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# MRO TRAINING

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August / September 2017

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PREVENTATIVE  
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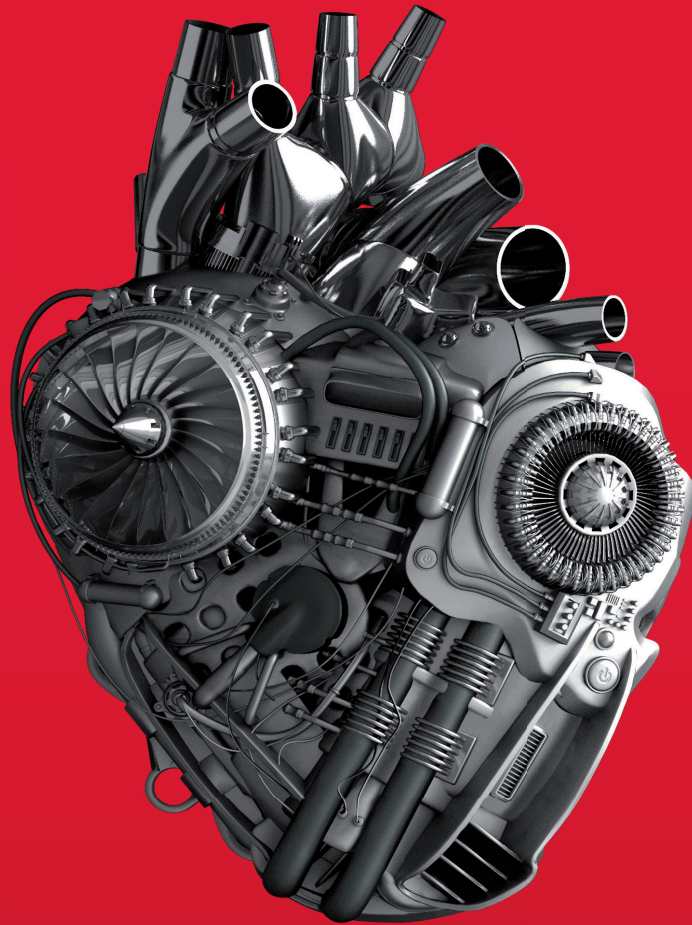
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AUGUST / SEPTEMBER 2017 VOL 36 ISSUE 5



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**US Publisher**  
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ASI Publications Ltd

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

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[www.avm-mag.com](http://www.avm-mag.com) or  
[www.aerospace-media.com](http://www.aerospace-media.com)

UK Company registration no 5999781  
UK VAT no GB227106044

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Aviation Maintenance (ISSN 1090-221X) is published bi-monthly by Aerospace & Security Media Ltd, 21362 Sparrow Place Potomac Falls, VA 20165. Application to mail at Periodicals postage paid at Dulles, VA and additional mailing offices. POSTMASTER send address changes to Aviation Maintenance 21362 Sparrow Place Potomac Falls, VA 20165. 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](mailto:news@avmain-mag.com). Subscriptions: Free to qualified individuals involved in the aircraft maintenance industry. All other prepaid subscriptions, see [www.avmain-mag.com](http://www.avmain-mag.com). Content may not be produced in any form without written permission.

# From Strength to Strength

BY ANDREW DRWIEGA  
EDITOR-IN-CHIEF



This is my last issue as editor of *Aviation Maintenance* magazine. It is simply a happy coincidence that I have been keeping the editor's seat warm for Joy Finnegan, the previous editor, who will be returning from the next issue. I am moving back into defence journalism and Joy is coming back to an industry with which she has an enduring association.

Having spent an all-too-brief time in the aviation maintenance sector of the aviation industry, it has nevertheless been a hugely informative experience. I have covered military aviation, and in particular military rotorcraft, for most of the last 20 years, and I have learned so much about the details behind the through-life-costs of aircraft ownership over the last 15 months on AVM.

I feel justified in saying that it is a revolutionary time.

The collation, management, understanding and effective use of 'big data' is not merely an evolution. But the learning curve is steep, everyone is trying to do the same thing at the same time, the effect of which is that the global aviation industry is facing a serious challenge to recruit and retain sufficient high quality 'white' and 'blue' collar workers for all its needs. Reforming the curricula and qualifications of today to meet the onrushing, transformational skills requirements of tomorrow poses a very serious challenge.

You will be pleased to know that *Aviation Maintenance* is also transforming to enable you, the reader, to keep up with all of the changes not only within the magazine but also daily on our website. And here I will hand over to Joy to tell you more. [AVM](#)

# Déjà Vu All Over Again!

BY JOY FINNEGAN  
EDITOR-IN-CHIEF



I have always chuckled when I have heard that classic Yogi Berra line. But now it makes more sense than ever. I left *Aviation Maintenance* a bit more than a year ago to pursue another position. Having done that and then been given the opportunity to return to this publication as its editor-in-chief once again, I am delighted to be back. This will be the third time I have been editor of this magazine.

The truth is, you don't know what you've got till it's gone and although I learned a lot and enjoyed my time away, I am so happy to be back with a group of people dedicated to bringing you the best, most useful and pertinent information for your business niche – maintaining aircraft.

I am also so very pleased to, once again, be among the most dedicated professionals in the aviation industry – you – our readers. As I have been telling people for years, the people that work in the aviation maintenance profession are among the hardest working, loyal, responsible, intelligent and creative workers I have ever encountered. It makes me so proud to be back here with the goal of helping bring you insightful information meant to help you learn, grow and meet the challenges of keeping the aircraft of the world flying safely.

I am grateful to Andrew Drwiega for keeping the magazine in good stead while I was away and I am incredibly grateful to our owner/publisher, Adrian Broadbent, for coming back around to offer me the opportunity to return. In addition to this editorial change, we also have additional new, focused members of the sales team. Paul McPherson is joining us to lead East Coast U. S. sales. Danny Faupel is coming aboard to head up West Coast U. S. sales. Becky Duclos is taking on our classified/back-of-book sales. Also newly focused is Josephine Zhu, who will lead China and Asia Pacific sales. As always, Jina Lawrence will continue to champion our European sales.

I have always been proud of the people who read this magazine and the amazing work you do. I have also been so proud to be a part of the team that covers this industry and of the publication that brings you key information to help you do your jobs better, faster, more efficiently and more safely. Now more than ever because, as the only independently audited publication in our market, we can say we are the largest, most widely read publication in the market.

As I mentioned, this is the third time I have taken the reins here at AVM and you know what they say...third time's the charm! [AVM](#)

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## Majority of GA Aircraft Still To Fit ADS-B

Figures released by the General Aviation Manufacturers Association (GAMA) have revealed that as of September 1, over 40,000 aircraft in the United States are flying with rule-compliant Automatic Dependent Surveillance-Broadcast (ADS-B) equipment onboard.

However, according to a Federal Aviation Administration (FAA) estimate, this still leaves between 100,000 to 160,000 general aviation aircraft still to be equipped with ADS-B Out before the January 1, 2020, mandate.

The modernization of air traffic control systems are accelerating worldwide and aircraft owners need to comply with emerging and existing regulatory mandates by selecting the right equipment for their aircraft's typical mission.

"We're now just over two years out from the FAA compliance deadline," said GAMA president and CEO Pete Bunce. "As we move forward, knowing that date will not change, it is essential that those operators who haven't yet, make a plan for equipage to avoid having their aircraft grounded and losing its residual value."

According to GAMA, the cost of ADS-B solutions for light general aviation aircraft are available for between \$1,200 to \$4,000, each providing significant safety benefits when presented on an ADS-B IN capable display.

Bunce cautions that early compliance would be beneficial "before installation lines grow long."

## CRMA Invests €8 million to Expand Capacity



CRMA, the AFI KLM E&M subsidiary, has launched an €8 million expansion plan called Project Apollo to extend its capacity by 25 percent. It currently specialises in the regeneration of mechanical components, engine assembly repairs and component maintenance.

Investment has added 2,500 square metres of additional surface area and new, ultra-modern equipment. Recent projects include new parts and engine assemblies, especially in the field of Very Big Engines (VBE). CRMA has also developed capabilities for GEnx engines, powering the Boeing 787, and is currently industrialising Rolls Royce engine part repairs, including for the A350's Trent XWB powerplant.

The new capacity is scheduled for delivery in the spring of 2018.

## StandardAero to Close Associated Air Centre



StandardAero will close its large transport category VIP completions center at Dallas Love Field at the end of the year.

StandardAero has concluded that it is no longer economically viable to operate its Associated Air Center (AAC). A statement from the company said: "Current and future work volumes do not support the fixed costs necessary to operate the facility. In addition, the limited pipeline for new business opportunities, excess industry capacity and slowing demands in the WVIP aircraft marketplace have all contributed to this decision. The decision also aligns with the company's near-term growth strategy and actions to strengthen StandardAero's portfolio by expanding its core engine MRO capabilities."

Associated Radio opened its hanger at Dallas Love Field in 1948 to install radio equipment into military aircraft that were being converted for civil use. Increased business led to an increase in MRO work and the company changed its name to Associated Air Center (AAC) in 1968. More recently it specialised particularly in work on Boeing Business Jet (BBJ) and Airbus Corporate Jet (ACJ) aircraft.

AAC will complete obligations on current contracts, service warranties and finish projects committed to existing customers. The announcement stated that: "The company will maintain as many employees as necessary to ensure customers are properly supported until all projects have been completed."

## AAR Acquires Two Premier Aviation Facilities

AAR has acquired two of Premier Aviation's aircraft MRO facilities in Canada – one at Trois-Rivières Airport in Québec and the other at Windsor International Airport in Ontario.

"We are excited to add an experienced workforce and two world-class facilities to our award-winning MRO network, and we look forward to growing our position in, and bringing more flexibility and value to, the Canadian market," said John Holmes, president and CEO, AAR.

Premier Aviation established the MRO facility in Trois-Rivières in 2002 and expanded it to 150,000 square feet in 2011. The facility can accommodate up to seven narrow-body aircraft. Premier began operating in Windsor in 2012 in a new 143,000-square-foot hangar with back shop capability and capacity for six narrow-body aircraft. The facilities have made significant investments in tooling over the past few years and currently employ over 300 aviation mechanics and personnel who will retain their positions based on expected workload.

