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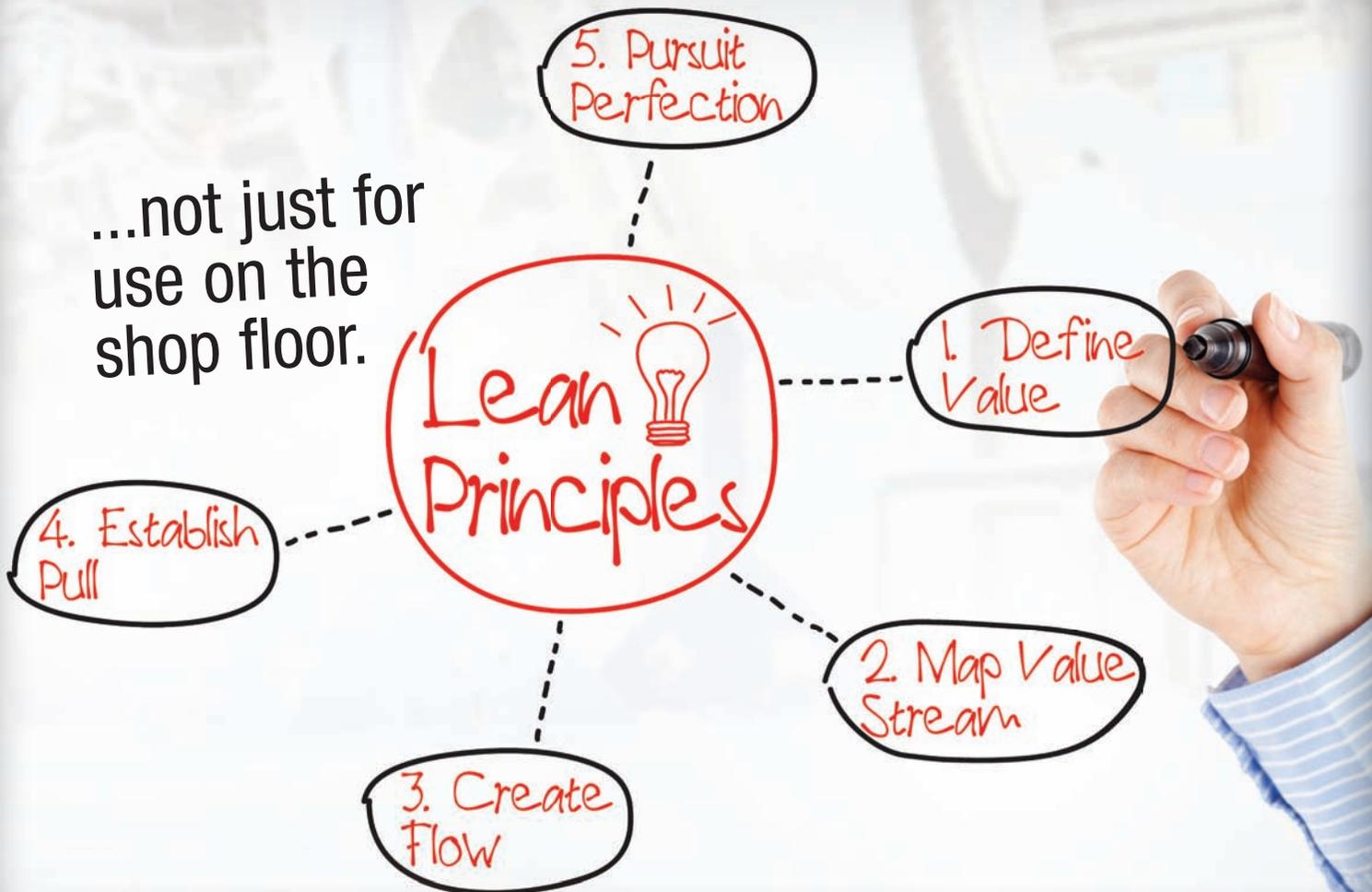
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 717-505 9701 x100

US Publisher

Daniel Brindley
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US Publishing Office Address:
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Aerospace & Security Media is a trading arm of ASI Publications Ltd

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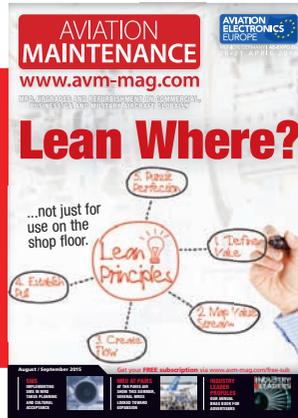
UK Company registration no 5999781
 UK VAT no GB919525796

COVER STORY

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Lean Where?

We take a look at using lean not only on the hangar floor, but in office areas like accounting, supply chain and other areas not necessarily associated with lean processes.



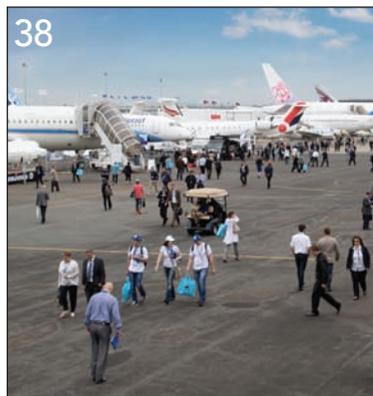
On the cover: Lean processes are being applied to more areas than ever.
 Cover image designed by Cavich Creative.

32 Safety Management Systems

Few industries are as unforgiving of errors as aviation maintenance. Safety management systems (SMS) are being implemented in MROs at an increasing rate to combat the occurrence of errors.

38 After Paris

The Paris Airshow broke records again this summer. Our man on the ground, Douglas Nelms, met with maintenance providers and others at Le Bourget to see what they were excited about this year.



CATEGORIES

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- AFTERMARKET

Aviation Maintenance (ISSN 1090-221X) is published bi-monthly by Aerospace & Security Media Ltd, 5590 N Diversey Blvd APT 209 Milwaukee, WI 53217. Application for mail at Periodicals postage paid at Milwaukee, WI and additional mailing offices. POSTMASTER send address changes to Aviation Maintenance 5590 N Diversey Blvd APT 209 Milwaukee, WI 53217. The editor welcomes articles, engineering and technical reports, new product information and other industry news. All editorial inquiries should be directed to Aviation Maintenance; Email: news@avmain-mag.com. Subscriptions: Free to qualified individuals involved in the aircraft maintenance industry. All other prepaid subscriptions, see www.avmain-mag.com. Content may not be produced in any form without written permission.

Lean Where?

BY JOY FINNEGAN
EDITOR-IN-CHIEF



Lean, agile, kaizen, theory of constraints, six sigma, equipment effectiveness, interval control. All of these theories and process improvement tools have been in use for many years. The lean movement has been a longstanding effort in manufacturing and production in many industries, including aviation and MRO.

Improvements to productivity, reducing bottlenecks and increasing profitability are the hoped for results of implementing any of these programs in a manufacturing environment. I'm sure you have all seen many a story about companies that have had those successes.

I can hear you now, "Tell me something I don't know!" You are right. But, lean can also be implemented in areas not traditionally associated with using it. And in this issue, on page 22, we take a look at implementing lean in the office.

We spoke to lean expert, Bill Peterson, a lecturer at the business school of the University of Tennessee and a consultant specializing in the application of Lean to MRO business processes about how MROs can implement lean in the office environment and make it work to improve work flow and ultimately, profitability.

Paperwork is a necessary evil in our business. Documentation, regulations, billing, registrations, procurement, training, inspections, the FAA and more all require copious amounts of paperwork. Just take one of those areas, billing, and think how leaning the steps needed to get a bill out to a client could help.

In many environments a common complaint about implementing lean to improve processes is that the work they are doing is highly variable and therefore what is coming next is never known. At least in a production line the next steps can be outlined with certainty – first step, second step, etc. On the hangar floor these things can be defined clearly as well – by looking at task cards. But in the office, these steps can be much less tangible. There are, no doubt, some steps in place but perhaps there are too many. Perhaps the steps were not well thought out or designed years ago prior to the implementation of technology in the office. Continual examination of all procedures, even in the office, can make

a significant impact on a company's bottom line.

However, it isn't always as easy as it may seem to implement new processes. "The application of any tool must be done in the context of the overall business process re-design in order to realize the full benefits," according to Lean.org, with regards to the pitfalls that can be encountered.

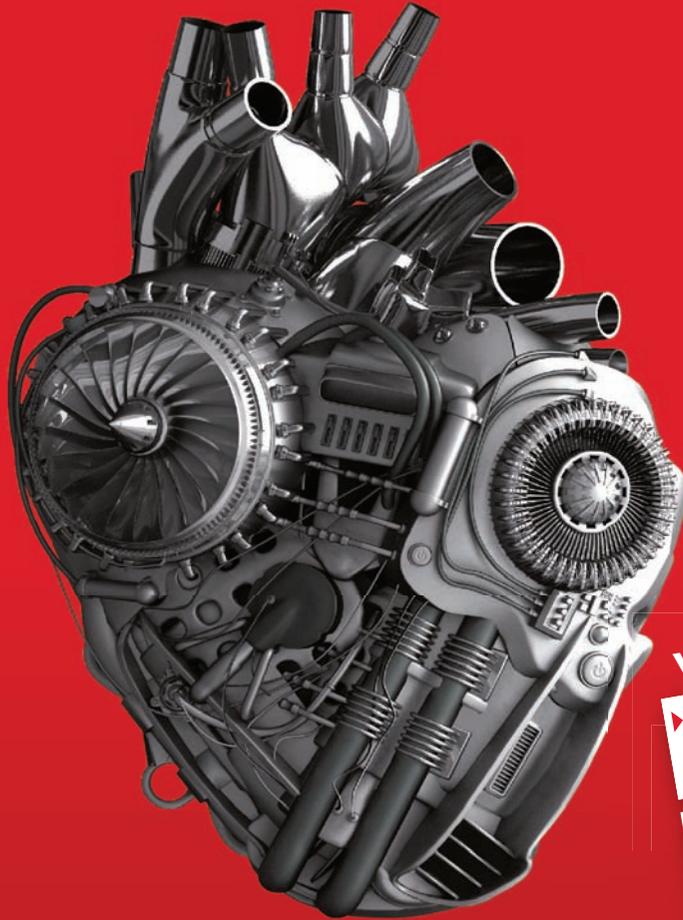
Policy constraints are also worth mentioning. "It may come as a surprise that the most common form of constraint (by far) is the policy constraint," according to leanproduction.com. "Since policy constraints often stem from long-established and widely accepted policies, they can be particularly difficult to identify and even harder to overcome." The website suggests that it can be much easier for an external party to identify policy constraints, since they would be less likely to take existing policies for granted.

For those looking for more information and additional reading about using lean in the office environment, a great resource is, "Lean Office and Service Simplified: The Definitive How-To Guide" by Drew Locher.

According to Locher, "Few organizations sufficiently invest in the development of their people. There are companies that have successfully applied lean for many years, five or even 10 years, but still "lost their way." Often this is attributed to the failure to continually develop leaders who deeply understand lean, who can sustain and even improve the system, and who can teach it to others. Only in this way can the culture of continuous improvement be sustained. As common sense as lean is, it is still not common practice."

If simply reading up on lean in the business office environment is not enough for you, and you are eager to learn more, check out the University of Tennessee's Haslam College of Business Lean Enterprise programs. As mentioned earlier, we spoke to Bill Peterson, a lecturer at the business school there and a consultant specializing in the application of Lean to MRO business processes, for the article. The university offers courses in graduate and executive education in Lean TOC Enterprise, Lean Maintenance, Repair and Overhaul and Lean Applied to Business Processes.  You can learn more about University of Tennessee's programs here: <http://operationsexcellence.utk.edu/programs/lean-enterprise.asp>.

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Marshall Affirms Commitment to Youth Employment

Marshall Aerospace and Defence Group has joined The 5% Club, an industry-led initiative in the UK, focused on driving momentum into the recruitment of apprentices, graduates and sponsored students.

"We're delighted to welcome Marshall Aerospace and Defence Group to the initiative," Dr. Sam Healy, program director of The 5% Club, says. The company is renowned for its commitment to training and apprenticeship programs, and having Marshall sign up to The 5% Club sends an extremely positive message out to industry. They set a shining example." The 5% Club campaign aims to tackle skills shortages and youth unemployment in the UK by asking public and private companies to commit to 5% of their work force being apprentices, graduates and sponsored students, within the next five years.

Marshall has maintained an unbroken apprentice training program for more than 95 years and has trained more than 10,000 apprentices. Many of the company's senior managers and the majority of directors began their careers as apprentices or graduates.

In addition, earlier this year the company unveiled the Marshall LaunchPad Scholarship scheme. Developed by a group of young engineers from the business, none of whom are older than 22 years old, the scheme aims to provide support, experiences and opportunities in engineering, maintenance and related topics for those aged 8 to 18.

"Young people are the lifeblood of our industry, we have and are continuing to encourage and provide a path for school children, students and graduates to pursue a career in engineering and industry," Steve Fitz-Gerald, CEO of Marshall comments. "I started my career as an apprentice and I am passionate about attracting, retaining and developing the future generations to this wonderful industry that has so much to offer."



In 2008 Marshall established AeroAcademy which offers a variety of training opportunities for students, including advanced apprenticeships, industrial placements for engineering undergraduates, foundation certificates and a degree in Aerospace Engineering (MRO) which combine academic studies and hands-on training

The importance of apprenticeship programs was recognized in last month's 'Sector Insights: skills and performance challenges in the advanced manufacturing sector' report produced by UK Commission for Employment and Skills (UKCES). "Some employers report that offering apprenticeships has enabled them to address skills and performance challenges. Other employers within advanced manufacturing could assess the benefits of offering apprenticeships, and ensure they have clear pathways in place to enable progression to higher-level technical and professional roles," the report says.

Robinson Upgrades R66 Police Helicopter

Robinson Helicopter Company announced its R66 Turbine Police Helicopter with the FLIR Systems Ultra 8000 Infrared Camera and the Spectrolab SX-7 searchlight with 30-million candlepower has been reconfigured to include a multitude of upgrades. The high performance four-place police helicopter comes standard with a Garmin G500H Primary and Multifunction Display System (PFD/MFD), a Garmin GTN 635 touch-screen navigator, and a Garmin GTR 225A COM radio. Also standard are Boland's 10.4" LCD monitor and two six-channel audio controllers.

The new streamlined instrument panel houses the Garmin G500H PFD/MFD along with traditional instruments and dual audio controllers. With the G500H panel, the aircraft can be flown from either seat and dual audio controllers allow for independent radio monitoring and transmitting by the pilot or copilot.

To complete the package, Robinson expanded the R66 Police Helicopter options list. New options include Genesys Aerosystems' HeliSAS autopilot, Garmin's GTN 650/750 navigators, FreeFlight's RA-4500 radar altimeter which displays radar altitude information on the G500H PFD, Technisonic's TDFM 9000 radio in a variety of single to four band options, and Aerocomputers' moving map system with View Sync 3D capability.

A fully-loaded R66 Police Helicopter, the first to come off the line with the new configuration, will be delivered to Night Flight Concepts in Bedford, Texas. The helicopter will be one of Night Flight's platform aircraft for its Law Enforcement Air Support Entity (L.E.A.S.E.) program.



Robinson has reconfigured their R66 Turbine Police Helicopter upgrading avionics and offering new options like the HeliSAS autopilot, FreeFlight's RA-4500 radar altimeter and Aerocomputer's moving map.

