ensuring smooth coverage. Precise climate and humidity control prevent issues such as uneven drying, cracking, or color inconsistencies, which can impact both the appearance and longevity of the paint.

From full refinishes to custom paint schemes, Elliott Aviation applies advanced materials and coatings with meticulous attention to detail. By combining paint projects with avionics, interiors, and maintenance, owners benefit from a consolidated schedule, reduced downtime, and the confidence that every aspect of their aircraft is handled to the highest standard.

Interior Services

A refreshed cabin can transform the passenger experience. Elliott Aviation's interior specialists handle everything from upholstery and cabinetry to lighting and cabin enhancements. Whether updating a single component or completing a full interior refurbishment, their team ensures the cabin is comfortable, functional, and visually stunning. Coordinating interior upgrades with avionics and paint projects allows owners to optimize scheduling and efficiency.

Maintenance and Inspections

Routine maintenance, preventive inspections, and repairs are essential for safe, reliable operations. Elliott Aviation provides comprehensive maintenance services for a wide range of aircraft, including business jets and turboprops. Their full-service approach ensures that maintenance, avionics upgrades, and cosmetic projects can be coordinated efficiently, reducing overall downtime and keeping aircraft in peak condition. Every project is executed to the highest standards of safety and craftsmanship, giving owners confidence in both performance and reliability.

Experience and Reliability

With decades of experience and hundreds of successful installations, Elliott Aviation combines technical expertise with project management excellence. Dedicated project managers keep owners informed at every step, ensuring transparency, reliability, and a seamless experience. From cutting-edge Garmin avionics and global Wi-Fi systems to complete paint, interior, and maintenance services, Elliott Aviation is the trusted partner for operators who demand quality, efficiency, and precision.

Whether upgrading your cockpit, refreshing the cabin, or maintaining peak performance, Elliott Aviation delivers a fully integrated, one-stop solution that enhances safety, value, and passenger experience. Trust your aircraft to the professionals who do it all right the first time.

ELLIOTT AVIATION: THE NAME BEHIND MORE GARMIN INSTALLS THAN ANY OTHER DEALER

With more than 500 Garmin installs completed, including 425+ G1000/G1000 NXi upgrades and 90+ G5000 installations, Elliott Aviation offers the experience that helps ensure a smoother upgrade and lasting confidence in your aircraft.

Reasons more operators choose Elliott Aviation for their install:

- Industry-leading experience - 15+ years running
- Industry-leading downtime - 15 days for G1000 NXi and 25 days for G5000
- Three dedicated Garmin integrated flight deck teams at our Moline HQ
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Chris Moore, Gogo

Viasat has also unveiled a proprietary terminal with an ESA, Viasat Aera. "This will unlock simultaneous dual-beam connections between satellites in GEO, HEO and LEO, enabling airlines and their passengers to enjoy a best-in-class IFC experience with a single antenna," the company states. "The new terminal is currently under development and is designed to dynamically adapt connectivity to leverage the strengths of all available transmission resources, offering an optimized experience for every application running on the global network."

Gogo is catering to the private jet and military/government sectors seeking connectivity that emulates the experience on the ground, according to Chris Moore, CEO at Gogo. "We have strong relationships with all satellite constellations and are fully leveraging the potential of the Eutelsat OneWeb (LEO) satellite constellation to support our HDX ESA. SES powers our Plane Simple Ku-band terminal and the Viasat constellation connects to our Plane Simple Ka-band system," he says. "Any commercial aircraft owner or operator can use GEO and/or LEO to stay constantly connected wherever they fly."

Gogo also provides an air-to-ground network in North America via a network of cellular towers, explains Moore. "We will activate our new 5G technology in 2026, which will bring high-speed broadband to the cabin of aircraft that have never had access to it before," he says. "Operators simply install MB-13 antennas on the underside of the aircraft and the AVANCE LX5 platform inside the aircraft to instantly access the internet, send emails, and even stream content. We combine GEO with LEO, LEO with air-to-ground (ATG), or any other combination that meets customers' mission requirements. We provide a solution for every market segment, from turboprops to heavy jets," he says. "Our technology comes with upgrade paths that are simple and require minimal downtime."

Gogo works closely with its expanding global MRO network, providing support through each phase of the sales, installation,

StandardAero generated the first pair of Gogo Galileo STCs for the HDX and FDX terminals on Challenger 600 series. This fuselage supports the Gogo Galileo FDX antenna.

Performance across all JetXP service plans, including future multi-orbit options, will be measured using Viasat's in-flight quality of experience (iQe) concept, which will be available next year and will reflects the overall connectivity experience for executives, operators and flight crew.

and commissioning cycle, explains Moore. "Our hardware and software design results in predictable installation requirements and guaranteed support in the event of unexpected issues or customer problems. Our connectivity customers expect our 24/7/365 support internationally, and the same goes for our MRO partners. Whether they are installing an air-to-ground system for the hundredth time or developing a new Gogo Galileo supplemental type certificate (STC), we provide feedback on the experiences of other members of our network. We have a three-ring policy that helps our MROs handle installation requests on time," he says. "As aircraft owners are much more interested in being able to make a consistent and reliable Teams call than in understanding the technology, we translate technology into practical applications. Our MRO network is essential, and we work closely with them to generate STCs for our new equipment as well."