"We are honored that a company with the reputation, breadth and depth of AAR has recognized the quality of our MRO facilities, and we are pleased that the customers and employees of these facilities will continue to be well-supported," said Ronnie DiBartolo, president of Premier Aviation. "This transaction also allows Premier to focus its resources on future areas for growth at our other two MRO facilities."

Holmes added: "This Canadian presence will be complementary to our U.S. MRO operations and workforce."

## Fleeing From Hurricane Irma



Although we usually report on Embry-Riddle in terms of their engineering courses connected to MRO, this story is worth telling.

In a last-minute bid to escape the expected ravages of Hurricane Irma in Florida, 62 flight instructors at Embry-Riddle Aeronautical University in Florida flew a fleet of small airplanes to two locations in Alabama. The pilots flew 44 Cessna 172s, 9 multi-engine Diamond 42s, 8 Piper Arrows, and 1 Beechcraft Baron aircraft through a thick band of rain, to Auburn University and Atlantic Aviation.



Dr. Ken Byrnes, chair, Flight Department, Embry-Riddle Daytona Beach Campus said that the logistical planning of the move was complex.

"We plan to have the fleet back by Tuesday for a Wednesday morning class...we're watching where the storm is going and it will be in the Auburn area as a tropical depression. So, we'll have to coordinate departing Auburn and getting back here in a timely manner. If we can't safely do it, we're not going to do it."

## Taiwan TADTE Delegates Learn International PMA Strategy

At the Taipei Aerospace & Defence Technology Exhibition (TADTE) 2017, which was held from 17-19 August in Taiwan, Aviation Maintenance's very own Legal Spin columnist Jason Dickstein presented a seminar entitled: Strategies for Success: Partnerships and Other Methods for Taiwanese companies Seeking to Enter the U.S. Aviation Parts Market." [continued on p. 8>](#)

## about people

### Etihad Airways Engineering Appoints New CEO

The Etihad Aviation Group (EAG) has confirmed the appointment of Abdul Khaliq Saeed as the new chief executive officer for Etihad Airways Engineering, replacing Jeff Wilkinson, who is leaving the post after 11 years with the company.

Saeed brings over 35 years of international MRO industry experience, and joins Etihad Airways Engineering from Abu Dhabi based, Turbine Services & Solutions (TS&S) where he has been chief executive officer since 2014.



Saeed

Before joining TS&S, he was president and CEO of Abu Dhabi Aircraft Technologies (ADAT) until it was acquired by Etihad Airways and became Etihad Airways Engineering in 2014. He has also held senior positions within Mubadala Aerospace, Jet Airways, and Gulf Air.

Mohamed Mubarak Fadhel Al Mazrouei, chairman of Etihad Aviation Group, said, "We are delighted to have Abdul Khaliq as CEO of Etihad Airways Engineering. The organisation has become a critical enabler for UAE commercial aviation and Abu Dhabi's role as a global aviation hub over the past 25 years."

Ray Gammell, interim group CEO of Etihad Aviation Group, said: "Abdul Khaliq's MRO experience, knowledge of the regional aviation market and proven track record makes him the clear choice to operate and grow this critical part of the Etihad Aviation Group."

### Beaudette and Corn Career Changes at Duncan Aviation

Duncan Aviation has announced that Jeff Beaudette has joined the modifications and completions sales team in Lincoln, Nebraska, while Susie Corn is a new hire, joining the company's turbine engine service sales team.

Beaudette, a 20 year veteran at Duncan Aviation, has served as a cabinet specialist and team leader before transitioning to the Engineering & Certification Department.

For the last several years, Beaudette served on the alterations planning team. One of his primary responsibilities was reviewing sales proposals for large and complex interior reconfiguration projects to ensure that there is a return-to-service path for the aircraft.

"Jeff is a self-starter with a positive, solution-based attitude who has been a valued employee in his years at Duncan Aviation," said manager of completion and modification sales Nate Klenke.

New hire Corn will focus on developing business relationships with new customers in the south central region of the USA, which includes Texas, Oklahoma, and Arkansas. She brings 17 years of aviation experience that includes accounting, customer service, and regional sales.

"Susie is a great addition to the team. We have confidence she will grow Duncan Aviation's engine program and brand awareness throughout the South Central Region," said Ryan Huss, Duncan Aviation's manager of airframe and engine service sales. »»



Beaudette



Corn

## about people

### » Batholomew Goes Back to KLM UK Engineering

Ian Bartholomew is now director of Business Development & Sales at KLM UK Engineering, a wholly-owned AFI KLM E&M.

Bartholomew has over 30 years of experience, beginning at KLM UK Engineering, holding various positions including materials manager. In 2003 he joined the Monarch Group as marketing sales manager progressing to sales and marketing director, commercial director and finally to accountable manager & managing director in his latest role at Etihad Airways Engineering in the Middle East.

### Larsen Moves to VP Sales at Constant Aviation

Mark Larsen joins Constant Aviation as the vice president of sales. Larsen will lead all aspects of sales operations — regional sales for maintenance, completions and modifications sales. He succeeds Jay Rizzo, who was recently promoted to executive vice president for strategic sales.

Larsen has over 35 years experience in the aviation industry. Prior to Constant Aviation, he served as the founder and CEO of Larsen Aviation Consulting, a firm focused on MRO & FBO sales and support. Prior to that, he held a 16-year tenure as the vice president of large fleet, fractional, and government contracts at Garrett Aviation, Landmark Aviation, & StandardAero Business Aviation.

"Larsen is well-established in the aviation industry and possesses invaluable sales acumen related to leading a team and supporting customers," noted Stephen Maiden, president and CEO of Constant Aviation. "Constant is in the midst of very strong business growth. We are confident that Larsen has the aptitude to sustain this momentum for the long term," he added.

## continued > Taiwan TADTE Delegates Learn International PMA Strategy



In his introduction, professor and department head / chairman at National Taipei University of Technology JK Chen stated that a number of "Taiwan companies are trying to upgrade their products and are looking to break into the aerospace market. Many have already proved that they can be outstanding suppliers to international markets."

Dickstein is general counsel of the American Suppliers Association. Formed in 1993, it is a non-profit association with over 630 members, nearly one third of which reside outside the United States.

Giving advice to aspiring Taiwanese companies, Dickstein said that parts that were acceptable in the U.S. market had to be "produced under the nation's production approval, or produced under foreign production approval but through an agreement with the domestic (U.S.) production authority."

In general, he concluded that if successful, companies should think in the long term about how they might supply aviation parts into the U.S. market. He said fixing the right pricing level was crucial: "you don't want to find you are losing money 10 years into a 20 year cycle." However, Dickstein reminded the audience of wider factors that could influence their business ambitions such as the balance of trade between countries. "For example, Boeing may want to sell to Taiwan and may then tie-in Taiwanese companies as suppliers to offset the deal."



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# The MRO Lab

## Adaptive Innovations

As an Airline MRO, Air France Industries KLM Engineering & Maintenance has developed a unique portfolio of know-how and engineering capabilities reflected in its development of a wide range of value-adding innovations.

"The MRO Lab" is the 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.

# Preventative maintenance for business jets.

**“Prevention is better than cure.”**

Desiderius Erasmus, Dutch Renaissance humanist, Catholic priest, social critic, teacher, and theologian.

by Dale Smith

Utilizing the Flightdocs App, technicians and crew are able to link images and videos to non-routine maintenance events as they occur on the hangar floor. (Photo: )

With a bit of planning and persistence, a proactive preventative maintenance plan can help keep bad – and often very expensive to repair – things from happening to good airplanes.



AR Part 1, Section 1.1, defines preventive maintenance as “... simple or minor preservation operations and the replacement of small standard parts not involving complex assembly operations.”

What the heck are “small standard parts” and “complex assembly operations” anyway? Ah, leave it

to the FAA to make something so basic seem so complicated. In layman’s terms now: preventative maintenance is all the simple day-to-day things you do to inspect, clean and monitor your aircraft’s overall condition in between its normally scheduled inspection intervals.

And while they may be simple, they are extremely important to ensuring the ongoing performance, safety and value of your business jet. And, of course, the older said aircraft gets, the more important increased attention these simple steps become.

“Aircraft have so many things going against them – all forms of corrosion, undocumented maintenance, pressure and temperature extremes, wear and tear – and all of it increases with age,” explained Tim Landis, president, Integrity Aero Service. “And so much of these damaging affects can be minimized or even prevented with targeted preventative maintenance including increased inspections and early connective actions.”

“We all think, ‘if it isn’t broken why fix it?’ – while not realizing the costs associated with delaying or foregoing preventative maintenance altogether,” he said. “Unexpected breakdowns and issues will happen, but preventative maintenance and inspections can and will minimize costly downtime and added labor costs when these events do happen.”

## Getting proactive with preventative maintenance.

While the maintenance guidelines set forth by the aircraft’s manufacturer give wonderful instructions for ‘regular’ maintenance, a good preventative maintenance program needs to be custom tailored to the individual aircraft.

“When you say ‘preventative maintenance,’ it means something particular with the FAA in terms of the FARs,” stated Michael Vercio, vice president, Product Support, Textron Aviation. “It’s pretty much considered by the FAA as ‘owner maintenance.’ As outlined in Advisory Circular 43-12A, there is a defined list of tasks that owner/operators are allowed to do.”

“As you know there are things that happen to airplanes as you use them: runway debris, hangar rash, wear and tear – things that fall outside of regularly scheduled maintenance guidelines,” Steve Taylor, manager, Maintenance Engineering, Textron Aviation added. “That’s where the owner/operator need to be in tune with their aircraft and able to spot these changes.”



Technician writes up an avionics discrepancy from the cockpit and reports the issue in real time to the maintenance management team. (Photo:)

"A good time to look for these abnormalities is during the pre- and post-flight inspections. Look closely for damage, paint discoloration, signs of corrosion, loosening rivets and nuts, things like that," he said. "It's just a good practice to look at the airplane with an eye for potential problems, especially as the aircraft ages."