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about people

Greenwich AeroGroup Hires Shontz to Lead Western

Greenwich AeroGroup has named Austin Shontz as vice president and general manager of Western Aircraft. Located in Boise, Idaho, Western Aircraft was acquired by Greenwich AeroGroup in 2007 and is one of the company's two Maintenance, Repair and Overhaul facilities.

"Austin is a thought leader with extensive experience in aircraft manufacturing, completions and MRO services," said president and CEO of Greenwich AeroGroup Jim Ziegler. "We believe his experience combined with his innovative ideas and leadership style will benefit Western at all levels of operations, customer service and support."

Shontz kicked off his career in 1986 working for McDonnell Douglas. From there, he went to Gulfstream Aerospace where he, leaving the company in 2013 after serving six years as its vice president of Manufacturing Operations, Final Phase Engineering and Supply Chain. He most recently served as a senior strategic advisor for Embraer Aerospace.



Thomas Kuhn is new President and CEO of BizJet International

Thomas Kuhn (51) has become president and CEO of Lufthansa Technik's US-subsi-dary BizJet International Sales and Support, Inc. in Tulsa / Oklahoma. He succeeds Manfred Gaertner, who has been leading BizJet International since 2013. Before, Kuhn was director Engineering Services in Lufthansa Technik's VIP & Executive Jet Maintenance business unit in Hamburg, Germany.

Kuhn studied aeronautics and in 1989 he began working at Lufthansa Technik as an aircraft engineer. In the following years he held different management functions, mainly in the maintenance business unit of Lufthansa Technik. In 2008, Kuhn became sub-division manager Overhaul at

Ameco Beijing, the Lufthansa Joint Venture with Air China. In 2011 he took over his current function as director Engineering Services in Lufthansa Technik's VIP & Executive Jet Maintenance Business Unit in Hamburg, Germany. Manfred Gaertner left Lufthansa Technik at the end of July.

Spairliners Names Hueschler as New CEO, Crombois Appointed New CFO

Spairliners announced changes to its two managing directors. The Supervisory Board appointed the former CFO, Sven-Uve Hueschler as new CEO of Spairliners. At the same time, Benoît Crombois has joined >>>

Innovative Boeing 737 Aircraft Fuselage and Wing Support Shoring System



Advantage Aviation Technologies (AAT) recently announced the availability of an innovative Boeing 737 Support Structure system. The support structures are to be designed to support key areas of 737 aircraft during AOG, scheduled and Boeing issued airworthiness directive inspections.

The support structure system provides 737 Operators and MROs and excellent alternative to existing wood specific fuselage and wing supports with design improvement integration of metal, wood and aluminum, increasing performance, portability, and storage. The AAT designed support system provides adjustable support of Boeing 737, fuselage, wing, keel and secondary window sections of the aircraft. The AAT Support System is comprised of seven individual assembly stations including wing, fuselage keel, and alternative fuselage window support assembly stations. The system is fabricated with a combination of metal, aluminum and hard-oak saddle supports, single and double precision screw jacks and preset adjustment pins for exact fit and retractable weight bearing side-wind swivel jacks for easy maneuverability, the company says. Each support system is designed to provide more than 50 percent weight bearing beyond spec

"The FAA recently issued an AD requiring visual inspection of potential fuselage issues on 737 600 and 700 series airplanes. We designed this system specifically for commercial operator MROs that require scheduled 737 support repairs and inspections," stated Glenn Mayberry, director of Commercial Aircraft Sales at AAT. "We wanted to demonstrate our commitment to operators with a dual use inspection and repair solution."

ST Engineering Reorganizes Its Aircraft Leasing Business

Singapore Technologies Engineering Ltd (ST Engineering) announced the joint venture agreement (JVA) between ST Aerospace Resources and Wings Capital Partners Holdings, has been terminated. The joint venture, WingStar was set up to acquire mid-life to end-of-life aircraft for lease, conversion or part out.

The decision to terminate the JVA and to commence Members' Voluntary Winding Up was mutually agreed upon between the two shareholders, as a result of differing views on the strategic focus and operational plans.

Recognizing aircraft leasing as an important extension of its total aviation support offering, ST Engineering's aerospace arm will continue to tap on opportunities created by global aircraft fleet expansion and renewal, to build up a portfolio of mid-life and end-of-life aircraft assets focused on Airbus A320 and Boeing 737NG family.

This has led ST Aerospace Resources to incorporate Keystone Holdings (Global), a subsidiary based in Singapore. Keystone Holdings serves as a holding company for aircraft leasing investments, and it plans to incorporate new subsidiaries in various geographies to support its projected portfolio purchase of aircraft, which are currently on lease to global airlines.

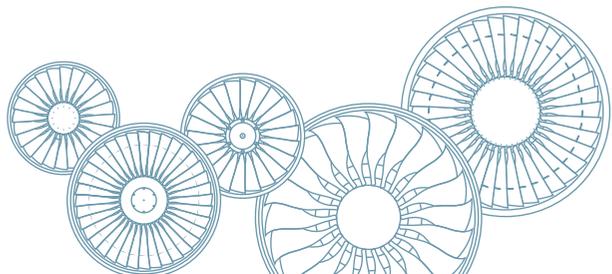


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about people

» the company's management team as CFO. Both directors assumed their role on August 01, 2015.

Hueschler brings an extensive background in aircraft component MRO to his new position as CEO. Before joining Spairliners in 2013, he handled different positions in strategy and business development at Lufthansa Technik and led strategy execution projects for aircraft component services worldwide.

Combois brings along 10 years of management experience in several disciplines like logistics, production and procurement of the MRO industry. Before joining Spairliners, he served as procurement director at AFI KLM E&M.

Landmark Expands Leadership

Landmark Aviation has expanded its aircraft management and charter division's leadership with the addition of Marla McGatlin as the manager of Client Relations based in Waukegan, Illinois and Greg Paxson as the director of Maintenance based in Van Nuys, California.

"I'm happy to welcome Marla and Greg to our team," president of Aircraft Management and Charter Ben Murray said. "They will be excellent assets to our team and clients."

McGatlin and Paxson each have more than 30 years of aviation experience. Paxson is returning to the Van Nuys hub where he previously served as the director of Maintenance with TWC Aviation for 17 years. McGatlin has an extensive background in aviation, which includes nine years as the client service lead for Tag Aviation.

Randy Deal has joined Landmark Aviation as the director of »

MTU First to Gain Approval for TP400-D6 Maintenance

MTU Aero Engines has received approval from the Federal Aviation Office (LBA) to maintain the propulsion system powering the A400M military transport aircraft. This makes MTU the first of the partners in Europrop International (EPI), the TP400-D6 consortium, to hold such an unlimited license for the maintenance, in accordance with EASA 145 standards, of the entire propulsion system.

Since the A400M military airlifter presently is, and in the foreseeable future will remain, the only application for the TP400-D6, this unlimited approval by a civil agency marks a milestone, MTU says. The engine is being produced under a civil type certificate, but its operation by purely military users did not fall within the scope of the certification. "After two years of intensive discussions with representatives of civil and military agencies we have now finally reached this goal, which is of importance to the TP400-D6 program and its customers," says Gerhard Baehr, MTU's director TP400-D6/Tyne Programs.

Plans now are to implement a set of harmonized military airworthiness rules, the EMAR (European Military Airworthiness Requirements) regulations, which are essentially based on the civil regulations, for adoption across Europe, the company says.



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Power Hydraulics Converts Warehouse into New State-Of-The-Art Facility



Power Hydraulics has moved its main office and shop to a larger, strategically planned facility in the Gloucester Industrial Park, located in Langley, British Columbia.

Supporting all in-house capabilities, the company says the now fully operational facility allows them to provide more services faster in the growing helicopter industry. "Our ultimate vision is to accommodate all our operations in this one building," says owner Corey Steinberg, "allowing us to shorten customer turnaround times by not having to outsource any components and to offer new business ventures in other areas of helicopter and fixed-wing aircraft maintenance." What was once a vacant warehouse is now Power Hydraulics' state-of-the-art facility, which houses hydraulics components, NDT work, machining and the company's new capabilities of wheels and brakes. It also supports Power Hydraulics' heavy investment into Black Hawk UH-60 components and hydraulics.

"From the initial stage of renovations," says Steinberg, "we modified every square foot of the building to support the optimization of the work flow and to accommodate the needs of our growing hydraulic maintenance shop—as well as our new expansion into components and wheels-and-brake maintenance." The new facility is a short 10-minute drive from Power Hydraulics' previous location in Abbotsford.

**Titan Tool Supply's
Low-cost Model TVSG
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Titan Tool's new, low-cost TVSG Series Videoscope records video or still images at remote quality control inspections. Borescope and accessories are supplied in a foam-fitted carrying case.

Titan Tool Supply offers a new economical videoscope to conduct remote quality control visual inspections required during aviation maintenance. The Titan Tool model TVSG videoscope has the capability to record video or still images on a supplied 8GB SD card.

The TVSG videoscopes feature 360° articulation with greater than 90° bending angle and five different illumination adjustments controlled by a mechanical joystick for smooth, accurate control and immediate response to inputs. These control features enable the camera tip to be steered through narrow bores, channels, and complex curves. Flexible borescope cables are constructed of durable, corrosion-resistant braided stainless steel and are available in diameters of 4.5mm (0.177") and 6.4mm (0.252") in lengths of 1.5m (59") and 3.0m (118").

Titan's TVSG videoscopes have a field of view of 80° / 60° and depth of field of 15mm to infinity with a 5X zoom function. The camera is illuminated by LED lights that can be adjusted in five different levels from off to high to deliver the correct amount of light. The TVSG is supplied with a foam-fitted carrying case that includes an AC power cord, AC battery charger, four rechargeable NiCad AA batteries (up to two hours working time per charge), and 8GB SD card, and a USB cable. Despite the TVSG's state-of-the-art features, Titan Tool Supply states that its cost is less than comparable performing videoscopes.

For technical specifications and pricing information, contact Titan Tool Supply, Inc., 68 Comet Avenue, Buffalo, NY 14216. Phone: 716-873-9907. Fax: 716-873-9998.

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Model TVSG



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about people

» MRO Sales. In this role, he will oversee Landmark Aviation's MRO sales division with the goal of increasing its avionics, interiors, airframe, wholesale parts, and AOG services.

"Randy is an excellent addition to our team," Landmark Aviation's vice president of MRO Skip Madsen stated. "He has developed a track record of success in his career, and I am confident that he will work to exceed the expectations of our customers."

Deal is an alumnus of Purdue University and has over 15 years of sales experience in business aviation. Prior to joining Landmark Aviation, he held leadership roles with Textron Aviation and Raisbeck Engineering.

Wishart-Mizsei Promoted to GM of Landmark Aviation in Luton

Samantha Wishart-Mizsei has been promoted to general manager of Landmark Aviation's FBO facility at London-Luton Airport (EGGW). She was formerly the location's assistant general manager. "Samantha has been a dedicated member of our leadership team in Luton, and I'm happy to announce her promotion to general manager," »

Greenwich AeroGroup Acquires Airpro



Jim Ziegler, CEO, Greenwich AeroGroup

Greenwich AeroGroup has acquired Miami-based Airpro Aviation Systems, an FAA certified repair station established in 1996 specializing in electronics, electrical and mechanical instruments, avionics and accessories.

"Airpro's business aligns well with our current structure and is an excellent strategic fit for Greenwich AeroGroup's Repair and Overhaul line of business," said Dave Miller, Greenwich AeroGroup senior vice president of CR&O and Distribution. "This exciting opportunity offers our customers access to a broader and deeper platform of products and services while better enabling us to seize on current global growth opportunities."

In addition to its FAA certification, Airpro Aviation also holds certifications from the European Aviation Safety Agency (EASA), the National Civil Aviation Agency (ANAC) and the Directorate General of Civil Aviation (Indonesia).

"Adding Airpro Aviation to our group of companies reinforces our growth strategy to build a broad portfolio of aftermarket services for the business, commercial, military and rotorcraft aviation markets," said Jim Ziegler, Greenwich AeroGroup president and CEO. "We are committed to growing our component repair and overhaul capabilities to better serve our current and future customers needs while enhancing shareholder value."

In addition to its core capabilities, the company is also an approved vendor for multiple airlines worldwide. Airpro Aviation Systems sales division, Airpro Aviation Airline Support Inc., offers programs such as rotatable exchanges and repair contracts.

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Tom Huismann, Vice President, Tradewind International.

Tradewind Now Has Airbus, Boeing, Fokker, and F-16 Parts

Expanding from what was its core business in serving the light and medium turbine helicopter industry, Tradewind International recently purchased a diverse inventory of parts from International Defense Systems US (IDSUS). The recently received inventory includes parts for Airbus, Boeing, and Fokker aircraft, and some F-16 parts and accessories. The company says it has been accumulating an inventory during a period of 25 years. However, this is the first significant purchase the company has made outside of its usual pursuit of parts and accessories for small and medium turbine-powered legacy helicopters.

"Tradewind International has served the helicopter industry for more than 25 years, and that will not change. We will continue to serve an industry that has been very important to us," said Tom Huismann, vice president of Tradewind International. "However, the recent inventory purchase from IDSUS is very significant and exciting, in that it opens up a new opportunity for us. This recent purchase will help us to further diversify our inventory, and enable us to use our capabilities and talents to serve more of the aerospace industry."

Tradewind International, LLC, is a veteran-owned business in Janesville, Wisconsin. More info at <http://www.tradewindinternational.com>.

Rectrix Aviation Joins FAA's ASAP

To further enhance its commitment to safety, Rectrix Aviation says it has joined the FAA's Aviation Safety Action Program (ASAP). ASAP is administered by the Air Charter Safety Foundation and establishes an error-reporting program that encourages aircrews and aviation employees to voluntarily report safety information to the FAA and company management to help minimize threats to safety. Rectrix Aviation, a private charter company owning its aircraft fleet and fixed based operations (FBO's), became a member of the Air Charter Safety Foundation earlier this year.

ASAP is non-punitive so employees can report safety concerns without fear that the FAA will take enforcement action against them or that an employer will use the information to take disciplinary measures. In return, ASAP successes and safety resolutions are shared with all program participants, helping to enhance company-based safety programs and prevent future safety-related events.

"Providing the highest levels of safety for our passengers and crews is a top priority at Rectrix," said Rectrix CEO Richard Cawley. "We believe strongly in ASAP, not only because it provides all of our flight crews and mechanics with an additional tool that enhances the safe operations of our aircraft and those of our clients, but also because it benefits industry as a whole."

While ASAP is established among commercial air carriers, Rectrix Aviation is one of only a handful of charter operators to enlist in this program. Rectrix is already Platinum certified by ARGUS, the highest safety ranking a charter carrier can receive.

VIM Airlines of Russia Joins Global OASES User Community

Commsoft announced that VIM Airlines, one of the largest airlines in Russia, has chosen OASES to support both its scheduled and charter passenger operations.

OASES, designed to combine ease of use with an industry-leading technical sophistication, is structured in a modular format and for its current fleet of ten Boeing 757-200s and four Airbus-319, VIM Airlines has opted for all of the following modules: core; airworthiness; planning; production; materials; line maintenance control and warranty.

The airline's use of OASES is scheduled to go live progressively in 2015.

"We're delighted that VIM Airlines has joined the ever growing, worldwide community of OASES users and we're looking forward to working closely with them to ensure a successful implementation process," says Nick Godwin, MD of Commsoft. "Their decision is further evidence that we really have developed a truly 'best of breed' MRO IT system."

Alexander Kochnev, general director of VIM Airlines, added,

"OASES offers VIM Airlines a flexible engineering management solution that fits the needs of our dynamic business operations."