Installation and Implementation

Beyond the operational maintenance of these systems, the initial installation process requires careful planning and structural modifications. According to Bharathan, the most significant structural modification involves the installation of the radome. "Electrical upgrades include the addition of components to support wireless access points (WAP), servers, and the cabling required for power and data transmission. Weight and drag are critical factors for airlines worldwide, and Viasat in-flight-connectivity (IFC) systems are designed to minimize the additional weight and drag caused by fuselage modifications, helping to limit any increase in fuel consumption," he says. "Prior to installation, Viasat works closely with each airline customer to understand their needs and ensure the IFC system meets their objectives."

Gogo has purpose-built and designed its connectivity terminals for the business and military/government aviation markets, explains Moore. "Traditionally, the high-speed connectivity dominance of large jets is now enabled by the purpose-built and Gogo Galileo antenna series," he says. "The Plane Simple antennas are compact, tail-mounted terminals comprising just two in-line-replaceable units — the tail-mounted antenna and the cabin router — connected via common wiring. The Ku-band variant is powered by the SES FlexExec constellation, dedicated to business aviation, while the Ka-band variant connects to the Viasat JX network, both providing powerful, high-speed GEO connectivity in the smallest form factors on the market. The Gogo Galileo HDX and FDX antennas optimize electronic phased array technology, eliminating the need for moving parts to allow for a smaller form factor and fuselage

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Gogo Plane Simple Ka-band terminal has been certified for Dassault Falcon 7X and 8X aircraft. Gogo image.

mounting. This reduces power requirements and waste heat. Gogo Galileo terminals optimize the Eutelsat OneWeb low earth orbit constellation for high-speed, low-latency connectivity."

For operators flying in the United States and southern Canada, the new Gogo 5G ATG service will also support high-speed internet connectivity, explains Moore. "Connecting to a network of ground towers, the antennas are also small, and while the MB-13 includes two antennas, their compact design and positioning minimize operational impact," he says. "The focus on creating smaller form factors means that aircraft, from very light jets to the largest, can maximize high-speed broadband connectivity worldwide. All antennas are designed to optimize connectivity while minimizing operational impact."

Typically, equipping an aircraft with connectivity systems represents a significant investment for the owner, as it inevitably involves dismantling old equipment, installing new equipment, and then repeating the process in a relatively short timeframe, given the rapid advancement of the connectivity industry, points out Moore. "By developing our technology specifically, we have also designed for the future, so that, as satellite technology continues to evolve, most of the system upgrades required to optimize solutions are made in our modem units. This minimizes downtime and costly cabin interior upgrades, ensures predictability in terms of maintenance, operations, and budgeting, and protects the owner's investment," he says. "Therefore, whenever possible, we strive to anticipate the future of the satellite communications landscape and find a solution by creating customized, long-term connectivity solutions."

Viasat is simplifying the installation process by integrating modems directly into the antenna structure, thus reducing the number of separate line-replaceable units (LRUs) required, according to Bharathan. "This approach simplifies both new installations and upgrades of existing hardware. Additionally, Viasat antenna systems are designed for future compatibility, allowing existing hardware to work with current and future networks or constellations via over-the-air software updates," he says. "This includes Viasat's next-generation IFC terminal, Viasat AERA. This design approach minimizes the need for hardware replacement, reduces maintenance time, and helps customers reduce costs associated with aircraft downtime."

To airline customers Viasat offers service level agreements (SLA), which include quantified performance benchmarks such as network availability and even individual passenger performance metrics, affirms Bharathan. "Our goal is to consistently meet (and exceed) these objectives, helping our airline partners deliver an exceptional connectivity experience to their passengers. We have a solid track record of reliability, a key factor in serving over 60 airlines and approximately 4,370 aircraft worldwide, as of September 2025," he says.

Summing Up

The evolution of in-flight connectivity reflects broader trends in aviation toward systems that balance advanced capability with operational practicality. The industry's adoption of multi-orbit architectures, integration of LEO and GEO satellite networks, and development of ATG alternatives demonstrates a pragmatic approach to meeting diverse operational requirements across different aircraft types, flight profiles, and geographic regions.

From a maintenance perspective, the convergence on simplified hardware designs, reduced component counts, and software-based upgrade paths addresses long-standing concerns about system complexity and aircraft downtime. The emphasis on maintaining consistent line maintenance procedures across different system types and orbital configurations minimizes the training burden on maintenance personnel while supporting operational flexibility. The focus on integrated modem designs, electronically steered antennas, and reduced line-replaceable units reflects an understanding of the cost and logistical challenges operators face.

