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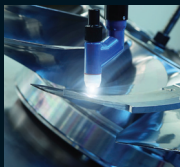
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MRO Titans

Each year we explore the largest MROs in the world to find out their secrets to being leaders in the industry, growth and changing with the times.



On the cover: Shown here is AAR, is one of our Titans of MRO. Cover image courtesy of AAR.



34 Avoiding FAA Fines

Interpreting the FAA rules and regulations can be tricky and missteps can lead to penalties and fines. We asked experts to weigh in on how best to avoid fines that can seriously impact the bottom line.

40 Thai Airways

For Thai Airways, 2015 was a year of recovery. Our writer, Douglas Nelms traveled to Thailand to see how the airline is coping with a reorg, a coup and growth.



CATEGORIES

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- MILITARY
- ENGINES
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- PRODUCTS/ TOOLS
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- AFTERMARKET

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Aviation Electronics vs. Maintenance

BY JOY FINNEGAN
EDITOR-IN-CHIEF



As aircraft become more and more high tech, the lines between an avionics technician and an aircraft mechanic are blending together. This needs to be addressed in the training curriculum for new mechanics as technology, innovation and aircraft become more electronic.

In recognizing this, the FAA has an NPRM that proposes to amend the regulations governing the curriculum and operations of FAA-certificated Aviation Maintenance Technician Schools. The NPRM states, "These amendments would modernize and reorganize the required curriculum subjects in the appendices of the current regulations. They would also remove the course content items currently located in the appendices and require that they be placed in each school's operations specifications so they could more easily be amended when necessary. The amendments are needed because the existing curriculums are outdated, do not meet current industry needs, and can be changed only through notice and comment rulemaking. These amendments would ensure that aviation maintenance technician students receive up-to-date foundational training to meet the demanding and consistently changing needs of the aviation industry."

Initially, the comments were to close at the end of 2015 but the deadline for comments has been extended to February 1, 2016. So there is still time to get your comments in for consideration and who better to comment than those of you in the daily fight? Please, share your knowledge and expertise by commenting on this proposed rule change and don't forget to thank Aviation Technical Education Council (ATEC), Aeronautical Repair Station Association (ARSA), Airlines for America (A4A), Aviation Suppliers Association (ASA), Helicopter Association International (HAI), Modification And Replacement Parts Association (MARPA), National Air Carrier Association (NACA) and other industry groups for petitioning to get that comment period extended.

Here at *Aviation Maintenance*, we are embracing these realities as well. You may have noticed over the course of the last year that we added a new section for avionics and aircraft electronics news. We are also publishing an aviation electronics eNewsletter in addition to our regular Aviation Maintenance eNews.

Furthermore, our parent company, Aerospace and Security Media, launched an aviation electronics event held in Munich, Germany last year. The event was a success and is being held again in Munich on April 20-21, 2016. Refer to pages 18-23 in this issue for the conference agenda, training and speaker information. More information and registration can be found here <http://www.ae-expo.eu/>. Please consider attending to

keep your knowledge of the future of avionics up to date. We believe this is the future and the blending of maintenance and electronics will only surge ahead.

Speaking of the alphabet groups, mentioned earlier in conjunction with the extension of the NPRM, have you looked into what these groups can do for you and your company? If your company is not active in the regulatory environment already, joining the group that represents your interests is important. ARSA, MARPA, ASA and many others stand up for our industry in Washington. They make it their mission to fight for what is right for the aviation maintenance industry.

Leaders like Sarah MacLeod of ARSA, quoted in our "Avoiding FAA Fines" story on page 34 and Jason Dickstein of MARPA who regularly provides a column for the magazine, are well-versed in the legalities of the aviation maintenance business as well as the way to get things done within the government bureaucracy. They have made it their life's work to protect the interests of their members. If your organization is not already a member of the association that represents your interests best, now is the time to join.

Lastly, as we went to press, the NTSB released its "Most Wanted" list, a yearly listing of their goals for improving aviation safety. It's important to note that while none of the list directly calls out maintenance, several of the items impact all sectors of transportation. The first item that can be a factor for maintainers is to "reduce fatigue-related accidents." Shift work, night work and working through until a write up is resolved can all lead to fatigue, so this is something MROs should continue to address.

Another item that can impact everyone in the aviation industry is "disconnect from deadly distractions" and I'm sure you can guess this is about electronic devices that rule our lives now. Being interrupted by a phone ringing or text chime during a procedure can distract and cause follow-up steps to be missed. Put a plan in place to prevent being distracted during procedural work.

And the last item that stood out to me is "end substance impairment in transportation." Please seriously consider this. Do you know someone struggling with alcohol abuse? Prescription drug use? Or worse? It is very rare in our world since there is random drug testing required for most. But where there is a will, there is a way and addicts can be the sneakiest and cleverest at avoiding. If you know someone who is struggling, please reach out to them and help them get the help they need. Most companies will have a program through which help is available. *The full NTSB Most Wanted list can be seen at www.ntsb.gov/safety/mwl.* **AM**

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PPG Introduces Qualified Redesigned Sliding Cockpit Windows for A320 Family



Frame Retainer is removed from a sliding cockpit window for the Airbus A320 Family by Jim Hartmann, PPG Industries program manager, that PPG has redesigned. The new design enables the frame retainer and window panel to be installed as a complete assembly while being distinct components, affording cost-effective replacement. PPG offers framed window assemblies as well as window panels and frame retainer kits. PPG image.

PPG Industries' aerospace transparencies group has introduced redesigned sliding cockpit windows for the Airbus A320 Family that are expected to have improved field performance over the previous design and afford cost-effective replacement.

The new windows have passed successfully all ground and flight tests in PPG and Airbus facilities. They can be used for original-equipment and replacement applications on Airbus A318, A319, A320 and A321 single-aisle airplanes as well as the NEO (new-engine option) Family that includes the A319neo, A320neo and A321neo airplanes.

PPG's redesigned aft fixed side cockpit windows were qualified by Airbus in 2012 with similar enhancements. A new simplified clamp design for the windows enables the frame retainer and window panel to be installed as a complete assembly while being distinct components. Operators can now salvage undamaged PPG frame retainers for reuse when only window panels need to be replaced. PPG offers replacements of the complete framed window

assemblies consisting of the frame retainer and window panel as well as window panels for installing in salvaged PPG frame retainers.

According to Arthur Scott, PPG global director for commercial aerospace transparencies, PPG has continued to improve performance of the windshields and side cockpit windows for the A320 Family since it was certified to supply them in the 1990s.

To defend against moisture ingress and delamination, the redesigned side cockpit windows have an added stainless steel Z-retainer, proprietary PR-2060 polyurethane sealant as an internal sealant behind the Z-retainer and S-123 urethane interlayers.

PPG's redesigned windshields for the A320 Family, which it introduced in 2010, incorporate S-123 urethane, PR-2060 sealant, PR-1425CF chromate-free sealant and an improved electrical system. According to Scott, thousands of aircraft are flying with the new-design windshields. "These windshields are demonstrating service life more than double that of the previous design, resulting in lower operating costs."

Bombardier and GlobalParts.Aero Team to Enhance Parts Support for Learjet 20/30/50

Bombardier Business Aircraft and GlobalParts.aero have entered into a strategic collaboration for all inventory of the Learjet 20, Learjet 30, and Learjet 50 series aircraft. GlobalParts.aero, a Kansas-based aviation parts supplier, will take over the primary responsibility for all planning, stocking and distribution of aircraft parts of these Learjet series aircraft.

"We are extremely pleased to collaborate with GlobalParts.aero in this venture. This agreement will ensure that many more parts will be available at a competitive price and we expect it will have a positive impact on our operators' cost of ownership," said Bill Molloy, vice president of Parts Services, Bombardier Business Aircraft.

"We are prepared to enhance support for Learjet 20, Learjet 30, and Learjet 50 series aircraft customers right away," said Malissa Nesmith, GlobalParts.aero's senior vice president and COO. "We have expanded our inventory of Learjet parts in recent months and have the capability and expertise to repair parts as well. We are working with Bombardier to ensure a seamless transition for this important customer segment."

Approximately 2,000 Learjet 20, Learjet 30, and Learjet 50 series aircraft were produced from the 1960s into the early 2000s, with the majority still in service.

"Given our diverse operator base, we were particularly committed to finding the right company with which to collaborate. With GlobalParts.aero's proven track record of exceptional parts support, we are confident this strategic collaboration will enhance our customers' experience," said Molloy.

Norwegian Group Expands Cooperation with Lufthansa Technik

The Norwegian Group has extended the Total Base Maintenance Support TBS contract with Lufthansa Technik for its Boeing 737-800 fleet ahead of time. The MRO contract covering Boeing 787 wheels and brakes has also been expanded.

Norwegian and Lufthansa Technik signed the first contract for a TBS covering the airline's Boeing 737-800 fleet already in 2012. Initially running over a period of five years, the airline has recently expanded and extended the contract. Beyond the existing fleet, the new contract also covers the future 737-800 fleet of the entire Norwegian Group. In addition to Norwegian Air Shuttle, this also includes Norwegian Air International, Norwegian Air UK and Norwegian Air Norway. For the first time, Lufthansa Technik will also perform end-of-lease checks, initially on eleven aircraft.

As a Messier-Bugatti-Dowty Recommended Repair Center (RRC) for Boeing 787 wheels and brakes, Lufthansa Technik is also responsible for the wheels and brakes of Norwegian's Boeing 787 Dreamliner fleet. The corresponding agreement has also been extended and the volume doubled. Under contract at Lufthansa Technik since 2013, Norwegian currently has eight 787-800 aircraft in operation. Beginning in 2016 the airline will also start operating the Dreamliner's -900 version.

ATP Releases Two New Products

Aircraft Technical Publishers (ATP) has released two new products, ATP Tool Compliance Manager and ATP Employee Compliance Manager. The availability of the new service offerings follow the company's recently announced new strategic vision that will focus on helping maintenance providers seamlessly manage all of their end-to-end maintenance processes, from compliance tracking to inventory management to maintenance forecasting, from a unified software as a service (SaaS) solution.

The two new products are delivered on the only single-source cloud-based SaaS platform designed specifically for maintenance providers—offering exceptional control, flexibility, and affordability—as part of ATP's integrated "smart content" suite of services, the company says. ATP enables customers to integrate workflows and optimize information management—resulting in improvements in productivity, cost savings, and aircraft utilizations, while also preventing costly regulatory lapses, they maintain.

"Effectively managing and tracking information is a huge challenge for maintenance providers because there are so many moving parts, technical information, operational requirements, and aviation safety, that all need to fit together," said Charles Picasso, ATP's new CEO. "Our customers told us that they need new solutions for replacing the spreadsheets and other time-consuming and disconnected processes, that they're currently using to manually juggle all of it and make sure that nothing slips through the cracks. We've listened and are thrilled to announce two products that will finally enable them to manage these critical processes in a single streamlined and integrated fashion."

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about people

Duncan Aviation Appoints New Business Development Manager

Duncan Aviation is pleased to announce Kevin Miesbach as Components/OEM New Business Development manager. This is a new position created to strengthen and drive components repair services toward new business opportunities with OEMs, government entities and new product capabilities, the company says.

In 1982 Miesbach began his career as an avionics technician with Lincoln Avionics. At the time, Lincoln Avionics was partly owned by Duncan Aviation and later the corporation was transitioned into Duncan Aviation. Miesbach transferred to the avionics installation department and began working on business aircraft such as Citations and Learjets.

Miesbach later joined the Components Repair team and in 1993 was promoted to NAV/Comm team leader. The past 15 years he has moved from Avionics Shop Supervisor to his most current position of Avionics Component Repair manager. During this time, the shop developed and gained a long list of new capabilities that includes FMS, TAWS and digital CVRs; NAT communications and audio equipment, newer weather radars and gyros.

Meridian Names Stephen Director of Marketing



Stephen

Teterboro Airport-based Meridian announced that Kirk Stephen has been named director of Marketing. Stephen has 20 years of marketing experience with an extensive background in brand management. In 2011, he joined Meridian as Marketing manager, and was given responsibility for all of the company's diverse business units, including Charter, FBO, Aircraft Management, and Aircraft Maintenance.

Since joining the organization, Stephen has been working unifying the Meridian companies under one master brand. His accomplishments include the consolidation of multiple domain names into one memorable website address (meridian.aero), the creation of the company's first corporate brochure, the launch of a fully redesigned website, the debut of an impactful new trade show exhibit, the development of innovative print advertising, and the establishment of a strong presence on digital and mobile platforms.

He holds an MBA in Marketing from Rutgers University and has worked at Bayer, Reckitt Benckiser and Cadbury over the years.



Turkish Airlines Signs Largest Order in Airline's History for Pratt & Whitney's Geared Turbofan



Turkish Airlines has signed a Definitive Agreement for Pratt & Whitney's PurePower PW1100G-JM engines to power its order of 92 firm A321neo aircraft, the largest engine order in Turkish Airline's history. The order was originally announced during the 2015 Paris Air Show as a Memorandum of Understanding with 72 firm and 20 option aircraft. Deliveries are scheduled to begin in 2018. The deal is also the largest engine order in 2015 for Pratt & Whitney, representing a year of pivotal milestones as it leads the industry into a new age in aviation history.

The PurePower Geared Turbofan engine family has about 7,000 orders, including options with more than 70 customers from more than 30 countries. "Turkish Airlines is proud to have Pratt & Whitney's PurePower engines power our A321neo aircraft order," said Dr. Temel Kotil, deputy chairman and CEO, Turkish Airlines. "This historic deal for our company is a statement on our commitment to develop the most technologically advanced fleet of aircraft in the industry."