Clinkenbeard Earns AS9100(C) with Zero Findings Two Years in a Row

Clinkenbeard, a Rockford, IL-based manufacturer of complex metal castings and machined parts, recently completed the necessary requirements to achieve AS9100(C) re-certification to the Quality Management System (QMS) for the aerospace and defense industries. Karen Spencer, quality manager, and Steve Helfer, general manager, report that a company-wide QMS audit resulted in the recertification and yielded zero findings. This certification means that Clinkenbeard meets the Aerospace and Defense industry's newest and highest standards of quality. Clinkenbeard first achieved AS9100(B) certification in July of 2006, and was recertified again in April of 2014. The company has achieved recertification for AS9100 every three years, as required, since 2006. In 2009, AS9100 was revised to AS9100(C) to improve existing requirements for quality.

Baker Aviation Mourns Sudden Passing of Tim Bowman



Baker Aviation announced the sudden death of Tim Bowman. Bowman suffered unexpected cardiac arrest caused by a blood clot on August 26th.

As a skilled aviation manager with more than 30 years of industry experience, Tim Bowman had recently joined Baker Aviation as the director of Quality Assurance. He began his career working for the Department of Defense in Oklahoma City at Tinker Air Force base, as a civilian aircraft mechanic. Working his way to up to supervising and managing maintenance teams, his career progressed with Part 135 conformity responsibilities with companies such as AMR Combs/Jet Solutions, Raytheon Aircraft Charter & Management, and later with Sentient Jet where he was national director of operations and maintenance programs. According to Baker Aviation, Bowman built exceptional relationships with local FAA administrators and was most recently director of Quality Assurance for Southwest Airframe and Tank Services in Dallas, Texas.

"Tim will be fondly remembered as a great friend and colleague, and in my daily thoughts forever," commented Ray Goyco, Jr., president and COO for Baker Aviation. "The entire business aviation industry has lost a true professional and from everyone here at Baker Aviation, our sincere condolences go out to his family. Goyco continued by calling Bowman a dedicated aviation veteran, loyal friend, loving father and husband."

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» Cy Farmer, vice president says.

Wishart-Mizsei has more than 12 years of experience in aviation and is an alumna of the University of Roehampton in London. She was the station manager for RSS Jet Centre at EGGW before RSS was acquired by Landmark Aviation in April 2014.



Pereira

Gulfstream Adds Two Field Services Reps

Gulfstream recently added three field service representatives (FSRs) to its customer service team in Latin America. Alexandre Nunes Pereira and João De Toni are based in São Paulo and Gerardo Tellez is based in Toluca, Mexico. All three report to Bill Fuger, senior manager, Field Service Operations, Gulfstream.



Tellez

"We now have five FSRs that cover Latin America," said Mitch Choquette, vice president, Customer Support. "We have enhanced our team with the addition of Alexandre, João and Gerardo. Their technical expertise and knowledge of their respective regions are tremendous resources for our customers."



De Toni



Weingartner

Weingartner Appointed to Sequa Board

Sequa Corporation has appointed Dr. Stefan Weingartner, whose career spans more than 26 years of aerospace industry leadership in Europe and Asia, to the Sequa Board of Directors.

"Throughout his career Stefan has transformed aircraft engine and systems businesses into high performance market leaders," said David L. Squier, executive chairman, Sequa Board of Directors. "Stefan intends to take an active role as a Sequa Board member, particularly in the area of strategic management of the Chromalloy gas turbine engine business. We anticipate far-reaching advantages from his thought leadership."

Weingartner joins the Sequa Board from MTU Maintenance where he led the organization as president for eight years. During this time he also was a member of the Executive Board of MTU Aero Engines AG a MDAX (MTX) listed company. At MTU Maintenance he was instrumental in leading the organization to profitable growth over an eight-year period in addition to other significant achievements.

He holds a Master in Physics from the Munich Technical University, a Master of Business Administration (MBA) from the Edinburgh Business School, and a Doctorate in Engineering from the Munich Technical University.

SOAR and Ascent Form Working Agreement

SOAR and Ascent Aviation Services (Ascent) have formed a renewable five-year Cooperative Working Agreement to offer international AOG Field Support Services to the commercial aviation community.

With its newly constructed 42,000 square-foot hangar in Tucson Ariz., Ascent is the latest to join the SOAR Network, a collective of aviation providers working under the management of SOAR to offer economical field support services.

Ascent Aviation says their FAA, EASA, NCAA and AFRA Certified repair station specializes in B727, B737 Classic, B737NG, B757, MD80/90, B717, CRJ 100/200 and the Airbus family.

Under the management of SOAR, Ascent is participating as a highly valued team member for SOAR AOG recovery, evaluation, and repair activities.

SOAR remains as the single point of contact for all AOG and Field Team or Field Support requests.

Australian Invention Hopes to Improve Aviation Testing



Australian test product, Acoutec, hopes to revolutionize the testing of acoustic liners.

An Australian idea has led to the development of a patented product, Acoutec, which its inventor says he hopes will significantly change the accuracy in testing of aircraft acoustic liners.

"This could revolutionize a vital part of aviation testing by extending the service life of aircraft acoustic linings," says the inventor, David Johnson, "thereby reducing operational cost to airlines and ensuring noise reduction levels are being maintained throughout the service life of the aircraft engines."

Johnson, an aircraft maintenance engineer, came up with the idea for Acoutec when he realized that early corrosion in the honeycomb structure of acoustic liners could not be accurately detected using current inspection methods, which includes use of the tap test. "Current maintenance procedures repair the linings after corrosion has taken hold, when damage is detected visually or by tapping with a coin," says Johnson. "As the damage can be widespread by the visual damage stage, it more often leads to replacement of the lining making this method of testing process highly inaccurate, expensive and wasteful," he adds.

Knowing that delamination and corrosion could be undetected below the surface of the skin, Johnson says he personally experienced the frustration involved with testing the linings. "Tapping seemed like an archaic process in an otherwise technically sophisticated industry where accuracy and safety are paramount."

Johnson's solution evolved from initial designs and sketches into a prototype of Acoutec, a device that uses air pressure to measure inconsistencies caused by corrosion deep within the liner. He continued to develop the product to meet both Single Degree of Freedom (SDOF) and Double Degree of Freedom (DDOF) acoustic liners and found that results were extremely positive and consistent throughout all stages of development. "I realized this new approach to acoustic liner testing could fundamentally change the maintenance protocol and lead to improved safety, lower costs and consistent noise suppression. This would be good news for people living in aircraft landing corridors, the travelling public, aircraft operators and for the aviation industry as a whole," says Johnson.

Relying on external industry experience, local airlines and repair facilities, Acoutec is moving towards commercialization. Further information can be found at www.acoutec-aviation.com.



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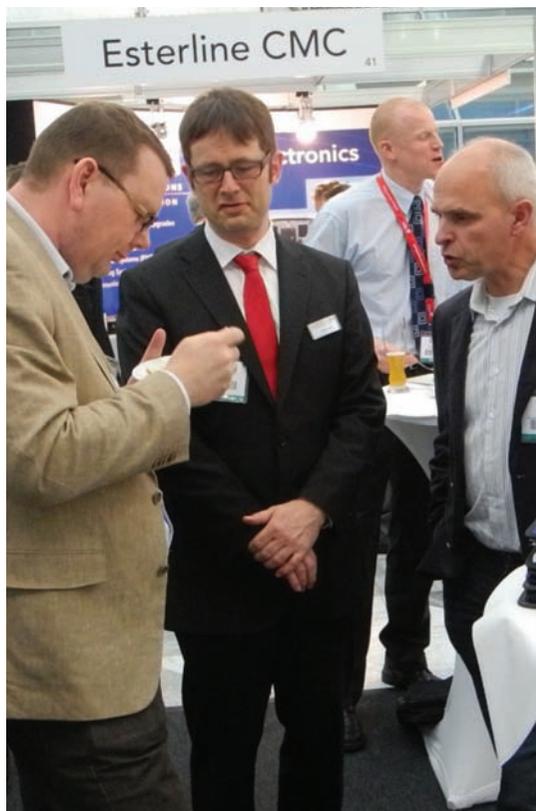
Aviation Electronics Europe is the premier platform for the international aviation electronics industry to learn, network and source new information, products and services at one unique annual event.

The conference will discuss the hot topics and issues of the day, whilst the exhibition enables companies and organisations to demonstrate and showcase new products, developments, technologies and services available on the market, and also key elements of the upgrades and retrofits market.

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. Safety in all aspects of aviation is something we encourage active discussion and information sharing at the conference.

The Single European Sky enters its deployment phase, but with many platforms currently in use, how does the industry ensure consistency, integration and reliable communication between and across these platforms to meet these objectives?

Aviation Electronics Europe is the leading exhibition and a conference programme with excellent content and discussion, which includes strategic and technical details, delivering high-level and quality presentations for both the commercial and defence sectors, fixed wing and rotorcraft.



Aviation Electronics Europe Conference Advisory Committee meet in London to set Conference Agenda

The Conference Advisory Committee of Aviation Electronics Europe gathered in London recently to set the conference agenda and programme for the event, which will take place on 20th-21st April 2016 in Munich, Germany.

Aviation Electronics Europe is the premier platform for the international aviation electronics industry to learn, network and source new information, products and services at one unique annual event, and the conference advisory committee took delight in reviewing nearly 100 abstracts submitted by the industry, all wishing to gain the opportunity to present to their peers.

After a day of discussions and debate, the committee have set a high quality programme that will deliver great educational and information sharing discussions, from policy and procedural issues concerning SESAR Deployment, to technical aspects in ADSB, CSN, Standardisation and Certification and Future Avionic Innovations.

The committee had a difficult job to slowly whittle the abstracts down to the final list, due not only to the number received, but also due to the high quality and relevant subjects covered by the papers.



Full details of the conference programme will be announced soon and will be available at www.ae-expo.eu.

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.

Conference Programme in Development

The conference programme is a key focus for Aviation Electronics Europe, and a focal point for the industry for education and learning to understand and keep up to date with the latest challenges and issues surrounding the industry. Following a successful conference committee meeting, the outline conference programme has been developed and will see interesting discussion in the following topic areas:

- SESAR & Next-Gen Update
- CNS Enabling Operational Efficiency
- ADSB Updates - today and tomorrow!
- Standardisation & Certification
- Cyber Security & the e-Enabled Aircraft
- Satellite Based Solutions for CNS
- Innovations in Avionics

Further details of the programme will be announced soon, and regular updates will be available at www.ae-expo.eu.

Exhibiting Opportunities Still Available

Aviation Electronics Europe attracts a broad representation from civil, government and military organisations, of senior management, project leaders, senior engineers, executives and decision makers who have the authority to purchase, or influence the purchase of products and services.

The exhibition is a prime opportunity to connect with customers and develop new business relationships, as well as showcase leading technologies, products and services to key decision makers.

Over 50% of Exhibition Space Already Sold

With over 50% of exhibition space already sold, space is filling at the MOC Event Centre, so companies and organisations are recommended to book their space early to avoid disappointment.

Aviation Electronics Europe is the only event where you can meet the avionics and aviation electronics community from commercial, defence and bizjet sectors and a key date in the diary for the industry.

For further information on exhibiting and sponsorship opportunities contact:

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DGLR, RAeS, IET and TUM Support in Munich

The organisations of the German Aeronautical Society (DGLR), Royal Aeronautical Society (RAeS), Institution of Engineering & Technology (IET), with branches in Bavaria, have confirmed their support of the 2016 Aviation Electronics Europe, along with the Technical University of Munich, whose Institute of Flight System Dynamics is the regions premier research facility for guidance and control of manned and unmanned aircraft; simulation, parameter identification and flight

safety; trajectory optimization; sensors, navigation and data fusion; and avionics and safety critical systems.



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These are just a few of the Airlines that have attended the event in Munich and could be at the show to talk about YOUR products. Have a look at a more comprehensive AIRLINE attendee sample via www.ae-expo.eu/attendees



Topics of Discussion

The Aviation Electronics Europe conference programme will deliver high quality content and discussions in the topic areas of: SESAR & Next-Gen Update; CNS Enabling Operational Efficiency; ADSB Updates - today and tomorrow!; Standardisation & Certification; Cyber Security & the e-Enabled Aircraft; Satellite Based Solutions for CNS; Innovations in Avionics.

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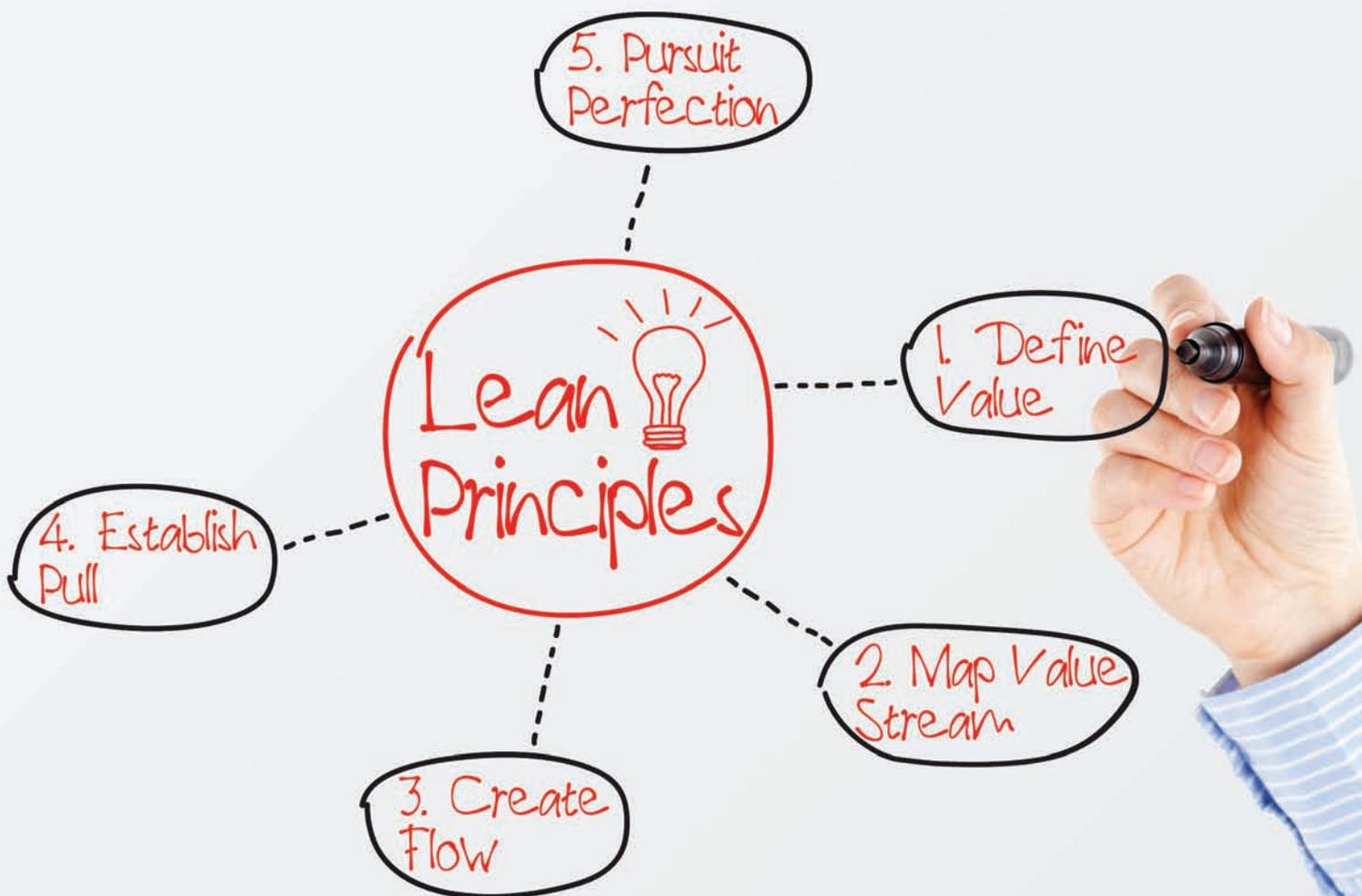
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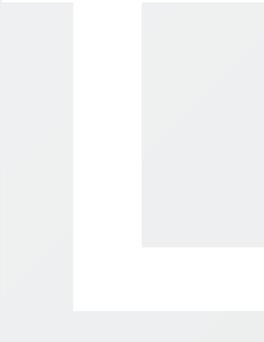
Leaning the Back Office:

Trimming the Fat from Support Functions

By Charlotte Adams



In the highly competitive maintenance, repair, and overhaul market MROs are looking beyond the shop for efficiency gains. Among the successful navigators of this terrain are Fokker Aerotron (dba Aerotron Airpower), Aero-mark, Duncan Aviation, AAR, Southwest Technical Operations, and Lufthansa Technik. These companies have applied Lean optimization methods to processes involving functions such as engineering, scheduling, billing and purchasing.