The implementation of service level agreements with quantified performance metrics, comprehensive MRO support networks, and collaborative approaches to supplemental type certificate development indicates a maturing industry that recognizes the importance of reliable, predictable system performance.

Looking ahead, the planned introduction of 5G ATG services, advancement of electronically steered antenna technology, and expansion of LEO constellation capacity will provide operators with additional options for meeting their connectivity requirements. The effective integration of these technologies will depend on a sustained focus on practical implementation considerations alongside technical capability. AVM

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By James Careless

CAE's David Bienvenu on the Talent Gap: How Hybrid Training and Modular Courses Are Rescuing Aviation Maintenance

The aviation industry is facing a critical talent inflection point. Mass retirements are draining the maintenance workforce of experienced technicians and managers, leaving MROs struggling with high new-hire turnover and a knowledge gap that on-the-job coaching can no longer fill. CAE recently unveiled a set of ground-breaking programs designed to meet this crisis head-on.

David Bienvenu, CAE's global leader for maintenance training and OEM relationships, sat down with Aviation Maintenance magazine to explain how his organization is pioneering solutions — from flexible hybrid classrooms to modular, fleet-specific coursework — to help MROs retain new hires, cultivate first-time managers, and ultimately, secure the future of aviation maintenance.

Aviation Maintenance: Let's begin by talking about what CAE unveiled at NBAA-BACE.

Bienvenu: At NBAA, we had a couple of things going on. First and foremost, we were talking to some of our customers about our Talent Aviation Forecast. This is where CAE forecasts the needs for pilots and technicians across the industry.

AVM: So what did you find this year?

Bienvenu: A lot of our customers are coming to us talking about their tech shortage. There are a lot of challenges they're seeing with their technicians, namely (a) retention and (b) training during their onboarding.

The reality of what we're seeing is that the shop floor is changing for a lot of our customers. In the past, you'd have essentially nine experienced technicians for one new individual. Under that structure, you would have structured training for your new hires, but most of the coaching was done on the job.

Fast forward to today, where you have mass retirement of a lot of your core technicians. About 30% of the workforce is within 10 years of retirement. So you get to a place where you have a lot of experienced technicians leaving, a lot of new technicians coming in, and an increase in demand in business aviation. This results in less time for a lot of that on-the-job training.

Going back to the theme of experienced employees retiring, it's not just veteran technicians who are approaching retirement — your experienced managers are leaving as well. As a result, a lot of technicians are now getting thrust into management positions. They too need the kind of structured training that CAE can provide, which is really important.

David Bienvenu, Global Leader for Maintenance Training and OEM Relationships, CAE

For people new to management, instead of just throwing 'em off the deep end, we take them through our Aviation Interpersonal Management Skills (AIM) class. We help them develop the skills they'll need to be a solid leader on the floor — a lot of those emotional intelligence skills — and facilitate the transition from a strong technical worker to a strong manager.

AVM: What else did you launch at NBAA?

Bienvenu: We talked about our online booking tool where customers can now effectively book their maintenance training courses online at mxt.cae.com. It's in beta mode for now, but we're taking feedback as we go along.

CAE image.

Using this site, customers can now peruse course details and have a view of the curriculum. If they do have an account with us, they can book online very simply. If not, they can click a button to contact one of our sales representatives. We see online booking as a natural extension of working with our customers in the way they want to interact with us.

AVM: So let's talk about the maintenance technician training. Let's start with remote hybrid training. What is involved in that?

Bienvenu: At CAE, we deliver training in three fashions. First, we deliver them at our 70 locations around the globe. Second, for customers with enough technicians, we actually will fly out an instructor and give the training at their location. Third, there's our hybrid training rooms and technology, which enable us to simultaneously have people in the classroom and at a distance. Our hybrid classrooms are designed and equipped with additional cameras, sensors, and TVs to really make sure that the person who's remote is not a small square on Teams. It's a proper portrait of the individual, with some additional tools to help the instructor keep the student engaged even though they're at a distance. This enables that additional flexibility for our customers.

We now have hybrid rooms in Montreal and Dallas. We'll be launching shortly in Savannah, Georgia soon, next to the Gulfstream facility, as well as shortly in Burgess Hills in the U.K.

AVM: Are AR/VR goggles going to be part of the training that's offered?

Bienvenu: Great question. If you take, as an example, our Gulfstream G500/G600 program, we do have a full VR walk-around of a G500/G600 where some of our trainees are able to interact virtually with the aircraft and be in a common space with our instructors. We see that really as a tool to complement a lot of the learning that they're having on our regular courses.

AVM: CAE is now offering modular training, where students can pick and choose the courses they take when they need to take them. Why have you come up with this approach and what are the benefits?

Bienvenu: We developed this approach for Bombardier. Our goal with modular training is to address their scheduling challenges. Having the ability to piecemeal the initial training across different weeks lets their staff take bite-sized pieces of what they've

CAE image.

learned, practice it on the floor, come back to learn more at a later date, and so on.