"Owner/operators and maintainers also used to do a lot of these type of inspections when they washed their aircraft, but with environmental restrictions that's getting harder to do on a consistent basis," Taylor said. "But even washing an aircraft has to be done correctly. We actually have special procedures for cleaning and washing the various parts of the interior and exterior of our aircraft, including steps that cover lubrication requirements after washing and the reapplication of corrosion inhibiting compounds when needed."

Vercio explained that Textron Aviation now includes instructions for preventative or as they call it 'discretionary maintenance' in the maintenance manuals for all new aircraft as part of the Corrosion Prevention and Control Program (CPCP).

"Older aircraft did not originally have that in their manuals, but Textron has gone back and added it to all the maintenance manuals, specifically because we want owner/operators to understand the importance of these processes and to take the best care of their airplanes," he said. "It's especially important for those operators who are new to aircraft ownership. They may be the aircraft's second or third owner and they need to understand the importance of programs like this."

"We have a dedicated team that is able to help all of our owners put together a CPCP program that fits their type of operation," Taylor said. "The help and guidance is free for owners of Textron Aviation aircraft and it's important for our customers to know that kind of guidance is available to them."

Vercio again stressed the value of the increasing role preventative maintenance plays in maximizing the operational life of aging aircraft and the importance of being aware of the particular areas that need attention in each aircraft model.

"We have a department that is staffed by experts on every Textron Aviation model to answer these types of questions from our customers," he said. "We encourage owners and DOMs to call in and ask for particulars on how to inspect and maintain their particular model of aircraft."

"It's incredibly important for owner/operators and DOMs to understand the vast amount of resources an information that is available to them," Taylor said. "We have webinars every quarter and host customer conferences around the world. Both formats are great resources for customers who take part in them. These are sessions covering every model of aircraft we deliver and a lot of information comes from other operators what they see and find. It's an invaluable resource for everyone."

## Engines need love too.

While the increasing value of a preventative maintenance program is pretty clear for an airframe, that's not always the case for other parts of the aircraft, especially for older turbojet and turbofan engines.

"What makes the difference, especially in an older airplane is you have to understand the condition of the engine and how that changes as it ages naturally," explained Bjorn Stickling, manager, Diagnostics, Prognostics and Engine Health Management for Pratt & Whitney, Canada. "Every engine is operated differently and it's critical to know its history so you can understand how that engine is performing compared to others in the fleet."

Stickling said that having documented information on an engine's operational history is a key piece to really understanding what is happening inside the engine, which is critical information when operators petition for TBO extensions.

"With a good operational and health history, Pratt and Whitney, Canada is able to make an accurate assessment as to how this engine is doing compared to what is expected from an engine that age that is operated in the same way, so starting a health and usage monitoring program early is very valuable," he said. "That is one of the reasons that we have invested so heavily in making technology available that can be cost-effectively retrofitted onto older engines."

"We are in the engine data acquisition and prognostics business because it lets us tailor solutions to match the value of the aircraft and deliver a service for that particular powerplant and installation," Stickling said. "One example is our FAST (Flight, Acquisition, Storage and Transmission) solution. FAST delivers situational awareness about an engine's health, usage and trends. We are using it to move customers toward a fully preventative maintenance environment, including on-condition programs and reduced operating costs because of greater availability, and in some cases, reduced rates for our pay-per-hour maintenance programs."

Stickling explained that the FAST technology is easy to retrofit and is fully configurable, so it can easily connect to the aircraft and recorder data even on older, 'non-digital' aircraft models.

"FAST can be easily configured to different avionics and engine control units," he said. "In cases where the aircraft is highly analog, without built-in sensors and (data) recording equipment, FAST comes with an analog-to-digital converter, creating a cost-effective solution that overcomes the complexity of having to develop and install digital recording and sensing systems."

"With FAST, customers can get their detailed digital health and usage information from the gas path and other sensors to create an accurate record over time on the engine's operational history and condition," Stickling stated. "When the time comes to request a TBO extension, we now have the true history and consistent data available to make our decision quickly and get the operator the most time on wing possible."

While retrofitting FAST is certainly an option for many operators, Pratt & Whitney, Canada recently introduced a program that can quickly benefit every engine operator. Introduced at EBACE 2017, its new Oil Analysis Technology is touted as the "next-generation on-wing monitoring solution for preventative maintenance."

As Stickling explained it, the Technology delivers greater sensitivity to be able to more accurately identify the actual type of metal alloy fragments found in the oil.

"Working with our experience, we know the critical components inside the engine and what alloys they are made from," he said. "Through analysis, we can tailor the risk management of the oil system as it progresses over time. We believe this technology has the potential to far exceed the efficiency of existing oil-debris monitoring methods and provide a variety of benefits."

## Simplifying your preventative maintenance program

While following the routine maintenance steps outlined in your aircraft's maintenance manual is pretty straightforward, creating a customized preventative maintenance program can be rather time consuming. Why? Well, it has to be tailored to the particular needs of an individual aircraft.

But, before you dismiss this as being too much additional work, like most things in our digitally-centered world there's an 'app' for that.

"In the past when an owner/operator would have a fault or an issue they would have to record these instances on an on-routine maintenance form including what the issue was, how it was corrected and when it needs inspection again," explained Greg Heine, chief operating officer, FlightDocs. "The problem is, it's very difficult for a technician to research past maintenance events. You really have no functional insight into the aircraft's history with a paper-based system."

"With a solution like ours, what we provide is an iPad application that allows pilots and maintainers anywhere to be able to access these types of records no matter where they are," he said. "They can also do a detailed write up on any new issues and even attach photos or digital video to the file. They now have the complete scheduled and non-scheduled maintenance history of that aircraft available when they need it."

"The operator can easily access historical data to find information, assess these maintenance events and determine if the OEM designated schedule should be altered for increased safety of aircraft performance," he said. "Having those alterations electronically in a system like FlightDocs provides the technicians with the tools that will automatically alert them of these changes."

Heine also said that FlightDocs will also has a 'Due List' tool that shows you a list of what tasks are coming do for each aircraft and when they need to be completed.

"If an aircraft is away from its base for a length of time, the pilots will know what tasks need completed and can work with local mechanics to take care of them wherever they are," he said. "And because it is all electronic, you never lose track of any of the compliance documentation."

"Additionally, because it is web-based, any maintenance that is performed at any location can be instantaneously shared with the aircraft's regular technicians back at its home base," Heine said. "It's almost error proof. With several layers of validation, it prevents inaccurate data from entering the system depending on the type of service or inspection being performed."

## The best laid plans...

No matter how you look at it, whether it's in the interior, on the exterior or in the engine, aging aircraft benefit from more frequent care and attention. But, one element that will make event the best preventative maintenance plan even better is consistency.

"One of the biggest mistakes owner, operators and technicians routinely make is showing a lack of consistency and follow-up from the initial implementation of any program," Landis said. "Once everyone has performed the preventative maintenance program as part of a routine, the enthusiasm for the task wanes."

"The thought is, 'Everything is going well, the aircraft is defect free, so why are we wasting our time greasing hinges and inspecting rivets when we haven't found any defects?'" he said. "Basically, it all falls back to the human factors side of defining these new requirements as integral parts of the preventative maintenance program."

In aircraft maintenance, like in most things in life, it's the sum of all the "little things" we do that combine to make a meaningful difference. **AM**



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# Oklahoma: Middle American's MRO Hotbed

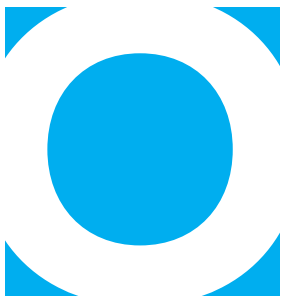
by Douglas Nelms

*ValAir, the MRO part of Commuter Air Technology, provides MRO services from avionics to horizontal stabilizers for some 150 aircraft annually, ranging in size up to Hawker 800 and Gulfstream G-100. (Photo: ValAir)*



A CRJ200 beginning a heavy maintenance visit at AAR Aircraft Services in Oklahoma City.

## The extension of tax breaks looks set to ensure that Oklahoma reputation as an aviation and MRO center will continue through the next decade.



Oklahoma solidly re-established itself as one of the most aviation friendly states in the nation on May 1, when Oklahoma Governor Mary Fallin signed Senate Bill 120 that extended special tax credits to employers and employees within the Oklahoman aerospace industry. That signing extends the tax credits until Jan. 1, 2026.

The state is currently home to over 500 aviation related companies, with a significant number involved in MRO work and/or spare parts production. Those companies employ more than 120,000 workers and generate over \$27 billion in annual sales.

"Since 2010, this tax credit has generated \$46.3 million in tax revenue while only costing the state \$18.4 million. With such a great economic impact for our state, it is vital that we support this flourishing industry," stated Governor Fallin. She added that

the aerospace engineer tax credit plays a "key role in maintaining Oklahoma's position as an internationally recognized hub for aerospace business" as well as creating hundreds of new, high-paying jobs for skilled Oklahomans.

"But Oklahoma goes beyond simply offering a tax credit to aerospace companies. Our robust CareerTech system works hand-in-hand with many aerospace companies to create and adapt the necessary training programs to produce a pipeline of talent. Our colleges and universities are developing their degree programs and coursework to better align with the skills needed to meet the needs of the industry," she continued.

CareerTech is a state-owned and operated program that provides training for multiple industries, "but specifically for aerospace areas such as A&P training, sheet metal, avionics, and composites, as well as tailored training specifically for individual companies," said Vince Howie, Aerospace & Defense director, Oklahoma Dept. of Commerce.

"Any aerospace company can send its employees to any of these schools basically for free. The state assigns a dollar value based



Pictures left to right: Three MRO specialists from Oklahoma - Mark James, director of operations for Intercontinental Jet in Tulsa, does MRO work primarily on Mitsubishi MU-2. Mike Perry, general manager of Vertical Aerospace which specializes in nacelle component work. Technician at Mint Turbines work mainly on Honeywell T-53 series and P&W PT6 engines from around the globe.

on the number of new jobs a company is bringing into the state, then translates that into tuition waivers or dollars that can be used for training for the company," he said.