Lean is an analytical process that goes to the root cause of a problem first, explains Bill Peterson, a lecturer at the business school of the University of Tennessee and a consultant specializing in the application of Lean to MRO business processes. (His clients include the U.S. Air Force, Southwest, Fokker Aerotron, and Aero-mark.) Lean can make a process flow more smoothly, increase business capacity, lower lead times, and reduce product prices, he says, affecting not just the support units but the core MRO mission.

Lean is “a huge deal” for AAR, says Dany Kleiman, group vice president for repair and engineering. Airframe maintenance is a tough business, so “if you don’t find a way every day to become more efficient and more effective, there is absolutely no way to survive and make any money.” He, along with everyone else who has embraced Lean, acknowledges that it isn’t easy. “It takes time to engage everybody in the work force,” he says. But “don’t give up,” he counsels. “There are a zillion opportunities to become better, but take the high trees first.”

Challenges

Lean can be a more challenging in the back office than on the shop floor, Peterson says. There’s less of a sense of urgency in the support units and the waste is less visible.

Ted Roethlisberger, the Lean leader at Duncan Aviation, however, points out that implementation in the second floor environment may be relatively easier. These employees aren’t shift workers, so a Lean team doesn’t have to get buy-in from multiple groups.

Peterson also suggests, from his experience, that the leading source of waste in MRO business processes is a lack of organizational focus – a category that he added to the Lean lexicon. This is not a problem on the shop floor because the mission is so obvious there. But in support offices – government or commercial – employees often lose track of the



LHT began applying Lean to "hardcore" administrative processes about five years ago. This involved departments such as accounting and engineering and processes such as maintenance scheduling.

core mission and the core customer. It's easy, as an organization grows, for support processes to become silos that optimize themselves at the expense of the whole, Peterson explains.

Another source of waste that many experts point to is overprocessing -- putting too many steps into a process.

Once a process has been improved, the metric for its efficiency needs to be changed, Peterson adds. The unit whose process has been optimized may have sacrificed some of its output for the greater good, so its job performance measure needs to be recalibrated.

Many steps in a support process, moreover, are inside a computer or in thought processes, so waste is very hard to see. "You can see the machining of a part but not the thought processes going into a document," Peterson says. He tries to make knowledge work "visual."

There are also cultural issues. Sometimes people don't ask "why" often enough, says

Roethlisberger. People tend to identify the immediate cause of a problem but not the root cause. They apply a band-aid and move on. These additional, often unnecessary, steps may actually compound the problem.

You First, Back Office

Lean efforts often start on the shop floor. Then solutions to those constraints point to constraints elsewhere. But it doesn't always work this way.

At Fokker Aerotron Lean began on the administrative side. The company is an independent component MRO (CMRO) in LaGrange, Ga., which repairs and overhauls aircraft accessories for the major airlines. Over the past seven years Fokker Aerotron has held 20 or more Lean events and continues to do so as business factors change and new constraints emerge.

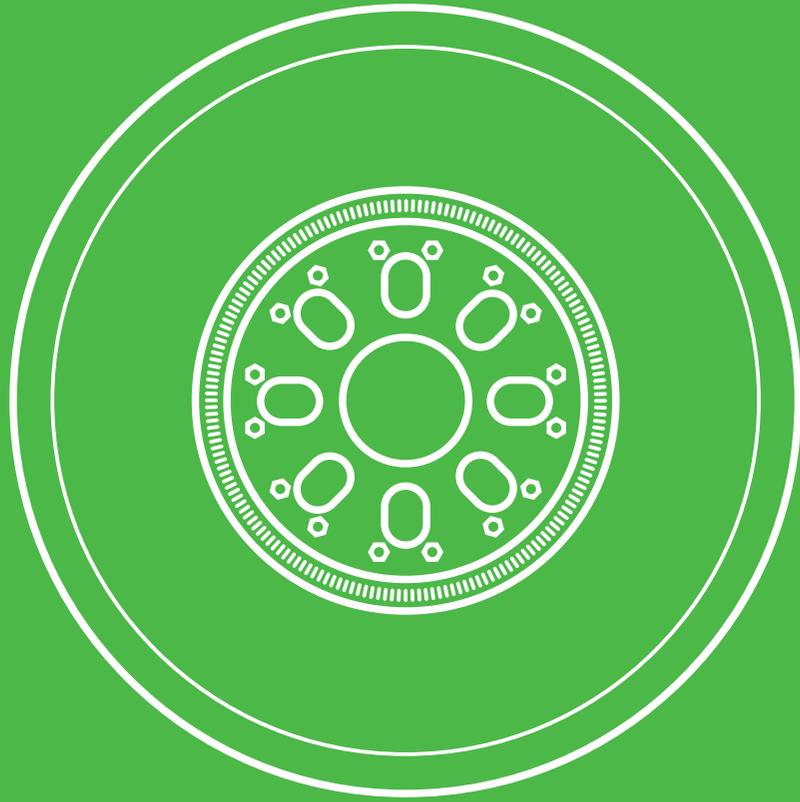
While Fokker Aerotron didn't have a "burning platform," it was not meeting turn time or on-time delivery requirements that customers demanded, explains Stacey Karr,

director of purchasing and materials and director of continuous improvement for the company. "Aerotron was looking for ways to improve our processes so we would have an edge over our competition." The company has worked with Peterson to analyze its processes.

"I was very skeptical" at the first Lean training event, Karr says. She had seen the company try various methods of process improvement in the past without much success.

Not-in-stock (NIS) procedures were a major opportunity, she says. This "bucket" includes the processes of ordering a part, receiving it, and issuing it to the shop. When the team analyzed these processes, they found waste in simple things like filing and faxing hard copies of purchase orders when electronic versions existed, numerous approval processes, handoffs, flow issues, etc.

Lean projects initiated between 2008 and 2011 -- covering the whole process from



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a technician's request for a part to issuing the part to the shop so the technician could repair or overhaul the component – yielded dramatic results.

In 2008 average overall turnaround time (TAT), from start to finish, was close to 50 days, Karr says, whereas the CMRO industry strives for TAT of 14 days or less. TAT is now approximately 15 days, she says. There were 234 steps and 70 handoffs in 2008. These were decreased to 109 and 28, respectively, in the following two years.

All told the Lean remedies produced savings of \$500,000 in one year with an investment cost of less than \$5,000. On-time delivery rose from 28 percent to 88 percent over the period.

Southwest

Southwest Airlines' Technical Operations unit also started Lean on the administrative side, says Yesso Tekerian, senior manager of engineering standards. Tech Ops has initiated about 100 Lean events in the last two years.

First the organization undertook an educational awareness program, he recalls. The Lean staff (two dedicated employees) developed "facilitation training." At last count around 60 employees were trained as Lean/Six Sigma green belts, participating

in projects on an as-needed basis. We also made sure people understood that we would promote the "Toyota or Honda way" of encouraging improvements, however small, and then coming back to revisit them, Tekerian says.

An engine asset management initiative – which blossomed into some five separate projects over the course of a year – addressed the administrative processes involved in the engine maintenance cycle, from the time an engine comes off wing, to when it arrives at Tech Ops in Dallas, to when it's sent off to the GE engine shops, to its return to Dallas and being sent out as a spare. Ultimately Southwest was able to increase the throughput of the engine cycle by 22 percent, Tekerian says.

Another Tech Ops project involved engineering. "At the end of 2014 and into the beginning of 2015, we applied Lean principles to the engineering processes associated with the induction of previously operated airplanes," explains Kent Horton, the carrier's director of engineering. These aircraft have to be reconfigured -- in areas such as paint schemes, interiors, and avionics -- to meet the airline's standards.

The problem was that the airplanes were coming out late. In 2014 none of the airplanes were considered to have

"We reduced the turn time for engineering conversion documentation by 35 percent and improved our structural repair review flow time by 32 percent...We are now at 62 percent, and climbing, for on time deliveries year to date in 2015."

**– Kent Horton,
Southwest**

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been completed "on time" due to the inefficiencies and challenges with the various support processes, he says.

Lean methods, however, significantly improved overall performance. For example, the engineering department's process of creating a statement of work for an airplane -- near the front end of the process -- has reached an efficient cadence. A statement of work is now generated every seven days, Horton says. This is important since the document is used by a lot of stakeholders in the project.

Overall throughput of airplanes placed into revenue service has increased from nine in 2014 to a projected total of 26 in 2015. Contributing to this increase were numerous improvements in engineering processes. "We reduced the turn time for engineering conversion documentation by 35 percent and improved our structural repair review flow time by 32 percent," Horton says. "We are now at 62 percent, and climbing, for on time deliveries year to date in 2015."

The induction project focused on things like lack of organizational focus, cadence, and work in progress (WIP) levels, he says. "The whole Lean mindset starts at the individual level, in terms of understanding WIP and the consequences of having too much of it," Horton says.

Some of the changes involved focusing on when various documents are needed by the production floor and moving people closer together in order to reduce communications delays.

Paperwork

Too much paper or too many steps can be signs of inefficient processes. At AMRO, a CMRO unit of the aerospace holding company, Aero-mark, Peterson helped to slim down the document package that records all work on an aircraft part from seven pages to a single page. Leaning the work pack involved eliminating a lot of waste, such as repeated stapling and unstapling steps, recalls Brad Caban, president of Aero-mark.

A side benefit of the process improvements has been an improvement in quality, Caban notes. Repairs for units under warranty have gone down to less than 1 percent at AMRO, he says. AMRO also has set up an internal "warranty tracker" process which flags "repeat offenders" -- units that have been to the facility in the last 24 months. These flags alert everyone to take a closer look at the unit, which may have an intermittent fault or be a rogue part. We're able to spot some problems before our airline customers see them, he says.

An event at CAS (Certified Aviation Services), Aero-mark's "touch maintenance" unit, involved days sales outstanding, or DSO, a measure of the time from performing a repair to receiving payment for it. This was shortened by 12 days through eliminating waste in invoice processing and other procedures, Caban says. (CAS does line maintenance and modification work for airlines at airports around the country.)

One of the improvements at CAS involved the creation of standard contract checklists

for mechanic, quality assurance, and billing processes. The checklists were designed to get rid of chokepoints in the process where things slowed down while an employee was waiting for other inputs. As a result of applying Lean and developing a solution, everybody understood what the optimum process flow is, so that a lot of waiting was eliminated. We didn't really change our work orders, but we managed them more efficiently, Caban says.

"We also went to preprinted forms wherever we could," he says, to make inputs



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easier and to make sure all the proper forms have been filed. A software "dashboard" tool was also acquired for CAS billing analysts, so they would know which jobs needed attention.

Lean Pull Events

One engineering project at Duncan Aviation back in 2013 emanated from the shop floor, Roethlisberger recalls. At the request of the cabinet shop, a Lean team with members from engineering and the shop came up with a way to do drawings that allowed the shop to create and assemble cabinetry more efficiently. "There was no problem with the drawings," he says. "It was just that the way they were drawn required more jigs to be built by the production shop."

It turned out that the engineering department had optimized its processes in a way that was repeatable and efficient for the department but that was less efficient for the shop. The solution was for the engineering department to provide data that allowed the cabinets to be built in a more timely manner. The solution produced an 81 percent time saving in the shop, but added five minutes to the drawing process for each panel. That drawing time has further decreased as the engineers have further optimized their process.

The engineering project is an example of a "pull event," in which ideas for improvement bubble up from the shop floor, Roethlisberger says. That is how we try to do Lean, he says.

Lufthansa Technik

Lufthansa Technik has also applied Lean to its business processes. When it started with Lean about 10 years ago, the MRO focused on the shop floor. It held back for "quite a while" from applying Lean to business processes, says Christian Langer, vice president of corporate improvement projects. The reason was that optimizing administrative processes can lead to direct reductions in the number of full-time positions in a company vs. improvements on the shop floor that can directly contribute to support business growth, he explains.

In Lufthansa Technik's case there have been reductions in the number of employees in business processes, but separations from the company were voluntary, and many occurred through early retirements and natural attrition. Other employees stayed with the company but moved to new job assignments.

LHT began applying Lean to "hardcore" administrative processes about five years

Dr. Christian Langer Takes on New Role Lufthansa Technik Logistik



Dr. Christian Langer has been appointed as managing director of Lufthansa Technik Logistik Services (LTL) starting September 1, 2015. He takes over this role from Andreas Meisel, who moved from this position after more than four years to join Ameco Beijing as chief MRO operation officer of the Executive Management.

Dr. Langer has been employed at Lufthansa Technik since 2004. He started his career in product management for aircraft maintenance in Frankfurt. He has been responsible for developing the lean production system and the Lufthansa Technik Lean Academy since 2007. In 2012 he additionally took on responsibility for a restructuring project of the administrative body of Lufthansa Technik and in 2013 became the founding managing director of Lumics GmbH & Co. KG, a joint venture between Lufthansa Technik AG and McKinsey & Company.

Dr. Langer studied Computer Science at the University of Koblenz. Following his degree and position in management consulting, he obtained a PhD (Dr. rer. pol.) from the WHU - Otto Beisheim School of Management in Koblenz.

"The first thing a Lean team looks at ... is how to reduce variation in customer needs as much as possible. They look for patterns in needs, for example, so work can be done more efficiently. The second question is how to increase the flexibility of the work force. But variety can't be reduced to zero and flexibility can't be increased to 100 percent. So the third question becomes how to reduce the remaining waste."

– Dr. Christian Langer, Lufthansa Technik

ago. This involved departments such as accounting and engineering and processes such as maintenance scheduling.

Maintenance scheduling was chosen because changing business conditions identified a constraint there. Lower-cost carriers have different maintenance patterns from those of the legacy carrier, Langer explains. New airline customers also have different needs.

One of the results of the project was to make the maintenance scheduling process more responsive to different customers'

needs, explains Johannes Weidisch, LHT's director of Lean management. The project succeeded in scheduling maintenance more efficiently, so that Lufthansa, for example, has increased the utilization of aircraft in revenue flights by the "low double-digit" numbers per month, Langer says.