FL Technics Signs CAMO Support Agreement with Somon Air

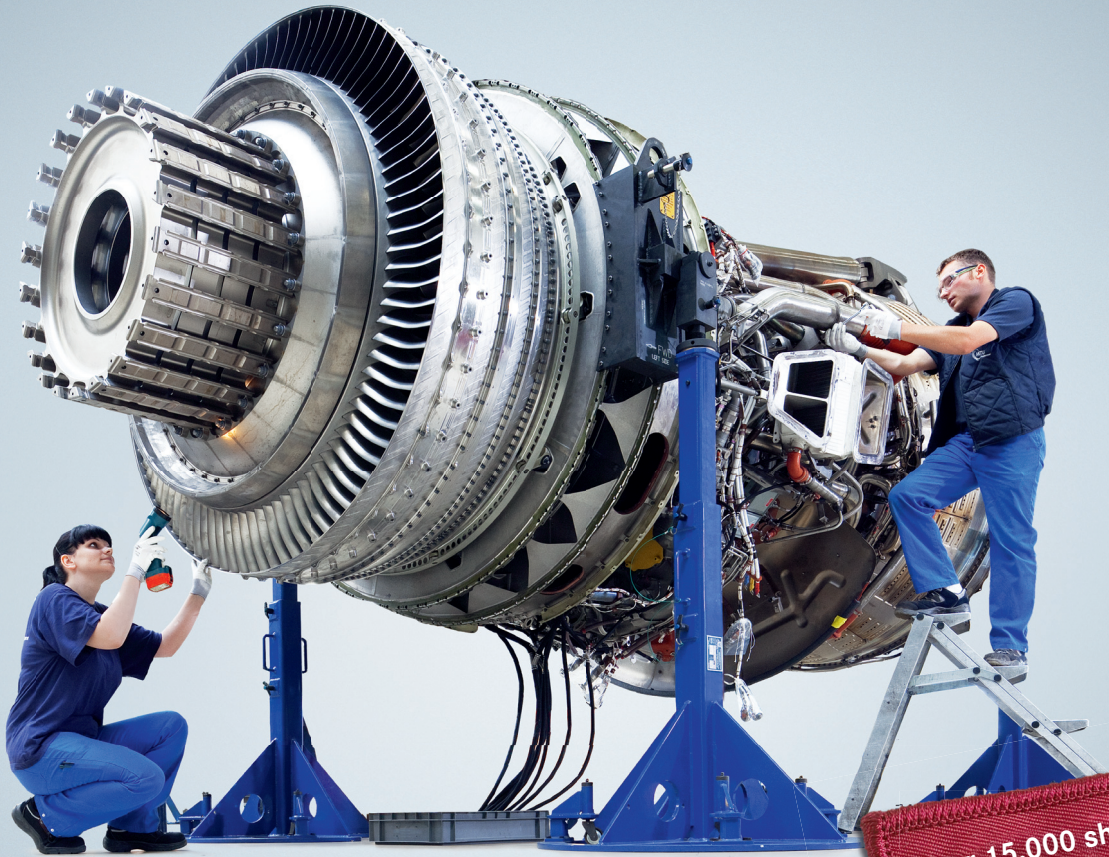
FL Technics has signed a four-year long CAMO support agreement with Somon Air, the first private airline in Tajikistan. FL Technics will also provide the carrier with engine condition monitoring services.

Under the long-term agreement, FL Technics will support the Tajikistani carrier's Boeing 737NG and CL fleet with complete Continuing Airworthiness Management services. FL Technics will assist Somon Air in the process of setting up and implementing Commsoft's OASES MRO IT system, which the company feels will make a step towards the launch of an in-house Continuing Airworthiness Management Organization. At a later stage FL Technics is to provide Somon Air consulting services related to aircraft engineering, maintenance and shop visits. Currently, the Tajikistani carrier operates a fleet of two Boeing 737CL and four Boeing 737NG.

"We have been working with Somon Air for several years now, and we are very grateful for the trusting cooperation between our companies," comments Kestutis Volungevicius, head of Engineering and Training at FL Technics. "Now, both parties are ready to open a new chapter in the relationship. Together with Commsoft we will help Somon Air implement one of the most efficient CAMO systems whilst the entire process will be supported by our highly skilled and experienced professionals." See related story page 10.

"With the sustainable development of Somon Air, we see the acquisition of CAMO approval as an achievable goal and we are happy to rely on such trusted and professional long-term partner as FL Technics to support us in every single activity towards this goal, including IT system implementation as well as CAMO support during the transition period and technical training," explains Robert Bryant, the Engineering and Maintenance director of Somon Air.

Apart from the cooperation in the CAMO area, FL Technics will support Somon Air with engine condition monitoring services allowing to track the performance of CFM56-3 and CFM56-7 engines.

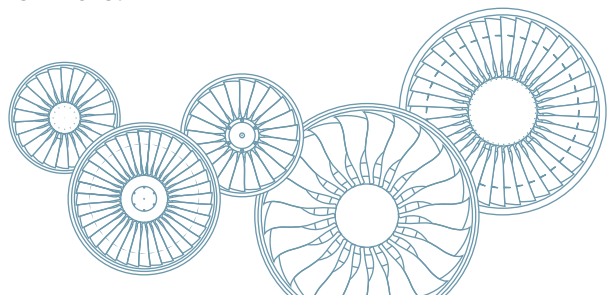


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about people

» Constant Aviation Names Embraer 450/500 Program Manager

Constant Aviation has added Jason Kanyuh as the Embraer 450/500 program manager. Prior to joining Constant Aviation, Kanyuh worked as the manager of Maintenance at Flight Options.



Kanyuh

"Jason brings knowledge and expertise on the Legacy 450/500 airframe to the organization. Our dedication to the Embraer product lines dates back to 1998. As the new Legacy 450/500 are being produced, it was important for our business to incorporate the necessary support system as they come off the delivery line," said Stephen Maiden, president/CEO.



Dalbey

ATS Adds Dalbey

Doug Dalbey is joining Aviation Technical Services (ATS) as vice president of Quality, Safety and Technical Training effective January 4, 2016. In this newly-created position, Dalbey will manage the safety, quality and training divisions at ATS' facilities in Everett and Moses Lake, WA; Kansas City, MO; and Fort Worth, Tex.

"Doug has an impressive background with over 40 years of aviation safety and quality experience," said ATS CEO Matt Yerbic. "As we continue to expand our business, it is critical that we uphold our excellent safety and quality record. Doug's expertise will be invaluable as ATS grows in order to maintain safety-first consistent practices at each of our locations."

Dalbey's aviation career began as a fixed-wing aircraft mechanic in the U. S. Army and he worked in various military and DOD positions. He joined the FAA as an Aviation Safety Inspector, where he oversaw airline maintenance and safety practices for American Airlines, Braniff Airways, and Express One Airlines. In 2006, Dalbey was selected into the FAA's Senior Executive Service and later became the Flight Standards' deputy director of Field Operations. Dalbey holds a FAA Mechanic Certificate with Airframe Rating.

Venkatesh Becomes Director Eng./R&D) at HAL



Venkatesh

D. K. Venkatesh has taken over as director of Eng. and R&D of Hindustan Aeronautics Limited, Bengaluru, India. He had been officer on Special Duty (OSD) previously. This newly created post is a part of the restructuring of HAL's Board. "My focus will be on promoting and developing new technologies, processes and products," Venkatesh says. »

Somon Air Signs Five-Year Contract to Use OASES MRO IT System

Somon Air, a private airline based in Dushanbe, Tajikistan, has selected OASES for its airline CAMO activities. OASES will control the airline's six-strong fleet of Boeing 737 'Classic' and NG aircraft.

The fast-growing airline has signed a 10 concurrent users, five-year contract with Commssoft, with implementation and set-up services provided by FL Technics scheduled to start straight away. FL Technics will use OASES to manage the Continuing Airworthiness of Somon Air's fleet. The contract covers three modules: Core, Airworthiness and Planning. It also allows the airline access to Commssoft's private cloud to manage its OASES operations.

"Somon Air's decision to entrust its airline CAMO activities to OASES is a major endorsement of our successful strategy with key CAMO partners across the world. It also represents a market break-through for OASES in Central Asia, and we are delighted to have entered into this business relationship," says Nick Godwin, managing director of Commssoft.

West Star Renews Hawker, Citation Service Center Agreement

West Star Aviation has renewed their Textron Aviation Authorized Hawker and Citation Service Center Agreement at their Grand Junction, Colorado (GJT) Location.

"In an era of OEM Service Center Agreement uncertainty we are extremely proud that Textron Aviation has renewed our agreement," stated Robert Rasberry, CEO of West Star. "The Hawker and Citation MRO services segment has been a focus of West Star for years and we continue to invest resources in its growth."

West Star GJT offers full service, one-stop capabilities to Hawker and Citation Operators including maintenance, avionics, component overhaul, paint, interior refurbishment, and is a Honeywell TFE731 and GTCP36-150 Line Service Center. In addition, West Star GJT is approved by Textron Aviation for Hawker landing gear overhaul.

Delta TechOps Announces a Long-Term Engine Maintenance Contract with Virgin Australia

Delta Air Lines' maintenance division will perform maintenance, repair and overhaul services for Virgin Australia's fleet of CFM56-7B engines through a 13-year exclusive agreement.

The new 13-year engine maintenance contract provides the opportunity for both carriers to collaborate on aircraft engineering, reliability and other maintenance-related activities.

"Delta TechOps provides a unique value proposition as the maintenance arm of the most reliable global U.S. airline," said Don Mitacek, Delta Air Lines' senior vice president - Technical Operations. "We wake up each morning with a passion to reduce turn-around time, lower engine overhaul costs and provide the highest quality product to our customers. We look forward to growing our relationship with Virgin Australia."

"This new engine maintenance contract further deepens Virgin Australia's strategic alliance with Delta Air Lines," said Gary Hammes, Virgin Australia's COO.

"At Virgin Australia, we constantly challenge ourselves to think differently so we are pleased to be working with Delta TechOps who have a track record of innovation as they service one of the world's most successful airlines."

VTT Research Helps Extend Life of HPT Blades in Hornets

With the help of research by VTT Technical Research Center of Finland, the Finnish Air Force (FINAF) has succeeded in increasing the operational life of the high pressure turbine (HPT) blades of its Hornet jet engines by 10 percent. The saving for their taxpayers is an estimated \$3 million dollars, or more than 2.7 million euros, compared to which the research investment was modest and the return (ROI) almost 100 times the research investment, VTT says.

FINAF sent the VTT's research results and some used HPT blades to the engine manufacturer. On the basis of the research findings and its operational experience, GE increased the lifespan of the HPT blades for its F/A-18C/D Hornet engines (2 x General Electric F404-GE-402) by around 10 percent. The FINAF has adopted the new life limit into operational use since May 2015.

VTT's research for FINAF has therefore created savings for the taxpayer and will ensure expertise-based security of supply in Finland.

Further information on VTT's research on FINAF's HPT blades is provided in the publication: http://www.vtt.fi/inf/julkaisut/muut/2013/ICAF_FinlandReview_2013_issue1_3April13.pdf



“Quality is not an act, it is a habit.”

(Aristoteles, 384 BC – 322 BC)

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PEMCO Redelivers Third B737 Freighter to Kahala Aviation and Looks to Start 2016 Hot

PEMCO World Air Services (PEMCO) has announced the redelivery of a B737-300F aircraft to Ireland-based Kahala Aviation. The freighter, converted at PEMCO's headquarters in Tampa, Fla., has now entered service. This conversion marks PEMCO's third redelivery of a B737-300 to Kahala since 2008. A fourth aircraft is scheduled for redelivery during Q4 of 2015.

"PEMCO is pleased to continue the rewarding

relationship it has with Kahala Aviation," said PEMCO's director of Cargo Conversions, Mike Andrews. "We look forward to providing this successful and versatile company with reliable, state-of-the-art cargo offerings."

PEMCO's latest 737-300F redelivery for Kahala Aviation provides nine pallet positions, up to 43,100 pounds of payload and 4,600 cubic feet of total volume.

"We are thrilled to be working with PEMCO

they are truly an outstanding, world-class air services company for our B737-300 freighter requirements," said Brad Smith managing director of Kahala Aviation.

PEMCO's 60-plus customers select the company's passenger-to-freighter conversion for its superior cargo door and system, superior operating functions, on-time turnaround, and a track record of two million hours of safe, reliable operation.

Aviation Maintenance has learned that PEMCO MRO facility located in Tampa has already inked two substantial agreements for 2016. One of the agreements is with a major legacy carrier for interior mod. The other agreement is for heavy maintenance with a low cost carrier. Both of these agreements encompass multiple lines at both hangars with heavy schedules for the term of the agreement.

Frontier Airlines recently presented PEMCO with its prestigious Tech Ops Business Partner Excellence Award for PEMCO's role in ensuring successful seat configuration program, supporting new aircraft induction, and responsiveness in operational needs.

PEMCO operates two hangars in Tampa International Airport (KTPA) where it performs heavy maintenance and freighter conversion of B737 classics. PEMCO also has partnerships for freighter conversions in Costa Rica, Canada, and China.

Marshall Ranked as One of Britain's Most Admired Companies in Management Today

One of Britain's leading business magazines, has placed Marshall Aerospace and Defence Group in the country's Top 100 Most Admired Companies. Within the sectors in which Marshall operates, the company scored higher than a number of its peers and also scored higher than well-established high street brands Barclays and Marks and Spencer.

Steve Fitz-Gerald, CEO of Marshall Aerospace and Defence Group, comments: "As a family business with a proud heritage, our longstanding values are an instinctive part of our day-to-day operations. They govern the way we think and the way we behave. We are incredibly proud to have been listed in the 2015 Top 100 of Britain's Most Admired Companies."

This is the 25th year of the Britain's Most Admired Companies list. It was compiled by Leeds Business School in conjunction with Management Today and comprises a number of distinct business sectors, each of which contains a maximum of 10 participating companies. The sector-specific participants grade each other plus analysts at leading City investment firms are also polled.