This modular approach offers another advantage for Bombardier, and some of the other larger MROs who are supporting a multi-aircraft fleet. We teach their people the commonalities on some of the platforms where they're common, and teach the differences where they're different. For example, on the Challenger 350, 605, and 650, some key elements are similar, so we teach them together. But where the elements are completely different, we have a separate course for each aircraft. This enables Bombardier technicians to ramp up a little bit faster on a larger suite of aircraft. Our ambition is to look at other MROs that would be interested in the same format.

AVM: Tell me about CAE's three tiers of professional development courses.

Bienvenu: My pleasure. Let's start with High Potential Employees, aka new technicians. We talked about the tech challenge associated with a lot of new technicians coming on board. If you don't want them to jump from one company's hangar to the next, you have to invest in them. That's because investing in their development is critical for employee retention. This is why CAE has classes really tailored to that first subset of the market, to help to get new technicians off the ground running quickly.

Then there's First-Time Managers. This is our flagship Aviation Interpersonal Management (AIM) course. It's a four-day course where we bring people together from different companies and work on developing their emotional intelligence and the skills that they'll need in order to start leading a team. It really helps to develop those future leaders that we're going to need.

Finally, there's Executive Training (AIM 2.0). We've recently developed AIM 2.0, which is much more tailored to personnel moving into an executive role at a company. So it goes a lot more in depth in some of the key areas versus AIM 1.0.

AVM: How does CAE see the world of training changing in the aviation industry?

Bienvenu: Overall, there are a lot of elements changing. First, we have a real learning divide that we've noticed. The newer generation, who grew up with an iPad and a computer, do not learn the same way. So, to teach them, we use videos, visuals, and bite-sized content, which are key elements that our newer customers will appreciate. I can see we'll expect a lot more of those interactive, visual bite-sized tools that'll start developing.

In addition to some of our classroom settings, I think we'll start pivoting towards more ongoing training, so more consistent training versus a quick sprint and then not doing it for the next two years. That consistent approach towards training is what we'll see some of the top companies in employee satisfaction and in employee retention will start to do.

AVM: Finally, are there new programs that we should be expecting from CAE in 2026?

Bienvenu: Of course. Especially from our division, with respect to the aforementioned issues around new technicians that we've discussed, we'll have a lot more to talk about in the first quarter next year. We have a lot more coming down the pipeline on some of these interactive elements too. So a lot of the trends we talked about today, we'll have a lot more to share with you in 2026. AVM

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Skin Deep

A good paint finish can give passengers confidence that the aircraft is well maintained but is also working hard at protecting the aircraft itself. Ian Harbison reports.

By Ian Harbison

Aircraft paints and coatings are about much more than decoration. They have to look good, of course, but they must also protect the aircraft under harsh conditions and last as long as possible, ideally until the next heavy check where paint has to be removed anyway for structural inspections. Application is equally critical, with a need to ensure even coverage while taking care of environmental concerns.

Mankiewicz

René Lang, executive managing director aviation at Mankiewicz, says basecoat/clearcoat is definitely the standard system for painting commercial aircraft. This consists of a solid color layer that is oversprayed with a clear polyurethane protective coating. In addition to protecting the basecoat, the clearcoat provides strong UV protection to prevent fading and a high gloss finish (high Distinctness Of Image, a function of the sharpness of a reflected image from a surface when measured using a DOI meter). It is also used to carry special finishes like mica for a metallic look.

He says durability and longevity are key decision-making criteria for OEMs when choosing paint for new aircraft. The aim is to deliver an aircraft that requires as little refurbishment as possible. A Boeing 737-800 of Canadian carrier Westjet was given a Disney-themed special scheme using the company's ALEXIT system, which lasted for 10 years before being repainted, although this was because the cooperation between WestJet and Disney ended.

Another advantage of ALEXIT is the combination of fast-drying and high-coverage, saving time in the application process. This is crucial nowadays, he says, as, looking at the order books of manufacturers around the globe, it is evident that production capacities will be fully utilized in the coming years. Every adjustment that helps to complete the painting process as quickly as possible is beneficial. The use of systems, such as ALEXIT BaseCoat/ClearCoat, is a real lever here in reducing the turnaround time of special liveries.

The ALEXIT BaseCoat/ClearCoat system features flexible application properties, including adjustable drying times, which accommodate large areas with good overspray uptake and fast drying properties for smaller areas. The most significant advantage is that the paint system enables the so-called wild spraying technique, reversing the classic painting process sequence. Instead of starting with the most frequent color, the lowest is applied first. In a standard procedure, you would begin by spraying the most frequently used color first (typically white), followed by the less frequently used colors in sequence. The original process requires an intensive workforce and materials are needed to mask the aircraft between paint applications.