The first thing a Lean team looks at -- both on the shop floor and in administrative processes -- is how to reduce variation in customer needs as much as possible, Langer says. They look for patterns in needs, for example, so work can be done more



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

(Aristoteles, 384 BC – 322 BC)

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Eight Wastes

In an office environment the eight wastes, from greatest to least, are the following, according to Bill Peterson, a lecturer at the business school of the University of Tennessee and a consultant specializing in the application of Lean to MRO business processes:



1. Lack of organizational focus,
2. Excessive inventory, as indicated by too much work in progress,
3. Transportation, involving moving information through too many approvals and handoffs,
4. Motion, or searching for information,
5. Waiting,
6. Defects, or not doing it right the first time,
7. Overprocessing, or handling an item too much, and
8. Overproduction, indicated by too many emails, too many reports, too many meetings, and even too many metrics.

efficiently. The second question is how to increase the flexibility of the work force. But variety can't be reduced to zero and flexibility can't be increased to 100 percent. So the third question becomes how to reduce the remaining waste.

In the area of core financial processes Lean projects aimed for about a 15 percent increase in efficiency Weidisch says. Responsibility for purchasing, for example, has been centralized in one department rather than being distributed through different business units. Undertaken last year, the project has reduced the number of purchasing positions by a third with a more standard approach.

The MRO unit has been so successful with Lean on the shop floor and in the back offices that it is contributing its expertise to other industries via Lumics, a 50/50 joint venture with the McKinsey consulting firm. So far customers of the two-year-old Lumics organization have included not only airlines and aviation OEMs but also companies in the chemical and oil and gas industries, which have similar maintenance-intensive processes and safety concerns.

AAR: Software Tools

Software tools are often employed to support Lean process improvements. This is especially true in the case of AAR, whose StAAR (Strategic Tools by AAR) work flow management software has been enhanced to help implement process changes, driving improvements in cost recovery and cash flow.

AAR has Lean teams at practically every facility, Kleiman says, and these teams are coordinated and harmonized at the group level to share best practices and move resources to where they are needed. The overall goal is to provide a uniform level of service or what the company calls "one MRO."

The company has held "value stream mapping events" to optimize the management of processes such as contracting, communications with customers, billing, and negotiating with customers, Kleiman says.

Aspects of the billing cycle have improved dramatically, thanks to Lean. And customers participated in the Lean team that developed the improvements. Among the optimizations that resulted from their analysis are customer approvals or rejections of requests for expansions of the scope of work or labor hours within 24 hours. The process improvements were supported by the development of an electronic log, which is linked to the StAAR system. This allows customers to approve or reject requests on-line via their iPads or iPhones. **AM**

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SMS for MROs

By Dale Smith



"As soon as you see a mistake and don't fix it, it becomes your mistake." – Author unknown

Safety management systems are rapidly becoming differentiators for today's leading MROs. Starting with the right plan and culture are critical to making your SMS implementation a success.

The fact is there are very few industries that are as unforgiving of errors as aviation maintenance. Unfortunately for us, mistakes are just as much a part of the human condition as breathing. So how can mistakes be found and fixed before they become headlines?

Well, the one methodology that is catching on in the MRO industry is to implement a Safety Management System (SMS). While that seems simple enough, there's really a lot to it – especially if you want to do it right.

First off you have to define what an SMS is. The typical definition for an SMS in aviation maintenance is a system of steps or processes that help identify problems or errors that happen while working on an aircraft. But, when you talk to the SMS experts, that definition only puts a small piece of the safety puzzle in place.

"Initially many organizations think that an SMS program is just about the technicians on the shop floor. It's not. The important thing is that a safety management system is for everyone in the company," Don Baldwin, president, Baldwin Safety & Compliance said. "Meaning that in the typical MRO setting you might have

elements of the program that are for the technicians and others for the supervisors, parts people, line service technicians – even the front office people. To be successful, it has to look at every person in the company and what they do."

"For example, say a secretary comes into the hangar and sees something that can be dangerous – a cable on the floor or something – everybody in the hangar is used to it being that way so they don't even see it," he said. "The problem is invisible to them. Outsiders will see that immediately and can question it. SMS gives them the tool to do that in the right way."

Baldwin said that having everyone in the company involved in identifying potential safety issues is critical to getting the information you need to make it all work. "Where we continually see difficulties and disconnects in companies is when the program is just dropped on a technician, or anyone for that matter, with no up front training or guidance," he said. "They're just handed the forms and told to fill them out if they see any issues."

"Providing the right training to everyone in the company is critical to the program's initial implementation and ultimate

success," explained Theresa McCormick, president, ATC Vantage. "An SMS program is only as good as the information you get from your employees so there will be a variety of reports: There will be mandatory reports, voluntary reports, and anonymous reports. The voluntary and anonymous reports are the hardest to get employees to use properly."

Ms. McCormick explained that there are a number of reasons why employees will not want to file some types or reports, including:

- Lack of training to know what information is needed in the report.
- Poor report formatting/questions.
- Lack of time for employees to properly fill-out the reports.
- The belief that they'll put in the effort and nothing will change.
- The stronger belief of punishment, harassment or negative attention from management.

She also stressed that to eliminate these issues, employees really have to understand and buy-in to the company's commitment that this information is only being collected to help eliminate (or mitigate) safety issues. Everyone must be assured that it's not a proverbial Witch Hunt in disguise.

"If I were helping a company implement an SMS program, the first step toward establishing this trust would be by issuing a policy statement from the very top management," she said. "There has to be a commitment for the addition of necessary human and material resources (budgets). The commitment to SMS must be evident to the employees. It must be more than a few words on a policy statement or it will be perceived as just another 'program of the day,' and doomed to fail."

Ms. McCormick said that once that commitment is made, the next step would be to do a survey of their employees to see what the current company culture is like.

"The majority of companies – large and small – would be surprised at how their employees actually view the current culture," she said. "Finding out where you are and what your workers believe management does to support them will tell you a lot."

So why is this so important? Well, one of the parts of an SMS that so many individuals and companies struggle with is it requires people to not only tattle on themselves, but on fellow employees. As you can guess, there are countless instances where people have used the reporting forms to wage their own personal vendettas against other individuals.

That's just something management is going to have to learn to weed out.

With regards to telling tale on themselves



The Safety Management International Collaboration Group (SM ICG) is a group dedicated to promoting a common understanding of SMS principles and requirements, and facilitating their application across the international aviation community. The group consists of representatives from the FAA, CASA, EASA, ANAC, TCCA and ICAO.

1. What is a safety management system (SMS)?

- A safety management system is a series of defined, organization-wide processes that provide for effective risk-based decision-making related to your daily business.

2. What does the SMS focus on?

- SMS focuses on maximizing opportunities to continuously improve the overall safety of the aviation system.

3. What are the key processes of an SMS?

- Hazard Identification – a method for identifying hazards related to your organization;
- Occurrence Reporting – a process for the acquisition of safety data;
- Risk Management – a standard approach for assessing risks and for applying risk controls;
- Performance Measurement – management tools for analyzing whether the organization's safety goals are being achieved; and
- Quality/Safety Assurance – processes based on quality management principles that support continuous improvement of the organization's safety performance.

4. What are the roles and responsibilities within the SMS?

The senior manager/accountable executive is accountable for establishing the SMS and allocating resources to support and maintain an effective SMS;

- Management is responsible for implementing, maintaining and adhering to SMS processes in their area; and
- Employees are responsible for identifying hazards and reporting them.

5. How will SMS benefit my organization?

- Provides for more informed decision-making;
- Improves safety by reducing risk of accidents;
- Provides for better resource allocation that will result in increased efficiencies and reduced costs;
- Strengthens corporate culture; and
- Demonstrates corporate due-diligence.

6. What key qualities are evident in organizations with an effective SMS?

- A top-down commitment from management and a personal commitment from all employees to achieve safety performance goals;
- A clear roadmap of what the SMS is and what it is supposed to accomplish;
- An established practice of open communication throughout the organization that is comprehensive and transparent, and where necessary, non-punitive; and
- An organizational culture that continuously strives to improve.

7. What SMS is not:

- Self-regulation / de-regulation;
- A stand alone department;
- A substitute for oversight; or
- An undue burden.

8. What SMS does:

- Builds on existing processes;
- Integrates with other management systems by tailoring a flexible regulatory framework to your organisation; and
- Demonstrates good business practice.

9. What's the difference between SMS and a flight safety program?

- A safety management system is primarily proactive/predictive. It considers hazards and risks that impact the whole organization, as well as risk controls. A flight safety program is primarily reactive and typically focuses on only one part of the system - the airline operation.

10. What's the difference between SMS and quality management systems (QMS)?

- SMS focuses on the safety aspects of the organization.
- QMS focuses on the services and products of the organization.
- While QMS focuses on conformity, SMS focuses on hazards. Both non-conformities and hazards can impact safety.
- Both systems enhance safety and are essential and complementary management tools. You cannot have an effective SMS without applying quality management principles.

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Ms. McCormick said that management needs to make it crystal clear that they are not going to reprimand someone from fessing up to making an honest mistake and having the courage to share it with the rest of the company. If you can't get the information your SMS is dead in the water.

"You have to make it clear that the SMS is not there to protect people who willfully violate regulations or procedures," she said. "Again, it's about knowing what your employees believe will happen if they file a report. You may even have to hand out rewards. (And, no, a day off without pay is not a reward – ED). I know that rewarding someone for confessing bad behavior is counterintuitive, but sometimes you have to do that to build trust."

"But, again it's different for every organization," Ms. McCormick said. "It starts with the employee survey. It's not hard. There are online survey forms free on the Internet. I have a list on our website." (www.actvantage.com/resources)

Better Safety Through Training

While it may seem that getting buy-in from the guys on the floor would be the hardest part of implementing an SMS program, that's not always the case.

"In our experience often the biggest roadblock is found in the company's leadership: there are multiple ideas of what it (SMS) is and how it needs to be managed," stated Sarah MacLeod, executive director, Aeronautical Repair Station Association (ARSA). "Most companies believe that they are already as 'safe' as they are going to get and anything else just adds to their paperwork and overhead."

"But the fact is, these SMS systems need to be treated as business systems – not just for quality, or safety, or some other singular element," she said. "That's why training for everyone involved in any aspect of your operation is so very important."

Ms. MacLeod stressed that ARSA experience has routinely found that proper training is the number one tool for maintenance providers to help eliminate or mitigate mistakes.

"Training can't stop all bad acts from having a consequence, but it can dramatically reduce the consequences of those acts by having properly trained technicians and supervisors," she said. "And by training I mean they understand the entire process: They won't work if they don't have the right data. They won't work if they don't have the right tools. They won't sign off on anything that's not done right. Period!"

"A clear understanding of what services

the company can provide to its customers is a critical part of training. Training must include your sales, purchasing and contracts departments for example," Ms. MacLeod said. "Let's say your sales staff is selling a service, but they don't really understand regulatory compliance. Making certain the elements are in place before the work can be done should not be left to the quality department or the technician on the floor. You aren't managing safety if you sell a service without understanding your customers' regulatory needs and what your company can do."

"It's possible for you to get an article in your door you can't work on," she said. "That puts undue pressure on your staff to try and quickly get compliant to do the work. That's a predecessor to who knows how many safety issues."

SMS as a Business Advantage

While there's little debate of the safety benefits of a well-run SMS program, there's also a growing shift for companies to require their service providers to have an auditable SMS in place.

"What we're seeing with charter operators is that the ones with SMS programs are using it as a competitive advantage now and I see it becoming a differentiator with the selection of MRO services as well," Baldwin said. "There is a growing wave amongst corporate operators to eliminate shops that do not have an SMS in place."

"Today's businesses need to clearly distinguish between the standards for complying with an aviation safety regulation and the higher standards demanded by their customers and commercial obligations," Ms. MacLeod said. "When an MRO does its safety management system risk assessment it needs to ensure that the final guidelines meet the requirements of its target customers and fully complies with their regulatory requirements. If I don't understand what those requirements are, then I've created a big roadblock to my company's success."

"While it's not yet mandated, it won't be long before SMS programs are required by the FAA," Baldwin said. "We believe the next sector being identified for regulatory oversight if you will, are the Part 135 operators, MROs and flight schools. So the sooner you start implementing a program, the better off you will be in the long run."

First Step to SMS Success

Okay, so you're ready to take your first step to implementing and SMS in your operation – trouble is, what's the right first step?

"Implementing an SMS is not something

you can just try. It has to be a total commitment from the beginning or it's going to fail," Ms. McCormick said. "The problem with that situation is when it is ultimately mandated by the FAA, you'll have an even harder time getting your employees to buy in a second time."

"I'd tell any MRO to absolutely start with attending some kind of training program. That's critical. There are a lot of components to an SMS," she said. "We typically like to see two people from a company come to our classes. There's a lot to take in during a short time and it's easier with two people."

Ms. McCormick said that the second step is for those who attended the training to go back and make a presentation to the upper management that includes not just what they learned but a workable implementation plan tailored for their company.

"You need management's buy-in and that includes all the details like how much is this going to cost? Will you need to hire someone to manage the SMS program in house? Will you need to buy new equipment? How much training will each group of employees need?" she said. "Again, it's a total commitment to do it all the right way or do nothing."

"I also think it's important to include a listing of what benefits the company may receive once the program is in place. Safer working conditions and higher quality work are two obvious benefits. But, you should contact your insurance carrier to see if there are discounts for SMS implementation? Saving money is a huge motivator," Ms. McCormick said. "The bottom line is, it's not about making one department in your operation safer. SMS is something that everyone in your company and everyone who brings their aircraft into your shop for maintenance will benefit from." **AM**

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Major MROs Looking At New Markets

By Douglas Nelms





Sherilyn Moline Images.

The 51st International Paris Air Show, held at Le Bourget Airport this summer broke records including 2,303 exhibitors, up 4 percent, 351,000 visitors, an increase of 11.4 percent of which 151,000 were trade visitors, an increase of 8.6 percent over 2013. There were 130 aircraft on display and the show was inaugurated by French President, François Hollande on opening day. Aviation Maintenance was there lending an eye to aircraft maintenance and MRO developments. Here is a bit of what we learned.

Two of the world's major MRO providers announced plans at the Paris Air Show last June to branch out on a global scale, each exploring new territory.

AAR Corp., based in Wood Dale, Ill., said that under a Memorandum of Understanding signed with South African Airways Technical (SAAT), it will provide technical assistance to help SAAT streamline its maintenance operations. While the AAR program is still in the MOU stage, current planning is that AAR will initially serve as consultants, according to Kathleen Cantillon, VP, Strategic Communications. "We will just be providing technical assistance, sending people over to South Africa to work with SAAT, providing knowledge aimed at reducing costs, increasing efficiencies, training workers and helping them establish the right type of curriculum for their technical school to train mechanics." The agreement will also cover the integration of IT solutions, including AAR's IMRO Software Suite.

According to Musa Zwane, CEO of SAAT, the AAR agreement could potentially support a new MRO facility planned for West and Central Africa. The planning for a new facility is to meet the growing regional air traffic in sub-Saharan Africa and increasing international traffic.

SAAT currently provides maintenance for South African Airways as well as third-party maintenance at its Tambo International Airport facility in Johannesburg. It has the capacity to handle up to five

Boeing 747s in its 85,000 square meters hangar, performing up to C- and D- checks. Cantillon noted that the agreement with SAAT was supported by the U.S. Department of Commerce' Doing Business In Africa (DBIA) initiative. The agreement is a planned movement into the African market, with the company also looking for a joint venture to establish a facility that can serve other areas within Africa, "which is a really developing market place."

Last April AAR sold off all of its cargo business and is using that money to finance its international expansion, she said. The African market "is not an easy place to get your foot in the water," and going into that market would be hard without a local partner, Cantillon said. "So SAAT is an ideal partnership since they know the culture and the people. We have established a lot of programs in the United States, so we know how to do that. We can help train their aviation mechanics, which are always in short supply."