It also serves specific needs of aerospace companies. "For instance, there was a company that bought some very specialized equipment from Germany, so we sent their employees to Germany to get trained on the equipment, all at no cost to the company," he added. He noted that the state added its 59th CareerTech campus last year.

The state also hosts an Oklahoma Talent Acquisition Team tasked to provide companies needing new employees. Its mandate is to "provide a single point of contact for all human-resource needs, identify qualified talent and develop interview schedules," along with other employment services.

The state, perhaps most famous for its university football teams and corn "as high as an elephant's eye," is a veritable hotbed of MRO activity. The two largest maintenance operations are Tinker AFB, home of the U.S. Air Force's largest depot level maintenance facility [featured in AVM June/July 2017], and American Airlines' primary maintenance facility with both already in expansion programs for new aircraft types.

Other MRO shops range from the very large, world-wide, companies such as AAR, with a large FBO and MRO operation at Will Rogers World Airport in Oklahoma City, to a very narrowly specialized Limco Airepair in Tulsa, a manufacturer of, and MRO repair station for, heat transfer products with 300 customers worldwide and growing at the rate of five new customers per month.

## Why Oklahoma?

Ask MRO executives why they are located

in the state and the tendency is to claim the standard: 'Location, Location, Location.'

Susanne Palkowski, president and CEO of BizJet, a Lufthansa Technik subsidiary in Tulsa, noted that being in the middle of the country provides "a big advantage for doing engine work with the engine still on the wing." BizJet does MRO work on Spey and Tay engines, plus tear down on CFM engines. Mark James, director of Operations for Intercontinental Jet in Tulsa, which does MRO work primarily on Mitsubishi MU-2, said that Tulsa is "as close to the middle of the country as we can be, with good airline support."

But while location was cited as a major draw for the state, it is actually a bit of a myth. Yes, Oklahoma is dead center between the East and West Coasts. But so are Texas, Kansas, Nebraska and the Dakotas, all of which have first class airports and sophisticated highway and rail networks.

Most MRO operations in Oklahoma are located in or close to either Tulsa or Oklahoma City, with major airports providing rapid air service from both coasts as well as Canada and Mexico. Others, however, are deep in what's best described as Oklahoma cattle country, away from the major airports but with ready access to connecting highway systems.

Mint Turbines is a relatively small engine MRO company located just north of Stroud, OK, dead center between Tulsa and Oklahoma City. Al Weser, vice president and general manager, said that they do work on both military and civil Honeywell T-53 and P&W PT6 engines that come in from South America, Mexico, Germany, Scandinavia, South Africa and Pakistan, as well as from Tinker AFB and Ft. Rucker, AL. These could be flown in to virtually any city in the United

States that has a decent sized airport, then trucked to his facility.

Weser said that Mint Turbines is based in Stroud because it was started by three former military helicopter mechanics from that area. The company currently has about 50 employees, with annual revenues of about \$20 million a year. "And we could double that with 75 people, easily."

Vertical Aerospace is another MRO between Oklahoma City and Tulsa, specializing in nacelle component work primarily on Boeing and Airbus products, with about 90 percent MRO and 10 percent manufacturing, according to Mike Perry, general manager.

Perry said the central location near Bristow, which sits right along side an interstate highway as well as the famed Route 66, helps in dealing with customers in Mexico and Canada, "when dealing with Europe and South America, we don't have as good of advantage, so we have to give them something in return." This includes free freight from Miami, which allows them to compete against the Florida area. As for the two main airline hubs in Dallas/Fort Worth and O'Hare, "trucks go through here all day from Chicago or Texas." Components come in from both international and domestic customers who send the components "either into Chicago, Dallas or Miami, and then they are trucked to here. Then it's all about price and turn time."

He said that Vertical Aerospace is in a "small business set-aside hub zone environment location," which allows a good area for its 226,000 sq. ft. facility "where we can do anything from the tail cone to the nose cone on any size aircraft.



A close-up, low-angle shot of a jet engine's compressor section. The numerous blades of the compressor are arranged in a circular pattern, creating a sense of depth and rotation. In the center of the engine, a small, dark globe is positioned, showing the continents of North and South America. The lighting is dramatic, with highlights on the metallic surfaces and deep shadows in the recesses of the blades.

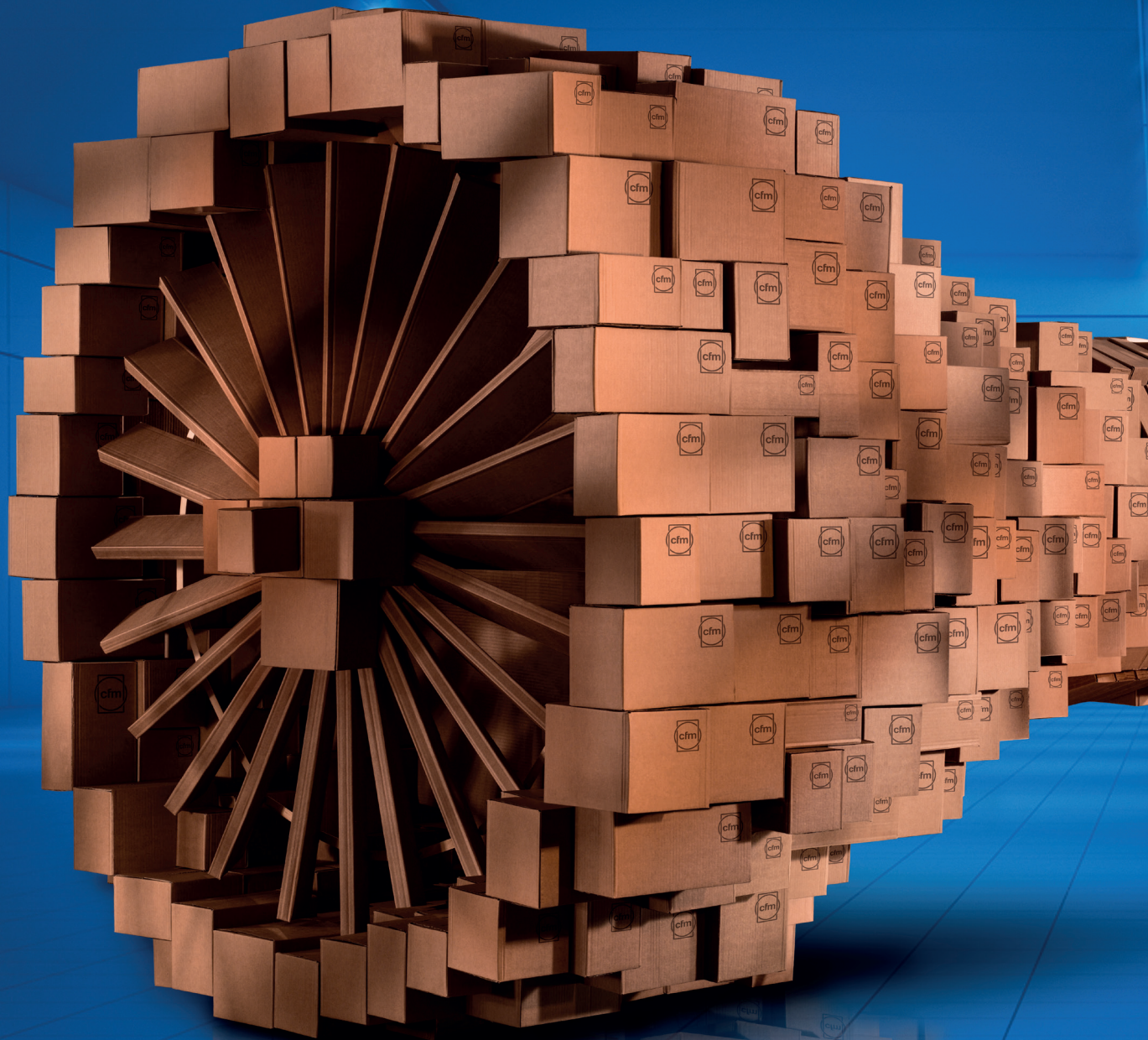
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King Aerospace in Ardmore, OK is decidedly off the beaten path, but relatively close to I-35, the north/south link between Oklahoma City and the Dallas/Fort Worth area. It is also located on Ardmore Municipal Airport with a 9,000 ft. runway that allows aircraft to fly in for paint or interior modification work. The company also offers full MRO work up to 757 sized aircraft, according to Roy Lischinsky, vice president of Operations.

### Economic advantages

Besides the idea of being in 'middle America,' the three biggest attractions for MRO operators are the economic advantages provided by the state government, availability of highly trained workers, and cost of living.

Perry said that a major advantage to being in Oklahoma is the talent pool. Twelve of the state's colleges and universities have aerospace programs, while a wide range of aircraft maintenance schools provide a steady source of young talent "so we can get them right out of school." He also runs an internship, getting students out of schools such as Oklahoma State University's aeronautical engineering program or Spartan College of Aeronautics and Technology.

AAR's Stan Mayer said that there will be a lot of retirements of maintainers coming up in the next five years, and that there is "a good chance that 50 percent of the work force will be retiring in the next four to five years." He noted that AAR has 700 people working in MRO, but that "we are constantly bringing in new people because of people moving over to Tinker (AFB). So we have a younger work force."

AAR promotes the growth of young people going into aviation maintenance by hosting career days with the local high schools as well as working with all of the technical schools "to

find a path for young people getting into the aviation world," he said.

Along with tax credits and a strong pool of maintainer talent, the state also enjoys a cost of living status weighted in its favor. Normally a low cost of living equates to a low salary base, with tends to neutralize the benefits. However, the cost of living in Oklahoma is roughly 25 percent less than more expensive states, while salaries only range from 10-15 percent less than nationwide. An Oklahoman Department of Commerce document cites examples showing an aerospace mechanical engineer earning a median hourly wage of \$38.36 compared to a nationwide median wage of \$42.30, roughly a 9 percent difference. An Oklahoman machinist earns \$17.01 compared to the national median of \$19.00, while welders, cutters, solderers and brazers are virtually dead even at \$17.37 compared to \$17.54.