Wild spraying also allows for spraying two colors at the same time, provided that they are not too close to each other, to avoid overspray. Mica and other special effect coatings are a design upgrade that airlines consistently choose to use. This is a great option, he comments, especially when it comes to giving brand reputation an additional boost in terms of high premium status. This works well with small mica accent areas, as well as in full-body mica variants. He says ALEXIT has been designed to give a uniform high-class finish even used on the complete fuselage,

Mankiewicz recently worked on this special job, a version of the Condor Flugdienst striped livery in the colors of German soccer club Eintracht Frankfurt. Mankiewicz image.

as Etihad Airways, and National Airlines have successfully demonstrated.

Examining the business aviation sector, aircraft owners often have very special and unique design requirements. The mica effect is usually a good choice for these smaller aircraft to create a perfect, customized look.

Special liveries are always lighthouse projects for all parties involved — the airline, the paint crew, and the paint manufacturer — and needs close cooperation. There have been two recent projects of note. The first was for Brussels Airlines, with an Airbus A320neo used to promote the annual Tomorrowland music festival in Antwerp. This featured Augmented Reality, as the bird design comes to life when scanned with a smartphone. This was painted by Airbourne Colours (see below). The second was a special version of the Condor Flugdienst striped livery in the colors of German soccer club Eintracht Frankfurt.

Lang says re-thinking state-of-the-art processes and products is a valuable approach that has led to various innovations like the first basecoat/clearcoat system implemented by Mankiewicz many years ago. The latest innovation, ALEXIT WingFlex, allows the top and bottom surfaces of the wings to be coated with a single product — previously, two different coating systems were used.

This is because the upper side requires high flexibility and UV resistance to withstand the impact of considerable compression caused by movement and sunlight, while the lower surfaces must resist harsh chemicals like hydraulic fluids.

Combining these contrasting requirements speeds up application time but also allows for touch-up and repair in service which was not possible before, saving process time, downtime, money and, in the end, unscheduled maintenance or early refurbishment.

He says that, as a paint manufacturer, the market has completely recovered in the post-pandemic period. It is reaching new heights, considering the flight numbers of the current fleets and their growth potential, along with the full order books of the OEMs around the globe. The continuing rise in demand and high passenger volumes also make it clear that both the OEM market and the MRO market offer significant growth potential, while exerting a very high, positive pressure to innovate. This is because both markets need paint systems that shorten the painting process, continuously extend the durability and performance of the paint, and match the perfect colors for the airlines' brands and special liveries.

Sherwin-Williams

Julie Voisin, aerospace market manager, explains that development is divided between four "buckets":

- Productivity improvements focus on how OEMs and MROs work more efficiently and do their job faster.
- Environmental improvements include the reduction of VOCs, removal of harmful chemicals and the introduction of chrome free solutions.
- Durability ensures coatings maintain their appearance and performance throughout the entire paint cycle.
- Color improvements include delivering unique finishes and special effects to meet aesthetic demands.

However, she adds, during the development process it sometimes happens that a new product will have applications beyond just one category. For example, Jet Prep pre-treatment, a chrome-free product developed for environmental improvements, turned out to improve productivity by being faster to apply, reducing the time to the start of primer application. The same happened with two new chrome-free

AkzoNobel Aerospace Coatings: Innovation That Performs

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primers that reduced the time to start painting.

The drying time for the CM0ACC201 Aerospace Clearcoat for general aviation aircraft is an example of productivity as the drying time can be modified by blending activators in different ways. Dan Szczepanik, global marketing director automotive division, points out that in automotive, speed is of the essence, in application and drying. This is also important for aviation repairs, but the much larger surface areas involved with aircraft, especially widebodies, means that smooth paint flow and longer drying times are more important. Voisin adds that the blending of activators is again a key factor in establishing the correct drying time for a given area.

Szczepanik points out that aircraft owners want to express themselves through their paint scheme, so color is extremely important. The company offers a web-based Aircraft Color Visualizer. In March 2025, it added four more generic aircraft types — high wing piston, light twin, high wing turboprop and low wing turboprop — to the existing models of a kit plane, single piston, twin turboprop, light business jet, heavy business jet and helicopter.

It allows users to customize the selected model with any color in the Sherwin-Williams aircraft color library and instantly view the combination on screen. The pre-designed schemes can integrate one base color and up to three accents, in both solids and metallics. The Aircraft Color Visualizer allows users to print, save and share their finished designs and they also can be referred to a professional aircraft designer to fulfil their vision on their specific aircraft.

Voisin says for business aviation, there is a clear divide between those who want to remain anonymous and those who want to show off their brand. She also feels that, generally, European customers are more adventurous with colors than those in North America.

Regarding special effects and unique finishes, Sherwin-Williams' latest 850 Series SKYscapes Effect Finishes is a high-performance polyurethane basecoat available as mica, metallic and hybrid finishes. This is specially designed for productivity and can be used from striping and accents to overall paint completion of commercial aircraft.

AkzoNobel

AkzoNobel is committing €50 million ($58.6 million) to modernize its Waukegan, Illinois, site — the company's largest aerospace coatings manufacturing facility worldwide.