The company is currently evaluating future opportunities on a case-by-case basis, and believes strongly "in the importance of having a local partner for their expertise on vendors, workers, etc. We are focused on expanding in developing countries since that is where the growth is," Cantillon said.

AAR Corp. also recently signed a \$39 million contract with the UAE's AMMROC (Advanced Military Maintenance Repair and Overhaul Center) to help them build a state-of-the-art military MRO facility, Cantillon said. AMMROC is a joint venture between



Yosi Melamed, EVP and general manager, Israel Aerospace Industries (IAI) says the company is looking at three locations worldwide to expand their MRO operations. Sherilyn Moline Image.

Abu Dhabi-based Mubadala Development Company, Sikorsky and Lockheed Martin.

AAR will help AMMROC build the facilities from scratch, designing and building support areas such as hangars, work areas and machine and special processing shops for a military maintenance center. The facility will be in Al Ain, one of the seven Emirates that make up the United Arab Emirates.

Cantillon noted that while the MOU with SAAT is still in the early stages, the agreement with AMMROC is "well under way." The key significance of these agreements is that AAR, a well-known company in the United States, is now being solicited to provide technical assistance to international MRO operators in other countries, Cantillon said. "We are always looking for local partners in growing markets."

IAI Looking Abroad

Yosi Melamed, EVP and general manager, Israel Aerospace Industries (IAI), told **Aviation Maintenance** during a one-on-one interview that they now intend to go global, looking at three locations worldwide to expand their MRO operations through partnership agreements.

The IAI initiative to form joint global partnerships is a change in vision for the Israeli-based company, Melamed said. "IAI has the capacity for all MRO work, able to perform all MRO operations. But until today, we have been focusing on Israel. Since I assumed my position about a year ago, I have changed the vision for IAI. We intend to go global. We plan at least in the coming months to find three locations."

Melamed said that two of the locations have already been chosen, although he would not say at this time where they were, although he did say, "Look where the MRO business is growing."

He hopes to have the first partnership in place later this year or early 2016, with

the second announced in late 2016. The third location has not yet been determined. "We are still exploring that one," he said. The partnership will be initially for heavy maintenance, "then we will see how much to expand depending on the success of the facility," he said.

He emphasized that the new joint efforts will be through partnerships, not through mergers. "The partner will be someone who has the capability to support our capabilities, and our capabilities can support their capabilities." He also emphasized that this global expansion was his vision that he can clearly see. "I'm pretty sure it will happen, but it still needs the approval of the board. We expect to get the go-ahead within the next few months." The success of the global expansion will be based on his philosophy on three key issues—quality, on-time delivery and responsiveness to the customer. "All of these should be over 99 percent," he said.

IT Entering Third Phase

The continuing growth of the use of information technology (IT) in maintenance automation was also a key topic at the Paris Air Show. In an article published last year in the Harvard Business Review, PTC President and CEO James Heppelmann stated that IT is now entering its third "transformation." The first, in the 1960s and '70s, was simply the introduction of individual IT elements into established systems, such as computer-aided design and manufacturing (CAD/CAM).

The rise of the Internet introduced the second stage in the '80s and '90, allowing "coordination and integration across individual activities, with outside suppliers, channels and customers. It allowed firms, for example, to closely integrate globally distributed supply chains," he said. PTC is a Needham, Mass.-based software solutions company.

The third wave is allowing IT to become

an integral part of the product itself, in which "embedded sensors, processors, software and connectivity in products, coupled with a product cloud in which product data is stored and analyzed and some applications are run, are driving dramatic improvements in product functionality and performance."

Lee Smith, PTC vice president said that they are now developing what they call "Smart, Connected Products" applications, an integrated set of supply chain enabling solutions, that allows MRO clients to know what parts will be needed, when they will be needed and where the parts are located.

The challenge is that with the massive amount of data coming from products and systems, "how do you manage and make the information useful," he said. "We now have a platform and applications that can leverage that information, and enable our clients to use that information, to build applications and systems that can take advantage of the Internet of Things (IOT) revolution to accelerate and leverage Smart, Connected Products and Systems."

This provides an "end to end" link to product information...taking data off of an aircraft, analyzing it and using it to position material in the supply chain, Smith said. If an on-board sensor detects a problem with a part, such as a fuel pump, the sensor will tell the computer, which feeds that information to a ground-based system. Using the PTC platform and applications, that system will then signal the airline or MRO what part will be needed, when it will be needed and where to position it. "We tell them where and when they need the parts, allowing them to place the order with their suppliers. We stop at the recommendation. We do not execute the order," Smith said.

"We are taking the aftermarket service supply chain to an entirely new level. What that means is that we are using, in conjunction with information coming off the equipment sensors, to be more predictive and analytical in aftermarket service. We're also enabling OEMs to sell their products and solutions as a service verses than just a traditional equipment sell."

Smith said PTC introduced the Smart, Connected Products development initiative last year, and already have a significant number of early adopters and market movers adopting the technology across a number of industry verticals, including high tech, medical, industrial and A&D. "As an example, for military clients, we can tell them what their need will be for the next ten to twenty years, and in end-of-part life situations let them



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Ken Witcher, dean of the College of Aeronautics, Embry-Riddle University, said that there is currently a "lot of concern" in the industry about maintainers. Sherilyn Moline Image.

know so they can go to the supplier and place a last time buy."

He said that PTC has come a long way in the development of the solutions "where we will be doing more, including using advanced analytics to make better and more automated actions so that it becomes faster and more predictable—and takes the human inefficiency out of the loop."

Smith also noted "we are now on the verge of a massive disruptive force in technology. There will be a new wave of technology and applications that have an impact on every aspect of our lives—all connected to the industrial Internet. We are going to see higher and higher levels of automation. Even though we have

significant levels of automation today, we have only scratched the surface. There are still a lot of human inefficiencies and touch points in it. But it is continuing to evolve rapidly, enabling early adopters to take a significant competitive edge well into the future."

Wanted: Aviation Maintainers

First the bad news—it is still unclear whether there is a growing shortage of mechanics in the aviation industry. Now the good news—there is a growing number of young people who want to become aviation mechanics, and with a better education that will provide greater value to the maintainer and the organization in which he or she works.

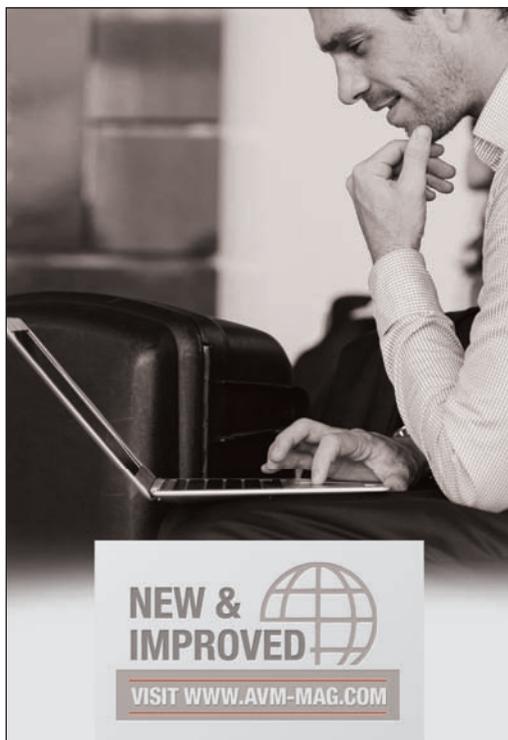
In a discussion with **Aviation Maintenance** at the Paris Air Show, Ken Witcher, dean of the College of Aeronautics, Embry-Riddle University, said that there is currently a "lot of concern" in the industry about maintainers. "The average age of the maintainers that we have is getting rather senior, so there is a lot of discussion about the need for young people coming into the program and how do we recruit them."

Of particular interest, however, is that Embry-Riddle's four-year bachelor of science and aviation maintenance degree program is the fastest growing degree program in the school's College of Aeronautics. "Over the past five years, we've almost doubled the number of students in that program, from about 800 to almost 1600."

This is resulting not only from young people wanting to get into the field of aviation maintenance, "but at the same time the aviation maintenance career field is starting to value education more than in the past," he said.

He noted that along with the growing technology required in the maintenance field, "it's not just a bunch of folks out turning wrenches, there is a lot of very sophisticated planning process that go into the management of aviation maintenance."

So not only are there major increases in technology required to do the basic maintenance work, there is also a growing awareness that maintenance is something





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AAR signed a \$39 million contract with the UAE's AMMROC (Advanced Military Maintenance Repair and Overhaul Center) to help them build a state-of-the-art military MRO facility, shown in rendering. AAR Image.

that has to bring value to the organization, how it fits into the sustainability of an organization's operations.

"So the ratio is changing from the person who can just do the basic maintenance criteria versus the person who understands the technology and the bigger picture."

Those are the things that are much more important than the basic A&P license required by the FAA, Witcher said. "That is the value that the industry is seeing now in the education (of the mechanic),

beyond just certification. The education that goes behind that, in our case the bachelor's level, that education has a real positive impact on the bottom line from the maintenance perspective."

The school's BS in aviation maintenance is currently focused on academic studies, Witcher said. "We don't do any of the hands-on, so we are not teaching to a certification level. What we are typically doing is teaching someone who is in the industry already, who has their A&P or are from the military. We're

teaching the bigger picture. We give them courses so that when they walk into the middle management position, they are going to walk in with a broader experience without the 15-20 years that it would have taken in the past to get on their own."

As part of that philosophy, the College of Aeronautics is now proposing a Master's Degree program in aviation maintenance to the Embry-Riddle board, Witcher said. "It will be the first of its kind in the country. Previously we didn't feel the industry would be interested in that kind of degree, but this year we are going to propose it because we now believe that aviation maintenance should be taught at the Master's level. It will be more of a professional degree. It's not an MS. It's just a Masters."

Witcher said he will go to the board of trustees this fall, then again in the spring. "So it is proposed to be launched in August 2016. The Board could say 'No', but we have heard good things back from the industry that it is something of value, and it is one of those things that just makes good sense."

The program will be proposed at 30 credit hours, so that it could be done within a year, although "the average will probably be 18 to 20 months," he said. **AMM**

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- Aftermarket**
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 - Repair Station
 - Distributor/Dealer
 - Inspection Authorization Services
- Operators**
- Commercial Airline
 - Business Aviation
 - Charter/Air Taxi
 - Cargo/Air Freight
 - General Aviation

OEM

- Airframe Manufacturer
- Avionics Systems Integrator
- Engine Supplier
- Manufacturer/Service Provider

Government

- Federal Regulatory Agency
- Government Maintenance Facility
- Military

Other

- Training School/Educational Facility/Consultants
- Others Allied to the Industry (please specify) _____

B. What is your job title? (Check only ONE)

- Owner/Partner/VP/Purchasing Agents

Supervisors/Director/Managers of:

- Maintenance
- Avionics
- Engineering
- Corporate Flight Dept.
- Customer Service
- Training
- Parts Department
- IA or Inspector
- A&P Mechanic
- Engineer

- Chief Pilot/Pilot
- Sales/Marketing Director/Manager/Supervisor
- Instructor
- Others Allied to the Industry (please specify) _____

C. Do you provide maintenance services or products for military customers?

- Yes
- No

D. What types of aircraft are supported by this business? (Check ALL that apply)

- Piston
- Light Turboprop
- Heavy Turboprop
- Business Jets
- Commercial Jets
- Helicopters
- Military Aircraft
- None of the above

E. Which of the following services does this business offer and/or utilize as an operator annually? (Check ALL that apply)

General Services

- Airframe
- Avionics
- Engines/Piston
- Engines/Turbine
- Interior Completion/Refurb
- Painting
- Technical Training

Specialty Services

- Wheels and Brakes
- Window Repair
- Corrosion Treatment
- De-Icing
- Instrument Repair
- Non-Destructive Testing
- Computer Maintenance Tracking/e-logbooks

- Composite Repair
- Landing Gear

Inspection Services

- Annual Inspections
- Hot Section Inspections
- Phase Inspections
- Letter Checks (A, B, C, D)
- Remote visual Inspections
- None of the Above

F. Which of the following products/services/equipment does your company plan to buy in the next 18 months? (Check ALL that apply)

- Aircraft Paint
- Batteries/Battery Charges
- Communication Equipment
- Composite Materials
- Connectors/Circuit Breakers/Relays
- Corrosion Inhibitors
- De-Ice/Anti-Ice Fluids
- Fasteners/Hardware
- Filters
- Ignition Systems/Spark Plugs
- NDT Supplies
- Oils/Lubricants/Oil Filters
- Paint/Coatings
- Avionics Test Equipment & Supplies
- Airframe Test Equipment & Supplies
- Engine Test Equipment & Supplies
- Testing/Inspection Equipment & Supplies
- Tires/Brakes
- Tools
- Avionics
- RFID
- Software/Maintenance
- Software/Enterprise
- Software/Other
- Ground Support Equipment
- Landing Gear
- None of the Above

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INDUSTRY LEADERS

airberlin technik

airberlin technik was formed out of three maintenance facilities in 2011 and is the responsible MRO partner within the airberlin group. As an EASA Part-145 approved MRO facility, approximately 1.400 profoundly trained and highly motivated employees provide a wide range of services, such as Line- & Base Maintenance, Field Service Support, Total Customer Care, Engine Housekeeping, Engineering Management and Component Repair not only to aircraft of the airberlin group but also to a continuously expanding number of customers worldwide. With Etihad as strong partner a fundament for a successful service concept was established which combines experience and knowledge gathered through years of maintaining a diversified aircraft fleet. Stations with maintenance facilities including hangar space are located in Dusseldorf, Munich, Berlin-Tegel, Berlin-Brandenburg, Nuremberg and Vienna. Line Maintenance teams ensure service on a 24/7 basis at all airberlin stations. Experienced and well trained teams offer the necessary skills of all what an aircraft needs in Heavy Maintenance including Checks of all levels. As a matter of course, high demands on safety and reliability standards always make sure that customers meet best conditions to get their aircraft dispatched on-time.

airberlin technik is also expanding on the segment of Field Service Support so that customers who need support at their own facility or any other destination can benefit from services such as full video borescopes (engine & APU), post bird strike inspection, implementation of Service Bulletins, blending but also major structural repairs. Years of experience, special tools and storage facility set the stage for Engine Housekeeping as well - QEC Build ups, blending, routine maintenance, borescope service, inspections and re-assembling of QEC-Kits completed including all relevant logistic services.



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Amongst other activities the team is specialised in:

- LOPA Changes
- Cabin Reconfigurations
- Cabin Equipment Modifications
- Video Surveillance Systems for cabin and cargo areas
- Cabin Item Replacement & Installation
- Modification & Certification for Livery Changes
- Connectivity Integration

The teams are able to modify all types of large airplane such like Airbus, Bombardier, Boeing and Embraer but also for all other manufacturers and aircraft types. After gaining a lot of experience



while phasing in connectivity into airberlin's own fleet a dedicated team of specialists is now well prepared to implement Wifi into other customers' aircraft. The modification will be performed in Vienna under the lead of our Austrian subsidiary NIKI.

Just recently airberlin technik opened up a new Shop for Wheels & Brakes in Kosice, Slovakia. Brand new equipment and well trained personnel will guarantee customer satisfaction and a very short turnaround time for Wheels and Brakes.