"Guys come down from Pennsylvania or New York to go to (aviation maintenance schools) and don't want to leave," Perry said. "They see that they can get a two-acre yard and a \$100,000 home that would cost half a million where they came from." He noted that Vertical Aerospace has doubled its growth over the past five years and will be getting a larger, 12-foot autoclave over the next five years to grow into the GE90 and Trent 800 size market.


ValAir, the MRO division of Commuter Air Technology, is running at about 20 percent growth, and is challenged by the fact "that we have a lot of really talented people who are getting ready to retire," said Mike Bowen, senior vp, Group Support Operations. "So we need to be really competitive with pay to get really talented people to replace them. Our salaries are in the top half of salary levels."

ValAir handles MRO for aircraft up to Hawker 800s and Gulfstreams, averaging about 150 aircraft a year at its facility at OKC's Wiley Post Airport. Its work is roughly

divided between military/civilian sectors, and last year it started a Customer Concierge Program, "which is all about taking care of the customer, including making hotel reservations, rental cars and even a crew car if we have one available," Bowen said.

Oklahoma is also home to several foreign subsidiaries. Along with BizJet, Lufthansa has Lufthansa Technik Component Services, also a wholly owned independent subsidiary of the airline. That company does component repair, primarily on airliners. "The majority of our work, about 85 percent, comes from the Americas. This is mainly airline business, but with some brokers," said Tobia Baumgart, COO for LTCS. The company started with five people, five years ago, and grew to around 25-30 by 2012. It currently has about 250 people in its Tulsa facility.

Baumgart said that LTCS now handles a lot of the work that was going to Lufthansa Technik in Hamburg and Frankfurt. Lufthansa Technik in Germany has over 4100 aircraft under contract, with some 900 being A320s. LTCS handles about a quarter of those, he said.

Intercontinental Jet Service was formed as a Mitsubishi service center when Mitsubishi ended its U.S. production some three decades ago. Three Mitsubishi employees got together to create Intercontinental, servicing those aircraft. Then 10 years ago Mitsubishi bought Intercontinental, turning it into an independent wholly owned subsidiary of Mitsubishi Heavy Industries of America. The company is now also a Piaggio service center and authorized service center for the Honeywell TPE-331 engine. It recently added service support for Hartzell, McCauley and MT propellers. James said that along with civilian operators, they have five military contracts with both the Army and the Navy, along with doing propeller work on the Israel Air Force KingAirs. 




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# OGMA Ready for Centenary Anniversary



by David Oliver

Some of the diverse aircraft types that OGMA provides MRO services for including the Airbus A320, P-3 C-130 and F-16B. (Photo: OGMA)

Portugal's OGMA will celebrate 100 years of service in 2018 with current responsibilities including its civil role as an Embraer service centre as well as military MRO to the Portuguese Air Force.



In the 29 June 2017, the Oficinas Gerais de Material Aeronáutico (OGMA) celebrated 99 years of existence and it aims to continue to play an active role in the evolution of aviation and aeronautics in Portugal.

OGMA was founded as part of the reorganization of the Portuguese Army's Aeronautic Service in June 29, 1918, under the name Parque

de Material Aeronáutico (Aeronautics Material Depot), with the responsibility of storing, repairing, manufacturing, and providing aeronautical material, as well as training to military aeronautic specialists and technicians. It was based at Alverca in the outskirts of Lisbon on the banks of the Tagus River where a military air base was built in 1918 that later served as the first international airport in Portugal until Lisbon Portela Airport opened in 1942. However in 1928 the Aeronautics Material Depot was renamed Oficinas Gerais de Material Aeronáutico (OGMA).

Today OGMA (Indústria Aeronáutica de Portugal S.A.) has 140,000 sq/m of covered facilities at Alverca, including 10 maintenance hangars, aerostructure manufacturing facilities, a large engine overhaul shop and a new paint hangar that was

opened in February 2017. It has the use of a 3,000m runway and control tower that are operated by the Força Aérea Portuguesa (Portuguese Air Force) for around the clock operations.

A new era in the company's history started in 2003 when the Portuguese government took a decision to privatise the company while retaining 35 percent of the shares and private ownership, with the Brazilian company Embraer owning the remaining 65 percent of the company share capital. Today MRO services for commercial, executive and defense aviation, engines, components and engineering account for 71 percent of OGMA's total business volume.

OGMA is an established authorized maintenance centre for a number of Original Equipment Manufacturers (OEM), including Lockheed Martin, Airbus, and Rolls-Royce. As a service provider in the aircraft Maintenance, Repair and Overhaul (MRO) field, OGMA holds extensive experience in defence aviation. This includes intermediate and heavy maintenance, engine and component maintenance, avionics upgrades, major structural repairs, fieldwork teams, aircraft recovery and airworthiness management (CAMO). It is certified as a FAR 145 and EASA 145 repair station, with AQAP 2110 and ISO 9001-2008 Quality Management.

In 1998, OGMA became the first Embraer Authorised Service Centre (EASC) in the world for the ERJ135/140/145 aircraft types.



The OGMA facility at Alverca on the banks of the River Tagus River in the outskirts of Lisbon. (Photo: OGMA)

With an established capability to provide integrated services, it is the main independent EASC in Europe and has carried out over 350 C Checks on this aircraft family in addition to other maintenance and repair tasks. In its role as a 'one-stop-shop', it also features an Authorised Maintenance Centre (AMC) for Rolls-Royce AE3007 engines providing technical assistance teams in the field.

With Embraer as its major shareholder, the strategy has been to support all Embraer commercial jet products and OGMA has been an EASC for the ERJ-170/190 E-Jet family since the first aircraft arrived in Europe. It is also an important service provider in the A320 market by guaranteeing a complete overhaul service for both engines and components. Established to meet the special requirements of executive jet operators, the OGMA Executive Jets Centre was developed featuring a fully equipped hangar, workshops and reception rooms. It provides heavy maintenance, warranty repairs, engine services and fleet management. Dedicated services are offered to Embraer Legacy 600/650 and Lineage 1000, Airbus ACJ and Dassault Falcon 50 operators.

In the defence sector, OGMA is responsible for maintenance of the Portuguese Air Force (POAF) fleet of F-16 fighter aircraft and their Mid-Life Update (MLU) programme. The upgrade of 16 single-seat A-models and four two-seat B-models included new avionics and a cockpit upgrade. In 2013 nine POAF F-16 MLU aircraft were sold to Romania plus three former USAF aircraft that were upgraded to F-16 MLU standard by OGMA prior to transfer to Romania.

Since 1982 OGMA has been providing a wide range of

maintenance services and upgrades to different P-3 Orion operators including the POAF. Product specific services include major structural repairs, life extension programmes and structural life extension.

OGMA has more than 35 years of continuous experience with the C-130/L-100 Hercules aircraft and has been a fully authorised Lockheed Martin Service Centre for the type since 1982. The Alverca facility has up to 12 maintenance bays available and has carried out more than 600 C-130A/B/H Hercules aircraft inspections to date. Programmed Depot Maintenance (PDM) and Isochronal (ISO) checks which involve the examination and maintenance of the entire airframe to increase the overall performance and safety, are carried out in accordance with the USAF Technical Order (TO) system.

Major structural repairs include wing refurbishment/replacement and OGMA has an In-house capability for overhauling the T56/501D turboprop engine and the C-130J's Rolls-Royce AE 2100D3. It also carries out the repair, overhaul, modification, upgrade and testing of the Hercules Hamilton Sundstrand 54H60 series propellers and Goodrich landing gear. Additionally the aerostructure division manufactures C-130J engine nacelle doors and wing trailing edge panels.

OGMA's defence customer portfolio comprises 24 air forces worldwide, many of them C-130 operators, one of its largest being the French Air Force's C-130H fleet. OGMA also has a fieldwork team deployed to France's Base Aérienne 188 in Djibouti which carries out deep maintenance, including the dynamic and mechanical testing of the main rotor head, of the French Air Force



Embraer ERJ-145 regional airliners and an Airbus ACJ A318 outside of OGMA's maintenance hangars at Alverca.



The extensive C-130 maintenance hangars at Alverca with Niger and French Air Force Hercules in the foreground.

Top: An Embraer Legacy undergoing maintenance in the OGMA Executive Jets Centre. Above: OGMA engineers work on a C-130's T56 turboprop engines. (Photos: OGMA).

and Army SA330 Puma helicopters. On the Swedish Air Force C-130, OGMA is also currently performing a series of retrofits. It has C-130 MRO contracts with no less than seven African air forces, including the Cameroon Air Force's three C-130H aircraft, which play a pivotal role in the countries military operations against Boko Haram. All are maintained by OGMA and the air force also contracted former POAF Hercules pilot instructors.

A Gabon Air Force L100-20 has presented OGMA with one of its most demanding challenges to date. The 1976-built L100-20 aircraft was transported to Portugal at the end of 2015 since when it was subjected to an in-depth inspection and disassembled.

OGMA's director of defence maintenance, Jorge Palma, told AVM that the work involved to get the aircraft airworthy will include the installation of new avionics and a glass cockpit, as well as the replacement of several structural parts. The company expects the modifications and rebuild will take almost a year to complete. The customer has been advised of the cost of the work required and a final decision on the fate of the aircraft is expected by the end of September.

OGMA is well established in component MRO activity, specializing in hydraulic and electromechanical component maintenance, and some specific components in particular such as C-130 and P-3 Orion propellers, pump and valve housings, AC Generators, landing

gears and brakes. Maintenance services are also provided for the Eurocopter SA330 Puma including main rotor head and main rotor and tail rotor repairs and dynamic balancing, as well as providing full in service support (FISS) in partnership with AgustaWestland for the AW101 helicopter, both of which are operated by the POAF.

Embraer selected OGMA to provide in-house or on-site support to its Tucano/ Super-Tucano family of training/light attack aircraft, with solutions ranging from the lighter maintenance checks to avionics upgrades and full fleet support. OGMA also maintains Embraer's EMB-312 Super Tucano demonstrator aircraft for the Middle East and Africa at Alverca. **AVI**



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by Charlotte Adams

(Photo: MTU)

# Labor Shortfall Prompts Industry Action

The impending dearth in skilled maintainers is triggering the industry to increase its profile and work with education establishments to re-position aviation engineering and technical skills as an attractive career option.