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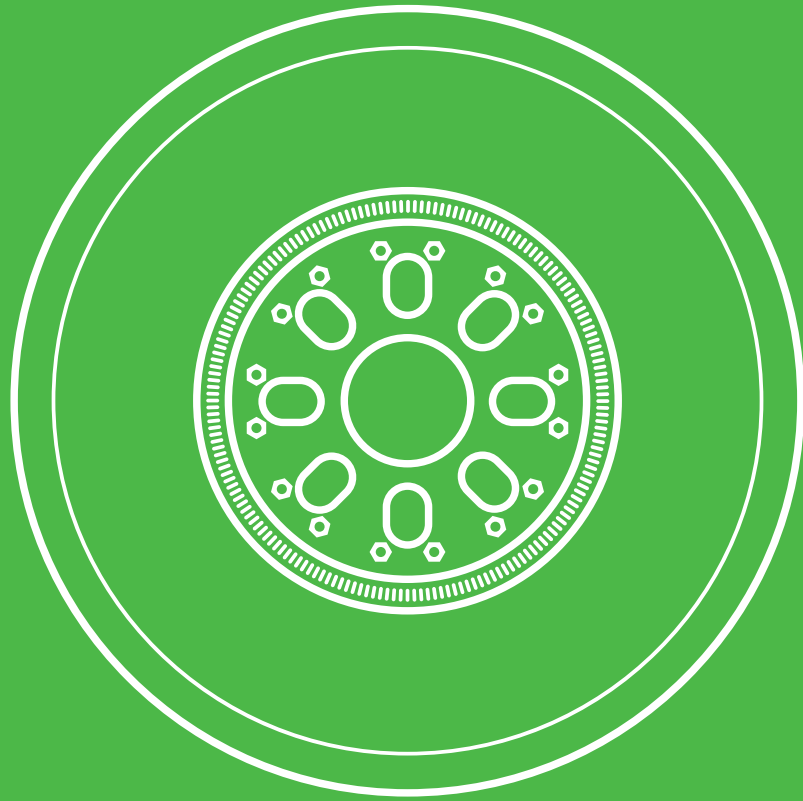
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Pentastar Aviation Unveils Newly Designed Website



information they are looking for as quickly as possible, and as the use of smart devices continues to increase, we knew it was important to ensure that information is readily accessible on any device."

In addition to the refreshed look and responsive design upgrade, the main site navigation provides easy, one-click access to information about Pentastar Aviation's services including Private Jet Charter, Aircraft Management, Advisory Services, Aircraft Maintenance, Avionics, Interior and Fixed Base Operations including Private Jet Catering.

"We wanted the ease of use found on the website to reflect the efficiency and convenience we're known for delivering in all of our service offerings," said Greg Schmidt, president and CEO of Pentastar Aviation. "The combination of responsive design and search engine optimization allows us to deliver a wealth of information that is both easy to find and to navigate."

The new Pentastar Aviation website furthers the company's rebrand that took effect on their Facebook, Twitter, and LinkedIn accounts earlier this year.

Pentastar Aviation recently launched a rebranded website – www.pentastaraviation.com – featuring a refreshed look and upgrade to responsive design technology. The new website allows users to quickly access information about Pentastar's wide range of products and services on both computers and smart devices.

"Our website serves as the first impression of our brand for many customers and we want that first impression to be a positive one," said Tracy Neil, Pentastar Aviation's director of Marketing. "The new website is designed to be easy to navigate so that users can find the

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PA100 PUREair Engine Protection System for the H125/AS350 and H130 Completes Falling/Blowing Snow Trials

The PA100 PUREair System is ready for in-flight missions in falling and blowing snow conditions after successfully completing falling and blowing snow flight testing. The PA100 is now fully approved by TCCA, FAA and ANAC with no operational limitations. The PA100 continuously removes falling and blowing snow and will not clog during flight. DART says harsh operating environments can now be faced head on with confidence and security, and snowy and severe conditions are no longer a hindrance.

DART and Pall Aerospace co-developed the PA100 PUREair engine protection system for the H125/ AS350 as well as the H130 helicopters and have been working on obtaining this important approval for the past year. Operators can now install the PA100 PUREair System in markets where the TCCA, FAA, and ANAC approval is recognized and falling and blowing snow clearance is needed. EASA STC approval is also expected imminently and will include the falling and blowing snow approval.

The PA100 PUREair System, is a totally redesigned, reengineered, and retested air filtration system that is virtually self-cleaning and maintenance free. This fourth generation PA100 PUREair system leverages the latest advances in Pall Aerospace technology, including 3D Computational Fluid Dynamics, optimized system design and innovative nano-material technologies to achieve optimal engine protection for harsh operating environments.

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Marshall has strong industry presence from training to complex maintenance programmes, with uncompromising commitment to quality and relentless focus on customer service to ensure timely and cost effective solutions for an evolving aerospace market.

about people

» Venkatesh has more than 35 years of experience in aerospace industry in manufacturing, assembly, repair, overhaul, prototype development, quality management, projects, design, customer support of aircraft, helicopters and gas turbine engines. He is a member of the Aeronautical Society of India and an active member of the Society for Failure Analysis.

Venkatesh holds a Bachelor of Mechanical Engineering (Mech) from National Institute of Technology, Surat. He is an Associate of the Institute of Costs & Works Accountants of India and holds a Post-graduate Diploma in Marketing Management and Computer Applications.

Jet Center MFR's Hudnall is New ARSA President

The Aeronautical Repair Station Association's (ARSA) board of directors has announced the election of its new president, Gary Hudnall, general manager of Jet Center MFR in Medford, Ore.

Jim Perdue, continues on as a board member and valuable resource to the association's leadership. "With the support of my fellow board members, including [past president] Jim [Perdue], ARSA will continue to be a strong voice of the aviation maintenance industry in 2016." said Hudnall. "We will advocate for the industry as Congress reauthorizes the FAA, help repair stations bridge the skills gap as they build their workforces of the future and continue to offer world-class support and resources to association members. This is important work: The world can't fly without us."

Warner Calvo, quality and safety director of Coopesa, R.L. in Alajuela, Costa Rica, is now board vice president, while Basil Barino, executive vice president of NORDAM in Tulsa, Oklahoma serves as board treasurer.

Superior Appoints Grimes as Quality Assurance Manager

Superior Air Parts announced Stephen J. Grimes has joined the company as its new Quality Assurance manager.

"Superior Air Parts takes great pride in our commitment to not only provide the highest manufacturing quality in our products, but to also deliver the best overall ownership experience to our dealers and customers," stated Keith Chatten, CEO, Superior Air Parts, Inc. "Adding Stephen's extensive experience in quality assurance and Lean Sigma-based operational and value stream management will enable us to further improve the internal and external quality assurance programs we already have in place."

Prior to joining Superior Air Parts, Grimes was Internal Consultant and Trainer for SAFRAN USA.

MAEL Completes Boeing 787 Phase Check



Monarch Aircraft Engineering Ltd (MAEL), the engineering division of Monarch announced that their maintenance, repair and overhaul (MRO) was the first UK MRO to carry out a Phase 12 Check (C-Check) on the Boeing 787-8 Dreamliner aircraft and in early 2016 plan to complete a Phase 18 Check (C-Check).

In 2012 MAEL began working on the Boeing 787-8 Dreamliner with the opening of a line station at Warsaw to support the first European Boeing 787-8 Dreamliner into service for LOT Polish Airlines and in addition has now increased its capability to carry out maintenance on the aircraft type at Birmingham, Manchester and London Gatwick in the UK. "We've demonstrated commitment to new technology aircraft and MAEL will continue to lead in the MRO sector by offering airframe maintenance to global operators of the Boeing 787 Dreamliner," says Ian Bartholomew, MAEL managing director.

Air Tahiti Nui Selects Sabena technics for Full Cabin Mod



Sabena technics developed and supplied the STC (Supplemental Type Certificate) in-house as well as the kit manufacturing for the cabin modification for a full cabin modification on a fourth Air Tahiti Nui jet.

Sabena technics' teams have equipped the two-class cabin with brand new seats as well as with the latest In-Flight Entertainment systems allowing passengers to benefit from a wireless internet connection on-board using their own personal touchscreen tablet.

"This project highlights our ability to carry out a complex cabin modification from A to Z, inhouse, with an utmost attention to detail," said Philippe Rochet, COO of Sabena technics. "With this new cabin, passengers choosing to travel with Air Tahiti Nui will get the best value in terms of technologies, comfort and materials."

"The retrofit of this fourth aircraft completes our fleet renovation program initiated two years ago. This \$22.4 million project aims at offering improved seat comfort to our customers both in business and economy class. The highlights of the new cabins also include a new Inflight Entertainment System featuring an on demand access to a selection of movies, music, games, and magazines. In the same time, the new configuration also helps generating fuel cost savings through lighter equipment. I would like to thank our partners for their ongoing support and trust our customers will enjoy this experience, said M. Michel Monvoisin, chairman & CEO of Air Tahiti Nui."

Sabena says the aircraft was delivered on-schedule to the airline at the beginning of December.

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INTERNATIONAL AVIONICS CHALLENGES INTEGRATING THE SINGLE SKY



Preliminary Conference Programme Announced

The Aviation Electronics Europe team have been working hard to design and deliver the leading conference programme and discussion for the avionics and aviation electronics community's annual gathering.

With more focus on content and discussions, this year's event offers an enhanced main conference programme, more specialist workshops, certified training courses and exhibitor workshops, all geared up for you, the industry professional.

Aviation Electronics Europe, 20th-21st April 2016, Munich, Germany, will not simply look at the latest and future for

cockpit technologies, where airlines aim to deliver the most up-to-date and efficient systems for their pilots and the safety of passengers, but also updates on the Single European Skies initiative, which enters its third and final phase. Single European Sky and NextGen continue to dominate the aerospace industry, with targets of ensuring the utilisation of technology to increase traffic, improve aircraft and control communications whilst enhancing safety in an ever increasingly busy sky.

We are delighted to announce the Preliminary Conference Programme, which details the event and its various aspects, to enable you to plan your attendance and discussions you need to attend to enhance your knowledge and maintain your continual professional development.

- The only event for the international Avionics and Aviation Electronics community in Europe
- For the latest in SESAR, NextGen and performance based navigation
- For what the Pilot wants, the Aircraft needs and Industry must have
- From aircraft to the ground and all communications and technologies inbetween

Leading the Avionics Discussion

- **Leading Main Conference** with international industry expert speakers.
- **Technical Workshops** for in-depth analysis on key topics.
 - Standardisation & Certification Workshop
 - Future Avionics, Cyber Security & eEnabling Workshop
 - Software and Embedded Systems Workshop
- **Certified Training Courses** by leading expert on safety critical software/computer systems and certification.
 - Understanding & Applying DO-178C and ARP-4754A
 - Understanding & Applying ADS-B



HOW TO REGISTER

Register by 20th March
for Early Bird savings

1. Online at www.ae-expo.eu/online-reg or...
Download and complete the registration form from www.ae-expo.eu and...
2. Email to abroadbent@aerospace-media.com
3. Fax to +44 (0) 208 090 6211
4. Call +44 (0) 1704 621057
5. Mail to Aviation Electronics Europe, 1 Coyners Avenue, Southport, Merseyside, PR8 4SZ, UK

EARLY BIRD REGISTRATION NOW OPEN

Register online today and save €€€ with the Early Bird delegate fees.

(Early Bird delegate rate deadline is 20th March 2016).

You can register your place at Aviation Electronics Europe online and benefit from Early Bird Savings for the conference programme, technical workshops or certified training.

With a great range of discussions, presentations and training opportunities, ensure you plan your visit to the event and secure your place by booking early.

Register online today to ensure you receive regular event updates and keep informed of the latest conference developments.

Registration is simple, and you can make your payment by Paypal or credit card, just www.ae-expo.eu/online-reg.

SCHEDULE OF EVENTS

REGISTRATION HOURS

Tuesday 19 th April 2016	2:00pm - 5:00pm
Wednesday 20 th April 2016	8:00am - 7:00pm
Thursday 21 st April 2016	8:00am - 5:00pm

EXHIBITION OPENING HOURS

Wednesday 20 th April 2016	10:30am - 7:30pm
Thursday 21 st April 2016	9:30am - 5:30pm

MAIN CONFERENCE PROGRAMME

WEDNESDAY 20TH APRIL 2016

9:00am - 10:30am	Opening Keynote
10:30am - 11:00am	Networking Coffee Break
11:00am - 12:30pm	SESAR & Next-Gen
12:30pm - 2:00pm	Update
2:00pm - 3:30pm	Delegate Lunch
	CNS Enabling Operational
3:30pm - 4:00pm	Efficiency
4:00pm - 5:30pm	Networking Coffee Break
	ADS-B Updates - today and tomorrow!
5:30pm - 7:30pm	Networking Reception

THURSDAY 21ST APRIL 2016

9:00am - 10:30am	Standardisation & Certification
10:30am - 11:00am	Networking Coffee Break
11:00am - 12:30pm	Cyber Security & the e-Enabled Aircraft
12:30pm - 2:00pm	Delegate Lunch
2:00pm - 3:30pm	Satellite Based Solutions for CNS
3:30pm - 4:00pm	Networking Coffee Break
4:00pm - 5:30pm	Innovations in Avionics

TECHNICAL WORKSHOPS

WORKSHOP ONE

Wednesday 20th April - 11.00am- 3.30pm
Standardisation & Certification Workshop

WORKSHOP TWO

Thursday 21st April - 9.30am-12.30pm
Future Avionics, Cyber Security & eEnabling Workshop

WORKSHOP THREE

Thursday 21st April - 2pm-4.30pm
Software and Embedded Systems Workshop

CERTIFIED TRAINING COURSES

Wednesday 20th April 2016 - 11.00am-5.30pm
Understanding & Applying DO-178C & ARP-4754A

Thursday 21st April 2016 - 10.00am-4.30pm
Understanding & Applying ADS-B



MAIN CONFERENCE PROGRAMME

Wednesday 20th April 2016

9:00am - 10:30am - Opening Keynote

Gzim Ocakoglu, Policy Advisor, European Commission / DG MOVE, European Commission

Friedhelm Runge, Avionics Expert, European Aviation Safety Agency (EASEA)

TBC

11:00am-12:30pm - SESAR & Next-Gen Update

Europe's Single Sky (SES) and the US Next-Gen initiatives continue to be the fundamental drivers in the aerospace sector for enhance safety and communication in an ever increasingly busy sky. The introduction of the SESAR Deployment Manager sees the programme begin to deliver and be deployed across platforms. This session provides an update on the SES and Next-Gen programmes including the main operational challenges and the technical enablers for SES deployment and integration with ATM, from the commercial airline and business jet perspectives.