The portfolio includes:

- A320 Family & A330
- B737
- Q400
- all other aircrafts types if the volume is sufficient

The, by the EASA and GCAA approved, airberlin academy is continuously expanding their capacities for technical trainings. The facilities based in Berlin, Dusseldorf and Munich can accommodate up to 220 students at once. A flexible team of instructors perform can perform onsite training. In addition to that the airberlin academy is able to provide Engine Run Up practical training in Dusseldorf. The simulator represents a virtual aircraft – containing a fully functional MCDU – that allows insight in every single compartment. Removal/ Installation and troubleshooting procedures – even measurement of connectors – can be practiced with the new simulator. 250 maintenance errors as well as all maintenance activities can be simulated. All functions can be demonstrated in the cockpit and animated schematics represent the configuration of the subject aircraft systems. This simulator will clearly improve training quality and will help to focus even more on customer requirements.

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- Human Factors in accordance with EASA145.A.30(e)
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Aeropeople have recently entered into a partnership with Marshall AeroAcademy, a Part-147 training organisation, who provide a full lifecycle approach to training from basic handskills and Apprentice training through to Aircraft type courses and degree level qualifications.

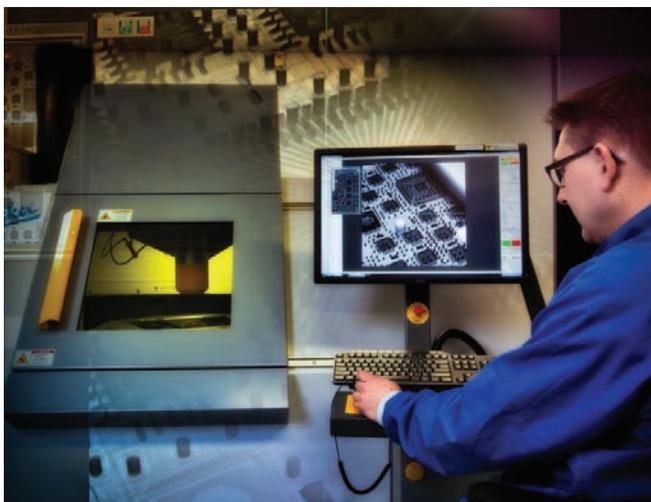
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Fokker Services

Fokker Services is an independent aerospace services provider, supporting a wide range of regional, commercial and military aircraft. Our services range from Type Certificate Holder related product support services to component availability programs and aircraft completions and conversions. The combination of OEM (design) knowledge and independent after-sales support services makes us a unique and valuable partner for the aerospace industry.



Whether you need a comprehensive set of total aircraft conversion and support services or a tailored package of MRO services, Fokker Services has the skills and capabilities in house to exceed your requirements.

FLYFokker

As type certificate holder of all Fokker aircraft operated today we are fully committed to safe and reliable operations. We dedicate ourselves to keeping Fokker aircraft competitive. With our FLYFokker program we are providing complete solutions for services and technology, solutions for all phases in the life cycle of the operation. The program consists of cost effective aircraft and service solutions for start up, mature and phase out operators. FLYFokker is supported by a large number of strategic partners.

ABACUS Logistic Support Program

A unique, customizable, nose-to-tail service that guarantees the availability of all line replaceable components for your aircraft. We have the capabilities to handle all component maintenance needed and unlike other providers, we develop fully approved alternative repairs

and parts which will add value and control the cost. Next to all Fokker aircraft types, this program is also available for Bombardier Dash8 Q100/200/300 aircraft, CRJ 700/900/1000.

Next to the Full coverage of the ABACUS program, Fokker Services also offer solutions for specific subsets of components. These so called ABACUS Solutions have a strong focus on the component reliability and the Direct-Operating-Costs of a specific system (eg; environmental control, Engines accessories,) Fokker Services is confident that with this system oriented approach in combination with our flexibility, customer focus will safeguard a maximum availability of your aircraft and protect your asset-value. These solutions are also available for Boeing 737NG.

Aircraft MRO

Among commercial and defense operators, Fokker Services has developed a reputation for excellence in Aircraft MRO. These services include: maintenance, modification, painting, working parties, damage assessment, fleet management support, CAMO, AOG support and turnkey solutions for severe repair and ferry flight preparation. Downtime will be kept to the absolute minimum without comprising safety and quality. In addition to Fokker aircraft a lot Airbus, ATR and Boeing MRO and redelivery work is done.

CMRO

Fokker Services has in house CMRO capabilities and local CMRO presence in all regions as part of the integral offering. Back shops and repair shops for one-stop-shop & redelivery offering AMRO, including In house repair capability for repair management/availability programs.

Modifications

The knowledge as Fokker Type certificate holder is used for many different modifications. We launch over 300 new modifications a year on different aircraft types such as Fokker, Bombardier Dash 8 & CRJ, Airbus A320 family and Boeing 737. Some examples are the EFB solution for iPad, interior solutions and GNSS. This makes Fokker Services the biggest modifications supplier in the world on a retrofit basis. On the site Modstore.aero we offer a trading place for aircraft modifications.

Completion Services

Fokker Services is dedicated to helping you to get the most out of your fleet. From simple upgrades to conversions or completions from scratch, we work with any aircraft for any purpose, from VIP private or corporate to commercial and defense requirements.

Global Presence

Fokker Services has 3 locations in The Netherlands: Schiphol Airport and nearby Hoofddorp as well as Woensdrecht Air Base, which has a large hangar facility. Additionally, there are facilities in Atlanta and LaGrange, Georgia, USA, as well as a 2012 built 'state of the art' hangar facility at Singapore's Seletar Airport.

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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.

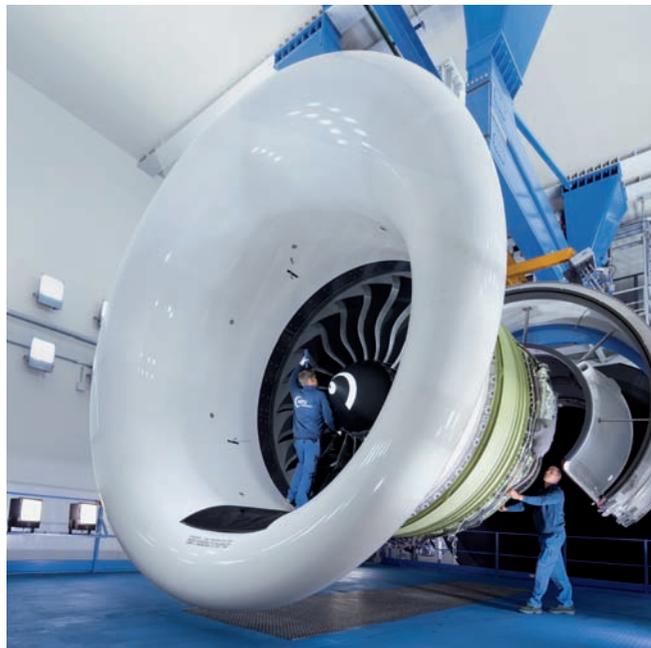
Apart from traditional engine MRO services, a compelling choice of specifically tailored packages consequently follow the customers' individual needs, allowing them to have their engines managed in the best possible way throughout the entire life cycle. At the same time, MRO costs are reduced significantly. 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

- 1) P&WC Customer Service Center Europe
- 2) Turbine Center Frame (TCF)
- 3) Low Pressure Turbine (LPT)
- 4) Planned

For further information contact us at:

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AAR Wheel & Brake Services

AAR WBS® offers commercial, military and regional aviation customers a complete program of aircraft wheel and brake services including repair, rebuilding and inspection for all major aircraft types. Our high-tech testing and certification process ensures that hairline fractures and other nonvisible stress defects are detected and repaired before they cause damage or affect safety. AAR provides fast turnaround from our modern 10,000 square foot facility, with an extensive inventory of long-lasting, original OEM parts. AAR's volume-buying capability allows us to offer the highest quality products at competitive prices.



Customer Benefits:

- AAR maintains a complete inventory of OEM parts on-hand for fast turnarounds.
- High-quality work delivered on time means improved safety and more landings for your aircraft.
- Exterior parts are cleaned and painted with durable coatings. Professional priming and painting extends part life by protecting metal parts from debris and wear.
- Backed by AAR's global presence, our diverse product offering and professional services enable us to meet all your program needs.



Competitive Differentiators:

- **Experience** — AAR is experienced in all aspects of wheel and brake overhaul, rebuild and repairs.
- **Quality** — AAR maintains a complete inventory of OEM parts on-hand for faster turnaround. Quality OEM parts last longer and are manufactured to meet the highest standards.
- **Capabilities** — AAR performs critical testing and certification on all models in accordance with FAA, EASA and CAAC.
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Service provided to the Strategic Air Command and the KC-10 "Extender" fleet

When you need reliable wheel and brake services, nothing endorses that more than the support of the KC-10 fleet of refuelers. AAR WBS is critical to missions around the world as we support military air operations for Overhaul and Repair to the Strategic Air Command.

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Established in 1967, Monarch Aircraft Engineering (MAEL), the engineering division of The Monarch Group is one of Europe's leading independent MRO's. MAEL operates globally, supporting clients located in east and west Europe, Middle East, Australia and North America. The Company has superior knowledge in maintaining legacy fleets and is also a leading MRO for new technology aircraft, including the Boeing 787 Dreamliner, for which it is one of a small group of worldwide Boeing-approved GoldCare providers.



Heavy Maintenance

With facilities strategically located at London Luton Airport, Birmingham Airport and Manchester Airport in the UK, MAEL are capable of accommodating up to twelve lines of heavy maintenance across Boeing, Airbus, Embraer and Bombardier types including the Boeing 737NG, 757, 767 and 787 Dreamliner as well as the Airbus A320 family, A300, A310 and A330, Embraer 170, 175, 190, 195 and Bombardier Q400.

Line Maintenance

MAEL has a reputation as being one of the leading line maintenance providers in the UK and overseas. With permanent year round stations at London Gatwick, London Luton, Birmingham, Manchester, Leeds Bradford, Copenhagen, Malaga, Warsaw and Kiev the company can support, including all levels of maintenance on Airbus, Boeing, Embraer and Bombardier aircraft types.



AOG Support and Assistance

MAEL is acutely aware of the significant damage to airline operations and revenue when AOG events are not responded to immediately. In order to ensure that the necessary action is taken to manage the operational limitations, Monarch has created a Specialised Monarch AOG Response Team (SMART). Available 24/7, this service is managed through Monarch's Integrated Operations Centre (IOC).

Component Services

With an established a state-of-the-art component maintenance centre, the facility has an excellent range of tools and test equipment, and several workshops, including avionics, composites, and mechanical services. With a \$100 million spares inventory, Monarch Aircraft Engineering is able to provide full spares support programmes on a flight-hour basis as well as offering components on a loan and exchange basis. Consignment stocks are available, and Monarch's team of experts can also advise on initial provisioning packages and stocking policies. The spares inventory owned by Monarch is dual-released with both EASA and FAA certification.

Fleet Technical Support

MAEL has an industry leading Continuing Airworthiness Management Organisation (CAMO) and Part 21 Subpart J Design Organisation teams. The company provides CAMO services to clients across Europe, the Middle East, Australia and North America. Focused on delivering first class solutions to operator, they recognise the significant costs of maintaining airworthiness management infrastructure and through their EASA Part M Subpart G Approval can create a service package to specifically support operator's exact needs.

Monarch Aircraft Engineering Training Academy (MAETA)

EASA Part 147 Approved aircraft type training is delivered by the Monarch Aircraft Engineering Training Academy. MAETA has gained a worldwide reputation for its continuing high standards and provides technical training for numerous aircraft types and engine combinations. MAETA can also provide tailored technical and safety management systems (SMS) consulting services to airlines, MROs, and supply chain organisations. These services can be offered on a short-, medium- or long-term basis, and can be tailored to specific client requirements.

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IBERIA MAINTENANCE & ENGINEERING AND BRITISH AIRWAYS ENGINEERING

The merger of the Iberia and British Airways businesses under the IAG banner in April 2011 will have a great impact on the MRO market. With the progressive integration of services, the world class engineering capabilities, facilities and expertise of British Airways Engineering and Iberia Maintenance & Engineering have come together to provide global carriers with compelling, premium MRO services.

The combined capabilities of the two companies provide airlines with high-quality services that deliver real value for money. With worldwide reputations for engineering excellence, Iberia Maintenance & Engineering and British Airways Engineering provide customers with a flexible approach that keeps their fleets in the air for longer. Combined, the two MROs can provide customers with:

- Full airline engineering and maintenance capability
 - o Aircraft management
 - o Aircraft maintenance and repair
 - o Modification design and installation
- Approximately 8,700 staff
- Base maintenance at Madrid, Heathrow and Gatwick
- Heavy maintenance at Madrid, Barcelona, Cardiff and Glasgow
- Engine overhaul shop at Madrid
- Component maintenance sites at London, Cardiff and Madrid

The merger of the two MROs has significantly widen the capabilities and extended the scope of each business, ensuring airworthiness, increasing the efficiency and substantially reducing aircraft downtime for more carriers in more locations.

Boosting some of the broadest capabilities in the market, the combined company can deliver MRO services for Boeing 737, 747, 757, 767, 777, 787 and Airbus 300, 320, 330, 340 and 380 families as well as the MD80. It can also provide repair and overhaul services for APUs including GTCP85-98, GTCP36-300 and 131-9A.

Iberia Maintenance & Engineering offers engine process on a wide range of products such as CFM56-5A1/-5B/-5C4, CFM56-7B; RB211-535E4/-C, CF34-3A/-3B, V2500, RR Pegasus MK 154 and JT8D-217A/-C. The company leading edge technology and innovative repair procedures developed in-house.

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Air France Industries KLM Engineering & Maintenance: a major multi-product MRO.



About AFI KLM E&M

AFI KLM E&M offers a comprehensive portfolio of Components & Logistics support for Airbus, Boeing and regional aircraft, GE and CFM engine overhaul, and airframe & modifications services. AFI KLM E&M provides expertise and scale effects based on its support for close to 1500 aircraft worldwide.

Its 14,000 highly-skilled personnel working in world-class facilities leverage more than 80 years of hands-on experience. From one-off repairs to all-in fleet support, AFI KLM E&M meets and surpasses the requirements of today's highly-competitive civil aviation market.

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The AFI KLM E&M Network

AFI KLM E&M is consolidating a strong network of subsidiaries and joint ventures, both for the development of new products and the extension of its geographical presence. These include:

- US-based component units Barfield, AeroTechnologies and Precision Electronics (component support, repair and GSTE),
- Spairliners in Hamburg (A380 and E-jet component services),
- EPCOR in Amsterdam (APU and APU component maintenance),
- AFI KLM E&M Components China in Shanghai (component services),
- Max MRO Services in India (component services),
- AMES in Dubai (Aerostructure services),

- KLM UK Engineering in Norwich (full maintenance of Boeing 737, regional fleets and A320 Family),
- Aerotechnic Industries in Casablanca (A320 Family and 737NG Airframe services),
- CRMA in Paris (engine parts repairs),
- Bonus Tech and Bonus Aerospace in Miami (engine tear down and engine MRO)
- Tradewinds in Florida (Engine parts trading)

A single point of contact and local support is provided by sales offices all over the world. Ultimately, the strength of AFI KLM E&M lies in the extent of its knowledge, flexibility and experience, combined with its worldwide network support.

The MRO Lab

As an Airline MRO, AFI KLM E&M has developed a unique portfolio of know-how and engineering capabilities reflected in its development of a wide range of value-adding innovations. This mind-set has always been deeply embedded in Group DNA.

"The MRO Lab" is a R&D program where all the innovations developed by AFI KLM E&M and its network of affiliates converge. Specially tailored to the challenges of aircraft maintenance, the innovations are the fruit of continuous development aimed at satisfying the requirements of airline operating performance. The know-how deriving from mastery of these technologies benefits AFI KLM E&M clients by generating scale effects and optimizing fleet performance.