It's tough times for aviation maintenance employers. Demand is high for graduates of aviation maintenance schools, particularly specialists like avionics technicians and sheet metal mechanics, and even for beginners who can be

trained on the job. Employers are reaching out to middle schools, high schools, and colleges to boost interest in maintenance careers while beefing up internal training programs.

Adding to the challenge are more fundamental questions, in the United States (U.S.) at least, about what students at aviation maintenance schools are learning and how adaptable the curriculum is to what industry actually needs. Stay tuned



Apprentices Aircraft Mechanic Engines learning at a CF6 engine. (Photo: Lufthansa Technik)

for a revision of 14 CFR 147 (Part 147), which governs aviation maintenance technician (AMT) schools.

### Supply and Demand

According to an Oliver Wyman study, by 2027 the demand for aviation mechanics in the U.S. could outstrip supply by nine percent. The firm expects aviation maintenance technician retirements to spike in the next decade, given that the median age of aviation mechanics is 51, almost a decade older than the average worker. The problem would bite when the world fleet is expanding and modernizing.

The situation is “probably worse on the [employer] end than what you see in a lot of the statistics,” said John Gallagher, HR manager with Component Repair Technologies (CRT), a Mentor, Ohio, specialist in the repair of large metal engine components.

The problem is “a serious threat to the growth of companies that rely on skilled labor that requires specialized training or industry certifications but not necessarily a four-year bachelor’s

degree,” echoed Greg Dellinger, director of talent acquisition for AAR.

Unfilled positions may be costing U.S. repair stations as much as \$1.95 billion in lost revenues this year, according to the Aeronautical Repair Station Association. Various assumptions are involved in coming up with that figure, but there is definitely more money to be made.

Lufthansa Technical Training (LTT), an arm of Lufthansa Technik (LHT), sees the looming shortage of AMTs as mainly a demographic issue – the convergence of trends such as the aging workforce and the focus on white-collar jobs. The problem is serious, especially with groups such as ‘highly licensed mechanics,’ and the shortfall will occur sooner rather than later, said Georg Walter, LTT’s head of product management and marketing in Frankfurt.

### Supply & Demand

Crystal Maguire, executive director of the Aviation Technician Education Council (ATEC) stated that U.S. aviation maintenance



PCS students who interned at AAR's global headquarters throughout the year and over the summer. (Photo: AAR)

schools are placing around 90 percent of their students upon graduation. ATEC represents 120 of the 170 certificated schools in the FAA database.

Embry-Riddle Aeronautical University's maintenance program enjoys an official placement rate of 98 percent," according to Assoc. Prof. Charles Horning, chairman of Embry-Riddle's Aviation Maintenance Science Department. For the last several years it's basically been 100 percent, he confirmed.

Embry-Riddle is seeing employers "getting more pro-active about trying to partner with schools," he said. It has internships with Delta Air Lines, for example, that involve students in line maintenance. Horning has also seen increasing interest in the last two or three years from business aviation.

One of the problems is the pipeline. Only 60 percent of students coming out of aviation maintenance schools take the FAA certification test, said Maguire. According to an ATEC survey, one out of four graduates chooses another field. Since AMT skills are highly transferable, graduates are sought after by other industries, such as amusement parks and oil & gas, which may offer higher hourly rates, she suggested.

### Root Causes

Dellinger said that the problem dates back to "lackluster investment in vocational education following de-industrialization in the 1980s. Enrollment in A&P [airframe & powerplant] licensing programs plummeted after 9/11 and has yet to return to pre-9/11 levels ... Until public policy catches up, employers will be required to make the

investment in training workers they need now and in the future."

Shortages are most acute with FAA-certified A&Ps; U.S. Federal Communications Commission-certified avionics technicians specializing in radios, navigation equipment, and computers; structural technicians; and sheet metal mechanics, according to AAR.

### What's to be Done?

CRT takes an aggressive, "all hands on deck" approach to recruiting talent, extending from partnerships with schools and colleges to robot competitions and powwows with local principals and guidance counselors, but especially emphasizing internal training. These activities can be a little daunting on top of running the business, but it's an "investment in the long term," explained Gallagher.

High schools are "trying to get the correct career paths" for their students, he said. After years of steering all the students toward four-year college degrees, "they are now realizing this was probably not the best approach... and are trying to figure it out."

CRT works with neighboring Lakeland and Cuyahoga community colleges. The company has a machinist apprenticeship program with Cuyahoga. And CRT representatives sit on Lakeland's welding, machining, and engineering advisory boards. The company also donated scrap parts and weld wire to Lakeland. As a result, when students complete the school's welding class, they are already experienced with the nickel metal alloys that CRT uses.

CRT, however, devotes most of its workforce development resources to enhancing its internal training programs. It works with online content providers such as Tooling U and BizLibrary. Beyond that Component Repair Technologies has developed "hundreds of ... online courses," said Gallagher. It is currently developing "a pretty lengthy computer-based training module to teach how to mask parts."

Dellinger said that AAR is also creating a "talent pipeline" through partnerships in communities near each of the company's five aircraft maintenance centers in North America. One of the main reasons the company built a facility at the Rockford airport in Rockford, Ill., was an agreement that Rock Valley College would enhance its training program. The community college has built a 40,000-square-foot training center at the airport to train more A&Ps, and the program is now "completely full, with 170 students."

AAR's facility in Oklahoma City has partnered with the Francis Tuttle Technology Center to design a sheet metal technician apprenticeship and training program that combines classroom and on-the-job training (OJT).

In Indianapolis AAR has a long-standing relationship with Vincennes University. "We have trained sheet metal technicians using the Structures Technician registered apprenticeship training curriculum that AAR developed with Francis Tuttle, and we hire 20 percent of Vincennes' A&P licensed graduates right off the top," declared Dellinger.

LTT has been offering apprenticeships for more than 60 years. The LHT unit gives high marks to the dual system of vocational training that combines company OJT with instruction at a technical college or training center in Germany, Austria, and Switzerland. Nevertheless "it has become more and more difficult to fill apprenticeship vacancies," admitted Walter. LTT also is targeting students who are not finishing their university degrees.

LTT combines the latest learning techniques with the tried-and-true. It "brings aircraft into the classroom via visualization, e.g., spherical panoramas," added Walter. But it also has "training aircraft on-site in Hamburg and Frankfurt."

### New Categories

"To accelerate hiring of entry-level workers," AAR has created the support technician job category of "non-technical workers [who can] perform basic skills labor under the tutelage of a licensed A&P mechanic," said Dellinger.

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## MTU Maintenance Revs Training



2015, MTU Maintenance has increased its global workforce by four percent for the same time period, stated Christoph Humberg, head of HR for the company in Hannover.

MTU Maintenance is still looking to fill positions, but challenges differ according to local conditions. The company's Zuhai, China, facility, for example, has not noticed a shortage of qualified applicants, explained Li Hao, training manager. The facility's training regime runs the gamut from induction through refresher courses. And, generally speaking, employees taking these courses already have graduated from an aviation college or university, so that once they have completed initial and on-the-job training, they can become mechanics, planners, or engineers.

In Germany, however, "it is becoming more difficult to find qualified and interested applicants for apprenticeship-type jobs, as many young people are choosing academic over vocational training programs," said Michael Siefkens, head of education and training for the company. MTU Maintenance offers apprenticeships for both engine and aircraft mechanics, as part of the German vocational education system, and takes in around 25 paid trainees a year at its Hannover site.

Other apprenticeships at German locations include specialties such as mechatronics, surface coatings and logistics. Under the German system these full-time, paid apprentices can become certified in three-and-a-half years, at which point they are considered qualified to work on engines, under supervision, said Humberg.

Like other MROs, MTU Maintenance is trying to attract young talent. In Germany programs range from participation in STEM (Science, Technology, Engineering and Mathematics) events and career fairs to school visits, work experience days, information distribution, etc. "We also have a number of collaborations with universities across the world," such as with the Maintenance Laboratory (Maintenance Labor), a collaboration with the Technische Universität Braunschweig, which combines theory with practical experience for engineering students, explained Siefkens.

Another program bridges the gap between vocational and university tracks. In Germany MTU Maintenance offers the opportunity to take part in a paid, dual-study program which combines vocational training with a degree. "And we offer a large number of internships and student jobs, including the opportunity for students to join us and write their bachelor's or master's theses here on a paid basis," concluded Humberg.

A promotional graphic for Abaris training. The background features a colorful geometric pattern of triangles in shades of blue, green, and orange. The text "FILL THE SKILLS GAP" is written in large, bold, blue letters, with the word "GAP" partially obscured by a white commercial airplane flying across the scene. Below the main text, it says "ADVANCED COMPOSITE REPAIR TRAINING" in bold blue letters, followed by "• MANUFACTURING • ENGINEERING • REPAIR" in smaller blue text. The Abaris logo, consisting of the word "ABARIS" in a stylized font above a blue arrow pointing right with the word "TRAINING" inside it, is positioned below that. At the bottom, the contact information "+1 (775) 827-6568 • www.abaris.com" is displayed in white text on a dark blue background.

After 18 months of training, these individuals "are better equipped to pass the test to become airframe-certified."

AAR and other MROs have been involved in an effort with Francis Tuttle and the National Center for Aerospace & Transportation Technologies in Ft. Worth, Texas, to establish a portable, nationally recognized credential for airframe sheet metal technicians.

Duncan Aviation conducts outreach, as well. The company works with the Bakers School of Aeronautics to help employees achieve their A&P license while working full-time. In addition Duncan Aviation routinely offers summer internship programs for students in aviation-related fields, said Felicia Nicholson, manager, professional development, training, and safety. Approximately 15 internships are available across the company's three main locations.

### Curricula Realignment

Curriculum requirements for FAA-certificated schools have changed little in decades. The disconnect between the FAA requirements and market needs has powered a drive to revise Part 147, which regulates AMT/A&P schools and what they teach, as well as Part 65, which includes test standards. Still aspirational at this point, is the effort to align curricula with testing requirements, so that students are taught what industry expects them to know.