The two-phase investment will expand production capacity

Airbourne Colours has seen a major trend for airlines to outsource work rather than operate their own paint facilities. Airbourne Colours image.

China Southern Airlines features vibrant special liveries, most recently a striking 48-color Airbus A350 scheme using Akzo Nobel coatings. Akzo Nobel image.

AkzoNobel is modernizing its Waukegan, Illinois site, investing in new automated equipment and adding a new warehouse in Wisconsin.

through new equipment and higher levels of automation, while also adding a new warehouse facility just over the state line in Wisconsin. Together, the company says these upgrades are designed to strengthen its North American supply network and support future growth.

"This investment enhances our end-to-end supply capabilities across North America and reinforces our leadership in aerospace coatings," says Patrick Bourguignon, director of automotive and specialty coatings. "With air travel demand set to rise significantly in the coming years, we want to ensure our customers can meet that growth with aircraft finished to the highest standards."

The 11-acre Waukegan site employs around 200 people and manufactures a broad portfolio of aerospace coatings, including primers, basecoats, clearcoats and pre-treatment products. The facility also houses its own dedicated color center.

Planned enhancements include the introduction of a liquid pre-batch area, the installation of high-speed dissolvers, and the creation of a rapid service unit aimed at shortening turnaround times for customers in the MRO market.

AkzoNobel says relocating warehousing operations to Pleasant Prairie, Wisconsin, will free up additional space at its Waukegan site, allowing for increased production of customized coatings and faster responses to customer requirements.

"Our customers expect — and deserve — best-in-class coatings," adds Martijn Arkesteijn, global operations director for aerospace coatings. "These investments will give us greater flexibility, enabling larger batch deliveries, improved responsiveness to market needs, and shorter lead times for color development."

Airbourne Colours

A frequent customer for products from both companies (as well as AkzoNobel and PPG) is U.K.-based Airbourne Colours, which celebrated 15 years of operation in November with the opening of a second facility at Teeside Airport. The 27,000-sq-ft unit brings up to 40 jobs and will be capable of accommodating narrowbody aircraft, including the Airbus A321 and Boeing 737 MAX 10.

Remarkably, the first facility, the same size, only opened for

One of Airbourne Colours' latest triumphs is shown here on a Brussels Airlines A320 that features the Atomium, a 102-m high representation of an iron crystal that was built for the 1958 Brussels World Fair. Airbourne Colours image.

business in October 2024. This is due to a resurgent airline market, says Simon Cracknell, sales and marketing director, giving the company an annual turnover of more than £12 million (approx. $16 million) with a customer base that includes Brussels Airlines, easyJet, Jet2, Loganair, Lufthansa, Smartlynx, SAS and TAP Portugal. He adds that, in the last five years, there has a been trend for major airlines to outsource work rather than operate their own paint facilities.

Teeside complements the original paint shop at Bournemouth. This was followed by an A321-sized bay at East Midlands Airport in 2014 with a second bay commissioned a year later. In March 2016, the business expanded its capabilities with the creation of Airbourne Graphics & Signs, supporting both aviation clients and a variety of other industries.

In March 2023, another facility came online at Exeter Airport, capable of handling business and regional aircraft up to the size of an ATR 72. This was followed in October by the launch of Airbourne Executive at London Biggin Hill Airport, to provide painting for components such as control surfaces and landing gear. Customers include Bombardier, Gulfstream, Harrods Aviation and Inflite Engineering. In addition, the company deploys self-sufficient teams to customer sites for small jobs such as repairs. Business aviation now accounts for about 20% of the workload.

Cracknell says the post-pandemic rush of airline work is mainly over and demand is now transitioning to its traditional seasonal busy time of October to May. In contrast, the business aviation side tends to see a fairly even flow throughout the year.

No widebody painting is available at the moment but could be considered in the future as there is currently a huge backlog of work with extended waiting times.

With so many aircraft types involved, the company outsources Part 145 support to generate Certificates of Release to Service. This is provided by Willis Aerospace at Teesside, BCT at East Midlands and Exeter Aerospace.

He says technology developments are always slow in aviation, but environmental challenges are having an effect, with chrome-free primer in widespread use and UV-cured sealants making an appearance, but use is driven by cost and availability.

As the latest facilities, Teeside reflects some of these challenges, with recirculating heating systems, improved air filtration, LED lighting (which is also better for inspection), and a dust extraction system used during sanding which directs the dust into a hopper. Unfortunately, solar panels could not be fitted due to a conflict with air traffic control.

In June 2025, the Airbourne Colours Aircraft Painting Trainee Programme was launched through a partnership with Hartlepool College and funded by the Tees Valley Mayor and Combined Authority through its Adult Skills Fund. An initial intake of 24 undertook six weeks of foundational training at Hartlepool College, to be followed by a further 19 months of training, combining paid practical and educational phases, in the Airbourne Colours facility at Teesside International Airport and Hartlepool College. Successful trainees will earn internationally recognized SAE AS7489 certification.