2:00pm - 3:30pm - CNS Enabling Operational Efficiency

Aeronautical communications, navigation, and surveillance (CNS) systems are key to the delivery of safe and efficient air traffic management. What are the latest concepts and developments in enhancing the CNS operations for more efficient and safer sky? Can 4D provide greater insight into optimising efficiencies?

4:00pm - 5:30pm - ADSB Updates - today and tomorrow!

Allowing air traffic controllers to route traffic more efficiently, reducing congestion, noise, emission and fuel consumption, ADS-B promises to keep our skies safer by enhancing situational awareness. What is the latest blue sky thinking and architectural challenges in ADS-B In and ADS-B Out towards meeting the 2020 mandate?



Thursday 26th March 2016

8:30am - 10:30am - Standardisation & Certification

With the necessity for all systems and software design developed to be fit for purpose and support the deployment of SESAR and Next-Gen, we explore the latest approaches, analysis and implications in compliance and what the latest in standards and certification mean to developers, solutions providers and end users.

11:00am - 12:30pm - Cyber Security & the e-Enabled Aircraft

Cyber security is on the lips of every industry discussion and aerospace and avionics industry is no different. The alleged hacking of MH-370 causes major concern for the industry, and with high profile cyber attacks on government agencies . With the aircrafts becoming more connected and wireless communications increasing in the cabin and cockpit, how can we ensure we make the aircraft secure and skies even safer from potential attack? Can we learn from other infrastructure sectors that have equally difficult challenges in cyber security?

2:00pm - 3:30pm - Satellite Based Solutions for CNS

The eConnected aircraft and wireless communications require the increasing use of satellite technologies to fulfil services. What are the latest space based solutions and applications that can make ADS-B and the avionics systems more efficient in communication with ATM and enhance the increasing demand for passenger based communications.

4:00pm - 5:30pm - Innovations in Avionics

What innovations and concepts are around the corner that could soon become part of todays development in avionics. What are the future technologies and latest thinking in concepts for safer, more cost effective skies? How can the increasing demand for wireless be utilised in enhancing avionics?

For further details on the Main Conference Programme, Speaker Information, Delegate Fees and to register online visit www.ae-expo.eu/programme.

Aviation Electronics Europe 20-21 April 2016 Munich, Germany www.ae-expo.eu

Technical Workshops Programme

The Aviation Electronics Europe Technical Workshops deliver greater insights for engineers and technicians into specific areas of focus, for more detailed analysis.

WORKSHOP ONE

Wednesday 20th April - 11.00am - 3.30pm

Standardisation & Certification Workshop

- How Hypervisor OS can cope with Multi-core Certification Challenges - Sven Nordhoff, SYSGO
- Reducing administrative overhead for DO-178C code coverage - Andrew Coomes, Rapita Systems
- Reaping the benefits of Reusable Software Components - Mark Pitchford, Lynx Software
- Building Application and System Resilience in a Multi-Core Computing Environment - Patrick Huyck, Green Hills Software
- Managing Avionics Safety Certification for Unmanned Aircraft - David Barnett, Real Time Innovations
- Open System Architectures and COTS reduce risk and project schedule for safety critical avionics applications - Marc Gandillon, CES Swap

WORKSHOP TWO

Thursday 21st April - 9.30am-12.30pm

Future Avionics, Cyber Security & eEnabling Workshop

- Aircraft Controllability and Primary Flight Displays - Knut Lande, General Manager/Flight Safety Advisor, LandAvia
- Modular and Scalable Satellite Avionics based on COTS - Hans-Juergen Herpel, Airbus DS GmbH
- Intelligent Mini SAR-Copter - Prof. Dr Ing Peter Sachs, Prozessautomatisierung
- A New Platform to Study the Correlation between Aging and SEE Sensitivity for the Reliability of Deep Submicron Electronics Devices - Marc Gatti, Thales Avionics
- Advanced backlights for LCD cockpit displays - NLR and NDF Special Light Products
- Future Avionics Model-Based Design workflows that satisfy DAL-A requirements while minimizing engineering efforts - MathWorks

WORKSHOP THREE

Thursday 21st April - 2.00pm - 4.30pm

Software and Embedded Systems Workshop

- Managing Software Quality in an Aerospace Support Centre - Richard Borcz, Airbus Helicopter
 - The Benefits of Data Driven Modeling in HMI Display Design - Raymond Niagaris, ENSCO Avionics
 - The impact of design constructs on testing of high integrity FPGAs - Matthew Noonan, Resource Group Embedded Systems & Solutions
 - Which Bus Should I Get On? - Tim Keller, Great River Technology
- The challenges of developing embedded real-time aerospace applications on next generation multi-core processors - Paul Parkinson, Wind River

For further details on the Technical Workshops Programme and to register online visit www.ae-expo.eu/workshops-programme

Announcing the Certified Training Courses

Aviation Electronics Europe will deliver two Certified Training Courses by Afuzion's director of Avionics Certification, Mr Vance Hilderman.



Two one-day courses, enabling you to gain enhanced levels of specialist knowledge, will take place during the two days of Aviation Electronics Europe and cover:

Wednesday 20th April 2016

Understanding & Applying DO-178C and ARP-4754A

- Understanding ARP-4754A for Avionics Systems; now required for almost all aircraft & avionics
- Applying DO-178C to modern avionics software system development.
- Understand the relationship between DO-178C and ARP-4754A, the new "Avionics Development Ecosystem".
- Understand the differences with DO-178B and DO-178C's best practices.
- Understand and apply DO-331 Model Based Development, DO-332 Object Oriented Programming, and DO-330 Tool Qualification in a DO-178C environment.
- Controlling engineering cost/risks with DO-178C & ARP-4754A.
- Understanding and avoiding the top 15 mistakes with DO-178C & ARP-4754A.
- Applying Best Practices within DO-178C & ARP-4754A

Attendees will put this all together in a fast paced training to "truly" understand how to understand and apply the new DO-178C & ARP-4754A standards for the real world: THEIR WORLD !

Thursday 21st April 2016

Understanding & Applying ADS-B

- Understanding ADS-B (Automatic Dependent Surveillance – Broadcast) for Avionics Systems; now required for almost all aircraft.
- Background and technical context of ADS-B; what is really involved.
- Ins and Outs of ADS-B: how to leverage ADS-B "In" and ADS-B "Out" in avionics solutions
- Why is ADS-B mandatory, and what are costs versus benefits?
- Today's versus Tomorrow's ADS-B solutions: how will avionics evolve for ADS-B?
- Top ADS-B development risks and how to certify ADS-B for EASA & FAA
- Applying ADS-B Best Practices

Attendees to "Understanding & Applying ADS-B" will gain the information they need to truly understand the "Ins" and "Outs" of the new mandatory ADS-B capability.

For further details visit www.ae-expo.eu/certified-training

EXHIBITION

70% of Exhibition space Sold

Aviation Electronics Europe has already 70% of its exhibition space booked and will see over 50 companies and organisations exhibiting their leading technologies, products and services, making it the largest gathering of avionics and aviation electronics solutions in Europe.

The event will also deliver a range of Exhibitor Presentations and Micro Workshops with many of the companies participating providing an enhanced level of activity to engage visitors and delegates.

- Discover new and latest technologies and solutions in Avionics and Aviation Electronics
- Network with the international avionics community in a great environment

List of Exhibitors (at 8th January 2016):

- AES Aerospace Embedded Solutions GmbH (AES)
- Aerospace Manufacturing
- Aitech Systems Ltd
- Aircraft Systems & Manufacturing (ASM)
- Aviation Maintenance Magazine
- Avionics Magazine
- Avionics Today
- bavAIRia eV
- CES
- Core Avionics / Channel One
- COTSWORKS
- Curtiss Wright
- DAC International
- DGLR Munich
- dSPACE
- EBAS
- EUROCONTROL
- Great River
- The HR Smith Group of Companies
- Institution of Engineering & Technology (IET)
- Interface Concepts

- ICG / Rockwell Collins
- Liebherr
- Lynx Software Technologies
- Mathworks
- mbs
- MEN Mikro Elektronik
- MICCAVIONICS
- Rotor & Wing Magazine
- RAeS Munich Branch
- Rapita Systems
- SYSGO
- TechSAT
- Techtest Ltd
- TTTech
- (UN)MANNED
- Vector
- VEROCEL
- Wind River

Visit www.ae-expo.eu/exhibitors2016 for full listings

Limited exhibiting and sponsorship opportunities are still available, to join the list of leading companies and organisations showcasing their technologies and solutions.

For further information on exhibiting and sponsorship please contact:

Paul McPherson

✉ pmcpherson@aerospace-media.com

☎ T: +1 240-463-1700



Exhibitor Workshops

A range of **FREE TO ATTEND** workshops by leading avionics technology and solutions companies exhibiting at Aviation Electronics Europe will deliver additional technical and technological presentations and discussions, for you to discover the latest advanced systems and ideas in the market.

A full Exhibitor Workshops schedule is available at www.ae-expo.eu but some of the leading avionics technology and solutions companies participating in these workshops include:

- Saving Weight & Space through HUMS Integration into Crash Recorder Designs - Curtiss Wright
- COTS GPU Selection Criteria for Avionics Display Systems - Core Avionics
- AviBlocks: Adapting to Modern Avionics Development - Curtiss Wright
- Security for the E-enabled aircraft - Wind River
- Speeding up the development cycles for C4ISR mission equipment using fully SW compatible laboratory development platforms - CES Swap

Keep up to date of the latest programme and workshop developments at www.ae-expo.eu.

IMPORTANT

**EARLY BIRD RATES ARE LISTED BELOW
AFTER 20th March 2016 these rates will INCREASE by 20%**

- A 19% VAT/sales tax is included
- ID will be required on site for any Airline/Government subsidised rates before badges can be picked up

MAIN CONFERENCE (ACCESS ALL AREAS PASS) 20 & 21 April

Includes Main Conference, Workshops, Expo and any other FREE sessions. Includes Lunch/coffees

- AIRLINE ONLY RATE.....(€83 + 19% Tax) – **€99**
- GOVERNMENT ONLY.....(€495 + 19% Tax) – **€589**
- Full standard delegate.....(€795 + 19% Tax) – **€946**
- One Day standard delegate 20 or 21 Apr.....(€495 + 19% Tax) – **€589**
- Group booking 2 day – 3 for cost of ONLY 3..... (€1590 + 19% Tax) – **€1892**
- Group booking 2 day – 5 for cost of ONLY 3..... (€2385 + 19% Tax) – **€2838**

WORKSHOPS

Includes access to Expo

20 APRIL

- Standardisation & Certification.....(€250 + 19% Tax) – **€298**
- Understanding, Designing, Simulating & Testing
Complex ARINC 818 Sys.....(€99 + 19% Tax) – **€122**

21 APRIL

- Future Avionics, Cyber Security & eEnabling.....(€250 + 19% Tax) – **€298**
- Software and Embedded Systems.....(€250 + 19% Tax) – **€298**

CERTIFIED TRAINING

Includes access to Expo

20 APRIL

- Understanding & Applying DO-178C and ARP-4754A.....(€489 + 19% Tax) – **€589**

21 APRIL

- Understanding & Applying ADS-B.....(€489 + 19% Tax) – **€589**

EXHIBITION ONLY

- FREE to attend (NOT Conference) if BOOKED before 1st April 2016

PRESS

- FREE – Full access (ID required)

Supporting Associations Discount

A 10% discount will be applied if you are a member of one of the following Associations (Please tick box of your trade association membership. NOT applicable to Airline only, Government or Group booking packages):

- AEA bavAIRia DGLR RAeS IET ASD

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Job Title _____ Email _____

First name _____ Last name _____

Job Title _____ Email _____

First name _____ Last name _____

Job Title _____ Email _____

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State/Province _____

Country _____

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Signature _____

Outlook Brightens for MRO Titans

By Charlotte Adams



Low fuel prices and anticipated higher interest rates will spur MRO growth over the long term by allowing middle-aged and mature aircraft to fly longer, producing more maintenance, repair, and overhaul business for their engines, components, and airframes.

Low fuel prices have made it more attractive to fly older aircraft longer," says Bill Dwyer, general manager, services marketing, for GE Aviation. "Industry-wide, retirements are down more than 50 percent, compared to 2013," he says, and "most analysts predict a period of sustained low fuel prices." He also points to the expected rise in borrowing costs, which tend to favor used aircraft. "We think these factors will continue to spur interest in extending in-service life, and that creates opportunity for everyone in the MRO space."

Major Trends

ICF International expects the global air transport MRO market to expand from \$62.1 billion in 2014 to \$90 billion in 2024, or about a 3.8 percent compound annual growth rate, with Asia-Pacific and China as the drivers. China and Asia-Pacific, combined, are expected to spend more than \$29 billion in 2024, compared with \$16.9 billion in 2014. MRO firms will continue to expand their footprint in this area.

Meanwhile, U.S. carrier wide bodies are coming back to North America, analysts note. This reflects factors such as increasing labor rates in Asia, currency valuations, and the sophistication of U.S. carriers' analysis of the total costs involved in outsourcing, says Jonathan Berger, vice president of ICF International.

Relatively lower costs in the U.S. as a result of changes in the dollar are important in this shift, but so is really good technology, says Wayne Plucker, director of aerospace research for Frost & Sullivan. He cites AAR, the U.S. MRO. "They understand composites [and] can work with more sophisticated engine materials, [which] tends to reshore some of that [work]." AAR also has invested in IT, allowing customers, for example, to access their asset data in real time.

The global air transport MRO market will expand from \$62.1 billion in 2014 to \$90 billion in 2024 — about a 3.8 percent compound annual growth rate, with Asia-Pacific and China as the drivers. AAR Image.