The MRO Lab
Adaptive Innovations

Approvals and certification

- **European approvals (EASA and DGAC)**
EASA Part 145, Part M subpart G, Part 21J, Part 21G, Part 147
- **US approvals**
FAR 145: FAA approved Repair Station: CNFY912C
- **Other international approvals**
Over 30 approvals have been granted to AFI KLM E&M by a number of international authorities (and notably CAAC), enabling the Group to work on aircraft registered in the countries concerned.
- **Certification**
AFI is the world's only MRO to have obtained Global and Unique Certification covering nine international standards for all of its facilities: ISO14 001 (Environment), ISO 9001 (Quality Management), EN 9100 (Aircraft Design), EN 9110 (Aircraft Maintenance), EN 9120 (Logistics and Storage), ISO 22 000 (Food Safety), OHSAS 18 001 (Occupational Health & Safety), ISO 15 489 (Records Management) and ISO 26000 (Sustainable Development). In the Netherlands, KLM E&M's avionics unit is also ISO 14 001 certified.

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Component Control

Component Control, based in San Diego, Calif., is a leading developer and provider of MRO and Logistics Software solutions for the aviation industry. Its core product, Quantum Control, provides advanced aviation management support to original equipment manufacturers, aftermarket service divisions, component repair and overhaul companies, fixed base operators, aircraft completion centers, airlines, MRO facilities, and part distribution / redistribution companies. Quantum is installed in over 50 countries and can be deployed as a single-site or multinational solution.

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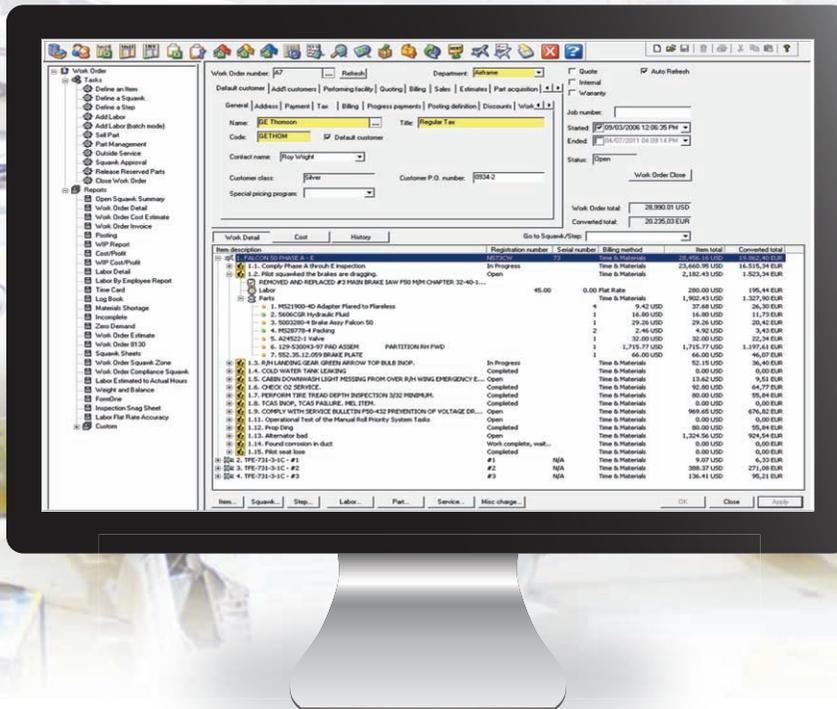
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Instructions for Continued Airworthiness

– Are You Getting All the Right Data?

The FAA has issued new draft of its guidance on Instructions for Continued Airworthiness (ICA). The changes are not earth-shattering, but they serve as an excellent reminder of the FAA's policies on ICAs.

ICAs are very important to repair stations and other facilities that perform maintenance and alterations. These documents provide the instructions that are typically followed by repair stations performing preventative maintenance, maintenance, and alteration on aircraft. By following these instructions, repair stations help to ensure that aircraft remain safe.

Increasingly, we are encountering stories of repair stations that are having problems obtaining the ICAs that they need in order to perform maintenance or alteration, safely. When a repair station is unable to obtain the latest versions of the ICAs, or when ICAs become incomplete because a previously-published repair has been removed in order to reserve it for use only by certain repair stations, then this can be the first domino in a chain that leads to a safety issue.

What Are the ICAs?

In general terms, ICAs are the maintenance and overhaul manuals on which we rely for maintenance and overhaul instructions. But this simple view of ICAs can easily miss some of the important yet subtle issues that surround those manuals. Technically speaking, ICAs are limited to the specific instructions that are required by the appendices that describe ICAs.

Different products have different requirements. For example, engine and propeller ICAs specifically require overhaul instructions, while airframe ICAs

typically require information about recommended overhaul periods. It is normal to require a list of special tooling in the ICAs, but only the ICA regulations for engines require specific instruction on how to use the that tooling.

Who Produces the ICAs?

Most people understand that the typical source for ICAs is the manufacturer. In most cases, the manufacturer is both the design approval holder and the production approval holder. But in those rare cases where there is a split between the design approval holder and the production approval holder, the official responsibility for creating the ICAs rests with the design approval holder.

In addition, though, other design approval holders, including those who hold supplemental type certificates (STC), may have obligations to produce ICAs.

The design approval holder must produce ICAs that meet the appropriate regulatory requirements. The FAA imposes this obligation on design approval holders as a condition of the design approval, in order to make sure that those important safety instructions are created and shared with the parties that use them to maintain airworthiness in the aviation system.

The basic theme of the ICA requirements remains the same. The ICAs should provide the information that is necessary for an operator to maintain the airworthiness of the product. And in the modern era, that frequently means instructions for the operator's maintenance contractor, who has an obligation to follow the instructions that the operator has identified for their fleet.

Some manufacturers may have "conditional" obligations to produce ICAs. For example, PMA

holders are typically required to analyze whether the TC ICAs remains valid when the PMA is installed. If they remain valid, then the PMA holder does not need to produce alternative ICAs (and in fact should not do so). This approach helps to relieve confusion by continuing the use of the baseline ICAs when such use has been shown to be appropriate.

But if the Type Certificate (TC) holder's ICAs are no longer valid, such as when the PMA makes a change in the design of the product that changes the necessary maintenance instructions, then the PMA part may have its own ICAs that supplement the TC ICAs.

What About Instructions for Subsidiary Components?

Generally, ICAs must include instructions for each appliance required by the regulations. So if the regulations (including operating regulations) require an avionics device for an aircraft, then the ICAs for that avionics device are required to be part of the ICAs for that aircraft.

The ICAs can be supplied by the manufacturer of the appliance, particularly if the appliance is complex. But if the ICAs are not supplied by the appliance manufacturer for any reasons, then the aircraft manufacturer typically is required to include the essential airworthiness information for the aircraft (as related to that appliance) in its own ICAs.

ICA Problems for Repair Stations

The regulations that describe the contents of the ICAs can be vague about the exact nature of the instructions that need to be included in the ICAs. This has become more noticeable in recent years. The ICA scope regulations are written broadly, so as to avoid unintentionally excluding important instructions. At the time that the ICA regulations were written, many large manufacturers did a fine job of creating comprehensive ICAs; but a minority of manufacturers was failing to develop adequate ICAs. The current regulations were designed to bring everyone to the same level in an environment where most manufacturers created ICAs. At the time, manufacturers often did not rely on the repair market for a significant portion of their revenues, so there was little competitive incentive to withhold instructions from repair stations, and there were sound safety reasons for providing comprehensive maintenance and overhaul instructions.

Fast-forward a few decades later and there are many manufacturers who also have repair facilities (or financial relationships with repair stations). They now compete with independent repair stations. And some manufacturers may be using their control of the ICAs to help leverage the competitive position of their repair capabilities.

Another ICA issue facing the repair station community is confusion about the difference between a manufacturer's manual and ICAs. The manufacturing regulations describe ICAs and require them to be produced and distributed. The maintenance regulations, and the repair-station-specific-regulations found in Part 145, make reference to manufacturer manuals. This has led some people to try to posit a difference between the terms (ICAs vs. manuals). The fact is that the difference in terms was not originally meant to have any meaning. ICAs are commonly called maintenance manuals and overhaul manuals. Once again, this was not really a distinction that anyone paid any attention to, until manufacturers started to use their manual systems for competitive advantage.

Air carriers and repair stations alike have complained about ICA incompleteness. It appears that some manufacturers are removing repairs from their ICAs and declaring those repairs to be "proprietary" in order gain a competitive advantage over independent repair stations. This can be very frustrating for operators and repair stations.

But the most important problems or repair stations is a simple issue of availability. The regulations are very clear that manufacturers need to produce ICAs and that they must be made

available. But some repair stations and air carriers continue to face problems obtaining the ICAs in conformity with the regulations.

Litigation surrounding the "make available" language in other parts of the law has clarified that when things must be made available, the party making them available cannot charge for them unless specifically authorized to do so under the governing regulation(s). Yet, some manufacturers insist on getting paid for making those manuals available. Payment can be a simple monetary payments, or it can be in the form of an agreement to indemnify the manufacturer, agreement not to purchase goods from competing manufacturers, agreement not to use repairs unless they are approved by the manufacturer (after already being approved by the governing authority, like the FAA) or other anti-competitive clauses.

Other times, manufacturers refuse to make the ICAs available to parties that they consider to be competitors (usually, competitors in the maintenance marketplace, but this sort of discrimination can also affect repair stations that have manufacturing divisions).

Facts vary, but some of these refusals to "make available" the ICAs are illegal. What sort of facts should you review if you are trying to determine whether a refusal to make ICAs available is illegal?

- **First**, determine which regulatory regime applies to your situation. The U. S. has strong regulations and guidance affecting ICAs, and the European Union also has very similar regulations requiring the production and sharing of ICAs.
- **Second**, determine whether the documents in question are covered by the regulations. Some manuals are not ICAs; but the FAA has interpreted its own regulations by explaining that when the ICAs cross-reference a different manual, the cross-referenced manual is incorporated by reference. Thus, ICAs that declare that the instructions for a specific function are found in another manual, incorporate that other manual by reference, and that other manual becomes part of the aforementioned ICAs.
- **Third**, determine the basis for the repair station's claim to be entitled to the ICAs. The FAA has published guidance suggesting that a repair station is not entitled to the ICAs until the affected product or article falls within the ratings and operations specifications of the repair station.
- **Fourth**, identify who, under the regulations has the obligation to make the ICAs available. Sometimes it might be the producer of a higher level assembly.
- **Finally**, connect the dots to show that the documents are ICAs and that the regulations require those documents to be made available to your business.

By following these steps, applying the existing regulations and guidance, and documenting their legal entitlement, repair stations and other parties entitled to the ICAs can help to show to their manufacturing partners (and to the regulators) that they are entitled to the ICAs in question.

Many manufacturers have asserted intellectual property justifications for refusing to distribute ICAs. In the next issue, we will examine some of those arguments and the reasons why they generally DO NOT excuse a design approval holder's compliance with the "make available" requirements. **AM**

Want to learn more?

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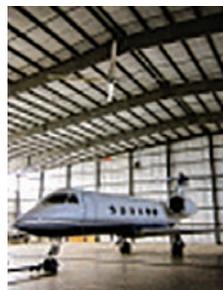
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Matthew Bromberg,
president, Aftermarket
at Pratt & Whitney

Aviation is always a dynamic place. With 12,000 active engines flying around the world, 6,000 professionals and 20 facilities open 24/7, we asked Pratt & Whitney's Matthew Bromberg, Aftermarket president how their company is reacting to the fun, exciting, dynamic aftermarket. He says this year in particular, Pratt & Whitney is undergoing a monumental change.

Next Generation Engines: Competing for Aftermarket Success

Over the next 15 years, the regional and mainline commercial jet installed base is projected to reach about 45,000 aircraft, which is nearly twice the 23,000 aircraft we have in service today. These aircraft are being rapidly introduced in emerging markets and are replacing aging fleets in North America and Europe.

A large percentage – about two-thirds – of these new aircraft will be powered by next-generation engines, engines that increase fuel efficiency and reduce maintenance visits for aircraft operators. Engines are being designed for less maintenance. Easier maintenance.

As next-generation engines and aircraft are incorporated at an unprecedented rate, those of us on the maintenance side need to take a hard look at what operators require to be successful. Are we still meeting our customers' needs or should we adjust our offerings and approach?

If we listen closely to airlines and operators, we learn that they demand competition, which leads to high-quality and fair-priced services. And they need a global maintenance partner that they can trust, one who is ready, reliable and proven, to service their next-generation engines today and 50 years from now.

Competition Breeds High-Quality, Fair Prices

Consumers in any market demand choice and competition – the more options the better – and at Pratt & Whitney, we agree. Competition in the aviation maintenance marketplace forces us to become better service providers. It requires that we do what is best for our customers at all times. It is the essence of our industry, and it makes us work hard to improve.

That is why, from the beginning, Pratt & Whitney designed an open, flexible approach to our Geared Turbofan engine maintenance that gives operators the choice they demand. To be close to our global operator base, facilities in the network are being strategically located in Asia, Europe and North America. As this network grows, we expect it to include engine partner shops, airline shops and independent MRO facilities.

Historically, most aircraft operators rely on the engine OEM to provide maintenance for a new engine's early years of operation. This is because they want cost predictability, and they recognize that new technology is best understood by the manufacturer.

Over time, independent maintenance providers and other third parties will join in, leading to a competitive marketplace providing a variety of service options for the aircraft operator.

This competition drives us to provide better service and better value for our customers.

Competition has Gone Global

Thirty years ago, most airlines had internal MRO capability. Fifteen years ago, many airlines outsourced MRO, but on a local or regional level. Today, airlines have a different view. Whereas previously many shops served captive regional or national markets, today we know that all shops compete on a global scale.

We have the global presence to meet our customers' needs. We have 6,000 employees worldwide to meet local needs. Add to that our partner network companies, such as MTU and JAEC. We have a GTF engine lease pool positioned to keep engines close to our customers around the globe. And to support customers in their own backyards, Pratt & Whitney will perform more maintenance on-wing and will increase the field force by 50 percent by 2020. At the same time, we are laser-focused on providing quality, speed and value. Our shops are working to reduce turnaround time by 20 percent.

Ready for a Challenge

We know there will be open competition between OEMs, airlines and independent MRO providers for the maintenance of next generation engines coming onto the market, including the GTF engine. This is a welcome challenge. Our company is working very hard to offer the best quality, speed and value to earn this business.

It is one thing to design and build the next generation of commercial propulsion. Equally important is the preparedness of both the operator and the engine manufacturer to support this new fleet in the field.

With the unprecedented success of the GTF engine – selling over 7,000 engines to date — we are strengthening our Global Operations Center in preparation for the Geared Turbofan engine entry into service. Our center provides 15,000 technical solutions and handles 50,000 customer interactions per year, with over 90 percent of those customer requests completed within 24 hours. This 24/7/365 operation will be expanded to deliver world-class responsiveness and aircraft-on-ground (AOG) resolution, full data capture and enhanced communications to support GTF engine customers.

Now is the Time

The most high-technology engines and aircraft in the world are entering revenue service in the coming months. And supporting those aircraft will be no small feat.

If we continue to offer aircraft operators choices and competition in the market, support our customers globally and locally, and ensure that we are ready to meet their needs, we will find success.

The industry is getting ready for take-off with next generation engines and aircraft, and we're ready to support them. **AMM**

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