AAR agrees that the FAA Part 147 curriculum needs updating. An A&P license is essentially "a license to learn," Dellinger said. "FAA curriculum standards for A&P mechanics apply decades-old technologies."

The new Part 147 could roll out this year. And a new standard for A&P testing may arrive next year. Currently in draft form, the new document, known as the Aviation Maintenance Technician Airman Certification Standards, or ACS, revises A&P testing procedures and could ultimately bear on curriculum management. ACS describes the minimum level of knowledge and skills that an A&P requires,



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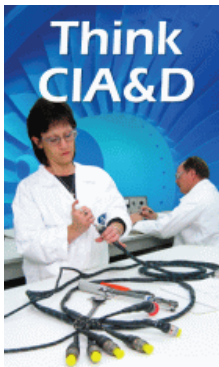
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said Maguire. The new document also expands the scope of practical testing to include risk management.

**Outdated Rule**

Part 147 "is way overdue for a revisit," according to Maguire. She expects that the very specific curriculum requirements now in the rule will be taken out, so that the rule will be more focused on the requirements that schools must meet in areas such as facilities and equipment.

Part 147 also gets into grading standards. Because local FAA inspectors are not necessarily experts in this area, "nightmare situations" can arise, where a school may have to change an institution-wide grading system "because of the whim of the local inspector." Maguire hopes that the Part 147 regulations on grading standards and A&P testing norms are removed in the rewrite or through the process supporting larger, "two for one" regulation reform.

**One Step Further?**

"We also asked the agency to go one step further ... to set knowledge and skill standards through the mechanic tests and let schools teach to these standards," Maguire said.

"Ideally we would like to use the ACS to drive school curriculum, which makes sense because the ACS is going to define the testing standards - what the applicants are going to be tested on to get the A&P certification," said Horning. "That basically tells schools what they need to be teaching in the curriculum." Updating subject matter through the schools' operations specifications (ops specs) which would, in theory, reference the current ACS, would be much faster than trying to change the regulations.

FAA may or may not sign off on the idea of using ACS to drive curriculum updates without changing Part 65, Horning cautioned. A rule change process can take five to six years to complete.

But even if the hoped-for alignment of curriculum with testing standards doesn't pan out in the near future, ACS will be a "big improvement," if only because it ties the items being tested to FAA guidance material, he said. The ACS activity also has established a review board to evaluate test questions and verify that they can be tied back to ACS and supporting guidance. **AM**



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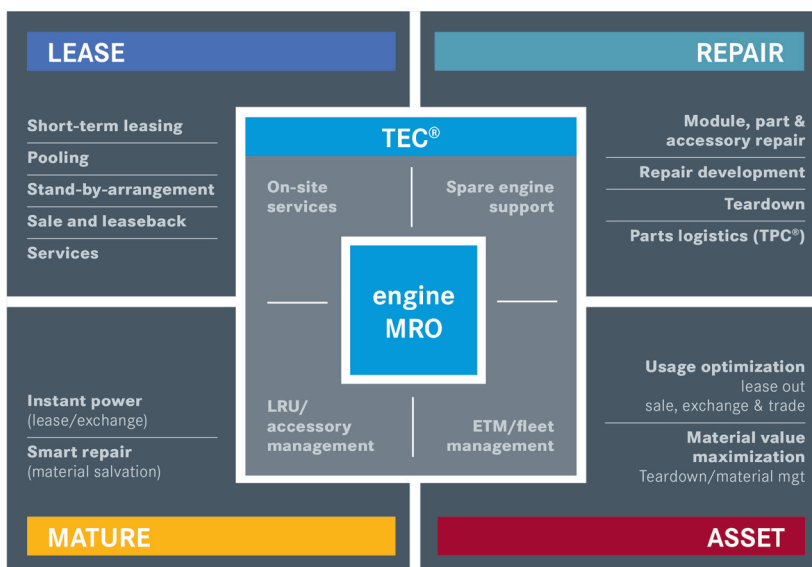
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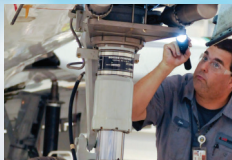
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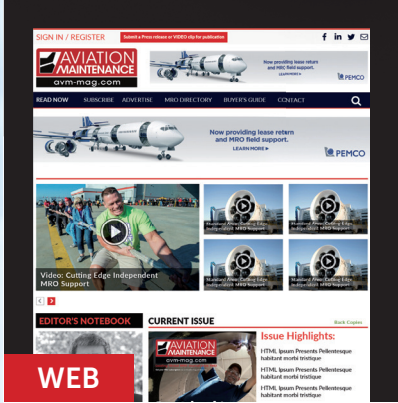
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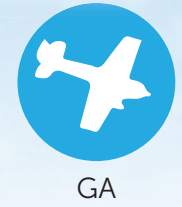
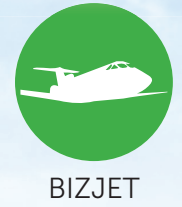
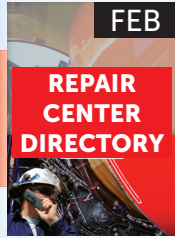


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	PRINT				DIGITAL	COMBINED	Yrs Established
	US	INT	TOTAL	INDEPENDENT AUDIT?			
<b>Aviation Maintenance Magazine (AVM)<sup>1</sup></b>	29,350	5,840	35,190	✓	7,560	42,750	<b>28</b>
Aviation & Maintenance Technology (AMT) <sup>2</sup>	Not Available <sup>†</sup>	Not Available <sup>†</sup>	Not Available <sup>†</sup>	✗	Not Available <sup>†</sup>	41,374	<b>28</b>
Inside MRO <sup>3</sup>	Not Available <sup>†</sup>	Not Available <sup>†</sup>	Not Available <sup>†</sup>	✗	Not Available <sup>†</sup>	36,184	<b>5</b>
Director of Maintenance (DOM) <sup>4</sup>	Not Available <sup>†</sup>	Not Available <sup>†</sup>	Not Available <sup>†</sup>	✗	Not Available <sup>†</sup>	21,000	<b>9</b>
MRO Management <sup>5</sup>	2,237	5,094	7,331	✓	2,794	8,176	<b>20</b>

1. Verified 2017 Audit & RunMags [www.avm-mag.com/live-stats](http://www.avm-mag.com/live-stats)  
 2. Publishers own data – 2017 Media Kit  
 3. Publishers own data – 2017 Media Solutions (Kit)  
 4. Publishers own data – 2017 Media Kit  
 5. BPA Brand Report – Jun 17 issue  
 † Not readily available in media kits

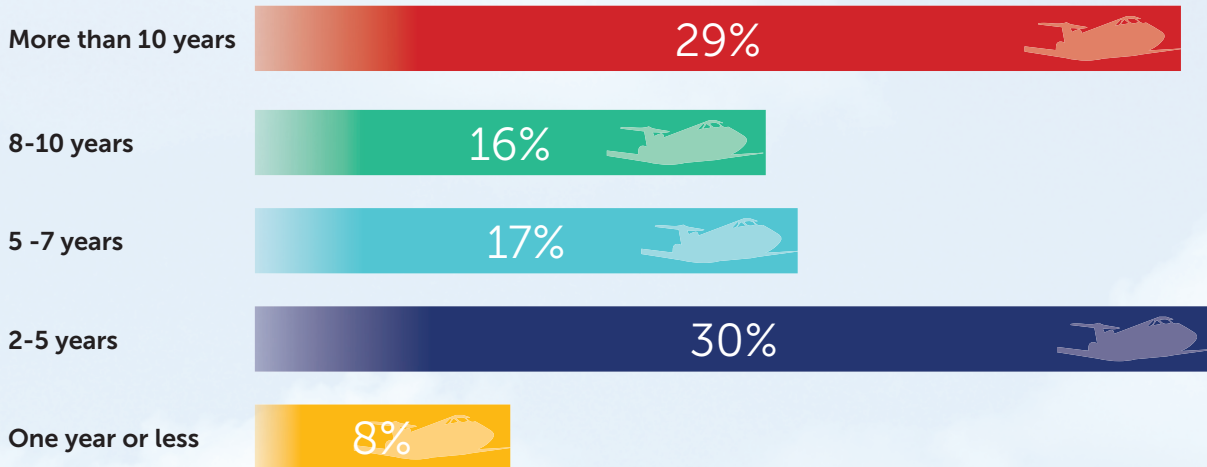
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# The Readership Survey

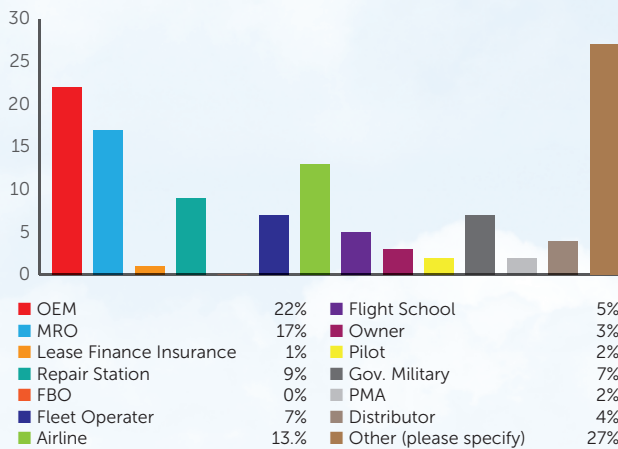
The Readership Survey underscores the position and reach of AVM as THE magazine that truly reaches the most influential professionals in the MRO industry.



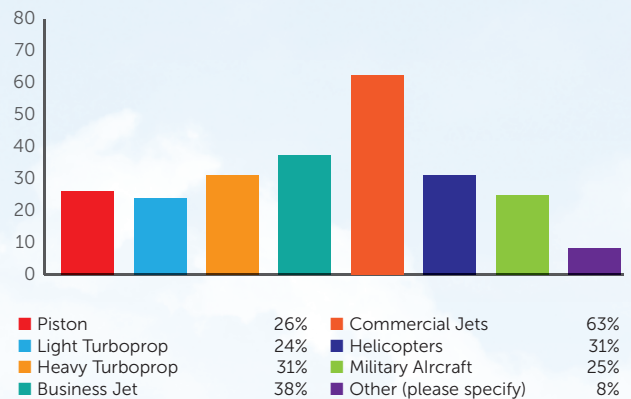
## How many years have you been reading Aviation Maintenance Magazine?