A lot of North American carriers' MRO is still done in Asia because a lot of those airlines fly there, Berger says. A key driver is, as Asian fleets continue their exponential growth, U.S. carriers will have to compete with increased organic demand for slots in Asia.

Other pressures continue to reshape the industry. There are still too many players in airframe and component maintenance, observers say, and this may drive further consolidation. In the component area airlines increasingly want MROs to provide a wide range of services at a predictable cost. Though the march of the engine makers into the aftermarket may have reached its peak, component OEMs continue to capture business, and MROs, especially the independent operators, are teaming with them.

Meanwhile the parting out of retired aircraft for reusable airframe, engine material, and components is a growing activity at major airlines, Berger says. AFI KLM Engineering & Maintenance (AFI KLM E&M) stresses its U.S. engine teardown capability through its joint venture (JV), Bonus Tech. The MRO sees growth in aircraft and engine teardown and associated parts trading services.

Delta Air Lines also has become a savvy player in the used parts arena to reduce the cost of maintaining its own mature fleet. In 2013 the carrier bought 23 MD-80s from SAS AB of Sweden. And Lufthansa Technik (LHT) in past years has purchased former Lufthansa aircraft and parted out components for internal consumption.

This trend means these airlines are buying fewer of these parts from OEMs and surplus traders and can sell excess supplies through surplus sales departments, Berger notes. The practice is pressuring the OEMs, who are now forced to find innovative ways to replace this revenue. Airlines continue to seek creative ways to reduce their operating costs, and finding alternate sources of material is a key strategic lever, he says. "It's a really big change in the last two years."

The top dog of the independent MROs is probably ST Engineering, the parent of ST Aerospace, Plucker says. "They

don't miss a chunk of the market," including engines, airframe, and components. Berger places ST Aerospace with AAR and HAECO as the largest independent MROs.

The Singapore company invests in the U.S. as well. In addition to existing sites there, it plans to open a facility in Pensacola, Fla., late next year and has opened a new parting-out business in Hondo, Texas.

AAR

AAR is the largest independent MRO in North America and the third-largest airframe MRO in the world in terms of man-hours and revenues. In 2014 AAR performed about 5 million man-hours of airframe maintenance and expects to do about the same this year, says Dany Kleiman, group vice president for repair and engineering. Man-hours are up from 3 million only three to four years ago.



GE commercial services revenues in 2014 were \$8.9 billion, including GE's share of both CFM and Engine Alliance partnerships. GE Image.

The company as a whole recorded net sales of \$2.04 billion in FY2014, down from \$2.14 billion the year before, according to its annual report. But AAR's MRO revenues grew in 2014 and will continue to grow, Kleiman says. In 2014 AAR serviced 900 to 1,000 aircraft, mostly U.S.-registered commercial carriers.

The company has been expanding wide body capacity in the last two years, taking a lease on a facility in Lake Charles, La., and building a new facility in Rockford, Ill., which is expected to open next year. "We see that U.S. companies are more competitive today with Asia-Pacific providers, and we are looking forward to the in-shoring, instead of out-shoring, of services to U.S. carriers," Kleiman says.

Component MRO

While ST Aerospace expects engine MRO to drive market growth, it anticipates that component MRO growth will catch up with the engine sector in the next five years. ST Aero's maintenance by the hour (MBH) program supports nearly 900 aircraft and more than 20 operators with fleets in Asia-Pacific, Europe, and the Middle East.

AFI KLM E&M is a major player in CMRO. As far as multiproduct MRO is concerned, AFI KLM E&M ranks No.1 or No. 2 for component support, depending on the fleets, says Rob Pruim, vice president, strategy, for the business. The component MRO market is robust and growing, he says. "There is widespread availability of spare parts for some aircraft types like the A320 and A340."

The Franco-Dutch maintenance business sees component MRO, along with engine MRO, as a path to growth. AFI KLM E&M signed a long-term contract with Royal Air Maroc in 2015 to support component repair and overhaul for 787s. It likewise inked a deal with

Thai Airways International involving component support for 787s. The agreement includes support for consumables, rotables, and tooling and equipment, as well as for APUs and engine nacelles. In fact, AFI KLM E&M considers itself the current market leader for 787 component support.

AAR is also a player in component maintenance, as part of its "A to Z" strategy of engaging in a range of activities, including airframe maintenance – its largest line of MRO work – component maintenance, landing gear overhaul, supply chain/parts distribution and trading, engineering services, and aircraft leasing. It regards LHT, SR Technics, and ST Aero as major competitors in this sphere. Its largest revenue stream in the component area is power-by-the-hour (PBH) contracts, Kleiman says. The company in 2014 also bought the component support programs of independent MRO, Sabena Technics, in Brussels.

AJW

AJW Aviation ranks itself as No. 3 among the top five providers of component flight hour services contracts in terms of fleet coverage, says CEO Boris Wolstenholme, citing its 1,000 aircraft under PBH contracts – 850 of which are active, with the balance to come from the expected growth of contracted fleets during the course of the agreements. AJW Aviation expects revenues in 2015 of more than \$400 million, about half from support contracts –both PBH and ad hoc engagements -- and half from parts trading.

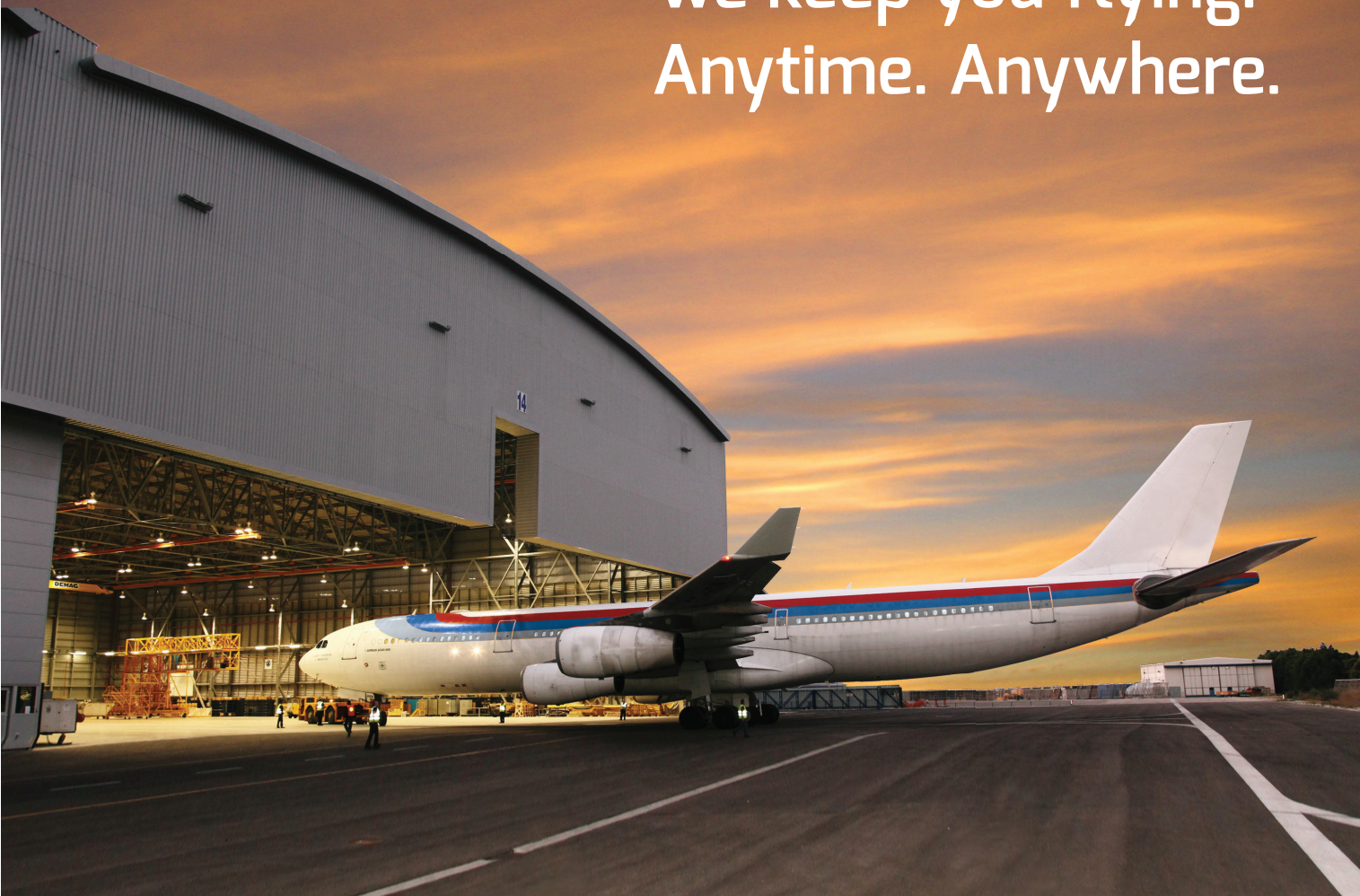
A core part of AJW Aviation's strategy involves OEM participation, Wolstenholme says. Sister division, AJW Technique, "captures about 40 percent of our repair work," with the remaining 60 percent going to OEMs or third-party specialists, he says. "That's a balance we like to maintain." This balance allows the OEMs to maintain their relationships with the airlines but "ensures a fair and even competitive environment" between AJW Technique and the manufacturers, Wolstenholme says.

"The airlines feel that they're the ones suffering as a consequence of [the OEMs'] business methodology, but we're there to ease the pain," he says. The airlines are looking for integrators who can put



The airlines are looking for integrators who can put services together for a predictable per-flight-hour cost, says AJW. AJW image.

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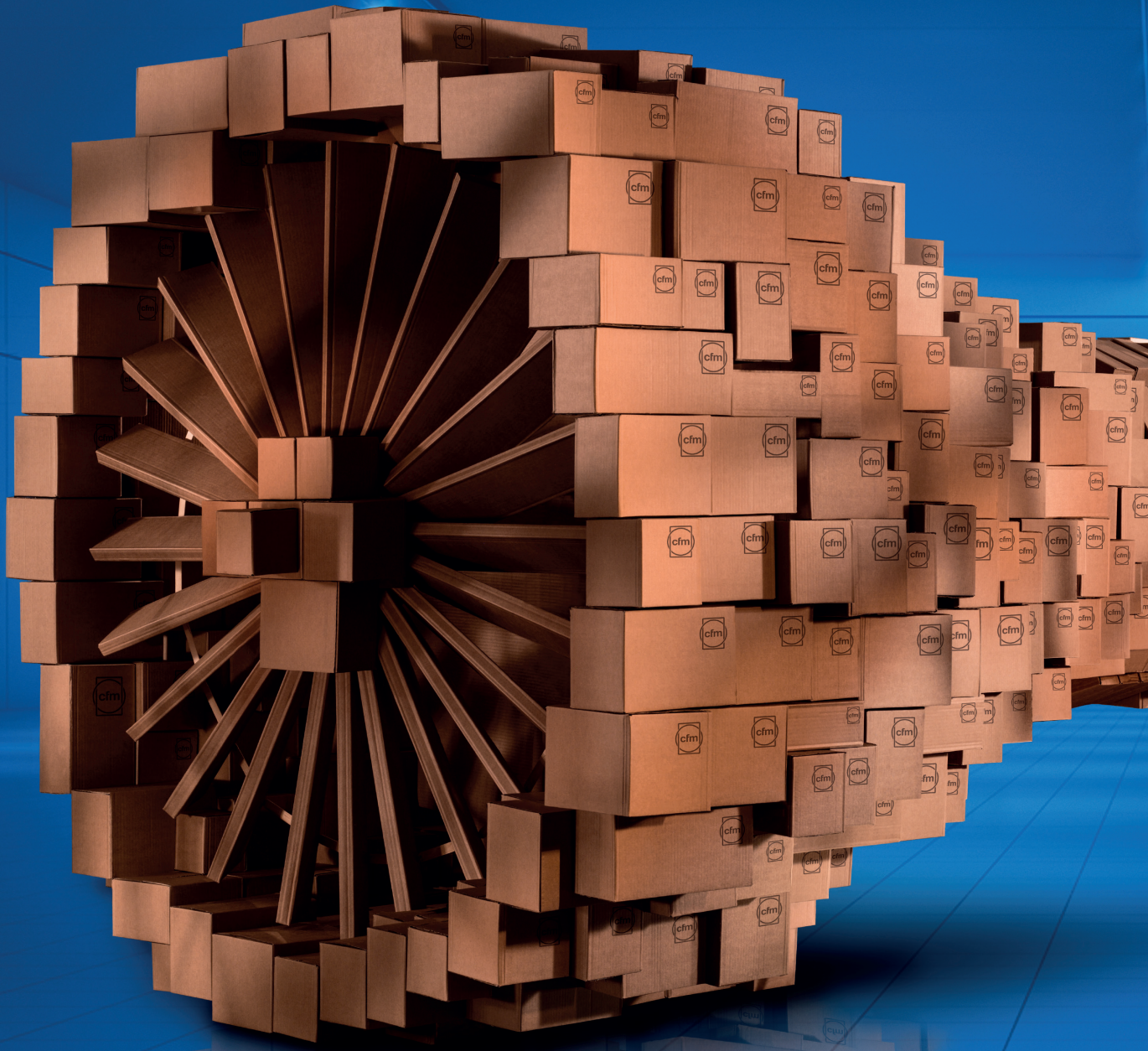
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services together for a predictable per-flight-hour cost, so if the MRO and OEM respect each other, there's no reason they can't work together to provide a solution, he says.

AJW Group's contract with easyJet this year is an example of this three-way cooperation. It covers component repair and overhaul, supply of consumable parts, and management of spares inventory – including storage and distribution -- across the airline's European network of 30 line

stations. Much of the work will be performed by AJW Technique, but AJW will also deploy its network of repair vendors and "most importantly" its strategic partnerships with OEMs such as Thales and Zodiac Aerospace Services, to "further increase the quality and speed of repairs," the company says.