The company has also acquired an ATR 42 fuselage for hands-on training in the Teeside hangar, as well as lot of components.

Thanks to Brussels Airlines being a customer for ten years, the company has considerable experience of special schemes. The latest, on an A320 in March 2025, featured the Atomium, the 102-m high representation of an iron crystal that was built for the 1958 Brussels World Fair. In addition, there is an annual Tomorrowland scheme promoting the festival.

He notes that, if it takes nine days to strip and paint a 737-800, a special scheme can take twice as long, as well as being much more expensive. AVM

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By Jason Dickstein

SMS — The Dawn of a New Era

By the time you read this, it will be 2026 and the EASA SMS requirement that applies to U.S.-based repair stations with EASA 145 privileges should be fully implemented. Congratulations, you've got an SMS!

The EASA SMS regulation applies indirectly to U.S.-based repair stations through the FAA-EASA Bilateral Aviation Safety Agreement and its implementing guidance. This means that U.S.-based repair stations do not have to comply directly with the EASA SMS regulations. Instead, the SMS provision is declared as a "special condition" and the current implementation mode is for the U.S.-based repair station to establish a "voluntary" SMS that meets the requirements of 14 CFR Part 5. FAA acknowledgement of the repair station's participation in the voluntary program is (currently) sufficient to meet the requirements. But that is not the end of your SMS adventure. It is only the beginning.

You need to operate your SMS effectively in order to extract safety value from the system. You also need to manage the care and feeding of your SMS. Care comes in the form of working in accordance with the processes defined within your SMS: Safety Policy, Safety Risk Management, Safety Assurance and Safety Promotion. Feeding reflects the data that you feed into your system in order to assess risk, assess the success of mitigations, and generally assess the safety performance of your organization (including through the recording of the SMS elements like hazards, risks, and mitigations).

Ideally, you should be continuously receiving data on your safety performance. This data might show that your system is working well or it may reveal safety hazards that should be considered in a risk assessment. This is one of the things that makes SMS different (and that potentially makes it superior to other programs): the program should have mechanisms for obtaining data on a consistent basis and analyzing that data.

Record Your Data

It is important that you have a way to record the safety data generated by, and provided to, your SMS. A hazard that might not seem to need mitigation today might be subject to mitigation in the future if (a) your original risk assessment is shown to be incorrect (e.g., the safety hazard occurs more often or with greater safety effect than previously calculated), (b) your safety assurance mechanism suggests that the mitigations targeting this hazard are not effective in reducing the risk to an acceptable level, or (c) your safety goals change in a way that requires the safety mitigation (or further mitigation) of the identified hazard.

For many years I have promoted the creation of a relational database that lists all recognized hazards and their risk assessment metrics. This should include both initial risk assessments and post-mitigation risk assessments.

For example, obtaining parts that do not meet correct specifications is a hazard. The related unmitigated risk is typically unacceptable. Because the risk is unacceptable, a number of related mitigations are required by law. For example, receiving inspections are typically a required part of the quality system under Part 145. Related mitigations may include receiving inspector training, supplier audits, or special measurement equipment, to support the inspections.

In addition, though, the relational database should identify the mitigations, and connect each one of those mitigations to one or more hazards. The mitigations are the procedures and processes used to reduce the risk (of a hazard) to an acceptable level. Each of these mitigations should be identified in the relational database, and they should also be connected to the hazards that they mitigate. Recognize that one mitigation may actually respond to more than one hazard, and each hazard may have more than one mitigating process that collectively reduce the risk of that hazard to an acceptable level. This is the first reason for the relational database, so that you can record these often complex relationships.

Starting the SMS Database

If you are just starting out, and want a good way to start, then I recommend that you populate your company's hazard database with your company's existing processes. Each process is meant to accomplish a goal. Those goals can be recharacterized as avoided hazards. The example, above, of the receiving inspection processes being tied to the hazard of improperly received goods is a good specimen of the sort of thing that can be identified as a pre-existing hazard-mitigation pair. By identifying your pre-existing hazard-mitigation relationships, you start to better understand how your system works, you may identify processes that don't appear to have a function (and thus will need further review), and most importantly you are creating a useful tool for using SMS to help guide future change management (we will return to this change management idea in a few paragraphs).

You will also want to have a mechanism for reviewing the SMS data in order to support continuous improvement. Part of this is using your database to feed data into your safety assurance program. You should be scheduling safety audits (or other safety assurance activities) for your mitigation processes to assess (1) whether the process is correctly implemented, and (2) whether the process is achieving the intended results.

Another important relationship to record is data generated by your safety assurance processes, which may include (but not be limited to) audits assessing the success of your implemented safety mitigations. One way to record this might be to provide an anticipated risk assessment when a mitigation process is developed, and a corrected risk assessment once the process has been audited. Another mechanism could be to simply record the findings associated with the process, to use those findings to help drive future process improvements and innovations.