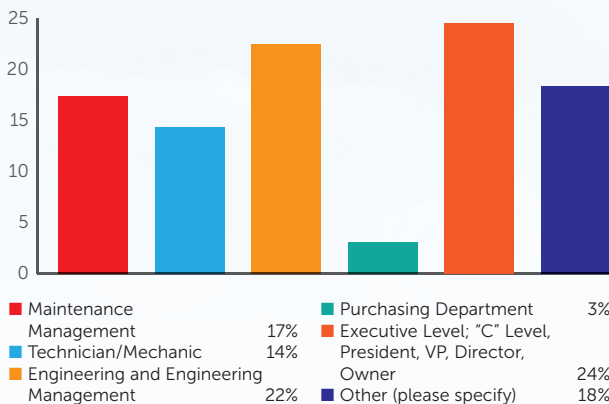
## Describe your Employer?



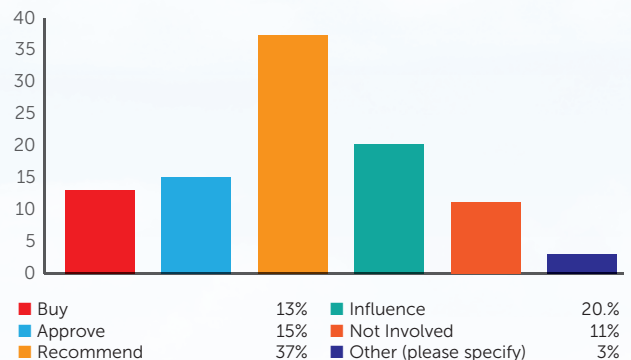
## Which type of Aircraft are supported by your business?



## Which of the following mostly matches your Job Title?



## What level of purchasing power do you have?



# Circulation Strength



**MOST READ MRO PUBLICATION IN THE WORLD – 42,750 (SEPT 17)**

**AVIATION MAINTENANCE MAGAZINE**

**42,750** Print/Digital readers as of Sept 17

**iOS**

Over **8,469** users as of Sept 2017

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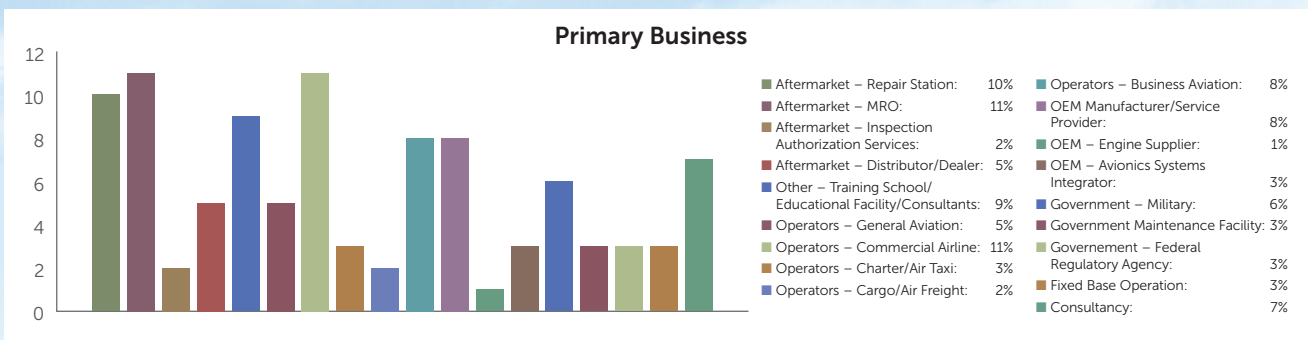
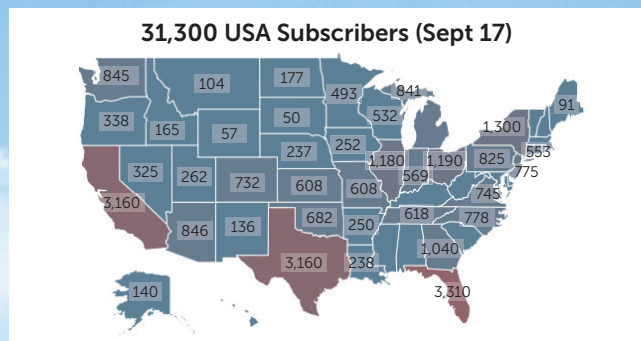
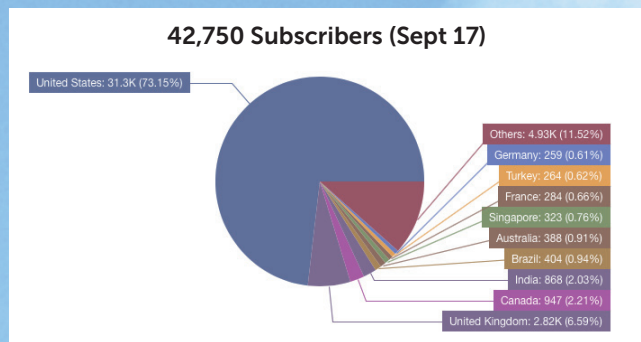
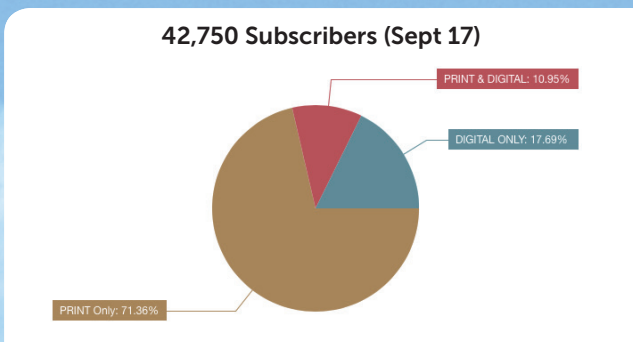
**5,198** average users (BPA Jun 17 Brand report)

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# FAA Renews Critical Stop-Gap Measures for Repair Stations

If you work for a dual-certificated (FAA & EASA) repair station then you have probably been wondering what is going on with documentation requirements. You are probably throwing around terms like “MAG 6,” “8130-3” and “Bilateral Agreements” at parties and around the water cooler.

And if you haven’t been discussing these items, then you should be, because they represent a fragile system that is in danger of breaking down and needlessly inhibiting your business.

In 2016, the US and European aviation authorities, FAA and EASA, updated a guidance document. It was known as the Maintenance Annex Guidance (MAG). The MAG’s purpose is to provide guidance on how to comply with the Maintenance Annex, which is an agreement between the US and the Europe to share information and oversight duties on repair stations.

In essence, the Maintenance Annex says that if a US repair station wants to hold EU repair station certification, the EU will rely on the FAA findings to support the application. The metrics used are: 1) the repair station must meet the FAA’s regulations (which it already does if it is a FAA repair station) and; 2) the repair station must also meet a short list of European special conditions which add subtle nuances to the rules. For example, US law says that a repair station has to complete an approval for return to service for the aircraft records. The European Special Condition is that the record has to be made on an 8130-3 tag. This is a commercial norm for component maintenance but it is not a legal requirement under US law.

The problem arose when the guidance document was used to create a new European Special Condition that does not exist in the Maintenance Annex. That new Special Condition

was published in MAG revision six (known as “MAG 6”) and it required specific documentation as a condition of acceptance of parts. But the MAG 6 documentation rules were written more narrowly than European law, so they failed to allow repair stations to accept the parts that they need to accept on both sides of the Atlantic.

The essence of the problem? Good, airworthy parts made by US production approval holders can’t be used because they don’t have the right paperwork, according to the MAG.

The FAA recognized that this was a problem but the FAA did not want to immediately renege on the agreement with Europe’ so they created several temporary solutions, which were supposed to keep industry in business, pending resolution of the underlying language. It has now been about a year since these two temporary solutions were issued and they have both been recently renewed for an additional year as talks continue.

The first temporary solution is found in FAA Notice 8900.429 (previously numbered as FAA Notice 8900.380). This Notice allows repair stations to inspect and approve parts for return to service that are not accompanied by the MAG-mandated documentation. They can then use those parts in repairs.

Checking the airworthiness of a part is a very normal function that is performed by repair stations around the world, but the language of MAG 6 prevented that sort of normal function. So the FAA issued the Notice in order to reopen this function to normal usage. The Notice simply permits repair stations to inspect parts that don’t have 8130-3 tags and find that they are airworthy based on other credible evidence (like evidence of having been produced by a FAA Production Approval Holder).

The Notice helps businesses with airworthy inventory to sell to repair stations by explicitly recognizing repair stations' right to receive, inspect, and approve for return to service any article for which they are rated.

Recognizing that some repair stations are still uncomfortable in light of the MAG language calling for 8130-3 tags on inventory, the FAA has issued a second important policy. This second important temporary "fix" is found in the FAA's Function Code 56 program. This program created a class of limited Designated Airworthiness Representatives (DARs) and gave them a very limited function that permits them to issue 8130-3 tags for new parts that have certain types of known evidence supporting their sourcing from an FAA production approval holder.

They are only allowed to issue the tags in an administrative role, where airworthiness has already been found. Under the current policy, this is limited to new parts marked under FAA Part 45 (like PMA and TSOA) where the installer would be able to rely on the marking, and new parts that bear a manufacturer's certificate of conformity to FAA standards. In those two cases, issuing an 8130-3 tag is truly an administrative function that requires no independent airworthiness analysis because the issuer relies on the airworthiness finding of the manufacturer. A further limitation is that the DAR must function in the environment of an FAA-accredited distributor, so that the DAR can rely on the quality assurance system. This limited DAR

function permits some of the "low-hanging fruit" to be tagged with 8130-3 tags.

Although these two FAA policies don't solve all of the problems wrought by MAG 6, they give the aviation community another year of normal operation while the FAA works with EASA on a permanent solution to the documentation problems created by MAG 6. [AVI](#)



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