Airline MROs

Probably the largest two airline MROs are Lufthansa Technik and AFI KLM E&M,

reporting external sales for 2014 of 2.7 billion euros and 1.3 billion euros, respectively. LHT has 795 customers and 3,290 aircraft under exclusive contracts, according to the company. Among the highlights of the year was the signing of a memorandum of understanding with GE Aviation to establish a JV engine overhaul facility in Europe to service GENx-2B and GE9X engines, beginning in 2018.

Last year the MRO announced a boost of innovation investment from 50 million euros over the preceding five years to 200 million euros for the following four-year period. The unit announced steps such as a 60 million euro investment in a new wheel and brake shop in Frankfurt and a new chemistry lab in Hamburg.

Lufthansa Technik opened a facility in Puerto Rico for the repair and overhaul of narrow body Airbus aircraft. It is also expanding hangar capacity at its Philippines maintenance site. This will be the site's second line for A380 base maintenance and its entry into Boeing 777 base maintenance.

AFI KLM E&M serviced about 1,500 aircraft in 2014. About 2/3 of these airplanes are owned/leased by its 200 airline customers. As of Sept. 30, 2015, the MRO had an order book of \$8.4 billion for external business, up from \$7.5 billion as of year-end 2014. It has won major contracts from Air China (Cargo), LATAM, Saudia, and Jet 2.

The MRO has a growing engine portfolio, as well. It already has performed several quick turns on GENx engines for third-party airlines. And it will be performing full shop visits for both its own fleet and external customers. AFI KLM E&M supports all major GE products, including the GE90, GENx and GP7200.

The situation with the Rolls-Royce Trent XWB engines is developing. Air France KLM Trent XWB engines will be supported under a long-term service support agreement with Rolls-Royce, while the OEM will support AFI KLM E&M in implementing Trent XWB engine overhaul capability in Paris. Air France KLM and Rolls-Royce are evaluating further MRO cooperation, Pruim says.

AFI KLM E&M likewise is investing in America. Last year the unit took full control of Barfield, a U.S.-based component MRO, and acquired a 50 percent stake in Tradewinds, a U.S.-based engine parts trading company. It formed a branch of its "MRO lab" in Singapore, partnering with software provider, RAMCO. It also has added a new logistics center in Dubai and is opening a major aero structures/composites facility in Paris.

Engine OEMs

The OEMs remain dominant in their aftermarket. Rolls-Royce enjoys an estimated



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AFI KLM E&M is the only MRO to form part of an airline group that has ordered A380s, 787s and A350s. On the strength of this unique expertise, AFI KLM E&M has been shaping its industrial development program ever since the A350's maiden flight. As a result, your own A350 can now reap the benefits of AFI KLM E&M ADAPTIVENESS®. ADAPTIVENESS® is our response to the changing MRO business environment. It means partnering with you and providing vital support through change and daily challenges, in a spirit of continuous improvement. If you seek efficient MRO solutions for your A350 leading to optimized MTBRs and overall performance, talk to us about ADAPTIVENESS®.

80 to 90 percent share of the total MRO spend for its engines on average, Berger says. GE Aviation, including its share of CFM International, holds an estimated 50 to 60 percent of its aftermarket, and Pratt & Whitney an estimated 30 to 40 percent of its aftermarket, he says.

GE commercial services revenues in 2014 were \$8.9 billion, including GE's share of both CFM and Engine Alliance partnerships. There are approximately 32,000 GE and JV commercial engines in active service, powering some 15,100 commercial aircraft, including wide bodies, narrow bodies, and regional jets. GE's overhaul shops perform less than 40 percent of overhauls for the fleet. The OEM estimates a \$106 billion backlog for long-term engine services and materials agreements.

In what is may be a new high water mark, GE Aviation announced that Emirates signed a \$16 billion contract for OnPoint MRO of the GE9X engines to power its fleet of 150 777X aircraft over a 12-year period. Typically from 60 to 80 percent of aftermarket contracts for new-generation engines are negotiated between the OEM and operator/lessor at the time the engine is purchased, according to data from MTU Aero Engines, a major player in both new manufacturing and MRO.

GE Aviation nevertheless does not monopolize its aftermarket. The CFM56, of which there are 20,000 flying on 10,000 aircraft, is serviced by many MROs, Dwyer says. On GE CFM engines there is a relatively large pool of available shop visits to compete for, he says, so more third-party MROs bid on them. "That's been a hallmark of our services business." Because the "open network" allows for competition, non-GE MROs are interested in buying used parts, which they can purchase from airlines or other non-OEM sources, all of which helps the engines to maintain their residual value.

On newer engines the OEMs are more dominant. On the GE90-115B, for example, GE says there are only four MROs. Much depends upon customers' perception of risk and market dynamics, Dwyer says. With new engines customers are biased towards risk transfer, but as engines get older they may want to take advantage of used parts. Many customers change their engine maintenance product during the life cycle, he says.

Meanwhile, Rolls-Royce, the OEM with the largest share of its aftermarket, is reengineering its aftermarket operations to inject more competition. It selected Delta TechOps as the first independent Approved Maintenance Center (AMC). Delta TechOps will be able to overhaul Trent XWB and Trent 7000 engines for Delta and other airlines. Rolls-Royce also announced changes to three AMC JVs, introducing "a more competitive business model," according to information from the company.

Pratt & Whitney

Pratt & Whitney likewise has a large presence in the aftermarket. It has 19 facilities in eight countries -- with a work force of about 5,000 people, says Joe Sylvestro, vice president of aftermarket operations. Most of these facilities do work on commercial aviation engines. Major facilities are located in Taiwan, Shanghai, Singapore, Istanbul, and the U.S.

Pratt & Whitney also asserts the strong residual value for its engines. The V2500, for example, boasts some 200 customers and over 6,800 engines delivered. About 60 percent of the V2500 fleet is managed by Pratt & Whitney, but customers have a wide range of maintenance options, the company says.

As of March 2015, the company calculated an engine services backlog of \$57 billion, including commercial, military, and smaller engines.

Since 2000 P&W has been performing about 650 engine overhauls a year, adding up to more than 10,000 engines in the

past 15 years, mainly PW2000s, PW4000s, and V2500s, Sylvestro says. There are more than 10,000 Pratt & Whitney engines in operational use today in commercial aviation. And there is a backlog of 7,000 new Geared Turbofan engines. The company has about 450 airline customers.

P&W has invested heavily in Asia-Pacific over the last 30 years and recently announced an investment of nearly \$110 million in two new facilities in Singapore, says Kevin Kirkpatrick, the company's executive director of aftermarket operations for Singapore and Taiwan. One of these supports PW4000 engine component repairs. In fact, overhaul of the wide-body PW4000 engine is carried out only in Singapore, he says. The PW4000 overhaul facility is a JV with Singapore Airlines Engineering Co.

Unlike GE and Rolls-Royce, Pratt & Whitney works on engines other than its own. For example, the Shanghai Engine Center, a joint venture with China Eastern Airlines, completed its 500th CFM56 overhaul this year.

MTU

MTU Maintenance is the largest independent engine MRO provider in the world, according to Leo Koppers, senior vice president of MRO programs at MTU Aero Engines. "The worldwide commercial engine MRO market is at about 8,000 shop visits for 2015, 8 percent of which are performed by MTU Maintenance," he says. "This makes us No. 3 worldwide, and the largest independent provider."


MTU Maintenance is very active in the aftermarket of GE, CFM, and Pratt & Whitney engines. It is the No. 1 independent MRO provider on the CF6-50/-80C2, the GE90-110B/-115B, the CFM56-3/-5B/7, and the PW2000, according to Koppers. MTU Maintenance has more than 150 airline customers and about 50 lessor customers with a commercial maintenance order backlog of 4.4 billion euros as of Sept. 30, 2015.

In the commercial arena MTU's relationship with GE Aviation, according to the U.S. OEM, involves or will involve:

- **CF34** – Overhauls via a GE-Branded Services Agreement;
- **CFM56** – Independent third-party overhauls;
- **GE90** – Independent third-party overhauls;
- **GENx** – Risk sharing partner (new-make and overhaul provider for the turbine center frame);
- **GE9x** – Risk sharing partner (new-make and overhaul provider for the turbine center frame);

The company also has secured aftermarket participation on the PW1100G-JM Geared Turbofan engine. MTU is only one of three shops that will have capability to repair PW1100G-JM engines shortly after they enter into service, Koppers says.

The company's MRO revenues in 2014 reached 1.3 billion euros, a seven percent increase from the preceding year. For FY2015 MTU expects to achieve "high single-digit growth rate in revenues in the commercial maintenance segment, compared to 2014," Koppers says. Additional opportunities may result from the "investigation of the EU Commission [as to] whether airlines are forced into anti-competitive contracts," he says. Although this investigation involved specific engines and components, it "may result in more OEMs' opening up the market," he says.

MTU Maintenance also has expanded cooperation with AAR for the supply of used PW2000 engine material, which will "significantly streamline the logistical processes and improve the turnaround time for PW2000 shop visits," Koppers says. In the last few years MTU also has expanded or upgraded maintenance facilities in Zhuhai (China), Dallas, Vancouver, and Hannover. 

Pratt & Whitney – Preparing for GTF Engine Aftermarket Success

Soon operators will begin flying aircraft powered by the Pratt & Whitney PurePower® Geared Turbofan™ (GTF) engine. This engine offers operators game changing performance benefits, including 16 percent reduction in fuel consumption, 75 percent reduction in noise footprint, 50 percent reduction in regulated emissions and 46 percent reduction in number of airfoils.

And the Pratt & Whitney Aftermarket team is not sitting idly by, but is ramping up a robust customer support network before the GTF engine begins flying. In advance of this tremendous milestone, Pratt & Whitney is engaging in a variety of activities to ensure that operators have access to the following:

- Comprehensive global network of overhaul shops
- GTF engine customer training facilities
- Predictive analytics
- Dedicated field representatives
- Global lease engine pool
- Enhanced customer service center

Comprehensive global network of overhaul shops

Pratt & Whitney is establishing a world-class, global MRO network to provide customers with maximum quality, choice and value. Based on experience and the large number of GTF engines soon to enter service, by 2020 when the first wave of GTF engines come in for their first overhauls, more than 10 engine overhaul shops in the Pratt & Whitney network are expected to be available to provide quality services to GTF engine customers around the world.

Initial PW1100G-JM engine shop visits will be performed by Pratt & Whitney and its program partners, MTU and JAEC. Current maintenance locations include Pratt & Whitney's facility in Christchurch, New Zealand; MTU's maintenance center in Hanover, Germany; and JAEC's IHI Corporation overhaul center in Mizuho, Japan.

As the volume of shop visits grows, the overhaul capability will expand outside of the Pratt & Whitney partner network to include airline shops and independent maintenance, repair and overhaul shops, as appropriate.

GTF engine customer training facilities

To date, more than 1,600 days of PW1000G engine family training have been delivered to more than 600 students. Over the next five years, the annual training volume on all Pratt & Whitney models is expected to double to more than 25,000 student days per year.

To that end, Pratt & Whitney recently opened a third training facility in Hyderabad, India, in addition to East Hartford and Beijing customer training facilities. This new facility will satisfy training demand in that region, close to where the GTF engine customers in that region operate.

The Customer Training Center in India will provide key training for GTF engine and V2500 engine customers, beginning with a capacity of training the equivalent of 2,000 students attending a one-week class per year, with growth capability of up to 4,000 students per year.

Predictive analytics

Pratt & Whitney is investing in data analytics to accurately and proactively monitor the health of customers' engines. Specifically, data analytics helps determine the health of the engine on-wing and predict future maintenance visits.



Through predictive analytics, Pratt & Whitney can customize work scopes and provide early warning detection and improved visibility into the overall health of an operator's engine fleet.

Dedicated field representatives

In addition to Pratt & Whitney's existing team of more than 100 field representatives around the world, a team of a dozen highly experienced field personnel has been assembled, focused on GTF engine entry into service readiness.

These field representatives will work on-site, side-by-side with customers and local teams for three to six months, bringing specific knowledge and experience to enhance support and accelerate learning as new aircraft are received.

Today, this team is supporting the ongoing aircraft flight test programs and validating tools, technical manuals and procedures.

Global lease engine pools

Lease engines need to be near where operators are located to ensure speedy delivery when required. To satisfy this need, Pratt & Whitney is establishing an operational infrastructure of four regional storage locations to keep lease GTF engines close to customers around the globe.

Enhanced customer service center

Pratt & Whitney's Global Operation Center (GOC) has been a cornerstone of Pratt & Whitney's Aftermarket business for 20 years. The GOC provides 15,000 technical solutions and handles 50,000 customer interactions per year, completing nearly all of them within 24 hours. Enhancements are being made to the GOC to provide customers with the fastest response possible.

This 24/7/365 operation is delivering world-class responsiveness and aircraft on the ground (AOG) resolution, full data capture and enhanced communications to support GTF engine customers.

Ninety years of support

Pratt & Whitney has developed some of the most innovative engines in the world and ensuring that customers have the support they require to operate those engines is no small feat.

While the engines have evolved significantly over that time, Pratt & Whitney's dedication to providing its customers with maximum quality, choice and value has been unwavering.

Avoiding FAA Fines

By Dale Smith



"Regulations are laws. They can be 'interpreted' by the agency, but it is not the final arbiter of compliance – federal courts play that role," says Sarah MacLeod, executive director of ARSA. Image by Joy Finnegan

“Be polite; write diplomatically; even in a declaration of war [or dealing with the FAA] one observes the rules of politeness.” – Otto von Bismarck, conservative Prussian statesman

When it comes to minimizing, or better yet avoiding penalties or fines from the FAA, sometimes the best way to communicate your point is to say nothing at all.

Riddle me this: What does a baseball home plate umpire have in common with your local FAA inspector?

They both have a strict set of approved written rules, yet each have the authority to call balls and strikes as they see them – even if their interpretation of the “strike zone” differs from the published rule. As an MLB batter you can either live with the calls or complain and get tossed from the game. As an aircraft technician, you try to comply with the rules the best you possibly can, but that compliance is unfortunately subject to interpretation. And quite often, while complaints about inconsistencies won’t get you tossed, they can earn you a healthy fine.