It is a good idea to use your safety promotion mechanisms to communicate the new processes, and to train on them, to improve the chance that they will be successful in driving the behavior that you want to drive. By providing a brief summary of your safety assurance data (what is working and what is not), you can help your employees and business partners understand how your system is changing and why those changes are important to the business' safety improvement efforts.

Change Management

Remember the relationships that we described earlier in the article: hazards, related to risks, which are in turn related to mitigations? Part of the value of a robust database is that it becomes a useful tool for change management. If you plan to change a procedure and it is identified in your relationship database, then you can see which hazards are mitigated by this procedure.

This allows you to assess whether your proposed change will affect the way that the related hazard(s) are mitigated by the process change. This helps to avoid unintended consequences that undermine past safety mitigations.

By using your SMS as a change management tool, you now have data to drive your change management analysis, instead of relying on mere conjectures about the likely effects of a change.

The SMS database should not be your only tool in analyzing changes, but it can be an important one. AVM

By Sarah MacLeod, Executive Director, and Brett Levanto, Vice President of Operations, Aeronautical Repair Station Association

Moonlighting

The 1980s' hit show "Moonlighting" brought mystery and charm to the small screen while propelling Hollywood icon Bruce Willis to the big one and cementing Cybil Shepherd's performance legacy. Much like Willis and Shepherd's private investigators, modern aerospace technicians can work a different job every day. An in-demand certificated mechanic produces great personal value and fills personnel gaps by using that certificate on behalf of multiple employers.

"Maintenance moonlighting" may make for a compelling hour of television, which would of course include sexy regulatory compliance issues. Aviation takes guts and brains, without any glory. Not only must each technician be aware of the certificate under which work is being performed (and/or approved for return to service), but the individual must also understand the business contracts involved to ensure proper coverage by drug testing programs when work is performed for air carriers. Obtaining the knowledge will take some detective work.

The drug and alcohol testing program requirements in 14 CFR part 120 apply whenever a safety-sensitive function is performed in the United States for a part 121 or 135 air carrier or a § 91.147 sightseeing operator. Note that a 2024 rulemaking expanded applicability worldwide for FAA-certificated repair stations effective Dec. 2027.

Importantly, §§ 120.105 and 120.215 mandate that individuals performing safety-sensitive functions be covered by an anti-drug and alcohol program when performing such work directly or by contract including subcontracting at any tier. Any individual performing, ready to perform, or immediately available to perform maintenance or preventive maintenance on an aircraft or component of that aircraft subject to part 120 must comply with the drug and alcohol testing program requirements for each employer.

"An employer may use a contract employee who is not included under that employer's FAA-mandated drug and alcohol testing program to perform a safety-sensitive function only if that contract employee is included under the contractor's FAA-mandated drug and alcohol testing program and is performing a safety-sensitive function on behalf of the contractor (i.e., within the scope of employment of that contractor)," the definition of "employer" in § 120.7 states. Any contractor — even an individual certificate holder contracted to perform covered work on a "moonlighting" basis — must participate in an FAA-mandated testing program.

Maintenance functions subject to part 120 include inspection, overhaul, repair, preservation, and the replacement of parts. The FAA has opined that any step or series of steps in the disassembly, cleaning, inspection, repair, replacement of parts, reassembly, and testing process is maintenance. Repair functions include specialized services as well as methods, techniques, and practices acceptable to the FAA under § 43.13(a): work steps included in a CMM, traveler, router, task card, etc. There are also many activities performed in repair stations and other facilities that are not subject to D&A requirements, including receiving inspections, tool/equipment restoration, calibration, and engineering functions. Fabrication for maintenance, which is performed as allowed by § 21.9(a)(6), is not a safety-sensitive function.

Determining coverage, when in doubt, depends on whether the activity is required to be documented on a §§ 43.9 or 43.11 record. If yes, it is safety-sensitive and the individual's performance of the task will be obvious to an FAA inspector when reviewing maintenance or inspection releases … like shooting fish in a barrel.

This applicability along with the expansive definition of "performing" to include those ready and immediately available provides flexibility while demanding compliance attention of maintenance providers. The expectation that an individual will be called upon to "perform" must be included in planning, clear to human resources and contracting personnel, and stipulated by any individual accepting safety-sensitive work.

The skills of an aviation technician, regardless of certificate, are extremely valuable. As with all aviation safety rules, part 120 demands careful planning and attention to details, such as the definitions. Failure to do so during "maintenance moonlighting" can result in an outcome more painful than the cancelation of a television show. AVM

Sarah MacLeod is managing member of Obadal, Filler, MacLeod & Klein, P.L.C. and a founder and executive director of the Aeronautical Repair Station Association. She has advocated for individuals and companies on international aviation safety law, policy, and compliance issues since the 1980s.

Brett Levanto is vice president of operations of Obadal, Filler, MacLeod & Klein, P.L.C. managing firm and client communications in conjunction with regulatory and legislative policy initiatives. He provides strategic and logistical support for the Aeronautical Repair Station Association.

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