Of course as a professional aircraft technician, your number one goal is to ensure safety even if that means going outside the regulation. But we’ll save that subject for another story.

Right now we want to concentrate on how you can ensure safety while avoiding any misunderstandings that can lead to FAA penalties and/or fines. To get first hand information on this difficult subject, we contacted Sarah MacLeod, executive director of the Aeronautical Repair Station Association (ARSA).

Unfortunately, Ms. MacLeod and her team deal with situations like this on a daily basis.

Her first tip is to know and understand the procedures and rules of compliance better than your FAA inspector.

“If you actually know the rules and apply the guidance with a focus on aviation safety, the path to compliance is seldom rocky,” she stated. “However, if a certificate holder does not know the difference between complying with a regulation and ‘best practices’ or a ‘good idea’ or ‘local inspector preference’ – bad decisions are made.”

“One bad decision is becoming non-compliant, or even worse in my mind, not knowing when you are in compliance,” Ms. MacLeod said. “Both ills can be cured by knowledge and that comes with reading and understanding the regulations and guidance materials.”

While some understanding of regulations can be gained through discussions with business peers or your FAA representative, Ms. MacLeod cautioned that this kind of education must be taken with a grain of salt.

“Don’t be fooled into thinking this is knowledge. You may



“You have to know the rules, you have to know your rights and you have to be able to exercise your most basic liberty – keep your mouth shut.”

– Sarah MacLeod, Executive Director of the Aeronautical Repair Station Association (ARSA)

only be gaining another person’s perspective or opinion,” she said. “Regulations are laws. They can be ‘interpreted’ by the agency, but it is not the final arbiter of compliance – federal courts play that role.”

“Today, you have to be every bit as smart about the rules as your FAA inspector,” stated Richard Simmons, accountable manager for TPS Aerospace. “There is a lot of interpretation in the field. If there’s a problem you have to be able to point to the written rule and show how your processes meet it.”

Ms. MacLeod said that the best first line of compliance is to write a detailed procedural manual and then train everyone in your company to follow those “rules.”

“Failure to follow written procedures – starting with the regulations, is the number one finding we have in every audit,” she explained. “We find that shops often write procedures and then continually rewrite those procedures without taking the time to train the technicians to follow those new directions.”

“The fault for creation of mismanaged policies, processes and procedures can be laid at both the industry’s and government’s doorsteps,” Ms. MacLeod said. “However the government is the one that can fine companies and individuals.”

“Paper (process documentation) and training and the most important products a company can produce. You have to create a procedural manual for your entire operation and then train to it,” Simmons said. “That is probably the number one trap a shop will fall into. They can’t or don’t want to invest the time and money to develop the procedures and provide adequate training for their people.”

Best Laid Plans...

Of course, always remember that you are dealing with the FAA – think umpire – so even following the rules to the letter doesn’t guarantee compliance. You must have documentation and more importantly know why the documentation says what it does.

“One very important point is that it doesn’t matter if the agency ‘approved’ something – it can change its mind and that ‘approval’ does not mean compliance,” Ms. MacLeod said. “I cannot tell you how many certificate holders say, ‘But the FAA approved it.’ Unfortunately, my response is always: ‘So what. The agency doesn’t have to be right, you do.’”

Ms. MacLeod explained that it is the certificate holder’s responsibility to comply and the agency’s responsibility to oversee that compliance.

“If the agency’s representative cannot cite a regulation, or appropriate guidance material that is not contrary to the

regulation, there is no ‘requirement,’” she said. “Likewise, if a certificate holder does not know why it put something in a manual or ‘thought’ it complied with a section of the regulation but cannot explain how or why it complies, then a non-compliance would be real.”

Here again is an area where continual training is extremely valuable to ensuring correct “compliance.”

“Educate, educate, educate and encourage open and honest discussions of the regulations – the actual language of the regulations within your company,” Ms. MacLeod said. “Individual technicians have tremendous responsibility and power, but without the proper knowledge and understanding of the regulations and the technical requirements driven by those standards, the power is wasted.”

Because your technicians on the shop floor are often the first people your FAA inspector will talk to during a visit, make sure the technicians are prepared and understand that it’s perfectly fine and acceptable to answer any question with three simple words: “I don’t know.”

“You can have great processes and documentation, but if your technicians don’t know why its written the way it is, it’s of little use during an audit,” Simmons said. “Instruct your technicians that if an FAA inspector ever asks them a question, make damn sure they know the right answer. If they’re not totally sure, then just say they don’t know and to go get their lead. You won’t get fined for that. It’s when you try and make up an answer that you get in trouble.”

“You have to know the rules, you have to know your rights and you have to be able to exercise your most basic liberty,” Ms. MacLeod said. “Keep your mouth shut.”

Her guidance in these situations is to ask the FAA representative to provide their concerns in writing so all the information required can be provided in a professional manner rather than off-the-cuff and under pressure.

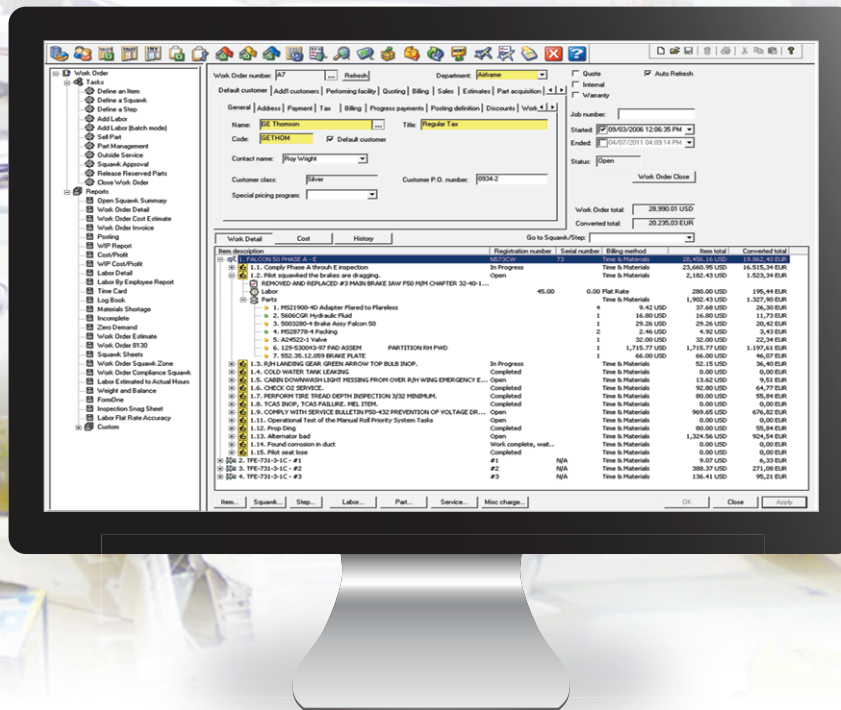
I’m Okay. You’re Okay...Maybe

The fact is, sooner or later your facility is going to face an FAA audit of one form or another so it’s best practice to be prepared.

“Constantly perform personal and professional skills audits of regulations, policies and procedures,” Ms. MacLeod said. “Failure of companies to train their technical staff has created unintentional questions and consternations. Some have even led to fines and certificate revocations. Almost all started with someone answering the agency’s questions incorrectly.”

“A lot of it depends on your relationship with your inspector,”

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Simmons said. "The inspector I have now is very easy to communicate with. I can call him and discuss any issues up front before it becomes a problem. That hasn't been the case with others we've had here."

"Of course good processes and documentation enable you to say 'no' to the FAA," he said. "But you have to be 100 percent correct in your position. You have to have everything exactly right to show compliance for this situation. Bare-in-mind though, if you do argue with the FAA you can still get popped on something else. They can always find something."

No matter how big you are or how right you are, nobody wants to go toe-to-toe with the FAA. But, like many situations in life and

business, if you get called to the carpet, you immediately assume you are guilty.

"My positive experiences are that if a matter can be nipped in the bud early, before tempers and misinformation fly, it can be resolved without any penalty or legal action," Ms. MacLeod explained. "But once the matter has 'gone south,' it is very difficult to recover."

She said that the most egregious examples she and her ARSA staff sees are of small businesses that submit to demand after demand after demand and still cannot satisfy their local inspector.

"By the time the company contacts the association (ARSA), they have no money and the hole they dug for themselves

by capitulation becomes so deep it's impossible to refill," she said. "The bottom line is capitulating to a government demand is taken as guilt of no-compliance even when the agency doesn't cite any regulations."

When faced with this situation, Ms. MacLeod suggests certificate holders politely, but firmly, ask for the information to be sent in written form and responded to in written form. The less you say the better.

But no matter what pressure your FAA representative puts on you, even if you have agreed to do an action, do not admit you did anything wrong – even in casual conversation – just explain how you fixed "it" and steps you've taken to keep whatever "it" was from happening again.

She provided this example of a polite communiqué that admits no wrongdoing on your part:

"I'm sorry we did not communicate clearly today. The questions you asked were not answered fully during the time we had. We have attached the complete work order associated with the single-page document you copied while you were here. We have highlighted the information that shows compliance with section 43.13. In the future, we will be sure to write your concerns down as you express them so proper information can be provided in an a timely manner."

You Are Not Alone...

Solo navigation of a course in and around anything pertaining to FAA compliance is not for the faint of heart. ARSA member companies have the added benefit of accessing a host of online training courses as well as being able to talk to the organization's regulatory compliance experts who are there to provide information on regulations and guidance materials to address a variety of hypothetical situations.

ARSA members and non-member companies also have the option to contact Ms. MacLeod's law firm, Obadal, Filler, MacLeod & Klien, to obtain professional, confidential and privileged compliance and legislative services, as well as customized training programs.

"Obviously, if you get in trouble and have a few dollars, the law firm can help during actual audits, in answering (FAA) letters of investigation or in determining compliance under specific facts and circumstances," she said. "My best advice is again, know the rules and put the right processes, documentation and training in place well before you ever get a visit from the FAA." **AM**



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Reorganization Hits Thai Airways Maintenance



By Douglas Nelms

For Thai Airways, 2015 has been a year of recovery—a reorganization designed to get the airline out of the red and back into the black after years of mismanagement and political turmoil have steadily eroded its bottom line.

While the airline's reorganization program hasn't impacted its maintenance center as much as it has the airline itself, there have been changes. An immediate impact is the loss of roughly 200 maintenance workers out of a total of 4,001 employees being cut from the airline's employment base through a voluntary early retirement program, or Mutual Separation Plan. The 200 employees leaving the technical service represented roughly five percent of the total maintenance staff of 4,191.

These employees most likely will not be coming back, allowing the airline to "stay lean," according to Charnporn Jotikasthira, the airline's president. The airline is expected to be back in the black during 2016, and "the crisis should be over by 2017," said Catipod Keasmonkong, the Technical Department manager.

The airline is also downsizing its fleet by more than 24 aircraft by 2016. The airline currently has 94 aircraft in its fleet, down from 102 at the end of 2014, and anticipates being down to fewer than 90 going into 2016.

It is continuing to reduce that by eliminating several older aircraft while adding a few new aircraft. It currently has 14 aircraft on order, consisting of two 787-9 and 12 A350-900s. The A350 will begin entering the fleet in June 2016, while the 787s are scheduled for delivery in 2017.

Keasmonkong noted that along with reducing the cost of operating and maintaining the older aircraft, it will allow its maintenance services to obtain increased revenue from third-party work.

Another problem facing the Technical Department is a series of bans placed on Thai airlines based on safety concerns raised by ICAO. These were primarily placed on charter flights and tended to be related to air operator certification processes. Keasmonkong said that Thai Airways has resolved this through increased inspections to ensure compliance with the standards of certifying aviation authorities.

While the May 2014 coup in Thailand put the country under a military junta and caused initial economic and political disruption, the same government has now reported brought

stability back to the business environment in Thailand. This is increasing growth in an already well-established MRO hub in Southeast Asia, with Thai Airways being one of the leading providers of aviation maintenance.

Thai Airways itself was formed in 1960 by a joint venture between Thai Airways Company, a domestic air carrier, and SAS. Technical support came from SAS. In March 1977, SAS terminated its investment in Thai Airways, and in 1985 Thai Airways Technical Department (TATD) was formed to provide maintenance support for the airline.

At that time the airline was flying the A300-B4, 737, McDonnell Douglas DC-10 and 747-200. Today it has a fleet of Boeing 747-400s, 777-200s and 300s, 737-400s and 787-8s, plus the Airbus A330-300, 320-200, A340-600 and A380-800.

Keasmonkong said that the technical department is considered a profit center by the airlines, which pays for its services. However, it is all done through "internal financing." The airline's annual report doesn't list its maintenance department's revenue. But it does list costs. Maintenance and Overhaul costs for 2014 were THB 14.68 billion (\$411.8 million) a 9.2 percent increase over 2013 costs of THB 13.45 billion (\$377.12 million). The 2014 costs represented 6.7 percent of the total airline's costs, compared to 6.1 percent in 2013. The 9.2 percent increase in costs was due to the estimation of return condition and overhaul expenses for expired operating lease of three 737-400s and upcoming expired leases on two 777-200 and two A330-300s.

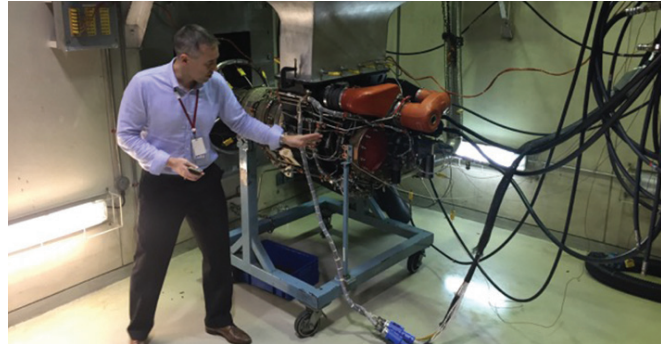
Keasmonkong said that the older aircraft being decommissioned will done on an "as is" basis, reducing the amount needed to be spent getting them ready to return to the lessors.

The airline has maintenance centers at three airports—Suvarnabhumi International and Don Mueang International near Bangkok, and U-Tapao International at Rayong. All three provide light maintenance. Heavy C- and D-check maintenance is done at Don Mueang International and at U-Tapao.

Suvarnabhumi is the headquarters for Thai Airways maintenance. While it has three bays capable of handling the super jumbo A380 size aircraft, it currently provides light maintenance and component repair, although it does A- and



Thai Airways has had a challenging two years but is determined to beat the odds with a strong plan for the future. The technical department is considered a profit center by the airlines and third-party maintenance is a major part of the airline's overall recovery program, including a plan to double APU overhauls in two years.



C- checks for the A380. Thai Airways currently flies six A380-800s. The maintenance facility encompasses 193,425 sq. m., with 24,300 sq. m. of hangar space, reported by the airline as "the largest hangar in Southeast Asia." It has a maintenance apron of 26,100 sq. m.

Don Muang provides maintenance up to C- and D-checks, with five hangars having six bays able to hold up to 747 size aircraft plus one bay for 737 size aircraft. It is actually the smallest of the three, with 170,000 sq. m.

The U-Tapao facility is the largest of the three, with 240,000 sq. m., although it has the fewest employees, with 491 compared to 2,040 at Suvarnabhumi and 1,791 at Don Muang. The facility consists of two bays with full support systems for 747, 777 and

A330 aircraft. Its 240,000 sq. m. area includes the two bays totaling 24,000 sq. m plus 43,000 sq. m. for aircraft parking.

As noted, third-party maintenance is a major part of the airline's overall recovery program. Keasmonkong said that they are targeting the Low Cost Carriers (LLCs) as potential customers. An LLC they already have as a customer is Nok Air, a Thai airline owned 39% by Thai Airways. He noted that they have done 16 "C" checks for Nok Air 737-800s during 2015, and are scheduled to do 15 during 2016.

Other airline customers include heavy maintenance for Japan Airlines, All Nippon Airways, Air France, Siberia Airlines, MIAT Mongolian Airlines, Southern Air, and Thai Smile (a regional carrier 100 percent owned by Thai Airways), as well as doing the heavy D-checks on A300-600s for Lufthansa Technik. It does line and light maintenance for some 80 airlines at the Bangkok airports and for 44 customers at its route stations. In 2014 it provided 81,608 line maintenance operations for client customers while doing only 55,356 for its own airline.

The Royal Thai Air Force, headquartered at Don Muang International Airport, also uses TATD for its maintenance needs, primarily on its transport aircraft such as the 737 and A320.

It also does aircraft washing for six customer airlines at its Suvarnabhumi Airport facility, using a new NORDIC DINO machine designed for washing aircraft as large as the A380. The machine has a three-arm system with a stretch exceeding 11 meters to get up and over the larger aircraft.

Another source of income is APU overhauls, accounting for about 30 percent of the company's work. They currently do "about 128 APUs a year," and want to double that within the next two years, Keasmonkong said.

The Technical Division does outsource some of its maintenance requirements. Landing gear is sent to Singapore for repairs, and it sends the modules for its Rolls-Royce Trent 700 and 800 engines back to Rolls. However, it does do module changes and testing for the Rolls-Royce engines. It can do module disassembly and assembly for its CF6-80C2 engines, and has a test cell rated at 150,000 SHP for all three engines.

There have been reports of a possible joint collaboration agreement between Thai Airways Technical Department, Air France Industries and KLM Engineering & Maintenance, although the airline said it is currently in a "non-disclosure" period regarding that collaboration. The report also stated that the agreement would establish a joint aircraft maintenance facility, with U-Tapao Airport being considered as the facility site. Thai Airways has already signed a long-term maintenance deal with the two other maintenance organizations that covers Thai Airways' 787 components, engine nacelles and APUs. **AM**

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MTU Maintenance – Global player in commercial engine MRO

MTU Maintenance, a division of MTU Aero Engines, is one of the top five providers of maintenance services for aircraft engines. Its engine portfolio is the largest worldwide and includes the bestsellers V2500 and CFM56, and the world's largest engine, the GE90-110/-115B. New engine programs are continuously added to offer customers the most popular variants and to secure the company's position in the aftermarket for next generation engines. About 4,000 employees at various locations around the globe and over 15,000 shop visits in 35 years ensure excellent customer service, the highest quality standards and innovative MRO solutions.

Apart from its outstanding engineering know-how, customer proximity is one of MTU's greatest strengths. A network of locations around the globe as well as representative offices, joint ventures and on-site teams ensure that its customers' expectations are fulfilled at shorter notice and with lower maintenance costs and shorter turnaround time.

A true alternative

MTU Maintenance is continuously looking to help customers find cost-effective alternatives to the replacement with new parts. One of those are its high-tech repairs for which the company has earned a world-class reputation. Owing to decades of experience, and innovative processes, MTU succeeds in repairing also heavily worn parts, components and accessories to give them a second or third lease on life. MTU's repair approaches are globally unique, mostly patented and known under the trademark MTUPlus repairs.

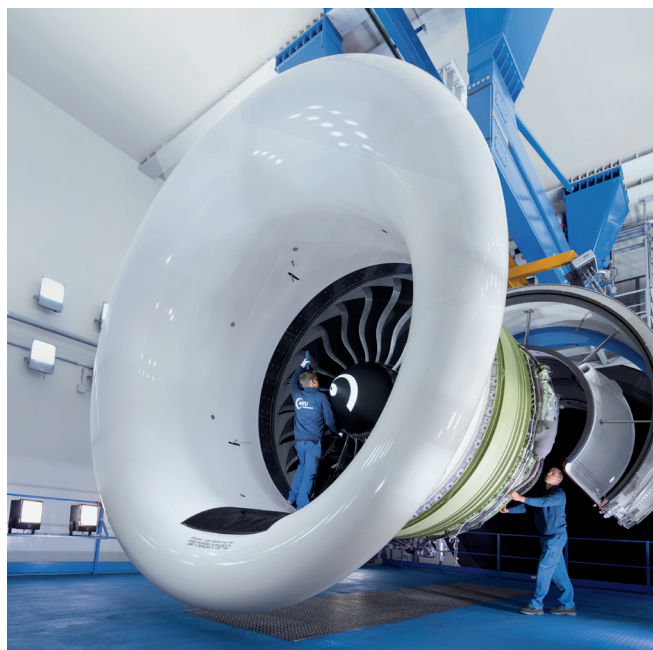
Apart from traditional engine MRO services, a compelling choice of specifically tailored packages consequently follow the customers' individual needs, allowing them to have their engines managed in the best possible way throughout the entire life cycle. At the same time, MRO costs are reduced significantly. MTU's services offer includes on-site and on-wing services, spare engine support, MTUPlus engine trend monitoring as well as accessory and LRU management. They can be combined under MTU's all-encompassing modular service package 'Total Engine Care' (TEC®), guaranteeing customers carefree operations of their engines.

Integrated engine leasing and end-of-life solutions

To respond even better to the growing needs for lease engines, MTU has entered into two joint ventures with the Japan-based Sumitomo Cooperation. MTU Maintenance Lease Services B.V. and Sumisho Aero Engine Lease B.V. offer integrated lease solutions, from short- to long-term leasing agreements, engine pooling, stand-by arrangements and sale and lease-back solutions. In addition, MTU offers individually tailored solutions for asset owners to capitalize on the value of their engines toward the end of their economic life, be it by leasing out or selling the engine or by providing value-added solutions when flying is no longer viable.

Aligning MTU's OEM and MRO businesses

With a new generation of engines entering into service, the business model for engine MRO is undergoing significant changes. As a risk and revenue sharing partner, MTU is now increasingly negotiating



aftermarket participations with the OEM already at the time of entering into engine programs. This trend has led the company to merge its OEM and MRO activities. Thanks to its broad and innovative portfolio of repairs and services, MTU is confident that it will continue to dominate the independent market segment. At the same time, the company is offering its services as an OEM network partner, allowing it to participate in the market of next generation engines, such as the PW1100G, the GENx and the GE9X as well.

MRO portfolio at a glance

- Turboprops: PT6A, PW100/1501
- Helicopters: PT6B/C/T1, PW200
- Business jets: CF34-1/-3, JT15D1, PW300, PW500, PW6001
- Regional jets: CF34-3/-8/-10E
- Narrowbodies: CFM56-2/-3/-5B/-7, PW1100G5, PW2000, PW6000, V2500
- Widebodies: CF6-50/-80C2, GENx3, GE90-110/-115B, GE9X5, GP72004

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- 2) Turbine Center Frame (TCF)
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GlobalParts.aero Plays a Significant Part in Aviation



Just as an aircraft is made up of many working components, the business aviation industry is made up of many components as well. An example is Wichita-based GlobalParts.aero. What began in Augusta, Kansas, in 2003 as a two-person operation working out of residential basement has expanded into an aviation powerhouse boasting more than 100,000 square feet of warehouse and operational space housing more than 90,000 parts.

Today, GlobalParts.aero has expanded and included four primary divisions. The original GlobalParts.aero continues to serve the worldwide aviation spares market with cost effective, quality parts by offering anytime delivery and service from a substantial inventory of over 90,000 items.

Global Parts Aero Manufacturing delivers fast, cost-effective turnarounds on both one-off and large quantity machining projects. Global Parts Aero Services provides quick, efficient exchange or direct repair of aircraft components including mechanical, hydraulic, pneumatic, structural and electrical components plus brakes and oxygen bottles.

Global Parts Aero Structures offers maintenance, repair and overhaul of aviation-grade structures. In addition to repair, capabilities encompass everything from manufacturing and engineering to paint coat matching and quality control. Together, these capabilities make the company one of the most comprehensive and multi-faceted providers of aviation products and services found in the industry today.

“Our focus is always on ways to maximize results for our customers while providing the most all-inclusive parts experience in the world, backed by unparalleled service and support,” said Senior Vice President and Chief Operating Officer Malissa Nesmith. Over the past year, the organization has identified another opportunity for growth. It has expanded its capabilities even further by now offering maintenance, repair and overhaul (MRO) services for components and structures.

“From power supplies, static inverters, converters and brakes to generator control units and hydrostatic testing on most oxygen and

hand-held fire extinguisher bottles, our seasoned MRO team offers superior quality and speed. Clients won’t find our vast capabilities anywhere else. Whatever their MRO need, we have it covered,” said Nesmith.

The GlobalParts Aero Structures service portfolio now includes FAA-approved repair capabilities for virtually any inlet issue. The company’s extensive range of sheet metal capabilities enables it to repair/manufacture and replace some of the most common items including D-rings, frames, bulkheads, barrel skins and outer skins.

“Our internal workflow is reliable and efficient to ensure quick processing and customer satisfaction with every job. From the moment we receive a component it’s inspected and verified. From there, the part is disassembled and a detailed part inspection is performed. Finally, the part is built or repaired, thoroughly tested down to the micron and returned to the customer in top shape. Our partnership with our on-site distribution center allows not only quick turnaround, but the ability to leverage affordable costs,” Nesmith added.

GlobalParts Aero Services also now tests or refills oxygen bottles, and is the exclusive factory-authorized overhaul and certification facility for Ontic Engineering’s Kidde Oxygen bottles and components throughout North and South America.

Demonstrating its commitment to quality, GlobalParts.aero is a certified distributor of aviation spares and has earned ISO, AS9120A and ASA-100 accreditation for quality management systems. GlobalParts.aero is a Federal Aviation Administration-certified repair station. The overhaul & repair service, Global Parts Aero Services, Inc is FAA Part 145 certified and the manufacturing service, Global Parts Aero Manufacturing, Inc. is ISO AS9100C accredited.

“We’ve evolved from distribution to offering comprehensive manufacturing and MRO services. We’re committed to not only carrying the most complete inventory of aviation spares in the world, but to being the single source for our client’s complete aviation component needs,” said Nesmith.



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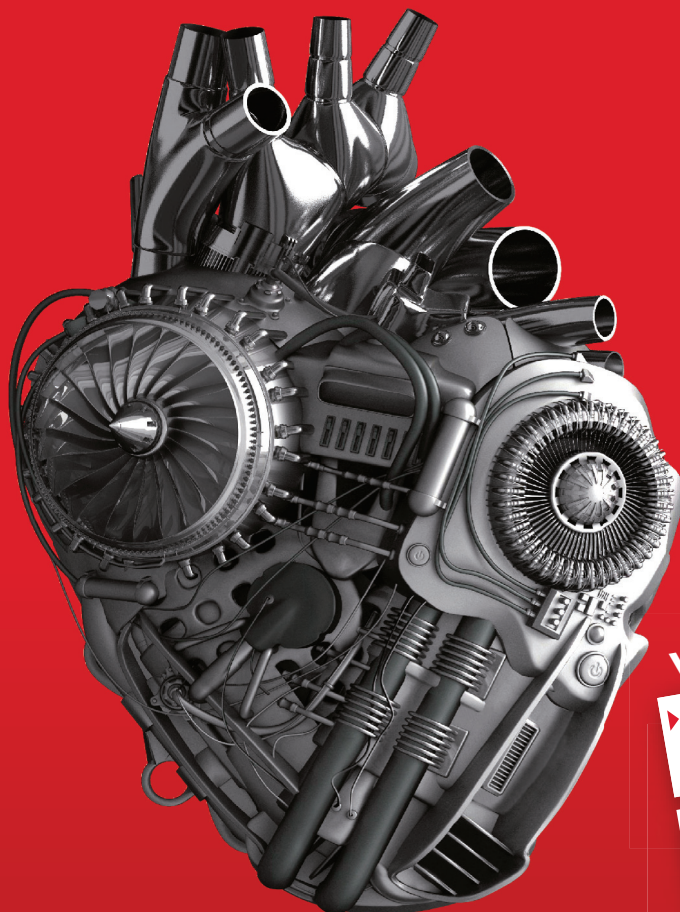
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